

## CHIMERIC ANTIGEN RECEPTORS TARGETING FC RECEPTOR-LIKE 5 AND USES THEREOF

### CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application claims priority to U.S. Provisional Patent Application Serial No. 62/088,164, filed December 5, 2014, the content of which is incorporated by reference in its entirety, and to which priority is claimed.

### INTRODUCTION

10 The presently disclosed subject matter provides for methods and compositions for treating cancer. It relates to chimeric antigen receptors (CARs) that specifically target Fc Receptor-like 5 (FcRL5), *e.g.*, domain 9 of FcRL5, immunoresponsive cells comprising such CARs, and methods of using such cells for treating cancer (*e.g.*, multiple myeloma).

### BACKGROUND OF THE INVENTION

15 Cell-based immunotherapy is a therapy with curative potential for the treatment of cancer. T cells and other immune cells may be modified to target tumor antigens through the introduction of genetic material coding for artificial or synthetic receptors for antigen, termed Chimeric Antigen Receptors (CARs), specific to  
20 selected antigens. Targeted T cell therapy using CARs has shown recent clinical success in treating hematologic malignancies.

Multiple myeloma (MM) is the second most common hematologic malignancy mortality (Siegel *et al.*, *CA: a cancer journal for clinicians* 63, 11-30 (2013)). Approximately 25% of patients have high-risk cytogenetics, which portends a median  
25 survival of less than 2 years (Boyd *et al.*, *Genes, chromosomes & cancer* 50, 765-774 (2011); Shaughnessy *et al.*, *Blood* 109, 2276-2284 (2007)). While recent strides have been made, regardless of cytogenetics, the disease is still considered incurable outside the immuno-therapeutic graft versus myeloma (GvM) effect of an allogeneic transplant. However, allogeneic transplants are limited by ineligibility and high rates  
30 of transplant-associated morbidity and mortality (Gahrton *et al.*, *The New England journal of medicine* 325, 1267-1273 (1991)). Similar to the GvM effect, a potentially curative T cell effect may be achieved with minimal toxicity through autologous

adoptive T cell therapy.

Myeloma is expected to be an ideal disease to test adoptive T cell therapy. First, allogeneic transplants demonstrate that the T cell can be a curative treatment, even with minimal or no concomitant chemotherapy such as after non-myeloablative transplants or post-transplantation donor lymphocyte infusions. Second, conditioning chemotherapy, possibly through the mechanism of depleting regulatory T cells (Tregs), enhances the efficacy of adoptive T cell therapy (Brentjens *et al.*, *Blood* 118, 4817-4828 (2011) and Pegram *et al.*, *Blood* 119, 4133-4141 (2012)) as such, the immediate post-autologous transplant period could be an optimal time to administer T cells, and myeloma is one of the few diseases where autologous stem cell transplantation is the standard of care. Third, the immunomodulatory drug lenalidomide may improve CAR based therapy, as has been shown in mice (Bertilaccio *et al.*, *Blood* 122, 4171 (2013)), and lenalidomide is commonly used to treat MM. Fourth, adoptive T cell therapy works best in bone marrow predominant disease such as ALL (Brentjens *et al.*, *Science translational medicine* 5, 177ra138 (2013); Davila *et al.*, *Science translational medicine* 6, 224ra225 (2014)), when compared to solid tumors or extra-medullary CLL (Brentjens *et al.* (2011)) and similar to ALL, myeloma is a disease of the bone marrow.

While there are various reasons to expect that adoptive T cell therapy may work well in MM, expanding adoptive T cell therapy to myeloma poses unique challenges. Unlike other B-cell malignancies, CD19 expression is seen in only 2% of myeloma patients (Bataille *et al.*, *Haematologica* 91, 1234-1240 (2006)). Furthermore, unlike CD19, the common extracellular immunophenotypic markers in myeloma (CD138, CD38, and CD56) are all co-expressed on other essential cell types, and CARs to any of these targets could lead to unacceptable “off tumor, on target” toxicity (Brentjens *et al.* (2013)) which can be fatal even in targets where antibodies are well tolerated, as was the case with a HER2 targeted CAR (Morgan *et al.*, *Molecular therapy: the journal of the American Society of Gene Therapy* 18, 843-851 (2010)). Accordingly, there are needs for novel therapeutic strategies to design CARs targeting antigens that are highly expressed in MM cells and limited expression in normal tissues for treating multiple myeloma, which strategies capable of inducing potent tumor eradication with minimal toxicity and immunogenicity.

### **SUMMARY OF THE INVENTION**

The presently disclosed subject matter generally provides chimeric antigen receptors (CARs) that specifically target Fc Receptor-like 5 (FcRL5), immunoresponsive cells comprising such CARs, and uses of these CARs and  
5 immunoresponsive cells for treating multiple myeloma.

The presently disclosed subject matter provides CARs. In one non-limiting example, the CAR comprises an extracellular antigen-binding domain, a transmembrane domain and an intracellular domain, where the extracellular antigen-binding domain specifically binds to FcRL5. In certain embodiments, the  
10 extracellular antigen-binding domain binds to domain 9 of FcRL5.

In certain non-limiting embodiments, the extracellular antigen-binding domain is a single-chain variable fragment (scFv). In certain embodiments, the extracellular antigen-binding domain is a murine scFv. In certain embodiments, the extracellular antigen-binding domain is a human scFv. In certain non-limiting embodiments, the  
15 extracellular antigen-binding domain is a Fab, which is optionally crosslinked. In certain non-limiting embodiments, the extracellular binding domain is a F(ab)<sub>2</sub>. In certain non-limiting embodiments, any of the foregoing molecules can be comprised in a fusion protein with a heterologous sequence to form the extracellular antigen-binding domain. In certain embodiments, the extracellular antigen-binding domain  
20 specifically binds to FcRL5 with a binding affinity ( $K_d$ ) of from about  $1 \times 10^{-11}$  M to about  $3 \times 10^{-6}$  M,  $1 \times 10^{-10}$  M to about  $3 \times 10^{-6}$  M or  $1 \times 10^{-9}$  M to about  $3 \times 10^{-6}$  M. In certain embodiments, the extracellular antigen-binding domain specifically binds to domain 8 or 9 of FcRL5 with a  $K_d$  of from about  $1 \times 10^{-9}$  M to about  $3 \times 10^{-6}$  M.

In certain embodiments, the extracellular antigen-binding domain comprises a  
25 light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID  
30 NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID

NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917 and SEQ ID NO:921, wherein the extracellular antigen-binding domain binds to FcRL5.

In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915 and SEQ ID NO:919, wherein the extracellular

antigen-binding domain binds to FcRL5.

In certain embodiments, the extracellular antigen-binding domain comprises (a) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917 and SEQ ID NO:921; and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID

NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915 and SEQ ID NO:919, wherein the extracellular antigen-binding domain binds to FcRL5.

In certain embodiments, the extracellular antigen-binding domain comprises a light chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917, SEQ ID NO:921 and conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16,

SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915, SEQ ID NO:919 and conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:915. In certain embodiments, the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:917. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:919. In certain embodiments, the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:921. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:144. In certain embodiments, the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:143. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:216. In certain embodiments, the extracellular antigen-

binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:215. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:220. In certain  
5 embodiments, the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:219. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:236. In certain embodiments, the extracellular antigen-binding domain  
10 comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:235. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:268. In certain embodiments, the extracellular antigen-binding domain comprises a light chain variable region  
15 comprising amino acids having the sequence set forth in SEQ ID NO:267. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:116. In certain embodiments, the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in  
20 SEQ ID NO:115. In certain embodiments, the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:172. In certain embodiments, the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:171.

25 In certain embodiments, the extracellular antigen-binding domain comprises (a) a light chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55,  
30 SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ



ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917, SEQ ID NO:921 and conservative modifications thereof; and (b) a heavy chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915, SEQ ID NO:919 and conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:915; and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:917. In certain embodiments, the

extracellular antigen-binding domain comprises extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:919; and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:921. In certain

5       embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:144, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:143. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising

10       amino acids having the sequence set forth in SEQ ID NO:216, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:215. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:220, and (b) a light chain variable region comprising amino acids

15       having the sequence set forth in SEQ ID NO:219. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:236, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:235. In certain embodiments, the extracellular antigen-binding domain

20       comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:268, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:267. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID

25       NO:116, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:115. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:172, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID

30       NO:171.

In certain non-limiting embodiments, the extracellular antigen-binding domain comprises both of said heavy and light chains, optionally with a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain

variable region. For example, in certain non-limiting embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:915, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:917, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:919 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:92, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:144 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:143, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:216 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:215, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:220 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:219, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:236 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:235, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular

antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:268 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:267, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:116 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:115, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region. In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:172 and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:171, optionally with (c) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 311, 317, 323, 328, 334, 337, 342, 347, 351, 356, 362, 368, 374, 376, 380, 384, 389, 394, 396, 400, 405, 408, 412, 415, 422, 427, 432, 437, 442, 446, 451, 453, 456, 458, 459, 463, 464, 467, 473, 476, 482, 486, 489, 492, 494, 497, 502, 507, 512, 517, 522, 527, 529, 532, 536, 539, 543, 546, 550, 553, 555, 561, 567, 570, 574, 577, 578, 579, 584, 578, 587, 591, 925 and 931; and (b) a light chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 314, 320, 325, 331, 339, 345, 350, 353, 359, 365, 371, 377, 383, 386, 392, 395, 399, 402, 407, 410, 414, 418, 419, 424, 430, 435, 439, 443, 449, 452, 455, 457, 462, 465, 470, 479, 485, 488, 491, 493, 495, 499, 505, 509, 514, 519, 524, 528, 530, 531, 535, 541, 542, 545, 549, 554, 558, 564, 569, 573, 576, 581, 592, 928 and 934.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 309, 315, 321, 326, 332, 335, 340, 346, 354, 360, 366, 372, 378, 387, 393, 403, 411, 420, 425, 436, 440, 444, 471, 480, 500,

510, 515, 520, 525, 537, 551, 559, 565, 582, 589, 923 and 929; (b) a heavy chain variable region CDR2 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 310, 316, 322, 327, 333, 336, 341, 355, 361, 367, 373, 379, 388, 404, 412, 421, 426, 431, 441, 445, 450, 466, 472, 475, 481, 496, 501, 506, 511, 516, 521, 526, 538, 552, 560, 566, 583, 590, 924 and 930; (c) a heavy chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 311, 317, 323, 328, 334, 337, 342, 347, 351, 356, 362, 368, 374, 376, 380, 384, 389, 394, 396, 400, 405, 408, 412, 415, 422, 427, 432, 437, 442, 446, 451, 453, 456, 458, 459, 463, 464, 467, 473, 476, 482, 486, 489, 492, 494, 497, 502, 507, 512, 517, 522, 527, 529, 532, 536, 539, 543, 546, 550, 553, 555, 561, 567, 570, 574, 577, 578, 579, 584, 578, 587, 591, 925 and 931; (d) a light chain variable region CDR1 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 312, 318, 324, 329, 338, 343, 348, 352, 357, 363, 369, 381, 390, 397, 401, 406, 416, 423, 428, 433, 447, 460, 468, 474, 477, 483, 490, 498, 503, 508, 518, 533, 540, 544, 547, 556, 562, 568, 571, 580, 585, 588, 926 and 932; (e) a light chain variable region CDR2 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 313, 319, 330, 344, 349, 358, 364, 370, 382, 385, 391, 398, 409, 417, 429, 434, 438, 448, 454, 461, 469, 478, 484, 487, 504, 513, 523, 534, 429, 448, 548, 557, 563, 572, 575, 586, 927 and 933; and (f) a light chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 314, 320, 325, 331, 339, 345, 350, 353, 359, 365, 371, 377, 383, 386, 392, 395, 399, 402, 407, 410, 414, 418, 419, 424, 430, 435, 439, 443, 449, 452, 455, 457, 462, 465, 470, 479, 485, 488, 491, 493, 495, 499, 505, 509, 514, 519, 524, 528, 530, 531, 535, 541, 542, 545, 549, 554, 558, 564, 569, 573, 576, 581, 592, 928 and 934.

In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:923 or conservative modifications thereof, (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:924 or conservative modifications thereof, and (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:925 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises (a) a light chain variable region

CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:926 or conservative modifications thereof, (b) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:927 or conservative modifications thereof, and (c) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:928 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:929 or conservative modifications thereof, (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:930 or conservative modifications thereof, and (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:931 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises (a) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:932 or conservative modifications thereof, (b) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:933 or conservative modifications thereof, and (c) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:934 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:923 or conservative modifications thereof, (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:924 or conservative modifications thereof, (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:925 or conservative modifications thereof, (d) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:926 or conservative modifications thereof, (e) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:927 or conservative modifications thereof, and (f) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:928 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises:

(a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:929 or conservative modifications thereof, (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:930 or conservative modifications thereof, (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:931 or conservative modifications thereof, (d) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:932 or conservative modifications thereof, (e) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:933 or conservative modifications thereof, and (f) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:934 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:463 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:419 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:515 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:516 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:517 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:531 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:403 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:404 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:532 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:533 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:534 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:535.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:543 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:544 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:448 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:545 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:372 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:475 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:570 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:571 thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:572 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:573 or conservative modifications thereof.



In certain embodiments, the extracellular antigen-binding domain comprises:  
(a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:440 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:441 or conservative  
5 modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:442 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:329 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:330 or conservative  
10 modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:443 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain comprises:  
(a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:309 or conservative modifications thereof; (b) a heavy chain variable region  
15 CDR2 comprising the amino acid sequence of SEQ ID NO:310 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:489 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:490 or conservative modifications thereof; (e) a light chain variable region CDR2  
20 comprising the amino acid sequence of SEQ ID NO:313 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:491 or conservative modifications thereof.

In certain non-limiting embodiments, the extracellular antigen-binding domain comprises amino acids having the sequence set forth in SEQ ID NO:664 or  
25 conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises amino acids having the sequence set forth in SEQ ID NO:700 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises amino acids having the sequence set forth in SEQ ID NO:702 or conservative modifications thereof. In certain  
30 embodiments, the extracellular antigen-binding domain comprises amino acids having the sequence set forth in SEQ ID NO:710 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises amino acids having the sequence set forth in SEQ ID NO:726 or conservative modifications

thereof. In certain embodiments, the extracellular antigen-binding domain comprises amino acids having the sequence set forth in SEQ ID NO:650 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises amino acids having the sequence set forth in SEQ ID NO:678 or conservative modifications thereof.

In certain non-limiting embodiments, the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:923 or conservative modifications thereof, a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:924 or conservative modifications thereof, and a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:925 or conservative modifications thereof, and (ii) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:926 or conservative modifications thereof, a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:927 or conservative modifications thereof, and a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:928 or conservative modifications thereof, optionally with (iii) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In another non-limiting embodiment, the extracellular antigen-binding domain comprises (i) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:929 or conservative modifications thereof, a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:930 or conservative modifications thereof, and a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:931 or conservative modifications thereof, and (ii) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:932 or conservative modifications thereof, a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:933 or conservative modifications thereof, and a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:934 or conservative modifications thereof, optionally with (iii) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:463 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:419 or conservative modifications thereof, optionally with (g) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:515 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:516 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:517 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:531 or conservative modifications thereof, optionally with (g) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:403 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:404 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:532 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:533

or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:534 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:535, optionally with (g) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:543 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:544 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:448 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:545 or conservative modifications thereof, optionally with (g) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:372 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:475 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:570 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:571 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:572 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:573 or conservative modifications thereof, optionally with (g) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding domain comprises:

(a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:440 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:441 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:442 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:329 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:330 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:443 or conservative modifications thereof, optionally with (g) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:309 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:310 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:489 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:490 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:313 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:491 or conservative modifications thereof, optionally with (g) a linker sequence, for example a linker peptide, between the heavy chain variable region and the light chain variable region.

In certain embodiments, the linker peptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO:307 and SEQ ID NO:897.

In certain embodiments, the extracellular antigen-binding domain binds to FcRL5 comprising the amino acid sequence set forth in SEQ ID NO:899. In certain embodiments, the extracellular antigen-binding domain binds to an epitope comprising the amino acid sequence set forth in SEQ ID NO:964. In certain embodiments, the extracellular antigen-binding domain binds to an epitope comprising the amino acid sequence set forth in SEQ ID NO:965.

In accordance with the presently disclosed subject matter, the extracellular antigen-binding domain is covalently joined to a transmembrane domain. The extracellular antigen-binding domain can comprise a signal peptide that is covalently joined to the 5' terminus of the extracellular antigen-binding domain. In certain  
5       embodiments, the transmembrane domain of the CAR comprises a CD8 polypeptide, a CD28 polypeptide, a CD3 $\zeta$  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 (not based on a protein associated with the immune response), or a  
10       combination thereof. In a non-limiting embodiment, the transmembrane domain comprises a CD8 polypeptide. In certain embodiments, the transmembrane domain comprises a CD28 polypeptide.

In accordance with the presently disclosed subject matter, in certain embodiments, the intracellular domain comprises a CD3 $\zeta$  polypeptide. In certain  
15       embodiments, the intracellular domain further comprises at least one signaling region. In certain embodiments, the at least one signaling region comprises a CD28 polypeptide, a 4-1BB polypeptide, an OX40 polypeptide, an ICOS polypeptide, a DAP-10 polypeptide, a PD-1 polypeptide, a CTLA-4 polypeptide, a LAG-3 polypeptide, a 2B4 polypeptide, a BTLA polypeptide, a synthetic peptide (not based  
20       on a protein associated with the immune response), or a combination thereof. In certain embodiments, the signaling region is a co-stimulatory signaling region. In certain embodiments, the 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. In certain embodiments, the at least  
25       one co-stimulatory signaling region comprises a CD28 polypeptide. In certain non-limiting embodiments, the transmembrane domain comprises a CD28 polypeptide, the intracellular domain comprises a CD3 $\zeta$  polypeptide, and the co-stimulatory signaling domain comprises a CD28 polypeptide. In certain non-limiting embodiments, the transmembrane domain comprises a CD8 polypeptide, the intracellular domain  
30       comprises a CD3 $\zeta$  polypeptide, and the co-stimulatory signaling domain comprises a 4-1BB polypeptide.

In certain embodiments, the CAR is recombinantly expressed. The CAR can be expressed from a vector. In certain embodiments, the vector is a  $\gamma$ -retroviral

rector.

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 secretes 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  $\gamma$ -retroviral vector. In certain embodiments, the host cell is a T cell.

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 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 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 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 FcRL5 $\Delta$ dom9). (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 "FcRL5 $\Delta$ dom9").

Figure 4 depicts the screening of anti-FcRL5 scFv ET200-39 on 3T3 cells expressing FcRL5 $\Delta$ dom9.

Figure 5 depicts the screening of anti-FcRL5 scFv ET200-104 on 3T3 cells expressing FcRL5 $\Delta$ dom9.

Figure 6 depicts the screening of anti-FcRL5 scFv ET200-105 on 3T3 cells expressing FcRL5 $\Delta$ dom9.

5        Figure 7 depicts the screening of anti-FcRL5 scFv ET200-109 on 3T3 cells expressing FcRL5 $\Delta$ dom9.

Figure 8 depicts the screening of anti-FcRL5 scFv ET200-117 on 3T3 cells expressing FcRL5 $\Delta$ dom9.

Figure 9A-B. Schematics of chimeric antigen receptor targeting FcRL5 in  
10        accordance with non-limiting embodiments of the presently disclosed subject matter.  
(A) Schematic of FcRL5-targeted CAR with CD28 co-stimulatory domain and  
CD3zeta. (B) Schematic of FcRL5-targeted CAR with 4-1BB co-stimulatory domain  
and CD3zeta.

Figure 10 depicts the vector map of a chimeric antigen receptor targeting  
15        FcRL5 using scFV ET200-31 in accordance with one non-limiting embodiment of the  
presently disclosed subject matter.

Figure 11 depicts the vector map of a chimeric antigen receptor targeting  
FcRL5 using scFV ET200-39 in accordance with one non-limiting embodiment of the  
presently disclosed subject matter.

20        Figure 12 depicts the vector map of a chimeric antigen receptor targeting  
FcRL5 using scFV ET200-69 in accordance with one non-limiting embodiment of the  
presently disclosed subject matter.

Figure 13 depicts the vector map of a chimeric antigen receptor targeting  
FcRL5 using scFV ET200-104 in accordance with one non-limiting embodiment of  
25        the presently disclosed subject matter.

Figure 14 depicts the vector map of a chimeric antigen receptor targeting  
FcRL5 using scFV ET200-105 in accordance with one non-limiting embodiment of  
the presently disclosed subject matter.

Figure 15 depicts the vector map of a chimeric antigen receptor targeting  
30        FcRL5 using scFV ET200-109 in accordance with one non-limiting embodiment of  
the presently disclosed subject matter.

Figure 16 depicts the vector map of a chimeric antigen receptor targeting  
FcRL5 using scFV ET200-117 in accordance with one non-limiting embodiment of

the presently disclosed subject matter.

Figure 17 depicts the expression of FcRL5-targeted chimeric antigen receptors on the surface of transduced T cells.

Figure 18 depicts the cytotoxicity of FcRL5-targeted chimeric antigen receptor  
5 T cells for FcRL5-expressing cells.

Figure 19 depicts the induction of cytokine secretion of FcRL5-targeted chimeric antigen receptor T cells.

Figure 20 depicts the proliferation of FcRL5-targeted chimeric antigen receptor T cells upon antigen stimulation.

10 Figure 21 illustrates the CLIPS technology. The CLIPS reaction takes place between bromo groups of the CLIPS scaffold and thiol sidechains of cysteines. The reaction is fast and specific under mild conditions. Using this elegant chemistry, native protein sequences are transformed into CLIPS constructs with a range of structures. From left to right: two different single T2 loops, T3 double loop,  
15 conjugated T2+T3 loops, stabilized beta sheet, and stabilized alpha helix (Timmerman et al., J. Mol. Recognit. 2007; 20: 283-29).

Figure 22 illustrates combinatorial clips library screening. The target protein (left) containing a discontinuous conformational epitope is converted into a matrix library (middle). Combinatorial peptides are synthesized on a proprietary minicard  
20 and chemically converted into spatially defined CLIPS constructs (right).

Figure 23 depicts T3 looped CLIPSTM construct.

Figure 24A-D illustrates heat map technology. (A) Table of combined peptides, with two sub-sequences indicated as "Loop 1" and "Loop 2." (B) Data from A displayed as a matrix. (C) Color bar indication of the heat map representation. (D)  
25 Heat map visualization of data from A.

Figure 25 shows heatmap analysis of data recorded for Herceptin.

Figure 26 shows heatmap analysis of data recorded for ET200-104.

Figure 27 illustrates a 3D model of amino acid residues 380-731 of FcRL55 with peptide stretch <sub>657</sub>SRPILTFRAPR<sub>667</sub> highlighted.

30

## **DETAILED DESCRIPTION OF THE INVENTION**

The presently disclosed subject matter generally provides FcRL5-targeted chimeric antigen receptors (CARs). In one non-limiting example, the CAR comprises

an extracellular antigen-binding domain, a transmembrane domain and an intracellular domain, where the extracellular antigen-binding domain specifically binds to FcRL5. In certain embodiments, the extracellular antigen-binding domain specifically binds to domain 7, 8 or 9 of FcRL5. The presently disclosed subject matter also provides  
5 immunoresponsive cells (*e.g.*, 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) expressing the FcRL5-targeted CARs, and methods of using such immunoresponsive cells for treating a tumor, *e.g.*, multiple  
10 myeloma.

### ***I. Definitions***

Unless defined otherwise, all technical and scientific terms used herein have the meaning commonly understood by a person skilled in the art to which this invention belongs. The following references provide one of skill with a general  
15 definition of many of the terms used in this invention: Singleton et al., Dictionary of Microbiology and Molecular Biology (2nd ed. 1994); The Cambridge Dictionary of Science and Technology (Walker ed., 1988); The Glossary of Genetics, 5th Ed., R. Rieger et al. (eds.), Springer Verlag (1991); and Hale & Marham, The Harper Collins Dictionary of Biology (1991). As used herein, the following terms have the meanings  
20 ascribed to them below, unless specified otherwise.

As used herein, the term “about” or “approximately” means within an acceptable error range for the particular value as determined by one of ordinary skill in the art, which will depend in part on how the value is measured or determined, *i.e.*, the limitations of the measurement system. For example, “about” can mean within 3  
25 or more than 3 standard deviations, per the practice in the art. Alternatively, “about” can mean a range of up to 20%, preferably up to 10%, more preferably up to 5%, and more preferably still up to 1% of a given value. Alternatively, particularly with respect to biological systems or processes, the term can mean within an order of magnitude, preferably within 5-fold, and more preferably within 2-fold, of a value.

30 As used herein, the term “cell population” refers to a group of at least two cells expressing similar or different phenotypes. In non-limiting examples, a cell population can include at least about 10, at least about 100, at least about 200, at least about 300, at least about 400, at least about 500, at least about 600, at least about 700,

at least about 800, at least about 900, at least about 1000 cells expressing similar or different phenotypes.

As used herein, the term “antibody” means not only intact antibody molecules, but also fragments of antibody molecules that retain immunogen-binding ability. Such fragments are also well known in the art and are regularly employed both *in vitro* and *in vivo*. Accordingly, as used herein, the term “antibody” means not only intact immunoglobulin molecules but also the well-known active fragments F(ab')<sub>2</sub>, and Fab. F(ab')<sub>2</sub>, and Fab fragments that lack the Fe fragment of intact antibody, clear more rapidly from the circulation, and may have less non-specific tissue binding of an intact antibody (Wahl et al., *J. Nucl. Med.* 24:316-325 (1983)). The antibodies of the invention comprise whole native antibodies, bispecific antibodies; chimeric antibodies; Fab, Fab', single chain V region fragments (scFv), fusion polypeptides, and unconventional antibodies.

As used herein, the term “single-chain variable fragment” or “scFv” is a fusion protein of the variable regions of the heavy (V<sub>H</sub>) and light chains (V<sub>L</sub>) of an immunoglobulin (*e.g.*, mouse or human) covalently linked to form a V<sub>H</sub>::V<sub>L</sub> heterodimer. The heavy (V<sub>H</sub>) and light chains (V<sub>L</sub>) are either joined directly or joined by a peptide-encoding linker (*e.g.*, 10, 15, 20, 25 amino acids), which connects the N-terminus of the V<sub>H</sub> with the C-terminus of the V<sub>L</sub>, or the C-terminus of the V<sub>H</sub> with the N-terminus of the V<sub>L</sub>. The linker is usually rich in glycine for flexibility, as well as serine or threonine for solubility. The linker can link the heavy chain variable region and the light chain variable region of the extracellular antigen-binding domain. Non-limiting examples of linkers are disclosed in Shen et al., *Anal. Chem.* 80(6):1910-1917 (2008) and WO 2014/087010, the contents of which are hereby incorporated by reference in their entirety. In certain embodiments, the linker is a G4S linker.

In a non-limiting example, the linker comprises amino acids having the sequence set forth in SEQ ID NO:897 as provided below.

GGGGSGGGSGGGGS [SEQ ID NO: 897]. In certain embodiments, the nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:897 is set forth in SEQ ID NO:898, which is provided below:

GGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCT [SEQ ID NO:898].

In another non-limiting example, the linker comprises amino acids having the

sequence set forth in SEQ ID NO:307 as provided below:

SRGGGGSGGGGSGGGGSLEMA [SEQ ID NO:307]. In certain embodiments, the nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:307 is set forth in SEQ ID NO:305, which is provided below:

5 TCTAGAGGTGGTGGTGGTAGCGGCGGCGGCGCTCTGGTGGTGGTGGATCCCTCGAGATGGCC [SEQ ID NO: 305].

Despite removal of the constant regions and the introduction of a linker, scFv proteins retain the specificity of the original immunoglobulin. Single chain Fv polypeptide antibodies can be expressed from a nucleic acid comprising V<sub>H</sub> - and V<sub>L</sub> -encoding sequences as described by Huston, et al. (Proc. Nat. Acad. Sci. USA, 85:5879-5883, 1988). See, also, U.S. Patent Nos. 5,091,513, 5,132,405 and 4,956,778; and U.S. Patent Publication Nos. 20050196754 and 20050196754. Antagonistic scFvs having inhibitory activity have been described (see, *e.g.*, Zhao et al., Hyrbidoma (Larchmt) 2008 27(6):455-51; Peter et al., J Cachexia Sarcopenia Muscle 2012 August 12; Shieh et al., J Immunol2009 183(4):2277-85; Giomarelli et al., Thromb Haemost 2007 97(6):955-63; Fife et al., J Clin Invest 2006 116(8):2252-61; Brocks et al., Immunotechnology 1997 3(3):173-84; Moosmayer et al., Ther Immunol 1995 2(10):31-40). Agonistic scFvs having stimulatory activity have been described (see, *e.g.*, Peter et al., J Bioi Chern 2003 25278(38):36740-7; Xie et al., Nat Biotech 1997 15(8):768-71; Ledbetter et al., Crit Rev Immunol1997 17(5-6):427-55; Ho et al., BioChim Biophys Acta 2003 1638(3):257-66).

As used herein, "F(ab)" refers to a fragment of an antibody structure that binds to an antigen but is monovalent and does not have a Fc portion, for example, an antibody digested by the enzyme papain yields two F(ab) fragments and an Fc fragment (*e.g.*, a heavy (H) chain constant region; Fc region that does not bind to an antigen).

As used herein, "F(ab')<sub>2</sub>" refers to an antibody fragment generated by pepsin digestion of whole IgG antibodies, wherein this fragment has two antigen binding (ab') (bivalent) regions, wherein each (ab') region comprises two separate amino acid chains, a part of a H chain and a light (L) chain linked by an S-S bond for binding an antigen and where the remaining H chain portions are linked together. A "F(ab')<sub>2</sub>" fragment can be split into two individual Fab' fragments.

As used herein, the term "vector" refers to any genetic element, such as a

plasmid, phage, transposon, cosmid, chromosome, virus, virion, etc., which is capable of replication when associated with the proper control elements and which can transfer gene sequences into cells. Thus, the term includes cloning and expression vehicles, as well as viral vectors and plasmid vectors.

5 As used herein, the term “expression vector” refers to a recombinant nucleic acid sequence, *i.e.*, recombinant DNA molecule, containing a desired coding sequence and appropriate nucleic acid sequences necessary for the expression of the operably linked coding sequence in a particular host organism. Nucleic acid sequences necessary for expression in prokaryotes usually include a promoter, an operator  
10 (optional), and a ribosome binding site, often along with other sequences. Eukaryotic cells are known to utilize promoters, enhancers, and termination and polyadenylation signals.

As used herein, “CDRs” are defined as the complementarity determining region amino acid sequences of an antibody which are the hypervariable regions of  
15 immunoglobulin heavy and light chains. See, *e.g.*, Kabat et al., Sequences of Proteins of Immunological Interest, 4th U. S. Department of Health and Human Services, National Institutes of Health (1987). Generally, antibodies comprise three heavy chain and three light chain CDRs or CDR regions in the variable region. CDRs provide the majority of contact residues for the binding of the antibody to the antigen  
20 or epitope. In certain embodiments, the CDRs regions are delineated using the Kabat system (Kabat, E. A., et al. (1991) Sequences of Proteins of Immunological Interest, Fifth Edition, U.S. Department of Health and Human Services, NIH Publication No. 91-3242).

As used herein, the term “affinity” is meant a measure of binding strength.  
25 Without being bound to theory, affinity depends on the closeness of stereochemical fit between antibody combining sites and antigen determinants, on the size of the area of contact between them, and on the distribution of charged and hydrophobic groups. Affinity also includes the term “avidity,” which refers to the strength of the antigen-antibody bond after formation of reversible complexes. Methods for calculating the  
30 affinity of an antibody for an antigen are known in the art, comprising use of binding experiments to calculate affinity. Antibody activity in functional assays (*e.g.*, flow cytometry assay) is also reflective of antibody affinity. Antibodies and affinities can be phenotypically characterized and compared using functional assays (*e.g.*, flow

cytometry assay).

Nucleic acid molecules useful in the methods of the invention include any nucleic acid molecule that encodes a polypeptide of the invention or a fragment thereof. Such nucleic acid molecules need not be 100% identical with an endogenous  
5 nucleic acid sequence, but will typically exhibit substantial identity. Polynucleotides having “substantial identity” to an endogenous sequence are typically capable of hybridizing with at least one strand of a double-stranded nucleic acid molecule. By “hybridize” is meant pair to form a double-stranded molecule between complementary polynucleotide sequences (*e.g.*, a gene described herein), or portions  
10 thereof, under various conditions of stringency. (See, *e.g.*, Wahl, G. M. and S. L. Berger (1987) *Methods Enzymol.* 152:399; Kimmel, A. R. (1987) *Methods Enzymol.* 152:507).

For example, stringent salt concentration will ordinarily be less than about 750 mM NaCl and 75 mM trisodium citrate, preferably less than about 500 mM NaCl and  
15 50 mM trisodium citrate, and more preferably less than about 250 mM NaCl and 25 mM trisodium citrate. Low stringency hybridization can be obtained in the absence of organic solvent, *e.g.*, formamide, while high stringency hybridization can be obtained in the presence of at least about 35% formamide, and more preferably at least about 50% formamide. Stringent temperature conditions will ordinarily include  
20 temperatures of at least about 30°C, more preferably of at least about 37°C, and most preferably of at least about 42°C. Varying additional parameters, such as hybridization time, the concentration of detergent, *e.g.*, sodium dodecyl sulfate (SDS), and the inclusion or exclusion of carrier DNA, are well known to those skilled in the art. Various levels of stringency are accomplished by combining these various  
25 conditions as needed. In a preferred embodiment, hybridization will occur at 30° C in 750 mM NaCl, 75 mM trisodium citrate, and 1% SDS. In a more preferred embodiment, hybridization will occur at 37° C in 500 mM NaCl, 50 mM trisodium citrate, 1% SDS, 35% formamide, and 100 µg/ml denatured salmon sperm DNA (ssDNA). In a most preferred embodiment, hybridization will occur at 42° C in 250  
30 mM NaCl, 25 mM trisodium citrate, 1% SDS, 50% formamide, and 200 µg/ml ssDNA. Useful variations on these conditions will be readily apparent to those skilled in the art.

For most applications, washing steps that follow hybridization will also vary



in stringency. Wash stringency conditions can be defined by salt concentration and by temperature. As above, wash stringency can be increased by decreasing salt concentration or by increasing temperature. For example, stringent salt concentration for the wash steps will preferably be less than about 30 mM NaCl and 3 mM trisodium citrate, and most preferably less than about 15 mM NaCl and 1.5 mM trisodium citrate. Stringent temperature conditions for the wash steps will ordinarily include a temperature of at least about 25° C, more preferably of at least about 42° C, and even more preferably of at least about 68° C. In a preferred embodiment, wash steps will occur at 25° C in 30 mM NaCl, 3 mM trisodium citrate, and 0.1% SDS. In a more preferred embodiment, wash steps will occur at 42° C. in 15 mM NaCl, 1.5 mM trisodium citrate, and 0.1% SDS. In a more preferred embodiment, wash steps will occur at 68° C in 15 mM NaCl, 1.5 mM trisodium citrate, and 0.1% SDS. Additional variations on these conditions will be readily apparent to those skilled in the art. Hybridization techniques are well known to those skilled in the art and are described, for example, in Benton and Davis (Science 196:180, 1977); Grunstein and Rogness (Proc. Natl. Acad. Sci., USA 72:3961, 1975); Ausubel et al. (Current Protocols in Molecular Biology, Wiley Interscience, New York, 2001); Berger and Kimmel (Guide to Molecular Cloning Techniques, 1987, Academic Press, New York); and Sambrook et al., Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory Press, New York.

By “substantially identical” is meant a polypeptide or nucleic acid molecule exhibiting at least 50% identity to a reference amino acid sequence (for example, any one of the amino acid sequences described herein) or nucleic acid sequence (for example, any one of the nucleic acid sequences described herein). Preferably, such a sequence is at least 60%, more preferably 80% or 85%, and more preferably 90%, 95% or even 99% identical at the amino acid level or nucleic acid to the sequence used for comparison.

Sequence identity is typically measured using sequence analysis software (for example, Sequence Analysis Software Package of the Genetics Computer Group, University of Wisconsin Biotechnology Center, 1710 University Avenue, Madison, Wis. 53705, BLAST, BESTFIT, GAP, or PILEUP/PRETTYBOX programs). Such software matches identical or similar sequences by assigning degrees of homology to various substitutions, deletions, and/or other modifications. In an exemplary

approach to determining the degree of identity, a BLAST program may be used, with a probability score between  $e^{-3}$  and  $e^{-100}$  indicating a closely related sequence.

As used herein, the term “analog” refers to a structurally related polypeptide or nucleic acid molecule having the function of a reference polypeptide or nucleic acid molecule.

As used herein, the term “ligand” refers to a molecule that binds to a receptor. In particular, the ligand binds a receptor on another cell, allowing for cell-to-cell recognition and/or interaction.

As used herein, the term “disease” refers to any condition or disorder that damages or interferes with the normal function of a cell, tissue, or organ. Examples of diseases include neoplasia or pathogen infection of cell.

As used herein, the term “effective amount” refers to an amount sufficient to have a therapeutic effect. In certain embodiments, an “effective amount” is an amount sufficient to arrest, ameliorate, or inhibit the continued proliferation, growth, or metastasis (*e.g.*, invasion, or migration) of a neoplasia.

As used herein, the term “heterologous nucleic acid molecule or polypeptide” refers to a nucleic acid molecule (*e.g.*, a cDNA, DNA or RNA molecule) or polypeptide that is not normally present in a cell or sample obtained from a cell. This nucleic acid may be from another organism, or it may be, for example, an mRNA molecule that is not normally expressed in a cell or sample.

As used herein, the term “immunoresponsive cell” refers to a cell that functions in an immune response or a progenitor, or progeny thereof.

As used herein, the term “modulate” refers positively or negatively alter. Exemplary modulations include an about 1%, about 2%, about 5%, about 10%, about 25%, about 50%, about 75%, or about 100% change.

As used herein, the term “increase” refers to alter positively by at least about 5%, including, but not limited to, alter positively by about 5%, by about 10%, by about 25%, by about 30%, by about 50%, by about 75%, or by about 100%.

As used herein, the term “reduce” refers to alter negatively by at least about 5% including, but not limited to, alter negatively by about 5%, by about 10%, by about 25%, by about 30%, by about 50%, by about 75%, or by about 100%.

As used herein, the term “isolated cell” refers to a cell that is separated from the molecular and/or cellular components that naturally accompany the cell.

As used herein, the term “isolated,” “purified,” or “biologically pure” refers to material that is free to varying degrees from components which normally accompany it as found in its native state. “Isolate” denotes a degree of separation from original source or surroundings. “Purify” denotes a degree of separation that is higher than isolation. A “purified” or “biologically pure” protein is sufficiently free of other materials such that any impurities do not materially affect the biological properties of the protein or cause other adverse consequences. That is, a nucleic acid or peptide of this invention is purified if it is substantially free of cellular material, viral material, or culture medium when produced by recombinant DNA techniques, or chemical precursors or other chemicals when chemically synthesized. Purity and homogeneity are typically determined using analytical chemistry techniques, for example, polyacrylamide gel electrophoresis or high performance liquid chromatography. The term “purified” can denote that a nucleic acid or protein gives rise to essentially one band in an electrophoretic gel. For a protein that can be subjected to modifications, for example, phosphorylation or glycosylation, different modifications may give rise to different isolated proteins, which can be separately purified.

As used herein, the term “secreted” is meant a polypeptide that is released from a cell via the secretory pathway through the endoplasmic reticulum, Golgi apparatus, and as a vesicle that transiently fuses at the cell plasma membrane, releasing the proteins outside of the cell.

As used herein, the term “specifically binds” or “specifically binds to” or “specifically target” is meant a polypeptide or fragment thereof that recognizes and binds a biological molecule of interest (*e.g.*, a polypeptide), but which does not substantially recognize and bind other molecules in a sample, for example, a biological sample, which naturally includes a polypeptide of the invention.

As used herein, the term “treating” or “treatment” refers to clinical intervention in an attempt to alter the disease course of the individual or cell being treated, and can be performed either for prophylaxis or during the course of clinical pathology. Therapeutic effects of treatment include, without limitation, preventing occurrence or recurrence of disease, alleviation of symptoms, diminishment of any direct or indirect pathological consequences of the disease, preventing metastases, decreasing the rate of disease progression, amelioration or palliation of the disease state, and remission or improved prognosis. By preventing progression of a disease or

disorder, a treatment can prevent deterioration due to a disorder in an affected or diagnosed subject or a subject suspected of having the disorder, but also a treatment may prevent the onset of the disorder or a symptom of the disorder in a subject at risk for the disorder or suspected of having the disorder.

5           As used herein, the term “subject” refers to any animal (*e.g.*, a mammal), including, but not limited to, humans, non-human primates, rodents, and the like (*e.g.*, which is to be the recipient of a particular treatment, or from whom cells are harvested).

## II. *Fc Receptor-Like 5 (FcRL5)*

10           Fc Receptor-Like 5 (FcRL5) (also known as “CD307e” or “IRTA2”) is a rational target for treating multiple myeloma as it is expressed on B cells and plasma cells. FcRL5 binds to the Fc portion of IgG and contributes to B cell receptor signaling and B cell proliferation (Franco *et al.*, *Journal of immunology* 190, 5739-5746 (2013); Dement-Brown *et al.*, *Journal of leukocyte biology* 91, 59-67 (2012)).

15           FcRL5 was found to be an alternative to CD138 as a FACS marker for malignant plasma cells from fresh or frozen patient samples with a mean relative MFI between 10-55 (n=23) (Ise *et al.*, *Leukemia* 21, 169-174 (2007)). Another study confirmed cell surface expression of FcRL5 by FACS on primary patient samples from most chronic lymphocytic leukemia (CLL), and mantle cell lymphoma cases, and all multiple

20           myeloma (MM) (n=8) cases tested (Ise *et al.* (2007)). A third group found high surface staining on plasma cells from normal bone marrows (n=7), in MGUS (n=16), and in MM (n=16), (MFI similar in all three groups, ~1000 fold increase compared to isotype control) (Elkins *et al.*, *Molecular cancer therapeutics* 11, 2222-2232 (2012)). FcRL5 is on 1q21 and has been found to be involved in 1q21 abnormalities in B cell

25           malignancies (Hatzivassiliou *et al.*, *Immunity* 14, 277-289 (2001)). Amplification of 1q21 is found in 48% of MM patients at diagnosis and 67% of patients at relapse, and correlates with a worse prognosis (An *et al.*, *Haematologica* 99, 353-359 (2014)). An antibody-drug conjugate targeting FcRL5 was effective in treating an *in vivo* murine model of MM (Elkins *et al.* (2012)).

30           Non-limiting examples of human FcRL5 amino acid sequences can be found under GenBank Protein Accession Nos: AAI01070.1; XP\_011508332.1; XP\_011508334.1; XP\_011508333.1; XP\_011508332.1; and NP\_001182317.1.

In certain non-limiting embodiments, FcRL5 is human FcRL5 having the

amino acid sequence set forth in SEQ ID NO:899, or fragments thereof. SEQ ID NO:899 is provided below:

MLLWVILLVLAPVSGQFARTPRPIIFLQPPWTTVFQGERVTLTCKGFRFYSPQKTKWYHRYLGKEILRE  
 TPDNILEVQESGEYRCQAQGSPLSSPVHLDFFSSASLILQAPLSVFEGDSVVLRCRAKAEVTLNNTIYKN  
 5 DNVLAFLNKRITDFHIPHACLKDNGAYRCTGYKESCCPVSSNTVKIQVQEPFTRPVL RASSFQPISGNPV  
 TLT CETQLSLERSDVPLRFRFFRDDQTLGLGWSLSPNFQITAMWSKDSGFYWCKAATMPHSIISDSPRS  
 WIQVQIPASHPVLTLSPEKALNFEGTKVTLHCETQEDSLRTLRYFYHEGVPLRHKSVCRCERGASISFSL  
 TTENSGNYYCTADNGLGAKPSKAVSLSVTVPVSHPVNLSSPEDLIFEGAKVTLHCEAQRGSLPILYQF  
 HHEDAALERRSANSAGGVAISFSLTAEHSGNYYCTADNGFGPQRSKAVSL SITVPVSHPVLTLS SAEAL  
 10 TFEGATVTLHCEVQRGSPQILYQFYHEDMPLWSSSTPSVGRVSFSFSLTEGHSGNYYCTADNGFGPQRS  
 EVVSLFVTVPVSRPILTLRV PRAQAVVGDLLELHCEAPRGSPPILYW FYHEDVTLGSSSAPSGGEASFN  
 LSLTAEHSGNYSCEANGLVAQHSDTISLSVIVPVSRPILTFRAPRAQAVVGDLLELHCEALRGSSPIL  
 YW FYHEDVTLGKISAPSGGGASFNLSLTTEHSGIYSCEADNGLEAQRSEMVT LKVAVPVSRPVLT LRAP  
 GTHAAVGDLLELHCEALRGSPILILYRFFHEDVTLGNRSSPSGGASLNL SLTAEHSGNYSCEADNGLGAQ  
 15 RSETVTLYITGLTANRSGPFATGVAGLLS IAGLAAGALLLYCWL SRKAGRKPASDPARSPSDSDSQEP  
 TYHNVP AWHEELQPVYTNANPRGENVVYSEVR I IQEKKKHAVASDPRHLRNKGSP I IYSEVKVASTPVSG  
 SLFLASSAPHR [SEQ ID NO:899].

In certain embodiments, FcRL5 comprises 9 immunoglobulin (Ig)-like domains, *e.g.*, domain 1, domain 2, domain 3, domain 4, domain 5, domain 6, domain  
 20 7, domain 8 and domain 9 (*see* Figure 3A and 3C). In certain embodiments, domain 9 of FcRL5 comprises the amino acid sequence set forth in SEQ ID NO:900. SEQ ID NO:900 is provided below.

RPVLT LRAPGTHAAVGDLLELHCEALRGSPILILYRFFHEDVTLGNRSSPSGGASLNL SLTAEHSGNYSCEADNGLGAQRSETVTLYI [SEQ ID NO:900].

25 In certain embodiments, domain 9 of FcRL5 can have the amino acid sequence set forth in SEQ ID NO:963, or fragments thereof. SEQ ID NO:963 is provided below:

GTHAAVGDLLELHCEALRGSPILILYRFFHEDVTLGNRSSPSGGASLNL SLTAEHSGNYSCEADNGLGAQRSETVTLYI [SEQ ID NO:963].

30 In certain embodiments, domain 1 can comprise amino acids 23-100 of SEQ ID NO:899; domain 2 can comprise amino acids 105-185 of SEQ ID NO:899; domain 3 can comprise amino acids 191-273 of SEQ ID NO:899; domain 4 can comprise amino acids 287-373 of SEQ ID NO:899; domain 5 can comprise amino acids 380-466 of SEQ ID NO:899; domain 6 can comprise amino acids 490-555 of SEQ ID  
 35 NO:899; domain 7 can comprise amino acids 565-638 of SEQ ID NO:899; domain 8 can comprise amino acids 658-731 of SEQ ID NO:899; and domain 9 can comprise

amino acids 754-835 of SEQ ID NO:899.

In certain embodiments, domain 9 of FcRL5 comprises an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid  
5 sequence of SEQ ID NO:900 or 963.

### **III. Chimeric Antigen Receptor (CAR).**

Chimeric antigen receptors (CARs) are engineered receptors, which graft or confer a specificity of interest onto an immune effector cell. CARs can be used to graft the specificity of a monoclonal antibody onto a T cell; with transfer of their  
10 coding sequence facilitated by retroviral vectors.

There are three generations of CARs. "First generation" CARs are typically composed of an extracellular antigen binding domain (*e.g.*, a single-chain variable fragments (scFv)) fused to a transmembrane domain, fused to cytoplasmic/intracellular domain of the T cell receptor chain. "First generation"  
15 CARs typically have the intracellular domain from the CD3 $\zeta$ - chain, which is the primary transmitter of signals from endogenous TCRs. "First generation" CARs can provide *de novo* antigen recognition and cause activation of both CD4<sup>+</sup> and CD8<sup>+</sup> T cells through their CD3 $\zeta$  chain signaling domain in a single fusion molecule, independent of HLA-mediated antigen presentation. "Second generation" CARs add  
20 intracellular domains from various co-stimulatory molecules (*e.g.*, CD28, 4-1BB, ICOS, OX40) to the cytoplasmic tail of the CAR to provide additional signals to the T cell. "Second generation" CARs comprise those that provide both co-stimulation (*e.g.*, CD28 or 4-1BB) and activation (CD3 $\zeta$ ). Preclinical studies have indicated that "Second Generation" CARs can improve the anti-tumor activity of T cells. For  
25 example, robust efficacy of "Second Generation" CAR modified T cells was demonstrated in clinical trials targeting the CD19 molecule in patients with chronic lymphoblastic leukemia (CLL) and acute lymphoblastic leukemia (ALL). "Third generation" CARs comprise those that provide multiple co-stimulation (*e.g.*, CD28 and 4-1BB) and activation (CD3 $\zeta$ ).

30 In accordance with the presently disclosed subject matter, the CARs comprise an extracellular antigen-binding domain, a transmembrane domain and an intracellular domain, where the extracellular antigen-binding domain binds to FcRL5. In a specific non-limiting embodiment, the extracellular antigen-binding domain is a scFv. In a

specific non-limiting embodiment, the extracellular antigen-binding domain is a Fab, which is optionally crosslinked. In a specific non-limiting embodiment, the extracellular binding domain is a F(ab)<sub>2</sub>. In a specific non-limiting embodiment, any of the foregoing molecules may be comprised in a fusion protein with a heterologous sequence to form the extracellular antigen-binding domain.

In certain non-limiting embodiments, the extracellular antigen-binding domain of a CAR of the present disclosure has a high binding specificity as well as high binding affinity to FcRL5 or domain 9 of FcRL5. In certain non-limiting embodiments, the extracellular antigen-binding domain of a CAR of the present disclosure has a high binding specificity as well as high binding affinity to domain 8 of FcRL5. In certain non-limiting embodiments, the extracellular antigen-binding domain of a CAR of the present disclosure has a high binding specificity as well as high binding affinity to domain 7 of FcRL5. For example, in such embodiments, the extracellular antigen-binding domain of the CAR (embodied, for example, in an scFv or an analog thereof) binds to FcRL5 (or domain 8 or domain 9 of FcRL5) with a dissociation constant ( $K_d$ ) of about  $3 \times 10^{-6}$  M or less. In certain embodiments, the  $K_d$  is about  $1 \times 10^{-6}$  M or less, about  $1 \times 10^{-7}$  M or less, about  $1 \times 10^{-8}$  M or less, about  $1 \times 10^{-9}$  M or less, about  $1 \times 10^{-10}$  M or less or about  $1 \times 10^{-11}$  M or less. In certain embodiments, the  $K_d$  is from about  $1 \times 10^{-11}$  M to about  $3 \times 10^{-6}$  M,  $1 \times 10^{-10}$  M to about  $3 \times 10^{-6}$  M or from about  $1 \times 10^{-9}$  M to about  $3 \times 10^{-6}$  M, such as from about  $1 \times 10^{-9}$  M to about  $1 \times 10^{-8}$  M, from about  $1 \times 10^{-8}$  M to about  $1 \times 10^{-7}$  M, or from about  $1 \times 10^{-7}$  M to about  $1 \times 10^{-6}$  M, or from about  $1 \times 10^{-6}$  M to about  $3 \times 10^{-6}$  M.

Binding of the extracellular antigen-binding domain (embodiment, for example, in an scFv or an analog thereof) of a presently disclosed CAR to FcRL5 (or domain 8 or domain 9 of FcRL5) can be confirmed by, for example, enzyme-linked immunosorbent assay (ELISA), radioimmunoassay (RIA), FACS analysis, bioassay (*e.g.*, growth inhibition), or Western Blot assay. Each of these assays generally detect the presence of protein-antibody complexes of particular interest by employing a labeled reagent (*e.g.*, an antibody, or an scFv) specific for the complex of interest. For example, the scFv can be radioactively labeled and used in a radioimmunoassay (RIA) (see, for example, Weintraub, B., Principles of Radioimmunoassays, Seventh Training Course on Radioligand Assay Techniques, The Endocrine Society, March, 1986, which is incorporated by reference herein). The radioactive isotope can be

detected by such means as the use of a  $\gamma$  counter or a scintillation counter or by autoradiography. In certain embodiments, the FcRL5-targeted extracellular antigen-binding domain is labeled with a fluorescent marker. Non-limiting examples of fluorescent markers include green fluorescent protein (GFP), blue fluorescent protein (e.g., EBFP, EBFP2, Azurite, and mKalamal), cyan fluorescent protein (e.g., ECFP, Cerulean, and CyPet), and yellow fluorescent protein (e.g., YFP, Citrine, Venus, and YPet). In certain embodiments, the FcRL5-targeted human scFv is labeled with GFP.

In certain embodiments, the extracellular antigen-binding domain of a presently disclosed CAR comprises a single-chain variable fragment (scFv). In one specific embodiment, the extracellular antigen-binding domain of a presently disclosed CAR comprises a human scFv that specifically binds to human FcRL5. In another specific embodiment, the extracellular antigen-binding domain of a presently disclosed CAR comprises a murine scFv that specifically binds to human FcRL5. In certain embodiments, the extracellular antigen-binding domain of a presently disclosed CAR comprises a scFv that specifically binds to at least a portion of domain 7 of FcRL5. In certain embodiments, the extracellular antigen-binding domain of a presently disclosed CAR comprises a scFv that specifically binds to at least a portion of domain 8 of FcRL5. In certain embodiments, the extracellular antigen-binding domain of a presently disclosed CAR comprises a scFv that specifically binds to at least a portion of domain 9 of FcRL5. For example, and not by way of limitation, domain 9 of FcRL5 comprises the amino acid sequence set forth in SEQ ID NO:900 or 963, or fragments thereof.

In certain embodiments, the extracellular antigen-binding domain is a murine scFv obtained from two commercially available mouse hybridomas binding different extracellular epitopes on human FcRL5, which have been characterized in the Franco *et al.*, *Journal of Immunology* (2013);190:5739-5746; Ise *et al.*, *Clinical cancer research: an official journal of the American Association for Cancer Research* (2005);11:87-96; and Ise *et al.*, *Clinical chemistry and laboratory medicine: CCLM/FESCC* (2006);44:594-602, each of which are herein incorporated by reference in their entireties. In certain embodiments, the extracellular antigen-binding domain is a murine scFv that is derived from a heavy chain variable region and a light chain variable region of an antibody that binds to human FcRL5, e.g., antibodies F56 and F119 as disclosed in Ise *et al.* (2005), which is herein incorporated by reference in



its entirety.

Extracellular Antigen-Binding Domain of A CAR

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917 and SEQ ID NO:921, wherein the scFv antibody binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ

ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, 5 SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915 and SEQ ID NO:919.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) 10 comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:915 as provided below.

VKLQESGGGLVQPGGSRKLSCAASGFTFSIFGLHWVRQAPEKGLEWVAYISGDSNTIYYADTVKGRFTI  
SRDNPKNLTLFLQMTSLRSEDAMYYCARNSYALDYWGQGTIVTVSS [SEQ ID NO: 915]

The nucleic acid sequence encoding the amino acid sequence of SEQ ID 15 NO:915 is set forth in SEQ ID NO:916 as provided below.

GTGAAGCTGCAGGAGTCTGGGGGAGGCTTAGTGACGCTGGAGGTCCCGAAACTCTCCTGTGCAGCC  
TCTGGATTCACTTTCAGTATCTTTGGATTGCACTGGGTTTCGTCAGGCTCCAGAGAAGGGGCTGGAGTGG  
GTCGCATACATTAGTGGTGACAGTAATACCATCTACTATGCAGACACAGTGAAGGGCCGATTACCATC  
TCCAGAGACAATCCCAAGAACACCCTGTTCTGCAAATGACCAGTCTAAGGTCTGAGGACACGGCCATG  
20 TATTACTGTGCAAGAAATAGCTACTATGCTCTGGACTACTGGGGCCAAGGGACCACGGTCACCGTCTCC  
TCA [SEQ ID NO:916]

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:917 as provided below.

25 DIELTQSPAIMSVSPGEKVTMTCRASSSVSSSYLHWYQQRSGASPKIWIYSTSNLASGVPARFSGSGTG  
TSYSLTISSVEAEDAATYYCQQYSGYPWTFGGGTKLEI [SEQ ID NO:917]

The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:917 is set forth in SEQ ID NO:918 as provided below.

30 GACATTGAGCTCACCCAGTCTCCAGCAATCATGTCTGTATCTCCAGGTGAAAAGGTCACCATGACCTGC  
AGGGCCAGCTCAAGTGTGAGTTCAGTTACTTGCAGTGGTACCAGCAGAGGTCAGGTGCCTCCCCAAA  
ATCTGGATTTATAGCACATCCAACCTGGCTTCTGGAGTCCCTGCTCGCTTCACTGGCAGTGGGACTGGG  
ACCTCTTACTCTCTACAATCAGCAGTGTGGAGGCTGAAGATGCTGCCACTTATTACTGCCAGCAGTAC  
AGTGTTACCCGTGGACGTTCTGGTGGAGGGACCAAGCTGGAGATC [SEQ ID NO:918]

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) 35 comprises a heavy chain variable region comprising amino acids having the sequence

set forth in SEQ ID NO:919 as provided below.

VQLQESGGGLVQPGGSRKLSCTASGFTFSSFGMHWVRQAPEKGLEWVAYISSGSNNIYFADTVKGRFTI  
SRDNPKNLTLFLQMTSLRSED TAMYYCARSEYYGSSHMDYWGQGT TVTVSS [SEQ ID NO:919]

The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:3  
5 is set forth in SEQ ID NO:920 as provided below.

GTCCAAC TGCAGGAGTCAGGGGGAGGCTTAGTGCAGCCTGGAGGGTCCCGGAACTCTCCTGTACAGCC  
TCTGGATTCACTTTT CAGTAGCTTTGGAATGCACTGGGTTCGTCAGGCTCCAGAGAAGGGGCTGGAGTGG  
GTCGCATACATTAGTAGTGGCAGTAATAACATCTACTTTGCGGACACAGTGAAGGGCCGATTACCATC  
TCCAGAGACAATCCCAAGAACACCCCTGTTTCTGCAAATGACCAGTCTAAGGTCTGAGGACACGGCCATG  
10 TATTACTGTGCAAGATCGGAATACTACGGTAGTAGCCATATGGACTACTGGGGCCAAGGGACCACGGTC  
ACCGTCTCCTCA [SEQ ID NO:920]

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)  
comprises a light chain variable region comprising amino acids having the sequence  
set forth in SEQ ID NO:921 as provided below.

15 DIELTQSPKFMSTSVGDRVSVTCKASQNVGTNVAWYQQKPGQSPKPLIYSATYRNSGVPDRFTGSGSGT  
DFTLTITNVQSKDLADYFCQQYNRYPYTSGGGTKLEI [SEQ ID NO:921]

The nucleic acid sequence encoding the amino acid sequence of SEQ ID  
NO:921 is set forth in SEQ ID NO:922 as provided below.

GACATTGAGCTACCCAGTCTCCAAAATTCATGTCCACATCAGTAGGAGACAGGGTCAGCGTCACCTGC  
20 AAGGCCAGTCAGAAATGTGGGTACTAATGTAGCCTGGTATCAACAGAAACCAGGACAATCTCCTAAACCA  
CTGATTTACTCGGCAACCTACCGGAACAGTGGAGTCCCTGATCGCTTACAGGCAGTGGATCTGGGACA  
GATTTCACTCTCACCATCACTAACGTGCAGTCTAAAGACTTGGCAGACTATTTCTGTCAACAATATAAC  
AGGTATCCGTACACGTCCGGAGGGGGGACCAAGCTGGAGATC [SEQ ID NO:922]

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)  
25 comprises a heavy chain variable region comprising amino acids having the sequence  
set forth in SEQ ID NO:144. The nucleic acid sequence encoding the amino acid  
sequence of SEQ ID NO:144 is set forth in SEQ ID NO:142.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)  
comprises a light chain variable region comprising amino acids having the sequence  
30 set forth in SEQ ID NO:143. The nucleic acid sequence encoding the amino acid  
sequence of SEQ ID NO:143 is set forth in SEQ ID NO:141.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)  
comprises a heavy chain variable region comprising amino acids having the sequence  
set forth in SEQ ID NO:216. The nucleic acid sequence encoding the amino acid  
35 sequence of SEQ ID NO:216 is set forth in SEQ ID NO:214.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:215. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:215 is set forth in SEQ ID NO:213.

5        In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:220. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:220 is set forth in SEQ ID NO:218.

10       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:219. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:219 is set forth in SEQ ID NO:217.

15       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:236. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:236 is set forth in SEQ ID NO:234.

20       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:235. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:235 is set forth in SEQ ID NO:232.

25       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:268. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:268 is set forth in SEQ ID NO:266.

30       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:267. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:267 is set forth in SEQ ID NO:265.

30       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:172. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:172 is set forth in SEQ ID NO:170.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)

comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:171. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:171 is set forth in SEQ ID NO:169.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:116. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:116 is set forth in SEQ ID NO:114.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:115. The nucleic acid sequence encoding the amino acid sequence of SEQ ID NO:115 is set forth in SEQ ID NO:113.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:317, SEQ ID NO:321 and (b) a heavy chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40,

SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:917 and SEQ ID NO:921, wherein the extracellular binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:3, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:4.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:7, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:8.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:11, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:12.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:15, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:16.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)

comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:19, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:20.

5 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:23, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:24.

10 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:27, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:28.

15 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:31, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:32.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:35, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:36.

20 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:39, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:40.

25 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:43, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:44.

30 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:47, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:48.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence

set forth in SEQ ID NO:51, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:52.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:55, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:56.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:59, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:60.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:63, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:64.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:67, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:68.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:71, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:72.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:75, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:76.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:79, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:80.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:83, and (b) a heavy chain variable region comprising amino



acids having a sequence set forth in SEQ ID NO:84.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:87, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:88.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:91, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:92.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:95, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:96.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:99, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:100.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:103, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:104.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:107, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:108.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:111, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:112.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:115, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:116.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:119, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:120.

5        In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:123, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:124.

10       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:127, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:128.

15       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:131, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:132.

20       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:135, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:136.

25       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:139, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:140.

30       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:143, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:144.

35       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:147, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:148.

40       In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)

comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:151, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:152.

5 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:155, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:156.

10 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:159, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:160.

15 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:163, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:164.

20 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:167, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:168.

25 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:171, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:172.

30 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:175, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:176.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:179, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:180.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence

set forth in SEQ ID NO:183, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:184.

5 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:187, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:188.

10 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:191, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:192.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:195, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:196.

15 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:199, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:200.

20 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:203, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:204.

25 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:207, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:208.

30 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:211, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:212.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:215, and (b) a heavy chain variable region comprising amino

acids having a sequence set forth in SEQ ID NO:216.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:219, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:220.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:223, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:224.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:227, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:228.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:231, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:232.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:235, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:236.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:239, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:240.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:243, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:244.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:247, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:248.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:251, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:252.

5 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:255, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:256.

10 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:259, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:260.

15 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:263, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:264.

20 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:267, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:268.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:271, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:272.

25 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:275, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:276.

30 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:279, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:280.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)

comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:283, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:284.

5 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:287, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:288.

10 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:291, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:292.

15 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:279, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:280.

20 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:283, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:284.

25 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:287, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:288.

30 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:291, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:292.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:295, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:296.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence

set forth in SEQ ID NO:299, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:300.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:303, and (b) a heavy chain variable region comprising amino acids having a sequence set forth in SEQ ID NO:304.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:915, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:917.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:919, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:921.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises heavy and light chain variable regions comprising amino acid sequences that are homologous to the amino acid sequences described herein and as disclosed in Tables 1-76. For example, and not by way of limitation, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID



NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917 and SEQ ID NO:921.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915 and SEQ ID NO:919.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31,

SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, 5 SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ 10 ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID 15 NO:299, SEQ ID NO:303, SEQ ID NO:917 and SEQ ID NO:921; and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, 20 SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID 25 NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, 30 SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID

NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915 and SEQ ID NO:919.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:143, and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:144, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:215, and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:216, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:219, and (b) a heavy chain variable comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:220, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth

in SEQ ID NO:235, and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:236, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:267, and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:268, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:915, and (b) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:917, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:919, and (b) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:921, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)

comprises (a) a light chain variable comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:115, and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:116, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:171, and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to the amino acid sequence set forth in SEQ ID NO:172, wherein the extracellular antigen-binding domain binds to an FcRL5 polypeptide.

An extracellular antigen-binding domain (*e.g.*, scFv) comprising V<sub>H</sub> and/or V<sub>L</sub> regions having high (*i.e.*, 80% or greater) homology to the V<sub>H</sub> and V<sub>L</sub> regions of the sequences set forth above, can be obtained by mutagenesis (*e.g.*, site-directed or PCR-mediated mutagenesis), followed by testing of the encoded altered scFv for retained function (*i.e.*, the binding affinity) using the binding assays described herein. In certain embodiments, a V<sub>L</sub> sequence having at least 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% identity contains substitutions (*e.g.*, conservative substitutions to generate conservative modifications of a sequence), insertions or deletions relative to the reference sequence, but an extracellular antigen-binding domain (*e.g.*, scFv) comprising that sequence retains the ability to bind to FcRL5. In certain embodiments, a V<sub>H</sub> sequence having at least 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or 99% identity contains substitutions (*e.g.*, conservative substitutions), insertions or deletions relative to the reference sequence, but an extracellular antigen-binding domain (*e.g.*, scFv) comprising that sequence retains the ability to bind to FcRL5. In certain embodiments, a total of about 1 to about 10 amino acids have been substituted, inserted and/or deleted in the disclosed sequences.

For example, and not by way of limitation, a V<sub>H</sub> sequence or a V<sub>L</sub> sequence, can have up to about one, up to about two, up to about three, up to about four, up to about five, up to about six, up to about seven, up to about eight, up to about nine or up to about ten amino acid residues that are modified and/or substituted. Non-limiting examples of conservative modifications are provided below, *e.g.*, within Table 231.

The presently disclosed subject matter further provides extracellular antigen-binding domains (*e.g.*, scFv) that comprise heavy chain variable region and light chain variable region CDRs, *e.g.*, CDR1s, CDR2s and CDR3s, as disclosed herein in Tables 229 and 230. The CDR regions are delineated using the Kabat system (Kabat, E. A., et al. (1991) Sequences of Proteins of Immunological Interest, Fifth Edition, U.S. Department of Health and Human Services, NIH Publication No. 91-3242). The present disclosure further provides extracellular antigen-binding domains (*e.g.*, scFv) that comprise conservative modifications of the antibody sequences disclosed herein. For example, and not by way of limitation, an extracellular antigen-binding domains (*e.g.*, scFv) of the presently disclosed subject matter comprises a heavy chain variable region comprising CDR1, CDR2 and CDR3 sequences and a light chain variable region comprising CDR1, CDR2 and CDR3 sequences, wherein one or more of these CDR sequences comprise specified amino acid sequences disclosed herein, or conservative modifications thereof, and wherein the extracellular antigen-binding domains retain the desired functional properties. *See* Tables 229 and 230.

In certain embodiments, the presently disclosed subject matter provides an extracellular antigen-binding domain (*e.g.*, scFv) comprising a light chain variable region, wherein the light chain variable region comprises: (a) a CDR1 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 312, 3118, 324, 329, 338, 343, 348, 352, 357, 363, 369, 381, 390, 397, 401, 406, 416, 423, 428, 433, 447, 460, 468, 474, 477, 483, 490, 498, 503, 508, 518, 533, 540, 544, 547, 556, 562, 568, 571, 580, 585, 588, 926 and 932, and conservative modifications thereof; (b) a CDR2 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 313, 319, 330, 344, 349, 358, 364, 370, 382, 385, 391, 398, 409, 417, 429, 434, 438, 448, 454, 461, 469, 478, 484, 487, 504, 513, 523, 534, 429, 448, 548, 557, 563, 572, 575, 586, 927 and 933, and conservative modifications thereof; and (c) a CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 314, 320, 325, 331, 339, 345, 350, 353, 359, 365, 371, 377, 383, 386,

392, 395, 399, 402, 407, 410, 414, 418, 419, 424, 430, 435, 439, 443, 449, 452, 455, 457, 462, 465, 470, 479, 485, 488, 491, 493, 495, 499, 505, 509, 514, 519, 524, 528, 530, 531, 535, 541, 542, 545, 549, 554, 558, 564, 569, 573, 576, 581, 592, 928 and 934, and conservative modifications thereof.

5           In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region, wherein the heavy chain variable region comprises: (a) a CDR1 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 309, 315, 321, 326, 332, 335, 340, 346, 354, 360, 366, 372, 378, 387, 393, 403, 411, 420, 425, 436, 440, 444, 471, 480, 500, 510, 515, 520,  
10   525, 537, 551, 559, 565, 582, 589, 923 and 929 and conservative modifications thereof; (b) a CDR2 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 310, 316, 322, 327, 333, 336, 341, 355, 361, 367, 373, 379, 388, 404, 412, 421, 426, 431, 441, 445, 450, 466, 472, 475, 481, 496, 501, 506, 511, 516, 521, 526, 538, 552, 560, 566, 583, 590, 924 and 930 and conservative  
15   modifications thereof; and (c) a CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 311, 317, 323, 328, 334, 337, 342, 347, 351, 356, 362, 368, 374, 376, 380, 384, 389, 394, 396, 400, 405, 408, 412, 415, 422, 427, 432, 437, 442, 446, 451, 453, 456, 458, 459, 463, 464, 467, 473, 476, 482, 486, 489, 492, 494, 497, 502, 507, 512, 517, 522, 527, 529, 532, 536, 539, 543, 546, 550,  
20   553, 555, 561, 567, 570, 574, 577, 578, 579, 584, 578, 587, 591, 925 and 931, and conservative modifications thereof.

          In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain  
25   variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:463 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region CDR1 comprising the  
30   amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:419 or conservative

modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:515 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:516 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:517 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:531 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:403 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:404 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:532 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:533 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:534 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:535 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:543 or conservative



modifications thereof. In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:544 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:448 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:545 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:372 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:475 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:570 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:571 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:572 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:573 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:440 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:441 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:442 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:329 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:330 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:443 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:309 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:310 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:489 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:490 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:313 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:491 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:923 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:924 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:925 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises (a) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:926 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:927 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:928 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:929 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:930 or conservative modifications thereof; and (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ

ID NO:931 or conservative modifications thereof. In certain embodiments, the extracellular antigen-binding domain comprises (a) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:932 or conservative modifications thereof; (b) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO: 933 or conservative modifications thereof; and (c) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:934 or conservative modifications thereof.

The presently disclosed subject matter provides an extracellular antigen-binding domain (*e.g.*, scFv) comprising a heavy chain variable region comprising CDR1, CDR2, and CDR3 sequences and a light chain variable region comprising CDR1, CDR2, and CDR3 sequences, wherein: (a) the heavy chain variable region CDR3 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 311, 317, 323, 328, 334, 337, 342, 347, 351, 356, 362, 368, 374, 376, 380, 384, 389, 394, 396, 400, 405, 408, 412, 415, 422, 427, 432, 437, 442, 446, 451, 453, 456, 458, 459, 463, 464, 467, 473, 476, 482, 486, 489, 492, 494, 497, 502, 507, 512, 517, 522, 527, 529, 532, 536, 539, 543, 546, 550, 553, 555, 561, 567, 570, 574, 577, 578, 579, 584, 578, 587, 591, 925 and 931, and conservative modifications thereof; and (b) the light chain variable region CDR3 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 314, 320, 325, 331, 339, 345, 350, 353, 359, 365, 371, 377, 383, 386, 392, 395, 399, 402, 407, 410, 414, 418, 419, 424, 430, 435, 439, 443, 449, 452, 455, 457, 462, 465, 470, 479, 485, 488, 491, 493, 495, 499, 505, 509, 514, 519, 524, 528, 530, 531, 535, 541, 542, 545, 549, 554, 558, 564, 569, 573, 576, 581, 592, 928 and 934 and conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds to human FcRL5.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:463 or conservative modifications thereof; and (b) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:419 or conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds FcRL5.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising the amino acid

sequence of SEQ ID NO:517 or conservative modifications thereof; and (b) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:531 or conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds FcRL5.

5           In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:532 or conservative modifications thereof; and (b) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:535 or conservative modifications thereof; wherein the antibody or antigen-binding  
10   fragment thereof specifically binds FcRL5.

          In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:543 or conservative modifications thereof; and (b) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:545  
15   or conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds FcRL5.

          In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:570 or conservative modifications thereof; and (b) a light  
20   chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:573 or conservative modifications thereof; wherein the antibody or antigen-binding fragment thereof specifically binds FcRL5.

          In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising amino acids having the  
25   sequence set forth in SEQ ID NO:925 or conservative modifications thereof; and (b) and a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:928 or conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds FcRL5.

          In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv)  
30   comprises (a) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:931 or conservative modifications thereof; and (b) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:934 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:442 or conservative modifications thereof; and (b) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:443 or conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds FcRL5.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:489 or conservative modifications thereof; and (b) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:491 or conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds FcRL5.

In certain embodiments, the presently disclosed subject matter provides an extracellular antigen-binding domain (*e.g.*, scFv) comprising a heavy chain variable region comprising CDR1, CDR2, and CDR3 sequences and a light chain variable region comprising CDR1, CDR2, and CDR3 sequences, wherein: (a) the heavy chain variable region CDR1 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 309, 315, 321, 326, 332, 335, 340, 346, 354, 360, 366, 372, 378, 387, 393, 403, 411, 420, 425, 436, 440, 444, 471, 480, 500, 510, 515, 520, 525, 537, 551, 559, 565, 582, 589, 923 and 929, and conservative modifications thereof; (b) the heavy chain variable region CDR2 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 310, 316, 322, 327, 333, 336, 341, 355, 361, 367, 373, 379, 388, 404, 412, 421, 426, 431, 441, 445, 450, 466, 472, 475, 481, 496, 501, 506, 511, 516, 521, 526, 538, 552, 560, 566, 583, 590, 924 and 930, and conservative modifications thereof; (c) the heavy chain variable region CDR3 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 311, 317, 323, 328, 334, 337, 342, 347, 351, 356, 362, 368, 374, 376, 380, 384, 389, 394, 396, 400, 405, 408, 412, 415, 422, 427, 432, 437, 442, 446, 451, 453, 456, 458, 459, 463, 464, 467, 473, 476, 482, 486, 489, 492, 494, 497, 502, 507, 512, 517, 522, 527, 529, 532, 536, 539, 543, 546, 550, 553, 555, 561, 567, 570, 574, 577, 578, 579, 584, 578, 587, 591, 925 and 931 and conservative modifications thereof; (d) the light chain variable region CDR1 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 312, 3118, 324, 329, 338, 343, 348, 352, 357,

363, 369, 381, 390, 397, 401, 406, 416, 423, 428, 433, 447, 460, 468, 474, 477, 483, 490, 498, 503, 508, 518, 533, 540, 544, 547, 556, 562, 568, 571, 580, 585, 588, 926 and 932 and conservative modifications thereof; (e) the light chain variable region CDR2 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs:313, 319, 330, 344, 349, 358, 364, 370, 382, 385, 391, 398, 409, 417, 429, 434, 438, 448, 454, 461, 469, 478, 484, 487, 504, 513, 523, 534, 429, 448, 548, 557, 563, 572, 575, 586, 927 and 933 and conservative modifications thereof; and (f) the light chain variable region CDR3 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 314, 320, 325, 331, 339, 345, 350, 353, 359, 365, 371, 377, 383, 386, 392, 395, 399, 402, 407, 410, 414, 418, 419, 424, 430, 435, 439, 443, 449, 452, 455, 457, 462, 465, 470, 479, 485, 488, 491, 493, 495, 499, 505, 509, 514, 519, 524, 528, 530, 531, 535, 541, 542, 545, 549, 554, 558, 564, 569, 573, 576, 581, 592, 928 and 934 and conservative modifications thereof; wherein the extracellular antigen-binding domain specifically binds FcRL5.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:463 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:419 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:515 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:516 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:517 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino

acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:531 or conservative  
5 modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:403 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:404 or  
10 conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:532 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:533 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:534  
15 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:535 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid  
20 sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:543 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino  
25 acid sequence of SEQ ID NO:544 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:448 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:545 or conservative modifications thereof.

30 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:372 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:475 or

conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:570 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:571 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:572 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:573 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:923 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:924 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:925 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:926 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:927 or conservative modifications thereof; and (f) and a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:928 or conservative modifications thereof.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:929 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:930 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:931 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:932 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:933 or conservative modifications thereof, and (f) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:934 or conservative modifications



thereof.

In certain embodiments, a presently disclosed anti-FcRL5 antibody or antigen-binding fragment thereof comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:440 or conservative  
5 modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:441 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:442 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:329 or conservative  
10 modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:330 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:443 or conservative modifications thereof.

In certain embodiments, a presently disclosed anti-FcRL5 antibody or antigen-binding fragment thereof comprises: (a) a heavy chain variable region CDR1  
15 comprising the amino acid sequence of SEQ ID NO:309 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:310 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:489 or conservative modifications thereof; (d) a light chain variable region CDR1  
20 comprising the amino acid sequence of SEQ ID NO:490 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:313 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID  
25 NO:491 or conservative modifications thereof.

As used herein, the terms “conservative sequence modifications” and “conservative modifications” refers to amino acid modifications that do not significantly affect or alter the binding characteristics of the presently disclosed CAR (*e.g.*, the extracellular antigen-binding domain) comprising the amino acid sequence.  
30 Such conservative modifications include amino acid substitutions, additions and deletions. Modifications can be introduced into the human scFv of the presently disclosed subject matter by standard techniques known in the art, such as site-directed mutagenesis and PCR-mediated mutagenesis. Amino acids can be classified into

groups according to their physicochemical properties such as charge and polarity.

Conservative amino acid substitutions are ones in which the amino acid residue is replaced with an amino acid within the same group. For example, amino acids can be classified by charge: positively-charged amino acids include lysine, arginine, histidine, negatively-charged amino acids include aspartic acid, glutamic acid, neutral charge amino acids include alanine, asparagine, cysteine, glutamine, glycine, isoleucine, leucine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine. In addition, amino acids can be classified by polarity: polar amino acids include arginine (basic polar), asparagine, aspartic acid (acidic polar), glutamic acid (acidic polar), glutamine, histidine (basic polar), lysine (basic polar), serine, threonine, and tyrosine; non-polar amino acids include alanine, cysteine, glycine, isoleucine, leucine, methionine, phenylalanine, proline, tryptophan, and valine. Thus, one or more amino acid residues within a CDR region can be replaced with other amino acid residues from the same group and the altered antibody can be tested for retained function (*i.e.*, the functions set forth in (c) through (l) above) using the functional assays described herein. In certain embodiments, no more than one, no more than two, no more than three, no more than four, no more than five residues within a specified sequence or a CDR region are altered. Exemplary conservative amino acid substitutions are shown in Table 231.

20

**Table 231**

| <b>Original Residue</b> | <b>Exemplary conservative amino acid Substitutions</b> |
|-------------------------|--------------------------------------------------------|
| Ala (A)                 | Val; Leu; Ile                                          |
| Arg (R)                 | Lys; Gln; Asn                                          |
| Asn (N)                 | Gln; His; Asp, Lys; Arg                                |
| Asp (D)                 | Glu; Asn                                               |
| Cys (C)                 | Ser; Ala                                               |
| Gln (Q)                 | Asn; Glu                                               |
| Glu (E)                 | Asp; Gln                                               |
| Gly (G)                 | Ala                                                    |
| His (H)                 | Asn; Gln; Lys; Arg                                     |
| Ile (I)                 | Leu; Val; Met; Ala; Phe                                |

| Original Residue | Exemplary conservative amino acid Substitutions |
|------------------|-------------------------------------------------|
| Leu (L)          | Ile; Val; Met; Ala; Phe                         |
| Lys (K)          | Arg; Gln; Asn                                   |
| Met (M)          | Leu; Phe; Ile                                   |
| Phe (F)          | Trp; Leu; Val; Ile; Ala; Tyr                    |
| Pro (P)          | Ala                                             |
| Ser (S)          | Thr                                             |
| Thr (T)          | Val; Ser                                        |
| Trp (W)          | Tyr; Phe                                        |
| Tyr (Y)          | Trp; Phe; Thr; Ser                              |
| Val (V)          | Ile; Leu; Met; Phe; Ala                         |

In certain non-limiting embodiments, an extracellular antigen-binding domain of the CAR can comprise a linker connecting the heavy chain variable region and light chain variable region of the extracellular antigen-binding domain. As used  
5 herein, the term “linker” refers to a functional group (*e.g.*, chemical or polypeptide) that covalently attaches two or more polypeptides or nucleic acids so that they are connected to one another. As used herein, a “peptide linker” refers to one or more amino acids used to couple two proteins together (*e.g.*, to couple V<sub>H</sub> and V<sub>L</sub> domains). Non-limiting examples of peptide linkers are disclosed in Shen et al., Anal. Chem.  
10 80(6):1910-1917 (2008).

In one non-limiting example, the linker is a G4S linker that comprises amino acids having the sequence set forth in SEQ ID NO:897. In certain embodiments, the nucleotide sequence encoding the amino acid sequence of SEQ ID NO:897 is set forth in SEQ ID NO:898. In one non-limiting example, the linker comprises amino acids  
15 having the sequence set forth in SEQ ID NO:307. In certain embodiments, the nucleotide sequence encoding the amino acid sequence of SEQ ID NO:307 is set forth in SEQ ID NO:305.

In certain embodiments, the linker comprises amino acids having the sequence set forth in SEQ ID NO:901 as provided below.

20 GGGGS [SEQ ID NO:901].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:902 as provided below.

SGGSGGS [SEQ ID NO:902].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:903 as provided below.

GGGSGGGS [SEQ ID NO:903].

5 In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:904 as provided below.

GGGSGGGS [SEQ ID NO:904].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:905 as provided below.

10 GGGSGGGS [SEQ ID NO:905].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:906 as provided below.

GGGSGGGS [SEQ ID NO:906].

15 In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:907 as provided below.

GGGSGGGS [SEQ ID NO:907].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:908 as provided below.

GGGSGGGS [SEQ ID NO:908].

20 In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:909 as provided below.

GGGSGGGS [SEQ ID NO:909].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:910 as provided below.

25 EPKSCDKTHTCPPCP [SEQ ID NO:910].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:911 as provided below.

GGGSGGGS [SEQ ID NO:911].

30 In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:912 as provided below.

ELKTPGLGDTTHTCPRCPEPKSCDTPPPCPRCPEPKSCDTPPPCPRCPEPKSCDTPPPCPRCP [SEQ ID NO:912].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:913 as provided below.

35 GSGSGS [SEQ ID NO:913].

In certain embodiments, the the linker comprises amino acids having the sequence set forth in SEQ ID NO:914 as provided below.

AAA [SEQ ID NO:914].

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) comprises a heavy chain variable region, a light chain variable region and a linker peptide between the heavy chain variable region and the light chain variable region. Non-limiting examples of extracellular antigen-binding domains, *e.g.*, scFvs, of the present disclosure that comprise a heavy chain variable region, a light chain variable region and a linker peptide are disclosed in Tables 77-152. For example, and not by way of limitation, the extracellular antigen-binding domain comprising a heavy chain variable region, a light chain variable region and a linker peptide of the present disclosure comprises an amino acid sequence selected from the group consisting of 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:622, 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, SEQ ID NO:744 and conservative modifications of (as shown in Tables 77-152).

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker peptide comprises the amino acid sequence of SEQ ID NO:650 or conservative

modifications of.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker peptide comprises the amino acid sequence of SEQ ID NO:664 or conservative  
5 modifications of.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker peptide comprises the amino acid sequence of SEQ ID NO:678 or conservative modifications of.

10 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker peptide comprises the amino acid sequence of SEQ ID NO:700 or conservative modifications of.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker  
15 peptide comprises the amino acid sequence of SEQ ID NO:702 or conservative modifications of.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker  
20 peptide comprises the amino acid sequence of SEQ ID NO:710 or conservative modifications of.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker  
25 peptide comprises the amino acid sequence of SEQ ID NO:726 or conservative modifications of.

In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker peptide comprises the amino acid sequence of SEQ ID NO:650 or conservative modifications of.

30 In certain embodiments, the extracellular antigen-binding domain (*e.g.*, scFv) having a heavy chain variable region, a light chain variable region and a linker peptide comprises the amino acid sequence of SEQ ID NO:678 or conservative modifications of.

In addition, the extracellular antigen-binding domain can comprise a leader or a signal peptide that directs the nascent protein into the endoplasmic reticulum. Signal peptide or leader can be essential if the CAR is to be glycosylated and anchored in the cell membrane. The signal sequence or leader can be a peptide  
 5 sequence (about 5, about 10, about 15, about 20, about 25, or about 30 amino acids long) present at the N-terminus of newly synthesized proteins that directs their entry to the secretory pathway. In non-limiting examples, the signal peptide is covalently joined to the 5' terminus of the extracellular antigen-binding domain. In certain embodiments, the signal peptide comprises a CD8 polypeptide comprising amino  
 10 acids having the sequence set forth in SEQ ID NO:26 as provided below.

MALPVTALLLPLALLLHAAR [SEQ ID NO:935]

The nucleotide sequence encoding the amino acid sequence of SEQ ID NO:935 is set forth in SEQ ID NO:936, which is provided below:

15 ATGGCTCTCCAGTGACTGCCCTACTGCTTCCCCTAGCGCTTCTCCTGCATGCAGCTCGT [SEQ ID NO:936]

In another embodiment, the signal peptide comprises amino acids having the sequence set forth in SEQ ID NO:937 as provided below.

METDTLLLLWVLLLWVPGSTG [SEQ ID NO:937]

The nucleotide sequence encoding the amino acid sequence of SEQ ID NO:937 is set forth in SEQ ID NO:938, which is provided below:

20 ATGGAAACCGACACCCTGCTGCTGTGGGTGCTGCTGTGCTGTGGGTGCCAGGATCCACAGGA [SEQ ID NO:938]

In certain embodiments, the extracellular antigen-binding domain, *e.g.*, the human scFv, comprises a heavy chain variable region, a light chain variable region, a  
 25 linker peptide between the heavy chain variable region and the light chain variable region, and an His-tag and an HA-tag. In certain embodiments, the amino acid sequence of the His-tag and HA-tag comprises the amino acid sequence of SEQ ID NO:308. The nucleotide sequence encoding SEQ ID NO: 308 is SEQ ID NO: 306.

In certain embodiments, the extracellular antigen-binding domain, *e.g.*, the  
 30 human scFv, binds to a human FcRL5 polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 899. In certain embodiments, the extracellular antigen-binding domain, *e.g.*, the human scFv, binds to an epitope in domain 9 (*e.g.*, amino acids 754-835 of SEQ ID NO:899). In certain embodiments, the extracellular antigen-binding domain, *e.g.*, the human scFv, binds to an epitope in domain 8 (*e.g.*,

amino acids 658-731 of SEQ ID NO:899). In certain embodiments, the extracellular antigen-binding domain, *e.g.*, the human scFv, binds to an epitope within domain 9 comprising amino acids 829-840 of SEQ ID NO:899. In certain embodiments, the extracellular antigen-binding domain, *e.g.*, the human scFv, binds to an epitope within domain 8 comprising amino acids 657-667 of SEQ ID NO:899. For example, and not by way of limitation, the extracellular antigen-binding domain, *e.g.*, the human scFv, binds to an epitope comprising the amino acid sequence RSETVTLYITGL (SEQ ID NO:964). In certain embodiments, In certain embodiments, an antibody or an antigen-binding fragment thereof of the present disclosure binds to an epitope comprising the amino acid sequence SRPILTFRAPR (SEQ ID NO:965).

Transmembrane Domain of a CAR

In certain non-limiting embodiments, the transmembrane domain of the CAR comprises a hydrophobic alpha helix that spans at least a portion of the membrane. Different transmembrane domains result in different receptor stability. After antigen recognition, receptors cluster and a signal is transmitted to the cell. In accordance with the presently disclosed subject matter, the transmembrane domain of the CAR can comprise a CD8 polypeptide, a CD28 polypeptide, a CD3 $\zeta$  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 (not based on a protein associated with the immune response), or a combination thereof.

In certain embodiments, the transmembrane domain of a presently disclosed CAR comprises a CD28 polypeptide. The CD28 polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or 100% homologous to the sequence having a NCBI Reference No: P10747 or NP\_006130 (SEQ ID NO:939), or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions. In non-limiting embodiments, the CD28 polypeptide can have an amino acid sequence that is a consecutive portion of SEQ ID NO:939 which is at least 20, or at least 30, or at least 40, or at least 50, and up to 220 amino acids in length. Alternatively or additionally, in non-limiting various embodiments, the CD28 polypeptide has an amino acid sequence of amino acids 1 to 220, 1 to 50, 50 to 100, 100 to 150, 150 to 200, or 200 to 220 of SEQ ID NO:939. In certain embodiments,



the CAR of the presently disclosed subject matter comprises a transmembrane domain comprising a CD28 polypeptide, and an intracellular domain comprising a co-stimulatory signaling region that comprises a CD28 polypeptide. In certain embodiments, the CD28 polypeptide comprised in the transmembrane domain and the intracellular domain has an amino acid sequence of amino acids 114 to 220 of SEQ ID NO:939.

SEQ ID NO:939 is provided below:

```

1   MLRLLLALNL FPSIQVTGNK ILVKQSPMLV AYDNAVNLSC KYSYNLFSRE FRASLHKGLD
61  SAVEVCVVYG NYSQQLQVYS KTGFNCDGKL GNEVTFYQLQ NLYVNQTDIY FCKIEVMYPP
10  121 PYLDNEKSNG TIIHVKGKHL CPSPLFPGPS KPFWVLVVVG GVLACYSLLV TVAFIIFWVR
181 SKRSRLHSD YMNMTPRRPG PTRKHYQPYA PPRDFAAYRS [SEQ ID NO:939]

```

In accordance with the presently disclosed subject matter, a “CD28 nucleic acid molecule” refers to a polynucleotide encoding a CD28 polypeptide. In certain embodiments, the CD28 nucleic acid molecule encoding the CD28 polypeptide comprised in the transmembrane domain and the intracellular domain (*e.g.*, the co-stimulatory signaling region) of the presently disclosed CAR (amino acids 114 to 220 of SEQ ID NO:939) comprises nucleic acids having the sequence set forth in SEQ ID NO:940 as provided below.

```

20  ATTGAAGTTATGTATCCTCCTCCTTACCTAGACAATGAGAAGAGCAATGGAACCATTATCCATGTGAAA
GGGAAACACCTTTGTCCAAGTCCCCTATTTCCCGGACCTTCTAAGCCCTTTTGGGTGCTGGTGGTGGTT
GGTGGAGTCTTGCTTGTCTATAGCTTGCTAGTAACAGTGCGCCTTTATTATTTTCTGGGTGAGGAGTAAG
AGGAGCAGGCTCCTGCACAGTGACTACATGAACATGACTCCCCGCCGCCCGGGGCCACCCGCAAGCAT
TACCAGCCCTATGCCCCACCACGCGACTTCGCAGCCTATCGCTCC [SEQ ID NO:940].

```

In certain embodiments, the transmembrane domain of a presently disclosed CAR comprises a CD8 polypeptide. The CD8 polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or 100% homologous to the sequence having a NCBI Reference No: AAH25715 (SEQ ID NO:960), or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions. In non-limiting embodiments, the CD8 polypeptide can have an amino acid sequence that is a consecutive portion of SEQ ID NO:960 which is at least 20, or at least 30, or at least 40, or at least 50, or at least 70, or at least 100, or at least 150, or at least 200 and up to 235 amino acids in length. Alternatively or additionally, in non-limiting various embodiments, the CD8 polypeptide has an amino acid sequence of

amino acids 1 to 235, 1 to 50, 50 to 100, 100 to 150, 150 to 200, 130 to 210, or 200 to 235 of SEQ ID NO:960. In certain embodiments, the CAR of the presently disclosed subject matter comprises a transmembrane domain comprising a CD8 polypeptide. In certain embodiments, the CD8 polypeptide comprised in the transmembrane domain has an amino acid sequence of amino acids 137 to 207 of SEQ ID NO:960.

SEQ ID NO:960 is provided below:

```

1  malpvtalll plalllhaar psqfrvspld rtwnlgetve lkcqvllsnp tsgcswlfqp
61  rgaaasptfl lylsqnpkpa aegldtqrfs gkrlgdtfvl tldsfrrene gcyfcsalsn
121 simyfshfvp vflpakpttt paprpptpap tiasqplslr peacrpaagg avhtrgldfa
10 181 cdiyiwapla gtcgvllsl vitlycnhrn rrrvckcprp vvksgdkpsl saryv [SEQ
ID NO:960]

```

In accordance with the presently disclosed subject matter, a “CD8 nucleic acid molecule” refers to a polynucleotide encoding a CD8 polypeptide. In certain embodiments, the CD8 nucleic acid molecule encoding the CD8 polypeptide comprised in the transmembrane domain and the intracellular domain (*e.g.*, the co-stimulatory signaling region) of the presently disclosed CAR (amino acids 137 to 207 of SEQ ID NO:960) comprises nucleic acids having the sequence set forth in SEQ ID NO:961 as provided below.

```

CCCACCACGACGCCAGCGCCGCGACCAACCCGGCGCCACGATCGCGTCGCAGCCCCTGTCCCTG
20 CGCCCAGAGGCGTGCCGGCCAGCGGCGGGGGCGCAGTGACACAGAGGGGGCTGGACTTCGCCTGTGAT
ATCTACATCTGGGCGCCCCCTGGCCGGGACTTGTGGGGTCCTTCTCCTGTCACTGGTTATCACCCCTTAC
TGCAAC [SEQ ID NO:961]

```

In certain non-limiting embodiments, a CAR can also comprise a spacer region that links the extracellular antigen-binding domain to the transmembrane domain. The spacer region can be flexible enough to allow the antigen binding domain to orient in different directions to facilitate antigen recognition. The spacer region can be the hinge region from IgG1, or the CH<sub>2</sub>CH<sub>3</sub> region of immunoglobulin and portions of CD3.

#### Intracellular Domain of a CAR

In certain non-limiting embodiments, an intracellular domain of the CAR can comprise a CD3ζ polypeptide, which can activate or stimulate a cell (*e.g.*, a cell of the lymphoid lineage, *e.g.*, a T cell). CD3ζ comprises three ITAMs, and transmits an activation signal to the cell (*e.g.*, a cell of the lymphoid lineage, *e.g.*, a T cell) after antigen is bound. The CD3ζ polypeptide can have an amino acid sequence that is at

least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or about 100% homologous to the sequence set forth in SEQ ID NO:941, or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions. In non-limiting embodiments, the CD3 $\zeta$  polypeptide can have an amino acid sequence that is a consecutive portion of SEQ ID NO:941 which is at least 20, or at least 30, or at least 40, or at least 50, and up to 163 amino acids in length. Alternatively or additionally, in non-limiting various embodiments, the CD3 $\zeta$  polypeptide has an amino acid sequence of amino acids 1 to 163, 1 to 50, 50 to 100, 100 to 150, or 150 to 163 of SEQ ID NO:941. In certain embodiments, the CD3 $\zeta$  polypeptide comprised in the intracellular domain of a presently disclosed CAR has an amino acid sequence of amino acids 52 to 163 of SEQ ID NO: 941.

SEQ ID NO: 941 is provided below:

```

1  MKWKALFTAA ILQAQLPITE AQSFGLLDPK LCYLLDGILF IYGVILTALF LRVKFSRSAD
15 61  APAYQQGQNG LYNELNLGRR EYDVLDKRR GRDPEMGGKP RRKNPQEGLY NELQDKMAE
121 AYSEIGMKGE RRRGKGHDGL YQGLSTATKD TYDALHMQAL PPR [SEQ ID NO:941]

```

In accordance with the presently disclosed subject matter, a “CD3 $\zeta$  nucleic acid molecule” refers to a polynucleotide encoding a CD3 $\zeta$  polypeptide. In certain embodiments, the CD3 $\zeta$  nucleic acid molecule encoding the CD3 $\zeta$  polypeptide comprised in the intracellular domain of a presently disclosed CARs (amino acids 52 to 163 of SEQ ID NO: 941) comprises nucleic acids having the sequence set forth in SEQ ID NO:942 as provided below.

```

AGAGTGAAGTTCAGCAGGAGCGCAGACGCCCCGCGTACCAGCAGGGCCAGAACCAGCTCTATAACGAG
CTCAATCTAGGACGAAGAGAGGAGTACGATGTTTTGGACAAGAGACGTGGCCGGGACCCTGAGATGGGG
25  GGAAAGCCGAGAAGGAAGAACCCTCAGGAAGGCCTGTACAATGAACTGCAGAAAGATAAGATGGCGGAG
GCCTACAGTGAGATTGGGATGAAAGGCGAGCGCCGGAGGGGCAAGGGGCACGATGGCCTTTACCAGGGT
CTCAGTACAGCCACCAAGGACACCTACGACGCCCTTCACATGCAGGCCCTGCCCCCTCGCTAA [SEQ
ID NO:942]

```

In certain non-limiting embodiments, an intracellular domain of the CAR further comprises at least one signaling region. The at least one signaling region can include a CD28 polypeptide, a 4-1BB polypeptide, an OX40 polypeptide, an ICOS polypeptide, a DAP-10 polypeptide, a PD-1 polypeptide, a CTLA-4 polypeptide, a LAG-3 polypeptide, a 2B4 polypeptide, a BTLA polypeptide, a synthetic peptide (not based on a protein associated with the immune response), or a combination thereof.

In certain embodiments, the signaling region is a co-stimulatory signaling region. In certain embodiments, the co-stimulatory region comprises at least one co-stimulatory molecule, which can provide optimal lymphocyte activation. As used  
5 herein, “co-stimulatory molecules” refer to cell surface molecules other than antigen receptors or their ligands that are required for an efficient response of lymphocytes to antigen. The at least one co-stimulatory signaling region can include a CD28 polypeptide, a 4-1BB polypeptide, an OX40 polypeptide, an ICOS polypeptide, a DAP-10 polypeptide, or a combination thereof. The co-stimulatory molecule can  
10 bind to a co-stimulatory ligand, which is a protein expressed on cell surface that upon binding to its receptor produces a co-stimulatory response, *i.e.*, an intracellular response that effects the stimulation provided when an antigen binds to its CAR molecule. Co-stimulatory ligands, include, but are not limited to CD80, CD86, CD70, OX40L, 4-1BBL, CD48, TNFRSF14, and PD-L1. As one example, a 4-1BB ligand  
15 (*i.e.*, 4-1BBL) may bind to 4-1BB (also known as “CD137”) for providing an intracellular signal that in combination with a CAR signal induces an effector cell function of the CAR<sup>+</sup> T cell. CARs comprising an intracellular domain that comprises a co-stimulatory signaling region comprising 4-1BB, ICOS or DAP-10 are disclosed in U.S. 7,446,190 (*e.g.*, the nucleotide sequence encoding 4-1BB is set forth  
20 in SEQ ID NO:15, the nucleotide sequence encoding ICOS is set forth in SEQ ID NO:16, and the nucleotide sequence encoding DAP-10 is set forth in SEQ ID NO:17 in U.S.7,446,190), which is herein incorporated by reference in its entirety. In certain embodiments, the intracellular domain of the CAR comprises a co-stimulatory signaling region that comprises a CD28 polypeptide. In certain embodiments, the  
25 intracellular domain of the CAR comprises a co-stimulatory signaling region that comprises two co-stimulatory molecules:CD28 and 4-1BB or CD28 and OX40.

4-1BB can act as a tumor necrosis factor (TNF) ligand and have stimulatory activity. The 4-1BB polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or  
30 100% homologous to the sequence having a NCBI Reference No: P41273 or NP\_001552 (SEQ ID NO:943) or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions. In certain embodiments, the 4-1BB polypeptide comprised in the intracellular domain of a

presently disclosed CAR has an amino acid sequence of amino acids 214 to 255 of SEQ ID NO: 943. SEQ ID NO:943 is provided below:

1 MGNSCYNIVA TLLLVLNFER TRSLQDPCSN CPAGTFCDNN RNQICSPCPP NSFSSAGGQR  
 61 TCDICRQCKG VFRTRKECSS TSNAECDCTP GFHCLGAGCS MCEQDCKQGQ ELTKKGCKDC  
 5 121 CFGTFNDQKR GICRPWTNCS LDGKSVLVNG TKERDVVCGP SPADLSPGAS SVTPPAPARE  
 181 PGHSPQIISF FLALTSTALL FLLFFLTILRF SVVKRGRKKL LYIFKQPFMR PVQTTQEEDG  
 241 CSCRFPPEEEE GGCEL [SEQ ID NO:943]

In accordance with the presently disclosed subject matter, a “4-1BB nucleic acid molecule” refers to a polynucleotide encoding a 4-1BB polypeptide. In certain  
 10 embodiments, the 4-1BB nucleic acid molecule encoding the 4-1BB polypeptide comprised in the intracellular domain of a presently disclosed CARs (amino acids 214 to 255 of SEQ ID NO: 943) comprises nucleic acids having the sequence set forth in SEQ ID NO: 962 as provided below.

15 AAACGGGGCAGAAAGAAGCTCCTGTATATATTCAAACAACCATTTATGAGACCAGTACAACTACTCAA  
 GAGGAAGATGGCTGTAGCTGCCGATTTCAGAAGAAGAAGAGGAGGATGTGAAGT [SEQ ID NO:  
 962]

An OX40 polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or 100% homologous to the sequence having a NCBI Reference No: P43489 or NP\_003318  
 20 (SEQ ID NO:944), or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions.

SEQ ID NO:944 is provided below:

1 MCVGARRLGR GPCAALLLLG LGLSTVTGLH CVGDTYPSND RCHECRPGN GMVSRCSRSQ  
 61 NTVCRPCGPG FYNDVVSSKP CKPCTWCNLR SGSEKQLCT ATQDTCRCR AGTQPLDSYK  
 25 121 PGVDCAPCPP GHFSPGDNQA CKPWTNCTLA GKHTLQPASN SSDAICEDRD PPATQPQETQ  
 181 GPPARPITVQ PTEAWPRTSQ GPSTREVEVP GGRAVAAILG LGLVLGLLGP LAILLALYLL  
 241 RRDQRLPPDA HKPPGGGSFR TPIQEEQADA HSTLAKI [SEQ ID NO:944]

In accordance with the presently disclosed subject matter, an “OX40 nucleic acid molecule” refers to a polynucleotide encoding an OX40 polypeptide.

30 An ICOS polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or 100% homologous to the sequence having a NCBI Reference No: NP\_036224 (SEQ ID NO:945) or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions.

35 SEQ ID NO:945 is provided below:

1 MKSGLWYFFL FCLRIKVLTG EINGSANYEM FIFHNGGVQI LCKYPDIVQQ FKMQLLKGGQ  
 61 ILCDLTKTKG SGN TVSIKSL KFCHS QLSNN SVSFFLYNLD HSHANYFCN LSIFDPPPFK  
 121 VTLTGGYLHI YESQLCCQLK FWLPIGCAAF VVVCILGCIL ICWLTKKKYS SSVHDPNGEY  
 181 MFMRAVNTAK KSRLTDVTL [SEQ ID NO: 945]

5 In accordance with the presently disclosed subject matter, an “ICOS nucleic acid molecule” refers to a polynucleotide encoding an ICOS polypeptide.

CTLA-4 is an inhibitory receptor expressed by activated T cells, which when engaged by its corresponding ligands (CD80 and CD86; B7-1 and B7-2, respectively), mediates activated T cell inhibition or anergy. In both preclinical and clinical studies,  
 10 CTLA-4 blockade by systemic antibody infusion, enhanced the endogenous anti-tumor response albeit, in the clinical setting, with significant unforeseen toxicities.

CTLA-4 contains an extracellular V domain, a transmembrane domain, and a cytoplasmic tail. Alternate splice variants, encoding different isoforms, have been characterized. The membrane-bound isoform functions as a homodimer  
 15 interconnected by a disulfide bond, while the soluble isoform functions as a monomer. The intracellular domain is similar to that of CD28, in that it has no intrinsic catalytic activity and contains one YVKM motif able to bind PI3K, PP2A and SHP-2 and one proline-rich motif able to bind SH3 containing proteins. One role of CTLA-4 in inhibiting T cell responses seem to be directly via SHP-2 and PP2A  
 20 dephosphorylation of TCR-proximal signaling proteins such as CD3 and LAT. CTLA-4 can also affect signaling indirectly via competing with CD28 for CD80/86 binding. CTLA-4 has also been shown to bind and/or interact with PI3K, CD80, AP2M1, and PPP2R5A.

In accordance with the presently disclosed subject matter, a CTLA-4  
 25 polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or about 100% homologous to UniProtKB/Swiss-Prot Ref. No.: P16410.3 (SEQ ID NO:946) (homology herein may be determined using standard software such as BLAST or FASTA) or fragments thereof, and/or may optionally comprise up to one or up to two  
 30 or up to three conservative amino acid substitutions.

SEQ ID NO:946 is provided below:

1 MACLG FQRHK AQLNLATRTW PCTLLFFLLF IPVFC KAMHV AQP AVVLASS RGIASFVCEY  
 61 ASPGKATEVR VTVLRQADSQ VTEVCAATYM MGNELTFLDD SICTGTSSGN QVNLT IQGLR  
 121 AMDTGLYICK VELMYPPPY Y LGIGNGTQIY VIDPEPCPDS DFLLWILA AV SSGLFFYSFL

181 LTAVSLSKML KKRSPLETTGV YVKMPPEPE CEKQFQPYFI PIN [SEQ ID NO:946]

In accordance with the presently disclosed subject matter, a “CTLA-4 nucleic acid molecule” refers to a polynucleotide encoding a CTLA-4 polypeptide.

PD-1 is a negative immune regulator of activated T cells upon engagement  
 5 with its corresponding ligands PD-L1 and PD-L2 expressed on endogenous macrophages and dendritic cells. PD-1 is a type I membrane protein of 268 amino acids. PD-1 has two ligands, PD-L1 and PD-L2, which are members of the B7 family. The protein’s structure comprises an extracellular IgV domain followed by a transmembrane region and an intracellular tail. The intracellular tail contains two  
 10 phosphorylation sites located in an immunoreceptor tyrosine-based inhibitory motif and an immunoreceptor tyrosine- based switch motif, that PD-1 negatively regulates TCR signals. SHP- I and SHP-2 phosphatases bind to the cytoplasmic tail of PD-1 upon ligand binding. Upregulation of PD-L1 is one mechanism tumor cells may evade the host immune system. In pre- clinical and clinical trials, PD-1 blockade by  
 15 antagonistic antibodies induced anti-tumor responses mediated through the host endogenous immune system.

In accordance with the presently disclosed subject matter, a PD-1 polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or about 100% homologous to NCBI  
 20 Reference No: NP\_005009.2 (SEQ ID NO:947) or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions.

SEQ ID NO:947 is provided below:

1 MQIPQAPWPV VWAVLQLGWR PGWFLDSPDR PWNPPTFSPA LLVVTEGDNA TFTCSFSNTS  
 25 61 ESFVLNWYRM SPSNQTDKLA AFPEDRSQPG QDCRFRVTQL PNGRDFHMSV VRARRNDSGT  
 121 YLCGAISLAP KAQIKESLRA ELRVTEERRAE VPTAHPSPSP RPAGQFQTLV VGVVGGLLGS  
 181 LVLLVWVLAV ICSRAARGTI GARRTGQPLK EDPSAVPVFS VDYGELDFQW REKTPEPPVP  
 241 CVPEQTEYAT IVFPSPMGTS SPARRGSADG PRSAQPLRPE DGHCSWPL [SEQ ID  
 NO:947]

30 In accordance with the presently disclosed subject matter, a “PD-1 nucleic acid molecule” refers to a polynucleotide encoding a PD-1 polypeptide.

Lymphocyte-activation protein 3 (LAG-3) is a negative immune regulator of immune cells. LAG-3 belongs to the immunoglobulin (Ig) superfamily and contains 4 extracellular Ig-like domains. The LAG3 gene contains 8 exons. The sequence data,

exon/intron organization, and chromosomal localization all indicate a close relationship of LAG3 to CD4. LAG3 has also been designated CD223 (cluster of differentiation 223).

In accordance with the the presently disclosed subject matter, a LAG-3 polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or about 100% homologous to UniProtKB/Swiss-Prot Ref. No.: P18627.5 (SEQ ID NO:948) or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions.

SEQ ID NO:948 is provided below:

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1 MWEAQFLGLL FLQPLWVAPV KPLQPGAIEVP VVWAQEGAPA QLPCSTIPL QDLSLLRRAG
61 VTWQHQPDSG PPAAAPGHPL APGPHPAAPS SWGPRPRRYT VLSVGPGLR SGRPLQPRV
121 QLDERGRQRG DFSLWLRPAR RADAGEYRAA VHLRDRALSC RLRLRLGQAS MTASPPGSLR
181 ASDWVILNCS FSRPDRPASV HWFRNRGQGR VPVRESPHHH LAESFLFLPQ VSPMDSGPWG
15 241 CILTYRDGFN VSIMYNLTVL GLEPPTPLTV YAGAGSRVGL PCRLPAGVGT RSFLTAKWTP
301 PGGGPDLLVT GDNGDFTLRL EDVSAQAGT YTCHIHLEQ QLNATVTLAI ITVTPKSFGS
361 PGS LGKLLCE VTPVSGQERF VWSSLDTPSQ RSFSGPWLEA QEAQLLSQPW QCQLYQGERL
421 LGAAYFTTEL SSPGAQRSGR APGALPAGHL LLFLILGVLS LLLLVGTAFG FHLWRRQWRP
481 RRFSALEQGI HPPQAQSKIE ELEQEPEPEP EPEPEPEPEP EPEQL [SEQ ID NO:948]

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In accordance with the presently disclosed subject matter, a “LAG-3 nucleic acid molecule” refers to a polynucleotide encoding a LAG-3 polypeptide.

Natural Killer Cell Receptor 2B4 (2B4) mediates non-MHC restricted cell killing on NK cells and subsets of T cells. To date, the function of 2B4 is still under investigation, with the 2B4-S isoform believed to be an activating receptor, and the 2B4- L isoform believed to be a negative immune regulator of immune cells. 2B4 becomes engaged upon binding its high-affinity ligand, CD48. 2B4 contains a tyrosine-based switch motif, a molecular switch that allows the protein to associate with various phosphatases. 2B4 has also been designated CD244 (cluster of differentiation 244).

In accordance with the presently disclosed subject matter, a 2B4 polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or about 100% homologous to UniProtKB/Swiss-Prot Ref. No.: Q9BZW8.2 (SEQ ID NO:949) or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative



amino acid substitutions.

SEQ ID NO:949 is provided below:

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1 MLGQVVTLIL LLLLKVYQ GK GCQGSADHVV SISGVPLQLQ PNSIQTKVDS IAWKKLLPSQ
61 NGFHHILKWE NGSLPSNTSN DRFSFIVKNL SLLIKAAQQQ DSGLYCLEVT SISGKVQTAT
5 121 FQVVFVESLL PDKVEKPRLQ GQGKILDRGR CQVALSCLVS RDGNVSYAWY RGSKLIQTAG
181 NLTYLDEEVD INGTHYTCN VSNPVSWE SH TLNLTQDCQN AHQEFRFWPF LVIIIVILSAL
241 FLGTLACFCV WRRKRKEKQS ETSPKEFLT I YEDVKDLKTR RNHEQEQTFF GGGSTIYSMI
301 QSQSSAPTSQ EPAYTLYSLI QPSRKSGSRK RNHSPSFNST IYEVIGKSP KAQNPARLSR
361 KELENFDVYS [SEQ ID NO:949]
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10 In accordance with the presently disclosed subject matter, a “2B4 nucleic acid molecule” refers to a polynucleotide encoding a 2B4 polypeptide.

B- and T-lymphocyte attenuator (BTLA) expression is induced during activation of T cells, and BTLA remains expressed on Th1 cells but not Th2 cells. Like PD1 and CTLA4, BTLA interacts with a B7 homolog, B7H4. However, unlike  
15 PD-1 and CTLA-4, BTLA displays T-Cell inhibition via interaction with tumor necrosis family receptors (TNF-R), not just the B7 family of cell surface receptors. BTLA is a ligand for tumor necrosis factor (receptor) superfamily, member 14 (TNFRSF14), also known as herpes virus entry mediator (HVEM). BTLA-HVEM complexes negatively regulate T-cell immune responses. BTLA activation has been  
20 shown to inhibit the function of human CD8<sup>+</sup> cancer-specific T cells. BTLA has also been designated as CD272 (cluster of differentiation 272).

In accordance with the presently disclosed subject matter, a BTLA polypeptide can have an amino acid sequence that is at least about 85%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99% or about 100%  
25 homologous to UniProtKB/Swiss-Prot Ref. No.: Q7Z6A9.3 (SEQ ID NO:950) or fragments thereof, and/or may optionally comprise up to one or up to two or up to three conservative amino acid substitutions.

SEQ ID NO:950 is provided below:

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1 MKTLPAMLGT GKLFVFFLI PYLDIWNHIG KESCDVQLYI KRQSEHSILA GDPFELECPV
30 61 KYCANRPHVT WCKLNGTTCV KLEDRQTSWK EEKNISFFIL HFEPVLPNDN GSYRCSANFQ
121 SNLIESHSTT LYVTDVKSAS ERPSKDEMAS RPWLLYRLLP LGGLPLLITT CFCLECCLLR
181 HQGKQNELSD TAGREINLVD AHLKSEQTEA STRQNSQVLL SETGIYDNDP DLCFRMQEGS
241 EVYSNPCLEE NKPGIVYASL NHSVIGPNSR LARNVKEAPT EYASICVRS [SEQ ID
NO:950]
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35 In accordance with the presently disclosed subject matter, a “BTLA nucleic

acid molecule” refers to a polynucleotide encoding a BTLA polypeptide.

In certain embodiments, the CAR comprises an extracellular antigen-binding region that specifically binds to human FcRL5, a transmembrane domain comprising a CD28 polypeptide, and an intracellular domain comprising a CD3 $\zeta$  polypeptide and  
5 a co-stimulatory signaling region that comprises a CD28 polypeptide, as shown in Figure 9. As shown in Figure 9, the CAR also comprises a signal peptide or a leader covalently joined to the 5' terminus of the extracellular antigen-binding domain. The signal peptide comprises a CD8 polypeptide.

In certain embodiments, the CAR of the presently disclosed subject matter can  
10 further comprise an inducible promoter, for expressing nucleic acid sequences in human cells. Promoters for use in expressing CAR genes can be a constitutive promoter, such as ubiquitin C (UbiC) promoter.

The presently disclosed subject matter also provides isolated nucleic acid molecule encoding the FcRL5-targeted CAR described herein or a functional portion  
15 thereof. In certain embodiments, the isolated nucleic acid molecule encodes a presently disclosed FcRL5-targeted CAR comprising an scFv that specifically binds to human FcRL5, a transmembrane domain comprising a CD28 polypeptide, and an intracellular domain comprising a CD3 $\xi$  polypeptide and a co-stimulatory signaling region comprising a CD28 polypeptide. In certain embodiments, the scFv is a fully  
20 human scFv. In certain embodiments, the scFv is a murine scFv. In certain non-limiting embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:951 provided below:

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ATGGCTCTCCCAGTGACTGCCCTACTGCTTCCCCTAGCGCTTCTCCTGCATGCAGCTCGTGTGAAGCTG
CAGGAGTCTGGGGGAGGCTTAGTGACGCTGGAGGGTCCCGAACTCTCCTGTGCAGCCTCTGGATTCT
25 ACTTTCAGTATCTTTGGATTGCACTGGGTTCGTCAGGCTCCAGAGAAGGGGCTGGAGTGGGTTCGCATAC
ATTAGTGGTGACAGTAATACCATCTACTATGCAGACACAGTGAAGGGCCGATTACCATCTCCAGAGAC
AATCCCAAGAACACCCTGTTCTCTGCAAATGACCAGTCTAAGGTCTGAGGACACGGCCATGTATTACTGT
GCAAGAAATAGCTACTATGCTCTGGACTACTGGGGCCAAGGGACCACGGTCACCGTCTCCTCAGGTGGA
GGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATTGAGCTACCCAGTCTCCAGCAATC
30 ATGTCTGTATCTCCAGGTGAAAAGGTCACCATGACCTGCAGGGCCAGCTCAAGTGTGAGTTCCAGTTAC
TTGCACTGGTACCAGCAGAGGTGAGGTGCTTCCCCCAAATCTGGATTTATAGCACATCCAACCTGGCT
TCTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGACTGGGACCTCTTACTCTCTACAATCAGCAGTGTG
GAGGCTGAAGATGCTGCCACTTATTACTGCCAGCAGTACAGTGGTTACCCGTGGACGTTCCGGTGGAGGG
ACCAAGCTGGAGATCGAACAAAACTCATCTCAGAAGAGGATCTGGCGGCCGCAATTGAAGTTATGTAT
35 CCTCCTCCTTACCTAGACAATGAGAAGAGCAATGGAACCATTATCCATGTGAAAGGGAAACACCTTTGT
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CCAAGTCCCCTATTTCCCGGACCTTCTAAGCCCTTTTGGGTGCTGGTGGTGGTTGGTGGAGTCCTGGCT  
 TGCTATAGCTTGCTAGTAACAGTGGCCTTTATTATTTTCTGGGTGAGGAGTAAGAGGAGCAGGCTCCTG  
 CACAGTGAATGACATGAACATGACTCCCCGCCGCCCGGGCCACCCGCAAGCATTACCAGCCCTATGCC  
 CCACCACGCGACTTCGCAGCCTATCGCTCCAGAGTGAAGTTCAGCAGGAGCGCAGACGCCCCCGCGTAC  
 5 CAGCAGGGCCAGAACCAGCTCTATAACGAGCTCAATCTAGGACGAAGAGAGGAGTACGATGTTTTGGAC  
 AAGAGACGTGGCCGGGACCCTGAGATGGGGGGAAAGCCGAGAAGGAAGAACCCTCAGGAAGGCCTGTAC  
 AATGAACTGCAGAAAGATAAGATGGCGGAGGCCTACAGTGAGATTGGGATGAAAGGCGAGCGCCGGAGG  
 GGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGTACAGCCACCAAGGACACCTACGACGCCCTTCAC  
 ATGCAGGCCCTGCCCTCGCTAA [SEQ ID NO:951] The isolated nucleic acid  
 10 molecule having the nucleotide sequence of SEQ ID NO:951 encodes a FcRL-5-  
 targeted CAR comprising a murine scFv that comprises a heavy chain variable region  
 comprising amino acids having the sequence set forth in SEQ ID NO:915, a light  
 chain variable region comprising amino acids having the sequence set forth in SEQ  
 ID NO:917, and a linker having an amino acid sequence of SEQ ID NO:897  
 15 positioned between the heavy chain variable region and the light chain variable  
 region, a transmembrane domain comprising a CD28 polypeptide, and an intracellular  
 domain comprising a CD3 $\xi$  polypeptide and a co-stimulatory signaling region  
 comprising a CD28 polypeptide.

In another specific non-limiting example, the isolated nucleic acid molecule  
 20 comprises nucleic acids having the sequence set forth in SEQ ID NO:952 provided  
 below:

ATGGAGACAGACACACTCCTGCTATGGGTACTGCTGCTCTGGGTTCAGGTTCCACTGGTGACGTCCA  
 ACTGCAGGAGTCAGGGGGAGGCTTAGTGACGCTGGAGGGTCCCGGAACTCTCCTGTACAGCCTCTGG  
 ATTCACCTTTAGTAGCTTTGGAATGCACTGGGTTCGTCAGGCTCCAGAGAAGGGGCTGGAGTGGGTGCG  
 25 ATACATTAGTAGTGGCAGTAATAACATCTACTTTGCGGACACAGTGAAGGGCCGATTACCATCTCCAG  
 AGACAATCCCAAGAACACCCTGTTCTCTGCAAAATGACCAGTCTAAGGTCTGAGGACACGGCCATGTATTA  
 CTGTGCAAGATCGGAATACTACGGTAGTAGCCATATGGACTACTGGGGCCAAGGGACCACGGTCACCGT  
 CTCTCAGGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATTGAGCTCACCCA  
 GTCTCCAAAATTCATGTCCACATCAGTAGGAGACAGGGTCAGCGTCACCTGCAAGGCCAGTCAGAATGT  
 30 GGGTACTAATGTAGCCTGGTATCAACAGAAACCAGGACAATCTCCTAAACCACTGATTTACTCGGCAAC  
 CTACCGGAACAGTGGAGTCCCTGATCGCTTCACAGGCAGTGGATCTGGGACAGATTTCACTCTACCAT  
 CACTAACGTGCAGTCTAAAGACTTGGCAGACTATTTCTGTCAACAATATAACAGGTATCCGTACACGTC  
 CGGAGGGGGGACCAAGCTGGAGATCGAACAATACTCATCTCAGAAGAGGATCTGGCGGCCGCAATTGA  
 AGTTATGTATCCTCCTCCTTACCTAGACAATGAGAAAGCAATGGAACCATTATCCATGTGAAAGGGAA  
 35 ACACCTTTGTCCAAGTCCCCTATTTCCCGGACCTTCTAAGCCCTTTTGGGTGCTGGTGGTGGTTGGTGG  
 AGTCCTGGCTTGCTATAGCTTGCTAGTAACAGTGGCCTTTATTATTTTCTGGGTGAGGAGTAAGAGGAG  
 CAGGCTCCTGCACAGTGAATGACATGACTCCCCGCCGCCCGGGCCACCCGCAAGCATTACCA

GCCCTATGCCCCACACGCGACTTCGCAGCCTATCGCTCCAGAGTGAAGTTCAGCAGGAGCGCAGACGC  
 CCCCCGCTACCAGCAGGGCCAGAACCAGCTCTATAACGAGCTCAATCTAGGACGAAGAGAGGAGTACGA  
 TGTTTTGGACAAGAGACGTGGCCGGGACCCCTGAGATGGGGGGAAAGCCGAGAAGGAAGAACCCTCAGGA  
 AGGCCTGTACAATGAACTGCAGAAAAGATAAGATGGCGGAGGCCTACAGTGAGATTGGGATGAAAGGCGA  
 5 GCGCCGGAGGGGCAAGGGGCACGATGGCCTTTACCAGGTCTCAGTACAGCCACCAAGGACACCTACGA  
 CGCCCTTCACATGCAGGCCCTGCCCCCTCGCTAA [SEQ ID NO:952]. The isolated nucleic  
 acid molecule having the nucleotide sequence of SEQ ID NO:952 encodes a FcRL-5-  
 targeted CAR comprising a murine scFv that comprises a heavy chain variable region  
 comprising amino acids having the sequence set forth in SEQ ID NO:919, a light  
 10 chain variable region comprising amino acids having the sequence set forth in SEQ  
 ID NO:921, and a linker having an amino acid sequence of SEQ ID NO:897  
 positioned between the heavy chain variable region and the light chain variable  
 region, a transmembrane domain comprising a CD28 polypeptide, and an intracellular  
 domain comprising a CD3 $\xi$  polypeptide and a co-stimulatory signaling region  
 15 comprising a CD28 polypeptide.

In certain embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:953 provided below:

CCGGTGGTACCTCACCCCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTA  
 GAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATC  
 20 GCAGCTTGATACACGCCGCCACGTGAAGGCTGCCGACCCCGGGGTGGACCATCCTCTAGACTGCCA  
 TGGAACCGATACACTGCTGCTGTGGGTGCTGCTGCTGTGGGTGCCAGGATCCACAGGCTCCTATGTGC  
 TGA CT CAGCCACCC T CAGTGT CAGTGGCCCCAGGAAAGACGGCCAGGATTACCTGTGGGGGAAACAACA  
 TTGGAAGTAAAAGTGTGCACTGGTACCAGCAGAAGCCAGGCCAGGCCCTGTGCTGGTCATCTATTATG  
 ATAGCGACCGGCCCTCAGGGATCCCTGAGCGATTCTCTGGCTCCA ACTCTGGGAACACGGCCACCCTGA  
 25 CCATCAGCAGGGTCGAAGCCGGGGATGAGGCCGACTATTACTGTCAGGTGTGGGATAGTAGTAGTGATT  
 ATGTCTTCGGA ACTGGGACCAAGGTCACCGTCCTAGGTTCTAGAGGTGGTGGTAGCGGCGGGCG  
 GCTCTGGTGGTGGTGGATCCCTCGAGATGGCCGAGGTGCAGCTGGTGGAGACTGGGGGAGGCTTGGTCA  
 AGCCTGGAGGGTCCCTGAGACTCTCCTGTGCAGCCTCTGGATTACCGTCAGTGA CTACTACATGAGCT  
 GGATCCGCCAGGCTCCAGGGAAGGGCCTGGAGTGGATTTCATACATTAGTGGTAGTGGTAATAGCATAT  
 30 ACTACGCAGACTCTGTGAAGGGCCGATTACCATCTCCAGGGACAACGCCAAGAACTCACTGGATCTGC  
 AAATGACCAGCCTGAGAGCCGAGGACACGGCCGTATATTACTGTGCGCGCTCTACTAAATTCGATTACT  
 GGGGTCAAGGTACTCTGGTGACCGTCTCCTCAGCGGCCGCACCCACCACGACGCCAGCGCCGCGACCAC  
 CAACCCCGGCGCCACGATCGCGTCGCAGCCCCCTGTCCCTGCGCCCAGAGGCGTGCCGGCCAGCGGCGG  
 GGGGCGCAGTGCACACGAGGGGGCTGGACTTCGCTGTGATATCTACATCTGGGCGCCCCCTGGCCGGGA  
 35 CTTGTGGGGTCCCTTCTCCTGTCACTGGTTATCACCCCTTTACTGCAACAAACGGGGCAGAAAGAAGCTCC  
 TGTATATATTCAAACAACCATTTATGAGACCAGTACAACTACTCAAGAGGAAGATGGCTGTAGCTGCC  
 GATTTCCAGAAGAAGAAGAAGGAGGATGTGAACTGAGAGTGAAGTTCAGCAGGAGCGCAGAGCCCCCG

[illegible]

CAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATCATGTAACTCGCCTTG  
ATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACGAGCGTGACACCACGATGCCTGTAGCAA  
TGGCAACAACGTTGCGCAAACTATTAAGTGGCGAACTACTTACTCTAGCTTCCCGGCAACAATTAATAG  
ACTGGATGGAGGCGGATAAAGTTGCAGGACCACTTCTGCGCTCGGCCCTTCCGGCTGGCTGGTTTATTG  
5 CTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGCCAGATGGTAAGC  
CCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCG  
CTGAGATAGGTGCCCTCACTGATTAAAGCATTGGTAACTGTCAGACCAAGTTTACTCATATATACTTTAGA  
TTGATTTAAACTTTCATTTTTAATTTAAAAGGATCTAGGTGAAGATCCTTTTTGATAATCTCATGACCA  
AAATCCCTTAACGTGAGTTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTT  
10 GAGATCCTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAACACCGCTACCAGCGGTGGTTT  
GTTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAAGTGGCTTCAGCAGAGCGCAGATACCAA  
ATACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACC  
TCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACT  
CAAGACGATAGTTACCGGATAAGGCGCAGCGGTGCGGGCTGAACGGGGGGTTTCGTGCACACAGCCCAGCT  
15 TGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCATTGAGAAAGCGCCACGCTTCCCG  
AAGGGAGAAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTC  
CAGGGGGAAACGCTTGGTATCTTTATAGTCCTGTCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTT  
TGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCTTGG  
CCTTTTGTGTCCTTTTGTCTACATGTTCTTTCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTA  
20 CCGCCTTTGAGTGAGCTGATACCGCTCGCCGACGCCAACGACCGAGCGCAGCGAGTCAGTGAGCGAGG  
AAGCGGAAGAGCGCCCAATACGCAAAACCGCTCTCCCCGCGCGTTGGCCGATTCAATTAATGCAGCTGGC  
ACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGAGTTAGCTCACTCATT  
AGGCACCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGTGGAATTGTGAGCGGATAACAAT  
TTCACACAGGAAACAGCTATGACCATGATTACGCCAAGCTTTGCTCTTAGGAGTTTCTTAATACATCCC  
25 AAACCTCAAATATATAAAGCATTGACTTGTTCTATGCCCTAGGGGGCGGGGGGAAGCTAAGCCAGCTTT  
TTTTAACATTTAAAATGTTAATTCCATTTTAAATGCACAGATGTTTTATTTTATAAGGGTTTCAATGT  
GCATGAATGCTGCAATATTCTGTTACCAAAGCTAGTATAAATAAAAAATAGATAAACGTGGAAATTACT  
TAGAGTTTCTGTCAATTAACGTTTCTTCTCAGTTGACAACATAAATGCGCTGCTGAGCAAGCCAGTTT  
GCATCTGTGAGGATCAATTTCCCATTTATGCCAGTCATATTAATTACTAGTCAATTAGTTGATTTTTATT  
30 TTTGACATATACATGTGAATGAAAGACCCACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATTT  
TGCAAGGCATGGAAAAATACATAACTGAGAATAGAAAAGTTCAGATCAAGGTCAGGAACAGATGGAACA  
GCTGAATATGGGCCAAACAGGATATCTGTGTTAAGCAGTTCTTGCCCCGGCTCAGGGCCAAGAACAGAT  
GGAACAGCTGAATATGGGCCAAACAGGATATCTGTGTTAAGCAGTTCTTGCCCCGGCTCAGGGCCAAGA  
ACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGC  
35 CCCAAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTTCGCTTCTCGCTTCTGTTTCG  
CGCGCTTATGCTCCCCGAGCTCAATAAAAAGAGCCACAAACCCCTCACTCGGGGCGCCAGTCTCCGATT  
GACTGAGTCGCCCCGGTACCCGTGTATCCAATAAACCCCTCTTGCAAGTGCATCCGACTTGTGGTCTCGC  
TGTTCTTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTGAGCGGGGGTCTTTTCAATTTGGGGGCTCG  
TCCGGGATCGGGAGACCCCTGCCAGGGACCACCGACCCACCACCGGGAGGTAAGCTGGCCAGCAACTT  
40 ATCTGTGCTGTGCCGATTGTCTAGTGTCTATGACTGATTTTATGCGCCTGCGTCGGTACTAGTTAGCTA

ACTAGCTCTGTATCTGGCGGACCCGTGGTGGAACTGACGAGTTCGGAACACCCGGCCGCAACCCTGGGA  
 GACGTCCCAGGGACTTCGGGGGCCGTTTTTGTGGCCCGACCTGAGTCCTAAAATCCCAGTCGTTTAGGA  
 CTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGACGAGAACCTAAAACAGTTC  
 CCGCCTCCGTCTGAATTTTTGCTTTTCGGTTTGGGACCGAAGCCGCGCCGCGCTCTTGTCTGCTGCAGC  
 5 ATCGTTCTGTGTTGTCTCTGTCTGACTGTGTTTCTGTATTTGTCTGAAAATATGGGCCCGGGCTAGACT  
 GTTACCACTCCCTTAAGTTTGACCTTAGGTCACTGGAAAGATGTCGAGCGGATCGCTCACAACCAGTCG  
 GTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCAGAATGGCCAACCTTTAACGTCGGATGG  
 CCGCGAGACGGCACCTTTAACCGAGACCTCATCACCCAGGTTAAGATCAAGGTCTTTTCACCTGGCCCCG  
 CATGGACACCCAGACCAGGTCCCTTACATCGTGACCTGGGAAGCCTTGGCTTTTGACCCCCCTCCCTGG  
 10 GTCAAGCCCTTTGTACACCCTAAGCCTCCGCTCCTCTTCTCCATCCGCCCCGTCTCTCCCCCTTGAA  
 CCTCCTCGTTCGACCCCGCTCGATCCTCCCTTTATCCAGCCCTCACTCCTTCTCTAGGCGCCCCCATA  
 TGGCCATATGAGATCTTATATGGGGCACCCCCGCCCTTGTAAGTTCCTGACCCCTGACATGACAAGA  
 GTTACTAACAGCCCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTAGTCCAGCACGAAGTCTGGAGA  
 CCTCTGGCGGCAGCCTACCAAGAACAACCTGGACCGA [SEQ ID NO: 953] . The isolated  
 15 nucleic acid molecule having the nucleotide sequence of SEQ ID NO: 953 encodes a  
 FcRL-5-targeted CAR (designated as 31 FcRL5-targeted BBz CAR) comprising a  
 fully human scFv (encoded by nucleotides 207-998 of SEQ ID NO: 953) that  
 comprises a heavy chain variable region comprising amino acids having the sequence  
 set forth in SEQ ID NO: 116, a light chain variable region comprising amino acids  
 20 having the sequence set forth in SEQ ID NO: 115, and a linker having an amino acid  
 sequence of SEQ ID NO: 307 positioned between the heavy chain variable region and  
 the light chain variable region, a transmembrane domain comprising a CD8  
 polypeptide having 137 to 207 of SEQ ID NO: 960, and an intracellular domain  
 comprising a CD3 $\xi$  polypeptide comprising amino acids 52 to 163 of SEQ ID NO:  
 25 941, and a co-stimulatory signaling region comprising a 4-1BB polypeptide having  
 amino acids 214-255 of SEQ ID NO: 943. Nucleotides 270-998 of SEQ ID NO: 953  
 encodes the human scFv. Nucleotides 1008-1220 of SEQ ID NO: 953 encodes the  
 CD8 polypeptide comprised in the transmembrane domain. Nucleotides 1221-1346 of  
 SEQ ID NO: 953 encodes the 4-1BB polypeptide comprised in the intracellular  
 30 domain. Nucleotides 1347-1685 of SEQ ID NO: 953 encodes the CD3 $\zeta$   
 polypeptide comprised in the intracellular domain. Other portions of SEQ ID NO:  
 953 are shown in Table 232.

Table 232

| Portions | Nucleotide Sequence | Number of Nucleotides |
|----------|---------------------|-----------------------|
|----------|---------------------|-----------------------|

|                    | Positions of SEQ ID NO: 953 |     |
|--------------------|-----------------------------|-----|
| anti-FcRL5 scFv 31 | 207..998                    | 792 |
| CD8a TM            | 1008..1220                  | 213 |
| 4-1BB              | 1221..1346                  | 126 |
| CD3zeta            | 1347..1685                  | 339 |
| LTR                | 1965..2434                  | 470 |
| M13 fwd            | 3133..3149                  | 17  |
| AmpR promoter      | 3624..3728                  | 105 |
| AmpR               | 3729..4589                  | 861 |
| ori                | 4760..5348                  | 589 |
| CAP binding site   | 5636..5657                  | 22  |
| lac promoter       | 5672..5702                  | 31  |
| lac operator       | 5710..5726                  | 17  |
| M13 rev            | 5734..5750                  | 17  |
| LTR                | 6159..6752                  | 594 |
| MMLV Psi           | 6815..7172                  | 358 |
| gag (truncated)    | 7237..7653                  | 417 |

In certain embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:954 provided below:

5 CCGGTGGTACCTCACCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTA  
 GAACCTCGCTGGAAAGGACCTTACACAGTCCTGTGACCACCCCCACCGCCCTCAAAGTAGACGGCATC  
 GCAGCTTGGATACACGCCGCCACGTGAAGGCTGCCGACCCCCGGGGTGGACCATCCTCTAGACTGCCA  
 TGGAAACCGATACACTGCTGCTGTGGGTGCTGCTGTGCTGTGGGTGCCAGGATCCACAGGCAATTTTATGC  
 TGACTCAGCCCCACTCTGTGTCGGAGTCTCCGGGGAAGACGGTAACCATCTCCTGCACCCGCAGCAGTG  
 GCAGCATTGCCAGCAACTATGTGCAGTGGTACCAGCAGCGCCCGGGCAGTTCCCCCACCCTGTGATCT  
 10 ATGAGGATAACCAAAGACCCTCTGGGGTCCCTGATCGGTTCTCTGGCTCCATCGACAGCTCCTCCA  
 CTGCCTCCCTACCATCTCTGGACTGAAGACTGAGGACGAGGCTGACTACTACTGTCAGTCTTATGATA  
 GCAGCAATTGGGTGTTTCGGCGAGGGACCAAGCTGACCGTCCTAGGTTCTAGAGGTGGTGGTAGCG  
 GCGGCGGCGGCTCTGGTGGTGGTGGATCCCTCGAGATGGCCGAGGTCCAGCTGGTGCAGTCTGGGGCTG  
 AGGTGAAGAAGCCTGGGTCCCTCGGTGAAGGTCTCCTGCAAGGCTTCTGGAGGCACCTTCAGCAGCTATG  
 15 CTATCAGCTGGGTGCGACAGGCCCTGGACAAGGGCTTGAGTGGATGGGAGGGATCATCCCTATCTTTG  
 GTACAGCAAACTACGCACAGAAAGTTCCAGGGCAGAGTCACGATTACCGCGGACGAATCCACGAGCACAG  
 CCTACATGGAGCTGAGCAGCCTGAGATCTGAGGACACGGCCGTGTATTACTGTGCGCGCTCTAACTACT  
 ACTACAACGATTACTGGGGTCAAGGTACTCTGGTGACCGTCTCCTCAGCGGCCGCACCCACCACGACGC



CAGCGCCGCGACCACCAACCCCGGCGCCACGATCGCGTCGCAGCCCCGTGCCCTGCGCCCAGAGGCGT  
GCCGGCCAGCGGCGGGGGGCGCAGTGCACACGAGGGGGCTGGACTTCGCCTGTGATATCTACATCTGGG  
CGCCCCCTGGCCGGGACTTGTGGGGTCCTTCTCCTGTCACTGGTTATCACCCCTTTACTGCAACAAACGGG  
GCAGAAAGAAGCTCCTGTATATATTCAAACAACCATTTATGAGACCAGTACAACTACTCAAGAGGAAG  
5 ATGGCTGTAGCTGCCGATTTCCAGAAGAAGAAGAAGGAGGATGTGAACTGAGAGTGAAGTTCAGCAGGA  
GCGCAGAGCCCCCGCGTACCAGCAGGGCCAGAACCAGCTCTATAACGAGCTCAATCTAGGACGAAGAG  
AGGAGTACGATGTTTTGGACAAGAGACGTGGCCGGGACCCTGAGATGGGGGGAAAGCCGAGAAGGAAGA  
ACCCCTCAGGAAGGCCTGTACAATGAACTGCAGAAAGATAAGATGGCGGAGGCCTACAGTGAGATTGGGA  
TGAAAGGCGAGCGCCGGAGGGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGTACAGCCACCAAGG  
10 ACACCTACGACGCCCTTCACATGCAGGCCCTGCCCCCTCGCTAACAGCCACTCGAGGATCCGGATTAGT  
CCAATTTGTTAAAGACAGGATATCAGTGGTCCAGGCTCTAGTTTTGACTCAACAATATCACCAGCTGAA  
GCCTATAGAGTACGAGCCATAGATAAAAATAAAAGATTTTATTTAGTCTCCAGAAAAAGGGGGGAATGAA  
AGACCCACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGCAAGGCATGGAAAAATACATA  
ACTGAGAATAGAGAAGTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAACAGGAT  
15 ATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAA  
CAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCAGATGCGGTC  
CAGCCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTG  
TGCCTTATTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTTTCGCGCGCTTCTGCTCCCCGAGCTCA  
ATAAAAGAGCCCACAACCCCTCACTCGGGGCGCCAGTCCCGATTGACTGAGTCGCCCGGGTACCCGT  
20 GTATCCAATAAACCCCTCTTGCAGTTGCATCCGACTTGTGGTCTCGCTGTTCCCTGGGAGGGTCTCCTCT  
GAGTGATTGACTACCCGTCAGCGGGGGTCTTTACACATGCAGCATGTATCAAAATTAATTTGGTTTTT  
TTTTCTTAAGTATTTACATTAAATGGCCATAGTACTTAAAGTTACATTGGCTTCCTTGAAATAAACATGG  
AGTATTCAGAATGTGTCATAAAATATTTCTAATTTTAAAGATAGTATCTCCATTGGCTTTCTACTTTTTCT  
TTTTATTTTTTTTTTGCTCTGTCTTCCATTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTT  
25 TGGTTAATTTTTTTTTTAAAGATCCTACACTATAGTTCAAGCTAGACTATTAGCTACTCTGTAACCCAGG  
GTGACCTTGAAGTCATGGGTAGCCTGCTGTTTTAGCCTTCCCACATCTAAGATTACAGGTATGAGCTAT  
CATTTTTGGTATATTGATTGATTGATTGATTGATGTGTGTGTGTGTGATTGTGTTTGTGTGTGTGACTG  
TGAAATGTGTGTATGGGTGTGTGTGAATGTGTGTATGTATGTGTGTGTGTGAGTGTGTGTGTGTGTGT  
GTGCATGTGTGTGTGTGTGACTGTGTCTATGTGTATGACTGTGTGTGTGTGTGTGTGTGTGTGTGTGT  
30 TGTGTGTGTGTGTGTGTTGTGAAAAAATATTCTATGGTAGTGAGAGCCAACGCTCCGGCTCAGGTGTCA  
GGTTGGTTTTTTGAGACAGAGTCTTTCACCTAGCTTGGAATTCACITGGCCGTCGTTTTACAACGTCGTGA  
CTGGGAAAACCCCTGGCGTTACCCAACTTAATCGCCTTGACGACATCCCCCTTTCCGAGCTGGCGTAA  
TAGCGAAGAGGCCCCGACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCCTGAT  
GCGGTATTTTTCTCCTTACGCATCTGTGCGGTATTTACACCCGCATATGGTGCACCTCTCAGTACAATCTG  
35 CTCTGATGCCGCATAGTTAAGCCAGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACGGGCTTG  
TCTGCTCCCGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATGTGTCTCAGAGTTTTTC  
ACCGTCATCACCGAAACGCGCGATGACGAAAGGGCCTCGTGATACGCCTATTTTTATAGGTTAATGTCA  
TGATAATAATGGTTTTCTTAGACGTGAGTGGCACTTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTT  
TATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCTGATAAATGCTTCAATAAT  
40 ATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCTTATTCCCTTTTTTGCGGCATTTT

GCCTTCCTGTTTTTGTCTACCCAGAAACGCTGGTGAAAAGTAAAAGATGCTGAAGATCAGTTGGGTGCAC  
GAGTGGGTTACATCGAACTGGATCTCAACAGCGGTAAAGATCCTTGAGAGTTTTTCGCCCCGAAGAACGTT  
TTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTATTGACGCCGGGCAAG  
AGCAACTCGGTTCGCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGC  
5 ATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCCATAACCATGAGTGATAACACTGCGG  
CCAACCTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATC  
ATGTAACCTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACGAGCGTGACACCA  
CGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACTATTAACCTGGCGAACTACTTACTCTAGCTTCCC  
GGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCCTTCTGCGCTCGGCCCTTCCGG  
10 CTGGCTGGTTTTATTGCTGATAAACTGAGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGG  
GGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAAC  
GAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTAACTGTCAGACCAAGTTTACT  
CATATATACTTTAGATTGATTTAAACTTCATTTTTTAATTTAAAAGGATCTAGGTGAAGATCCTTTTTTG  
ATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGA  
15 TCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAACCACCGC  
TACCAGCGGTGGTTTTGTTTGGCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAAGTGGCTTCAGCA  
GAGCGCAGATACCAAACTGTCTTCTAGTGTAGCCGTAGTTAGGCCACCCTTCAAGAACTCTGTAG  
CACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTC  
TTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTGCGGGCTGAACGGGGGGTTTCGT  
20 GCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCATTGAGAAA  
GCGCCACGCTTCCCCGAAGGGAGAAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGC  
GCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTGCGGTTTTGCCACCTCTGAC  
TTGAGCGTCGATTTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCT  
TTTTACGGTTCCTGGCCTTTTTGCTGGCCTTTTTGCTCACATGTTCTTTCTGCGTTATCCCTGATTCTG  
25 TGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCG  
AGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCCCCGCGCGTTGGCCGATTCT  
ATTAATGCAGCTGGCACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGA  
GTTAGCTCACTCATTAGGCACCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGTGGAATTG  
TGAGCGGATAACAATTTACACAGGAAAACAGCTATGACCATGATTACGCCAAGCTTTGCTCTTAGGAGT  
30 TTCCTAATACATCCCAAACCTCAAATATATAAAGCATTTGACTTGTTCTATGCCCTAGGGGGCGGGGGGA  
AGCTAAGCCAGCTTTTTTTTAACATTTAAAAATGTTAATTCATTTTAAATGCACAGATGTTTTTATTTCA  
TAAGGGTTTCAATGTGCATGAATGCTGCAATATTCCTGTTACCAAAGCTAGTATAAATAAAAAATAGATA  
AACGTGGAAATTACTTAGAGTTTCTGTCAATTAACGTTTCCTTCCTCAGTTGACAACATAAATGCGCTGC  
TGAGCAAGCCAGTTTGATCTGTGACGATCAATTTCCCATTTATGCCAGTCATATTAATTACTAGTCAAT  
35 TAGTTGATTTTTATTTTTGACATATACATGTGAATGAAAGACCCACCTGTAGGTTTGGCAAGCTAGCT  
TAAGTAACGCCATTTTGAAGGCATGGAAAAATACATAACTGAGAATAGAAAAGTTTCAAGTCAAGGTCA  
GGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCTTGCCCCGGCTCA  
GGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCTTGCCCC  
GGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAG  
40 ATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTCGCT

- TCTCGCTTCTGTTTCGCGCGCTTATGCTCCCCGAGCTCAATAAAAAGAGCCCACAACCCCTCACTCGGGGC  
GCCAGTCTCTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGCAGTTGCATCC  
GACTTGTGGTCTCGCTGTTCCCTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTT  
TCATTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGACCACCGACCCACCACCGGGAGGTAA  
5 GCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGTCTATGACTGATTTTATGCGCCTGCGTC  
GGTACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCCGTGGTGGAAGTACGAGTTTCGGAACACCCG  
GCCGCAACCCCTGGGAGACGTCCAGGGACTTCGGGGGCCGTTTTTGTGGCCCGACCTGAGTCCTAAAAT  
CCCGATCGTTTAGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGACGAG  
AACCTAAAACAGTTCCCGCCTCCGTCTGAATTTTTGCTTTTCGGTTTGGGACCGAAGCCGCGCCGCGCGT  
10 CTTGTCTGCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTGTTTCTGTATTTGTCTGAAAATATG  
GGCCCGGGCTAGACTGTTACCACTCCCTTAAAGTTTGACCTTAGGTCACTGGAAGATGTCGAGCGGATC  
GCTCACAACCAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCAGAATGGCCAACC  
TTTAACGTCGGATGGCCGCGAGACGGCACCTTTAACCAGACCTCATCACCCAGGTAAAGATCAAGGTC  
TTTTACCTGGCCCGCATGGACACCCAGACCAGGTCCCCTACATCGTGACCTGGGAAGCCTTGGCTTTT  
15 GACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCTCTTCCCTCCATCCGCCCCG  
TCTCTCCCCCTTGAACCTCCTCGTTTCGACCCCGCCTCGATCCTCCCTTTATCCAGCCCTCACTCCTTCT  
CTAGGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCGCCCCCTTGTAACCTTCCCTGAC  
CCTGACATGACAAGAGTTACTAACAGCCCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTAGTCCAG  
CACGAAGTCTGGAGACCTCTGGCGGCAGCTACCAAGAACAACCTGGACCGA [SEQ ID NO:954].  
20 The isolated nucleic acid molecule having the nucleotide sequence of SEQ ID  
NO:954 encodes a FcRL-5-targeted CAR (designated as 39 FcRL5-targeted BBz  
CAR) comprising a fully human scFv (encoded by nucleotides 207-1013 of SEQ ID  
NO:954) that comprises a heavy chain variable region comprising amino acids having  
the sequence set forth in SEQ ID NO:144, a light chain variable region comprising  
25 amino acids having the sequence set forth in SEQ ID NO:143, and a linker having an  
amino acid sequence of SEQ ID NO:307 positioned between the heavy chain variable  
region and the light chain variable region, a transmembrane domain comprising a  
CD8 polypeptide having 137 to 207 of SEQ ID NO: 960, and an intracellular domain  
comprising a CD3 $\xi$  polypeptide comprising amino acids 52 to 163 of SEQ ID NO:  
30 941, and a co-stimulatory signaling region comprising a 4-1BB polypeptide having  
amino acids 214-255 of SEQ ID NO: 943. Nucleotides 207-1013 of SEQ ID NO: 954  
encodes the human scFv. Nucleotides 1023-1235 of SEQ ID NO: 954 encodes the  
CD8 polypeptide comprised in the transmembrane domain. Nucleotides 1236-1361 of  
SEQ ID NO: 954 encodes the 4-1BB polypeptide comprised in the intracellular  
35 domain. Nucleotides 1362-1700 of SEQ ID NO: 954 encodes the CD3zeta

polypeptide comprised in the intracellular domain. Other portions of SEQ ID NO: 954 are shown in Table 233.

Table 233

| Portions           | Nucleotide Sequence<br>Positions of SEQ ID NO:<br>954 | Number of Nucleotides |
|--------------------|-------------------------------------------------------|-----------------------|
| anti-FcRL5 scFv 39 | 207..1013                                             | 807                   |
| CD8a TM            | 1023..1235                                            | 213                   |
| 4-1BB              | 1236..1361                                            | 126                   |
| CD3zeta            | 1362..1700                                            | 339                   |
| LTR                | 1980..2449                                            | 470                   |
| M13 fwd            | 3148..3164                                            | 17                    |
| AmpR promoter      | 3639..3743                                            | 105                   |
| AmpR               | 3744..4604                                            | 861                   |
| ori                | 4775..5363                                            | 589                   |
| CAP binding site   | 5651..5672                                            | 22                    |
| lac promoter       | 5687..5717                                            | 31                    |
| lac operator       | 5725..5741                                            | 17                    |
| M13 rev            | 5749..5765                                            | 17                    |
| LTR                | 6174..6767                                            | 594                   |
| MMLV Psi           | 6830..7187                                            | 358                   |
| gag (truncated)    | 7252..7668                                            | 417                   |

5

In certain embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:955 provided below:

CCGGTGGTACCTCACCCCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTA  
 GAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATC  
 10 GCAGCTTGATACACGCCGCCACGTGAAGGCTGCCGACCCCGGGGTGGACCATCTCTAGACTGCCA  
 TGGAAACCGACACCCTGCTGCTGTGGGTGCTGCTGCTGTGGGTGCCAGGATCCACAGGACAGTCTGTCTG  
 TGACGCAGCCACCCCTCAGCGTCTGGGACCCCGGGCAGAGGGTCACCATCTCTTGTCTGGAAGCAGCT  
 CCAACATCGGAAGTAATTATGTATACTGGTACCAGCAGCTCCCAGGAACGGCCCCCAAATCCTCATCT  
 ATAGTAATAATCAGCGGCCCTCAGGGGTCCCTGACCGATTCTCTGGCTCCAAGTCTGGCACCTCAGCCT  
 15 CCCTGGCCATCAGTGGGCTCCGGTCCGAGGATGAGGCTGATTATTACTGTGCAGCATGGGATGACAGCC

TGAGTGGTTATGCTCTTCGGAACCTGGGACCAAGCTGACCGTCCCTAGGTTCTAGAGGTGGTGGTAGCG  
 GCGGCGGCGGCTCTGGTGGTGGTGGATCCCTCGAGATGGCCCAGGTGCAGCTACAGCAGTGGGGCGCAG  
 GACTGTTGAAGCCTTCGGAGACCCTGTCCCTCACCTGCGCTGTCTATGGTGGGTCCCTTCAGTGGTTACT  
 ACTGGAGCTGGATCCGCCAGCCCCAGGGAAGGGGCTGGAGTGGATTGGGGAAATCAATCATAGTGGAA  
 5 GCACCAACTACAACCCGTCCCTCAAGAGTTCGAGTACCATATCAGTAGACACGTCCAAGAACCAGTTCT  
 CCCTGAAGCTGAGCTCTGTGACCGCCGCGGACACGGCCGTGTATTACTGTGCGCGCCTGTACGAAGGTG  
 GTTACCATGGTTGGGGTTCTTGGCTGTCTTCTGATTCTTGGGGTCAAGGTACTCTGGTGACCGTCTCCT  
 CAGCGGCCGCACCCACCACGACGCCAGCGCCGCGACCACCAACCCCGGCGCCACGATCGCGTCGCAGO  
 CCCTGTCCCTGCGCCCAGAGGCGTGCCGGCCAGCGGCGGGGGGCGCAGTGCACACGAGGGGGCTGGACT  
 10 TCGCCTGTGATATCTACATCTGGGCGCCCCTGGCCGGGACTTGTGGGGTCCCTTCTCCTGTCACTGGTTA  
 TCACCCTTTACTGCAACAAACGGGGCAGAAAGAAGCTCCTGTATATATTCAAACAACCATTTATGAGAC  
 CAGTACAAACTACTCAAGAGGAAGATGGCTGTAGCTGCCGATTTCCAGAAGAAGAAGAAGGAGGATGTG  
 AACTGAGAGTGAAGTTCAGCAGGAGCGCAGAGCCCCCGCGTACCAGCAGGGCCAGAACCAGCTCTATA  
 ACGAGCTCAATCTAGGACGAAGAGAGGAGTACGATGTTTTGGACAAGAGACGTGGCCGGGACCCTGAGA  
 15 TGGGGGGAAAGCCGAGAAGGAAGAACCCTCAGGAAGGCCTGTACAATGAACTGCAGAAAGATAAGATGG  
 CGGAGGCCTACAGTGAGATTGGGATGAAAGGCGAGCGCCGGAGGGGCAAGGGGCACGATGGCCTTTACC  
 AGGGTCTCAGTACAGCCACCAAGGACACCTACGACGCCCTTCACATGCAGGCCCTGCCCCCTCGCTAAC  
 AGCCACTCGAGGATCCGGATTAGTCCAATTTGTTAAAGACAGGATATCAGTGGTCCAGGCTCTAGTTTT  
 GACTCAACAATATCACCAGCTGAAGCCTATAGAGTACGAGCCATAGATAAAATAAAAGATTTTATTTAG  
 20 TCTCCAGAAAAAGGGGGGAATGAAAGACCCACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATT  
 TTGCAAGGCATGGAATAACATAACTGAGAATAGAGAAGTTCAGATCAAGGTCAGGAACAGATGGAAC  
 AGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTTCTGCCCCGGCTCAGGGCCAAGAACAGA  
 TGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTTCTGCCCCGGCTCAGGGCCAAG  
 AACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTG  
 25 CCCCAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTTC  
 GCGCGCTTCTGCTCCCCGAGCTCAATAAAAGAGCCACAACCCCTCACTCGGGGCGCCAGTCTCCGAT  
 TGA CTGAGTGC CCCGGGTACCCGTGTATCCAATAAACCCCTCTTG CAGTTGCATCCGACTTGTGGTCTCG  
 CTGTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTGACGCGGGGTCTTTACACATGCAGCA  
 TGTATCAAAATTAATTTGGTTTTTTTTCTTAAGTATTTACATTAAATGGCCATAGTACTTAAAGTTACA  
 30 TTGGCTTCCTTGAAATAAACATGGAGTATTCAGAATGTGTCATAAATATTTCTAATTTTAAGATAGTAT  
 CTCCATTGGCTTTCTACTTTTTCTTTATTTTTTTTTTGTCCTCTGTCTTCCATTTGTTGTTGTTGTTGT  
 TTGTTTGTGTTGTTGTTGTTGTTGTTGTTAATTTTTTTTTTAAAGATCCTACACTATAGTTCAAGCTAGA  
 CTATTAGCTACTCTGTAACCCAGGGTGACCTTGAAGTCATGGGTAGCCTGCTGTTTTAGCCTTCCCACA  
 TCTAAGATTACAGGTATGAGCTATCATTTTTGGTATATTGATTGATTGATTGATTGATGTGTGTGTGTG  
 35 TGATTGTGTTTGTGTGTGTGACTGTGAAATGTGTGTATGGGTGTGTGTGAATGTGTGTATGTATGTGT  
 GTGTGTGAGTGTGTGTGTGTGTGTGTGTGTCATGTGTGTGTGTGTGACTGTGTCTATGTGTATGACTGTGTG  
 TGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT  
 GCCAACGCTCCGGCTCAGGTGTCAGGTTGGTTTTTTGAGACAGAGTCTTTCACTTAGCTTGAATTCACT  
 40 GGCCGTCGTTTTACAACGTCGTGACTGGGAAAACCCTGGCGTTACCCAACCTTAATCGCCTTGCAGCACA  
 TCCCCCTTTTCGCCAGCTGGCGTAATAGCGAAGAGGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAG

CCTGAATGGCGAATGGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTACACCCGCAT  
ATGGTGCACCTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGCCCCGACACCCGCCAACACC  
CGCTGACGCGCCCTGACGGGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGG  
GAGCTGCATGTGTCAGAGGTTTTACCGTTCATCACCAGAAACGCGCGATGACGAAAGGGCCTCGTGATAC  
5 GCCTATTTTTATAGGTTAATGTCATGATAATAATGGTTTTCTTAGACGTCAGGTGGCACTTTTCGGGGAA  
ATGTGCGCGGAACCCCTATTTGTTTATTTTTCTAAAATACATTCAAATATGTATCCGCTCATGAGACAAT  
AACCTTGATAAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCC  
TTATTTCCCTTTTTTGGCGCATTTTGCCTTCCTGTTTTTGTCTACCCAGAAACGCTGGTGAAAGTAAAAG  
ATGCTGAAGATCAGTTGGGTGCACGAGTGGGTTACATCGAACTGGATCTCAACAGCGGTAAGATCCTTG  
10 AGAGTTTTTCGCCCCGAAGAACGTTTTTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTAT  
TATCCCGTATTGACGCCGGGCAAGAGCAACTCGGTGCGCGCATACACTATTCTCAGAATGACTTGGTTG  
AGTACTCACCAGTCACAGAAAAGCATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGTGCCA  
TAACCATGAGTGATAACACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCG  
CTTTTTTGACAACATGGGGGATCATGTAACCTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCA  
15 TACCAAACGACGAGCGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACATTAACTG  
GCGAACTACTTACTCTAGCTTCCCGGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGAC  
CACTTCTGCGCTCGGCCCTTCCGGCTGGCTGGTTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGT  
CTCGCGGTATCATTGCAGCACTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGG  
GGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATT  
20 GGTAACGTGCAGACCAAGTTTACTCATATATACTTTAGATTGATTTAAACTTTCATTTTTAATTTAAAA  
GGATCTAGGTGAAGATCCTTTTTTGATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACT  
GAGCGTCAGACCCCGTAGAAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCT  
GCTTGCAAAACAAAAAACACCAGCTACACGCGGTGGTTTTGTTTGCCGGATCAAGAGCTACCAACTCTTT  
TTCCGAAGGTAACCTGGCTTCAGCAGAGCGCAGATACCAAAATACTGTCTTCTAGTGTAGCCGTAGTTAG  
25 GCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTG  
CTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGC  
GGTCGGGCTGAACGGGGGGTTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGAT  
ACCTACAGCGTGAGCATTGAGAAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAA  
GCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTC  
30 CTGTCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTAT  
GGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCTTGCCCTTTTGCTGGCCTTTTGCTCACATGTTCT  
TTCTGCGTTATCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCC  
GCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGC  
CTCTCCCCGCGCGTTGGCCGATTCAATTAATGCAGCTGGCACGACAGGTTTCCGACTGGAAAGCGGGCA  
35 GTGAGCGCAACGCAATTAATGTGAGTTAGCTCACTCATTAGGCACCCAGGCTTTACACTTTATGCTTC  
CGGCTCGTATGTTGTGTGGAATTGTGAGCGGATAACAATTTACACAGGAAACAGCTATGACCATGATT  
ACGCCAAGCTTTGCTCTTAGGAGTTTCTAATACATCCCAAACCTCAAATATATAAAGCATTGTACTTGT  
TCTATGCCCTAGGGGGCGGGGGAAGCTAAGCCAGCTTTTTTTAACATTTAAATGTTAATTCCATTTT  
AAATGCACAGATGTTTTTATTTTATAAGGGTTTCAATGTGCATGAATGCTGCAATATTCCTGTTACCAA  
40 AGCTAGTATAAAATAAAATAGATAAACGTGGAAATTACTTAGAGTTTCTGTCATTAACGTTTCCTTCCT

CAGTTGACAACATAAAATGCGCTGCTGAGCAAGCCAGTTTGCATCTGTCAGGATCAATTTCCATTATGC  
CAGTCATATTAATTACTAGTCAATTAGTTGATTTTTATTTTTGACATATACATGTGAATGAAAGACCCC  
ACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGCAAGGCATGGAAAAATACATAACTGAGA  
ATAGAAAAGTTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTG  
5 GTAAGCAGTTCTTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATA  
TCTGTGGTAAGCAGTTCTTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCT  
CAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTGTGCCTTA  
TTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTTTCGCGCGCTTATGCTCCCCGAGCTCAATAAAAG  
AGCCCACAACCCCTCACTCGGGGCGCCAGTCTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTATCCA  
10 ATAAACCCCTCTTGACAGTTGCATCCGACTTGTGGTCTCGCTGTTCCCTTGGGAGGGTCTCCTCTGAGTGAT  
TGACTACCCGTCAGCGGGGTCTTTCATTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGAC  
CACCGACCCACCACCGGGAGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGTCTA  
TGACTGATTTTATGCGCCTGCGTCGGTACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCCGTGGTG  
GAACTGACGAGTTTCGGAACACCCGGCCGCAACCTGGGAGACGTCCCAGGGACTTCGGGGGCCGTTTTT  
15 GTGGCCCGACCTGAGTCCTAAAATCCCGATCGTTTAGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGA  
TATGTGGTTCTGGTAGGAGACGAGAACCATAAACAGTTCCCGCCTCCGTCTGAATTTTTGCTTTCGGTT  
TGGGACCGAAGCCGCGCCGCGCTCTTGCTGCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTG  
TTTCTGTATTTGTCTGAAAATATGGGCCCGGGCTAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGT  
CACTGGAAAGATGTCGAGCGGATCGCTCACAACCAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACC  
20 TTCTGCTCTGCAGAAATGGCCAACCTTTAACGTCGGATGGCCGCGAGACGGCACCTTTAACCGAGACCTC  
ATCACCCAGGTTAAGATCAAGGTCTTTTACCTGGCCCGCATGGACACCCAGACCAGGTCCCTTACATC  
GTGACCTGGGAAGCCTTGGCTTTTGAACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCTAAGCCTCCG  
CCTCCTCTTCCCTCCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTCGACCCCGCTCGATCCTCC  
CTTTATCCAGCCCTCACTCCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCC  
25 CCGCCCCCTTGTAACCTTCCCTGACCCTGACATGACAAGAGTTACTAACAGCCCCTCTCTCCAAGCTCAC  
TTACAGGCTCTCTACTTAGTCCAGCACGAAGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAACCTG  
GACCGA [SEQ ID NO:955]. The isolated nucleic acid molecule having the  
nucleotide sequence of SEQ ID NO:955 encodes a FcRL-5-targeted CAR (designated  
as 69 FcRL5-targeted BBz CAR) comprising a fully human scFv (encoded by  
30 nucleotides 207-1037 of SEQ ID NO:955) that comprises a heavy chain variable  
region comprising amino acids having the sequence set forth in SEQ ID NO:172, a  
light chain variable region comprising amino acids having the sequence set forth in  
SEQ ID NO:171, and a linker having an amino acid sequence of SEQ ID NO:307  
positioned between the heavy chain variable region and the light chain variable  
35 region, a transmembrane domain comprising a CD8 polypeptide having 137 to 207 of  
SEQ ID NO: 960, and an intracellular domain comprising a CD3 $\xi$  polypeptide  
comprising amino acids 52 to 163 of SEQ ID NO: 941, and a co-stimulatory signaling

region comprising a 4-1BB polypeptide having amino acids 214-255 of SEQ ID NO: 943. Nucleotides 207-1037 of SEQ ID NO: 955 encodes the human scFv. Nucleotides 1047-1259 of SEQ ID NO: 955 encodes the CD8 polypeptide comprised in the transmembrane domain. Nucleotides 1260-1385 of SEQ ID NO: 955 encodes the 4-1BB polypeptide comprised in the intracellular domain. Nucleotides 1386-1724 of SEQ ID NO: 955 encodes the CD3zeta polypeptide comprised in the intracellular domain. Other portions of SEQ ID NO: 955 are shown in Table 234.

Table 234

| Portions           | Nucleotide Sequence Positions of SEQ ID NO: 955 | Number of Nucleotides |
|--------------------|-------------------------------------------------|-----------------------|
| anti-FcRL5 scFv 69 | 207..1037                                       | 831                   |
| CD8a TM            | 1047..1259                                      | 213                   |
| 4-1BB              | 1260..1385                                      | 126                   |
| CD3zeta            | 1386..1724                                      | 339                   |
| LTR                | 2004..2473                                      | 470                   |
| M13 fwd            | 3172..3188                                      | 17                    |
| AmpR promoter      | 3663..3767                                      | 105                   |
| AmpR               | 3768..4628                                      | 861                   |
| ori                | 4799..5387                                      | 589                   |
| CAP binding site   | 5675..5696                                      | 22                    |
| lac promoter       | 5711..5741                                      | 31                    |
| lac operator       | 5749..5765                                      | 17                    |
| M13 rev            | 5773..5789                                      | 17                    |
| LTR                | 6198..6791                                      | 594                   |
| MMLV Psi           | 6854..7211                                      | 358                   |
| gag (truncated)    | 7276..7692                                      | 417                   |

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In certain embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:956 provided below:



CCGGTGGTACCTCACCCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTA  
GAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATC  
GCAGCTTGGATACACGCCGCCACGTGAAGGCTGCCGACCCCGGGGGTGGACCATCCTCTAGACTGCCA  
TGGAAACCGACACCCTGCTGCTGTGGGTGCTGCTGCTGTGGGTGCCAGGATCCACAGGAAATTTTATGC  
5 TGA CT CAGCCCCACTCTGTGTGGAGTCTCCGGGGAAGACGGTAACCATCTCCTGCACCCGCAGCAGTG  
GCAGCATTGCCAGCAACTATGTGCAGTGGTACCAGCAGCGCCCGGGCAGTGCCCCCACCCTGTGATCT  
ATGAGGATAACCAAAGACCCTCTGGGGTCCCTGATCGGTTCTCTGGCTCCATCGACAGCTCCTCCA  
CTGCCTCCCTCACCATCTCTGGACTGAAGACTGAGGACGAGGCTGACTACTACTGTGAGTCTTATGATA  
GCAGCAATGTGGTATTCGGCGGAGGGACCAAGGTCACCGTCTTAGGTTCTAGAGGTGGTGGTGGTAGCG  
10 GCGGCGGCGGCTCTGGTGGTGGTGGATCCCTCGAGATGGCCGAGGTGCAGCTGGTGGAGTCTGGGGGAG  
GCTTGGTACAGCCTGGAGGGTCCCTGAGACTCTCCTGTGCAGCCTCTGGATTACCTTCAGTAGTTATG  
AAATGAACTGGGTCCGCCAGGCTCCAGGGAAGGGGCTGGAGTGGGTTTCATACATTAGTAGTAGTGGTA  
GTACCATATACTACGCAGACTCTGTGAAGGGCCGATTACCATCTCCAGAGACAACGCCAAGAACTCAC  
TGTATCTGCAAATGAACAGCCTGAGAGCCGAGGACACGGCTGTTTATTACTGTGCACGCTGGGACTACG  
15 GTATGGACGTCTGGGGCCAAGGGACCACGGTCACCGTCTCCTCAGCGGCCGCACCCACCACGACGCCAG  
CGCCGCGACCACCAACCCCGCGGCCACGATCGCGTCGCAGCCCCTGTCCCTGCGCCCAGAGGCGTGCC  
GGCCAGCGGCGGGGGGCGCAGTGCACACGAGGGGGCTGGACTTCGCCTGTGATATCTACATCTGGGCGC  
CCCTGGCCGGGACTTGTGGGGTCTTCTCCTGTCACTGGTTATCACCTTTTACTGCAACAAACGGGGCA  
GAAAGAAGCTCCTGTATATATTCAAACAACCATTTATGAGACCAGTACAACTACTCAAGAGGAAGATG  
20 GCTGTAGCTGCCGATTTCCAGAAGAAGAAGAGGAGTGTGAACTGAGAGTGAAGTTCAGCAGGAGCG  
CAGAGCCCCCGCGTACCAGCAGGGCCAGAACCAGCTCTATAACGAGCTCAATCTAGGACGAAGAGAGG  
AGTACGATGTTTTGGACAAGAGACGTGGCCGGGACCCTGAGATGGGGGGAAAGCCGAGAAGGAAGAACC  
CTCAGGAAGGCCTGTACAATGAACTGCAGAAAGATAAGATGGCGGAGGCCTACAGTGAGATTGGGATGA  
AAGGCGAGCGCCGGAGGGGCAAGGGGCACGATGGCCTTTACCAGGTCTCAGTACAGCCACCAAGGACA  
25 CCTACGACGCCCTTCACATGCAGGCCCTGCCCCCTCGCTAACAGCCACTCGAGGATCCGGATTAGTCCA  
ATTTGTTAAAGACAGGATATCAGTGGTCCAGGCTCTAGTTTTGACTCAACAATATCACCAGCTGAAGCC  
TATAGAGTACGAGCCATAGATAAAATAAAAGATTTTATTTAGTCTCCAGAAAAAGGGGGGAATGAAAGA  
CCCCACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGAAGGCATGGAAAAATACATAACT  
GAGAATAGAGAAGTTCAGATCAAGGTGAGGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATC  
30 TGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAG  
GATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAG  
CCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTGTGC  
CTTATTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTTTCGCGCGCTTCTGCTCCCCGAGCTCAATA  
AAAGAGCCCACAACCCCTCACTCGGGGCGCCAGTCTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTA  
35 TCCAATAAACCCCTCTTGCAAGTTGCATCCGACTTGTGGTCTCGCTGTTTCTTGGGAGGGTCTCCTCTGAG  
TGATTGACTACCCGTCAGCGGGGGTCTTTCACACATGCAGCATGTATCAAAATTAATTTGGTTTTTTTT  
CTTAAGTATTTACATTAATGGCCATAGTACTTAAAGTTACATTGGCTTCCTTGAAATAAACATGGAGT  
ATTCAGAATGTGTATATAAATATTTCTAATTTTAAGATAGTATCTCCATTGGCTTTCTACTTTTTCTTTT  
ATTTTTTTTTTGTCCTCTGTCTTCCATTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTG  
40 TTAATTTTTTTTTTAAAGATCCTACACTATAGTTCAAGCTAGACTATTAGCTACTCTGTAACCCAGGGTG

ACCTTGAAGTCATGGGTAGCCTGCTGTTTTAGCCTTCCCACATCTAAGATTACAGGTATGAGCTATCAT  
TTTTGGTATATTGATTGATTGATTGATTGATGTGTGTGTGTGTGATTGTGTTTGTGTGTGTGACTGTGA  
AAATGTGTGTATGGGTGTGTGTGAATGTGTGTATGTATGTGTGTGTGTGAGTGTGTGTGTGTGTGTGTG  
CATGTGTGTGTGTGTGACTGTGTCTATGTGTATGACTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT  
5 GTGTGTGTGTGTGTGTGTGAAAAAATATTCTATGGTAGTGAGAGCCAACGCTCCGGCTCAGGTGTCAGGT  
TGGTTTTTGTGACAGAGTCTTTCACTTAGCTTGGAAATCACTGGCCGTCGTTTTACAACGTCGTGACTG  
GGAAAACCTGGCGTTACCCAACCTTAATCGCCTTGACAGCACATCCCCCTTCGCCAGCTGGCGTAATAG  
CGAAGAGGCCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCCTGATGCG  
GTATTTTCTCCTTACGCATCTGTGCGGTATTTACACCCGCATATGGTGCACCTCTCAGTACAATCTGCTC  
10 TGATGCCGCATAGTTAAGCCAGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACGGGCTTGTCT  
GCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATGTGTGAGAGGTTTTACC  
GTCATCACCGAAACGCGCGATGACGAAAGGGCCTCGTGATACGCCTATTTTTATAGGTTAATGTCATGA  
TAATAATGGTTTTCTTAGACGTCAGGTGGCACTTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTTTTAT  
TTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCTGATAAATGCTTCAATAATATT  
15 GAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCTTATCCCTTTTTTTCGGCATTTTGCC  
TTCTGTTTTTTGCTCACCCAGAAACGCTGGTGAAAGTAAAAGATGCTGAAGATCAGTTGGGTGCACGAG  
TGGGTTACATCGAACTGGATCTCAACAGCGGTAAGATCCTTGAGAGTTTTCGCCCCGAAGAAGCTTTTC  
CAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTATTGACGCCGGGCAAGAGC  
AACTCGGTCGCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTACCAGTCACAGAAAAGCATC  
20 TTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCCATAACCATGAGTGATAAACTGCGGCCA  
ACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATCATG  
TAACTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACGAGCGTGACACCACGA  
TGCTGTAGCAATGGCAACAACGTTGCGCAAACTATTAAGTGGCGAACTACTTACTCTAGCTTCCCGGC  
AACAATTAATAGACTGGATGGAGGCGGATAAAAGTTGCAGGACCACTTCTGCGCTCGGCCCTTCCGGCTG  
25 GCTGGTTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGC  
CAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGAGTCAGGCAACTATGGATGAACGAA  
ATAGACAGATCGCTGAGATAGGTGCCCTCACTGATTAAAGCATTGGTAACTGTCAGACCAAGTTTACTCAT  
ATATACTTTAGATTGATTTAAAACTTCATTTTTTAATTTAAAAGGATCTAGGTGAAGATCCTTTTTGATA  
ATCTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCGCTAGAAAAGATCA  
30 AAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAACCACCGCTAC  
CAGCGGTGGTTTTGTTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAAGTGGCTTCAGCAGAG  
CGCAGATACCAAATACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCAC  
CGCCTACATACTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTA  
CCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGTCCGGGCTGAACGGGGGGTTCTGTGCA  
35 CACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCATTGAGAAAGCG  
CCACGCTTCCCGAAGGGAGAAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCCGAACAGGAGAGCGCA  
CGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTGCGGTTTTGCCACCTCTGACTTG  
AGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTT  
TACGGTTCCCTGGCCTTTTTGCTGGCCTTTTGCTCACATGTTCTTTCTGCGTTATCCCTGATTCTGTGG  
40 ATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGT

- CAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCCCCGCGCGTTGGCCGATTCAATT  
AATGCAGCTGGCAGCAGAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGAGTT  
AGCTCACTCATTAGGCACCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGTGGAATTGTGA  
GCGGATAACAATTTACACAGGAAACAGCTATGACCATGATTACGCCAAGCTTTGCTCTTAGGAGTTTC  
5 CTAATACATCCCAAACTCAAATATATAAAGCATTGACTTGTTCTATGCCCTAGGGGGCGGGGGGAAGC  
TAAGCCAGCTTTTTTTAAACATTTAAAATGTTAATTCCATTTTAAATGCACAGATGTTTTATTTTCATAA  
GGGTTTCAATGTGCATGAATGCTGCAATATTCCCTGTTACCAAAGCTAGTATAAATAAAAAATAGATAAAC  
GTGGAAATTACTTAGAGTTTCTGTCAATTAACGTTTCCTTCCTCAGTTGACAACATAAATGCGCTGCTGA  
GCAAGCCAGTTTGCATCTGTGAGGATCAATTTCCCATTTATGCCAGTCATATTAAATTACTAGTCAATTAG  
10 TTGATTTTTATTTTTGACATATACATGTGAATGAAAGACCCACCTGTAGGTTTGGCAAGCTAGCTTAA  
GTAACGCCATTTTGTCAAGGCATGGAAAAATACATAACTGAGAATAGAAAAGTTTCAGATCAAGGTCAGGA  
ACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTTCTGCCCCGGCTCAGGG  
CCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTTCTGCCCCGGC  
TCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAGATG  
15 TTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTTCGCTTCT  
CGCTTCTGTTCGCGCGCTTATGCTCCCCGAGCTCAATAAAAGAGCCACAACCCCTCACTCGGGGCGCC  
AGTCCTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGAGTTGCATCCGAC  
TTGTGGTCTCGCTGTTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTTTCA  
TTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGACCACCGACCCACCACCGGGAGGTAAGCT  
20 GGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGTCTATGACTGATTTTATGCGCCTGCGTCGGT  
ACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCCGTGGTGGAACTGACGAGTTTCGGAACACCCGGCC  
GCAACCCCTGGGAGACGTCCCAGGGACTTCGGGGGCGCTTTTTGTGGCCCGACCTGAGTCCTAAAATCCC  
GATCGTTTAGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGACGAGAAC  
CTAAAACAGTTCCCGCCTCCGTCTGAATTTTTGCTTTTCGGTTTGGGACCGAAGCCGCGCCGCGCTCTT  
25 GTCTGCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTGTTTCTGTATTTGTCTGAAAATATGGGC  
CCGGGCTAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGTCAGTGAAAGATGTCGAGCGGATCGCT  
CACAACCAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCAGAATGGCCAACCTTT  
AACGTCGGATGGCCGCGAGACGGCACCTTTAACCGAGACCTCATACCCAGGTTAAGATCAAGGTCTTT  
TCACCTGGCCCGCATGGACACCCAGACCGTCCCTACATCGTGACCTGGGAAGCCTTGGCTTTTGAC  
30 CCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCTCTTCTCCATCCGCCCCGTCT  
CTCCCCCTTGAACCTCCTCGTTCGACCCCGCTCGATCCTCCCTTTATCCAGCCCTCACTCCTTCTCTA  
GGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCGCCCTTGTAACCTTCCCTGACCCT  
GACATGACAAGAGTTACTAACAGCCCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTAGTCCAGCAC  
GAAGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAACCTGGACCGA [SEQ ID NO:956].  
35 The isolated nucleic acid molecule having the nucleotide sequence of SEQ ID  
NO:956 encodes a FcRL-5-targeted CAR (designated as 104 FcRL5-targeted BBz  
CAR) comprising a fully human scFv (encoded by nucleotides 207-1010) that  
comprises a heavy chain variable region comprising amino acids having the sequence  
set forth in SEQ ID NO:216, a light chain variable region comprising amino acids

having the sequence set forth in SEQ ID NO:215, and a linker having an amino acid sequence of SEQ ID NO:307 positioned between the heavy chain variable region and the light chain variable region, a transmembrane domain comprising a CD8 polypeptide having 137 to 207 of SEQ ID NO: 960, and an intracellular domain comprising a CD3 $\xi$  polypeptide comprising amino acids 52 to 163 of SEQ ID NO: 941, and a co-stimulatory signaling region comprising a 4-1BB polypeptide having amino acids 214-255 of SEQ ID NO: 943. Nucleotides 207-1010 of SEQ ID NO: 956 encodes the human scFv. Nucleotides 1020-1232 of SEQ ID NO: 956 encodes the CD8 polypeptide comprised in the transmembrane domain. Nucleotides 1233-1358 of SEQ ID NO: 956 encodes the 4-1BB polypeptide comprised in the intracellular domain. Nucleotides 1359-1697 of SEQ ID NO: 956 encodes the CD3zeta polypeptide comprised in the intracellular domain. Other portions of SEQ ID NO: 956 are shown in Table 235.

15

Table 235

| Portions           | Nucleotide Sequence<br>Positions of SEQ ID NO:<br>956 | Number of Nucleotides |
|--------------------|-------------------------------------------------------|-----------------------|
| antiFcRL5 scFv 104 | 207..1010                                             | 804                   |
| CD8a TM            | 1020..1232                                            | 213                   |
| 4-1BB              | 1233..1358                                            | 126                   |
| CD3zeta            | 1359..1697                                            | 339                   |
| LTR                | 1977..2446                                            | 470                   |
| M13 fwd            | 3145..3161                                            | 17                    |
| AmpR promoter      | 3636..3740                                            | 105                   |
| AmpR               | 3741..4601                                            | 861                   |
| ori                | 4772..5360                                            | 589                   |
| CAP binding site   | 5648..5669                                            | 22                    |
| lac promoter       | 5684..5714                                            | 31                    |
| lac operator       | 5722..5738                                            | 17                    |
| M13 rev            | 5746..5762                                            | 17                    |
| LTR                | 6171..6764                                            | 594                   |

|                 |            |     |
|-----------------|------------|-----|
| MMLV Psi        | 6827..7184 | 358 |
| gag (truncated) | 7249..7665 | 417 |

In certain embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:957 provided below:

CCGGTGGTACCTCACCCCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTA  
 5 GAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATC  
 GCAGCTTGGATACACGCCGCCACGTGAAGGCTGCCGACCCCGGGGTGGACCATCCTCTAGACTGCCA  
 TGGAAACCGATACACTGCTGCTGTGGGTGCTGCTGCTGTGGGTGCCAGGATCCACAGGCTCCTATGTGC  
 TGA CTCAGCCACCCCTAGTGTCCGTGTCCCCAGGACAGACAGCCAGCATCACCTGCTCTGGAGATAGAT  
 TGACGAATAAATATGTTTCTTGGTATCAACAGAAGCCAGGCCAGTCCCCTGTGTTGGTCATCTATGAGG  
 10 ATGCCAAGCGGCCCTCAGGGATCCCTGCGCGATTCTCTGGGTCCA ACTCTGGGAACACAGCCACTCTGA  
 CCATCAGCGGGACCCAGGCTATGGATGAGTCTGAATATTACTGTGAGGCGTGGGACAGCAGTGTGGTGG  
 TTTTGGCGGAGGGACCAAGCTGACCGTCC TAGGTTCTAGAGGTGGTGGTGGTAGCGGCGGCGGGCT  
 CTGGTGGTGGTGGATCCCTCGAGATGGCCGAGGTGCAGCTGGTGGAGTCTGGGGGAGGCTTGGTACAGC  
 CTGGCAGGTCCCTGAGACTCTCCTGTGCAGCCTCTGGATTTACCTTTGATGATTATGCCATGCACTGGG  
 15 TCCGGCAAGCTCCAGGGAAGGGCCTGGAGTGGGTCTCAGGTATTAGTTGGAATAGTGGTAGTATAGGCT  
 ATGCGGACTCTGTGAAGGGCCGATTACCATCTCCAGAGACAACGCCAAGAACTCCCTGTATCTGCAAA  
 TGAACAGTCTGAGAGATGAGGACACGGCCTTGTATTACTGTGCAAAAGACCGAGGGGGGGGAGTTATCG  
 TTAAGGATGCTTTTGATATCTGGGGCCAAGGGACAATGGTCACCGTCTCTTCAGCGGCCGACCCACCA  
 CGACGCCAGCGCCGCGACCACCAACCCCGCGCCACGATCGCGTCGCAGCCCCGTGCCCTGCGCCCAG  
 20 AGGCGTGCCGGCCAGCGGCGGGGGGCGCAGTGCACACGAGGGGGCTGGACTTCGCCTGTGATATCTACA  
 TCTGGGCGCCCCCTGGCCGGGACTTGTGGGGTCCTTCTCCTGTCACTGGTTATCACCCTTTACTGCAACA  
 AACGGGGCAGAAAGAAGCTCCTGTATATATTCAAACAACCATTTATGAGACCAGTACAACTACTCAAG  
 AGGAAGATGGCTGTAGCTGCCGATTTCCAGAAGAAGAAGGAGGATGTGAAGTGAAGTGAAGTTCA  
 GCAGGAGCGCAGAGCCCCCGGTACCAGCAGGGCCAGAACCAGCTCTATAACGAGCTCAATCTAGGAC  
 25 GAAGAGAGGAGTACGATGTTTTGGACAAGAGACGTGGCCGGGACCCTGAGATGGGGGGAAAGCCGAGAA  
 GGAAGAACCCTCAGGAAGGCCTGTACAATGAACTGCAGAAAGATAAGATGGCGGAGGCCTACAGTGAGA  
 TTGGGATGAAAGGCGAGCGCCGGAGGGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGTACAGCCA  
 CCAAGGACACCTACGACGCCCTTCACATGCAGGCCCTGCCCCCTCGCTAACAGCCACTCGAGGATCCGG  
 ATTAGTCCAATTTGTTAAAGACAGGATATCAGTGGTCCAGGCTCTAGTTTTGACTCAACAATATCACCA  
 30 GCTGAAGCCTATAGAGTACGAGCCATAGATAAAAATAAAAGATTTTATTTAGTCTCCAGAAAAAGGGGGG  
 AATGAAAGACCCACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGAAGGCATGGAAAAA  
 TACATAACTGAGAATAGAGAAGTTCAGATCAAGTTCAGGAACAGATGGAACAGCTGAATATGGGCCAAA  
 CAGGATATCTGTGGTAAGCAGTTTCTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGG  
 GCCAAACAGGATATCTGTGGTAAGCAGTTTCTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGAT  
 35 GCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATG  
 ACCCTGTGCCTTATTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTTTCGCGCGCTTCTGCTCCCCG  
 AGCTCAATAAAAGAGCCCACAACCCCTCACTCGGGGCGCCAGTCTCCGATTGACTGAGTCGCCCGGGT

ACCCGTGTATCCAATAAACCCCTCTTGCAGTTGCATCCGACTTGTGGTCTCGCTGTTCCCTGGGAGGGTC  
TCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTTTCACACATGCAGCATGTATCAAAATTAATTTG  
GTTTTTTTTCTTAAGTATTTACATTAAATGGCCATAGTACTTAAAGTTACATTGGCTTCCTTGAAATAA  
ACATGGAGTATTCAGAATGTGTCATAAAATATTTCTAATTTTAAGATAGTATCTCCATTGGCTTTCTACT  
5 TTTTCTTTTATTTTTTTTTTGTCTCTGTCTTCCATTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTG  
GTTGGTTGGTTAATTTTTTTTTTAAAGATCCTACACTATAGTTCAAGCTAGACTATTAGCTACTCTGTAA  
CCCAGGGTGACCTTGAAGTCATGGGTAGCCTGCTGTTTTAGCCTTCCCACATCTAAGATTACAGGTATG  
AGCTATCATTTTTGGTATATTGATTGATTGATTGATTGATGTGTGTGTGTGTGATTGTGTTTGTGTGTG  
TGACTGTGAAAATGTGTGTATGGGTGTGTGTGAATGTGTGTATGTATGTGTGTGTGTGAGTGTGTGTGT  
10 GTGTGTGTGCATGTGTGTGTGTGTGACTGTGTCTATGTGTATGACTGTGTGTGTGTGTGTGTGTGTGTG  
TGTGTGTGTGTGTGTGTGTGTGTGTGTGAAAAAATATTCTATGGTAGTGAGAGCCAACGCTCCGGCTCAG  
GTGTGAGGTTGGTTTTTGTGACAGAGTCTTTCACCTAGCTTGAATTCACCTGGCCGTCGTTTTACAACG  
TCGTGACTGGGAAAACCCCTGGCGTTACCCAACTTAATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTG  
GCGTAATAGCGAAGAGGCCCGCACCAGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCG  
15 CCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTACACCGCATATGGTGCACCTCTCAGTAC  
AATCTGCTCTGATGCCGCATAGTTAAGCCAGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG  
GGCTTGTCTGCTCCCGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATGTGTGAGAG  
GTTTTACCGTCATCACCGAAACGCGCGATGACGAAAGGGCCTCGTGATACGCCTATTTTTATAGGTTA  
ATGTCATGATAATAATGGTTTCTTAGACGTCAGGTGGCACTTTTCGGGGAAATGTGCGCGGAACCCCTA  
20 TTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCTGATAAATGCTTC  
AATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCTTATTCCCTTTTTTGC GG  
CATTTTGCCTTCCTGTTTTTGTCTACCCAGAAACGCTGGTGAAAGTAAAAGATGCTGAAGATCAGTTGG  
GTGCACGAGTGGGTTACATCGAACTGGATCTCAACAGCGGTAAAGATCCTTGAGAGTTTTCGCCCCGAAG  
AACGTTTTTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTATTGACGCCG  
25 GGCAAGAGCAACTCGGTGCGCGCATACACTATTCTCAGAAAGACTTGGTTGAGTACTACCAGTCACAG  
AAAAGCATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGCTGCCATAACCATGAGTGATAACA  
CTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCCTTTTTTGCACAACATGG  
GGGATCATGTAACCTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACGAGCGTG  
ACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACTATTAAGTGGCGAACTACTTACTCTAG  
30 CTTCCCGGCAACAATTAATAGACTGGATGGAGGCGGATAAAAGTTGCAGGACCACTTCTGCGCTCGGCCC  
TTCCGGCTGGCTGGTTTATTGTGATAAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAG  
CACTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGG  
ATGAACGAAATAGACAGATCGCTGAGATAGGTGCCCTCACTGATTAAGCATTGGTAACGTGCAGACCAAG  
TTTACTCATATATACTTTAGATTGATTTAAACTTCATTTTTTAATTTAAAGGATCTAGGTGAAGATCC  
35 TTTTTGATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTTCGTTCCACTGAGCGTCAGACCCCGTAG  
AAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAAC  
CACCGCTACCAGCGGTGGTTTGTGTGCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAACGGCT  
TCAGCAGAGCGCAGATACCAATACTGTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACT  
CTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGT  
40 CGTGCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTGGGGCTGAACGGGGG

GTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCATT  
GAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAG  
GAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGTTTCGCCACC  
TCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGA AAAACGCCAGCAACG  
5 CGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCTGCGTTATCCCTG  
ATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCGAGC  
GCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCCCCGCGCGTTGGC  
CGATTCAATTAATGCAGCTGGCACGACAGGTTTCCCGACTGGAAGCGGGCAGTGAGCGCAACGCAATTA  
ATGTGAGTTAGCTCACTCATTAGGCACCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGTG  
10 GAATTGTGAGCGGATAACAATTTACACAGGAAACAGCTATGACCATGATTACGCCAAGCTTTGCTCTT  
AGGAGTTTCCCTAATACATCCCAAACCTCAAAATATATAAAGCATTGACTTGTTCTATGCCCTAGGGGGCG  
GGGGGAAGCTAAGCCAGCTTTTTTTAACATTTAAATGTTAATTCCATTTTAAATGCACAGATGTTTTT  
ATTTTATAAGGGTTTCAATGTGCATGAATGCTGCAATATTCCTGTTACCAAAGCTAGTATAAATAAAAA  
TAGATAAACGTGGAAATTACTTAGAGTTTCTGTCATTAAACGTTTCCTTCCTCAGTTGACAACATAAATG  
15 CGCTGCTGAGCAAGCCAGTTTGCATCTGTCAGGATCAATTTCCCATATGCCAGTCATATTAATTACTA  
GTCAATTAGTTGATTTTTATTTTTGACATATACATGTGAATGAAAGACCCACCTGTAGGTTTGGCAAG  
CTAGCTTAAGTAACGCCATTTTGC AAGGCATGGA AAAATACATAACTGAGAATAGAAAAGTT CAGATCA  
AGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCTTGCCCC  
GGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCC  
20 TGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAAC  
CATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCCTGTGCCTTATTTGAACTAACCAATCAG  
TTCGCTTCTCGCTTCTGTTTCGCGCGCTTATGCTCCCCGAGCTCAATAAAAGAGCCCAACCCCTCACT  
CGGGGCGCCAGTCCTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGCA GTT  
GCATCCGACTTGTGGTCTCGCTGTTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGG  
25 GGTCTTTTCA TTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGACCACCGACCCACCACCGGG  
AGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGTCTATGACTGATTTTATGCGCC  
TGCGTCGGTACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCCGTGGTGGAAC TGACGAGTT CGGAA  
CACCCGCGCCGAACCCCTGGGAGACGTCCAGGGACTTCGGGGGCGGTTTTTGTGGCCCGACCTGAGTCC  
TAAAATCCCGATCGTTTAGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGA  
30 GACGAGAACCTAAAACAGTTCCCGCCTCCGCTCTGAATTTTTGCTTTTCGGTTTGGGACCGAAGCCGCGCC  
GCGCGTCTTGCTGCTGCAGCATCGTTCTGTGTTGCTCTGTCTGACTGTGTTTCTGTATTTGTCTGAA  
AATATGGGCCCCGGGCTAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGTCAGTGGAAGATGTCGAG  
CGGATCGCTCACAACCAAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCAG AATGG  
CCAACCTTTAACGTCGGATGGCCGCGAGACGGCACCTTTAACCGAGACCTCATCACCCAGGTTAAGATC  
35 AAGGTCTTTTACCTGGCCCGCATGGACACCCAGACCAGGTCCCCTACATCGTGACCTGGGAAGCCTTG  
GCTTTTGACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCTCTTCCCTCCATCC  
GCCCCGTCTCTCCCCCTTGAACCTCCTCGTTTCGACCCCGCCTCGATCCTCCCTTTATCCAGCCCTCACT  
CCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCGCCCCCTTGTA AACTTC  
CCTGACCCTGACATGACAAGAGTTACTAACAGCCCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTA  
40 GTCCAGCACGAAGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAACCTGGACCGA [SEQ ID

NO:957]. The isolated nucleic acid molecule having the nucleotide sequence of SEQ ID NO:957 encodes a FcRL-5-targeted CAR (designated as 105 FcRL5-targeted BBz CAR) comprising a fully human scFv (encoded by nucleotides 207-1019) that comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:220, a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:219, and a linker having an amino acid sequence of SEQ ID NO:307 positioned between the heavy chain variable region and the light chain variable region, a transmembrane domain comprising a CD8 polypeptide having 137 to 207 of SEQ ID NO: 960, and an intracellular domain comprising a CD3 $\xi$  polypeptide comprising amino acids 52 to 163 of SEQ ID NO: 941, and a co-stimulatory signaling region comprising a 4-1BB polypeptide having amino acids 214-255 of SEQ ID NO: 943. Nucleotides 207-1019 of SEQ ID NO: 957 encodes the human scFv. Nucleotides 1029-1241 of SEQ ID NO: 957 encodes the CD8 polypeptide comprised in the transmembrane domain. Nucleotides 1242-1367 of SEQ ID NO: 957 encodes the 4-1BB polypeptide comprised in the intracellular domain. Nucleotides 1368-1706 of SEQ ID NO: 957 encodes the CD3zeta polypeptide comprised in the intracellular domain. Other portions of SEQ ID NO: 957 are shown in Table 236.

20

Table 236

| Portions           | Nucleotide Sequence Positions of SEQ ID NO: 957 | Number of Nucleotides |
|--------------------|-------------------------------------------------|-----------------------|
| antiFcRL5 scFv 105 | 207..1019                                       | 813                   |
| CD8a TM            | 1029..1241                                      | 213                   |
| 4-1BB              | 1242..1367                                      | 126                   |
| CD3zeta            | 1368..1706                                      | 339                   |
| LTR                | 1986..2455                                      | 470                   |
| M13 fwd            | 3154..3170                                      | 17                    |
| AmpR promoter      | 3645..3749                                      | 105                   |
| AmpR               | 3750..4610                                      | 861                   |
| ori                | 4781..5369                                      | 589                   |



|                  |            |     |
|------------------|------------|-----|
| CAP binding site | 5657..5678 | 22  |
| lac promoter     | 5693..5723 | 31  |
| lac operator     | 5731..5747 | 17  |
| M13 rev          | 5755..5771 | 17  |
| LTR              | 6180..6773 | 594 |
| MMLV Psi         | 6836..7193 | 358 |
| gag (truncated)  | 7258..7674 | 417 |

In certain embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:958 provided below:

CCGGTGGTACCTCACCCCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTA  
 5 GAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATC  
 GCAGCTTGGATACACGCCGCCACGTGAAGGCTGCCGACCCCGGGGTGGACCATCCTCTAGACTGCCA  
 TGGAAACCGACACCCTGCTGCTGTGGGTGCTGCTGCTGTGGGTGCCAGGATCCACAGGACTGCCTGTGC  
 TGA CTCAGCCACCCCTCAGCGTCTGCGACCCCGGGCAGAGGGTCACCATCTCTTGTCTGGAACACCT  
 CCAACATCGGAAGTAATACTGTACACTGGTACCAGCAGCTCCCAGGGACGGCCCCAACTCCTCATCT  
 10 ATAATAATAATCAGCGGCCCTCAGGGGTCCCTGACCGATTCTCTGGCTCCAAGTCTGGCACCTCAGCCT  
 CCCTGGCCATCAGTGGGCTCCGGTCCGAGGATGAGGCTACATATTCCTGTGCAACATGGGATGACAGCC  
 TGAGTGGTGTGGTCTTCGGCGGAGGGACCAAGCTGACCGTCCTAGGTTCTAGAGGTGGTGGTAGCG  
 GCGGCGGCGGCTCTGGTGGTGGTGGATCCCTCGAGATGGCCGAGGTCCAGCTGGTGCAGTCTGGGGCTG  
 AGGTGAAGAAGCCTGGGTCCCTCGGTGAAGGTCTCCTGCAAGGCTTCTGGAGGCACCTTCAGCAGCTATG  
 15 CTATCAGCTGGGTGCGACAGGCCCTGGACAAGGGCTTGAGTGGATGGGAGGGATCATCCCTATCTTTG  
 GTACAGCAAACTACGCACAGAA GTTCCAGGGCAGAGTCACGATTACCGCGGACGAATCCACGAGCACAG  
 CCTACATGGAGCTGAGCAGCCTGAGATCTGAGGACACGGCCGTGTATTACTGTGCGAGAGATCCCGCCT  
 ACGGTGACTACGAGTATGATGCTTTTGATATCTGGGGCCAAGGGACAATGGTCACCGTCTCTTCAGCGG  
 CCGCACCCACCACGACGCCAGCGCCGCGACCACCAACCCCGCGCCACGATCGCGTCGCAGCCCCGTGT  
 20 CCCTGCGCCCAGAGGCGTGCCGGCCAGCGGCGGGGGGCGCAGTGCACACGAGGGGGCTGGACTTCGCCT  
 GTGATATCTACATCTGGGCGCCCCTGCCGGGACTTGTGGGGTCCTTCTCCTGTCACTGGTTATCACCC  
 TTTACTGCAACAAACGGGGCAGAAAGAAGCTCCTGTATATATTCAAACAACCATTTATGAGACCAGTAC  
 AAATACTCAAGAGGAAGATGGCTGTAGCTGCCGATTTCCAGAAGAAGAAGAGGAGGATGTGAAC TGA  
 GAGTGAAGTTT CAGCAGGAGCGCAGAGCCCCCGCTACCAGCAGGGCCAGAACCAGCTCTATAACGAGC  
 25 TCAATCTAGGACGAAGAGAGGAGTACGATGTTTTGGACAAGAGACGTGGCCGGGACCCCTGAGATGGGGG  
 GAAAGCCGAGAAGGAAGAACCCTCAGGAAGGCCTGTACAATGAACTGCAGAAAGATAAGATGGCGGAGG  
 CCTACAGTGAGATTGGGATGAAAGGCGAGCGCCGGAGGGGCAAGGGGCACGATGGCCTTTACCAGGGTC  
 TCAGTACAGCCACCAAGGACACCTACGACGCCCTTCACATGCAGGCCCTGCCCCCTCGCTAACAGCCAC  
 TCGAGGATCCGGATTAGTCCAATTTGTTAAAGACAGGATATCAGTGGTCCAGGCTCTAGTTTTGACTCA  
 30 ACAATATCACCAGCTGAAGCCTATAGAGTACGAGCCATAGATAAAAATAAAAGATTTTATTTAGTCTCCA

GAAAAAGGGGGGAATGAAAGACCCACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGCAA  
GGCATGGAAAAATACATAACTGAGAATAGAGAAGTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGA  
ATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGAAC  
AGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGA  
5 TGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAA  
GGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTTTCGCGCGC  
TTCTGCTCCCCGAGCTCAATAAAAAGAGCCCACAACCCCTCACTCGGGGCGCCAGTCTCCGATTGACTG  
AGTCGCCCCGGGTACCCGTGTATCCAATAAACCCCTCTTGCAATTGCATCCGACTTGTGGTCTCGCTGTTT  
CTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTGAGCGGGGTCTTTCACACATGCAGCATGTATC  
10 AAAATTAATTTGGTTTTTTTTTCTTAAGTATTTACATTAAATGGCCATAGTACTTAAAGTTACATTGGCT  
TCCTTGAAATAAACATGGAGTATTCAGAATGTGTCATAAATATTTCTAATTTTAAAGATAGTATCTCCAT  
TGGCTTTCTACTTTTTCTTTTATTTTTTTTTTGTCTCTGTCTTCCATTTGTTGTTGTTGTTGTTGTTT  
GTTTGTGTTGTTGGTTGGTTGGTTAATTTTTTTTTTAAAGATCCTACACTATAGTTCAAGCTAGACTATTA  
GCTACTCTGTAACCCAGGGTGACCTTGAAGTCATGGGTAGCCTGCTGTTTTAGCCTTCCCACATCTAAG  
15 ATTACAGGTATGAGCTATCATTTTTGGTATATTGATTGATTGATTGATTGATTGATGTGTGTGTGTGTGATTG  
TGTTTGTGTGTGTGACTGTGAAAAATGTGTGTATGGGTGTGTGTGAATGTGTGTATGTATGTGTGTGTGT  
GAGTGTGTGTGTGTGTGTGTGTGATGTGTGTGTGTGTGACTGTGTCTATGTGTATGACTGTGTGTGTGTG  
TGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGAAAAAATATTCTATGGTAGTGAGAGCCAAC  
GCTCCGGCTCAGGTGTGAGGTGGTTTTTGGAGACAGAGTCTTTCACCTTAGCTTGGAAATTCAGTGGCCGT  
20 CGTTTTACAACGTCGTGACTGGGAAAACCCGTGGCGTTACCCAACTTAATCGCCTTGCAGCACATCCCCC  
TTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAA  
TGGCGAATGGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTACACCGCATATGGTG  
CACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGCCCCGACACCCGCCAACACCCGCTGA  
CGCGCCCTGACGGGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTG  
25 CATGTGTCAGAGGTTTTACCGTCATCACCGAAACGCGCGATGACGAAAGGGCCTCGTGATACGCCTAT  
TTTTATAGGTTAATGTCATGATAATAATGGTTTTCTTAGACGTCAGGTGGCACTTTTCGGGGAAATGTGC  
GCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACCCCT  
GATAAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTGCCCCATTATC  
CCTTTTTTGGCGCATTTTGCCTTCCTGTTTTTGTCTACCCAGAAACGCTGGTGAAAGTAAAAGATGCTG  
30 AAGATCAGTTGGGTGCACGAGTGGGTACATCGAACTGGATCTCAACAGCGGTAAGATCCTTGAGAGTT  
TTCGCCCCGAAGAACGTTTTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCC  
GTATTGACGCCGGGCAAGAGCAACTCGGTGCGGCATACACTATTCTCAGAATGACTTGGTTGAGTACT  
CACCAGTCACAGAAAAGCATCTTACGGATGGCATGACAGTAAGAGAATTATGCAGTGTGCCATAACCA  
TGAGTGATAACACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTT  
35 TGCACAACATGGGGGATCATGTAACCTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAA  
ACGACGAGCGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACCTATTAAGTGGCGAAC  
TACTTACTCTAGCTTCCCGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCACTTC  
TGCCTCGGCCCTTCCGGCTGGCTGGTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCG  
GTATCATTGCAGCACTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTC  
40 AGGCAACTATGGATGAACGAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTAAC

TGTCAGACCAAGTTTACTCATATATACTTTAGATTGATTTAAACTTCATTTTTAATTTAAAGGATCT  
AGGTGAAGATCCTTTTTGATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGT  
CAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTCTGCGCGTAATCTGCTGCTTGC  
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTGTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGA  
5 AGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCACC  
ACTTCAAGAACTCTGTAGCACCGCCTACATACTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCA  
GTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCCG  
GCTGAACGGGGGGTTCGTGCACACAGCCCAGCTTGAGCGAACGACCTACACCGAACTGAGATACCTAC  
AGCGTGAGCATTGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGTAAGCGGCA  
10 GGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCTG  
GGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGAAAAA  
ACGCCAGCAACGCGGCCTTTTTACGGTTCCGTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCTG  
CGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCC  
GAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCC  
15 CCGCGCGTTGGCCGATTCATTAATGCAGCTGGCACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGC  
GCAACGCAATTAATGTGAGTTAGCTCACTCATTAGGCACCCAGGCTTTACACTTTATGCTTCCGGCTC  
GTATGTTGTGTGGAATTGTGAGCGGATAACAATTTACACAGGAAACAGCTATGACCATGATTACGCCA  
AGCTTTGCTCTTAGGAGTTTCCTAATACATCCCAAACCTCAAATATATAAAGCATTGTGCTTCTATG  
CCCTAGGGGGCGGGGGAAGCTAAGCCAGCTTTTTTTAAACATTTAAATGTTAATTCCATTTTAAATGC  
20 ACAGATGTTTTTATTTTATAAGGGTTTCAATGTGCATGAATGCTGCAATATTCCTGTTACCAAAGCTAG  
TATAAATAAAAAATAGATAAACGTGGAAATTACTTAGAGTTTCTGTCTTAACGTTTCTTCCCTCAGTTG  
ACAACATAAATGCGCTGCTGAGCAAGCCAGTTTGCATCTGTGAGGATCAATTTCCATTATGCCAGTCA  
TATTAATTACTAGTCAATTAGTTGATTTTTATTTTTGACATATACATGTGAATGAAAGACCCACCTGT  
AGGTTTGGCAAGCTAGCTTAAGTAACGCCATTTTGCAAGGCATGGAAAAATACATAACTGAGAATAGAA  
25 AAGTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGC  
AGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTG  
GTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAG  
TTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTGTGCCTTATTTGAA  
CTAACCAATCAGTTCGCTTCTCGCTTCTGTTTCGCGCGCTTATGCTCCCCGAGCTCAATAAAAGAGCCCA  
30 CAACCCCTCACTCGGGGCGCCAGTCTCCGATTGACTGAGTCGCCCCGGGTACCCGTGTATCCAATAAAC  
CCTCTTGCAAGTTGCATCCGACTTGTGGTCTCGCTGTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTA  
CCCGTCAGCGGGGGTCTTTTATTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGACCACCGA  
CCCACCACCGGGAGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGTCTATGACTG  
ATTTTATGCGCCTGCGTCGGTACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCCGTGGTGGAAGT  
35 ACGAGTTTCGGAACACCCGGCCGCAACCCTGGGAGACGTCCAGGGACTTCGGGGGCCGTTTTTGTGGCC  
CGACCTGAGTCCTAAAATCCCGATCGTTTAGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTG  
GTTCTGGTAGGAGACGAGAACCTAAAACAGTTCCCGCCTCCGTCTGAATTTTTGCTTTCCGTTTGGGAC  
CGAAGCCGCGCCGCGCTTGTCTGCTGCAGCATCGTTCTGTGTTGTCTGTCTGACTGTGTTTCTG  
TATTTGTCTGAAAATATGGGCCCGGGCTAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGTCAGTGG  
40 AAAGATGTCGAGCGGATCGCTCACAAACAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGC

TCTGCAGAAATGGCCAACCTTTAACGTCGGATGGCCGCGAGACGGCACCTTTAACCGAGACCTCATCACC  
 CAGGTTAAGATCAAGGTCTTTTACCTGGCCCGCATGGACACCCAGACCAGGTCCCCTACATCGTGACC  
 TGGGAAGCCTTGGCTTTTGACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCT  
 CTTCTCCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTCGACCCCGCCTCGATCCTCCCTTTAT  
 5 CCAGCCCTCACTCCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCCGCC  
 CTTGTAAACTTCCCTGACCCTGACATGACAAGAGTTACTAACAGCCCCCTCTCTCCAAGCTCACTTACAG  
 GCTCTCTACTTAGTCCAGCACGAAGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAACCTGGACCGA

[SEQ ID NO:958]. The isolated nucleic acid molecule having the nucleotide  
 sequence of SEQ ID NO:958 encodes a FcRL-5-targeted CAR (designated as 109  
 10 FcRL5-targeted BBz CAR) comprising a fully human scFv (encoded by nucleotides  
 207-1031) that comprises a heavy chain variable region comprising amino acids  
 having the sequence set forth in SEQ ID NO:236, a light chain variable region  
 comprising amino acids having the sequence set forth in SEQ ID NO:235, and a  
 linker having an amino acid sequence of SEQ ID NO:307 positioned between the  
 15 heavy chain variable region and the light chain variable region, a transmembrane  
 domain comprising a CD8 polypeptide having 137 to 207 of SEQ ID NO: 960, and an  
 intracellular domain comprising a CD3 $\xi$  polypeptide comprising amino acids 52 to  
 163 of SEQ ID NO: 941, and a co-stimulatory signaling region comprising a 4-1BB  
 polypeptide having amino acids 214-255 of SEQ ID NO: 943. Nucleotides 207-1031  
 20 of SEQ ID NO: 957 encodes the human scFv. Nucleotides 1041-1253 of SEQ ID  
 NO: 958 encodes the CD8 polypeptide comprised in the transmembrane domain.  
 Nucleotides 1254-1379 of SEQ ID NO: 958 encodes the 4-1BB polypeptide  
 comprised in the intracellular domain. Nucleotides 1380-1718 of SEQ ID NO: 958  
 encodes the CD3zeta polypeptide comprised in the intracellular domain. Other  
 25 portions of SEQ ID NO: 958 are shown in Table 237.

Table 237

| Portions            | Nucleotide Sequence<br>Positions of SEQ ID NO:<br>958 | Number of Nucleotides |
|---------------------|-------------------------------------------------------|-----------------------|
| anti-FcRL5 scFv 109 | 207..1031                                             | 825                   |
| CD8a TM             | 1041..1253                                            | 213                   |
| 4-1BB               | 1254..1379                                            | 126                   |

|                  |            |     |
|------------------|------------|-----|
| CD3zeta          | 1380..1718 | 339 |
| LTR              | 1998..2467 | 470 |
| M13 fwd          | 3166..3182 | 17  |
| AmpR promoter    | 3657..3761 | 105 |
| AmpR             | 3762..4622 | 861 |
| ori              | 4793..5381 | 589 |
| CAP binding site | 5669..5690 | 22  |
| lac promoter     | 5705..5735 | 31  |
| lac operator     | 5743..5759 | 17  |
| M13 rev          | 5767..5783 | 17  |
| LTR              | 6192..6785 | 594 |
| MLLV Psi         | 6848..7205 | 358 |
| gag (truncated)  | 7270..7686 | 417 |

In certain embodiments, the isolated nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:959 provided below:

5 CCGGTGGTACCTCACCTTACCGAGTCGGCGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTA  
 GAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATC  
 GCAGCTTGGATACACGCCGCCACGTGAAGGCTGCCGACCCCCGGGGTGGACCATCTCTAGACTGCCA  
 TGGAAACCGATACACTGCTGCTGTGGGTGCTGCTGCTGTGGGTGCCAGGATCCACAGGCGATGTTGTGA  
 TGACTCAGTCTCCACCCCTCCCTGTCCGTCACCCCTGGAGAGCCGGCCTCCATCACCTGCAGGTCTAGTC  
 AGAGCCTCCTGGAAAGAAATGCATACAATACTTGGATTGGTACCTGCAGAGGCCAGGACAGTCTCCAC  
 10 AGCTCCTGATCTACTTGGGTTCTAATCGGGCCCGGGGTCCCTGACAGGTTTCACTGGCAGTGATCAG  
 GCAGAGATTTTACACTGAAAATCAGCAGAGTGGAGCCTGAGGATGTTGGGGTTTATTACTGCATGCAAG  
 CTCTACAAGCTCCGTTCACTTTTCGGCGGAGGGACCAAGGTGGAGATCAAACGTTCTAGAGGTGGTGGTG  
 GTAGCGGCGGCGGGCTCTGGTGGTGGTGGATCCCTCGAGATGGCCGAAGTGCAGCTGGTGCAGTCTG  
 GGGGAGGCTTGGTACAGCCTGGGGGTCCCTGAGACTCTCCTGTGCAGCCTCTGGATTACCTTTAGCA  
 15 GCTATGCCATGAGCTGGGTCCGCCAGGCTCCAGGGAAGGGGCTGGAGTGGGTCTCAGCTATTAGTGGTA  
 GTGGTGGTAGCACATACTACGCAGACTCCGTGAAGGGCCGGTTCACCATCTCCAGAGACAATTCCAAGA  
 ACACGCTGTATCTGCAAATGAACAGCCTGAGAGCCGAGGACACGGCCGTATATTACTGTGCGAAATGGG  
 GCGCGTTTCAGGATGCTTTTGATATCTGGGGCCAAGGGACAATGGTCACCGTCTCTTCAGCGGCCGCAC  
 CCACCACGACGCCAGCGCCGCGACCACCAACCCCGCGCCCACGATCGCGTCGAGCCCCCTGTCCCTGC  
 20 GCCCAGAGGCGTGCCGGCCAGCGGCGGGGGGCGCAGTGCACACGAGGGGGCTGGACTTCGCCTGTGATA  
 TCTACATCTGGGCGCCCCCTGGCCGGGACTTGTGGGGTCCCTTCTCCTGTCACTGGTTATACCCCTTACT  
 GCAACAAACGGGGCAGAAAGAAGCTCCTGTATATATTCAAACAACCATTTATGAGACCAGTACAACTA  
 CTCAAGAGGAAGATGGCTGTAGCTGCCGATTTCCAGAAGAAGAAGGAGGATGTGAACTGAGAGTGA

[illegible]

ATAAACTGCGGCCAACTTACTTCTGACAACGATCGGAGGACCGAAGGAGCTAACCGCTTTTTTGCACA  
ACATGGGGGATCATGTAACCTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGACG  
AGCGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACCTATTAACCTGGCGAACTACTTA  
CTCTAGCTTCCCGGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCACCTTCTGCGCT  
5 CGGCCCCTTCCGGCTGGCTGGTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCA  
TTGCAGCACTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAA  
CTATGGATGAACGAAATAGACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTAACCTGTCAG  
ACCAAGTTTACTCATATATACTTTAGATTGATTTAAACCTTCATTTTTAATTTAAAGGATCTAGGTGA  
AGATCCTTTTTTGATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACC  
10 CCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACAA  
AAAAACCACCGCTACCAGCGGTGGTTTGTGTTGCCGGATCAAGAGCTACCAACTCTTTTTCCGAAGGTAA  
CTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCA  
AGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCG  
ATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTGGGCTGAA  
15 CGGGGGGTTTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTG  
AGCATTGAGAAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCG  
GAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCTGTGCGGTTTC  
GCCACCTCTGACTTGAGCGTCGATTTTTTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCA  
GCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTTCTTTCTGCGTTAT  
20 CCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGA  
CCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAGAGCGCCCAATACGCAAACCGCCTCTCCCCGCGC  
GTTGGCCGATTCAATTAATGCAGCTGGCACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACG  
CAATTAATGTGAGTTAGCTCACTCATTAGGCACCCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGT  
TGTGTGGAATTGTGAGCGGATAACAATTTACACAGGAAACAGCTATGACCATGATTACGCCAAGCTTT  
25 GCTCTTAGGAGTTTCCCTAATACATCCCAAACCTCAAATATATAAAGCATTTGACTTGTTCTATGCCCTAG  
GGGGCGGGGGAAGCTAAGCCAGCTTTTTTTAACATTTAAATGTTAATTCCATTTTAAATGCACAGAT  
GTTTTTATTTTATAAGGGTTTCAATGTGCATGAATGCTGCAATATTCCTGTTACCAAAGCTAGTATAAA  
TAAAAATAGATAAACGTGGAAATTACTTAGAGTTTCTGTCATTAACTTTCTTCTCAGTTGACAACA  
TAAATGCGCTGCTGAGCAAGCCAGTTTGCATCTGTCAGGATCAATTTCCATTATGCCAGTCATATTAA  
30 TTACTAGTCAATTAGTTGATTTTTATTTTTGACATATACATGTGAATGAAAGACCCACCTGTAGGTTT  
GGCAAGCTAGCTTAAGTAACGCCATTTTGCAAGGCATGGAAAAATACATAACTGAGAATAGAAAAGTTC  
AGATCAAGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCC  
TGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGC  
AGTTCTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCTA  
35 GAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACC  
AATCAGTTTCGCTTCTCGCTTCTGTTTCGCGCGCTTATGCTCCCCGAGCTCAATAAAAGAGCCACAAACC  
CTCACTCGGGGCGCCAGTCTCCGATTGACTGAGTCGCCCGGTACCCGTGTATCCAATAAACCTCTT  
GCAGTTGCATCCGACTTGTGGTCTCGCTGTTCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTC  
AGCGGGGGTCTTTTCAATTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGACCACCGACCCACC  
40 ACCGGGAGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGTCTATGACTGATTTTA

TGCGCCTGCGTCGGTACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCCGTGGTGGAAGTACGAGT  
 TCGGAACACCCCGGCCGAACCCCTGGGAGACGTCCCAGGGACTTCGGGGGCCGTTTTTGTGGCCCGACCT  
 GAGTCCTAAAATCCCGATCGTTTAGGACTCTTTGGTGCACCCCCCTTAGAGGAGGGATATGTGGTTCTG  
 GTAGGAGACGAGAACCTAAAACAGTTCCCGCCTCCGTCTGAATTTTTGCTTTTCGGTTTGGGACCGAAGC  
 5 CGCGCCGCGCGTCTTGTCTGCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTGTTTCTGTATTTG  
 TCTGAAAATATGGGCCCCGGGCTAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGTCAGTGGAAAGAT  
 GTCGAGCGGATCGCTCACAACCAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCA  
 GAATGGCCAACCTTTAACGTCGGATGGCCGCGAGACGGCACCTTTAACGAGACCTCATCACCAGGTT  
 AAGATCAAGGTCTTTTACCTGGCCCGCATGGACACCCAGACCAGTCCCCTACATCGTGACCTGGGAA  
 10 GCCTTGGCTTTTTGACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCTCTTCCT  
 CCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTTCGACCCCGCCTCGATCCTCCCTTTATCCAGCC  
 CTCACTCCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCGCCCCCTTGTA  
 AACTTCCCTGACCCTGACATGACAAGAGTTACTAACAGCCCCCTCTCTCCAAGCTCACTTACAGGCTCTC  
 TACTTAGTCCAGCACGAAGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAAGTGGACCGA [SEQ  
 15 ID NO:959]. The isolated nucleic acid molecule having the nucleotide sequence of  
 SEQ ID NO:959 encodes a FcRL-5-targeted CAR (designated as 117 FcRL5-targeted  
 BBz CAR) comprising a fully human scFv (encoded by nucleotides 207-1025 of SEQ  
 ID NO:959) that comprises a heavy chain variable region comprising amino acids  
 having the sequence set forth in SEQ ID NO:268, a light chain variable region  
 20 comprising amino acids having the sequence set forth in SEQ ID NO:267, and a  
 linker having an amino acid sequence of SEQ ID NO:307 positioned between the  
 heavy chain variable region and the light chain variable region, a transmembrane  
 domain comprising a CD8 polypeptide having 137 to 207 of SEQ ID NO: 960, and an  
 intracellular domain comprising a CD3 $\xi$  polypeptide comprising amino acids 52 to  
 25 163 of SEQ ID NO: 941, and a co-stimulatory signaling region comprising a 4-1BB  
 polypeptide having amino acids 214-255 of SEQ ID NO: 943. Nucleotides 207-1025  
 of SEQ ID NO: 959 encodes the human scFv. Nucleotides 1035-1247 of SEQ ID  
 NO: 959 encodes the CD8 polypeptide comprised in the transmembrane domain.  
 Nucleotides 1248-1373 of SEQ ID NO: 959 encodes the 4-1BB polypeptide  
 30 comprised in the intracellular domain. Nucleotides 1374-1712 of SEQ ID NO: 959  
 encodes the CD3zeta polypeptide comprised in the intracellular domain. Other  
 portions of SEQ ID NO: 959 are shown in Table 238.

Table 238

| Portions | Nucleotide | Sequence | Number of Nucleotides |
|----------|------------|----------|-----------------------|
|----------|------------|----------|-----------------------|



|                     | Positions of SEQ ID NO: |     |
|---------------------|-------------------------|-----|
|                     | 959                     |     |
| anti-FcRL5 scFv 117 | 207..1025               | 819 |
| CD8a TM             | 1035..1247              | 213 |
| 4-1BB               | 1248..1373              | 126 |
| CD3zeta             | 1374..1712              | 339 |
| LTR                 | 1992..2461              | 470 |
| M13 fwd             | 3160..3176              | 17  |
| AmpR promoter       | 3651..3755              | 105 |
| AmpR                | 3756..4616              | 861 |
| ori                 | 4787..5375              | 589 |
| CAP binding site    | 5663..5684              | 22  |
| lac promoter        | 5699..5729              | 31  |
| lac operator        | 5737..5753              | 17  |
| M13 rev             | 5761..5777              | 17  |
| LTR                 | 6186..6779              | 594 |
| MMLV Psi            | 6842..7199              | 358 |
| gag (truncated)     | 7264..7680              | 417 |

In certain embodiments, the isolated nucleic acid molecule encodes a functional portion of a presently disclosed FcRL5-targeted CAR. As used herein, the term “functional portion” refers to any portion, part or fragment of a presently disclosed FcRL5-targeted CAR, which portion, part or fragment retains the biological activity of the FcRL5-targeted CAR (the parent CAR). For example, functional portions encompass the portions, parts or fragments of a presently disclosed FcRL5-targeted CAR that retains the ability to recognize a target cell, to treat a disease, *e.g.*, multiple myeloma, to a similar, same, or even a higher extent as the parent CAR. In certain embodiments, an isolated nucleic acid molecule encoding a functional portion of a presently disclosed FcRL5-targeted CAR can encode a protein comprising, *e.g.*, about 10%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, and 95%, or more of the parent CAR, *e.g.*, of the nucleic acid sequences 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.

### **III. Immunoresponsive Cells**

The presently disclosed subject matter provides immunoresponsive cells  
5 expressing a CAR that comprises an extracellular antigen-binding domain, a transmembrane domain and an intracellular domain, where the extracellular antigen-binding domain specifically binds to FcRL5 (*e.g.*, human FcRL5), as described above. In certain embodiments, the extracellular antigen-binding domain specifically binds to domain 7 of FcRL5. In certain embodiments, the extracellular antigen-binding  
10 domain specifically binds to domain 8 of FcRL5. In certain embodiments, the extracellular antigen-binding domain specifically binds to domain 9 of FcRL5. The immunoresponsive cells can be transduced with a presently disclosed CAR such that the cells express the CAR. The presently disclosed subject matter also provides methods of using such cells for the treatment of a tumor, *e.g.*, multiple myeloma  
15 (MM). The immunoresponsive cells of the presently disclosed subject matter can be cells of the lymphoid lineage. The lymphoid lineage, comprising B, T and natural killer (NK) cells, provides for the production of antibodies, regulation of the cellular immune system, detection of foreign agents in the blood, detection of cells foreign to the host, and the like. Non-limiting examples of immunoresponsive cells of the  
20 lymphoid lineage include T cells, Natural Killer (NK) cells, cytotoxic T lymphocytes (CTLs), regulatory T cells, embryonic stem cells, and pluripotent stem cells (*e.g.*, those from which lymphoid cells may be differentiated). T cells can be lymphocytes that mature in the thymus and are chiefly responsible for cell-mediated immunity. T cells are involved in the adaptive immune system. The T cells of the presently  
25 disclosed subject matter can be any type of T cells, including, but not limited to, T helper cells, cytotoxic T cells, memory T cells (including central memory T cells, stem-cell-like memory T cells (or stem-like memory T cells), and two types of effector memory T cells: *e.g.*, T<sub>EM</sub> cells and T<sub>EMRA</sub> cells), Regulatory T cells (also known as suppressor T cells), Natural killer T cells, Mucosal associated invariant T  
30 cells, and  $\gamma\delta$  T cells. In certain embodiments, the CAR-expressing T cells express Foxp3 to achieve and maintain a T regulatory phenotype. Natural killer (NK) cells can be lymphocytes that are part of cell-mediated immunity and act during the innate immune response. NK cells do not require prior activation in order to perform their

cytotoxic effect on target cells. Cytotoxic T cells (CTL or killer T cells) are a subset of T lymphocytes capable of inducing the death of infected somatic or tumor cells.

The immunoresponsive cells of the presently disclosed subject matter can express an extracellular antigen-binding domain (*e.g.*, an scFV, a Fab that is optionally crosslinked, or a F(ab)<sub>2</sub>) that specifically binds to FcRL5 (*e.g.*, human FcRL5), for the treatment of multiple myeloma. Such immunoresponsive cells can be administered to a subject (*e.g.*, a human subject) in need thereof for the treatment of multiple myeloma. In certain embodiments, the immunoresponsive cell is a T cell. The T cell can be a CD4<sup>+</sup> T cell or a CD8<sup>+</sup> T cell. In certain embodiments, the T cell is a CD4<sup>+</sup> T cell. In another embodiment, the T cell is a CD8<sup>+</sup> T cell.

A presently disclosed immunoresponsive cell can be further transduced with at least one co-stimulatory ligand, such that the immunoresponsive cell co-expresses or is induced to co-express the FcRL5-specific CAR and the at least one co-stimulatory ligand. The interaction between the FcRL5-specific CAR and at least one co-stimulatory ligand provides a non-antigen-specific signal important for full activation of an immunoresponsive cell (*e.g.*, T cell). Co-stimulatory ligands include, but are not limited to, members of the tumor necrosis factor (TNF) superfamily, and immunoglobulin (Ig) superfamily ligands. TNF is a cytokine involved in systemic inflammation and stimulates the acute phase reaction. Its primary role is in the regulation of immune cells. Members of TNF superfamily share a number of common features. The majority of TNF superfamily members are synthesized as type II transmembrane proteins (extracellular C-terminus) containing a short cytoplasmic segment and a relatively long extracellular region. TNF superfamily members include, without limitation, nerve growth factor (NGF), CD40L (CD40L)/CD154, CD137L/4-1BBL, TNF- $\alpha$ , CD134L/OX40L/CD252, CD27L/CD70, Fas ligand (FasL), CD30L/CD153, tumor necrosis factor beta (TNF $\beta$ )/lymphotoxin-alpha (LT $\alpha$ ), lymphotoxin-beta (LT $\beta$ ), CD257/B cell-activating factor (BAFF)/Blys/THANK/Tall-1, glucocorticoid-induced TNF Receptor ligand (GITRL), and TNF-related apoptosis-inducing ligand (TRAIL), LIGHT (TNFSF14). The immunoglobulin (Ig) superfamily is a large group of cell surface and soluble proteins that are involved in the recognition, binding, or adhesion processes of cells. These proteins share structural features with immunoglobulins -- they possess an immunoglobulin domain (fold).

Immunoglobulin superfamily ligands include, but are not limited to, CD80 and CD86, both ligands for CD28, PD-L1/(B7-H1) that ligands for PD-1. 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, PD-L1, and combinations thereof. In certain embodiments, the immunoresponsive cell is transduced with one co-stimulatory ligand that is 4-1BBL. In certain embodiments, the immunoresponsive cell is transduced with two co-stimulatory ligands that are 4-1BBL and CD80. CARs transduced with at least one co-stimulatory ligand are described in U.S. Patent No. 8,389,282, which is incorporated by reference in its entirety.

Furthermore, a presently disclosed immunoresponsive cell can be further transduced with at least one cytokine, such that the immunoresponsive cell secretes the at least one cytokine as well as expresses the FcRL5-specific CAR. 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, and IL-21. In certain embodiments, the cytokine is IL-12.

The FcRL5-specific or FcRL5-targeted human lymphocytes that can be used in peripheral donor lymphocytes, *e.g.*, those disclosed in Sadelain, M., *et al.* 2003 *Nat Rev Cancer* 3:35-45 (disclosing peripheral donor lymphocytes genetically modified to express CARs), in Morgan, R.A., *et al.* 2006 *Science* 314:126-129 (disclosing peripheral donor lymphocytes genetically modified to express a full-length tumor antigen-recognizing T cell receptor complex comprising the  $\alpha$  and  $\beta$  heterodimer), in Panelli, M.C., *et al.* 2000 *J Immunol* 164:495-504; Panelli, M.C., *et al.* 2000 *J Immunol* 164:4382-4392 (disclosing lymphocyte cultures derived from tumor infiltrating lymphocytes (TILs) in tumor biopsies), and in Dupont, J., *et al.* 2005 *Cancer Res* 65:5417-5427; Papanicolaou, G.A., *et al.* 2003 *Blood* 102:2498-2505 (disclosing selectively *in vitro*-expanded antigen-specific peripheral blood leukocytes employing artificial antigen-presenting cells (AAPCs) or pulsed dendritic cells). The immunoresponsive cells (*e.g.*, T cells) can be autologous, non-autologous (*e.g.*, allogeneic), or derived *in vitro* from engineered progenitor or stem cells.

In certain embodiments, a presently disclosed immunoresponsive cell (*e.g.*, T cell) expresses from about 1 to about 4, from about 2 to about 4, from about 3 to about 4, from about 1 to about 2, from about 1 to about 3, or from about 2 to about 3 vector

copy numbers/cell of a presently disclosed FcRL5-specific CAR.

The unpurified source of CTLs may be any known in the art, such as the bone marrow, fetal, neonate or adult or other hematopoietic cell source, *e.g.*, fetal liver, peripheral blood or umbilical cord blood. Various techniques can be employed to  
5 separate the cells. For instance, negative selection methods can remove non-CTLs initially. Monoclonal antibodies are particularly useful for identifying markers associated with particular cell lineages and/or stages of differentiation for both positive and negative selections.

A large proportion of terminally differentiated cells can be initially removed  
10 by a relatively crude separation. For example, magnetic bead separations can be used initially to remove large numbers of irrelevant cells. Preferably, at least about 80%, usually at least 70% of the total hematopoietic cells will be removed prior to cell isolation.

Procedures for separation include, but are not limited to, density gradient  
15 centrifugation; resetting; coupling to particles that modify cell density; magnetic separation with antibody-coated magnetic beads; affinity chromatography; cytotoxic agents joined to or used in conjunction with a mAb, including, but not limited to, complement and cytotoxins; and panning with antibody attached to a solid matrix, *e.g.* plate, chip, elutriation or any other convenient technique.

20 Techniques for separation and analysis include, but are not limited to, flow cytometry, which can have varying degrees of sophistication, *e.g.*, a plurality of color channels, low angle and obtuse light scattering detecting channels, impedance channels.

The cells can be selected against dead cells, by employing dyes associated  
25 with dead cells such as propidium iodide (PI). Preferably, the cells are collected in a medium comprising 2% fetal calf serum (FCS) or 0.2% bovine serum albumin (BSA) or any other suitable, preferably sterile, isotonic medium.

#### **IV. Vectors**

Genetic modification of immunoresponsive cells (*e.g.*, T cells, CTL cells, NK  
30 cells) can be accomplished by transducing a substantially homogeneous cell composition with a recombinant DNA or RNA construct. The vector can be a retroviral vector (*e.g.*, gamma retroviral), which is employed for the introduction of the DNA or RNA construct into the host cell genome. For example, a polynucleotide

encoding the FcRL5-specific CAR can be cloned into a retroviral vector and expression can be driven from its endogenous promoter, from the retroviral long terminal repeat, or from an alternative internal promoter.

Non-viral vectors or RNA may be used as well. Random chromosomal  
5 integration, or targeted integration (*e.g.*, using a nuclease, transcription activator-like effector nucleases (TALENs), Zinc-finger nucleases (ZFNs), and/or clustered regularly interspaced short palindromic repeats (CRISPRs), or transgene expression (*e.g.*, using a natural or chemically modified RNA) can be used.

For initial genetic modification of the cells to provide FcRL5-specific CAR  
10 expressing cells, a retroviral vector is generally employed for transduction, however any other suitable viral vector or non-viral delivery system can be used. For subsequent genetic modification of the cells to provide cells comprising an antigen presenting complex comprising at least two co-stimulatory ligands, retroviral gene transfer (transduction) likewise proves effective. Combinations of retroviral vector  
15 and an appropriate packaging line are also suitable, where the capsid proteins will be functional for infecting human cells. Various amphotropic virus-producing cell lines are known, including, but not limited to, PA12 (Miller, *et al.* (1985) *Mol. Cell. Biol.* 5:431-437); PA317 (Miller, *et al.* (1986) *Mol. Cell. Biol.* 6:2895-2902); and CRIP (Danos, *et al.* (1988) *Proc. Natl. Acad. Sci. USA* 85:6460-6464). Non -amphotropic  
20 particles are suitable too, *e.g.*, particles pseudotyped with VSVG, RD114 or GALV envelope and any other known in the art.

Possible methods of transduction also include direct co-culture of the cells with producer cells, *e.g.*, by the method of Bregni, *et al.* (1992) *Blood* 80:1418-1422, or culturing with viral supernatant alone or concentrated vector stocks with or without  
25 appropriate growth factors and polycations, *e.g.*, by the method of Xu, *et al.* (1994) *Exp. Hemat.* 22:223-230; and Hughes, *et al.* (1992) *J. Clin. Invest.* 89:1817.

Transducing viral vectors can be used to express a co-stimulatory ligand (*e.g.*, 4-1BBL and IL-12) in an immunoresponsive cell. Preferably, the chosen vector exhibits high efficiency of infection and stable integration and expression (*see, e.g.*,  
30 Cayouette *et al.*, *Human Gene Therapy* 8:423-430, 1997; Kido *et al.*, *Current Eye Research* 15:833-844, 1996; Bloomer *et al.*, *Journal of Virology* 71:6641-6649, 1997; Naldini *et al.*, *Science* 272:263-267, 1996; and Miyoshi *et al.*, *Proc. Natl. Acad. Sci. U.S.A.* 94:10319, 1997). Other viral vectors that can be used include, for example,

adenoviral, lentiviral, and adeno-associated viral vectors, vaccinia virus, a bovine papilloma virus, or a herpes virus, such as Epstein-Barr Virus (also see, for example, the vectors of Miller, Human Gene Therapy 15-14, 1990; Friedman, Science 244:1275-1281, 1989; Eglitis et al., BioTechniques 6:608-614, 1988; Tolstoshev et al., Current Opinion in Biotechnology 1:55-61, 1990; Sharp, The Lancet 337:1277-1278, 1991; Cornetta et al., Nucleic Acid Research and Molecular Biology 36:311-322, 1987; Anderson, Science 226:401-409, 1984; Moen, Blood Cells 17:407-416, 1991; Miller et al., Biotechnology 7:980-990, 1989; Le Gal La Salle et al., Science 259:988-990, 1993; and Johnson, Chest 107:77S- 83S, 1995). Retroviral vectors are particularly well developed and have been used in clinical settings (Rosenberg et al., N. Engl. J. Med 323:370, 1990; Anderson et al., U.S. Pat. No. 5,399,346).

In certain non-limiting embodiments, the vector expressing a presently disclosed FcRL5-targeted CAR is a retroviral vector, *e.g.*, a 293galv9 retroviral vector.

Non-viral approaches can also be employed for the expression of a protein in cell. For example, a nucleic acid molecule can be introduced into a cell by administering the nucleic acid in the presence of lipofection (Feigner et al., Proc. Nat'l. Acad. Sci. U.S.A. 84:7413, 1987; Ono et al., Neuroscience Letters 17:259, 1990; Brigham et al., Am. J. Med. Sci. 298:278, 1989; Staubinger et al., Methods in Enzymology 101:512, 1983), asialoorosomucoid-polylysine conjugation (Wu et al., Journal of Biological Chemistry 263:14621, 1988; Wu et al., Journal of Biological Chemistry 264:16985, 1989), or by micro-injection under surgical conditions (Wolff et al., Science 247:1465, 1990). Other non-viral means for gene transfer include transfection in vitro using calcium phosphate, DEAE dextran, electroporation, and protoplast fusion. Liposomes can also be potentially beneficial for delivery of DNA into a cell. Transplantation of normal genes into the affected tissues of a subject can also be accomplished by transferring a normal nucleic acid into a cultivatable cell type *ex vivo* (*e.g.*, an autologous or heterologous primary cell or progeny thereof), after which the cell (or its descendants) are injected into a targeted tissue or are injected systemically. Recombinant receptors can also be derived or obtained using transposases or targeted nucleases (*e.g.* Zinc finger nucleases, meganucleases, or TALE nucleases). Transient expression may be obtained by RNA electroporation.

cDNA expression for use in polynucleotide therapy methods can be directed

from any suitable promoter (*e.g.*, the human cytomegalovirus (CMV), simian virus 40 (SV40), or metallothionein promoters), and regulated by any appropriate mammalian regulatory element or intron (*e.g.* the elongation factor 1  $\alpha$  enhancer/promoter/intron structure). For example, if desired, enhancers known to preferentially direct gene  
5 expression in specific cell types can be used to direct the expression of a nucleic acid. The enhancers used can include, without limitation, those that are characterized as tissue- or cell-specific enhancers. Alternatively, if a genomic clone is used as a therapeutic construct, regulation can be mediated by the cognate regulatory sequences or, if desired, by regulatory sequences derived from a heterologous source, including  
10 any of the promoters or regulatory elements described above.

The resulting cells can be grown under conditions similar to those for unmodified cells, whereby the modified cells can be expanded and used for a variety of purposes.

#### ***V. Polypeptides and Analogs and Polynucleotides***

Also included in the presently disclosed subject matter are extracellular  
15 antigen-binding domains that specifically binds to FcRL5 (*e.g.*, human FcRL5) (*e.g.*, an scFv, such as an scFv derived from antibodies F56 and F119, a Fab, or a (Fab)<sub>2</sub>), CD3 $\zeta$ , CD8, CD28, *etc.* polypeptides or fragments thereof, and polynucleotides encoding thereof that are modified in ways that enhance their anti-tumor activity  
20 when expressed in an immunoresponsive cell. In certain embodiments, the presently disclosed subject matter further provides extracellular antigen-binding domains that specifically binds to domain 9 FcRL5 (*e.g.*, domain 7, domain 8 or domain 9 of human FcRL5) (*e.g.*, an scFv, a Fab, or a (Fab)<sub>2</sub>), CD3 $\zeta$ , CD8, CD28, *etc.* polypeptides or fragments thereof, and polynucleotides encoding thereof that are  
25 modified in ways that enhance their anti-tumor activity when expressed in an immunoresponsive cell.

The presently disclosed subject matter provides methods for optimizing an amino acid sequence or a nucleic acid sequence by producing an alteration in the sequence. Such alterations may comprise certain mutations, deletions, insertions, or  
30 post-translational modifications. The presently disclosed subject matter further comprises analogs of any naturally-occurring polypeptide of the presently disclosed subject matter. Analogs can differ from a naturally-occurring polypeptide of the



presently disclosed subject matter by amino acid sequence differences, by post-translational modifications, or by both. Analogs of the presently disclosed subject matter can generally exhibit at least about 85%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98%, about 99% or more identity with all or part of a naturally-occurring amino, acid sequence of the presently disclosed subject matter. The length of sequence comparison is at least 5, 10, 15, 20, 25, 50, 75, 100 or more amino acid residues. Again, in an exemplary approach to determining the degree of identity, a BLAST program may be used, with a probability score between  $e^{-3}$  and  $e^{-100}$  indicating a closely related sequence.

Modifications comprise *in vivo* and *in vitro* chemical derivatization of polypeptides, *e.g.*, acetylation, carboxylation, phosphorylation, or glycosylation; such modifications may occur during polypeptide synthesis or processing or following treatment with isolated modifying enzymes. Analogs can also differ from the naturally-occurring polypeptides of the presently disclosed subject matter by alterations in primary sequence. These include genetic variants, both natural and induced (for example, resulting from random mutagenesis by irradiation or exposure to ethanemethylsulfate or by site-specific mutagenesis as described in Sambrook, Fritsch and Maniatis, *Molecular Cloning: A Laboratory Manual* (2d ed.), CSH Press, 1989, or Ausubel et al., *supra*). Also included are cyclized peptides, molecules, and analogs which contain residues other than L-amino acids, *e.g.*, D-amino acids or non-naturally occurring or synthetic amino acids, *e.g.*, beta ( $\beta$ ) or gamma ( $\gamma$ ) amino acids.

In addition to full-length polypeptides, the presently disclosed subject matter also provides fragments of any one of the polypeptides or peptide domains of the presently disclosed subject matter. A fragment can be at least 5, 10, 13, or 15 amino acids. In certain embodiments, a fragment is at least 20 contiguous amino acids, at least 30 contiguous amino acids, or at least 50 contiguous amino acids. In certain embodiments, a fragment is at least 60 to 80, 100, 200, 300 or more contiguous amino acids. Fragments of the presently disclosed subject matter can be generated by methods known to those of ordinary skill in the art or may result from normal protein processing (*e.g.*, removal of amino acids from the nascent polypeptide that are not required for biological activity or removal of amino acids by alternative mRNA splicing or alternative protein processing events).

Non-protein analogs have a chemical structure designed to mimic the

functional activity of a protein of the invention. Such analogs are administered according to methods of the presently disclosed subject matter. Such analogs may exceed the physiological activity of the original polypeptide. Methods of analog design are well known in the art, and synthesis of analogs can be carried out according to such methods by modifying the chemical structures such that the resultant analogs increase the anti-neoplastic activity of the original polypeptide when expressed in an immunoresponsive cell. These chemical modifications include, but are not limited to, substituting alternative R groups and varying the degree of saturation at specific carbon atoms of a reference polypeptide. The protein analogs can be relatively resistant to *in vivo* degradation, resulting in a more prolonged therapeutic effect upon administration. Assays for measuring functional activity include, but are not limited to, those described in the Examples below.

In accordance with the presently disclosed subject matter, the polynucleotides encoding an extracellular antigen-binding domain that specifically binds to FcRL5 (*e.g.*, an scFV (*e.g.*, an scFv derived from antibodies F56 and F119), a Fab, Fab' or a (Fab')<sub>2</sub>, CD3ζ, CD8, CD28) can be modified by codon optimization. Codon optimization can alter both naturally occurring and recombinant gene sequences to achieve the highest possible levels of productivity in any given expression system. Factors that are involved in different stages of protein expression include codon adaptability, mRNA structure, and various *cis*-elements in transcription and translation. Any suitable codon optimization methods or technologies that are known to ones skilled in the art can be used to modify the polynucleotids of the presently disclosed subject matter, including, but not limited to, OPTIMUMGENE™, Encor optimization, and Blue Heron.

## 25 VI. Administration

FcRL5-specific CARs and immunoresponsive cells expressing thereof of the presently disclosed subject matter can be provided systemically or directly to a subject for treating or preventing a neoplasia. In certain embodiments, the FcRL5-specific CARs and immunoresponsive cells expressing thereof are directly injected into an organ of interest (*e.g.*, an organ affected by a neoplasia). Alternatively or additionally, the FcRL5-specific CARs and immunoresponsive cells expressing thereof are provided indirectly to the organ of interest, for example, by administration into the circulatory system (*e.g.*, the tumor vasculature). Expansion and

differentiation agents can be provided prior to, during or after administration of cells and compositions to increase production of T cells *in vitro* or *in vivo*.

FcRL5-specific CARs and immunoresponsive cells expressing thereof of the presently disclosed subject matter can be administered in any physiologically acceptable vehicle, normally intravascularly, although they may also be introduced into bone or other convenient site where the cells may find an appropriate site for regeneration and differentiation (*e.g.*, thymus). Usually, at least  $1 \times 10^5$  cells can be administered, eventually reaching  $1 \times 10^{10}$  or more. A cell population comprising immunoresponsive cells expressing a FcRL5-specific CAR can comprise a purified population of cells. Those skilled in the art can readily determine the percentage of immunoresponsive cells in a cell population using various well-known methods, such as fluorescence activated cell sorting (FACS). The ranges of purity in cell populations comprising genetically modified immunoresponsive cells expressing a FcRL5-specific CAR can be from about 50% to about 55%, from about 55% to about 60%, from about 65% to about 70%, from about 70% to about 75%, from about 75% to about 80%, from about 80% to about 85%; from about 85% to about 90%, from about 90% to about 95%, or from about 95 to about 100%. Dosages can be readily adjusted by those skilled in the art (*e.g.*, a decrease in purity may require an increase in dosage). The immunoresponsive cells can be introduced by injection, catheter, or the like. If desired, factors can also be included, including, but not limited to, interleukins, *e.g.* IL-2, IL-3, IL 6, IL-11, IL-7, IL-12, IL-15, IL-21, as well as the other interleukins, the colony stimulating factors, such as G-, M- and GM-CSF, interferons, *e.g.*,  $\gamma$ -interferon.

Compositions of the presently disclosed subject matter comprise pharmaceutical compositions comprising immunoresponsive cells expressing a FcRL5-specific CAR and a pharmaceutically acceptable carrier. Administration can be autologous or non-autologous. For example, immunoresponsive cells expressing a FcRL5-specific CAR and compositions comprising thereof can be obtained from one subject, and administered to the same subject or a different, compatible subject. Peripheral blood derived T cells of the presently disclosed subject matter or their progeny (*e.g.*, *in vivo*, *ex vivo* or *in vitro* derived) can be administered via localized injection, including catheter administration, systemic injection, localized injection, intravenous injection, or parenteral administration. When administering a

pharmaceutical composition of the presently disclosed subject matter (*e.g.*, a pharmaceutical composition comprising immunoresponsive cells expressing a FcRL5-specific CAR), it can be formulated in a unit dosage injectable form (solution, suspension, emulsion).

5   **VII. Formulations**

Immunoresponsive cells expressing a generally FcRL5-specific CAR and compositions comprising thereof of the presently disclosed subject matter can be conveniently provided as sterile liquid preparations, *e.g.*, isotonic aqueous solutions, suspensions, emulsions, dispersions, or viscous compositions, which may be buffered  
10 to a selected pH. Liquid preparations are normally easier to prepare than gels, other viscous compositions, and solid compositions. Additionally, liquid compositions are somewhat more convenient to administer, especially by injection. Viscous compositions, on the other hand, can be formulated within the appropriate viscosity range to provide longer contact periods with specific tissues. Liquid or viscous  
15 compositions can comprise carriers, which can be a solvent or dispersing medium containing, for example, water, saline, phosphate buffered saline, polyol (for example, glycerol, propylene glycol, liquid polyethylene glycol, and the like) and suitable mixtures thereof.

Sterile injectable solutions can be prepared by incorporating the compositions  
20 comprising immunoresponsive cells expressing a generally FcRL5-specific CAR of the presently disclosed subject matter in the required amount of the appropriate solvent with various amounts of the other ingredients, as desired. Such compositions may be in admixture with a suitable carrier, diluent, or excipient such as sterile water, physiological saline, glucose, dextrose, or the like. The compositions can also be  
25 lyophilized. The compositions can contain auxiliary substances such as wetting, dispersing, or emulsifying agents (*e.g.*, methylcellulose), pH buffering agents, gelling or viscosity enhancing additives, preservatives, flavoring agents, colors, and the like, depending upon the route of administration and the preparation desired. Standard texts, such as "REMINGTON'S PHARMACEUTICAL SCIENCE," 17th edition,  
30 1985, incorporated herein by reference, may be consulted to prepare suitable preparations, without undue experimentation.

Various additives which enhance the stability and sterility of the compositions, including antimicrobial preservatives, antioxidants, chelating agents, and buffers, can

be added. Prevention of the action of microorganisms can be ensured by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, sorbic acid, and the like. Prolonged absorption of the injectable pharmaceutical form can be brought about by the use of agents delaying absorption, for example, alum  
5 inurn monostearate and gelatin. According to the present invention, however, any vehicle, diluent, or additive used would have to be compatible with the immunoresponsive cells expressing a generally FcRL5-specific CAR of the presently disclosed subject matter.

The compositions can be isotonic, i.e., they can have the same osmotic  
10 pressure as blood and lacrimal fluid. The desired isotonicity of the compositions of the presently disclosed subject matter may be accomplished using sodium chloride, or other pharmaceutically acceptable agents such as dextrose, boric acid, sodium tartrate, propylene glycol or other inorganic or organic solutes. Sodium chloride is preferred particularly for buffers containing sodium ions.

Viscosity of the compositions, if desired, can be maintained at the selected  
15 level using a pharmaceutically acceptable thickening agent. Methylcellulose can be used because it is readily and economically available and is easy to work with. Other suitable thickening agents include, for example, xanthan gum, carboxymethyl cellulose, hydroxypropyl cellulose, carbomer, and the like. The concentration of the  
20 thickener can depend upon the agent selected. The important point is to use an amount that will achieve the selected viscosity. Obviously, the choice of suitable carriers and other additives will depend on the exact route of administration and the nature of the particular dosage form, *e.g.*, liquid dosage form (*e.g.*, whether the composition is to be formulated into a solution, a suspension, gel or another liquid  
25 form, such as a time release form or liquid-filled form).

Those skilled in the art will recognize that the components of the compositions should be selected to be chemically inert and will not affect the viability or efficacy of the immunoresponsive cells as describe in the presently disclosed subject matter. This will present no problem to those skilled in chemical and pharmaceutical  
30 principles, or problems can be readily avoided by reference to standard texts or by simple experiments (not involving undue experimentation), from this disclosure and the documents cited herein.

One consideration concerning the therapeutic use of the immunoresponsive

cells of the presently disclosed subject matter is the quantity of cells necessary to achieve an optimal effect. The quantity of cells to be administered will vary for the subject being treated. In certain embodiments, from about  $10^4$  to about  $10^{10}$ , from about  $10^5$  to about  $10^9$ , or from about  $10^6$  to about  $10^8$  immunoresponsive cells of the presently disclosed subject matter are administered to a subject. More effective cells may be administered in even smaller numbers. In certain embodiments, at least about  $1 \times 10^8$ , about  $2 \times 10^8$ , about  $3 \times 10^8$ , about  $4 \times 10^8$ , and about  $5 \times 10^8$  immunoresponsive cells of the presently disclosed subject matter are administered to a human subject. The precise determination of what would be considered an effective dose may be based on factors individual to each subject, including their size, age, sex, weight, and condition of the particular subject. Dosages can be readily ascertained by those skilled in the art from this disclosure and the knowledge in the art.

The skilled artisan can readily determine the amount of cells and optional additives, vehicles, and/or carrier in compositions and to be administered in methods of the presently disclosed subject matter. Typically, any additives (in addition to the active cell(s) and/or agent(s)) are present in an amount of from about 0.001% to about 50% by weight) solution in phosphate buffered saline, and the active ingredient is present in the order of micrograms to milligrams, such as from about 0.0001 wt% to about 5 wt %, from about 0.0001 wt% to about 1 wt %, from about 0.0001 wt% to about 0.05 wt%, from about 0.001 wt% to about 20 wt %, from about 0.01 wt% to about 10 wt %, or from about 0.05 wt% to about 5 wt %. For any composition to be administered to an animal or human, and for any particular method of administration, toxicity should be determined, such as by determining the lethal dose (LD) and LD50 in a suitable animal model *e.g.*, rodent such as mouse; and, the dosage of the composition(s), concentration of components therein and timing of administering the composition(s), which elicit a suitable response. Such determinations do not require undue experimentation from the knowledge of the skilled artisan, this disclosure and the documents cited herein. And, the time for sequential administrations can be ascertained without undue experimentation.

## VIII. *Methods of Treatment*

**Tumor Microenvironment.** Tumors have a microenvironment that is hostile to the host immune response involving a series of mechanisms by malignant cells to protect themselves from immune recognition and elimination. This “hostile tumor

microenvironment” comprises a variety of immune suppressive factors including infiltrating regulatory CD4<sup>+</sup> T cells (Tregs), myeloid derived suppressor cells (MDSCs), tumor associated macrophages (TAMs), immune suppressive cytokines including IL-10 and TGF- $\beta$ , and expression of ligands targeted to immune suppressive receptors expressed by activated T cells (CTLA-4 and PD-1). These mechanisms of immune suppression play a role in the maintenance of tolerance and suppressing inappropriate immune responses, however within the tumor microenvironment these mechanisms prevent an effective anti-tumor immune response. Collectively these immune suppressive factors can induce either marked anergy or apoptosis of adoptively transferred CAR modified T cells upon encounter with targeted tumor cells.

**Challenges in tumor immunology.** Effective tumor immunity requires recognition of tumor antigens and unopposed tumor elimination by immune effector cells. Tumor antigens must contain peptide epitopes that are presented by the tumor and can be recognized by specific cytotoxic T lymphocytes (CTLs). The primed CTLs must expand to a sufficient number and migrate to tumor sites, wherein they mature into effectors to perform their functions, which are enhanced by helper T cells and dampened by Tregs and inhibitory macrophages.

**Targeted T cell therapy with engineered T lymphocytes.** T cell engineering is a groundbreaking strategy to potentially resolve many previously observed shortcomings of earlier immunotherapeutic approaches. Within the past year, researchers have reported dramatic complete remissions in relapsed (Brentjens *et al.*, *Blood* 118, 4817-4828 (2011) and Brentjens *et al.*, *Science translational medicine* 5, 177ra138 (2013)), chemorefractory leukemia and metastatic melanoma (Hunder *et al.*, *N. Engl.J.Med.* 358, 2698-2703 (2008); Rosenberg *et al.*, *Nat. Rev. Cancer* 8, 299-308 (2008); and Dudley *et al.*, *J Clin Oncol* 26, 5233-5239 (2008)), obtained with autologous peripheral blood T cells targeted to a defined antigen (CD19 and NY-ESO-1, respectively).

**Rationale for a genetic approach:** Cell engineering can be used to redirect T cells toward tumor antigens and to enhance T cell function. One impetus for genetic T cell modification is the potential to enhance T cell survival and expansion and to offset T cell death, anergy, and immune suppression. The genetic targeting of T cells can also be refined to prevent undesired destruction of normal tissues.

Chimeric antigen receptors (CARs): Tumor-specific T cells can be generated by the transfer of genes that encode CARs (Brentjens *et al.*, *Clin.Cancer Res.* 13, 5426-5435 (2007); Gade *et al.*, *Cancer Res.* 65, 9080-9088 (2005); Maher *et al.*, *Nat.Biotechnol.* 20, 70-75 (2002); Kershaw *et al.*, *J Immunol* 173, 2143-2150 (2004); Sadelain *et al.*, *Curr Opin Immunol* (2009); and Hollyman *et al.*, *J Immunother* 32, 169-180 (2009)). Second-generation CARs comprise a tumor antigen-binding domain fused to an intracellular signaling domain capable of activating T cells and a co-stimulatory domain designed to augment T cell potency and persistence (Sadelain *et al.*, *Cancer discovery* 3, 388-398 (2013)). CAR design can therefore reconcile antigen recognition with signal transduction, two functions that are physiologically borne by two separate complexes, the TCR heterodimer and the CD3 complex. The CAR's extracellular antigen-binding domain is usually derived from a murine monoclonal antibody (mAb) or from receptors or their ligands. Antigen recognition is therefore not MHC-restricted (Riviere *et al.*, *Curr Hematol Rep* 3, 290-297 (2004); and Stephan *et al.*, *Nat. Med.* 13, 1440-1449 (2007)) and is therefore applicable to any patient expressing the target antigen, using the same CAR. Antigen binding by the CARs triggers phosphorylation of immunoreceptor tyrosine-based activation motifs (ITAMs) in the intracellular domain, initiating a signaling cascade required for cytotoxic induction, cytokine secretion, and proliferation. Because MHC restriction of antigen recognition is bypassed, the function of CAR-targeted T cells is not affected by HLA downregulation or defects in the antigen-processing machinery.

T cell requirements for expansion and survival: Proliferation of tumor-specific T cells is needed *ex vivo* and is arguably desirable *in vivo*. T cell proliferation must be accompanied by T cell survival to permit absolute T cell expansion and persistence. To proliferate in response to antigen, T cells must receive two signals. One is provided by TCR recognition of antigenic peptide/MHC complexes displayed on the surface of antigen-presenting cells (APCs) (Sadelain *et al.*, *Curr Opin Immunol* (2009)). The other is provided by a T cell co-stimulatory receptor, such as the CD28 or 4-1BB receptors. Whereas the cytotoxic activity of T cells does not require concomitant co-stimulation, there is a critical need for the provision of co-stimulatory signals to sustain the antitumor functions of adoptively transferred T cells, as previously demonstrated (Maher *et al.*, *Nat.Biotechnol.* 20, 70-75 (2002); Sadelain *et al.*, *Cancer discovery* 3, 388-398 (2013); Krause *et al.*, *J Exp Med* 188, 619-626



(1998);Gong *et al.*, *Neoplasia*. 1, 123-127 (1999); and Lyddane *et al.*, *J.Immunol.* 176, 3306-3310 (2006)).

Immune monitoring: Lymphocytes are multifunctional “drugs” that exhibit dynamically evolving effects after infusion. Upon antigen encounter, tumor-specific  
5 T cells activate and/or release a variety of proteins that can trigger tumor killing, T cell proliferation, and recruitment or immunomodulation of other immune cells. Thus, measuring which proteins are secreted from which cells, in what quantity, and at what time point yields profound insights into why a particular patient is or is not responding and provides critical feedback for designing more-effective trials. These  
10 assay systems will permit direct and meaningful comparisons of clinical approaches and thus help design rational, next-generation therapeutic strategies.

For treatment, the amount administered is an amount effective in producing the desired effect. An effective amount can be provided in one or a series of administrations. An effective amount can be provided in a bolus or by continuous  
15 perfusion.

An “effective amount” (or, “therapeutically effective amount”) is an amount sufficient to affect a beneficial or desired clinical result upon treatment. An effective amount can be administered to a subject in one or more doses. In terms of treatment, an effective amount is an amount that is sufficient to palliate, ameliorate, stabilize,  
20 reverse or slow the progression of the disease, or otherwise reduce the pathological consequences of the disease. The effective amount is generally determined by the physician on a case-by-case basis and is within the skill of one in the art. Several factors are typically taken into account when determining an appropriate dosage to achieve an effective amount. These factors include age, sex and weight of the subject,  
25 the condition being treated, the severity of the condition and the form and effective concentration of the immunoresponsive cells administered.

For adoptive immunotherapy using antigen-specific T cells, cell doses in the range of about  $10^6$  to about  $10^{10}$  (*e.g.*, about  $10^9$  ) are typically infused. Upon administration of the immunoresponsive cells into the subject and subsequent  
30 differentiation, the immunoresponsive cells are induced that are specifically directed against one specific antigen (*e.g.*, FcRL5). “Induction” of T cells can include inactivation of antigen-specific T cells such as by deletion or anergy. Inactivation is particularly useful to establish or reestablish tolerance such as in autoimmune

disorders. The immunoresponsive cells of the presently disclosed subject matter can be administered by any methods known in the art, including, but not limited to, pleural administration, intravenous administration, subcutaneous administration, intranodal administration, intratumoral administration, intrathecal administration, intrapleural administration, intraperitoneal administration, and direct administration to the thymus. In certain embodiments, the immunoresponsive cells and the compositions comprising thereof are intravenously administered to the subject in need.

The presently disclosed subject matter provides various methods of using the immunoresponsive cells (*e.g.*, T cells) expressing a FcRL5-specific CAR. For example, the presently disclosed subject matter provides methods of reducing tumor burden in a subject. In one non-limiting example, the method of reducing tumor burden comprises administering an effective amount of the presently disclosed immunoresponsive cell to the subject, thereby inducing tumor cell death in the subject. The presently disclosed immunoresponsive cell can reduce the number of tumor cells, reduce tumor size, and/or eradicate the tumor in the subject. Non-limiting examples of suitable tumors include multiple myeloma, Non-Hodgkin Lymphoma (especially Mantle Cell), Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burkett's Lymphoma, and Waldenstrom's Macroglobulinemia.

The presently disclosed subject matter also provides methods of increasing or lengthening survival of a subject having a neoplasia. In one non-limiting example, the method of increasing or lengthening survival of a subject having neoplasia comprises administering an effective amount of the presently disclosed immunoresponsive cell to the subject, thereby increasing or lengthening survival of the subject. The method can reduce or eradicate tumor burden in the subject. The presently disclosed subject matter further provides methods for treating or preventing a neoplasia in a subject, comprising administering the presently disclosed immunoresponsive cell to the subject.

As used herein, the term "neoplasia" refers to a disease characterized by the pathological proliferation of a cell or tissue and its subsequent migration to or invasion of other tissues or organs. Neoplasia growth is typically uncontrolled and progressive, and occurs under conditions that would not elicit, or would cause

cessation of, multiplication of normal cells. Neoplasias can affect a variety of cell types, tissues, or organs, including but not limited to an organ selected from the group consisting of bladder, colon, bone, brain, breast, cartilage, glia, esophagus, fallopian tube, gallbladder, heart, intestines, kidney, liver, lung, lymph node, nervous tissue, ovaries, pleura, pancreas, prostate, skeletal muscle, skin, spinal cord, spleen, stomach, testes, thymus, thyroid, trachea, urogenital tract, ureter, urethra, uterus, and vagina, or a tissue or cell type thereof. Neoplasias include cancers, such as sarcomas, carcinomas, or plasmacytomas (malignant tumor of the plasma cells).

Cancers whose growth may be inhibited using the immunoresponsive cells of the presently disclosed subject matter comprise cancers typically responsive to immunotherapy. Non-limiting examples of cancers for treatment include 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 cancer is multiple myeloma.

Additionally, the presently disclosed subject matter provides methods of increasing immune-activating cytokine production in response to a cancer cell in a subject. In one non-limiting example, the method comprises administering the presently disclosed immunoresponsive cell to the subject. The immune-activating cytokine can be granulocyte macrophage colony stimulating factor (GM-CSF), IFN- $\alpha$ , IFN- $\beta$ , IFN- $\gamma$ , TNF- $\alpha$ , IL-2, IL-3, IL-6, IL-11, IL-7, IL-12, IL-15, IL-21, interferon regulatory factor 7 (IRF7), and combinations thereof. In certain embodiments, the immunoresponsive cells including an FcRL5-specific CAR of the presently disclosed subject matter increase the production of GM-CSF, IFN- $\gamma$ , and/or TNF- $\alpha$ .

Suitable human subjects for therapy typically comprise two treatment groups that can be distinguished by clinical criteria. Subjects with "advanced disease" or "high tumor burden" are those who bear a clinically measurable tumor (*e.g.*, multiple myeloma). A clinically measurable tumor is one that can be detected on the basis of tumor mass (*e.g.*, by palpation, CAT scan, sonogram, mammogram or X-ray; positive biochemical or histopathologic markers on their own are insufficient to identify this population). A pharmaceutical composition embodied in the presently disclosed subject matter is administered to these subjects to elicit an anti-tumor response, with the objective of palliating their condition. Ideally, reduction in tumor mass occurs as

a result, but any clinical improvement constitutes a benefit. Clinical improvement comprises decreased risk or rate of progression or reduction in pathological consequences of the tumor (*e.g.*, multiple myeloma).

5 A second group of suitable subjects is known in the art as the “adjuvant group.” These are individuals who have had a history of neoplasia (*e.g.*, multiple myeloma), but have been responsive to another mode of therapy. The prior therapy can have included, but is not restricted to, surgical resection, radiotherapy, and traditional chemotherapy. As a result, these individuals have no clinically measurable tumor. However, they are suspected of being at risk for progression of the disease,  
10 either near the original tumor site, or by metastases. This group can be further subdivided into high-risk and low-risk individuals. The subdivision is made on the basis of features observed before or after the initial treatment. These features are known in the clinical arts, and are suitably defined for each different neoplasia. Features typical of high-risk subgroups are those in which the tumor (*e.g.*, multiple  
15 myeloma) has invaded neighboring tissues, or who show involvement of lymph nodes. Another group has a genetic predisposition to neoplasia (*e.g.*, multiple myeloma) but has not yet evidenced clinical signs of neoplasia (*e.g.*, multiple myeloma). For instance, women testing positive for a genetic mutation associated with breast cancer, but still of childbearing age, can wish to receive one or more of the  
20 antigen-binding fragments described herein in treatment prophylactically to prevent the occurrence of neoplasia until it is suitable to perform preventive surgery.

The subjects can have an advanced form of disease (*e.g.*, multiple myeloma), in which case the treatment objective can include mitigation or reversal of disease progression, and /or amelioration of side effects. The subjects can have a history of  
25 the condition, for which they have already been treated, in which case the therapeutic objective will typically include a decrease or delay in the risk of recurrence.

Further modification can be introduced to the FcRL5-specific CAR-expressing immunoresponsive cells (*e.g.*, T cells) to avert or minimize the risks of immunological complications (known as “malignant T-cell transformation”), *e.g.*,  
30 graft versus-host disease (GvHD), or when healthy tissues express the same target antigens as the tumor cells, leading to outcomes similar to GvHD. A potential solution to this problem is engineering a suicide gene into the CAR-expressing T cells. Suitable suicide genes include, but are not limited to, Herpes simplex virus

thymidine kinase (hsv-tk), inducible Caspase 9 Suicide gene (iCasp-9), and a truncated human epidermal growth factor receptor (EGFRt) polypeptide. In certain embodiments, the suicide gene is an EGFRt polypeptide. The EGFRt polypeptide can enable T cell elimination by administering anti-EGFR monoclonal antibody (*e.g.*, cetuximab). EGFRt can be covalently joined to the 3' terminus of the intracellular domain of the FcRL5-specific CAR. The suicide gene can be included within the vector comprising nucleic acids encoding the presently disclosed FcRL5-specific CARs. In this way, administration of a prodrug designed to activate the suicide gene (*e.g.*, a prodrug (*e.g.*, AP1903 that can activates iCasp-9) during malignant T-cell transformation (*e.g.*, GVHD) triggers apoptosis in the suicide gene-activated CAR-expressing T cells.

### ***IX. Kits***

The presently disclosed subject matter provides kits for the treatment or prevention of a neoplasia (*e.g.*, multiple myeloma). In certain embodiments, the kit comprises a therapeutic or prophylactic composition containing an effective amount of an immunoresponsive cell comprising a FcRL5-specific CAR in unit dosage form. In particular embodiments, the cells further expresses at least one co-stimulatory ligand. In certain embodiments, the kit comprises a sterile container which contains a therapeutic or prophylactic vaccine; such containers can be boxes, ampules, bottles, vials, tubes, bags, pouches, blister-packs, or other suitable container forms known in the art. Such containers can be made of plastic, glass, laminated paper, metal foil, or other materials suitable for holding medicaments.

If desired, the immunoresponsive cell is provided together with instructions for administering the cell to a subject having or at risk of developing a neoplasia (*e.g.*, multiple myeloma). The instructions will generally include information about the use of the composition for the treatment or prevention of a neoplasia (*e.g.*, multiple myeloma). In other embodiments, the instructions include at least one of the following: description of the therapeutic agent; dosage schedule and administration for treatment or prevention of a neoplasia (*e.g.*, multiple myeloma) or symptoms thereof; precautions; warnings; indications; counter-indications; overdosage information; adverse reactions; animal pharmacology; clinical studies; and/or references. The instructions may be printed directly on the container (when present), or as a label applied to the container, or as a separate sheet, pamphlet, card, or folder

supplied in or with the container.

**X. Exemplary extracellular antigen-binding domains (e.g., scFvs)**

Table 1

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-001</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Cagtctgtgttgacgcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgtgtctggaagcagctc<br>caacatcggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcag<br>cggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtct<br>gaggatgagcgtgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcaccg<br>tcttaggt [SEQ ID NO: 1]<br><u>tctagaggtggtggtgtagcggcgggcgggcgtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]<br><b>cagggtgcagctacagcagtgggggcgaggactgttgaagccttcggagaccctgtccctcacctgcgtgtgtatgg</b><br><b>tgggtccttcagtgggttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaaatc</b><br><b>aatcatagtggaagcaccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaac</b><br><b>cagttctccctgaagctgagctctgtgaccgccggcacggccgtgtattactgtgcgcgcgaagggtccgtacga</b><br><b>cggtttcgattcttggggtaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 2]<br>ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>VTVLG [SEQ ID NO: 3]<br><u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]<br><b>QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKGLEWI</b><br><b>GEINHSGSTNYPNPSLKSRTISVDTSKNQFSLKLSSVTAADTAVYYCAREG</b><br><b>PYDGFDSWGQGTLVTVSS</b> [SEQ ID NO: 4]<br>TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 2

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-002</b>                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| Aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctcctgcacccgcagcagtggc<br>agcattgccagcaactatgtgcagtgggtaccagcagcggccgggcagtggccccaccactgtgatctatgaggataacca<br>aagacctctggggtcctgatcgggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactactgtcagtttatgatagcagcaattctgtggtattcggcggagggaaccaagctga<br>ccgtcctaggt [SEQ ID No. 5]                         |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                |
| <b>cagggtccagctgggtacagtctggcactgaggtgaagaagcctggggcctcagtgagggtcgctgcaaggcttctg<br/>gttaccctttaacaaatatgacatcaactgggtgcgacaggccctggacaagggttgagtggatgggaggcat<br/>catccctatctttcgtacaacaaactacgcacagaagttccaggggcagagtcacgattaccgcggaacgaatccacg<br/>agcacagcctacatggagctgagcagcctgagatctgaggacacggcgtatattactgtgcgcgcgaatggttct<br/>actgggatatctgggggtcaagggtactctgggtaccgtctcctca</b> [SEQ ID NO: 6] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNSVVFGGGTK<br>LTVLG [SEQ ID NO: 7]                                                                                                                                                                                                                                                                  |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                            |
| <b>QVQLVQSGTEVKKPGASVRVACKASGYPFNKYDINWVRQAPGQGLEW<br/>MGGIPIFRTTNYAQKFQGRVTITADESTSTAYMELSSLRSEDNAVYYCAR<br/>EWFYWDIWGQGTLVTVSS</b> [SEQ ID NO: 8]                                                                                                                                                                                                                                                     |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                             |

Table 3

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| <b>ET200-003</b>                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| cagtctgtgtgactcagccaccctcagtgtccgtgtccccaggacagacagccagcatctcctgctctggaaataaattgg<br>ggactaagtatgtttactggtatcagaagaggccaggccagctccctgtgttggtcatgtatgaagataatcagcggccctc<br>agggatcccgagcgggttctctggctccaactctgggaacacagccactctgacctcagagggaccagactgtggatg<br>aggctgactattactgtcaggcgtgggactccgacacttctgtggtcttcggcggagggaaccaaggtcaccgtcctaggt<br>[SEQ ID NO: 9]                                                           |
| <u>tctagagggtggtggttagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                       |
| <b>gagggtgcagctggtggagaccgggggaggcgtggtccagcctgggaggtccctgagactctcctgtgcagcctctg<br/>gattcaccttcagtagttatggcatgcactgggtccgccaggctccaggcaaggggctggagtgggtggcagttata<br/>tcacatgatggaagtaataaataactacgcagactccgtgaagggccgattcaccatctccagagacaattccaagg<br/>acacgctgtatctgcaaatgaacagcctgagaggtgaggacacggccgtatattactgtgcgcgctctaaccagtg<br/>gtctgggttacttcttttcgattactgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 10] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                           |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| QSVLTQPPSVSVSPGQTASISCSGNKLGTKYVYWYQKRPGQSPVLVMYEDNQ<br>RPSGIPERFSGSNSGNTATLTIRGTQTVDEADYYCQAWDSDTFVVFGGGTKVT<br>VLG [SEQ ID NO: 11]                                                                                                                                                                                                                                                                                       |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                              |
| <b>EVQLVETGGGVVQPGRSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWV<br/>AVISHDGSNKYYADSVKGRFTISRDN SKDTLYLQMNSLRGEDTAVYYCAR<br/>SNQWSGYFSFDYWGQGT LTVSS</b> [SEQ ID NO: 12]                                                                                                                                                                                                                                                                |
| TSGQAGQH HHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                               |



Table 4

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| <b>ET200-006</b>                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                             |
| tcctatgtgtgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaacaacatt<br>ggaagtaaaaagtgtgactgttaccagcagaagccaggccaggccctgtgtgtgtcatccattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgacctcagcaggggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtagtgatcctcttatgtcttcggaactgggaccaagggtcaccgt<br>cctaggt [SEQ ID NO: 13]                                          |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtgtggtggatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                            |
| <b>gagggtgcagctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaagggtctctgcaaggcttctg<br/>gttacacctttaccacctatgggtatcagctgggtgcgacaggccctggacaagggcttgagtggatgggatggatc<br/>aacacttacaatgggtcacacaaactatgcacagaagctccaggggcagagccacaatgaccgcagacacatccac<br/>gaacacagcctacatggagctgaggagcctgagatctgacgacactgccgtgtattactgtgcgcgcgttatctacg<br/>gttctggtgattactgggggtcaagggtactctgggtgaccgtctctca</b> [SEQ ID NO: 14] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                 |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                       |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                             |
| SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVTVIHYS<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK<br>VTVLG [SEQ ID NO: 15]                                                                                                                                                                                                                                                                             |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                     |
| <b>EVQLVQSGAEVKKPGASVKVSCKASGYTFRTYGISWVRQAPGQGLEWM<br/>GWINTYNGHTNYAQKLQGRATMTADTSTNTAYMELRSLRSDDTAVYYC<br/>ARVIYGSGDYWGQGLVTVSS</b> [SEQ ID NO: 16]                                                                                                                                                                                                                                                            |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                      |

Table 5

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| <b>ET200-007</b>                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| tcctatgtgctgactcagccactctcagtgctcagtggtggccccaggaaagacggccaggattacctgtgggggaaacaacatt<br>ggaagtaaaactgtgactggtaccagcagaagccaggccaggccccctgtgctggtcatctattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgacctcagcaggggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtagtgatcatcgggtgttcggcggagggaaccaagctgaccgtc<br>ctaggt [SEQ ID NO: 17]                            |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                   |
| <b>caggtgcagctgcaggagtcgggcccaggactggtgaagccttcggagaccctgtccctcacctgcaatgtctctg<br/>gttactccatcagcagtggttacttttggggctggatccggcagccccagggaaggggtggagtggattgggagt<br/>atctatcatagtaggagcacctactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaaga<br/>accagttctccctgaagctgaactctgtgaccgccgcagacacggccgtgtattactgtgcgcgcgggttacggttact<br/>tcgattactgggggtcaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 18] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| SYVLTQPLSVSVAPGKTARITCGGNNIGSKTVHWYQQKPGQAPVLVIYYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHRVFGGGTKL<br>TVLG [SEQ ID NO: 19]                                                                                                                                                                                                                                                                   |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                            |
| <b>QVQLQESGPGLVKPSETLSLTCNVSGYSISSGYFWGWIRQPPGKGLEWIG<br/>SIYHSRSTYYNPSLKSRTISVDTSKNQFSLKLNSVTAADTAVYYCARGYG<br/>YFDYWGGQTLVTVSS</b> [SEQ ID NO: 20]                                                                                                                                                                                                                                                    |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                             |

Table 6

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| <b>ET200-008</b>                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                |
| caatctgcctgactcagcctgcctccgtgtctgggtctcctggacagtcgatcaccatctcctgcactggaaccagcagtg<br>acgttggtggtataactatgtctcctggtaccaacaacacccaggcaaagccccaaactcatgatttatgatgtcagtaatc<br>ggccctcaggggttttaategccttctctggtccaagtctggcaacacggcctccctgaccatctctgggctccaggctga<br>ggacgaggctgattattactgcagctcatatacaagcagcagcacttcgaaggtgttcggcggagggaaccaagctgaccg<br>tcctaggt [SEQ ID NO: 21]                                       |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                |
| <b>gaggtgcagctggtggagtctgggggaggtgtggtacggcctggggggtcctgagactctcctgtgcagcctctg<br/>gattcacctttggtgattatggcatgagctgggtccgccaagctccagggaaggggctggagtgggtctctggtatt<br/>aattggaatggtggttagcacaggttatgcagactctgtgaagggccgattcaccatctccagagacaacgccaaga<br/>actccctgtatctgcaaataaacagtctgagagccgaggacacggccgtatattactgtgcgcgctctaaatacaac<br/>ttccatgtttactacgattactggggtaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 22] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                    |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                          |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                |
| QSALTQPASVSGSPGQSITISCTGTSSDVGGYNYVSWYQQHPGKAPKLMIYDV<br>SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCSSYTSSSTSKVFGGGTK<br>LTVLG [SEQ ID NO: 23]                                                                                                                                                                                                                                                                            |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                       |
| <b>EVQLVESGGGVVVRPGGSLRLSCAASGFTFGDYGMSWVRQAPGKGLEWV<br/>SGINWNGGSTGYADSVKGRFTISRDNKNSLYLQMNSLRAEDTAVYYCA<br/>RSKYNFHVYYDYWGQGTLVTVSS</b> [SEQ ID NO: 24]                                                                                                                                                                                                                                                           |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                         |

Table 7

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| <b>ET200-009</b>                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                            |
| cagtctgtgtgacgcagccaccctcagcgtctgggacccccgggcagacagtcaccatctctgttctggaagcaactcc<br>aacatcggagtaattatgtatactggtaccagcagctcccaggaacggccccaaactcctcatctataggaataatcagc<br>ggccctcaggggtccctgaccgattctcaggtccaagtctggcacctcagcctccctggccatcagtggtcctccgctccg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgagtgttatgtcttcggaactgggaccaaggtcacctg<br>cctaggt [SEQ ID NO: 25]                                        |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                           |
| <b>cagggtgcagctggtgcagctcggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccctggacaagggttgagtggatgggatggatc<br/>agcgttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacactgccgtgtattactgtgcgcgctcttcttggtaa<br/>catggtttcttgaaagatatgtgggtcaaggctactctggtgaccgtctctca</b> [SEQ ID NO: 26] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                            |
| QSVLTQPPSASGTPGQTVTISCSGSNSNIGSNYVYWYQQLPGTAPKLLIYRNN<br>QRPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAAWDDSLSAYVFGTGT<br>KVTVLG [SEQ ID NO: 27]                                                                                                                                                                                                                                                                         |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                    |
| <b>QVQLVQSGAEVKKPGASVKVSCKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAVYYCA<br/>RSSGNMVSWMKDMWGQGTLLTVSS</b> [SEQ ID NO: 28]                                                                                                                                                                                                                                                      |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                     |

Table 8

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-010</b>                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                  |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                 |
| caatctgcctgactcagcctgcctccgtgtctgggtctcctggacagtcgatcaccatctcctgcactggaaccagcagtg<br>acgttggtggtataactctgtctcctggtaccaacaacacccaggcaaagccccagactcatgatttatgatgtcagtaatc<br>ggccctcaggggttttaatecgttctctggtccaagtctggcaacacggcctccctgaccatctctgggtccaggctga<br>ggacgaggctgattattactgcagctcatatacaagcagcagcaccctttagtcttcggaactgggaccaaggtcaccgtc<br>ctaggt [SEQ ID NO: 29]                            |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                |
| <b>cagggtgcagctggtgcagctctggggctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccctggacaagggttgagtggatgggatggatc<br/>agcgttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacacggcctgtattactgtgcgcgcggtgctgttg<br/>cttaccatgattggggtaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 30] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                     |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                 |
| QSALTQPASVSGSPGQSITISCTGTSSDVGGYNSVSWYQQHPGKAPRLMIYDV<br>SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCSSYTSSSTPLVFGTGTK<br>VTVLG [SEQ ID NO: 31]                                                                                                                                                                                                                                                             |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                         |
| <b>QVQLVQSGAEVKKPGASVKVSCKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAVYYCA<br/>RGAVAYHDWGQGTLLTVSS</b> [SEQ ID NO: 32]                                                                                                                                                                                                                                                |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                          |

Table 9

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| <b>ET200-011</b>                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| cagtctgtcgtgacgcagccgccctcagtgtctgcggccccaggacagagggtcaccatctctgctctggaagcagctc<br>caacatttcgatttatgatgtatcctggatcagcagctcccaggaacagccccaaactcctcatttatggcaataataagcg<br>accctcggggattgctgaccgattctctggctccacgtctggcacgtcagccaccctgggcatcaccggactccagactgg<br>ggacgaggccgattattactgcggaacatgggatgacagtctgagtgggggggtgttcggcggaggggaccaagctgacc<br>gtcctaggt [SEQ ID NO: 33]                                   |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                         |
| <b>cagatgcagctgggtgcaatctggggctgaggtgaagaagcctgggtcctcgggtgaaggtctctgcgaggttctg<br/>gaggcaccctcagcagctatgctatcaactgggtgcgacaggccctggacaagggttgagtggatgggagggga<br/>tcatccctatgtttgttacagcacactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gaaaacagcctacatggagctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcggtgttcatt<br/>acgcttctttcgatcattgggggtcaaggtactctggtgaccgtctectca</b> [SEQ ID NO: 34] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                              |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| QSVVTQPPSVSAAPGQRVTISCSGSSSNISIYDVSWYQQLPGTAPKLLIYGNNK<br>RPSGIADRFSGSTSGTSATLGITGLQTGDEADYYCGTWDDSLSGGVFGGGTKL<br>TVLG [SEQ ID NO: 35]                                                                                                                                                                                                                                                                       |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                 |
| <b>QMQLVQSGAEVKKPGSSVKVSCEASGGTLSSYAINWVRQAPGQGLEWM<br/>GGIIPMFGTAHYAQKFQGRVTITADESTKTAYMELSSLRSEDNAVYYCAR<br/>GVHYASFDHWGQGTLVTVSS</b> [SEQ ID NO: 36]                                                                                                                                                                                                                                                       |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                   |

Table 10

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-012</b>                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| cagtctgtgtgacgcagccgccctcagtgtctgcccgcaggacagaaggtcaccatctcctgctctggaagcgactcc<br>aacattgggaataattatgtgtcctgggtatcaacacctcccagggacagccccaaactcctcatttatgacgttaaaatcga<br>ccctcagggattcctgaccggttctccggctccaagtctggctcgtcagccaccctaggcatcggcgactccagcctggg<br>gacgaggccgattattactgcggaacatgggacagtcggctggatgcctatgtcttcggaactgggaccaaggtcaccgtc<br>ctaggt [SEQ ID NO: 37]                                |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                |
| <b>cagatgcagctggtgcaatctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaagacttctg<br/>gtttccctttaatatctttggaatcacctgggtgcgacaggccctggacaagggttgagtggatgggatggatca<br/>gcggttacaacggtaacacagactaccacagaagttccagggcagagtcaccatgtccacagacacatccacga<br/>gtacagcctacatggagctgaggaacctgaaatctgacgacacggccgtgtattactgtgcgcggtgtcttacggt<br/>ggatatggatacttgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 38] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| QSVLTQPPSVSAAAGQKVTISCSGSDSNIGNNNYVSWYQHLPGTAPKLLIYDVK<br>NRPSGIPDRFSGSKSGSSATLGIAGLQPGDEADYYCGTWDSRLDAYVFGTGTK<br>VTVLG [SEQ ID NO: 39]                                                                                                                                                                                                                                                                |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                            |
| <b>QMQLVQSGAEVKKPGASVKVSKTSGFPFNIFGITWVRQAPGQGLEWM<br/>GWISGYNGNTDYPQKFQGRVTMSTDSTSTAYMELRNLSDDTAVYYCA<br/>RGAYGGMDTWGQGTTLTVSS</b> [SEQ ID NO: 40]                                                                                                                                                                                                                                                     |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                             |

Table 11

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| <b>ET200-013</b>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                              |
| cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctcctgcactgggagcacctc<br>caacatcggggcaggttatgatgtacactgggtatcagcagcttcagggaacagccccc aaactctcatctataactaacaac<br>tttcggccctcaggggtccctgaccgattctctgctccaagtctggcacttcagcttccctggccatcactggctccaggt<br>gaggatgaggctgattattactgcggaacatgggatagcagcctgagtgccgttggttcggcggagggaaccaagctgac<br>cgtcctaggt [SEQ ID NO: 41]                                   |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                              |
| <b>gagggtgcagctggtggagtctggaactgaggtgaagaagcctggggcctcagtgaaagtctcctgcaaggcttctg<br/>gttacatgtttaccagttatgggtctcaactgggtgcgacaggccccctggacaagggcttgagtggatgggatggatc<br/>agcgctaacaatggtaagacaaattatgctaagaaattccaggacagagtcaccatgaccagagacacttccacg<br/>agcacaggctacatggaactgaggagcctgagatctgacgacacggccgtatattactgtgcgcgccatateggtg<br/>gttcttacttcgatcgttggggtaagggtactctgggtgaccgtctcctca</b> [SEQ ID NO: 42] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                  |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                              |
| QSVVTQPPSVSGAPGQRVTISCTGSTSNIGAGYDVHWYQQLPGTAPKLLIYTN<br>NFRPSGVPDRFSASKSGTSASLAITGLQAEDEADYYCGTWDSSLSAVVFGGGT<br>KLTVLG [SEQ ID NO: 43]                                                                                                                                                                                                                                                                          |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                      |
| <b>EVQLVESGTEVKKPGASVKVSKKASGYMFTSYGLNWVRQAPGQGLEW<br/>MGWISANNGKTNIAKKFQDRVTMTRDTSTSTGYMELRSLRSDDTAVYY<br/>CARHIGGSYFDRWGQGTLLVTVSS</b> [SEQ ID NO: 44]                                                                                                                                                                                                                                                          |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                       |



Table 12

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-014</b>                                                                                                                                                                                                                                                                                                                                                                                                   |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                               |
| tcctatgtgtgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaacaacatt<br>ggaagtaaaagtgtgactggtaccagcagaagccaggccaggccctgtgctggtcatctattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgacctcagcagggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtagtgatcattatgtcttcggaactgggaccaaggtcaccgtcct<br>aggt [SEQ ID NO: 45]                                                 |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                           |
| <b>gagggtgcagctggtggagactgggggaggcttggtacagcctggggggtccctgagactctcctgtgcagcctctg<br/>gattcacctttagcagctatgccatgagctgggtccgccaggctccagggaaggggctggagtgggtctcagctatt<br/>agtggtagtgatggtagcacatactacgcagactccgtgaagggccggttcaccatctccagagacaattccaaga<br/>acacgctgtatctgcaaatgaacagcctgagagacgaggacacggccgtatattactgtgcgcgctctcatgaagc<br/>taacctggttggtgattggtgggggtcaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 46] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                   |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                         |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                               |
| SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHYVFGTGTKV<br>TVLG [SEQ ID NO: 47]                                                                                                                                                                                                                                                                              |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                       |
| <b>EVQLVETGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWV<br/>SAISGSDGSTYYADSVKGRFTISRDN SKNTLYLQMNSLRDEDTA VYYCAR<br/>SHEANLVGDWWGQGT LVT VSS</b> [SEQ ID NO: 48]                                                                                                                                                                                                                                                       |
| TSGQAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                        |

Table 13

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-015</b>                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                  |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                 |
| cagtctgtggtgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacat<br>tggaaagtaaaagtgtgcactggtaccagcagaagccaggccaggccccctgtgctggtcatctattatgatagcgaccggc<br>cctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggctcgaagccgg<br>ggatgagggccgactattactgtcaggtgtgggtagtagtagtgatgtggtattcggcggaggggaccaagctgaccgtcct<br>aggt [SEQ ID NO: 49]                                             |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                |
| <b>gagggtccagctggtacagtctggagctgagggtgaagaagcctggggcctcagtgaagggtctctgcaaggcttctg<br/>gttacacctttaccagctacgggtatcagctgggtgcgacaggccccctggacaagggcttgagtggatgggatggat<br/>cagcgcttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccac<br/>gagcacagcctacatggagctgaggagcctgagatctgacgacacggccgtgtattactgtgcgcgctgggggtggt<br/>ttcgggtgctgttgatcattgggggtcaagggtactctggtgaccgtctctca</b> [SEQ ID NO: 50] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                     |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                 |
| QSVVTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDVVFGGGTKLT<br>VLG [SEQ ID NO: 51]                                                                                                                                                                                                                                                                                 |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                        |
| <b>EVQLVQSGAEVKKPGASVKVSCKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAVYYCA<br/>RWGGFGAVDHWGQGTLVTVSS</b> [SEQ ID NO: 52]                                                                                                                                                                                                                                                              |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                          |

Table 14

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| <b>ET200-016</b>                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                       |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                      |
| tcttctgagctgactcaggaccctgctgtgtctgtggccttgggacagacagtcaagatcacgtgccaaggagacagcctc<br>acagactaccatgcaacctggtaccagcagaagccaggacaggccctgtcgtgtcatctatgtacaaacaaccggcc<br>cactgggatccagaccgattctctggtccagtccggaaacacagcttctttgaccatcactggggctcaggcgggaagat<br>gaggctgactattactgtaattcccgggacagcggcacggacgaagtgtattcggcggaggggaccaagctgaccgtctc<br>aggt [SEQ ID NO: 53]                                        |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                  |
| <b>gagggtgcagctggtggagactgggggaggcctgggtcaagcctgggggggtccctgagactctcctgtgcagcctctg<br/>gattcaccttcagtagctatagcatgaactgggtccgccaggctccagggaaggggctggagtgggtctcatccatt<br/>agtagtagtagtagttacatatactacgcagactcagtgaagggccgattcaccatctccagagacaacgccaaga<br/>actcactgtatctgcaaatgaacagcctgagagccgaggacacggccgtgtattactgtgcgcgcgggtcagggtta<br/>cgattactgggggtcaagggtactctggtgaccgtctctca</b> [SEQ ID NO: 54] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                          |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                      |
| SSELTQDPAVSVALGQTVKITCQGDSLTDYHATWYQQKPGQAPVAVIYATN<br>NRPTGIPDRFSGSSSGNTASLTITGAQAEDEADYYCNSRDSGTDEVLFGGGTK<br>LTVLG [SEQ ID NO: 55]                                                                                                                                                                                                                                                                     |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                             |
| <b>EVQLVETGGGLVKPGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWV<br/>SSISSSSSYIYYADSVKGRFTISRDNAKNSLYLQMNSLRAEDTAVYYCARG<br/>QGYDYWGQGTLVTVSS</b> [SEQ ID NO: 56]                                                                                                                                                                                                                                                       |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                               |

Table 15

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| <b>ET200-017</b>                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                             |
| tcctatgtgctgactcagccaccctcgggtgctcagtggccccaggaaagacggccaggattacctgtgggggaaacaacatt<br>ggaagtaaaagtgtgactggtaccagcagaagccaggccaggccctgtgctggctgtctatgatgatagcgaccggc<br>cctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgagcatcagcagggctgaagccgg<br>ggatgagggccgactattactgtcaggtgtgggatagtagtagtgatcatactgtcttcggaactgggaccaaggtcaccgtc<br>ctaggt [SEQ ID NO: 57]                         |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                             |
| <b>caggtgcagctacagcagtggtggcgaggactgttgaagccttcggagaccctgtccctcacctgcgtgtctatgg<br/>tgggtccttcagtgggttactactggagctggatccgccagccccagggaaggggctggagtggattggggaaatc<br/>aatcatagtgaagcaccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaac<br/>cagttctccctgaagctgagctctgtgaccgccggacacggccgtgtattactgtgcgcgtactacccgggtatg<br/>gatatgtgggggtcaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 58] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                 |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                       |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                             |
| SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVVYDDSD<br>RPSGIPERFSGSNSGNTATLSISRVEAGDEADYYCQVWDSSSDHTVFGTGTKV<br>TVLG [SEQ ID NO: 59]                                                                                                                                                                                                                                                            |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                     |
| <b>QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKGLEWI<br/>GEINHSGSTNYNPSLKSRTISVDTSKNQFSLKLSSVTAADTAVYYCARYY<br/>PGMDMWGQGTLVTVSS</b> [SEQ ID NO: 60]                                                                                                                                                                                                                                              |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                      |

Table 16

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-018</b>                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                  |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                 |
| caggctgtgctgactcagccgcctcaacgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacatcgggagaaatggtgtaaactggtaccagcagctcccaggagcggccccaaagtctcatctataatgataatcag<br>cgaccctcaggggtccctgaccgagtctctggctcccagctctggctcctcaggcaccctggccatcgatgggcttcggtct<br>gaggatgaggctgattattactgtgcggcatgggatgacagcctgcattggtgtggtattcggcggagggaccaagctgac<br>cgtcctaggt [SEQ ID NO: 61]                          |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                 |
| <b>caggctcagctggtacagtctggggctgagggtgaagaagcctggggcctcagtgaaggtctctgcaaggtttccg<br/>gatacaccctcaatgaattatccatgcactgggtgcgacaggctcctggaaaagggttgagtggatgggagggttt<br/>gatcctgaagatggtgaaacaatctacgcacagaagtccagggcagagtcaccatgaccgaggacacatctaca<br/>gacacagcctacatggagctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcggtgggttacg<br/>gtgattcttgggggtcaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 62] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                     |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                 |
| QAVLTQPPSTSGTPGQRVTISCSGSSSNIGRNGVNWYQQLPGAAPKVLINNDN<br>QRPSGVPDRVSGSQSGSSGTLAIDGLRSEDEADYYCAAWDDSLHGVVFGGGT<br>KLTVLG [SEQ ID NO: 63]                                                                                                                                                                                                                                                              |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                        |
| <b>QVQLVQSGAEVKKPGASVKVSCKVSGYTLNELSMHWVRQAPGKGLEW<br/>MGGFDPEDGETIYAQKFQGRVTMTEDTSTDYAYMELSSLRSEDYAVYYC<br/>ARGGYGDSWGQGTLVTVSS</b> [SEQ ID NO: 64]                                                                                                                                                                                                                                                 |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                          |

Table 17

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| <b>ET200-019</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                        |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcacccgcagcagtgggca<br>gcattgccagcaactatgtgcagtggtaccagcagcggccgggcagtgccccaccactgtgatctatgaggataaccaa<br>agacctctggggtccctgatcggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactgaa<br>gactgaggacgaggctgactactactgtcagtcttatgatagcagcaattcttgggtgttcggcggaggggaccaagctgac<br>cgtcctaggt [SEQ ID NO: 65]                                                                           |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                                                       |
| <b>cagggtgcagctggtgcaatctggggctgaggtgaagaggcctgggtcctcggtgaaggtctctgcacggcttctg<br/>gaggcaccttcagcagcgatgctatcagctgggtgcgacaggcccctggacaagggcttgagtggatgggaggaa<br/>tcacccctatgtttggtacagcaactacgcacagaagttccagggcagagtcacgattaccgcggaacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcggaaggttac<br/>tactacccgtctgcttacctgggttctgttctgaacgacatctcttctgtttacgatgaatgggggtcaaggtactctggt<br/>gaccgtctctca</b> [SEQ ID NO: 66] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                                            |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                        |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNSWVFGGTT<br>KLTVLG [SEQ ID NO: 67]                                                                                                                                                                                                                                                                                                                     |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>QVQLVQSGAEVKRPGSSVKVCTASGGTFSSDAISWVRQAPGQGLEWMG<br/>GIIPMEGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDNAVYYCARE<br/>GYYYPSAYLGSVLNDISSVYDEWGQGTLLTVSS</b> [SEQ ID NO: 68]                                                                                                                                                                                                                                                                                        |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 18

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| <b>ET200-020</b>                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                     |
| cagtctgtcgtgacgcagccgccctcagtgtctgcggccccaggacagaaggtcaccatctctgctctggaagcacctc<br>caacattggaaataatgatgtatcctggtaccagcagctcccaggacagccccaaactcctcatttatgacaataataagc<br>gacctcagggattcctgaccgattctctggctccaagtctggcacgtcagccacctgggcacaccggactccagactg<br>gggacgaggccgattattactgcggaacatgggatagcagcgtgagtgccttctgggtcttcggcagagggaccaagctg<br>accgtcctaggt [SEQ ID NO: 69]                               |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                     |
| <b>cagggtgcagctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccctggacaagggcttgagtggatgggatggatc<br/>agcgcttacaatggtaacacaaactatccacagaagctccagggcagagtcaccatgaccacagacctatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacacggccgtgtattactgtgcgcgctctatgacttc<br/>tttcgattactgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 70] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                         |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                     |
| QSVVTQPPSVSAAPGQKVTISCSGSTSNIGNNDVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSSVSASWVFGRGT<br>KLTVLG [SEQ ID NO: 71]                                                                                                                                                                                                                                                                 |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                             |
| <b>QVQLVQSGAEVKKPGASVKVSCKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYPQKLQGRVTMTTDPSTSTAYMELRSLRSDDTAVYYCA<br/>RSMTSFDYWQGTLVTVSS</b> [SEQ ID NO: 72]                                                                                                                                                                                                                                                     |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                              |

Table 19

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| <b>ET200-021</b>                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                   |
| cagtctgtgtgacgcagccgccctcagtgtctgcgcccccaggacagaaggtcaccatctcctgctctggaagcaactcc<br>aacattgggaataattatgtatcctggtatcagcaactcccagggacagccccaaactcctcatttatgacaataataagcg<br>accctcagggattcctgaccgattctctggctccaggtctggcacgtcagccaccctgggcatcaccggactccagactgg<br>ggacgaggccgattattactgcggaacatggaataccactgtgactcctggctatgtcttcggaactgggaccaaggtcac<br>cgtcctaggt [SEQ ID NO: 73]                         |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                  |
| <b>gaagtgcagctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccctggacaagggcttgagtggatgggatggatc<br/>agcgcttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacaccgcatgtattactgtgcgcgctctgtttacga<br/>cctggatacttgggggtcaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 74] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                       |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                   |
| QSVLTQPPSVSAAPGQKVTISCSGSNSNIGNNNYVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSRSGTSATLGITGLQTGDEADYYCGTWNTTVTPGYVFGTGT<br>KVTVLG [SEQ ID NO: 75]                                                                                                                                                                                                                                                              |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                          |
| <b>EVQLVQSGAEVKKPGASVKVSCKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAMYIC<br/>ARSVYDLDTWGQGTLVTVSS</b> [SEQ ID NO: 76]                                                                                                                                                                                                                                                  |
| TSGQAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                            |



Table 20

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-022</b>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                              |
| cagtctgtcgtgacgcagccgccctcagtgtctgcggccccaggacagaaggtcaccatctctgctctggaagcagctc<br>caacattgggaataattatgtatcctggtaccagcagctcccaggaacagccccaaactcctcatttatgacaataataagc<br>gacctcagggattcctgaccgattctctggctccaagtctggcacgtcagccaccctgggcatcaccggactccagactg<br>gggacgaggccgattattactgcgggaacatgggatagcagcctggggggccccttatgtcttcggaactgggaccaaggtc<br>accgtcctaggt [SEQ ID NO: 77]                                   |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                             |
| <b>gagggtgcagctggtgcagctctggggaggctcggaacagcctggcaggtccctgagactctctgtgcagcctctg<br/>gattcacctttgatgattatgccatgcactgggtccggcaagctccagggaaggcgctggagtgggtctcaggtatt<br/>agttggaatagcggtagcataggctatgcggactctgtgaagggccgattcaccatctccagagacaacgccaaag<br/>aattccctgtatctgcaaatgaacagctctgagagctgaggacaccgccatgtattactgtgcgcgtaccgtcagggtt<br/>ggttctgcttacgattcttgggtcaagggtactctggtgaccgtctctca</b> [SEQ ID NO: 78] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                  |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                              |
| QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSSLGAPYVFGTGT<br>KVTVLG [SEQ ID NO: 79]                                                                                                                                                                                                                                                                          |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                      |
| <b>EVQLVQSWGGSEQPGRSLRLSCAASGFTFDDYAMHWVRQAPGKGLEW<br/>VSGISWNSGSIGYADSVKGRFTISRDNKNSLYLQMNSLRAEDTAMYYCA<br/>RYSYQVGSAYDSWGQGTLVTVSS</b> [SEQ ID NO: 80]                                                                                                                                                                                                                                                          |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                       |

Table 21

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-023</b>                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| ctgcctgtgctgactcagccaccctcggtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacat<br>tggaaagtaaaagtgtgcaactggtatcagcagaagccaggccaggccccctgtgctggtcgtctatgctgatagcgaccggc<br>cctcagggatccctgagcgattctctggtccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg<br>ggatgagggccgactattactgtcaggtgtgggtagtagtagttatcataattatgtcttcggaactgggaccaaggtcaccg<br>tcctaggt [SEQ ID NO: 81]                                  |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                          |
| <b>gaggtgcagctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccccctggacaagggcttgagtggatgggatggatc<br/>agcgcttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagcctacatggagctgagcagcctgagatctgaggacaccgcatgtattactgtgcgcgctactggggttt<br/>cgggtgttctgatcggtggggtaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 82] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                              |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| LPVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVVYADSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSYHNYVFGTGTK<br>VTVLG [SEQ ID NO: 83]                                                                                                                                                                                                                                                                        |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                  |
| <b>EVQLVQSGAEVKKPGASVKVSCKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELSSLRSEDAMYYCA<br/>RYWGFGVSDRWGQGLTVTVSS</b> [SEQ ID NO: 84]                                                                                                                                                                                                                                                        |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                   |

Table 22

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-024</b>                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                   |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaccatctctgcaccggcagcagtggc<br>agcattgccagcaactatgtgcagtgggtaccagcagcggccgggcagtggccccaccactgtgatctatgaggataacca<br>aagacctctgggggtccccgatcgggtctctggctccatcgacagctcctccaactctgcctccctaccatctctggactga<br>agactgaggacgaggctgactactactgtcagtttatgacagcagcaatcttgggtgttcggcggagggaaccaagctga<br>ccgtcctaggt [SEQ ID NO: 85]                         |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                  |
| <b>cagatgcagctggtgcagctctggggctgaggtgaagaagcctgggtcctcggtgaaggtctctgcaaggttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggga<br/>tcatccctatctttggtacagcaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgtacaactac<br/>tactactacgattcttggggtaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 86] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                       |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                   |
| NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNLWVFGGGT<br>KLTVLG [SEQ ID NO: 87]                                                                                                                                                                                                                                                               |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                           |
| <b>QMQLVQSGAEVKKPGSSVKVSKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIIPFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARY<br/>NYYYYDSWGQGLVTVSS</b> [SEQ ID NO: 88]                                                                                                                                                                                                                                                    |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                            |

Table 23

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| <b>ET200-025</b>                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                     |
| gacatccagatgacccagctctccatcctccctgtctgcatctgtaggagacagagtcaccatcacttgccgggcaagtcagagcattagcagctatttaaattggtatcagcagaaaccagggaaagcccctaagctcctgatctatgctgcatccagtttgcaagtggtgggtcccatcaagggtcagtggtgagtggtgacagatttcactctaccatcagcagcttgcaacctgaagatttgcaacttactactgtcaacagagttacagtacccattcactttcggccctgggaccaaagtggatatcaaacgt [SEQ ID NO: 89]                                          |
| <u>tctagagggtggtggtggtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                   |
| <b>gaggtgcagctggtgcagctctggggctgaggtgaagaagcctgggtcctcggtgaaggtctctgcaaggttctggaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggatcatcctctatctttgttacagcaaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccacgagcacagcctacatggagctgagcagcctgagatctgaggacaccgcatgtattactgtgcgcgctactgggggtactgactcttacgatgaatgggggtcaaggtactctggtgaccgtctctca</b> [SEQ ID NO: 90] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCCGTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                             |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                     |
| DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFLTISLQPEDFATYYCQQSYSTPFTFGPGTKVDIKR [SEQ ID NO: 91]                                                                                                                                                                                                                                                               |
| <u>SRGGGGS GGGGS GGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                          |
| <b>EVQLVQSGAEVKKPGSSVKVSKASGGTFSSYAISWVRQAPGQGLEWMGGIIPFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDAMYYCARYWGYSYDEWGQGLVTVSS</b> [SEQ ID NO: 92]                                                                                                                                                                                                                                                 |
| TSGQAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                              |

Table 24

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| <b>ET200-026</b>                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaccatctctgcaccggcagcagtggc<br>agcattgccagcaactatgtgcagtgggtaccagcagcggccgggcagtggccccaccactgtgatctatgaggataacca<br>aagacctctgggggtccctgatcgggttctctgggtccatcagagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactactgtcagtttatgatagcagcaattgggtgttcggcggagggaaccaagctgacc<br>gtcctaggt [SEQ ID NO: 93]                                 |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                         |
| <b>gagggtccagctggtgcagctctggggctgagggtgaagaagcctgggtcctcggtgaaggctctctgcaaggttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggga<br/>tcatccctatctttgttacagcaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcgcaacaacca<br/>ttactacaacgattactgggggtcaagggtactctgggtgaccgtctctca</b> [SEQ ID NO: 94] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                              |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNWVFGGGTK<br>LTVLG [SEQ ID NO: 95]                                                                                                                                                                                                                                                                        |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                 |
| <b>EVQLVQSGAEVKKPGSSVKVSKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIIPFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARN<br/>NHYYNDYWGGQGLVTVSS</b> [SEQ ID NO: 96]                                                                                                                                                                                                                                                          |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                   |

Table 25

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| <b>ET200-027</b>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                     |
| cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagggggtcaccatcccctgcactgggagcagct<br>ccaacatcggggcaggttatgatgtacactgggtaccagcagcttcaggacagccccaaactcctcatctatggttaaca<br>acaatcggccctcaggggtccctgaccgcttctctggctccaggtctggctcctcagcctccctggccatcactgggtcca<br>ggctgaggatgaggctgattattactgccagtccatgacagcagcctgagtgatgtggtattcggcggagggaccaaggt<br>caccgtcctaggt [SEQ ID NO: 97]                                                             |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                                 |
| <b>gagggtccagctggtgcagtctggggctgagggtgaagaagcctggggctacagtgaaaatctcctgcaaggtttctg<br/>gatacaccttcaccgactactacatgcactgggtgcaacaggcccctggaaaagggttgagtggatgggacttgtt<br/>gatcctgaagatggtgaaacaataacgcagagaagtccagggcagagtcaccataaccgcggacacgtctaca<br/>gacacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcgctactggtctta<br/>ctctttcgactacctgtacatgccggaaggtaacgattggtgggggtcaagggtactctggtgacctctcctca</b> [SEQ<br>ID NO: 98] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                         |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                     |
| QSVLTQPPSVSGAPGQGVTIPCTGSSSNIGAGYDVHWYQQLPGTAPKLLIYGN<br>NNRPSGVPDRFSGSRSGSSASLAITGLQAEDEADYYCQSYDSSLSDVVFGGGT<br>KVTVLG [SEQ ID NO: 99]                                                                                                                                                                                                                                                                                                 |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>EVQLVQSGAEVKKPGATVKISKVSGYTFDYYMHWVQQAPGKGLEW<br/>MGLVDPEDGETIYAEKFQGRVTITADTSTDYAYMELSSLRSEDYAVYYCA<br/>RYWSYSFDYLYMPEGNDWWGQGTLLVTVSS</b> [SEQ ID NO: 100]                                                                                                                                                                                                                                                                          |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                              |

Table 26

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-028</b>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                   |
| cagtctgtgtgactcagccacccgcagcgtctgggacccccggacagagagtcaccatctctgttctggggcgctcc<br>aacatcgggagtggtgctctaaattggtaccagcaactcccaggaacggccccaaactcctcatctatagtacaatcagc<br>ggccctcaggggtctctgaccgattctctggctccaggctgccacctcagcctccctggccatcagtgggctccagtctga<br>ggatgaggetgattattactgtgcaacctgggatgatagtgtgaatggttgggtgttcggcggagggaaccaagctgaccgt<br>cctaggt [SEQ ID NO: 101]                                               |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                   |
| <b>cagggtccagctgggtacagtctggagctgaggtgaagaagcctggggattcagtgaaggtctctgcaagccttctg<br/>gttacaattttctcaactatgggtatcaactgggtgcgacaggccccctggacaagggcttgagtggatgggatggatt<br/>agcacttacaccggtaacacaaactatgcacagaagctgcagggcagagtcaccttcaccacagacacatccacg<br/>agcacagcctacatggagatgaggagcctgagatctgacgacacggccgtgtattactgtgcgcgcgacgtgtact<br/>actacgaaggtgttgattactgggggtcaaggtactctgggtgaccgtctcctca</b> [SEQ ID NO: 102] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                       |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                   |
| QSVLTQPPAASGTPGQRVTISCSGGVSNIGSGALNWYQQLPGTAPKLLIYSYN<br>QRPSGVSDRFSGRSATSASLAISGLQSEDEADYYCATWDDSVNGWVFGGGT<br>KLTVLG [SEQ ID NO: 103]                                                                                                                                                                                                                                                                                |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                           |
| QVQLVQSGAEVKKPGDSVKVSCKPSGYNFLNYGINWVRQAPGQGLEWMGW<br>ISTYTGNNTNYAQKLQGRVTFTTDTSTSTAYMEMRSLRSDDTAVYYCARDLY<br>YYEGVDYWGQGLVTVSS [SEQ ID NO: 104]                                                                                                                                                                                                                                                                       |
| TSGQAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                            |

Table 27

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| <b>ET200-029</b>                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| caggctgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccagggttacctgtgggggaaacaaca<br>tfggaagtgaagtgtgactgggtaccagcagaagccaggccaggccccctgtgttggtcatctattatgataccgaccggc<br>cctcagggatccctgagcgattctctggctcccactctgggaccacggccaccctgaccatcagcagggtcgaagccgg<br>ggatgagggccgactattactgtcaggtgtgggtagtagtagggatcatgtggtattcggcggagggaaccaagctgaccgt<br>cctaggt [SEQ ID NO: 105]                                                  |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                   |
| <b>cagggtgcagctggtgcagtctgggggaggcgtggtccagcctgggaggtccctgagactctctgtgcggcctctg<br/> gattcaccttcagtagctatgctatgcactgggtccgccaggctccaggcaagggaaggactggagtgggtggcagttata<br/> tcatatgatggaagcaataaatactacgcagactccgtgaagggcctattcaccatctccagagacaattccaaga<br/> acacgctgtatctgcaaatgaacagcctgagagctgaggacacggccgtgtattactgtgcgcgtcttacttcaett<br/> ctggtttctacgattactgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 106] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                           |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| QAVLTQPPSVSVAPGKTARVTCGGNNIGSESVHWYQQKPGQAPVLVIYYDTD<br>RPSGIPERFSGSHSGTTATLTISRVEAGDEADYYCQVWDSSRDHVVFGGGTKL<br>TVLG [SEQ ID NO: 107]                                                                                                                                                                                                                                                                                     |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                              |
| <b>QVQLVQSGGGVVQPGRSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWV<br/> AVISYDGSNKYYADSVKGLFTISRDN SKNTLYLQMNSLRAEDTAVYYCAR<br/> SYFTSGFYDYWGQGTLLVTVSS</b> [SEQ ID NO: 108]                                                                                                                                                                                                                                                              |
| TSGQAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                |



Table 28

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-030</b>                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctcctgcactgggagcagttc<br>caacatcggggcaggttatgatgtaaattggtatcagcagttccaggaaacagccccaaactcctcatctatggtaacagc<br>aatcgccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctccag<br>gctgaggatgaggctgattattactgccagtctatgacagcagcctgagtggctcttatgtcttcggaactgggaccaaggt<br>caccgtcctaggt [SEQ ID NO: 109]                       |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                    |
| <b>cagatgcagctggtgcagtctggggctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttccg<br/>gatacaccctcactgaattatccatgcactgggtgcgacaggctcctggaaaagggttgagtggatgggaggtttt<br/>gatcctgaagatggtgaaacaatctacgcacagaagtccagggcagagtcaccatgaccgaggacacatctaca<br/>gacacagcctacatggagctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcatgttctctat<br/>gtactacgattgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 110] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| QSVVTQPPSVSGAPGQRVTISCTGSSSNIGAGYDVNWYQQFPGTAPKLLIYGN<br>SNRPSGVPDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSLSGSYVFGTG<br>TKVTVLG [SEQ ID NO: 111]                                                                                                                                                                                                                                                              |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                            |
| <b>QMQLVQSGAEVKKPGASVKVSCKASGYTLTELSMHWVRQAPGKGLEW<br/>MGGFDPEDGETIYAQKFQGRVTMTEDTSTDYAYMELSSLRSEDYAVYYC<br/>ARMSSMYDYGQGTLLVTVSS</b> [SEQ ID NO: 112]                                                                                                                                                                                                                                                  |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                             |

Table 29

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| <b>ET200-031</b>                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                |
| tcctatgtgtgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacatt<br>ggaagtaaaaagtgtgactggtaccagcagaagccaggccaggccctgtgtggtcatctattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgacctcagcagggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtagtgattatgtcttcggaactgggaccaaggtcaccgtcctag<br>gt [SEQ ID NO: 113]                                   |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                               |
| <b>gagggtgcagctggtggagactgggggaggcttggtcaagcctggagggtccctgagactctcctgtgcagcctctg<br/>gattcacctcagtgactactacatgagctggatccgccaggctccagggaagggcctggagtggatttcatacatt<br/>agtggtagtggtaatagcatatactacgcagactctgtgaagggccgattcaccatctccagggaacgccaaga<br/>actcactggatctgcaaatgaccagcctgagagccgaggacacggccgtatattactgtgcgcgtctactaaattc<br/>gattactgggggtcaagggtactctggtgaccgtctctca</b> [SEQ ID NO: 114] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                    |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                          |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                |
| SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDYVFGTGTKVT<br>VLG [SEQ ID NO: 115]                                                                                                                                                                                                                                                               |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                        |
| <b>EVQLVETGGGLVKPGGSLRLSCAASGFTVSDYYMSWIRQAPGKGLEWIS<br/>YISGSGNSIYYADSVKGRFTISRDNAKNSLDLQMTSLRAEDTAVYYCARST<br/>KFDYWQGQTLVTVSS</b> [SEQ ID NO: 116]                                                                                                                                                                                                                                               |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                         |

Table 30

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-032</b>                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                  |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                 |
| ctgcctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacgtcggaaagtactgtaaactgggtaccggcaactcccaggaacggccccacactcctcatctataataataatcagc<br>ggccctcaggggtccctgaccgattctctgactccaagtctggcacctcggcctccctgaccattagtgggtccagcctga<br>ggatgaggtgattattattgtgcagcatgggatgacaggctgggtggttatgtcttcggaactgggaccaaggtcaccgtc<br>ctaggt [SEQ ID NO: 117]                                            |
| <u>tctagagggtggtggtgtagcggcgggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                  |
| <b>gagggtgcagctggtgcagctcggagcagagggtgaaaaagccgggggagtctctgaagatctctgtaagggttctg<br/>gatacagctttaccaactactggatcggtgggtgcgccagatgccccgggaaaggcctggagtggatggggatcat<br/>ctatcctggtgactctgataccagatacagccccgtcctccaaggccaggtcaccatctcagccgacaagtcacatca<br/>gcaccgcctacctacagtggagcagcctgaaggcctcggacaccgccatgtattactgtgcgcgtctactggttctt<br/>ctcatatgtctgatgaatgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 118] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                     |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                 |
| LPVLTQPPSASGTPGQRVTISCSGSSSNVGSYTVNWYRQLPGTAPTLLIYNNN<br>QRPSGVPDRFSDSKSGTSASLTISGLQPEDEADYYCAAWDDRLGGYVFGTGT<br>KVTVLG [SEQ ID NO: 119]                                                                                                                                                                                                                                                                             |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                         |
| <b>EVQLVQSGAEVKKPGESLKISCKSGYSFTNYWIGWVRQMPGKGLEWM<br/>GHIYPGDSDFRYSPSFQGQVTISADKSISTAYLQWSSLKASDTAMYCYCARS<br/>TGSSHMSDEWGQGTLLVTVSS</b> [SEQ ID NO: 120]                                                                                                                                                                                                                                                           |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                          |

Table 31

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| <b>ET200-033</b>                                                                                                                                                                                                                                                                                                                                                                                   |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                               |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcaccggcagcagtggc<br>agcattgccagcaactatgtgcagtggtagcagcagcggcggcagtgccccaccactgtgatctatgaggataacca<br>aagacctctggggtcctgatcgggtctctggctccatcacagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactactgtcagtttatgatagcagcaatcattgggtgttcggcggagggaaccaagctga<br>ccgtcctaggt [SEQ ID NO: 121]                       |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                              |
| <b>caagtgcagctacagcagtggggcgaggactgttgaagccttcggagaccctgtccctcacctgcgctgtctatgg<br/>tgggtccttcagtgggttactactggagctggatccgcagccccagggaaggggctggagtggattggggagatc<br/>actcatagtgaaggtccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacagtcacaagaacc<br/>agtttccctgaagctgagctctgtgaccgccgcggacacggccgtgtattactgtgcgcgctcttctatcatgtctga<br/>ttactgggggtcaaggtactctgggtgaccgtctctca</b> [SEQ ID NO: 122] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                   |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                         |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                               |
| NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNHWVFGGGT<br>KLTVLG [SEQ ID NO: 123]                                                                                                                                                                                                                                                           |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                       |
| <b>QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKGLEWI<br/>GEITHSGRSNYNPSLKSRTISVDTSKNQFSLKLSSVTAADTAVYYCARSSI<br/>MSDYWGQGTLLTVSS</b> [SEQ ID NO: 124]                                                                                                                                                                                                                                               |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                        |

Table 32

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| <b>ET200-034</b>                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                          |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                         |
| cagtctgtgtgacgcagccgccctcagtgtctggggcccccagggcagagggtcaccatctctgcactgggagcacctc<br>caacatcggggcaggttatgatgtacactggtaccagcagcttcagggaacagccccaaactcctcatcaacaataacag<br>gaatcggccctcaggggtccctgaccgattctctggctccaagtctggcacgtcagccaccctgggcacaccggactcc<br>agactggggacgagggccgattattactcggaacatgggatggcagcctgactggtgcagtgttcggcggaggggaccaa<br>gctgaccgtcctaggt [SEQ ID NO: 125]                              |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                         |
| <b>gagggtccagctggtgcagtctggggctgaggtgaagaagcctgggtcctcggtgaaggctctcatgcaaggttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggga<br/>tcatccctatctttgttacagcaactacgcacagaagttccagggcagagtcacgattaccgcgacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcgcggttctgct<br/>ctggaccattacgatcgttggggtaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 126] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                             |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                   |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                         |
| QSVLTQPPSVSGAPGQRVTISCTGSTSNIGAGYDVHWYQQLPGTAPKLLINNN<br>RNRPSGVPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDGSLTGAVFGGG<br>TKLTVLG [SEQ ID NO: 127]                                                                                                                                                                                                                                                                    |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                 |
| <b>EVQLVQSGAEVKKPGSSVKVSCKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIIPFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAIVYYCARG<br/>SALDHYDRWGQGTLVTVSS</b> [SEQ ID NO: 128]                                                                                                                                                                                                                                                     |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                  |

Table 33

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| <b>ET200-035</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)<br>aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaccatctctgcacccgcagcagtggca<br>gcattgccagcaactatgtgcagtgtaccagcagcggccgggcagtgccccaccactgtgatctatgaggataaccaa<br>agacctctggggtccctgatcggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactgaa<br>gactgaggacgaggctgactactactgtcagtcttatgatagcaccaattgggtgtcggcggagggaaccaagctgaccgt<br>cctaggt [SEQ ID NO: 129]<br><u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]<br><b>cagggtgcagctggtgcagtctggggctgaggtgaagaagcctgggtcctcggtgaaggtctctgcaaggttctg</b><br><b>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggga</b><br><b>tcatccctatctttgttacagcaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccac</b><br><b>gagcacagcctacatggagctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgtacaactac</b><br><b>tacttcaacgattactggggtcaagggtactctggtgaccgtctctca</b> [SEQ ID NO: 130]<br>ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)<br>NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTNWFVGGGTK<br>LTVLG [SEQ ID NO: 131]<br><u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]<br><b>QVQLVQSGAEVKKPGSSVKVSCKASGGTFSSYAISWVRQAPGQGLEWM</b><br><b>GGIIPFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARY</b><br><b>NYFYFNDYWGQGTTLTVSS</b> [SEQ ID NO: 132]<br>TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 34

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| <b>ET200-037</b>                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| tcctatgtgctgactcagccaccctcagtgctcagtggtggccaggaagacggccaggattacctgtgggggaacaacatt<br>ggaagtaaaagtgtgactggtaccagcagaagccaggccaggccctgtgctggtcatctattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgacctcagcagggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtagtgatcatccttatgtcttcggaactgggaccaagggtcaccgt<br>cctaggt [SEQ ID NO: 133]                                     |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                          |
| <b>cagatgcagctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaaggtctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccctggacaagggttgagtggatgggatggatc<br/>agcgcttacaatggttaacacaaactatgcacagaagctccagggcagagtcacctgaccacagacacatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacactgccgtgtattactgtgcgcgctctatgttcgg<br/>tgctcatgattcttgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 134] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                              |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK<br>VTVLG [SEQ ID NO: 135]                                                                                                                                                                                                                                                                       |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                  |
| <b>QMQLVQSGAEVKKPGASVKVSKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAVYYCA<br/>RSMFGAHDSWGQGTLLTVSS</b> [SEQ ID NO: 136]                                                                                                                                                                                                                                                        |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                   |

Table 35

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| <b>ET200-038</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)<br>cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcagctc<br>caacatcggggcaggttttgatgtacactggtaccagctacttccaggaacagccccaaactcctcatctatgctaacagc<br>aatcgccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctcctgg<br>ctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtgggtgtgtattcggcggagggaccaagctga<br>ccgtcctaggt [SEQ ID NO: 137]<br><u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]<br><b>cagggtgcagctgggtgcaatctggggctgaggtgaagaagcctgggtcctcggtgaaggtctctgcaaggettctg</b><br><b>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggga</b><br><b>tcatccctatctttgtacagcaaaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac</b><br><b>gagcacagcctacatggagctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgggtgcttctt</b><br><b>tgcaccgtcatgataactggggtaaggtactctgggtgaccgtctctca</b> [SEQ ID NO: 138]<br>ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)<br>QSVLTQPPSVSGAPGQRVTISCTGSSSNIGAGFDVHWYQLLPGTAPKLLIYANS<br>NRPSGVPDRFSGSKSGTSASLAITGLLAEDEADYYCQSYDSSLSGVVFGGGTK<br>LTVLG [SEQ ID NO: 139]<br><u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]<br><b>QVQLVQSGAEVKKPGSSVKVSCKASGGTFSSYAISWVRQAPGQGLEWM</b><br><b>GGIPIFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARG</b><br><b>ASFDRHDNWGQGTLVTVSS</b> [SEQ ID NO: 140]<br>TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



Table 36

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| <b>ET200-039</b>                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                       |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcacccgcagcagtggca<br>gcattgccagcaactatgtgcagtggtagcagcagcggcgggcagttccccaccactgtgatctatgaggataacaaa<br>gacctctgggggtccctgatcggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactgaag<br>actgaggacgaggctgactactactgtcagtttatgatagcagcaattgggtgttcggcggaggggaccaagctgaccgtc<br>ctaggt [SEQ ID NO: 141]                               |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                      |
| <b>gagggtccagctggtgcagctctggggctgagggtgaagaagcctgggtcctcggtgaaggtctctgcaaggttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgacagggccctggacaagggcttgagtggatgggagggga<br/>tcatccctatctttgttacagcaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcgctctaactac<br/>tactacaacgattactgggggtcaaggtactctggtgaccgtctctca</b> [SEQ ID NO: 142] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                           |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                       |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSSPTTVIYEDNQ<br>RPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNWVFGGGTKLT<br>VLG [SEQ ID NO: 143]                                                                                                                                                                                                                                                                    |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                              |
| <b>EVQLVQSGAEVKKPGSSVKVSKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIPIFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARS<br/>NYYYNDYWQGTLVTVSS</b> [SEQ ID NO: 144]                                                                                                                                                                                                                                                       |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                |

Table 37

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| <b>ET200-040</b>                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                       |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                      |
| cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcagctc<br>caacatcggggcaggttatgatgtacactggtaccagcagcttccagggaacagccccaaactcctcatctatggtaacag<br>caatcgccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctcca<br>ggctgaggatgaggctgattattactgccagtctatgacagcagcctgagtgggttatgtcttcggaactgggaccaaggtc<br>accgtcctaggt [SEQ ID NO: 145]                            |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                      |
| <b>cagggtgcagctggtgcagtctggggctgaggatgaagaagcctggggcctcagtgaaggctcctgcaaggtttccg<br/>gatacaccctcactgaattatccatgcactgggtgcgacaggctcctggaaaagggttgagtggatgggaggtttt<br/>gatcctgaagatggtgaaacaatctacgcacagaagtccagggcagagtcaccatgaccgaggacacatctaca<br/>gacacagcctacatggagctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgtactctgggtgt<br/>ttactacgattgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 146] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                          |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                      |
| QSVLTQPPSVSGAPGQRVTISCTGSSSNIGAGYDVHWYQQLPGTAPKLLIYGN<br>SNRPSGVPDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSLSGYVFGTGT<br>KVTVLG [SEQ ID NO: 147]                                                                                                                                                                                                                                                                 |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                             |
| <b>QVQLVQSGAEVKKPGASVKVSCKVSGYTLTELSMHWVRQAPGKGLEW<br/>MGGFDPEDGETIYAQKFQGRVTMTEDTSTDYAYMELSSLRSEDYAVYYC<br/>ARYSGVYYDWGQGTLLTVSS</b> [SEQ ID NO: 148]                                                                                                                                                                                                                                                    |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                               |

Table 38

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| <b>ET200-041</b>                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                          |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                         |
| aattttatgctgactcagccccactctgtgtcgggggtctccggggaagacggtaaccatctcctgcaccggcagcagtggc<br>agcattgccgacaactttgtgcagtgggtaccagcagcgccggggcgggtgtccccaccactgtgatctttaatgatgacgaa<br>agacctctggcgtccctgatcgggtctctggctccatcgacacctctccaattctgcctccctaccatctctggactgaag<br>actgaggacgaggctgactactactgtcagtcttatgataataataatcgaggggtgttcggcggagggaaccaagctgacc<br>gtcctaggt [SEQ ID NO: 149]                           |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                        |
| <b>cagggtccagctgggtgcagtctggggctgagggtgaagaagcctgggtcctcggtgaagggtctcctgaaggcttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggatggat<br/>gaacctaacagtggttaacacaggctatgcacagaagttccagggcagagtcaccatgaccaggaacacctccat<br/>aagcacagcctacatggagctgagcaacctgagatctgaggacacggcctgtattactgtgcgcgtactactctt<br/>acgggttacgattgggggtcaagggtactctgggtgaccgtctcctca</b> [SEQ ID NO: 150] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                             |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                   |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                         |
| NFMLTQPHSVSGSPGKTVTISCTGSSGSIADNFVQWYQQRPGGVPTTVIFNDD<br>ERPSGVPDRFSGSIDTSSNSASLTISGLKTEDEADYYCQSYDNNNRGVFGGGT<br>KLTVLG [SEQ ID NO: 151]                                                                                                                                                                                                                                                                    |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                |
| <b>QVQLVQSGAEVKKPGSSVKVSCKASGGTFSSYAISWVRQAPGQGLEWM<br/>GWMNPNSGNTGYAQKFQGRVTMTRNTSISTAYMELSNLRSEDTAVYYC<br/>ARYYSYGYDWGQGTLTVSS</b> [SEQ ID NO: 152]                                                                                                                                                                                                                                                        |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                  |

Table 39

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| <b>ET200-042</b>                                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                    |
| cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagacggtcaccatctctgcactgggggcagct<br>ccaacatcgggacaggtattttgtaaattgtaccagcaggtccaggaaaagccccaaactcctcactcctgggtaacaa<br>taatcggccctcgggggtccctgaccgactctcgggtccacgtccggcacctcagcctccctggccatcactgggctcca<br>ggctgaggatgagggtacttattactgccagtcctatgacagcagcctgagtgggtatgtcttcggaactgggaccaaggtc<br>accgtcctaggt [SEQ ID NO: 153]                                            |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                    |
| <b>caggta</b> cagctgcagcagtcaggtccaggactggtgaagccctcgcacccctctcactcacctgtggcatctccg<br>gggacagtgtctctaccaacagtgttgcttggcactggatcaggcagtcceccatcgagaggccttgagtggctggga<br>aggacatactacaggtccaagtgggtctaatgactatggagtatctgtgaaaagtcgaatcaccatcatcccagaca<br>catccaagaaccagttctccctgcagctgaactctgtgactcccaggacacggctgtgtattactgtgcgcgtctt<br>cttcttgggtaccagatcttcgattactggggtaagggtactctgggtgaccgtctctca [SEQ ID NO: 154] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                    |
| QSVVTQPPSVSGAPGQTVTISCTGGSSNIGTGYFVNWYQQVPGKAPKLLILGN<br>NNRPSGVPDRLSGSTSGTSASLAITGLQAEDEGTYYCQSYDSSLSGYVFGTGT<br>KVTVLG [SEQ ID NO: 155]                                                                                                                                                                                                                                                                               |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                            |
| <b>QVQL</b> QQSGPGLVKPSQTLSTCGISGDSVSTNSVAWHWIRQSPSRGLEWL<br>GRTYYSKWSNDYGVSVKSRITHPDTSKNQFSLQLNSVTPEDTAVYYCAR<br>SSSWYQIFDYWGQGTLVTVSS [SEQ ID NO: 156]                                                                                                                                                                                                                                                                |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                             |

Table 40

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| <b>ET200-043</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctctgcaccggcagcagcgac<br>agcatagccaacaactatgttcagtggtaccagcagcgccccgggcagtgccccaccaatgtgatctacgaagatgtcca<br>aagacctctgggggtccctgatcggttctctgggtccatcgacagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgtctactattgtcagttatcatagcgacaatcgttgggtgttcggcggcgaggaccaagctgac<br>cgtcctaggt [SEQ ID NO: 157]<br><u>tctagagggtggtggttagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]<br><b>cagggtgcagctgggtggagctctgggggaggcttggtacagcctgggggtccctgagactctctgtgcagcctctgg<br/>attcacctttagcagctatgccatgagctgggtccgccagggtccagggaaggggctggagtggtctcagctatta<br/>gtggttagtggtgtagcacatactacgcagactccgtgaagggccggttcaccatctccagagacaattccaagaa<br/>cacgctgtatctgcaaatgaacagcctgagagccgaggacacggccgtatattactgtgcgcgctctggtgcttact<br/>gggactactctgtttacgatgaatgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 158]<br>ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| NFMLTQPHSVSESPGKTVTISCTGSSDSIANNYVQWYQQRPGSAPTNVIYEDV<br>QRPSGVPDRFSGSIDSSNSASLTISGLKTEDEAVYYCQSYHSDNRWVFGGGT<br>KLTVLG [SEQ ID NO: 159]<br><u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]<br><b>QVQLVESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWV<br/>SAISGSGGSTYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAR<br/>SGAYWDYSVYDEWGQGTLVTVSS</b> [SEQ ID NO: 160]<br>TSGQAGQH HHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 41

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| <b>ET200-044</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| cagtctgtgtgactcagccaccctcagtgtccgtgtccccaggacagacagccaccatcgctgttctggacataaattgg<br>gggataaatatgcttctggtatcagcagaagtcgggccagtccctgtgtgatcatctatcaggataataagcgccctca<br>gggattcctgagcgattctctggctccaactctgggaacacagccactctgacctcagcgggagccaggctctggatgag<br>gctgactattattgtcaggcgtgggacagtagtacttatgtggcattcggcggaggggaccaagctgaccgtcctaggt<br>[SEQ ID NO: 161]<br><u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]<br><b>cagggtgcagctgcaggagtccggcccaggactggtgaagccttcggagaccctgtccctcactgcgttgtctctgg<br/>tggctccatcagcagtagtaactggtggagctgggtccgcagccccagggaaggggctggagtggattgggga<br/>aatctatcatagtgggagccccaactacaacctatccctcaagagtcgagtcaccatatcagtagacaagtccaag<br/>aaccagttctccctgaagctgagctctgtgaccgccgggacacggcctgtattactgtgcgcgcatgactactcat<br/>actttcgggttacgatgcttggggtaaggtactctggtgaccgtctcctca</b> [SEQ ID NO: 162]<br>ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QSVLTQPPSVSVSPGQTATIACSGHKLGDKYASWYQQKSGQSPVLIYYQDNKR<br>PSGIPERFSGSNSGNTATLTISGTQALDEADYYCQAWDSSTYVAFGGGTKLTV<br>LG [SEQ ID NO: 163]<br><u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]<br><b>QVQLQESGPGLVKPSETLSLTCVVSGGSISSSNWWSWVRQPPGKGLEWI<br/>GEIYHSGSPNYNPSLKSRVTISVDKSKNQFSLKLSSVTAADTAVYYCARM<br/>THTFGYDAWGQGLVTVSS</b> [SEQ ID NO: 164]<br>TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 42

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-045</b>                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                     |
| cagcctgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccacgattacttgtgggggaaacaacat<br>tggaaagtgaagtgtgcactggtaccaccagaagccaggccaggccccctgtgttggtcatctatgatgatgccggccggc<br>cctcagggatccctgagcgattcactggctccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg<br>ggatgagggccgactattactgtcaggtgtgggacagaaatagtgtcagttgtcttcggacctgggaccaaggtcaccgtc<br>ctaggt [SEQ ID NO: 165]                                 |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                 |
| <b>gagggtccagctggtgcagtctggagctgaggtaagaagcctggggcctcagtgaaggctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccccctggacaagggcttgagtggatgggatggatc<br/>agcgcttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacacggccgtgtattactgtgcgcgcgggtgttcattc<br/>ggattggtgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 166] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                         |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                     |
| QPVLTQPPSVSVAPGKTATITCGGNNIGSESVHWYHQPGQAPVLVIYDDAG<br>RPSGIPERFTGSNSGNTATLTISRVEAGDEADYYCQVWDRNSAQFVFGPGTKV<br>TVLG [SEQ ID NO: 167]                                                                                                                                                                                                                                                                    |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                            |
| <b>EVQLVQSGAEVKKPGASVKVSCKASGYTFTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAVYYCA<br/>RGVHLDWWGQGTLLTVSS</b> [SEQ ID NO: 168]                                                                                                                                                                                                                                                    |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                              |

Table 43

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| <b>ET200-069</b>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                    |
| cagtctgtcgtgacgcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaagtaattatgtatactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggtccgggtccg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgagtgggttatgtcttcggaactgggaccaagctgaccgt<br>cctaggt [SEQ ID NO: 169]                                                          |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                                |
| <b>cagggtgcagctacagcagtggtggcgaggactgttgaagccttcggagaccctgtccctcacctgcgtgtctatgg<br/>tgggtccttcagtggttactactggagctggatccgccagccccaggggaaggggctggagtggttggggaaatc<br/>aatcatagtgggaagcaccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaac<br/>cagttctccctgaagctgagctctgtgaccgccggacacggccgtgtattactgtgcgcgcctgtacgaagggtgg<br/>ttaccatgggtgggggttcttggctgtcttctgattcttgggggtcaagggtactctggtgaccgtctctca</b> [SEQ ID<br>NO: 170] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                    |
| QSVVTQPPSASGTPGQRVTISCSGSSSNIGSNYVYWYQQLPGTAPKLLIYSNN<br>QRPSGVPDRFSGSKSGTSASLAISGLRSEADYYCAAWDDSLSGYVFGTGT<br>KLTVLG [SEQ ID NO: 171]                                                                                                                                                                                                                                                                                                  |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKGLEWI<br/>GEINHSGSTNYPNPSLKSRTVISVDTSKNQFSLKLSSVTAADTAVYYCARLY<br/>EGGYHGWGSWLSSDSWGQGTLLTVSS</b> [SEQ ID NO: 172]                                                                                                                                                                                                                                                                        |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                             |



Table 44

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-078</b>                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| cagctctgtgtgactcagccaccctcagcgtctgggacccccgggcagagggcaccatctcttgttctggaagcagctcc<br>aacatcggaagtaatactgtaaacgtgtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagctctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttattgggtgttcggcggagggaaccaagctga<br>ccgtcctaggt [SEQ ID NO: 173]                             |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtggatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                      |
| <b>cagggtgcagctacagcagtggtggggcgcaggactgttgaagccttcggagaccctgtccctcacctgcgctgtctatgg<br/>tgggtccttcagtggttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaaatc<br/>aatcatagtggaagcaccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaac<br/>cagttctccctgaagctgagctctgtgaccgccggacacggctgtgtattactgtgcgcgcgaaggggcatttga<br/>tgcttttgatatctggggccaagggacaatggtcaccgtctcttca</b> [SEQ ID NO: 174] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                              |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                          |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYWVFGGTT<br>KLTVLG [SEQ ID NO: 175]                                                                                                                                                                                                                                                                     |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                  |
| QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKGLEWIGEIN<br>HSGSTNYPNPSLKSRTVISVDTSKNQFSLKLSSVTAADTAVYYCAREGAFDAFD<br>IWGQGTMTVTS [SEQ ID NO: 176]                                                                                                                                                                                                                                                                |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                   |

Table 45

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| <b>ET200-079</b>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                   |
| tcctatgagctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacatcggagtaattatgtatactgtaccagcagctcccaggaacggccccaaactcttcatctataggaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccgggtccg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgagtgggtatctcttcggaactgggaccaaggtcacctg<br>cctaggt [SEQ ID NO: 177]                                            |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                               |
| <b>gagggtgcagctggtggagtctgggggaggcttggtagcagcctggcaggtccctgagactctctgtgcagcctctgg<br/>attcacctttgatgattatgccatgcactgggtccggcaagctccaggaagggtcctggagtgggtctcaggtatta<br/>gttggaaatagtgtagcataggctatgcggactctgtgaagggccgattcaccatctccagagacaacgccaagaa<br/>ctccctgtatctgcaaataaacagtctgagagctgaggacacggccttgattactgtgcaaattggcgactccaact<br/>actactacgggtatggacgtctggggccaagggaaccacgggtcacctctctca</b> [SEQ ID NO: 178] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                       |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                   |
| SYELTQPPSASGTPGQRVTISCSGSSSNIGSNYVYWYQQLPGTAPKLFIYRNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAAWDDSLSGYLFGTGTKV<br>TVLG [SEQ ID NO: 179]                                                                                                                                                                                                                                                                               |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                          |
| <b>EVQLVESGGGLVQPGRSLRLSCAASGFTFDDYAMHWVRQAPGKGLEWV<br/>SGISWNSGSIGYADSVKGRFTISRDNANKNSLYLQMNSLRAEDTALYYCAN<br/>GDSNYYYGMDVWGQGTITVTVSS</b> [SEQ ID NO: 180]                                                                                                                                                                                                                                                           |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                            |

Table 46

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| <b>ET200-081</b>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                 |
| cagtctgccctgactcagcctgcctccgtgtccgggtctctggacagtcgatcaccatctcctgcactggaaccagcagtg<br>acattggtggttataactatgtctcctggtaccaacaacacccaggcaaagccccaaactcatgatttatgatgtcagtaatc<br>ggccctcaggggttttaategcttctctggtccaagtctggcaacacggcctccctgaccatctctgggtccaggctga<br>ggacgaggctgattattactgcattcatatacacgcacctggaaccctatgtcttcgggagtgaggaccaagggtcaccgtc<br>ctaggt [SEQ ID NO: 181]                                                         |
| <u>tctagagggtggtggttagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                              |
| <b>gagggtgcagctggtgcagctcgggggaggcgtggtacagcctgggggggtccctgagactctctgtgcagcctctg<br/>gattcacctttgatgattatgccatgcactgggtccgtcaagctccagggaagggtctggagtgggtctctcttattag<br/>tggggatggtggttagcacatactatgcagactctgtgaagggccgattcaccatctccagagacaacagcaaaaa<br/>ctccctgtatctgcaaataaacagctctgagaactgaggacaccgccttgattactgtgcaaaagatcgggcagcag<br/>ctggctactactactacgggtatggacgtctggggccaagggaccacgggtcaccgtctcctca</b> [SEQ ID NO:<br>182] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                     |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                           |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                 |
| QSALTQPASVSGSPGQSITISCTGTSSDIGGYNYVSWYQQHPGKAPKLMIYDV<br>SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCISYTRTWNPYVFGSGT<br>KVTVLG [SEQ ID NO: 183]                                                                                                                                                                                                                                                                                            |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>EVQLVQSGGGVVQPGGSLRLSCAASGFTFDDYAMHWVRQAPGKGLEW<br/>VSLISGDGGSTYYADSVKGRFTISRDNKNSLYLQMNSLRTEDTALYYCA<br/>KDRAAAGYYYYYGMDVWGQGTTVTVSS</b> [SEQ ID NO: 184]                                                                                                                                                                                                                                                                        |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                          |

Table 47

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| <b>ET200-097</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| ctgcctgtgctgactcagccaccctcagtgtccgtgtccccaggacagacagccatcatcacctgctctggagataaattgg<br>gggaaaaatatgttctcgtgtatcagcagaagccaggccagtcacctgtactggtcacgatcaagataaccaggaggccct<br>cagggatccctgagcgattctctggctccaactctgggaccacagccactctgacctcagcgggacccaggctatggat<br>gaggctgactattactgtcaggcgtgggacaggggtgtggtattcggcggagggaaccaagctgaccgtcctaggt<br>[SEQ ID NO: 185]<br><u>tctagagggtggtggtgtagcggcgccggcgccgctctggtggtggtggatccctcgagatggcc</u> [SEQ ID NO:<br>305]<br><b>gagggtgcagctggtggagtctgggggagacttggtagcagcctggcaggtccctgagactctctgtgcagcctctgg<br/>attcacctttaatgattatgccatgcactgggtccggcaagctccagggaagggcctggagtgggtctcaggtatta<br/>gttgagtggttaataacataggctatgcggactctgtgaagggccgattcaccatctccagagacaacgccaagaa<br/>ctccctgtatctgcaaataaacagtctgagagctgaggacacggccttgattactgtgcaaaagatagtatacggg<br/>atggcatcacctggggagggttttgactactggggccagggaaccctggtcaccgtctcctca</b> [SEQ ID NO:<br>186]<br>ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| LPVLTQPPSVSVSPGQTAITCSGDKLGEKYVSWYQQKPGQSPVLVIDQDTRR<br>PSGIPERFSGSNSGTTATLTISGTQAMDEADYYCQAWDRGVVFGGGTKLTVL<br>G [SEQ ID NO: 187]<br><u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]<br><b>EVQLVESGGDLVQPGRSLRLSCAASGFTFNDYAMHWVRQAPGKGLEWV<br/>SGISWSGNNIGYADSVKGRFTISRDNAKNSLYLQMNSLRAEDTALYYCAK<br/>DSIRYGITWGGFDYWGQGTLVTVSS</b> [SEQ ID NO: 188]<br>TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 48

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-098</b>                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                       |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                      |
| cagcctgtgctgactcagccaccctcgggtccaagggttgagacagaccgccacactcacctgcactgggaacagca<br>acaatgttggaacctagtagtagcttggtgcagcagcaccagggccaccctccaaactcctatcctacaggaataaca<br>accggccctcagggatctcagagagattatctgcatccaggtcaggaacacagcctccctgaccattactggactccagc<br>ctgaggacgaggtgactattactgctcagcatgggacagtagcctcagtgttggtgttcggcggagggaaccaagctg<br>accgtcctaggt [SEQ ID NO: 189]                                    |
| <u>tctagagggtggtggttagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                      |
| <b>gaggtgcagctggtggagtctgggggagtcgtggtacagcctggggggtccctgagactctctgtgcagcctctg<br/>gattcacctttgatgattatgccatgcactgggtccgtcaagctccggggaagggtctggagtgggtctcttattaa<br/>ttgggatggtggttagcacctactatgcagactctgtgaagggtcgattcaccatctccagagacaacagcaaaaac<br/>tccctgtatctgcaaatgaacagtctgagagctgaggacaccgcctgtattactgtgcaaaagggtgggcctgag<br/>ggcgtttgactactggggccagggaaccctggtcaccgtctctca</b> [SEQ ID NO: 190] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                          |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                      |
| QPVLTQPPSVSKGLRQTATLTCTGNSNNVGNLGVAWLQQHQGHPPKLLSYR<br>NNNRPSGISERLSASRSGNTASLTITGLQPEDEADYYCSAWDSSLSAWVFGGG<br>TKLTVLG [SEQ ID NO: 191]                                                                                                                                                                                                                                                                  |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                              |
| <b>EVQLVESGGVVVQPGGSLRLSCAASGFTFDDYAMHWVRQAPGKGLEWV<br/>SLINWDGGSTYYADSVKGRFTISRDN SKNSLYLQMNSLRAEDTALYYCAK<br/>GMGLRAFDYWQGTLVTVSS</b> [SEQ ID NO: 192]                                                                                                                                                                                                                                                  |
| TSGQAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                               |

Table 49

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| <b>ET200-099</b>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                             |
| cagtctgtgtgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcctgttctggaagcagctcc<br>aacatcgggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaatgatcagc<br>ggcctcaggggtccctgaccgattctctggctccaagtcggcacctcagcctccctggccatcagtgggctccagctg<br>aggatgaggctgattattactgtgcttcatgggatgacagcctgaatggcgttatgtcttcggaactgggaccaaggtcacc<br>gtcctaggt [SEQ ID NO: 193]                                                     |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtggatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                        |
| <b>cagggtccagctggttacagtctggggctgagggtgaggaagcctggggcctcagtgaaggtttctgcaagacttctg<br/>gatacaccttcagttggtatgctatacatctgggtgcgccaggccccggacaaaggcttgagtggatgggatggatc<br/>aacgtctggcaatggaaacacaaaatattcacagaaatttcagggcagagtcagctctaccaggggacacatccgag<br/>agcacagcctacatggagctgagcagcctgagatctgatgacacggctgtgtattactgtgcgagacccgataatt<br/>atggttcgggtggggatgttttgatatctggggccaagggacaatggtcaccgtctcttca</b> [SEQ ID NO:<br>194] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                 |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                       |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                             |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNDQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCASWDDSLNGRYVFGTGT<br>KVTVLG [SEQ ID NO: 195]                                                                                                                                                                                                                                                                                        |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>QVQLVQSGAEVRKPGASVKVCKTSGYTFSWYAIHWVRQAPGQRLEWM<br/>GWINAGNGNTKYSQKFQGRVSLTRDTSASTAYMELSSLRSDDTAVYYCA<br/>RPDNYGSGGDVFDIWGQGTMVTVSS</b> [SEQ ID NO: 196]                                                                                                                                                                                                                                                                      |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                      |

Table 50

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| <b>ET200-100</b>                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                       |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctctgcacccgcagcagtgga<br>gcattgccagcaactttgtgcagtggtaccagcagcgccggggcagtgccccaccctatgatctatgaggataacaaca<br>gacccctggggctcctgatcggttctctgcctccgtcgacagctcctccaactctgcctccctaccatctctggactgaag<br>actgaggacgaggctgactactactgtcagtttatgataccagcaatgtggtattcgcggggggaccaagctgaccgtc<br>ctaggt [SEQ ID NO: 197]                                    |
| <u>tctagagggtggtggtgtagcgggcgggcgggcgtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                    |
| <b>gagggtgcagctggtggagctctgggggaggttggtacagcctggagggtccctgagactctctgtgcagcctctg<br/>gattcaccttcagtagttatgaaatgaactgggtccgccagggtccagggaaggggctggagtgggtttcatacatt<br/>agtagtagtggttagtaccatatactacgcagactctgtgaaggggccgattcaccatctccagagacaacgccaaga<br/>actcactgtatctgcaaatgaacagcctgagagccgaggacacggctgtttattactgtgcacgctgggactacggt<br/>atggacgtctggggccaagggaccacgggtcaccgtctctca</b> [SEQ ID NO: 198] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                           |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                       |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNFVQWYQQRPGSAPTPMIYEDN<br>NRPPGVPDRFSASVDSSNSASLTISGLKTEDEADYYCQSYDTSNVVFGGGTK<br>LTVLG [SEQ ID NO: 199]                                                                                                                                                                                                                                                                    |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                              |
| <b>EVQLVESGGGLVQPGGSLRLSCAASGFTFSSYEMNWVRQAPGKGLEWV<br/>SYISSSGSTIYYADSVKGRFTISRDNKNSLYLQMNSLRAEDTAVYYCARW<br/>DYGMDVWGQGTTVTVSS</b> [SEQ ID NO: 200]                                                                                                                                                                                                                                                      |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                |

Table 51

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| <b>ET200-101</b>                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| caggctgtgctgactcagccaccctcagcgtctggggcccccgggcagagggtcaccgtctcttgttctggaagcaactc<br>caacatcgggaagtaactacgttaactggtaccagcagttcccagggaacggccccaaactcctcatgtatagtagtagtcag<br>cggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggtccactctg<br>aggatgaggctgattattactgtgctacatgggatgacagcctgaatgcttgggtgttcggcggagggaaccaagctgaccg<br>tcctaggt [SEQ ID NO: 201]                                            |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                      |
| <b>gagggtccagctggtgcagctctggggctgagggtgaggaagcctggggcctcagtgaaggttctgcaagacttctg<br/>gatacaccttcacttggtatgctatacattgggtgcgccaggcccccgacaaaggcttgagtggatgggatggate<br/>aacgtggcagtggaacacaaaaatattcacagaaatttcaggggcagagtcacccttaccaggggacacatccgag<br/>agcacagcgtacatggagctgagcagcctgagatctgatgacacggctgtgtattactgtgcgagaccaataact<br/>atggttcgggtggggatgttttgatatctggggccaagggaacaatggtcaccgtctcttca</b> [SEQ ID NO: 202] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                           |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| QAVLTQPPSASGAPGQRVTVSCSGSNSNIGSNYVNWYQQFPGTAPKLLMYSS<br>SQRPSGVPDRFSGSKSGTSASLAISGLHSEDEADYYCATWDDSLNAWVFGGG<br>TKLTVLG [SEQ ID NO: 203]                                                                                                                                                                                                                                                                                   |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                              |
| <b>EVQLVQSGAEVRKPGASVKVSCKTSGYTFTWYAIHWVRQAPGQRLEWM<br/>GWINAGSGNTKYSQKFQGRVTLTRDTSASTAYMELSSLRSDDTAVYYCA<br/>RPNNYGSAGDVFEDIWGQGTMVTVSS</b> [SEQ ID NO: 204]                                                                                                                                                                                                                                                              |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                |



Table 52

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-102</b>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                   |
| cagtctgtcgtgacgcagccgccctcagtgtctgcgccccaggacagaaggtcaccatctctgctctggaagcagctc<br>caacattgggaataattatgtatcctggtaccagcagctcccaggaacagccccaaactcctcatttatgacaataataagc<br>gacctcagggattcctgaccgattctctggctccaagtctggcacgtcagccacctgggcatcaccggactccagactg<br>gggacgaggccgattattactgcggaacatgggatagcagcctgagtgttatgtcttcggaactgggaccaaggtcacc<br>gtcctaggt [SEQ ID NO: 205]                                               |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                  |
| <b>cagggtccagctggtgcagtctggggctgagggtgaagaagcctggggcctcagtgaaagtttctgcaaggettctg<br/>gatacaccttcacgaactatgctctgcattgggtgcgccaggcccccgacaagggcttgagtggatggcatggat<br/>caacggtggcaatggtaacacaaaatattcacagaacttcaggggcagagtcaccattaccagggacacatccgc<br/>gagcacagcctatatggagctgagcagcctgagatctgaagacacggctgtgtattactgtgcgaaaccggagga<br/>aacagctggaacaatccactttgactactggggccagggaaccccggtcaccgtctctca</b> [SEQ ID NO: 206] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                       |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                   |
| QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSLSAYVFGTGTK<br>VTVLG [SEQ ID NO: 207]                                                                                                                                                                                                                                                                                |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                           |
| <b>QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYALHWVRQAPGQGLEW<br/>MAWINGNGNNTKYSQNFQGRVTITRDTSASTAYMELSSLRSEDTAVYYC<br/>AKPEETAGTIHFDYWGGQGPVTVSS</b> [SEQ ID NO: 208]                                                                                                                                                                                                                                                            |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                            |

Table 53

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-103</b>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                        |
| caggctgtgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctcctgcacccgcagcagtgg<br>cagcattgccagcaactatgtgcagtgggtaccagcagcggccgggcagtgccccaccactgtgatctatgaggataacc<br>aaagaccctctggggtccctgatcgggtctctgggtccatcgacagctcctccaactctgcctccctaccatctctggactg<br>aagactgaggacgaggctgactactactgtcagtcttatgatagcaccatcacgggtgtcggcggagggaaccaagctgac<br>cgtcctaggt [SEQ ID NO: 209]                                                              |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                                    |
| <b>cagggtccagctggttacagtctggggctgaggtgaagaagcctgggtcctcggtgaaggctcctgcaaggcttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggga<br/>tcatccctatctttggtacagcaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgggggaggggtta<br/>ctatgatagtagtggttattccaacggtgatgcttttgatatctggggccaagggaacaatggtcaccgtctcttca</b><br>[SEQ ID NO: 210] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                            |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                        |
| QAVLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTITVFGGGTKL<br>TVLG [SEQ ID NO: 211]                                                                                                                                                                                                                                                                                                    |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>QVQLVQSGAEVKKPGSSVKVSKKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIPIFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAIVYYCAGE<br/>GYYDSSGYSNGDAFDIWGQGTMTVTVSS</b> [SEQ ID NO: 212]                                                                                                                                                                                                                                                                           |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 54

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-104</b>                                                                                                                                                                                                                                                                                                                                                                    |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcacccgcagcagtggcagcattgccagcaactatgtgcagtggtaccagcagcgcccgggcagtgccccaccactgtgatctatgaggataacaaagacctctggggtccctgatcggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactgaagactgaggacgaggctgactactactgtcagtttatgatagcagcaatgtggtattcggcggagggaaccaaggtcacgccttaggt [SEQ ID NO: 213]                         |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                               |
| <b>gagggtgcagctggtggagctctgggggaggttggtacagcctggagggtccctgagactctctgtgcagcctctggattcaccttcagtagttatgaaatgaactgggtccgccagggtccagggaaggggctggagtggtttcatacattagtagtagtggttagtaccatatactacgcagactctgtgaagggccgattcaccatctccagagacaacgccaagaactcactgtatctgcaaatgaacagcctgagagccgaggacacggctgtttattactgtgcacgctgggactacggtatggacgtctggggccaagggaccacgggtcacctctctca</b> [SEQ ID NO: 214] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCCGTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                          |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDNQRPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNVVFGGGTKVTVLG [SEQ ID NO: 215]                                                                                                                                                                                                                                                     |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                        |
| <b>EVQLVESGGGLVQPGGSLRLSCAASGFTFSSYEMNWVRQAPGKGLEWVSYISSSGSTIYYADSVKGRFTISRDNAKNSLYLQMNSLRAEDTAVYYCARWDYGMVWVGQGTTVTVSS</b> [SEQ ID NO: 216]                                                                                                                                                                                                                                        |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                         |

Table 55

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| <b>ET200-105</b>                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                           |
| tcctatgtgtgactcagccaccctcagtgtccgtgtccccaggacagacagccagcatcacctgctctggagatagattga<br>cgaataaatatgtttcctgggtatcaacagaagccaggccagtcacctgtgttggtcatctatgaggatgccaaagcggccctc<br>agggatccctgcgcgattctctggctccaactctgggaacacagccactctgaccatcagcgggacccaggctatggatg<br>agtctgaatattactgtcagggcgtgggacagcagtgtggtggttttggcggaggggaccaagctgaccgtcctaggt<br>[SEQ ID NO: 217]                                                            |
| <u>tctagagggtggtggtgtagcggcgccggcgccctctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                        |
| <b>gagggtgcagctggtggagtctgggggaggcttggtacagcctggcaggtccctgagactctctgtgcagcctctgg<br/>atttacctttgatgattatgccatgcactgggtccggcaagctccagggaagggcctggagtgggtctcaggtattag<br/>ttggaatagtggtagtataggctatgcggactctgtgaagggccgattcaccatctccagagacaacgccaaagaac<br/>tcctgtatctgcaaatgaacagtctgagagatgaggacacggccttgattactgtgcaaaagaccgagggggggg<br/>gagttatcggttaaggatgcttttgatatctggggccaagggacaatggtcaccgtctcttca</b> [SEQ ID NO: 218] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                           |
| SYVLTQPPSVSVSPGQTASITCSGDRLTNKYVSWYQQKPGQSPVLVIYEDAKR<br>PSGIPARFSGSNSGNTATLTISGTQAMDESEYYCQAWDSSVVVFGGGTKLTVL<br>G [SEQ ID NO: 219]                                                                                                                                                                                                                                                                                           |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>EVQLVESGGGLVQPGRSLRLSCAASGFTFDDYAMHWVRQAPGKGLEWV<br/>SGISWNSGSIGYADSVKGRFTISRDNKNSLYLQMNSLRDEDTALYYCAK<br/>DRGGGVIVKDAFDIWGQGTMVTVSS</b> [SEQ ID NO: 220]                                                                                                                                                                                                                                                                   |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                    |

Table 56

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| <b>ET200-106</b>                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                           |
| tcctatgagctgactcagccacccgcagcgtctgggacccccggacagagagtcaccatctcttgttctgggggcgtctcc<br>aacatcgggagtggtgctctaaattggtaccagcaactcccaggaacggccccaaactcctcatctatagtataatcagc<br>ggccctcaggggtctctgaccgattctctggctccagggtctgccacctcagcctccctggccatcagtggggtccagtctga<br>ggatgaggtgattattactgtgcaacctgggatgatagtgtgaatggttgggtgttcggcggagggaaccaagctgaccgt<br>cctaggt [SEQ ID NO: 221]                                  |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                          |
| <b>gagggtgcagctggtggagtctggagctgaggtgaagaagcctggggattcagtgaagggtctctgcaagccttctg<br/>gttacaatttttcaactatggtatcaactgggtgcgacaggccccctggacaagggcttgagtggatgggatggatt<br/>agcacttacaccggaacacaaactatgcacagaagctgcagggcagagtcaccttcaccacagacacatccacg<br/>agcacagcctacatggagatgaggagcctgagatctgacgacacggccgtgtattactgtgcgcgccagcagggt<br/>ggtggttggtacgatgtttggggtaagggtactctggtcaccgtctcctca</b> [SEQ ID NO: 222] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                           |
| SYELTQPPAASGTPGQRVTISCSGGVSNIGSGALNWFYQQLPGTAPKLLIYSYN<br>QRPSGVSDRFSGRSATSASLAISGLQSEDEADYYCATWDDSVNGWVFGGGT<br>KLTVLG [SEQ ID NO: 223]                                                                                                                                                                                                                                                                       |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                   |
| <b>EVQLVESGAIEVKKPGDSVKVSKPSGYNFLNYGINWVRQAPGQGLEWM<br/>GWISTYTGNTNYAQKLQGRVTFTTDTSTSTAYMEMRSLRSDDTAVYYCA<br/>RQQGGGWYDVWGQGTLVTVSS</b> [SEQ ID NO: 224]                                                                                                                                                                                                                                                       |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                    |

Table 57

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| <b>ET200-107</b>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                               |
| cagtctgtcgtgacgcagccgccctcagtgtctgcggccccaggagagaaggtcaccatctcctgctctggaagcaacttc<br>aatgttggaataatgatgtatccttggtatcagcaactcccaggtgcagccccaaactcctcatttatgacaataataagcg<br>accctcagggattcctgaccgattctctggctccaagtctggcacgtcagccaccctggacatcaccgggctccacagtga<br>cgacgaggccgattattactgcggaacatgggatagcagcctgaatactgggggggtcttcggaactgggaccaaggtca<br>ccgtcctaggt [SEQ ID NO: 225]                                                   |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                            |
| <b>gagggtccagctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctg<br/>gttacacctttaccagctatactatcagctgggtacgacaggccccctggacaagggcttgagtggatgggatggatc<br/>agcaattacaatggtctcacaactatgcacagaacctccagggcagagtcaccatgactacagacacattcacga<br/>ccacagcctacatggagctgaggagcctcagatctgacgacacggccgtgtattactgtgtgagagaggggtcccc<br/>cgactacgggtgacttcgcgtcctttgactactggggccagggaaccctgggtcaccgtctcctca</b> [SEQ ID NO:<br>226] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                   |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                         |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                               |
| QSVVTQPPSVSAAPGEKVTISCSGSNFNVGNNDSWYQQLPGAAPKLLIYDN<br>NKRPSGIPDRFSGSKSGTSATLDITGLHSDDEADYYCGTWDSSLNTGGVFGTG<br>TKVTVLG [SEQ ID NO: 227]                                                                                                                                                                                                                                                                                           |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>EVQLVQSGAEVKKPGASVKVSKKASGYTFTSYTISWVRQAPGQGLEWM<br/>GWISTYNGLTNYAQNQLQGRVTMTTDTFTTTAYMELRSLRSDDTAVYYCV<br/>REGSPDYGDFASFDYWQGTLVTVSS</b> [SEQ ID NO: 228]                                                                                                                                                                                                                                                                      |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                        |

Table 58

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-108</b>                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                            |
| cagtctgtgtgacgcagccgccctcagtgtctgcggccgggacagaaggtcaccatctcctgctctggaagcagctcc<br>aacattgggaataattatgtatcctggtaccagcagttcccaggaacagccccaaactcctcatttatgacaataataagcg<br>accctcagggatttctgaccgattctctggctccaagtctggcagtcagccaccctgggcatcgccggactccagactgg<br>ggacgaggccgattattactgcggaacatgggataccagcctgagtggttttatgtcttcggaagtgggaccaaggtcacc<br>gtcctaggt [SEQ ID NO: 229]                                                     |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                        |
| <b>gagggtccagctggtacagtctggagctgaggtgaagaagcctggggcctcagtgaagggtcctgcaaggcttctg<br/>gttacacctttaccagctatactatcagctgggtacgacaggccctggacaagggcttgagtggatgggatggatc<br/>agcaattacaatggtctcacaactatgcacagaacctccagggcagagtcaccatgactacagacacattcacga<br/>ccacagcctacatggagctgaggagcctcagatctgacgacacggccgtgtattactgtgtgagagaggggtcccc<br/>cgactacgggtgacttcgctcctttgactactggggccagggaaccctgggtcaccgtctcctca</b> [SEQ ID NO:<br>230] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                            |
| QSVLTQPPSVSAPPGQKVTISCSGSSSNIGNNYVSWYQQFPGTAPKLLIYDNN<br>KRPSGISDRFSGSKSGTSATLGIAGLQTGDEADYYCGTWDTSLSGFYVFGSGT<br>KVTVLG [SEQ ID NO: 231]                                                                                                                                                                                                                                                                                       |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>EVQLVQSGAEVKKPGASVKVSCKASGYTFTSYTISWVRQAPGQGLEWM<br/>GWISTYNGLTNYAQNQLQGRVTMTTDTFTTTAYMELRSLRSDDTAVYYCV<br/>REGSPDYGDFASFDYWQGTLVTVSS</b> [SEQ ID NO: 232]                                                                                                                                                                                                                                                                   |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                     |

Table 59

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-109</b>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                              |
| ctgcctgtgctgactcagccaccctcagcgtctgcgacccccgggcagagggtcaccatctctgttctggaaccacctcc<br>aacatcgggaagtaatactgtacactggtaccagcagctcccaggggacggccccaaactcctcatctataataataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccgggtccg<br>aggatgaggctacatattctctgtgcaacatgggatgacagcctgagtgggtgtggtcttcggcggagggaaccaagctgacc<br>gtcctaggt [SEQ ID NO: 233]                                                |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                          |
| <b>gagggtccagctggtgcagctctggggctgagggtgaagaagcctgggtcctcggtgaaggctcctgcaaggttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggga<br/>tcacccctatctttggtacagcaaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggcctgtattactgtgcgagagatcccgc<br/>ctacggtgactacgagtatgatgcttttgatatctggggccaagggaacaatggtcaccgtctcttca</b> [SEQ ID<br>NO: 234] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                  |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                              |
| LPVLTQPPSASATPGQRVTISCSGTTSNIGSNTVHWYQQLPGTAPKLLIYNNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLRSEDEATYSCATWDDSLSGVVFGGGTKL<br>TVLG [SEQ ID NO: 235]                                                                                                                                                                                                                                                                                          |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>EVQLVQSGAEVKKPGSSVKVSCKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIPIFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTA VYYCARD<br/>PAYGDY EYDAFDIWGQGTMTVTVSS</b> [SEQ ID NO: 236]                                                                                                                                                                                                                                                                   |
| TSGQAGQH HHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                      |



Table 60

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-110</b>                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                           |
| cagtctgtgtgacgcagccgccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcgggaactaatggtgtaaactggtccagcagttcccaggaacggccccaaactcctcatctataactaatgatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>cggatgaggctgattattactgtgcagtgtgggaccacagcctgaatgggtccgggtgttcggcggaggggaccaagctgacc<br>gtcctaggt [SEQ ID NO: 237]                               |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                           |
| <b>cagggtgcagctggtgcagctctggggctgaggtgaagaagcctgggtcctcgggtgaaggtctctgcaaggttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgacagggccctggacaagggcttgagtggatgggagggga<br/>tcacccctatctttggtacagcaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgagagggggccgg<br/>ttttgatgcttttgatatctggggccaagggacaatggtcaccgtctcttca</b> [SEQ ID NO: 238] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                           |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGTNGVNWFFQFPGTAPKLLIYTNDQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSADEADYYCAVWDHSLNGPVFGGGTK<br>LTVLG [SEQ ID NO: 239]                                                                                                                                                                                                                                                                       |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                  |
| <b>QVQLVQSGAEVKKPGSSVKVSCKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIPIFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDNAVYYCARG<br/>AGFDAFDIWGQGTMTVTVSS</b> [SEQ ID NO: 240]                                                                                                                                                                                                                                                       |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                    |

Table 61

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-111</b>                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacatcggagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtctg<br>aggatgagactgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaagggtcaccgt<br>cctaggt [SEQ ID NO: 241]                            |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                |
| <b>cagggtgcagctacagcagtggtggcgaggactgttgaagccttcggagaccctgtccctcacctgcgctgtctatgg<br/>tgggtccttcagtggttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaaatc<br/>aatcatagtgggaagcaccactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaac<br/>cagttctccctgaagctgagctctgtgaccgccggacacggctgtgtattactgtgcgagagaggggctagatgc<br/>ttttgatatctggggccaagggacaatggtcaccgtctcttca</b> [SEQ ID NO: 242] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDETYYCAAWDDSLNGYVFGTGTK<br>VTVLG [SEQ ID NO: 243]                                                                                                                                                                                                                                                                 |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                           |
| <b>QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKGLEWI<br/>GEINHSGSTNYNPSLKSRTISVDTSKNQFSLKLSSVTAADTAVYYCAREG<br/>LDAFDIWGQGTMTVTVSS</b> [SEQ ID NO: 244]                                                                                                                                                                                                                                                  |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                             |

Table 62

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-112</b>                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacatcggagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatgtatagtaatgatcag<br>cgccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtct<br>gaggatgaggctgattattattgtgcagcatgggatgacagcctgaatggttatgtcttcgcagctgggacccagctcaccg<br>ttttaagt [SEQ ID NO: 245]                              |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                   |
| <b>cagggtgcagctacagcagtggtggcgaggactgttgaagccttcggagaccctgtccctcacctgcgtgtctatgg<br/>tgggtccttcagtggttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaaatc<br/>aatcatagtggaagcaccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaac<br/>cagttctccctgaagctgagctctgtgaccgccggacacggctgtgtattactgtgcgagagaggggctagatgc<br/>ttttgatatctggggccaagggaacaatggtcaccgtctcttca</b> [SEQ ID NO: 246] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                    |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLMYSND<br>QRPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFAAGT<br>QLTVLS [SEQ ID NO: 247]                                                                                                                                                                                                                                                                |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                           |
| <b>QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKGLEWI<br/>GEINHSGSTNYNPSLKSRTISVDTSKNQFSLKLSSVTAADTAVYYCAREG<br/>LDAFDIWGQGTMTVTVSS</b> [SEQ ID NO: 248]                                                                                                                                                                                                                                                  |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                             |

Table 63

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| <b>ET200-113</b>                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                        |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| cagtctgtcgtgacgcagccgccctcagtgtctgcggccccaggacagaaggtcaccatctctgctctggaagcagctc<br>caacattgggaataattatgtatcctggtaccagcagctcccaggaacagccccaaactcctcattatgacaataataagc<br>gacctcagggattcctgaccgattctctggctccaagtctggcacgtcagccacctgggcatcactggactccagactg<br>gggacgaggccgattattactgcggaacatgggatagcagcctgagtgtctgttatgtcttcggaactgggaccaaggtca<br>ccgtcctaggt [SEQ ID NO: 249]                                               |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                      |
| <b>cagggtccagctggttacagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctctgcaaggttctg<br/>gttacagctttaccagctatactatcagctgggttcgacaggccccctggacaaggccttgagtggatgggatgggtc<br/>agcaattacaatggtctcagaaactatgcacagaacctccagggcagagtcaccatgactacagacacactcacg<br/>accacagcctacatggagctgaggagcctcagatctgacgacacggcctgtattattgtgtgagagaggggtccc<br/>ccgactacggtgacttcgggccttgactactggggccagggcaccctggtcaccgtctctca</b> [SEQ ID NO: 250] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                           |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                       |
| QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSLSAAYVFGTGT<br>KVTVLG [SEQ ID NO: 251]                                                                                                                                                                                                                                                                                   |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                              |
| <b>QVQLVQSGAEVKKPGASVKVSCKASGYSTSYTISWVRQAPGQGLEWM<br/>GWVSTYNGLRNIAQNLQGRVTMTTDLTTTAYMELRSLRSDDTAVYYC<br/>VREGSPDYGDFAAFDYWGQGLVTVSS</b> [SEQ ID NO: 252]                                                                                                                                                                                                                                                                 |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                |

Table 64

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| <b>ET200-114</b>                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                   |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                  |
| caggctgtgctgactcagccaccctcagcgtctgagacccccgggcagagggtcaccatctctgttctggaagcaggctc<br>aacatcgggaactaatattgtacactggtaccagcagcgcaggaatggccccaaactcctcacttatggtagtcggcgg<br>ccctcaggggtcccgaccgattctctggctccaagtgttgccacctcagcctccctggccatcagtggggtccagtctgag<br>gatgaggtgattattattgtgcagcatgggatgacagtctgaatggtccggctttcggcggagggaccaagctgaccgtc<br>ctaggt [SEQ ID NO: 253]                               |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                              |
| <b>cagggtgcagctacagcagtggggcgaggactgttgaagccttcggagaccctgtccctcacctgcgtgtctatgg<br/>tgggtccttcagtggttactactggagctggatccgcagccccaggggaaggggctggagtggattggggaaatc<br/>aatcatagtggaagcaccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaac<br/>cagttctccctgaagctgagctctgtgaccgccgcggacacggctgtgtattactgtgcgagagacggtgggggcta<br/>ctttgactactggggccagggaaccctggtcaccgtctctca</b> [SEQ ID NO: 254] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                      |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                  |
| QAVLTQPPSASETPGQRVTISCSGSRSNIGTNIVHWYQQRPGMAPKLLTYGSR<br>RPSGVPDRFSGSKFGTSASLAISGLQSEDEADYYCAAWDDSLNGPAFGGGTK<br>LTVLG [SEQ ID NO: 255]                                                                                                                                                                                                                                                               |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                         |
| <b>QVQLQQWGAGLLKPSETLSLTCAVYGGSFSGYYWSWIRQPPGKLEWI<br/>GEINHSGSTNYNPSLKSRTISVDTSKNQFSLKLSSVTAADTAVYYCARDG<br/>GGYFDYWQGTLVTVSS</b> [SEQ ID NO: 256]                                                                                                                                                                                                                                                   |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                           |

Table 65

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| <b>ET200-115</b>                                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                   |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                  |
| cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcagctc<br>caatatggggcacgttatgatgtacactggtaccagcaactcccaggaacagcccccgactcctcatctctgtaactac<br>gatcggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctccag<br>gctgaggatgaggctgattattactgccagtcctatgacagcagtgtgagtgttgggtgttcggcggagggaaccaaggctc<br>accgtcctaggt [SEQ ID NO: 257]                                         |
| <u>tctagaggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                  |
| <b>gaagtgcagctggtgcagtctggggctgaagtgaaggagcctggggcctcagtgaggatctcctgccaggcatctg<br/>gatacaacttcacagttattatatgcactgggtgctggcaggccctgggcaaggctcttgagtggatgggcaccatc<br/>aaccaggcagtggtgagacagactactcacagaagttgcagggcagagtcaccatgaccagggaccgtccac<br/>gggtacattcgacatggggctgagcagcctgacatctggggacacggccgtctattattgtgcgacaggtctcatca<br/>gaggagctagcgatgcttttaatatctggggccgggggacaatggtcaccgtctcttca</b> [SEQ ID NO: 258] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                      |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                  |
| QSVLTQPPSVSGAPGQRVTISCTGSSSNIGARYDVHWYQQLPGTAPRLLISAN<br>YDRPSGVPDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSVSAWVFGG<br>TKVTVLG [SEQ ID NO: 259]                                                                                                                                                                                                                                                                              |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                          |
| <b>EVQLVQSGAEVKEPGASVRISCQASGYNFISYYMHWVRQAPGQGLEWM<br/>GTINPGSGETDYSQKLQGRVTMTRDPSTGTFDMGLSSLTSGDTAVYYCA<br/>TGLIRGASDAFNIWGRGTMVTVSS</b> [SEQ ID NO: 260]                                                                                                                                                                                                                                                           |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                           |

Table 66

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| <b>ET200-116</b>                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                     |
| cagcctgtgctgactcagccaccctcagtgtccgtgtccccaggacagacggccgccatcccctgttctggagataagttg<br>ggggataaatttgcttctggtatcagcagaagccaggccagtcacctgtgctggtcatctatcaagataactaagcggccct<br>cagggatccctgagcgattctctggtccaactctgggaacacagccactctgacctcagcgggaccaggctatggat<br>gaggctgactattactgtcagacgtgggccagcggcattgtggtgttcggcggaggggaccaagctgaccgtcctaggt<br>[SEQ ID NO: 261]                                                          |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                    |
| <b>cagggtacagctgcagcagtcagggtccaggactggtgaagccctcgagaccctctcactcacctgtgccatctccgg<br/>ggacagtgtctctagcaacagtgtgcttggaaactggatcaggcagtcacctcgagaggccttgagtggctggga<br/>aggacatactacaggtccaagtgtataatgattatgcagtatctgtgaaaagtcgaataaccatcaaccagaca<br/>catccaagaaccagtttctccctgcagctgaactctgtgactcccaggacacggctgtgtattactgtgcaagagag<br/>cgcagtggctggaagggatttgactactggggccagggaaccctggtcaccgtctcctca</b> [SEQ ID NO: 262] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                         |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                     |
| QPVLTPPPSVSVSPGQTAAIPCSGDKLGDKFASWYQQKPGQSPVLVIYQDTRK<br>PSGIPERFSGSNSGNTATLTISGTQAMDEADYYCQTWASGIVVFGGGTKLTVL<br>G [SEQ ID NO: 263]                                                                                                                                                                                                                                                                                     |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                             |
| <b>QVQLQQSGPGLVKPSQTLSTCAISGDSVSSNSAAWNWIRQSPSRGLEWL<br/>GRYYRSKWyNDYAVSVKSRITINPDTSKNQFSLQLNSVTPEDTAVYYCA<br/>RERSGWKGFdyWGQGLVTVSS</b> [SEQ ID NO: 264]                                                                                                                                                                                                                                                                |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                              |

Table 67

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| <b>ET200-117</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| gatgttgatgactcagtctccaccctccctgtccgtcaccctggagagccggcctccatcacctgcaggtctagtcaga<br>gcctcctggaaagaaatgcatacaactacttggattggtacctgcagaggccaggacagtctccacagctcctgatctactt<br>ggggttctaactggggccgccgggggtccctgacaggttcagtggcagtgatcaggcagagattttactgaaaatcagca<br>gagtggagcctgaggatgttgggtttattactgcatgcaagctctacaagctccgttcactttcggcggagggaaccaaggt<br>ggagatcaaact [SEQ ID NO: 265]<br><u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]<br><b>gaagtgcagctggtgcagctctgggggagggcttggtacagcctgggggtccctgagactctctgtgcagcctctgg<br/>           attcaccttttagcagctatgccatgagctgggtccgccagggtccagggaaggggctggagtgggtctcagctatta<br/>           gtggtagtgggtgtagcacatactacgcagactccgtgaagggccggttcaccatctccagagacaattccaagaa<br/>           cacgtgttatctgcaaatgaacagcctgagagccgaggacacggccgtatattactgtgcgaaatggggcccggtt<br/>           caggatgcttttgatatctggggccaagggaacaatggtcaccgtctcttca</b> [SEQ ID NO: 266]<br>ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| DVVMTQSPPSLSVTPGEPASITCRSSQSLLERNAYNYLDWYLQRPGQSPQLLI<br>YLGSNRAAGVPDRFSGSGSGRDFTLKISRVEPEDVG VYYCMQALQAPFTFGG<br>GTKVEIKR [SEQ ID NO: 267]<br><u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]<br><b>EVQLVQSGGGLVQPGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWV<br/>           SAISGSGGSTYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAK<br/>           WGPFDQDAFDIWGQGTMTVSS</b> [SEQ ID NO: 268]<br>TSGQAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



Table 68

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| <b>ET200-118</b>                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                           |
| caggctgtgctgactcagcctgcctccgtgtctgggtctctggacagtcgatcaccatctctgcactggaaccagcagtg<br>acgttggtggttataactatgtctctggtaccaacagcacccgggcaaaagccccaaactcatgatttatgaggtcagtaat<br>cggccctcaggggtttctaatacgttctctggctccaagtctggcaacacggcctccctgaccatctctgggtccaggctg<br>aggacgaggctgattattactgcagctcatatacaagcagcagcaccccttatgtcttcggagcagggaccaaggtcaccg<br>tcctaggt [SEQ ID NO: 269]                                                  |
| <u>tctagagggtggtggttagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                        |
| <b>gagggtgcagctggtggagtctgggggaggcttggtagcagcctggcaggtccctgagactctctgtgcagcctctgg<br/>attcacctttgatgattatgccatgcactgggtccggcaagctccagggaagggcctggagtggtctcaggtatta<br/>gttggaaatagtgtagcataggctatgcggactctgtgaagggccgattcacatctccagagacaacgccaagaa<br/>ctccctgtatctgcaaataaacagtctgagagctgaggacacggccttgattactgtgcaaaagccagggtggaca<br/>gcagtggcatcagaccaccactttgactactggggccagggaacgctggtcaccgtctctca</b> [SEQ ID NO:<br>270] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                           |
| QAVLTQPASVSGSPGQSITISCTGTSSDVGGYNYVSWYQQHPGKAPKLMIE<br>VSNRPSGVSNRFSKSGNTASLTISGLQAEDEADYYCSSYTSSSTPYVFGAGT<br>KVTVLG [SEQ ID NO: 271]                                                                                                                                                                                                                                                                                         |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>EVQLVESGGGLVQPGRSLRLSCAASGFTFDDYAMHWVRQAPGKGLEWV<br/>SGISWNSGSIGYADSVKGRFTISRDNANKNSLYLQMNSLRAEDTALYYCAK<br/>ARWTAVASDHFFDYWGQGTLLVTVSS</b> [SEQ ID NO: 272]                                                                                                                                                                                                                                                                |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                    |

Table 69

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| <b>ET200-119</b>                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                      |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                     |
| caggctgtgcttactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcgggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaagctgaccgt<br>cctaggt [SEQ ID NO: 273]                           |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                 |
| <b>gagggtgcagctggtgcagctctggggctgagggtgaagaagcctgggtcctcggtgaaggctctctgcaaggttctg<br/>gaggcaccttcagcagctatgctatcagctgggtgacagggccctggacaagggcttgagtggatgggagggga<br/>tcatccctatctttggtacagcaaactacgcacagaagttccagggcagagtcacgattaccgaggacgaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggcctgtattactgtgcgagagattggga<br/>ctacatggacgtctggggcaaagggaccacggtcaccgtctcctca</b> [SEQ ID NO: 274] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                         |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                               |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                     |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>LTVLG [SEQ ID NO: 275]                                                                                                                                                                                                                                                                 |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                            |
| <b>EVQLVQSGAEVKKPGSSVKVSCKASGGTFSSYAISWVRQAPGQGLEWM<br/>GGIIPFGTANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARD<br/>WDYMDVWGKGTITVTVSS</b> [SEQ ID NO: 276]                                                                                                                                                                                                                                                   |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                              |

Table 70

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-120</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                           |
| tcctatgagctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacatcggagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcage<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcacctg<br>cctaggt [SEQ ID NO: 277]                                                                    |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                                       |
| <b>gagggtgcagctggtggagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccctggacaagggttgagtggatgggatggatc<br/>agcgttacaatggttaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacacggccgtgtattactgtgcgagagacctatctc<br/>ggggagctaaccgcattactactactactacgggtatggacgtctggggccaaggggaccacggtcaccgtctcctc<br/>a</b> [SEQ ID NO: 278] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                           |
| SYELTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>VTVLG [SEQ ID NO: 279]                                                                                                                                                                                                                                                                                                       |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>EVQLVESGAIEVKKPGASVKVSKKASGYTFSTYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAVYYCA<br/>RDL</b> SRGANPHYYYYYYGMDVWGQGTTVTVSS [SEQ ID NO: 280]                                                                                                                                                                                                                                                                           |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 71

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| <b>ET200-121</b>                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                  |
| cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccgtctcctgcactgggagcagatc<br>caacatcggggcaggatatgatgtacactggtaccagcaactccagggaacagccccaaactcctcatctatggaaatag<br>taatcggcctccaggggtccctgaccgattctctgggtctaagtctggcacctcagcctccctggtcatcactggggtccag<br>gctgaggatgccgctgattattactgccagtcctatgacaacactgtgcgtgaatcaccttatgtcttcggaactgggaccaa<br>ggtcaccgtcctaggt [SEQ ID NO: 281]                                                 |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                              |
| <b>gagggtccagctggtacagtctggggctgagggtgaagaagcctggggcctcagtgaagggtcctgcaagggttccg<br/>gatacacctcactgaattatccatgcactgggtgcgacagggtcctggaaaagggttgagtggatgggagggttt<br/>gatcctgaagatggtgaaacaatctacgcacagaagtccaggggcagagtcaccatgaccgaggacacatctaca<br/>gacacagcctacatggagctgagcagcctgagatctgaggacacggcctgtattactgtgcaacagagagtaatt<br/>tagtgtccccgcactactactactacgggtatggacgtctggggccaagggaccacggtcaccgtctcctca</b> [SEQ<br>ID NO: 282] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                      |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                  |
| QSVLTQPPSVSGAPGQRVTVSCTGSRSNIGAGYDVHWYQQLPGTAPKLLIYG<br>NSNRPPGVDPDRFSGSKSGTSASLVITGLQAEDAADYYCQSYDNTVRESPYVFG<br>TGTKVTVLG [SEQ ID NO: 283]                                                                                                                                                                                                                                                                                          |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>EVQLVQSGAEVKKPGASVKVSCKVSGYTLTELSMHWVRQAPGKGLEW<br/>MGGFDPEDGETIYAQKFQGRVTMTEDTSTDYAYMELSSLRSEDTAVYYC<br/>ATESNLVSRHYYYYGMDVWGQGTITVTVSS</b> [SEQ ID NO: 284]                                                                                                                                                                                                                                                                      |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                           |

Table 72

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| <b>ET200-122</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                   |
| ctgcctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaaccagctcc<br>aacatcgggaagtaattctgtagactggtaccagcagctccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgaatctctggctccaagtctggcacctcagcctccctggccatcagtggtccagctctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcacctg<br>cctaggt [SEQ ID NO: 285]                                                                           |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                                               |
| <b>gaagtgcagctggtgcagctctggggctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctg<br/>gatacaccttcaccggctactatatgcactgggtgcgacaggccctggacaagggttgagtggatgggatggat<br/>caaccctaacagtgggtggcacaactatgcacagaagttcagggcagggtcaccatgaccagggacacgtccat<br/>cagcacagcctacatggagctgagcaggtgagatctgacgacacggcctgtattactgtgcgagagattacgg<br/>atactatggttcggggagttattcgagcggccccctttactactactacgggtatggacgtctggggccaaggga<br/>cggtcaccgtctcctca</b> [SEQ ID NO: 286] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                                       |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                                   |
| LPVLTQPPSASGTPGQRVTISCSGTSSNIGSNSVDWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRISGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>VTVLG [SEQ ID NO: 287]                                                                                                                                                                                                                                                                                                               |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>EVQLVQSGAEVKKPGASVKVSCKASGYTFTGYMHWRQAPGQGLEW<br/>MGWINPNSGGTNYAQKFQGRVTMTRDTSISTAYMELSRLRSDDTAVYYC<br/>ARDYGYYGSGSYSSGPLYYYGMDVWGQGTTVTVSS</b> [SEQ ID NO: 288]                                                                                                                                                                                                                                                                                    |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 73

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-123</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                           |
| caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatgtataataatgatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggtccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctcaatggttatgtcttcggacctgggaccaaggtcaccgt<br>cctaggt [SEQ ID NO: 289]                                                                    |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO:<br>305]                                                                                                                                                                                                                                                                                                                                                       |
| <b>cagggtgcagctgggtggagtctggagctgaggtgaagaagcctggggcctcagtgaagggtctcctgcaaggcttctg<br/>gttacacctttaccagctatggtatcagctgggtgcgacaggccctggacaagggttgagtggatgggatggatc<br/>agcgttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagcctacatggagctgaggagcctgagatctgacgacacggccgtgtattactgtgcgagagacctatctc<br/>ggggagctaaccgcattactactactactacgggtatggacgtctggggccaagggaccacggtcaccgtctcctc<br/>a</b> [SEQ ID NO: 290] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                                           |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLMYNND<br>QRPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGPGT<br>KVTVLG [SEQ ID NO: 291]                                                                                                                                                                                                                                                                                                       |
| <u>SRGGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>QVQLVESGAIEVKKPGASVKVSKKASGYTFSTSYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAQKLQGRVTMTTDTSTSTAYMELRSLRSDDTAVYYCA<br/>RDLSRGANPHYYYYYGMDVWGQGTTVTVSS</b> [SEQ ID NO: 292]                                                                                                                                                                                                                                                                            |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 74

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-125</b>                                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                    |
| aattttatgctgactcagccccacgctgtgtcggagtctccggggaagacggtaaccatctcctgcacccgcagcagtggc<br>agtattgccagcaactatgtgcagtgggtaccagcagcggccgggcagttccccgcactgtgatttatgaggataatcaaa<br>gacctctgggggtccctggtcgggtctctggctccatcgacagctcctccaactctgcctccctaccatctctggactgaag<br>actgaggacgagggctgactactactgtcagtcttatgattccaccagtgtgcttttcggcggaggggaccaagctgaccgtcc<br>taggt [SEQ ID NO: 293]                                          |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                   |
| <b>gagggtccagctggtgcagtctggggctgagggtgaagaagccagggctcctcgggtgaagggtcctgcaaggcctcg<br/>ggaggcaccttcagcagcaattctctcagctgggtgcgacaggccccctggacaagggcttgagtggatgggaagg<br/>atcttcctatcctgggtataacaaactatgcacagaagttccagggcagagtcacgattaccgcgacaaatccac<br/>gagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtctattactgtgcgagaggaaacta<br/>ccaatgggtatgatgcttttgatatctggggccaagggacaatggtcaccgtctcttca</b> [SEQ ID NO: 294] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                              |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                    |
| NFMLTQPHAVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSSPRTVIYEDN<br>QRPSGVPGRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTSVLFGGGTKL<br>TVLG [SEQ ID NO: 295]                                                                                                                                                                                                                                                                                |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                            |
| <b>EVQLVQSGAEVKKPGSSVKVSCKASGGTFSSNSLSWVRQAPGQGLEWM<br/>GRIFPILGITNYAQKFQGRVTITADKSTSTAYMELSSLRSEDTAVYYCARG<br/>NYQWYDAFDIWGQGTMTVSS</b> [SEQ ID NO: 296]                                                                                                                                                                                                                                                               |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                             |

Table 75

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-005</b>                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                           |
| cagcctgtgctgactcagccaccctcagtgtcagtgggtcccaggaaagacggccaggattacctgtgggggaaaaaacat<br>tggaaagtaaaagtgtgcaactggtaccagcagaagccaggccaggccccctgtggtggtcatccattatgatagtaccggc<br>cctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg<br>ggatgagggccgactattactgtcaggtgtgggatagtagtagtgatcatccttatgtcttcggaactgggaccaaggtcacc<br>gtcctaggt [SEQ ID NO: 297]                                |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                          |
| <b>cagggtgcagctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctg<br/>gttacacctttaccaactatggtatcagctgggtgcgacaggccccctggacaagggcttgagtggatgggatggatc<br/>agcgcttacaatggtaacacaaactatgcacataagctccagggcagagtcaccatgaccacagacacatccacg<br/>agcacagccaacatggagctgaggagcctgagacctgacgacactgccgtgtattactgtgcgcgctcttacttcgg<br/>ttctcatgattactgggggtcaagggtactctggtgaccgtctcctca</b> [SEQ ID NO: 298] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                           |
| QPVLTQPPSVSVVPGKTARITCGGKNIGSKSVHWYQQKPGQAPVVVIHYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK<br>VTVLG [SEQ ID NO: 299]                                                                                                                                                                                                                                                                        |
| <u>SRGGGSGGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                   |
| <b>QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYGISWVRQAPGQGLEWM<br/>GWISAYNGNTNYAHKLQGRVTMTTDTSTSTANMELRSLRPDDTAVYYC<br/>ARSYFGSHDYWGQGLVTVSS</b> [SEQ ID NO: 300]                                                                                                                                                                                                                                                         |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                    |



Table 76

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| <b>ET200-124</b>                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                            |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                           |
| tcctatgtgctgactcagccaccctcgggtgcagtggccccaggaaagacggccaggatttcctgtgggggaaacgacatt<br>ggaagtaaaagtgtttctggtatcagcagaggccaggccaggccccctgtgttggtcgtctatgatgatagcgaccggccct<br>cagggtccctgagcgattctctggttcaactctgggaacacggccaccctgaccatcagcagggtcgaagccggggat<br>gaggccgactattactgtcaagtgtgggatagtagtagtgatcattatgtcttcggaactgggaccaaggtcaccgtcctagg<br>t [SEQ ID NO: 301]                                                         |
| <u>tctagagggtggtggtgtagcggcgccggcggtctggtggtggtgatccctcgagatggcc</u> [SEQ ID NO: 305]                                                                                                                                                                                                                                                                                                                                          |
| <b>cagggtgcagctggtggagtctgggggaggcttggtacagcctggcaggtccctgagactctcctgtgcagcctctgg<br/>attcacctttgatgattatgccatgcactgggtccggcaagctccagggaagggcctggagtggtctcaggtatta<br/>gttggaaatagtggttagcataggctatgcggactctgtgaagggccgattcaccatctccagagacaacgccaagaa<br/>ctccctgtatctgcaaataaacagtctgagagctgaggacacggccttgattactgtgcaaaagatataacctatg<br/>gttcggggagttatggtgcttttgatatctggggccaagggacaatggtcaccgtctcttca</b> [SEQ ID NO: 302] |
| ACTAGTGGCCAGGCCGGCCAGCACCATCACCATCACCATGGCGCATACCC<br>GTACGACGTTCCGGACTACGCTTCT [SEQ ID NO: 306]                                                                                                                                                                                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                     |
| (light chain variable region <u>scFv linker</u> <b>heavy chain variable region</b> His tag + HA tag)                                                                                                                                                                                                                                                                                                                           |
| SYVLTQPPSVSVAPGKTARISCGGNDIGSKSVFWYQQRPGQAPVLVVYDDSD<br>RPSGLPERFSGFNSGNTATLTISRVEAGDEADYYCQVWDSSSDHYVFGTGTK<br>VTVLG [SEQ ID NO: 303]                                                                                                                                                                                                                                                                                         |
| <u>SRGGGGSGGGSGGGGSLEMA</u> [SEQ ID NO: 307]                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>QVQLVESGGGLVQPGRSLRLSCAASGFTFDDYAMHWVRQAPGKGLEWV<br/>SGISWNSGSIGYADSVKGRFTISRDNANKNSLYLQMNSLRAEDTALYYCAK<br/>DITYGSGSYGAFDIWGQGTMVTVSS</b> [SEQ ID NO: 304]                                                                                                                                                                                                                                                                 |
| TSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 308]                                                                                                                                                                                                                                                                                                                                                                                    |

**XI. Exemplary extracellular antigen-binding domains (e.g., scFvs) comprising a heavy chain variable region, a light chain variable region and a linker peptide**

Table 77

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| <b>ET200-001</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Cagtctgtgttgacgcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctc<br>caacatcggagtaatactgtaaactggtaccagcagctcccaggaacggccccc aaactcctcatctatagtaataatcag<br>cggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggtccagtct<br>gaggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcaccg<br>tcctaggttctagagggtggtggtgtagcggcggcggcggtctggtggtggtgatccctcagatggcccaggtgcag<br>ctacagcagtggggcgaggactgttgaagccttcggagacctgtccctcacctgcgctgtgtatggtgggtccttcagtg<br>gttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaaatcaatcatagtgaagcac<br>caactacaaccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgagctct<br>gtgaccgccgcggacacggccgtgtattactgtgcgcgcgaagggtccgtacgacggttcgattcttgggggtcaagggtact<br>ctggtgaccgtctcctca [SEQ ID NO: 593] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAVY<br>GGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRTISVDTSKNQF<br>SLKLSSVTAADTAVYYCAREGPYDGFDSWGQGTLVTVSS [SEQ ID NO: 594]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 78

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-002</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctctgcacccgcagcagtggc<br>agcattgccagcaactatgtgcagtgtgtaccagcagcggccgggcagtggccccaccactgtgatctataggataacca<br>aagaccctctggggtcctgatcggttctctggctccatcagagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactactgtcagttatgatagcagcaattctgtggtattcggcggagggaaccaagctga<br>ccgtcctaggttctagagggtggtggtgtagcggcggcggcggcgtctggtggtggtgatccctcagatggcccaggtc<br>cagctggtacagtctggcactgaggtgaagaagcctggggcctcagtgagggtcgctgcaaggcttctggttacccttt<br>aacaatatgacatcaactgggtgcgacaggcccctggacaagggtttagtggtgagggtcgaaggtcctatcttctgt<br>acaacaaactacgcacagaagttccagggcagagtcacgattaccggcgaatccacgagcacagcctacatggag |

|                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ctgagcagcctgagatctgaggacacggccgtatattactgtgcgcgcgaatggttctactgggatatctggggtcaaggta<br>ctctggtgaccgtctcctca [SEQ ID NO: 595]                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNSVVFGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGTEVKKPGASVRVACKAS<br>GYPFNKYDINWVRQAPGQGLEWMGGIPIFRTTNYAQKFQGRVTITADESTST<br>AYMELSSLRSEDNAVYYCAREWFYWDIWGQGTLVTVSS [SEQ ID NO: 596] |

Table 79

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-003</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Cagtctgtgttgactcagccaccctcagtgctccgtgtccccaggacagacagccagcatctcctgctctggaataaattgg<br>ggactaagtatgtttactggtatcagaagaggccaggccagtcacctgtgttggtcatgtatgaagataatcagcggccctc<br>agggatcccgagcgggttctctggctccaactctgggaacacagccactctgaccatcagagggaccagactgtggatg<br>aggctgactattactgtcaggcgtgggactccgacacttctgtggtcttcggcggagggaaccaagggtcaccgtcctagggtc<br>tagagggtggtggtgtagcggcggcggcggcgtctggtggtggtggatccctcagatggccgagggtgcagctggtgga<br>gaccgggggaggcgtggtccagcctgggagggtccctgagactctcctgtgcagcctctggattcaccttcagtagttatgg<br>catgcactgggtccgccagggtccaggcaaggggctggagtgggtggcagttatatcacatgatggaagtaataaatacta<br>cgcgactccgtgaaggggccgattcaccatctccagagacaattccaaggacacgctgtatctgcaaatgaacagcctga<br>gagggtaggacacggccgtatattactgtgcgcgctctaaccagtggctctggttacttctcttcgattactggggtcaaggta<br>ctctggtgaccgtctcctca [SEQ ID NO: 597] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| QSVLTQPPSVSVSPGQTASISCSGNKLGTKYVYWYQKRPGQSPVLVMYEDNQ<br>RPSGIPERFSGSNSGNTATLTIRGTQTVDEADYYCQAWDSDTFVVFGGGTKVT<br>VLGSRRGGGSGGGGSGGGGSLEMAEVQLVETGGGVVQPGRSLRLSCAASGF<br>TFSSYGMHWVRQAPGKGLEWVAVISHDGSNKYYADSVKGRFTISRDNKSDT<br>LYLQMNSLRGEDNAVYYCARSNQWSGYFSFDYWGQGTLVTVSS [SEQ ID<br>NO: 598]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 80

|                                                                                     |
|-------------------------------------------------------------------------------------|
| <b>ET200-006</b>                                                                    |
| <u>DNA Sequence</u>                                                                 |
| Tcctatgtgctgactcagccaccctcagtgctcagtggtcccccaggaaagacggccaggattacctgtgggggaaacaacat |

tggaagtaaaagtgtgactggtaccagcagaagccaggccaggcccctgtggtggtcatccattatgatagcgaccggc  
 cctcagggatccctgagcgattctctggtccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg  
 ggatgaggccgactattactgtcaggtgtgggtagtagtagtgatcatccttatgtcttcggaactgggaccaagggtcacc  
 gtcctaggttctagaggtggtggtgtagcggcggcggcggtctgtggtggtggtgatccctcgagatggccgagggtgca  
 gctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacc  
 acctatggtatcagctgggtgcgacaggcccctggacaagggtgagtggtggtgatggtgatcaacacttacaatggtcac  
 aaaaactatgcacagaagctccaggggcagagccacaatgaccgcagacacatccacgaacacagcctacatggagctg  
 aggagcctgagatctgacgacactgccgtgtattactgtgcgcgcgttatctacggttctggtgattactgggggtcaaggtac  
 tctggtgaccgtctctca [SEQ ID NO: 599]

Amino Acid Sequence

SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVVIHYDSD  
 RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK  
 VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSKAS  
 GYTFTTYGISWVRQAPGQGLEWMGWINTYNGHTNYAQKLQGRATMTADTS  
 TNTAYMELRSLRSDDTAVYYCARVIYGS GDYWGQGLTVTVSS [SEQ ID NO:  
 600]

Table 81

**ET200-007**

DNA Sequence

Tcctatgtgctgactcagccactctcagtgctcagtggtccaggaagacggccaggattacctgtgggggaaacaacat  
 tggaagtaaaactgtgactggtaccagcagaagccaggccaggcccctgtgctggtcatctattatgatagcgaccggcc  
 ctcagggatccctgagcgattctctggtccaactctgggaacacggccaccctgaccatcagcagggtcgaagccggg  
 gatgaggccgactattactgtcaggtgtgggtagtagtagtgatcatcggtgttcggcggaggggaccaagctgaccgtc  
 ctaggttctagaggtggtggtgtagcggcggcggcggtctgtggtggtggtgatccctcgagatggcccaggtgcagct  
 gcaggagtcggggccaggactggtgaagccttcggagaccctgtccctcacctgcaatgtctctggttactccatcagcag  
 tggttacttttggggctggatccggcagccccaggggaaggggctggagtggttgggagtatctatcatagtaggagcac  
 ctactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgaactct  
 gtgaccggcgagacacggccgtgtattactgtgcgcgcggttacgggttacttcgattactgggggtcaagggtactctggtga  
 ccgtctctca [SEQ ID NO: 601]

Amino Acid Sequence

SYVLTQPLSVSVAPGKTARITCGGNNIGSKTVHWYQQKPGQAPVLVIYYDSD  
 RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHRVFGGGTKL

TVLGSRRGGGSGGGGSGGGGSLEMAQVQLQESGPGLVKPSETLSLTCNVSGY  
 SISSGYFWGWIRQPPGKGLEWIGSIYHSRSTYYNPSLKSRVTISVDTSKNQFSL  
 KLNSVTAADTAVYYCARGYGYFDYWGQGTLVTVSS [SEQ ID NO: 602]

Table 82

**ET200-008**DNA Sequence

Caatctgcctgactcagcctgcctccgtgtctgggtctctggacagtcgacaccatctctgcactggaaccagcagtg  
 acgttggtggtataactatgtctcctggtaccaacaacaccaggcaagccccaaactcatgatttatgatgcagtaac  
 ggccctcaggggtttctaategcttctctggctccaagtctggcaacacggcctccctgaccatctctgggtccaggctga  
 ggacgaggctgattattactgcagctcatatacaagcagcagcacttgaagggttcggcggagggaaccaagctgaccg  
 tcctaggttctagaggtggtggtgtagcggcggcggcggtctgtgtggtggtgatccctcgagatggccgaggtgcag  
 ctggtggagtctgggggaggtgtgttacggcctgggggggtccctgagactctctgtgcagcctctggattcacctttggtg  
 attatggcatgagctgggtccgccaagctccagggaaggggctggagtgggtctctggtattaattggaatggtgtagca  
 caggttatgcagactctgtgaagggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaaca  
 gtctgagagccgaggacacggccgtatattactgtgcgcgtctaaatacaacttccatgtttactacgattactggggtaaa  
 ggtactctggtgaccgtctctca [SEQ ID NO: 603]

Amino Acid Sequence

QSALTQPASVSGSPGQSITISCTGTSSDVGGYNYVSWYQQHPGKAPKLMIYDV  
 SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYCYSSYTSSSTS KVFVGGGTK  
 LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGGGVVVRPGGSLRLSCAAS  
 GFTFGDYGMSWVRQAPGKGLEWVSGINWNGGSTGYADSVKGRFTISRDN  
 KNSLYLQMNSLRAEDTAVYYCARSKYNFHVYYDYWGQGTLVTVSS [SEQ ID  
 NO: 604]

Table 83

**ET200-009**DNA Sequence

Cagtctgtgtgacgcagccaccctcagcgtctgggacccccgggcagacagtcaccatctctgttctggaagcaactcc  
 aacatcggaagtaattatgtatactggtaccagcagctcccagggaacggccccaaactcctcatctataggaataatcagc  
 ggccctcaggggtccctgaccgattctcaggctccaagtctggcacctcagcctccctggccatcagtgggctccgctccg  
 aggatgaggctgattattactgtgcagcatgggatgacagcctgagtgttatgtcttcggaactgggaccaaggtcaccgt  
 cctaggttctagaggtggtggtgtagcggcggcggcggtctgtgtggtggtgatccctcgagatggcccaggtgcag  
 ctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaaggtctcctgcaaggcttctggttacacctttacca

|                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| gctatggtatcagctgggtgacagggccctggacaagggcttgagtggatgggatggatcagcgcttacaatggtaac<br>acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga<br>ggagcctgagatctgacgacactgccgtgtattactgtgcgcgctcttctggtaacatggtttcttgaaagatatgtggggtc<br>aaggtactctggtgaccgtctcctca [SEQ ID NO: 605] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                              |
| QSVLTQPPSASGTPGQTVTISCSGSNSNIGSNYVYWYQQLPGTAPKLLIYRNN<br>QRPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAAWDDSLSA YVFGTGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK<br>ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTD<br>TSTSTAYMELRSLRSDDTAVYYCARSSGNMVSWKDMWGQGTLVTVSS [SEQ<br>ID NO: 606]        |

Table 84

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-010</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Caatctgccctgactcagcctgccctccgtgtctgggtctcctggacagtcgatcaccatctcctgactggaaccagcagtg<br>acgttggtggttataactctgtctcctggtaccaacaacaccaggcaagccccagactcatgatttatgatgtcagtaac<br>ggcctcaggggtttctaategttctctggtccaagtctggcaacacggcctccctgaccatctctgggtccaggctga<br>ggacgaggctgattattactgcagctcatatacaagcagcagcacccttagtcttcggaactgggaccaaggtcaccgtc<br>ctaggttctagaggtggtggtgtagcggcgccggcggtctgtggtggtggtgatccctcagatggccaggtgcagct<br>ggtgcagctctggggctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctggttacacctttaccag<br>ctatggtatcagctgggtgacagggccctggacaagggcttgagtggatgggatggatcagcgcttacaatggttaaca<br>caaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctgag<br>gagcctgagatctgacgacacggcgtgtattactgtgcgcgctggtgctgttaccatgattgggtcaaggtactctg<br>gtgaccgtctcctca [SEQ ID NO: 607] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| QSALTQPASVSGSPGQSITISCTGTSSDVGGYNSVSWYQQHPGKAPRLMIYDV<br>SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCSSYTSSSTPLVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCKA<br>SGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDT<br>STSTAYMELRSLRSDDTAVYYCARGAVAYHDWGQGTLVTVSS [SEQ ID NO:<br>608]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 85







cctcaggggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcaggggtcgaagccgg  
ggatgaggccgactattactgtcaggtgtgggatagtagtgtgatcattatgtcttcggaactgggaccaaggtcaccgtc  
ctaggttctagaggtgtgtgtgtgtagcggcgggcgggcctctggtggtggtggatccctcgagatggccgaggtgcagct  
ggtggagactgggggagggcttggtagcgcctgggggggtccctgagactctctgtgcagcctctggattcacctttaagcag  
ctatgccatgagctgggtccgccaggctccaggggaaggggctggagtgggtctcagctattagtggtagtgatggtagca  
catactacgcagactccgtgaaggggcggttcaccatctccagagacaattccaagaacacgctgtatctgcaaatgaaca  
gcctgagagacgaggacacggccgtatattactgtgcgcgctctcatgaagctaacctgggttggtgattggtggggtcaag  
gtactctggtgaccgtctctca [SEQ ID NO: 615]

Amino Acid Sequence

SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDS  
RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHYVFGTGTKV  
TVLGSRGGGGSGGGGSGGGGSLEMAEVQLVETGGGLVQPGGSLRLSCAASG  
FTFSSYAMSWVRQAPGKGLEWVSAISGSDGSTYYADSVKGRFTISRDN SKNT  
LYLQMNSLRDEDTAVYYCAR SHEANLVGDWWGQGT LVT VSS [SEQ ID NO:  
616]

Table 89

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-015</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>Cagtctgtggtgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaaca</p> <p>ttggaagtaaaagtgtgcaactggtaccagcagaagccaggccaggccccctgtgctggtcatctattatgatagcgaccggc</p> <p>cctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggctgaagccgg</p> <p>ggatgaggccgactattactgtcaggtgtgggatagtagtagtgatgtggtattcggcggaggggaccaagctgaccgtcct</p> <p>aggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtggatccctcgagatggccgaggtccagctg</p> <p>gtacagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttaccagct</p> <p>acgggtatcagctgggtgcgacaggccccctggacaagggcttgagtggatgggatggatcagcgcttacaatggtaacaca</p> <p>aactatgcacagaagctccaggggcagagtcaccatgaccacagacatccacgagcacagcctacatgggagctgagg</p> <p>agcctgagatctgacgacacggcctgtattactgtgcgcgctgggggtggtttcgggtgctgttgatcattgggggtcaaggt</p> <p>ctctggtgaccgtctcctca [SEQ ID NO: 617]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>QSVVTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDS</p> <p>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDVVF</p> <p>VLGSRGGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSCKASG</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

YTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDTSTS  
TAYMELRSLRSDDTAVYYCARWGGFGAVDHWGQGLTVTVSS [SEQ ID NO:  
618]

Table 90

**ET200-016**DNA Sequence

Tcttctgagctgactcaggaccctgctgtgtctgtggccttgggacagacagtcaagatcacgtgccaaaggagacagcctc  
acagactaccatgcaacctggtaccagcagaagccaggacagggccctgtcgtgtcatctatgctacaaacaaccggcc  
cactgggatccagaccgattctctggttcagttccggaaacacagcttctttgaccatcactggggctcaggcggaagat  
gaggctgactattactgtaattccgggacagcggcgacggacgaagtgttattcggcggaggggaccaagctgaccgtcct  
aggttctagaggtggtggtgtagcggcggcgggctctggtggtggtgatccctcgagatggccgaggtgcagctg  
gtggagactgggggaggcctggtcaagcctggggggcctctgagactctcctgtgcagcctctggattcaccttcagtagc  
tatagcatgaactgggtccgccaggctccagggaaggggctggagtgggtctcatccattagtagtagtagttacatat  
actacgcagactcagtgaagggccgattcacatctccagagacaacgccaagaactcactgtatctgcaaatgaacagc  
ctgagagccgaggacacggccgtgtattactgtgcgcgcggtcagggttacgattactggggcaaggtactctggtgacc  
gtctctca [SEQ ID NO: 619]

Amino Acid Sequence

SSELTQDPAVSVALGQTVKITCQGDSLTDYHATWYQQKPGQAPVAVIYATN  
NRPTGIPDRFSGSSSGNTASLTITGAQAEDEADYYCNSRDSGTDEVLFGGGTK  
LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVETGGGLVKPGGSLRLSCAAS  
GFTFSSYSMNWVRQAPGKGLEWVSSISSSSYIYYADSVKGRFTISRDNKNS  
LYLQMNSLRAEDTAVYYCARGQGQYDYWGQGLTVTVSS [SEQ ID NO: 620]

Table 91

**ET200-017**DNA Sequence

Tcctatgtgctgactcagccaccctcggtgtcagtggtccaggaaagacggccaggattacctgtgggggaaacaaca  
ttggaagtaaaagtgtgactggtaccagcagaagccaggccaggccctgtgctggtcgtctatgatgatagcgaccgg  
ccctcagggatccctgagcgattctctggtccaactctgggaacacggccaccctgagcatcagcagggtcgaagccg  
gggatgaggccgactattactgtcaggtgtgggtagtagtagtgatcatactgtcttcggaactgggaccaaggtcaccgt  
cctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtgatccctcgagatggcccaggtgcag  
ctacagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagt  
gttactactggagctggatccgccagccccagggaaggggctggagtggattggggaaatcaatcatagtggaagcac

caactacaacccgtccctcaagagtcgagtcacatatcagtagacacgtccaagaaccagttctccctgaagctgagctctgtgaccgccgcggacacggccgtgtattactgtgcgcgctactacccgggtatggatatgtggggtaaggtactctgtgaccgtctcctca [SEQ ID NO: 621]

Amino Acid Sequence

SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVVYDDSD  
RPSGIPERFSGSNSGNTATLSISRVEAGDEADYYCQVWDSSSDHTVFGTGTKV  
TVLGSRRGGGSGGGGSGGGGSLEMAQVQLQWAGLLKPSETLSLTCAVYG  
GSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRTISVDTSKNQFSL  
KLSSVTAADTAVYYCARYYPGMDMWGQGTLVTVSS [SEQ ID NO: 622]

Table 92

**ET200-018**

DNA Sequence

Caggctgtgctgactcagccgccctcaacgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctccaacatcgggagaaatggtgtaaactgtaccagcagctcccaggagcggccccaaagtcctcatctataatgataatcagccaccctcaggggtccctgaccgagctcttggtctccagcttggtcctcaggcacccctggccatc gatgggttcggctctgaggatgaggctgattattactgtgcggcatgggatgacagcctgcatggtgtggtattcggcggagggaaccaagctgac cgtcctaggttctagagggtggtggttagcggcggcggcggtctggtggtggtgatccctcagatggcccaggtcc agctggtacagctctggggctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggtttccggatacacccctc aatgaattatccatgcactgggtgcgacaggctcctggaaaagggttgagtggatgggaggtttgatcctgaagatggtg aaacaatctacgcacagaagtccaggggcagagtcacatgaccgaggacacatctacagacacagcctacatggagct gagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcgggtggttacggtgattctggggtaaggtactctg gtgaccgtctcctca [SEQ ID NO: 623]

Amino Acid Sequence

QAVLTQPPSTSGTPGQRVTISCSGSSSNIGRNGVNWYQQLPGAAPKVLINYN  
QRPSGVPDRVSGSQSGSSGTLAIDGLRSEDEADYYCAAWDDSLHGVVFGGGT  
KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK  
VSGYTLNELSMHWVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMTED  
TSTD TAYMELSSLRSED TAVYYCARGGYGDSWGQGTLVTVSS [SEQ ID NO:  
624]

Table 93

**ET200-019**

DNA Sequence

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctctgcacccgcagcagtggc<br/> agcattgccagcaactatgtgcagtgggtaccagcagcggcgggagtgccccaccactgtgatctataggataacca<br/> aagaccctctggggtcctgatcgggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactga<br/> agactgaggacgaggctgactactgtcagtccttatgatagcagcaattcttgggtgttcggcggagggaaccaagctga<br/> ccgtcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtg<br/> cagctggtgcaatctggggctgaggtgaagaggcctgggtcctcgggaaggtctctgcacggcttctggaggcacctt<br/> cagcagcgaatgctatcagctgggtgacagggccctggacaagggttgagtggatgggaggaatcatccctatgtttg<br/> gtacagcaaactacgcacagaagttccagggcagagtcacgattaccgggacgaatccacgagcacagcctacatgga<br/> gctgagcagcctgagatctgaggacacggcctgtattactgtgcgcgcgaaggttactactaccgtctgcttacctgggt<br/> tctgttctgaacgacatcttctgtttacgatgaatggggtaagggtactctggtgaccgtctcctca [SEQ ID NO:<br/> 625]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br/> QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYQCQSYDSSNSWVFGGGT<br/> KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKRPGSSVKVSCA<br/> SGGTFSSDAISWVRQAPGQGLEWMGGIIPMFGTANYAQKFQGRVTITADEST<br/> STAYMELSSLRSEDNAVYYCAREGYYYPSAYLGSVLNDISSVYDEWGQGT<br/> LVSS [SEQ ID NO: 626]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 94

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-020</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>Cagtctgtcgtgacgcagcggccctcagtgtctgcggccccaggacagaaggtcaccatctcctgctctggaagcacctc<br/> caacattgaaataatgatgtatcctgggtaccagcagctcccaggaacagccccaaactcctcatttatgacaataataagc<br/> gaccctcagggattcctgaccgattctctgggtccaagtctggcagctcagccaccctgggcatcaccggactccagactg<br/> gggacgaggccgattattactgcggaacatgggatagcagcgtgagtgttcttgggtcttcggcagagggaaccaagctg<br/> accgtcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggt<br/> gcagctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctt<br/> taccagctatggtatcagctgggtgcgacagggccctggacaagggttgagtggatgggatggatcagcgcttacaatg<br/> gtaacacaaactatccacagaagctccagggcagagtcaccatgaccacagaccatccacgagcacagcctacatgga<br/> gctgaggagcctgagatctgacgacacggcctgtattactgtgcgcgctctatgacttcttcgattactggggtaaggta<br/> ctctggtgaccgtctcctca [SEQ ID NO: 627]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

QSVVTQPPSVSAAPGQKVTISCSGSTSNIGNNDVSWYQQLPGTAPKLLIYDNN  
KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSSVSASWVFGRGT  
KLTVLGSRGGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK  
ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYPQKLQGRVTMTTDP  
STSTAYMELRSLRSDDTAVYYCARSMTSFDYWGQGLTVTVSS [SEQ ID NO:  
628]

Table 95

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-021</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Cagtctgtgttgacgcagccgccctcagtgtctgcggccccaggacagaagggtcaccatctcctgctctggaagcaactc<br/> caacattgggaataattatgtatcctgggtatcagcaactcccaggacagccccaaaactcctcatttatgacaataataagc<br/> gacctcagggattcctgaccgattctctggctccagggtctggcacgtcagccacctgggcatcaccggactccagactg<br/> gggacgagggccgattattactgcggaacatggaataccactgtgactcctggctatgtcttcggaactgggaccaagggtca<br/> ccgtcttagggtctagaggtgggtgggtagcggcggcggcggtctgggtgggtggatccctcgagatggccgaagtgc<br/> cagctgggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaagggtctcctgcaaggcttctggttacaccttta<br/> ccagctatggtatcagctgggtgcgacagggccctggacaagggccttgagtggatgggatggatcagcgcttacaatggt<br/> aacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggag<br/> ctgaggagcctgagatctgacgacaccgccatgtattactgtgcgcgctctgtttacgacctggatacttgggggtcaaggta<br/> ctctggtgaccgtctcctca [SEQ ID NO: 629]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>QSVLTQPPSVSAAPGQKVTISCSGSNSNIGNNNYVSWYQQLPGTAPKLLIYDNN<br/> KRPSGIPDRFSGSRSGTSATLGITGLQTGDEADYYCGTWNTTVTPGYVFGTGT<br/> KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKKPGASVKVSK<br/> ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTD<br/> TSTSTAYMELRSLRSDDTAMYYCARSVYDLDTWGQGTLVTVSS [SEQ ID<br/> NO: 630]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 96

|                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-022</b>                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                        |
| cagtctgtcgtgacgcagccgccctcagtgtctgcggccccaggacagaagggtaccatctcctgctctggaagcagctc<br>caacattgggaataattatgtatcctgggtaccagcagctcccaggaacagccccaaactcctcatttatgacaataataagc<br>gacctcagggattcctgaccgattctctggtccaagtctggcacgtcagccaccctgggcatcaccggactccagactg |

gggacgagggccgattattactgcggaacatgggatatgagcctggggggccccttatgtcttcggaactgggaccaaggtc  
accgtcctaggttctagaggtggtggtgtagcggcgggcgggcctctggtggtggtggatccctcgagatggccgaggt  
gcagctggtgcagctcttggggaggctcggaaacagcctggcaggtccctgagactctctgtgcagcctctggattcaccttt  
gatgattatgccatgcactgggtccggcaagctccaggggaaggcctggagtgggtctcaggtattagtggaaatagcgggt  
agcataggctatcgggactctgtgaagggccgattaccatctccagagacaacgccaaagaattccctgtatctgcaaagt  
aacagtctgagagctgaggacaccgcatgtattactgtgcgcgctaccgtcaggttggtctgcttacgattcttgggggtca  
aggtactctggtgaccgtctctca [SEQ ID NO: 631]

Amino Acid Sequence

QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN  
KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSSLGAPYVFGTGT  
KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSWGGSEQPGRSLRLSCAA  
SGFTFDDYAMHWVRQAPGKGLEWVSGISWNSGSGIGYADSVKGRFTISRDN  
KNSLYLQMNSLRAEDTAMYYCARYRQVGSAYDSWGQGLTVTVSS [SEQ ID  
NO: 632]

Table 97

**ET200-023**

DNA Sequence

ctgcctgtgctgactcagccaccctcgggtgtagtggtggccaggaagacggccaggattacctgtgggggaaacaacat  
tggaagtaaaagtgtgcactggtatcagcagaagccaggccagggcccctgtgctggtcgtctatgctgatagcgaccggc  
cctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg  
ggatgagggccgactattactgtcaggtgtgggatagtagtagttatcataattatgtcttcggaactgggaccaaggtcaccg  
tcttaggttctagaggtggtggtgtagcggcgggcgggcctctggtggtggtggatccctcgagatggccgaggtgcag  
ctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacca  
gctatggtatcagctgggtgcgacagggcccctggacaaggccttgagtggatgggatggatcagcgcttacaatggtaac  
acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga  
gcagcctgagatctgaggacaccgcatgtattactgtgcgcgctactgggggttcggtgtttctgatcgttgggggtcaaggt  
actctggtgaccgtctctca [SEQ ID NO: 633]

Amino Acid Sequence

LPVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVVYADSD  
RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSYHNYVFGTGTK  
VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSKAS  
GYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDT



agaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagctgagcagcctgagatc  
tgaggacaccgccatgtattactgtgcgcgctactgggggttacgactcttacgatgaatgggggtcaaggctctgggtacc  
gtctctca [SEQ ID NO: 637]

Amino Acid Sequence

DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSL  
QSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQSYSTPFTFGPGTKVDIKRS  
RGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSKASGGTFSS  
YAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTSTAYMELS  
SLRSEDAMYYCARYWGYDSYDEWGQGLTVTVSS [SEQ ID NO: 638]

Table 100

**ET200-026**

DNA Sequence

aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcaccggcagcagtggc  
agcattgccagcaactatgtgcagtggtaccagcagcggcgggagtgccccaccactgtgatctataggataacca  
aagaccctctggggtcctgatcggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactga  
agactgaggacgaggctgactactactgtcagcttatgatagcagcaattgggtgttcggcggagggaaccaagctgacc  
gtcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtcca  
gctggtgcagctctggggctgaggtgaagaagcctgggtcctcgggtgaaggctcctgcaaggcttctggaggcaccttca  
gcagctatgctatcagctgggtgcgacaggccctggacaagggttgagtggatgggagggatcatccctatctttgta  
cagcaaactacgcacagaagtccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagct  
gagcagcctgagatctgaggacacggcgtgtattactgtgcgcgaacaaccattactacaacgattactgggggtcaagg  
tactctggtgaccgtctctca [SEQ ID NO: 639]

Amino Acid Sequence

NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN  
QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNWVFGGGTK  
LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSKAS  
GGTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTST  
AYMELSSLRSEDAMYYCARNNHYYNDYWGQGLTVTVSS [SEQ ID NO: 640]

Table 101

**ET200-027**

DNA Sequence

cagtctgtgtgacgcagccgccctcagtgtctggggcccccagggggtcaccatcccctgcactgggagcagct



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ccaacatcggggcaggttatgatgtacactggtaccagcagcttcaggagacagcccccactcctcatctatggttaaca<br>acaatcggccctcaggggtccctgaccgcttctctggtccaggtctggtcctcagcctccctggccatcactgggtcca<br>ggctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtgatgtggtattcggcggagggaaggt<br>caccgtcctaggttctagaggtggtggtgtagcggcggcggcggcctctggtggtggtgatccctcagatggccgag<br>gtccagctggtgcagtctgggctgaggtgaagaagcctggggctacagtgaaaatcctgcaaggtttctggatacacc<br>ttcaccgactactacatgcactgggtgcaacaggccctggaaaagggtgagtggtgggactgttgatcctgaagat<br>ggtgaacaatatagcagagaagttccagggcagagtcaccataaccgggacacgtctacagacacagcctacatgg<br>agctgagcagcctgagatctgaggacacggcgtgtattactgtgcgcgctactggtcttactcttcgactacctgtacatg<br>ccggaaggtaacgattggtggggtaaggtactctggtgaccgtctcctca [SEQ ID NO: 641] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| QSVLTQPPSVSGAPGQGVTIPCTGSSSNIGAGYDVHWYQQLPGTAPKLLIYGN<br>NNRPSGVPDRFSGSRSGSSASLAITGLQAEDEADYYCQSYDSSLSDVVFGGGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGATVKISCKV<br>SGYTFTDYMHVWVQQAPGKGLEWMGLVDPEDGETIYAEKFQGRVTITADTS<br>TDTAYMELSSLRSEDVAVYYCARYWSYSFDYLYMPEGNDWWGQGLVTVS<br>S [SEQ ID NO: 642]                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Table 102

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-028</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| cagtctgttgactcagccacccgcagcgtctgggacccccggacagagagtcaccatctcttgttctggggcgctctcc<br>aacatcgggagtggtgctctaaattgtaccagcaactcccaggaacggccccaaactcctcatctatagttacaatcagc<br>ggccctcaggggtctctgaccgattctctggtccaggtctgccacctcagcctccctggccatcagtggggtccagtctga<br>ggatgaggctgattattactgtgcaacctgggatgatagtgtgaatggttgggtgttcggcggagggaagctgaccgt<br>cctaggttctagaggtggtggtgtagcggcggcggcggcctctggtggtggtgatccctcagatggcccaggtccag<br>ctggtacagtctggagctgaggtgaagaagcctggggattcagtgaaggtctcctgcaagccttctggttacaattttctaa<br>ctatggtatcaactgggtgcgacaggccctggacaagggtgagtggtggatggatgtagcacttacaccggtaacac<br>aaactatgcacagaagctgcagggcagagtcacctcaccacagacacatccacgagcagacgcctacatggagatgagg<br>agcctgagatctgacgacacggcgtgtattactgtgcgcgcgacctgtactactacgaaggtgttgattactggggtcaag<br>gtactctggtgaccgtctcctca [SEQ ID NO: 643] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| QSVLTQPPAASGTPGQRVTISCSGGVSNIGSGALNWYQQLPGTAPKLLIYSYN<br>QRPSGVSDRFSGSRSATASLAISGLQSEDEADYYCATWDDSVNGWVVFGGGT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGDSVKVSCKP  
SGYNFLNYGINWVRQAPGQGLEWMGWISTYTGNTNYAQKLQGRVTFTTDS  
TSTAYMEMRSLRSDDTAVYYCARDLYYYEGVDYWGQGTLVTVSS [SEQ ID  
NO: 644]

Table 103

**ET200-029**DNA Sequence

caggctgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccagggttacctgtgggggaacaaca  
ttggaagtgaaagtgtgactggtaccagcagaagccaggccaggccctgtgttggtcatctattatgataccgaccggc  
cctcagggatccctgagcgattctctggctcccactctgggaccacggccaccctgaccatcagcagggtcgaagccgg  
ggatgaggccgactattactgtcaggtgtgggtagtagtagggatcatgtggtattcggcggagggaaccaagctgaccgt  
cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggtatccctcgagatggcccagggtcgag  
ctggtgcagtctgggggaggcgtggtccagcctgggagggtccctgagactctcctgtgcggcctctggattcaccttcagt  
agctatgctatgcactgggtccgccagggtccaggcaaggggactggagtgggtggcagttatatcatatgatggaagcaat  
aaatactacgcagactccgtgaagggcctattaccatctccagagacaattccaagaacacgctgtatctgcaaatgaaca  
gcctgagagctgaggacacggccgtgtattactgtgcgcgctcttacttcacttctggtttctacgattactggggtaaggt  
ctctggtgaccgtctcctca [SEQ ID NO: 645]

Amino Acid Sequence

QAVLTQPPSVSVAPGKTARVTCGNNIGSESVHWYQQKPGQAPVLVIYYDTD  
RPSGIPERFSGSHSGTTATLTISRVEAGDEADYYCQVWDSSRDHVVFGGGTKL  
TVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGGGVVQPGRSLRLSCAASG  
FTFSSYAMHWVRQAPGKGLEWVAVISYDGSNKYYADSVKGLFTISRDN SKN  
TLYLQMNSLRAEDTAVYYCARSYFTSGFYDYWGQGTLVTVSS [SEQ ID NO:  
646]

Table 104

**ET200-030**DNA Sequence

cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctcctgcactgggagcagttc  
caacatcggggcaggttatgatgtaaattggtatcagcagtttcagggaacagccccaaactcctcatctatggtaacagc  
aatcggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctccag  
gctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtggctcttatgtcttcggaactgggaccaaggt  
caccgtcctaggttctagaggtggtggtgtagcggcggcggcggcggctctggtggtggtggtatccctcgagatggcccaga

|                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>tcgagctggtgcagtctggggctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggctccggatacacc<br/>ctcactgaattatccatgcactgggtgcgacaggctcctggaaaagggcttgagtggatgggaggtttgatcctgaagatg<br/>gtgaaacaatctacgcacagaagttccagggcagagtcacatgaccgaggacacatctacagacacagcctacatgga<br/>gctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcacatgtcttctatgtactacgattgggggtcaaggta<br/>ctctggtgaccgtctctca [SEQ ID NO: 647]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                          |
| <p>QSVVTQPPSVSGAPGQRTVISCTGSSSNIGAGYDVNWYQQFPGTAPKLLIYGN<br/>SNRPSGVPDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSLSGSYVFGTG<br/>TKVTVLGSRRGGGSGGGGSGGGGSLEMAQMQLVQSGAEVKKPGASVKVSC<br/>KASGYTLTELSMHWVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMTE<br/>DTSTDTAYMELSSLRSEDTAVYYCARMSSMYDWDWGQGLVTVSS [SEQ ID<br/>NO: 648]</p>                                                                                          |

Table 105

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-031</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>tcctatgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacatt<br/>ggaagtaaaagtgtgcactggtaccagcagaagccaggccaggccccctgtgctggtcatctattatgatagcgaccggcc<br/>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcaggggtcgaagccggg<br/>gatgaggccgactattactgtcaggtgtgggatagtagtagtgattatgtcttcggaactgggaccaaggtcaccgtcctag<br/>gttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggtgatccctcgagatggccgaggtgcagctggt<br/>ggagactgggggaggcttggtcaagcctggagggtccctgagactctcctgtgcagcctctggattcaccgtcagtgacta<br/>ctacatgagctggatccgccaggctccagggaagggcctggagtggatttcatacattagtggtagtggttaatagcatatac<br/>tacgcagactctgtgaagggccgattcaccatctccagggacaacgccaaagaactcactggatctgcaaatgaccagcct<br/>gagagccgaggacacggccgtatattactgtgcgcgctctactaaattcgattactgggggtcaagggtactctggtgaccgtc<br/>tcctca [SEQ ID NO: 649]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDS<br/>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDYVFGTGTKVT<br/>VLGSRRGGGSGGGGSGGGGSLEMAEVQLVETGGGLVKPGGSLRLSCAASGF<br/>TVSDYYMSWIRQAPGKGLEWISYISGSGNSIYYADSVKGRFTISRDNKNSLD<br/>LQMTSLRAEDTAVYYCARSTKFDYWGGQGLVTVSS [SEQ ID NO: 650]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 106

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-032</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ctgcctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacgtcggaagtactgtaaactgggtaccggcaactccaggaacggccccacactcctcatctataataataatcagc<br>ggccctcaggggtccctgaccgattctctgactccaagtctggcacctcggcctccctgaccattagtgggtccagcctga<br>ggatgaggctgattattattgtgcagcatgggatgacaggctgggtggttatgtcttcggaactgggaccaaggtcaccgtc<br>ctaggttctagagggtgggtgggtgtagcggcggcggcggctctgggtgggtggatccctcagatggccgaggtgcagct<br>gggtgcagtctggagcagagggtgaaaaagccgggggagtgctctgaagatctcctgtaagggttctggatacagctttacca<br>ctactggatcggtgggtgcgccagatccccgggaaaggcctggagtggatggggatcatctatcctggtgactctgatac<br>cagatacagcccgctctccaaggccaggtcaccatctcagccgacaagtcctcagcaccgcctacctacagtggagca<br>gcctgaaggcctcggacaccgcatgtattactgtgcgcgtctactggttcttctcatatgtctgatgaatggggtaaggta<br>ctctggtgaccgtctctca [SEQ ID NO: 651] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| LPVLTQPPSASGTPGQRVTISCSGSSSNVGSYTVNWyRQLPGTAPTLIIYNNN<br>QRPSGVPDRFSDSKSGTSASLTISGLQPEDEADYYCAAWDDRLLGGYVFGTGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGESLKISCKG<br>SGYSFTNYWIGWVRQMPGKGLEWMGIIPGDS DTRYSPSFQGGVTVISADKSI<br>TAYLQWSSLKASDTAMYYCARSTGSSHMSDEWGQGLTVTVSS [SEQ ID NO:<br>652]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 107

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-033</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctctgcaccggcagcagtggc<br>agcattgccagcaactatgtgcagtgtgtaccagcagcggccgggcagtggccccaccactgtgatctataggataacca<br>aagaccctctggggtcctgatcgggttctctggctccatcagacgtcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactactgtcagtcttatgatagcagcaatcattgggtgttcggcggagggaaccaagctga<br>ccgtcctaggttctagagggtgggtggtagcggcggcggcggctctgggtgggtggatccctcagatggcccaagtg<br>cagctacagcagtggggcgaggactgtgaagccttcggagaccctgtccctcactgcgctgtctatgggtgggtccttc<br>agtgggtactactggagctggatccgccagccccagggaaggggctggagtggattggggagatcactcatagtggaa<br>ggccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctga<br>gctctgtgaccgccgcggacacggccgtgtattactgtgcgcgtcttctatcatgtctgattactggggtaagggtactctg<br>gtgaccgtctctca [SEQ ID NO: 653] |

Amino Acid Sequence

NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN  
 QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNHWVFGGGT  
 KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAV  
 YGGSFSGYYWSWIRQPPGKGLEWIGEITHSGRSNYPNPSLKSRVTISVDTSKNQ  
 FSLKLSSVTAADTAVYYCARSSIMSDYWQGTLVTVSS [SEQ ID NO: 654]

Table 108

**ET200-034**DNA Sequence

cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcacctc  
 caacatcggggcaggttatgatgtacactggtaccagcagctccagggaacagcccccactcctcatcaacaataacag  
 gaatcggccctcaggggtccctgaccgattctctggctccaagtctggcacgtcagccaccctgggcatcaccggactcc  
 agactggggacgagggccgattattactgcggaacatgggatggcagcctgactggtgcagtgttcggcggaggggaccaa  
 gctgaccgtcctagggtctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccg  
 aggtccagctggtgcagtctggggctgaggtgaagaagcctgggtcctcgggtgaaggctctcatgaaggcttctggaggc  
 accttcagcagctatgctatcagctgggtgcgacaggccctggacaagggttgatggatgggagggatcatccctatc  
 ttgggtacagcaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacat  
 ggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcgcgggtctgctctggaccattacgatcgttg  
 gggtaaggtactctggtgaccgtctcctca [SEQ ID NO: 655]

Amino Acid Sequence

QSVLTQPPSVSGAPGQRVTISCTGSTSNIGAGYDVHWYQQLPGTAPKLLINNN  
 RNRPSGVPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDGSLTGA VFGGG  
 TKLTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSK  
 ASGGTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADEST  
 STAYMELSSLRSEDTAVYYCARGSALDHYDRWGQGTLLVTVSS [SEQ ID NO:  
 656]

Table 109

**ET200-035**DNA Sequence

aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctctgcacccgcagcagtggca  
 gcattgccagcaactatgtgcagtgtaccagcagcggccgggcagtgccccaccactgtgatctatgaggataaccaa  
 agaccctctgggggtccctgatcgggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactgaa

gactgaggacgaggctgactactactgtcagtccttatgatagcaccaattgggtgttcggcggaggggaccaagctgaccgt  
 cctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtgcag  
 ctggtgcagctctggggctgaggtgaagaagcctgggtcctcgggtgaaggtctcctgcaaggcttctggaggcaccttcag  
 cagctatgctatcagctgggtgcgacaggcccctggacaagggccttgagtggatgggagggatccctatctttgttac  
 agcaaaactacgcacagaagttccaggggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagctg  
 agcagcctgagatctgaggacactgccgtgtattactgtgcgcgctacaactactacttcaacgattactgggtcaaggta  
 ctctggtgaccgtctctca [SEQ ID NO: 657]

#### Amino Acid Sequence

NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN  
 QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTNWWFGGGTK  
 LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSKAS  
 GGTFSSYAISWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTST  
 AYMELSSLRSEDNAVYYCARYNYYFNDYWGQGLVTVSS [SEQ ID NO: 658]

Table 110

#### **ET200-037**

#### DNA Sequence

tcctatgtctgactcagccaccctcagtgctcagtggtggccccaggaaagacggccaggattacctgtgggggaacaacatt  
 ggaagtaaaagtgtgcactggtaccagcagaagccaggccaggcccctgtgctggtcatctattatgatagcgaccggcc  
 ctgagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggtcgaagccggg  
 gatgaggccgactattactgtcaggtgtgggatagtagtagtgatcatccttatgtcttcggaactgggaccaaggtcaccgt  
 cctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccagatgcag  
 ctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaaggtctcctgcaaggcttctggttacacctttacca  
 gctatggtatcagctgggtgcgacaggcccctggacaagggccttgagtggatgggatgagcgcttacaatggtaac  
 aaaaactatgcacagaagctccaggggcagagtcaccatgaccacagacatccacgagcacagcctacatggagctga  
 ggagcctgagatctgacgacactgccgtgtattactgtgcgcgctctatgttcggtgctcatgattcttggggtaagggtactc  
 tggtagccgtctctca [SEQ ID NO: 659]

#### Amino Acid Sequence

SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDS  
 RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK  
 VTVLGSRRGGGSGGGGSGGGGSLEMAQMQLVQSGAEVKKPGASVKVSKA  
 SGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDT  
 STSTAYMELRSLRSDDTAVYYCARSMFGAHDWSWGQGLVTVSS [SEQ ID

NO: 660]

Table 111

**ET200-038**DNA Sequence

cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcagctc  
 caacatcggggcagggtttgatgtacactgtaccagctacttccagggaacagccccaaactcctcatctatgctaacagc  
 aatcggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctcctgg  
 ctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtgggtgtggtattcggcggagggaaccaagctga  
 ccgtcctaggttctagaggtgggtgggtgtagcggcggcggcggctctgggtgggtggatccctcgagatggcccagggtg  
 cagctggtgcaatctggggctgaggtgaagaagcctgggtcctcgggtgaaggtctcctgcaaggcttctggaggcaccttc  
 agcagctatgctatcagctgggtgcgacaggccccctggacaaggccttgagtggatgggagggatcatccctatctttggt  
 acagcaaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggag  
 ctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgggtgcttcttcgaccgtcatgataactggggctca  
 aggtactctggtgaccgtctcctca [SEQ ID NO: 661]

Amino Acid Sequence

QSVLTQPPSVSGAPGQRVTISCTGSSSNIGAGFDVHWYQLLPGTAPKLLIYANS  
 NRPSGVPDRFSGSKSGTSASLAITGLLAEDEADYYCQSYDSSLGCVVFGGGTK  
 LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSCKAS  
 GGTFFSSYAISWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTST  
 AYMELSSLRSEDNAVYYCARGASFDNRHDNWGQGTLVTVSS [SEQ ID NO:  
 662]

Table 112

**ET200-039**DNA Sequence

aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctctgcacccgcagcagtggca  
 gcattgccagcaactatgtgcagtgggtaccagcagcggccgggcagttccccaccactgtgatctatgaggataacaaaa  
 gaccctctgggggtccctgatcgggtctctgggtccatcgacagctcctccaactctgcctccctcaccatctctggactgaag  
 actgaggacgaggctgactactactgtcagtttatgatagcagcaattgggtgttcggcggagggaaccaagctgaccgtc  
 ctaggttctagaggtgggtgggtgtagcggcggcggcggctctgggtgggtggatccctcgagatggccgaggtccagct  
 ggtgcagctctggggctgaggtgaagaagcctgggtcctcgggtgaaggtctcctgcaaggcttctggaggcaccttcagca  
 gctatgctatcagctgggtgcgacaggccccctggacaaggccttgagtggatgggagggatcatccctatctttggtacag  
 caaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagctgag

|                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cagcctgagatctgaggacacggccgtgtattactgtgcgcgtctaactactactacaacgattactgggggtcaaggtact<br>ctggtgaccgtctcctca [SEQ ID NO: 663]                                                                                                                                                               |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                              |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSSPTTVIYEDNQ<br>RPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNWVFGGGTKLT<br>VLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSKASGG<br>TFSSYAIWVRQAPGQGLEWMGGIIPFGTANYAQKFQGRVTITADESTSTAY<br>MELSSLRSEDNAVYYCARSNYYYNDYWGGQGLTVTVSS [SEQ ID NO: 664] |

Table 113

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-040</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcagctc<br>caacatcggggcaggttatgatgtacactggtaccagcagcttcagggaacagccccaaactcctcatctatggtaacag<br>caatcggccctcaggggtcctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggtcca<br>ggctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtgggtatgtcttcggaactgggaccaaggtc<br>accgtcctaggttctagaggtggtggtgtagcggcgggcgggctctggtggtggtggtatccctcagatggcccaggt<br>gcagctggtgcagctctggggctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggtttccggatacacc<br>tactgaattatccatgcactgggtgcgacaggctcctggaaaagggttgagtggatgggaggtttgacatcgaagatgg<br>tgaacaatctacgcacagaagttccagggcagagtcaccatgaccgaggacacatctacagacacagcctacatggag<br>ctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgtactctggtgtttactacgattgggggtcaaggtac<br>tctggtgaccgtctcctca [SEQ ID NO: 665] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QSVLTQPPSVSGAPGQRVTISCTGSSSNIGAGYDVHWYQQLPGTAPKLLIYGN<br>SNRPSGVPDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSLSGYVFGTGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK<br>VSGYTLTELSMHWVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMTED<br>TSTDATYMESSLRSEDNAVYYCARYSGVYYDWGGQGLTVTVSS [SEQ ID<br>NO: 666]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 114

|                                                                                     |
|-------------------------------------------------------------------------------------|
| <b>ET200-041</b>                                                                    |
| <u>DNA Sequence</u>                                                                 |
| aattttatgctgactcagccccactctgtgtcgggggtctccggggaagacggtaaccatctcctgcaccggcagcagtggtc |



agcattgccgacaactttgtgcagtgggtaccagcagcgccggggcggtgtccccaccactgtgatctttaatgatgacgaa  
 agacctctggcgccctgatcgggtctctggctccatcgacacctctccaattctgcctccctcaccatctctggactgaag  
 actgaggacgagggctgactactactgtcagtcttatgataataataatcgaggggtgttcggcgaggaggaccaagctgacc  
 gtcctaggttctagaggtgggtggtagcggcggcgggcggtctgtgtgtggatccctcgagatggcccagggtcca  
 gctggtgcagtctggggctgaggtgaagaagcctgggtcctcggtgaaaggctcctgcaaggcttctggaggcaccttca  
 gcagctatgctatcagctgggtgcgacaggccctggacaagggtgagtgatgggatggatgaaccctaacagtgggt  
 aacacaggctatgcacagaagttccagggcagagtcaccatgaccaggaacacctccataagcacagcctacatggagc  
 tgagcaacctgagatctgaggacacggccgtgtattactgtgcgcgctactactcttacgggttacgattgggggtcaaggtact  
 ctggtgaccgtctcctca [SEQ ID NO: 667]

#### Amino Acid Sequence

NFMLTQPHSVSGSPGKTVTISCTGSSGSIADNFVQWYQQRPGGVPTTVIFNDD  
 ERPSGVPDFRSGSIDTSSNSASLTISGLKTEDEADYYCQSYDNNNRGVFGGGT  
 KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSCKA  
 SGGTFSSYAISWVRQAPGQGLEWMGNPNPNSGNTGYAQKFQGRVTMTRNT  
 SISTAYMELSNLRSEDTAVYYCARYYSYGYDWGQGTLLTVSS [SEQ ID NO:  
 668]

Table 115

#### **ET200-042**

#### DNA Sequence

cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagacggtcaccatctcctgcactgggggagct  
 ccaacatcgggacaggtattttgtaaattgtaccagcaggtccaggaaaagccccaaactcctcatcctgggtaacaa  
 taatggccctcgggggtccctgaccgactctccggctccacgtccggcacctcagcctccctggccatcactggggtcca  
 ggctgaggatgaggggtacttattactgccagtcctatgacagcagcctgagtggttatgtcttcggaactgggaccaaggtc  
 accgtcctaggttctagaggtgggtggtagcggcggcgggcggtctgtgtgtggatccctcgagatggcccagggt  
 acagctgcagcagtcaggtccaggactgggtgaagccctcgagaccctctcactcacctgtggcatctccggggacagtg  
 tctctaccaacagtgttgcttgccactggatcaggcagtcctccatcgagaggccttgagtggtgggaaggacatactaca  
 ggtccaagtgggtctaatgactatggagtatctgtgaaaagtcgaatcacatcatccagacacatccaagaaccagttctcc  
 ctgcagctgaactctgtgactcccaggacacggctgtgtattactgtgcgcgctcttcttcttggtaccagatcttcgattact  
 ggggtcaaggtactctggtgaccgtctcctca [SEQ ID NO: 669]

#### Amino Acid Sequence

QSVVTQPPSVSGAPGQTVTISCTGGSSNIGTGYFVNWYQQVPGKAPKLLILGN  
 NNRPSGVPDRLSGSTSGTSASLAITGLQAEDEGTYYCQSYDSSLSGYVFGTGT

KVTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQSGPGLVKPSQTLSTLCGIS  
GDSVSTNSVAWHWIRQSPSRGLEWLGRITYYRSKWSNDYGVSVKSRITIIPDTS  
KNQFSLQLNSVTPEDTAVYYCARSSSWYQIFDYWGQGTLVTVSS [SEQ ID  
NO: 670]

Table 116

**ET200-043**DNA Sequence

aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctctgcaccggcagcagcgac  
agcatagccaacaactatgttcagtggtaccagcagcgccccgggcagtgccccaccaatgtgatctacgaagatgtcca  
aagaccctctgggggtccctgatcgggttctctgggtccatcgacagctcctccaactctgcctccctcaccatctctggactga  
agactgaggacgaggctgtctactattgtcagttatcatagcgacaatcgttgggtgttcggcggcgggaccaagctgac  
cgtcttaggttctagagggtggtggtgtagcggcgggcgggcggtctggtggtggtgatccctcgagatggcccaggtgc  
agctggtggagctctgggggaggcttggtacagcctgggggggtccctgagactctctgtgcagcctctggattcacctttag  
cagctatgcatgagctgggtccgccaggctccagggaaggggctggagtggtgtcagctattagtggtagtggtggtga  
gcacatactacgcagactccgtgaaggggccgggtccaccatctccagagacaattccaagaacacgctgtatctgcaaatga  
acagcctgagagccgaggacacggccgtatattactgtgcgcgctctggtgcttactgggactactctgtttacgatgaatg  
gggtcaagggtactctggtgaccgtctctca [SEQ ID NO: 671]

Amino Acid Sequence

NFMLTQPHSVSESPGKTVTISCTGSSDSIANNYVQWYQQRPGSAPTNVIYEDV  
QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEAVYYCQSYHSDNRWVFGGGT  
KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVESGGGLVQPGGSLRLSCAA  
SGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNK  
NTLYLQMNSLRAEDTAVYYCARSGAYWDYSVYDEWGQGTLVTVSS [SEQ  
ID NO: 672]

Table 117

**ET200-044**DNA Sequence

cagtctgtgtgactcagccaccctcagtgtccgtgtccccaggacagacagccaccatcgctgttctggacataaattgg  
gggataaatatgcttcttggtatcagcagaagtcgggccagtcacctgtgttgatcatctatcaggataataagcggccctca  
gggattcctgagcgattctctggctccaactctgggaacacagccactctgaccatcagcgggacccaggtctggatgag  
gctgactattattgtcaggcgtgggacagtagtacttatgtggcattcggcggaggggaccaagctgaccgtcctaggttcta  
gaggtggtggtgtagcggcgggcgggcggtctggtggtggtgatccctcgagatggcccagggtgcagctgcaggagt



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| cagtctgtcgtgacgcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcgggaagtaattatgtatactgttaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccgggtccg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgagtgggtatgtcttcggaactgggaccaagctgaccgt<br>cctaggttctagagggtgggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggcccaggtgcag<br>ctacagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagtg<br>gttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaatcaatcatagtgaagcac<br>caactacaaccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgagctct<br>gtgaccgccgcggacacggcctgtattactgtgcgcgcctgtacgaaggtggttaccatggttgggggtcttggctgtctt<br>ctgattcttggggtaaggtactctggtgaccgtctcctca [SEQ ID NO: 677] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| QSVVTQPPSASGTPGQRVTISCSGSSSNIGSNYVYWYQQLPGTAPKLLIYSNN<br>QRPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAAWDDSLSGYVFGTGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAV<br>YGGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRVTISVDTSKNQ<br>FSLKLSSVTAADTAVYYCARLYEGGYHGWGSWLSSDSWGQGLTVTVSS<br>[SEQ ID NO: 678]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Table 120

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-078</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| cagtctgtgttgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcgggaagtaatactgtaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatgggtattgggtgttcggcggagggaaccaagctga<br>ccgtcctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggcccaggtg<br>cagctacagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttc<br>agtgggtactactggagctggatccgccagccccaggggaaggggctggagtggattggggaatcaatcatagtggaa<br>gcaccaactacaaccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctga<br>gctctgtgaccgccgcggacacggctgtgtattactgtgcgcgcgaaggggcatttgatgcttttgatatctggggccaagg<br>gacaatggtcaccgtctcttca [SEQ ID NO: 679] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ  
 RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYWVFGGGT  
 KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAY  
 YGGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRVTISVDTSKNQ  
 FSLKLSSVTAADTAVYYCAREGAFDAFDIWGQGTMTVTVSS [SEQ ID NO: 680]

Table 121

**ET200-079**DNA Sequence

tcctatgagctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc  
 aacatcggaagtaattatgtatactgtaccagcagctcccaggaacggcccccactcttcatctataggaataatcagc  
 ggccctcaggggtccctgaccgattctctggctccaagtctggcaccctcagcctccctggccatcagtgggctccgggtccg  
 aggatgaggctgattattactgtgcagcatgggatgacagcctgagtggttatctcttcggaactgggaccaaggtcaccgt  
 cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcagatggccgaggtgcag  
 ctggtggagtctgggggaggcttggtacagcctggcaggtccctgagactctctgtgcagcctctggattcacctttgatg  
 attatgccatgcactgggtccggcaagctccaggaaggcctggagtgggtctcaggtattagtggaatagtggtagca  
 taggctatgcggactctgtgaagggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaaca  
 gtctgagagctgaggacacggccttgattactgtgcaaatggcgactccaactactactacggatatggacgtctggggcca  
 agggaccacggtcaccgtctcctca [SEQ ID NO: 681]

Amino Acid Sequence

SYELTQPPSASGTPGQRVTISCSGSSSNIGSNYVYWYQQLPGTAPKLFIYRNNQ  
 RPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAAWDDSLSGYLFGTGTKV  
 TVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGRSLRLSCAASG  
 FTFDDYAMHWVRQAPGKGLEWVSGISWNSGSIYADSVKGRFTISRDNANK  
 SLYLQMNSLRAEDTALYYCANGDSNYYYGMDVWGQGTITVTVSS [SEQ ID  
 NO: 682]

Table 122

**ET200-081**DNA Sequence

cagtctgccctgactcagcctgcctccgtgtccgggtctctggacagtcgatcaccatctctgactggaaccagcagtg  
 acattggtggttataactatgtctcctggtaccaacaacacccaggcaagcccccaactcatgatttatgatgcagtaac  
 ggccctcaggggtttctaactgcttctctggctccaagtctggcaacacggcctccctgaccatctctgggtccaggctga  
 ggacgaggctgattattactgcatctcatatacacgcacctggaaccctatgtcttcgggagtgaggaccaaggtcaccgtc

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ctaggttctagaggtggtggtgtagcggcgggcgggcgtctggtggtggtgatccctcgagatggccgaggtgcagct<br>ggtgcagtctgggggaggcggtgtagcctggggggtccctgagactctctgtgcagcctctggattcacctttgatgat<br>tatgcatgcactgggtccgtcaagctccagggaagggtctggagtgggtctctcttattagtggggatggtgtagcacat<br>actatgcagactctgtgaagggccgattcaccatctccagagacaacagcaaaaactccctgtatctgcaaatgaacagct<br>gagaactgaggacaccgccttgattactgtgaaaagatcgggcagcagctggctactactactacggtatggacgtctg<br>gggccaagggaccacggtcaccgtctcctca [SEQ ID NO: 683] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| QSALTQPASVSGSPGQSITISCTGTSSDIGGYNVSWYQQHPGKAPKLMIYDV<br>SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCISYTRTWNPYVFGSGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGGGVVQPGGSLRLSCAA<br>SGFTFDDYAMHWVRQAPGKGLEWVSLISGDGGSTYYADSVKGRFTISRDN<br>KNSLYLQMNSLRTEDTALYYCAKDRAAAGYYYYGMDVWGQGTTVTVSS<br>[SEQ ID NO: 684]                                                                                                                                                                                 |

Table 123

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-097</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ctgcctgtgctgactcagccaccctcagtgtccgtgtccccaggacagacagccatcatcacctgctctggagataaattgg<br>gggaaaaatatgttctctggtatcagcagaagccaggccagtcacctgtactggtcatcgaataaccaggaggccct<br>cagggatccctgagcgattctctggtccaactctgggaccacagccactctgaccatcagcgggaccaggctatggat<br>gaggctgactattactgtcaggcgtgggacaggggtgtggtattcggcggaggggaccaagctgaccgtcctaggttctag<br>aggtggtggtgtagcggcgggcgggcgtctggtggtggtggtatccctcgagatggccgaggtgcagctggtggagtct<br>gggggagacttggtacagcctggcagggtccctgagactctctgtgcagcctctggattcacctttaatgattatgccatgca<br>ctgggtccggcaagctccagggaaggcgctggagtgggtctcaggtattagtggagtggtaataacataggctatcggg<br>actctgtgaagggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaacagctctgagagctg<br>aggacacggccttgattactgtgaaaagatagtatacgggtatggcatcacctggggagggtttgactactggggccaggg<br>aaccttggtaccgtctcctca [SEQ ID NO: 685] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| LPVLTQPPSVSVSPGQTAITCSGDKLGEKYVSWYQQKPGQSPVLVIDQDTRR<br>PSGIPERFSGSNSGTTATLTISGTQAMDEADYYCQAWDRGVVFGGGTKLTVL<br>GSRGGGSGGGGSGGGGSLEMAEVQLVESGDLVQPGRSLRLSCAASGFTF<br>NDYAMHWVRQAPGKGLEWVSGISWSGNNIGYADSVKGRFTISRDNKNSLY<br>LQMNSLRAEDTALYYCAKDSIRYGITWGGFDYWGQGTLLVTVSS [SEQ ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

NO: 686]

Table 124

**ET200-098**DNA Sequence

cagcctgtgctgactcagccaccctcgggtgtccaagggttgagacagaccgccacactcacctgcactgggaacagca  
 acaatgttggaacctaggagtagcttggtgcagcagcaccagggccaccctccaaactcctatcctacaggaataaca  
 accggccctcagggatctcagagagattatctgcatccaggtcaggaaacacagcctccctgaccattactggactccagc  
 ctgaggacgaggtgactattactgctcagcatgggacagtagcctcagtgcttgggtgttcggcggagggaaccaagctg  
 accgtcctaggttctagaggtgggtggtagcggcggcggcggctctggtgggtggatccctcgagatggccgaggt  
 gcagctgggtgagctctgggggagtcgtgtacagcctggggggcctgagactctcctgtgcagcctctggattcacctt  
 gatgattatgccatgcactgggtccgtcaagctccgggggaagggtctggagtggtctctcttattaattgggatggtgtag  
 cacctactatgcagactctgtgaagggtcgattcaccatctccagagacaacagcaaaaactccctgtatctgcaaatgaac  
 agtctgagagctgaggacaccgccttgattactgtgaaaagggtgaggcctgaggcgcttgactactggggccaggg  
 aaccctggtcaccgtctctca [SEQ ID NO: 687]

Amino Acid Sequence

QPVLTPPPSVSKGLRQTATLTCTGNSNNVGNLGVAWLQQHQGHPPKLLSYR  
 NNNRPSGISERLSASRSGNTASLTITGLQPEDEADYYCSAWDSSLSAWVFGGG  
 TKLTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGGV VVQPGGSLRLSCA  
 ASGFTFDDYAMHWVRQAPGKGLEWVSLINWDGGSTYYADSVKGRFTISRDN  
 SKNSLYLQMNSLRAEDTALYYCAKGMGLRAFDYWGQGTLVTVSS [SEQ ID  
 NO: 688]

Table 125

**ET200-099**DNA Sequence

cagtctgtgtgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcctgttctggaagcagctcc  
 aacatcggaagtaatactgtaaaactggtaccagcagctcccaggaacggccccaaactcctcctatagtaatgatcagc  
 ggccctcaggggtccctgaccgattctctggctccaagtcggcacctcagcctccctggccatcagtggtcctcagctg  
 aggatgaggctgattattactgtgcttcatgggatgacagcctgaatggcgttatgtcttcggaactgggaccaaggtcacc  
 gtcctaggttctagaggtgggtggtagcggcggcggcggcgtctggtgggtggatccctcgagatggcccagggtcca  
 gctgggtacagctctggggctgaggtgaggaagcctggggcctcagtgaaaggttctcgaagacttctggatacaccttcag  
 ttggtatgctatacattgggtgcgccaggccccggacaaaaggcttgagtgatgggatggaacgctggcaatggaa  
 acacaaaatattcacagaaatttcagggcagagtcagcttaccagggaacacatccgcgagcacagcctacatggagctg

|                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| agcagcctgagatctgatgacacggctgtgtattactgtgcgagacccgataaattatggttcgggtggggatgttttgatata<br>tggggccaagggaacaatggtcaccgtctctca [SEQ ID NO: 689]                                                                                                                                                            |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                            |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTNVNWWYQQLPGTAPKLLIYSNDQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCASWDDSLNGRYVFGTGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVRKPGASVKVSCK<br>TSGYTFSWYAIHWVRQAPGQRLEWMGWINAGNGNTKYSQKFQGRVSLTRD<br>TSASTAYMELSSLRSDDTAVYYCARPDNYGSGGDVFDIWGQGTMTVTVSS<br>[SEQ ID NO: 690] |

Table 126

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-100</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcacccgcagcagtggca<br>gcattgccagcaactttgtgcagtggtaccagcagcggccggcagtgccccaccctatgatctatgaggataacaaca<br>gacccctgggggtccctgatcggttctctgcctccgtcgacagctcctccaactctgcctccctcaccatctctggactgaag<br>actgaggacgagggctgactactactgtcagtccttatgataaccagcaatgtggattcggcgggggaccaagctgaccgtc<br>ctaggttctagaggtggtggtgtagcggcgggcgggcgtctggtggtggtgatccctcgagatggccgaggtgcagct<br>ggtggagctctgggggaggcttggtacagcctggagggtccctgagactctcctgtgcagcctctggattcaccttcagtagt<br>tatgaaatgaactgggtccgccaggctccagggaaggggctggagtggtttcatacattagtagtagtggttagtaccatat<br>actacgcagactctgtgaaggccgattcaccatctccagagacaacgccaagaactcactgtatctgcaaatgaacagcc<br>tgagagccgaggacacggctgtttattactgtgcacgctgggactacggtatggacgtctggggccaagggaccacggtc<br>accgtctctca [SEQ ID NO: 691] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNFVQWYQQRPGSAPTPMIYEDN<br>NRPPGVPDRFSASVDSSSNSASLTISGLKTEDEADYYCQSYDTSNVVFGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGGSLRLSCAAS<br>GFTFSSYEMNWVRQAPGKGLEWVSYISSSGSTIYYADSVKGRFTISRDNKNS<br>LYLQMNSLRAEDTAVYYCARWDYGMVDVWGQGTITVTVSS [SEQ ID NO: 692]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 127

|                                                                                 |
|---------------------------------------------------------------------------------|
| <b>ET200-101</b>                                                                |
| <u>DNA Sequence</u>                                                             |
| caggctgtgctgactcagccaccctcagcgtctggggccccgggcagagggtcaccgtctcttgttctggaagcaactc |



caacatcggagtaactacgttaactggtaccagcagttcccaggaacggccccaaactcctcatgtatagtagtagtcag  
 cggccctcaggggtccctgaccgattctctggtccaagtctggcacctcagcctccctggccatcagtggtccactctg  
 aggatgaggctgattattactgtgctacatgggatgacagcctgaatgcttgggtgttcggcggagggaaccaagctgaccg  
 tcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtggtatccctcagatggccgaggtccag  
 ctggtgcagtctggggctgaggtgaggaagcctggggcctcagtgaaggttctcgaagacttctggatacaccttcaact  
 ggtatgctatacattgggtgcgccaggccccggacaaaggcttgagtggatgggatggaacgctggcagtgga  
 cacaaaatattcacagaaatttcagggcagagtcaccctaccagggacacatccgcgagcacagcgtacatggagctga  
 gcagcctgagatctgatgacacggctgtgtattactgtgcgagacccaataactatggttcgggtggggatgttttgatatct  
 ggggccaaaggacaatggtcaccgtctctca [SEQ ID NO: 693]

Amino Acid Sequence

QAVLTQPPSASGAPGQRVTVSCSGSNSNIGSNYVNWYQQFPGTAPKLLMYSS  
 SQRPSGVDPDRFSGSKSGTSASLAISGLHSEDEADYYCATWDDSLNAWVFGGG  
 TKLTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVRKPGASVKVSK  
 TSGYTFTWYAIHWVRQAPGQRLEWMGWINAGSGNTKYSQKFQGRVTLTRD  
 TSASTAYMELSSLRSDDTAVYYCARPNNYGSGGDVFDIWGQGTMTVTSS  
 [SEQ ID NO: 694]

Table 128

**ET200-102**

DNA Sequence

cagtctgtcgtgacgcagccgccctcagtgtctgccccaggacagaaggtcaccatctctgctctggaagcagctc  
 caacattgggaataattatgtatcctggtaccagcagctcccaggaacagccccaaactcctcatttatgacaataataagc  
 gacctcagggattcctgaccgattctctggtccaagtctggcacgtcagccaccctgggcatcaccggactccagactg  
 gggacgaggccgattattactgcggaacatgggtagcagcctgagtgttatgtcttcggaactgggaccaaggtcacc  
 gtctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtggtatccctcagatggcccaggtcca  
 gctggtgcagtctggggctgaggtgaagaagcctggggcctcagtgaaggttctcgaaggcttctggatacaccttcac  
 gaactatgctctgattgggtgcgccaggccccggacaagggttgagtggatggcatggatcaacggtggcaatggta  
 acacaaaatattcacagaactccagggcagagtcaccattaccagggacacatccgcgagcacagcctatatggagctg  
 agcagcctgagatctgaagacacggctgtgtattactgtgcgaaaccggaggaaacagctggaacaatccactttgactac  
 tggggccagggaaaccccggtcaccgtctctca [SEQ ID NO: 695]

Amino Acid Sequence

QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN  
 KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSSLSAYVFGTGTK

VTVLGSRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCA  
SGYTFTNYALHWVRQAPGQGLEWMAWINGGNGNTKYSQNFQGRVTITRDT  
SASTAYMELSSLRSEDTAVYYCAKPEETAGTIHFDYWQGTPVTVSS [SEQ ID  
NO: 696]

Table 129

**ET200-103**DNA Sequence

caggctgtgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcacccgcagcagtg  
cagcattgccagcaactatgtgcagtgggtaccagcagcgccgggcagtgccccaccactgtgatctatgaggataacc  
aaagaccctctggggtccctgatcgggttctctggctccatcgacagctcctccaactctgcctccctaccatctctggactg  
aagactgaggacgaggctgactactactgtcagctttatgatagcaccatcacgggtgtcggcggagggaaccaagctgac  
cgtctaggttctagagggtggtggtgtagcggcgggcgggcgtctggtggtggtgatccctcgagatggcccaggtcc  
agctggtacagtctggggctgaggtgaagaagcctgggtcctcggtaaggctcctgcaaggcttctggaggcacctca  
gcagctatgctatcagctgggtgcgacaggcccctggacaagggcttgagtggatgggagggatcatccctatctttgta  
cagcaaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagct  
gagcagcctgagatctgaggacacggccgtgtattactgtcgggggagggttactatgatagtagtgtattccaacgggt  
gatgcttttgatatctggggccaagggacaatggtcaccgtctcttca [SEQ ID NO: 697]

Amino Acid Sequence

QAVLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN  
QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTITVFGGGTKL  
TVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSCKASG  
GTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTSTA  
YMESSLRSEDTAVYYCAGEGYDSSGYSNGDAFDIWGQGTMTVTVSS [SEQ  
ID NO: 698]

Table 130

**ET200-104**DNA Sequence

aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcacccgcagcagtgga  
gcattgccagcaactatgtgcagtgggtaccagcagcgccgggcagtgccccaccactgtgatctatgaggataaccaa  
agaccctctggggtccctgatcgggttctctggctccatcgacagctcctccaactctgcctccctaccatctctggactgaa  
gactgaggacgaggctgactactactgtcagctttatgatagcagcaatgtggtattcggcggagggaaccaaggtcacggt  
cctaggttctagagggtggtggtgtagcggcgggcgggcgtctggtggtggtgatccctcgagatggccgaggtgcag

|                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ctggtggagtctgggggaggcttggtacagcctggagggccctgagactctctgtgcagcctctggattcaccttcagta<br>ggtatgaaatgaactgggtccgccaggtccagggaaggggctggagtgggttcatacattagtagtagtgtagtaccat<br>atactacgcagactctgtgaagggccgattcaccatctccagagacaacgccaagaactcactgtatctgcaaatgaacag<br>cctgagagccgaggacacggctgtttattactgtgcacgctgggactacgggtatggacgtctggggccaaggaccacg<br>gtcaccgtctctca [SEQ ID NO: 699] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                     |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNVVFGGGTKV<br>TVLGSRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGGSLRLSCAASG<br>FTFSSYEMNWVRQAPGKGLEWVSYISSSGSTIYYADSVKGRFTISRDNKNSL<br>YLQMNSLR AEDTAVYYCARWDYGM DVWGQGTTVTVSS [SEQ ID NO: 700]                                                                                      |

Table 131

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-105</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| tcctatgtctgactcagccaccctcagtgtccgtgtccccaggacagacagccagcatcacctgctctggagatagattga<br>cgaataaataatgttctctggtatcaacagaagccaggccagtcctctgtgttggtcatctatgaggatgccaaagcggccctc<br>agggatccctgcgcgattctctggctccaactctgggaacacagccactctgaccatcagcgggaccaggctatggatg<br>agtctgaatattactgtcaggcgtgggacagcagtgtggtggttttggcggagggaaccaagctgaccgtcctaggttctag<br>aggtggtggtggtagcggcgccggcggtctggtggtggtggtcctcgagatggcgagggtgcagctggtggagtct<br>gggggaggcttggtacagcctggcaggctccctgagactctctgtgcagcctctggattacctttgatgattatgccatgca<br>ctgggtccggcaagctccagggaaggcctggagtgggtctcaggtattagttggaatagtggtagtataggctatgcgga<br>ctctgtgaagggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaacagctctgagagatga<br>ggacacggccttgattactgtgaaaagaccgaggggggggagttatcgttaaggatgcttttgatatctggggccaagg<br>gacaatggtcaccgtctctca [SEQ ID NO: 701] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| SYVLTQPPSVSVSPGQTASITCSGDRLTNKYVSWYQQKPGQSPVLVIYEDAKR<br>PSGIPARFSGSNSGNTATLTISGTQAMDESEYYCQAWDSSVVVFGGGTKLTVL<br>GSRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGRSLRLSCAASGFTF<br>DDYAMHWVRQAPGKGLEWVSGISWNSG SIGYADSVKGRFTISRDNKNSLY<br>LQMNSLRDEDTALYYCAKDRGGGVIVKDAFDIWGQGTMTVTVSS [SEQ ID<br>NO: 702]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 132

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-106</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| tcctatgagctgactcagccacccgcagcgtctgggacccccggacagagagtcaccatctctgttctgggggcgtctcc<br>aacatcgggagtggtgctctaaattggtaccagcaactccaggaacggccccaaactcctcatctatagtataatcagc<br>ggccctcaggggtctctgaccgattctctggctccaggctgccacctcagcctccctggccatcagtgggctccagtctga<br>ggatgaggctgattattactgtgcaacctgggatgatagtgtgaatggttgggtgttcggcggaggggaccaagctgaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtgcag<br>ctggtggagctctggagctgaggtgaagaagcctggggattcagtgaaggtctcctgcaagcctctggttacaattttc<br>ctatggtatcaactgggtgcgacaggccctggacaagggttgagtggatgggatggattagcacttacaccggtaacac<br>aaactatgcacagaagctgcagggcagagtcaccttcaccacagacacatccacgagcacagcctacatggagatgagg<br>agcctgagatctgacgacacggccgtgtattactgtgcgcgccagcagggtggtggtgtgtacgatgtttggggtaaggt<br>actctggtcaccgtctctca [SEQ ID NO: 703] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SYELTQPPAASGTPGQRVTISCSGGVSNIGSGALNWFYQQLPGTAPKLLIYSYN<br>QRPSGVSDRFSGRSATSASLAISGLQSEDEADYYCATWDDSVNGWVFGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGAEVKKPGDSVKVSKP<br>SGYNFLNYGINWVRQAPGQGLEWMGWISTYTGNTNYAQKLQGRVTFTTDS<br>TSTAYMEMRSLRSDDTAVYYCARQQGGGWYDVWGQGLVTVSS [SEQ ID<br>NO: 704]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 133

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-107</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| cagtctgtcgtgacgcagccgcctcagtgtctgcggccccaggagagaaggtcaccatctctgctctggaagcaacttc<br>aatgttgaaataatgatgtatcctggtatcagcaactccagggtgcagccccaaactcctcatttatgacaataataagcg<br>accctcagggattcctgaccgattctctggctccaagtctggcacgtcagccaccctggacatcaccgggctccacagtga<br>cgacgaggccgattattactgcggaacatgggatagcagcctgaatactgggggggtcttcggaactgggaccaaggtca<br>ccgtcctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggcgaggctc<br>cagctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaagggtctcctgcaaggcttctggttacaccttta<br>ccagctatactatcagctgggtacgacaggccctggacaagggttgagtggatgggatggatcagcacttacaatggtc<br>tcacaaactatgcacagaacctccagggcagagtcaccatgactacagacacattcacgaccacagcctacatggagctg<br>aggagcctcagatctgacgacacggccgtgtattactgtgtgagagaggggtccccgactacgggtgacttcgcgtccttt<br>gactactggggccagggaacctggtcaccgtctctca [SEQ ID NO: 705] |

Amino Acid Sequence

QSVVTQPPSVSAAPGEKVTISCSGSNFNVGNNDSWYQQLPGAAPKLLIYDN  
 NKRPSGIPDRFSGSKSGTSATLDITGLHSDDEADYYCGTWDSSLNTGGVFGTG  
 TKVTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSC  
 KASGYTFTSYTISWVRQAPGQGLEWMGWISTYNGLTNYAQNQLQGRVTMTTD  
 TFTTTAYMELRSLRSDDTAVYYCVREGSPDYGDFASFDYWGQGLTVTVSS  
 [SEQ ID NO: 706]

Table 134

**ET200-108**DNA Sequence

cagtctgtgtgacgcagccgccctcagtgtctgcgccccgggacagaaggtcaccatctctgctctggaagcagctcc  
 aacattgggaataattatgtatcctggtaccagcagttcccaggaaacagccccaaactcctcatttatgacaataataagcg  
 accctcagggatttctgaccgattctctggctccaagtctggcacgtcagccaccctgggcacgcgcggactccagactgg  
 ggacgaggccgattattactgcggaacatgggataccagcctgagtggttttatgtcttcggaagtgggaccaaggtcacc  
 gtctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtcca  
 gctggtacagctctggagctgaggtgaagaagcctggggcctcagtgaaaggtctcctgcaaggcttctggttacacctttacc  
 agctatactatcagctgggtacgacagggccctggacaagggcctgagtgatgggatggatcagcacttacaatggtctc  
 acaaactatgcacagaacctccagggcagagtcacatgactacagacacattcacgaccacagcctacatggagctgag  
 gagcctcagatctgacgacacggcgtgtattactgtgtgagagaggggtccccgactacgggtgacttcgcgtcctttga  
 ctactggggccaggggaacctggtcaccgtctctca [SEQ ID NO: 707]

Amino Acid Sequence

QSVLTQPPSVSAPPGQKVTISCSGSSSNIGNNYSWYQQFPGTAPKLLIYDNN  
 KRPSGISDRFSGSKSGTSATLGIAGLQTGDEADYYCGTWDTSLSGFYVFGSGT  
 KVTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSCK  
 ASGYTFTSYTISWVRQAPGQGLEWMGWISTYNGLTNYAQNQLQGRVTMTTDT  
 FTTTAYMELRSLRSDDTAVYYCVREGSPDYGDFASFDYWGQGLTVTVSS  
 [SEQ ID NO: 708]

Table 135

**ET200-109**DNA Sequence

ctgcctgtgctgactcagccaccctcagcgtctgcgacccccgggcagagggtcaccatctcttgttctggaaccacctcc  
 aacatcggaagtaatactgtacactggtaccagcagctcccaggagcggccccaaactcctcatctataataataatcagc

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccgggtccg<br>aggatgaggctacatattcctgtgcaacatgggatgacagcctgagtggtgtggtcttcggcggagggaaccaagctgacc<br>gtcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtgatccctcagatggccgaggtcca<br>gctggtgcagctcggggctgaggtgaagaagcctgggtcctcggtagaggtctcctgcaaggcttctggaggcaccttca<br>gcagctatgctatcagctgggtgcgacaggccctggacaagggttgagtggatgggagggatcatccctatctttgta<br>cagcaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagct<br>gagcagcctgagatctgaggacacggccgtgtattactgtgcgagagatcccgcctacggtgactacgagtatgatgctttt<br>gatatctggggccaagggaatggtcaccgtctcttca [SEQ ID NO: 709] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| LPVLTQPPSASATPGQRVTISCSGTTSNIGSNTVHWYQQLPGTAPKLLIYNNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLRSEDEATYSCATWDDSLSGVVFVGGGTKL<br>TVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSKASG<br>GTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTSTA<br>YMESSLRSEDTAVYYCARDPAYGDYEYDAFDIWGQGTMTVTVSS [SEQ ID<br>NO: 710]                                                                                                                                                                                                                                                                                                                                                               |

Table 136

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-110</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| cagctctgtgtgacgcagccgccctcagcgtctgggacccccggcagagggtcaccatctcttcttctggaagcagctcc<br>aacatcggaactaatggtgtaactggtccagcagttcccagggaacggccccaaactcctcctatctataactaatgatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagctctg<br>cggatgaggctgattattactgtgcagtgtgggaccacagcctgaatggtccggtgttcggcggagggaaccaagctgacc<br>gtcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtgatccctcagatggcccaggtgca<br>gctggtgcagctcggggctgaggtgaagaagcctgggtcctcggtagaggtctcctgcaaggcttctggaggcaccttca<br>gcagctatgctatcagctgggtgcgacaggccctggacaagggttgagtggatgggagggatcatccctatctttgta<br>cagcaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagct<br>gagcagcctgagatctgaggacacggccgtgtattactgtgcgagagggggcggtttgatgcttttgatatctggggccaa<br>gggacaatggtcaccgtctcttca [SEQ ID NO: 711] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGTNGVNWVFQFPGTAPKLLIYTNDQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSADEADYYCAVWDHSLNGPVFVGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSKAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

GGTFSSY AISWVRQAPGQGLEWMGGIIPFGTANYAQKFQGRVTITADESTST  
AYMELSSLRSED TAVYYCARGAGFDAFDIWGQGTMTVTVSS [SEQ ID NO:  
712]

Table 137

**ET200-111**DNA Sequence

caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc  
aacatcggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc  
ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg  
aggatgagactgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcaccgt  
cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcagatggcccaggtgcag  
ctacagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagt  
gttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaatcaatcatagtggaagcac  
caactacaaccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgagctct  
gtgaccgccgcggacacggctgtgtattactgtgcgagagaggggctagatgcttttgatatctggggccaagggacaat  
ggtcaccgtctctca [SEQ ID NO: 713]

Amino Acid Sequence

QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ  
RPSGVPDRFSGSKSGTSASLAISGLQSEDETDYYCAAWDDSLNGYVFGTGTK  
VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAVY  
GGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYNPSLKSRTISVDTSKNQF  
SLKLSSVTAADTAVYYCAREGLDAFDIWGQGTMTVTVSS [SEQ ID NO: 714]

Table 138

**ET200-112**DNA Sequence

caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc  
aacatcggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatgtatagtaatgatcag  
cggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtct  
gaggatgaggctgattattattgtgcagcatgggatgacagcctgaatggttatgtcttcgcagctgggaccagctcaccg  
ttttaagtctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcagatggcccaggtgcagc  
tacagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagtgg  
ttactactggagctggatccgccagccccaggggaaggggctggagtggattggggaatcaatcatagtggaagcacc

aactacaacccgtccctcaagagtcgagtcaccatcatcagtagacacgtccaagaaccagttctccctgaagctgagctctg  
tgaccgccgcggacacggctgtgtattactgtgcgagagaggggctagatgcttttgatatctggggccaagggaatg  
gtcaccgtctctca [SEQ ID NO: 715]

Amino Acid Sequence

QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLMYSND  
QRPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFAAGT  
QLTVLSSRGGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAY  
YGGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRVTISVDTSKNQ  
FSLKLSSVTAADTAVYYCAREGLDAFDIWGQGTMTVTVSS [SEQ ID NO: 716]

Table 139

**ET200-113**

DNA Sequence

cagtctgtcgtgacgcagccgccctcagtgtctgcccagacagaaggtcaccatctctgctctggaagcagctc  
caacattgggaataattatgtatcctggtaccagcagctcccaggaacagccccaaactctcattatgacaataataagc  
gacctcagggattctgaccgattctctggtccaagtctggcagctcagccaccctgggcactgactgactccagactg  
gggacgagggcattattactgcggaacatgggtagcagcctgagtgtctgcttatgtcttcggaactgggaccaaggtca  
ccgtcctaggttctagaggtggtggtgtagcggcggcgggcctctggtggtggtggtatccctcgagatggcccaggtc  
cagctggtacagctctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacagctta  
ccagctatactatcagctgggttcgacagggccctggacaaggccttgagtggatgggatgggtcagcacttacaatggtc  
tcagaaactatgcagaaacctccagggcagagtcaccatgactacagacacactcacgaccacagcctacatggagctg  
aggagcctcagatctgacgacacggcgtgtattattgtgtgagagaggggtccccgactacggtgacttcgcggccttt  
gactactggggccagggcacctggtcaccgtctctca [SEQ ID NO: 717]

Amino Acid Sequence

QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN  
KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSLSAAYVFGTGT  
KVTVLGSRGGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK  
ASGYSFTSYTISWVRQAPGQGLEWMGWVSTYNGLRNYAQNQLQGRVTMTTD  
TLTTTAYMELRSLRSDDTAVYYCVREGSPDYGDFAAFDYWGQGTTLTVTVSS  
[SEQ ID NO: 718]

Table 140

**ET200-114**

DNA Sequence



caggctgtgctgactcagccaccctcagcgtctgagacccccgggcagagggtcaccatctcttcttctggaagcaggtcc  
 aacatcggaactaatattgtactgtgtaccagcagcggccaggaatggccccaaactcctcacttatggtagtcggcgg  
 ccctcaggggtcccggaccgattctctggctccaagtgtggcacctcagcctccctggccatcagtggggtccagtctgag  
 gatgaggctgattattattgtgcagcatgggatgacagtctgaatgggtccggcttcggcggagggaaccaagtgcagctc  
 ctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccaggtgcagct  
 acagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagtgg  
 tactactggagctggatccgccagccccagggaaggggctggagtggattggggaaatcaatcatagtggaagcacca  
 actacaacccgtccctcaagagtcgagtcacatatcagtagacacgtccaagaaccagttctccctgaagctgagctctgt  
 gaccgccgcggacacggctgtgtattactgtgcgagagacgggtgggggctactttgactactggggccagggaaccctg  
 gtcaccgtctctca [SEQ ID NO: 719]

#### Amino Acid Sequence

QAVLTQPPSASETPGQRVTISCSGSRSNIGTNIVHWYQQRPGMAPKLLTYGSR  
 RPSGVPDRFSGSKFGTSASLAISGLQSEDEADYYCAAWDDSLNGPAFGGGTK  
 LTVLGSRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAVY  
 GGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYNPSLKSRTISVDTSKNQF  
 SLKLSSVTAADTAVYYCARDGGGYFDYWQGTLTVSS [SEQ ID NO: 720]

Table 141

#### **ET200-115**

#### DNA Sequence

cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcagctc  
 caatcggggcacgttatgatgtactgtgtaccagcaactcccaggaacagcccccgactcctcctctctgtaactac  
 gatcggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactggggtccag  
 gctgaggatgaggctgattattactgccagtcctatgacagcagtgtgagtgttgggtgttcggcggagggaaccaaggtc  
 accgtcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaagt  
 gcagctggtgcagtctggggctgaagtgaaggagcctggggcctcagtgaggatctcctgccaggcatctggatacaact  
 tcacagttattatatgcactgggtgcggcagggccctgggcaaggtcttgagtggatgggcaccatcaaccaggcagtg  
 gtgagacagactactcacagaagttgcagggcagagtcaccatgaccagggacccgtccacgggtacattcgacatggg  
 gctgagcagcctgacatctggggacacggcgtctattattgtgcgacaggtctcatcagaggagctagcgatgctttaat  
 atctggggccgggggacaatgggtaccgtctctca [SEQ ID NO: 721]

#### Amino Acid Sequence

QSVLTQPPSVSGAPGQRVTISCTGSSSNIGARYDVBHWYQQLPGTAPRLLISAN  
 YDRPSGVPDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSVSAWVFGG

TKVTVLGSRRGGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKEPGASVRISCQ  
 ASGYNFISYYMHWVRQAPGQGLEWMGTINPGSGETDYSQKLQGRVTMTRDP  
 STGTDFDMGLSSLTSGDTAVYYCATGLIRGASDAFNIWGRGTMVTVSS [SEQ  
 ID NO: 722]

Table 142

**ET200-116**DNA Sequence

cagcctgtgctgactcagccaccctcagtgccgtgtccccaggacagacggccgccatcccctgttctggagataagttg  
 ggggataaatttgcttctggtatcagcagaagccaggccagtcacctgtgctggatcatctatcaagataactaagcggccct  
 cagggatccctgagcgattctctggctccaactctgggaacacagccactctgaccatcagcgggaccaggctatggat  
 gaggctgactattactgtcagacgtgggccagcggcattgtggtgttcggcggaggggaccaagctgaccgtcctaggttct  
 agaggtggtggtgtagcggcgggcgggcgtctggtggtggtggatccctcgagatggcccagggtacagctgcagcagt  
 cagggtccaggactggtgaagccctcgcagaccctctcactcactgtgccatctccggggacagtgtctctagcaacagt  
 ctgcttggaactggatcaggcagtcctccatcgagaggccttgagtggctgggaaggacatactacagggtccaagtggata  
 atgattatgcagtatctgtgaaaagtcgaataaccatcaaccagacacatccaagaaccagttctccctgcagctgaactct  
 gtgactcccaggacacggctgtgtattactgtgcaagagagcgcagtggtggaagggatttgactactggggccaggg  
 aacctgtgcaccgtctctca [SEQ ID NO: 723]

Amino Acid Sequence

QPVLTPPPSVSVSPGQTAAIPCSGDKLGDKFASWYQQKPGQSPVLVIYQDTRK  
 PSGIPERFSGSNSGNTATLTISGTQAMDEADYYCQTWASGIVVFGGGTKLTVL  
 GSRGGGGSGGGGSGGGGSLEMAQVQLQQSGPGLVKPSQTLSTCAISGDSVS  
 SNSAAWNWIRQSPSRGLEWLGRITYYRSKWKYNDYAVSVKSRITINPDTSKNQF  
 SLQLNSVTPEDTAVYYCARERSGWKGFYWGQGTLVTVSS [SEQ ID NO:  
 724]

Table 143

**ET200-117**DNA Sequence

gatgttgatgactcagctccaccctccctgtccgtcaccctggagagccggcctccatcacctgcagggtctagtcaga  
 gcctcctggaaagaaatgcatacaactcttgattggtacctgcagaggccaggacagctccacagctcctgatctactt  
 ggggttctaategggccggcggggctccctgacaggttcagtggcagtgatcaggcagagattttactgaaaatcagca  
 gagtggagcctgaggatgttgggtttattactgcatgaagctctacaagctccgttcactttcggcggagggaaccaaggt  
 ggagatcaaacttctagaggtggtggtgtagcggcgggcggcgtctggtggtggtggatccctcgagatggccgaa

gtgcagctggtgcagtctgggggaggcttggtacagcctgggggggtccctgagactctctgtgcagcctctggattcacc  
 ttttagcagctatgccatgagctgggtccgccaggctccaggggaaggggctggagtgggtctcagctattagtggtagtgg  
 ggtagcacatactacgcagactccgtgaagggccgggttcaccatctccagagacaattccaagaacacgctgtatctgcaa  
 atgaacagcctgagagccgaggacacggccgtatattactgtgcgaaatggggcccgtttcaggatgcttttgatatctggg  
 gccaaagggacaatggtcaccgtctctca [SEQ ID NO: 725]

Amino Acid Sequence

DVVMTQSPPSLSVTPGEPASITCRSSQSLLERNAYNYLDWYLRPGQSPQLLI  
 YLGSNRAAGVPDRFSGSGSGRDFTLKISRVEPEDVGVYYCMQALQAPFTFGG  
 GTKVEIKRSRGGGSGGGGSGGGGSLEMAEVQLVQSGGGLVQPGGSLRLSC  
 AASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDN  
 SKNTLYLQMNSLRAEDTAVYYCAKWGPFQDAFDIWGQGTMTVTVSS [SEQ ID  
 NO: 726]

Table 144

**ET200-118**

DNA Sequence

caggctgtgctgactcagcctgcctccgtgtctgggtctcctggacagtcgatcaccatctcctgcactggaaccagcagt  
 acgttggtggttataactatgtctcctgtgtaccaacagcacccgggcaaagccccaaactcatgatttatgaggtcagtaat  
 cggccctcaggggtttctaatecgttctctggctccaagtctggcaacacggcctccctgaccatctctgggtccaggctg  
 aggacgaggctgattattactgcagctcatatacaagcagcagcaccccttatgtcttcggagcagggaccaaggtcaccg  
 tcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtgatccctcagatggccgaggtgcag  
 ctggtggagtctgggggaggcttggtacagcctggcaggctcctgagactctcctgtgcagcctctggattcaccttgatg  
 attatgccatgcactgggtccggcaagctccaggggaagggcctggagtgggtctcaggtattagttggaatagtggtagca  
 taggctatgcggactctgtgaagggcgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaaca  
 gtctgagagctgaggacacggccttgattactgtgaaaagccagggtggacagcagtgatcagaccaccactttgact  
 actggggccagggaacgctggtcaccgtctctca [SEQ ID NO: 727]

Amino Acid Sequence

QAVLTQPASVSGSPGQSITISCTGTSSDVGGYNYVSWYQQHPGKAPKLMIE  
 VSNRPSGVSNRFSKSGNTASLTISGLQAEDEADYYCSSYTSSSTPYVFGAGT  
 KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQGRSLRLSCAA  
 SGFTFDDYAMHWVRQAPGKGLEWVSGISWNSGSIGYADSVKGRFTISRDN  
 KNSLYLQMNSLRAEDTALYYCAKARWTAVASDHHFDYWQGQGLTVTVSS  
 [SEQ ID NO: 728]

Table 145

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-119</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| caggctgtgcttactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaaagtaataactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggcctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaagctgaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccgaggtgcag<br>ctggtgcagtctggggctgaggtgaagaagcctgggtcctcggatgaagggtcctcgaaggcttctggaggcaccttcag<br>cagctatgctatcagctgggtgcgacaggcccctggacaagggttgagtggatgggagggatcatccctatctttggtac<br>agcaaacacgcacagaagttccagggcagagtcacgattaccggcgacgaatccacgagcacagcctacatggagctg<br>agcagcctgagatctgaggacacggccgtgtattactgtgcgagagattgggactacatggacgtctggggcaaaggga<br>ccacggtcaccgtctcctca [SEQ ID NO: 729] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTNVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSKAS<br>GGTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTST<br>AYMELSSLRSEDTAVYYCARDWDYMDVWGKGTITVTVSS [SEQ ID NO: 730]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 146

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-120</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| tcctatgagctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaaagtaataactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggcctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaagggtcaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccgaggtgcag<br>ctggtggagctctggagctgaggtgaagaagcctggggcctcagtgaaagggtcctcgaaggcttctggttacacctttacca<br>gctatggtatcagctgggtgcgacaggcccctggacaagggttgagtggatgggatgagcgttacaatggtaac<br>acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga<br>ggagcctgagatctgacgacacggccgtgtattactgtgcgagagacctatctcggggagctaaccgcattactactact<br>actacggtatggacgtctggggccaagggaaccacgggtcaccgtctcctca [SEQ ID NO: 731] |

### Amino Acid Sequence

SYELTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ  
RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK  
VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGAEVKKPGASVKVVSCKAS  
GYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDT  
TSTAYMELRSLRSDDTAVYYCARDLSRGANPHYHYGMDVWGQGTTVTV  
SS [SEQ ID NO: 732]

Table 147

## ET200-121

### DNA Sequence

cagtctgtgttgacgcagccgccctcagtgtctgtggggcccccaggggcagagggtcaccgtctctgcactgggagcagatc  
caacatcggggcaggatatgatgtacactggtaccagcaacttcagggaacagcccccaaactcctcatctatggaaatag  
taatcggcctccaggggtccctgaccgattctctgggtctaaagtctggcacctcagcctccctggtcactactgggtccag  
gctgaggatgccgctgattattactgccagtcctatgacaacactgtgcgtgaatcaccttatgtcttcggaactgggaccaa  
gggtcaccgtcctagggtctagagggtggtggtggtagcggcggcggcggctctgggtggtggtggatccctcgagatggccg  
aggtccagctggtacagtctggggctgagggtgaagaagcctggggcctcagtgaagggtctcctgcaaggttccggatac  
accctactgaattatccatgcactgggtgcgacaggctcctggaaaagggcttgagtggatgggagggtttgatcctgaag  
atggtgaaacaatctacgcacagaagttccagggcagagtcacatgaccgaggacacatctacagacacagcctacatg  
gagctgagcagcctgagatctgaggacacggccgtgtattactgtgcaacagagagtaatttagtgtccggcactactact  
actacggtatggacgtctggggccaaagggaccacggtcaccgtctectca [SEQ ID NO: 733]

### Amino Acid Sequence

QSVLTQPPSVSGAPGQRVTVSCTGSRSNIGAGYDVHWYQQLPGTAPKLLIYG  
NSNRPPGVPDRFSGSKSGTSASLVITGLQAEDAADYYCQSYDNTVRESPYVFG  
TGTKVTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVS  
CKVSGYTLTELSMHWVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMT  
EDTSTDATAYMELSSLRSEDTAVYYCATESNLVSRHYYYYYGMVDVWGQGTTVT  
VSS [SEQ ID NO: 734]

Table 148

## ET200-122

### DNA Sequence

ctgcctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaaccagctcc  
aacatcggaagtaattctgtagactggtaccagcagctccagggaacggccccaaactctctatctataagtaataatcagc

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ggccctcaggggtccctgaccgaatctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcaccgt<br>cctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaagtgcag<br>ctggtgcagtctggggctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctgatacaccttcacc<br>ggctactatatgcactgggtgcgacagggccctggacaagggttgagtggatgggatggatcaaccctaacagtgggtg<br>cacaactatgcacagaagtttcagggcagggtcaccatgaccagggacacgtccatcagcacagcctacatggagctg<br>agcaggctgagatctgacgacacggccgtgtattactgtgcgagagattacggatactatggttcggggagttattcgagc<br>ggccccctttactactactacgggtatggacgtctggggccaagggaccacggtcaccgtctcctca [SEQ ID NO:<br>735] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LPVLTQPPSASGTPGQRVTISCSGTSSNIGSNSVDWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRISGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSKAS<br>GYTFTGYMHWRQAPGQGLEWMGWINPNSGGTNYAQKFQGRVTMTRDT<br>SISTAYMELSRLRSDDTAVYYCARDYGYGSGSYSSGPLYLYYYGMDVWGQG<br>TTVTVSS [SEQ ID NO: 736]                                                                                                                                                                                                                                                                                                                                                                                       |

Table 149

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-123</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatgtataataatgatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctcaatggttatgtcttcggacctgggaccaaggtcaccgt<br>cctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggcccaggtgcag<br>ctggtggagtctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctggttacacctttacca<br>gctatggtatcagctgggtgcgacagggccctggacaagggttgagtggatgggatggatcagcgcttacaatggtaac<br>acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga<br>ggagcctgagatctgacgacacggccgtgtattactgtgcgagagacctatctcggggagctaaccgcattactactact<br>actacgggtatggacgtctggggccaagggaccacggtcaccgtctcctca [SEQ ID NO: 737] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLMYNND<br>QRPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGPGT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

KVTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVESGAEVKKPGASVKVSCK  
 ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTD  
 TSTSTAYMELRSLRSDDTAVYYCARDLSRGANPHYYYYYYGMDVWGQGTTV  
 TVSS [SEQ ID NO: 738]

Table 150

**ET200-125**DNA Sequence

aattttatgctgactcagccccacgctgtgtcggagctctccggggaagacggttaaccatctcctgcacccgcagcagtggc  
 agtattgccagcaactatgtgcagtgggtaccagcagcgccgggagttccccgcactgtgatttatgaggataatcaaa  
 gaccctctgggggtccctggtcgggtctctggtccatcgacagctcctccaactctgcctccctaccatctctggactgaag  
 actgaggacgagggctgactactactgtcagtttatgattccaccagtgtgcttttcggcggaggggaccaagctgaccgtcc  
 taggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggtatccctcgagatggccgaggtccagctg  
 gtgcagtctggggctgaggtgaagaagccagggtcctcggtaagggtctctcgaaggcctcgggaggcaccttcagca  
 gcaattctctcagctgggtgcgacaggcccctggacaagggttgagtggatgggaaggatcttccctatcctgggtataa  
 caaactatgcacagaagttccagggcagagtcacgattaccgggacaaatccacgagcacagcctacatggagctgag  
 cagcctgagatctgaggacacggccgtctattactgtgcgagaggaaactaccaatggtatgatgcttttgatatctggggc  
 caagggacaatggtcaccgtctctca [SEQ ID NO: 739]

Amino Acid Sequence

NFMLTQPHAVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSSPRTVIYEDN  
 QRPSGVPGRFSGSIDSSSNSASLTISGLKTEDEADYQCQSYDSTSVLFGGGTKL  
 TVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSCKASG  
 GTFSSNSLSWVRQAPGQGLEWMGRIFPILGITNYAQKFQGRVTITADKSTSTA  
 YMELSSLRSEDVAVYYCARGNYQWYDAFDIWGQGTMTVTVSS [SEQ ID NO:  
 740]

Table 151

**ET200-005**DNA Sequence

cagcctgtgctgactcagccaccctcagtgtcagtgggtcccaggaaagacggccaggattacctgtgggggaaaaaacat  
 tggaaagtaaaagtgtgcactgggtaccagcagaagccaggccaggcccctgtggtggtcatccattatgatagtaccggc  
 cctcagggatccctgagcgattctctggtccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg  
 ggatgaggccgactattactgtcaggtgtgggatagtagtagtgatcatccttatgtcttcggaactgggaccaaggtcacc  
 gtctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggtatccctcgagatggcccaggtgca

|                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>gctgggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacc<br/> aactatggtatcagctgggtgcgacaggccctggacaagggttgagtggatgggatggatcagcgcttacaatggtaa<br/> cacaaactatgcacataagctccagggcagagtcaccatgaccacagacacatccacgagcacagccaacatggagctg<br/> aggagcctgagacctgacgacactgccgtgtattactgtgcgcgctcttacttcggttctcatgattactgggggtcaaggtact<br/> ctggtgaccgtctctca [SEQ ID NO: 741]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                             |
| <p>QPVLTPPPSVSVVPGKTARITCGGKNIGSKSVHWYQQKPGQAPVTVIHYDSD<br/> RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK<br/> VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCKA<br/> SGYTFTNYGISWVRQAPGQGLEWMGWISAYNGNTNYAHKLQGRVTMTTDT<br/> STSTANMELRSLRPDDTAVYYCARSYFGSHDYWGQGLTVTVSS [SEQ ID NO:<br/> 742]</p>                                                                                          |

Table 152

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-124</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>tcctatgtgctgactcagccaccctcggtgtcagtggccccaggaaagacggccaggatttctgtgggggaaacgacatt<br/> ggaagtaaaagtgttttctggtatcagcagaggccaggccaggccctgtgttggtcgtctatgatgatagcgaccggccct<br/> cagggtccctgagcgattctctggcttcaactctgggaacacggccaccctgaccatcagcagggtcgaagccggggat<br/> gaggccgactattactgtcaagtgtgggtagtagtagtgatcattatgtcttcggaactgggaccaaggtcaccgtctagg<br/> ttctagagggtggtggtgtagcggcggcggcgctctggtggtggtgatccctcgagatggccagggtgcagctggtg<br/> gagtctgggggaggcttggtacgcctggcagggtccctgagactctcctgtgcagcctctggattcaccttgatgattatgc<br/> catgcactgggtccggcaagctccagggaaggccctggagtgggtctcagggtattagttggaatagtggtagcataggct<br/> atgcggactctgtgaagggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaacagtctga<br/> gagctgaggacacggccttgattactgtgcaaaagatataacctatggttcggggagttatggtgcttttgatatctggggcc<br/> aagggacaatggtcaccgtctctca [SEQ ID NO: 743]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>SYVLTPPPSVSVAPGKTARISCGGNDIGSKSVFWYQQRPGQAPVLVYDDSD<br/> RPSGLPERFSGFNSGNTATLTISRVEAGDEADYYCQVWDSSSDHYVFGTGTK<br/> VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVESGGGLVQPGRSLRLSCAAS<br/> GFTFDDYAMHWVRQAPGKGLEWVSGISWNSGSIGYADSVKGRFTISRDNAL<br/> NSLYLQMNSLRAEDTALYYCAKDITYGSGSYGAFDIWGQGTMTVTVSS [SEQ<br/> ID NO: 744]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



**XII. Exemplary extracellular antigen-binding domains (e.g., scFvs) comprising a heavy chain variable region, a light chain variable region, a linker peptide and a His-tag and HA-tag**

Table 153

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-001</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| cagctctgtgtgacgcagccaccctcagcgtctgggacccccgggcagaggggtcaccatctcttgttctggaagcagctcc<br>aacatcggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccaagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcacctg<br>cctaggttctagaggtggtggtgtagcggcgggcggtctggtggtggtgatccctcgagatggcccaggtgcag<br>ctacagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtgtatggtgggtccttcagt<br>gttactactggagctggatccgccagccccaggggaaggggctggagtggttggggaatcaatcatagtgaagcac<br>caactacaaccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgagctct<br>gtgaccgccgcggacacggccgtgtattactgtgcgcgcgaaggtccgtacgacggtttcgattctggggtaaggtact<br>ctggtgaccgtctcctcaactagtggccagggcgccagcaccatcaccatcaccatggcgcataccgtacgacgttcc<br>ggactacgcttct [SEQ ID NO: 745] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAVY<br>GGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRTISVDTSKNQF<br>SLKLSSVTAADTAVYYCAREGPYDGFDSWGQGTLVTVSSTSGQAGQH HHHH<br>HGAYPYDVPDYAS [SEQ ID NO: 746]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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Table 154

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-002</b>                                                                                                                                                                                                                                                                                                                                    |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                 |
| aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctctgcacccgcagcagtgga<br>gcattgccagcaactatgtgcagtggtaccagcagcggccgggcagtgccccaccactgtgatctatgaggataaccaa<br>agaccctctgggggtccctgatcggttctctggctccatcgacagctcctccaactctgcctccctcaccatctctggactgaa<br>gactgaggacgaggctgactactactgtcagtccttatgatagcagcaattctgtgggtattcggcggaggggaccaagctgac |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cgtcctaggttctagaggtggtggtgtagcggcgggcggtctggtggtggtgatccctcagatggcccaggtcc<br>agctggtacagtctggcactgaggtgaagaagcctggggcctcagtgagggcgcctgcaaggcttctggttacccttta<br>acaaatatgacatcaactgggtgcgacagggccctggacaagggttgagtggatgggaggcatcatccctatctttcgta<br>caacaaactacgcacagaagttccagggcagagtcacgattaccgggacgaatccacgagcacagcctacatggagct<br>gagcagcctgagatctgaggacacggccgtatattactgtgcgcgcgaatggttctactgggatatctggggtcaagggtact<br>ctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacgttcc<br>ggactacgcttct [SEQ ID NO: 747] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNSVVFGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGTEVKKPGASVRVACKAS<br>GYPFNKYDINWVRQAPGQGLEWMGGIIPFRTTNYAQKFQGRVTITADESTST<br>AYMELSSLRSEDТАVYYCAREWFYWDIWGQGTЛTVSSSTSGQAGQH HHHH<br>HGAYPYDVDPDYAS [SEQ ID NO: 748]                                                                                                                                                                                                                        |

Table 155

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-003</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| cagtctgtgtgactcagccaccctcagtgtccgtgtccccaggacagacagccagcatctcctgctctggaataaattgg<br>ggactaagtatgtttactggtatcagaagaggccaggccagtcccctgtgttggtcatgtatgaagataatcagcggccctc<br>agggatcccgagcgggttctctggctccaactctgggaacacagccactctgaccatcagagggaccagactgtggatg<br>aggctgactattactgtcaggcgtgggactccgacactttcgtggtcttcggcggaggggaccaagggtcaccgtcctaggttc<br>tagaggtggtggtgtagcggcgggcggtctggtggtggtggatccctcagatggccgaggtgcagctggtgga<br>gaccgggggaggcgtggtccagcctgggagggtccctgagactctcctgtgcagcctctggattcaccttcagtagttatgg<br>catgcactgggtccgccaggctccaggcaaggggctggagtgggtggcagttatatcacatgatggaagtaataaatacta<br>cgcgactccgtgaagggccgattcaccatctccagagacaattccaaggacacgctgtatctgcaaataaacagcctga<br>gaggtgaggacacggccgtatattactgtgcgcgctctaaccagtggctctggttacttctcttcgattactgggggtcaaggta<br>ctctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacgttc<br>cggactacgcttct [SEQ ID NO: 749] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| QSVLTQPPSVSVSPGQTASISCSGNKLGTKYVYWYQKRPGQSPVLVMYEDNQ<br>RPSGIPERFSGSNSGNTATLTIRGTQTVDEADYYCQAWDSDTFVVFGGGTKVT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

VLGSRGGGSGGGGSGGGGSLEMAEVQLVETGGGVVQPGRSLRLSCAASGF  
TFSSYGMHWVRQAPGKGLEWVAVISHDGSNKYYADSVKGRFTISRDNKDT  
LYLQMNSLRGEDTAVYYCARSNQWSGYFSFDYWGQGTLVTVSSTSGQAGQ  
HHHHHHGAYPYDVPDYAS [SEQ ID NO: 750]

Table 156

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-006</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| tcctatgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacatt<br>ggaagtaaaagtgtgactgtgtaccagcagaagccaggccaggcccctgtgtgtgtcatccattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgacctcagcaggggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtagtgatcatccttatgtcttcgggaactgggaccaaggtcacgt<br>cctaggttctagaggtggtggtgtagcggcggcggcggctctgtgtgtgtggtgatccctcgagatggccgaggtgcag<br>ctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacca<br>cctatggtatcagctgggtgcgacagggccctggacaagggcttgagtggatgggatgaacacttacaatggtcaca<br>caaatatgcacagaagctccagggcagagccacaatgaccgcagacacatccacgaacacagcctacatggagctga<br>ggagcctgagatctgacgacactgccgtgtattactgtgcgcgcgttatctacggttctggtgattactgggggtcaaggtact<br>ctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacgttcc<br>ggactacgttct [SEQ ID NO: 751] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVTVIHYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSKAS<br>GYTFTTYGISWVRQAPGQGLEWMGWINTYNGHTNYAQKLQGRATMTADTS<br>TNTAYMELRSLRSDDTAVYYCARVIYGSFDYWGQGTLVTVSSTSGQAGQHH<br>HHHHGAYPYDVPDYAS [SEQ ID NO: 752]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 157

|                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-007</b>                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                   |
| tcctatgtgctgactcagccactctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacatt<br>ggaagtaaaactgtgactgtgtaccagcagaagccaggccaggcccctgtgtgtgtcatctattatgatagcgaccggcc |

ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggctgaagccggg  
gatgaggccgactattactgtcaggtgtgggtagtagtagtgatcatcggtgttcggcggagggaaccaagctgaccgtc  
ctaggttctagaggtggtggtgtagcggcggcggcggcgtctggtggtggtggatccctcagatggccaggtgcagct  
gcaggagtcgggcccaggactggtgaagccttcggagaccctgtccctcacctgcaatgtctctggttactccatcagcag  
tggttacttttgggctggatccggcagccccagggaaggggctggagtggattgggagtatcatatagtaggagcac  
ctactacaacccgtccctcaagagtcgagtcaccatatacagtagacacgtccaagaaccagttctccctgaagctgaactct  
gtgaccgccgcagacacggcgtgtattactgtgcgcgcggttacggttacttcgattactgggggtcaagggtactctggtga  
ccgtctcctaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcagctccggactac  
gcttct [SEQ ID NO: 753]

Amino Acid Sequence

SYVLTQPLSVSVAPGKTARITCGNNIGSKTVHWYQQKPGQAPVLVIYYDSD  
RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHRVFGGGTKL  
TVLGSRGGGSGGGGSGGGGSLEMAQVQLQESGPGLVKPSETLSLTCNVSGY  
SISSGYFWGWIRQPPGKGLEWIGSIYHSRSTYYNPSLKSRVTISVDTSKNQFSL  
KLNSVTAADTAVYYCARGYGYFDYWQGTLVTVSSTSGQAGQH HHHHHHGA  
YPYDVDPDYAS [SEQ ID NO: 754]

Table 158

**ET200-008**

DNA Sequence

caatctgcctgactcagcctgcctccgtgtctgggtctcctggacagtcgacaccatctcctgcactggaaccagcagt  
acgttggtggttataactatgtctcctgttaccacaacaccaggcaaaagcccccactcatgatttatgatgtcagtaac  
ggccctcaggggttttaatecgttctctggtccaagtctggcaacacggcctccctgaccatctctgggtccaggctga  
ggacgaggctgattattactgcagctcatatacaagcagcagcacttcgaagggtgttcggcggagggaaccaagctgaccg  
tcctaggttctagaggtggtggtgtagcggcggcggcggcgtctggtggtggtggatccctcagatggccgaggtgcag  
ctggtggagtctgggggaggtgtgttacggcctgggggggtccctgagactctcctgtgcagcctctggattcacctttgtg  
attatggcatgagctgggtccgccaagctccagggaaggggctggagtgggtctctggtattaattggaatggtgtagca  
caggttatgcagactctgtgaagggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaaca  
gtctgagagccgaggacacggcgtatattactgtgcgcgctctaaatacaacttccatgtttactacgattactggggtaa  
ggtactctggtgaccgtctcctaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagca  
cgttccggactacgcttct [SEQ ID NO: 755]

Amino Acid Sequence

QSALTQPASVSGSPGQSITISCTGTSSDVGGYNYVSWYQQHPGKAPKLMYDV  
 SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCSSYTSSSTSKVFGGGTK  
 LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGGGVVVRPGGSLRLSCAAS  
 GFTFGDYGMSWVRQAPGKGLEWVSGINWNGGSTGYADSVKGRFTISRDN  
 KNSLYLQMNSLRAEDTAVYYCARSKYNFHVYYDYWGQGTLVTVSSTSGQA  
 GQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 756]

Table 159

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-009</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| cagtcgtgtgacgcagccaccctcagcgtctgggacccccgggcagacagtcaccatctctgttctggaagcaactcc<br>aaccatcggaagtaattatgtatactggtaccagcagctcccagggaacggccccaaactcctcatctataggaataatcagc<br>ggccctcaggggtccctgaccgattctcaggctccaagtctggcacctcagcctccctggccatcagtgggctccgctccg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgagtgcttatgtcttcggaactgggaccaaggtcaccgt<br>cctaggttctagaggtggtggtgtagcggcggcggcgctctggtggtggtgatccctcgagatggcccaggtgcag<br>ctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacca<br>gctatggtatcagctgggtgacagggccctggacaagggccttgagtggtggatggatcagcgttacaatggtaac<br>acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga<br>ggagcctgagatctgacgacactgccgtgtattactgtgcgcgctcttctgtaacatggttcttgaaagatatgtggggtc<br>aaggctactctgtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagc<br>gacgttccggactacgcttct [SEQ ID NO: 757] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| QSVLTQPPSASGTPGQTVTISCSGSNSNIGSNYVYWYQQLPGTAPKLLIYRNN<br>QRPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAAWDDSLSAYVFGTGT<br>KVTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK<br>ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTD<br>TSTSTAYMELRSLRSDDTAVYYCARSSGNMVSWKDMWGQGTLVTVSSTSG<br>QAGQH HHHHHHHGAYPYDVPDYAS [SEQ ID NO: 758]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 160

|                     |
|---------------------|
| <b>ET200-010</b>    |
| <u>DNA Sequence</u> |

caatctgccctgactcagcctgcctccgtgtctgggtctcctggacagtcgatcaccatctcctgcactggaaccagcagtg  
acgttggtggttataactctgtctcctggtaccaacaacacccaggcaaagccccagactcatgatttatgatgtcagtaatc  
ggccctcaggggttttaatcgtttctctggctccaagtctggcaacacggcctccctgaccatctctgggtccaggctga  
ggacgaggctgattattactgcagctcatatacaagcagcagcaccctttagtcttcggaactgggaccaaggtcaccgtc  
ctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcagatggcccagggtcagct  
ggtgcagtctggggctgaggtgaagaagcctggggcctcagtgaaggctctcctgcaaggcttctggttacacctttaccag  
ctatggtatcagctgggtgcgacaggcccctggacaagggttgagtggatgggatggatcagcgttacaatggttaaca  
caaatatgcacagaagctccaggggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctgag  
gagcctgagatctgacgacacggcctgtattactgtgcgcgcgggtgctgttgcttaccatgattggggtaagggtactctg  
gtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagacgttccgga  
ctacgttct [SEQ ID NO: 759]

Amino Acid Sequence

QSALTQPASVSGSPGQSITISCTGTSSDVGGYNSVSWYQQHPGKAPRLMIYDV  
SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYICSSYTSSSTPLVFGTGTK  
VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCKA  
SGYTFTSYGISWVRQAPGQGLEWMGWISA YNGNTNYAQKLQGRVTMTTDT  
STSTAYMELRSLRSDDTAVYYCARGAVAYHDWGQGTLVTVSSTSGQAGQH  
HHHHHGAYPYDVPDYAS [SEQ ID NO: 760]

Table 161

**ET200-011**

DNA Sequence

cagtctgtctgacgcagccgccctcagtgtctgcggccccaggacagagggtcaccatctcctgctctggaagcagctc  
caacatttcgatttatgatgtatcctggtatcagcagctcccaggaaacagccccaaaactectcatttatggcaataataagc  
accctcggggattgctgaccgattctctggctccacgtctggcacgtcagccaccctgggcatcaccggactccagactgg  
ggacgaggccgattattactgcggaacatgggatgacagtctgagtgggggggtgttcggcggagggaaccaagctgacc  
gtcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcagatggcccagatgca  
gctggtgcaatctggggctgaggtgaagaagcctgggtcctcgggaagggtctcctgcgaggcttctggaggcacctca  
gcagctatgctatcaactgggtgcgacaggcccctggacaagggttgagtggatgggagggatcaccctatgtttgta  
cagcacactacgcacagaagttccaggggcagagtcacgattaccgcggacgaatccacgaaaacagcctacatggagct  
gagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcgggtgttcattacgcttctttcgaatgggggtcaag  
gtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagac

|                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| gttcggactacgettct [SEQ ID NO: 761]                                                                                                                                                                                                                                                                                       |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                               |
| QSVVTQPPSVSAAAPGQRTISCSGSSSNISIYDVSQYQQLPGTAPKLLIYGNNK<br>RPSGIADRFSGSTSGTSATLGITGLQTGDEADYYCGTWDDSLSGGVFGGGTKL<br>TVLGSRRGGGSGGGGSGGGGSLEMAQMQLVQSGAEVKKPGSSVKVSCEASG<br>GTLSSYAINWVRQAPGQGLEWMGGIIPMFGTAHYAQKFQGRVTITADESTKT<br>AYMELSSLRSEDNAVYYCARGVHYASFDHWGQGTLLTVSSTSGQAGQHHH<br>HHHGAYPYDVPDYAS [SEQ ID NO: 762] |

Table 162

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-012</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| cagtctgtgtgacgcagccgccctcagtgtctgcggccgcaggacagaaggtcaccatctcctgctctggaagcgactcc<br>aacattgggaataattatgtgtcctggtatcaacacctcccaggacagccccaaactcctcatttatgacgttaaaatcga<br>ccctcagggaattctgaccggttctccggctccaagtctggctcgtcagccaccctaggcatcgccggactccagcctggg<br>gacgaggccgattattactgcggaacatgggacagtcggctggatgcctatgtcttcggaactgggaccaaggtcaccgtc<br>ctaggttctagaggtggtggtgtagcggcgccggcggctctggtggtggtgatccctcgagatggcccagatgcagct<br>ggtgcaatctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaagacttctggttcccccttaatatct<br>ttggaatcacctgggtgcgacaggccccctggacaagggcttgagtggtggatggatcagcggttacaacggtaacaca<br>gactaccacagaagttccagggcagagtcaccatgtccacagacacatccacgagtacagcctacatggagctgagga<br>acctgaaatctgacgacacggcgtgtattactgtgcgcgggtgcttacggtggtatggatactgggggtcaaggtactct<br>ggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggtccgg<br>actacgettct [SEQ ID NO: 763] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| QSVLTQPPSVSAAAGQKVTISCSGSDSNIGNNYVSWYQHLPGTAPKLLIYDVK<br>NRPSGIPDRFSGSKSGSSATLGIAGLQPGDEADYYCGTWDSRLDAYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAQMQLVQSGAEVKKPGASVKVSCKT<br>SGFPFNIFGITWVRQAPGQGLEWMGWISGYNGNTDYPQKFQGRVTMSTDST<br>STAYMELRNLSDDTAVYYCARGAYGGMDTWGQGTLLTVSSTSGQAGQHH<br>HHHHGAYPYDVPDYAS [SEQ ID NO: 764]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Table 163

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-013</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctcctgcactgggagcacctc<br>caacatcggggcaggttatgatgtacactggatcagcagcttcagggaacagccccaaactcctcatctataactaacaac<br>tttcggccctcaggggtccctgaccgattctctgectccaagtctggcacttcagcttcctggccatcactgggtctccaggct<br>gaggatgaggctgattattactgcggaacatgggatagcagcctgagtgccgttggttcggcggagggaaccaagctgac<br>cgtcctaggttctagagggtggtggtgtagcggcggcggcggtctggtggtggtggtgatccctcgagatggccgagggtgc<br>agctggtggagtctggaactgagggtgaagaagcctggggcctcagtgaagtctcctgcaaggcttctggttacatgtttac<br>cagttatggtctcaactgggtgcgacaggccccctggacaagggttgagtggatgggatggatcagcgctaacaatggtta<br>agacaaattatgctaagaaattccaggacagagtcaccatgaccagagacacttcacgagcacaggctacatggaactg<br>aggagcctgagatctgacgacacggccgtatattactgtgcgcgcataatcgggtgttcttacttcgatcgttggggtaag<br>gtactctggtgaccgtctcctaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccctgacgac<br>gttccggactacgcttct [SEQ ID NO: 765] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| QSVVTQPPSVSGAPGQRVTISCTGSTSNIGAGYDVHWYQQLPGTAPKLLIYTN<br>NFRPSGVDPDRFSASKSGTSASLAITGLQAEDEADYICGTWDSLSAVVFGGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGTEVKKPGASVKVSCKA<br>SGYMFTSYGLNWVRQAPGQGLEWMGWISANNGKTN YAKKFQDRVTMTRD<br>TSTSTGYMELRSLRSDDTAVYYCARHIGGSYFDRWGQGLTVTVSSTSGQAGQ<br>HHHHHHGAYPYDVPDYAS [SEQ ID NO: 766]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 164

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-014</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| tcctatgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaacaacatt<br>ggaagtaaaaagtgtgactggtaccagcagaagccaggccaggccctgtgctggtcatctattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtagtgatcattatgtcttcggaactgggaccaaggtcaccgtcct<br>aggttctagagggtggtggtgtagcggcggcggcggtctggtggtggtggatccctcgagatggccgagggtgcagctg<br>gtggagactgggggaggcttggtacagcctgggggggtccctgagactctcctgtgcagcctctggattcaccttagcagc<br>tatgccatgagctgggtccgccaggctccagggaaggggctggagtgggtctcagctattagtggtagtgatggttagcac<br>atactacgcagactccgtgaaggggcgggttcaccatctccagagacaattccaagaacacgctgtatctgcaaatgaacag |



cctgagagacgaggacacggccgtatattactgtgcgcgctctcatgaagctaacctggttggtgattggtgggtcaagg  
tactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcagct  
tccggactacgcttct [SEQ ID NO: 767]

Amino Acid Sequence

SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDSD  
RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHYVFGTGTKV  
TVLGSRRGGGSGGGGSGGGGSLEMAEVQLVETGGGLVQPGGSLRLSCAASG  
FTFSSYAMSWVRQAPGKGLEWVSAISGSDGSTYYADSVKGRFTISRDNKNT  
LYLQMNSLRDEDTAVYYCARSHANLVGDWWGQGLVTVSSTSGQAGQHH  
HHHHGAYPYDVPDYAS [SEQ ID NO: 768]

Table 165

**ET200-015**

DNA Sequence

cagtctgtggtgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacat  
tggaagtaaaagtgtgcactggtaccagcagaagccaggccaggccctgtgctggtcatctattatgatagcgaccggc  
cctcagggatccctgagcgattctctggtccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg  
ggatgaggccgactattactgtcaggtgtgggatagtagtagtgatgtggtattcggcggaggggaccaagctgaccgtcct  
aggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgagggtccagctg  
gtacagtctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctggttacaccttaccagct  
acggtatcagctgggtgcgacaggcccctggacaagggcctgagtggtggatggatcagcgcttacaatggtaacaca  
aactatgcacagaagctccagggcagagtcaccatgaccacagacatccacgagcacagcctacatggagctgagg  
agcctgagatctgacgacacggcgtgtattactgtgcgcgctgggggtggttcggtgctgttgatcattgggtcaaggt  
ctctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcagcttc  
cggactacgcttct [SEQ ID NO: 769]

Amino Acid Sequence

QSVVTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDSD  
RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDVVFGGGTKLT  
VLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSCKASG  
YTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDTSTS  
TAYMELRSLRSDDTAVYYCARWGGFGAVDHWGQGLVTVSSTSGQAGQHH  
HHHHGAYPYDVPDYAS [SEQ ID NO: 770]

Table 166

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-016</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| tcttctgagctgactcaggaccctgctgtgtctgtggccttgggacagacagtcaagatcacgtgccaaggagacagcctc<br>acagactaccatgcaacctggtaccagcagaagccaggacaggccctgtcgtgtcatctatgctacaacaaccggcc<br>cactgggatccagaccgattctctggttccagtccggaaacacagcttctttgaccatcactggggctcaggcggaagat<br>gaggctgactattactgtaattccgggacagcggcgacggacgaagtgttattcggcgaggggaccaagctgaccgtcct<br>aggttctagagggtggtggtgtagcggcggcgggcgtctggtggtggtgatccctcgagatggccgaggtgcagctg<br>gtggagactgggggaggcctggtcaagcctgggggggtccctgagactctcctgtgcagcctctggattcaccttcagtagc<br>tatagcatgaactgggtccgccaggctccagggaaggggctggagtgggtctcatccattagtagtagtagttacatat<br>actacgcagactcagtgaaggggcgttcaccatctccagagacaacgccaaagaactcactgtatctgcaaatgaacagc<br>ctgagagccgaggacacggccgtgtattactgtgcgcggcgtcagggttacgattactgggtcaagggtactctggtgacc<br>gtctctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacgtccggactacgc<br>ttct [SEQ ID NO: 771] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| SSELTQDPAVSVALGQTVKITCQGDSLTDYHATWYQQKPGQAPVAVIYATN<br>NRPTGIPDRFSGSSSGNTASLTITGAQAEDEADYYCNSRDSGTDEVLFGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVETGGGLVKPGGSLRLSCAAS<br>GFTFSSYSMNWVRQAPGKGLEWVSSISSSSYIYYADSVKGRFTISRDNKNS<br>LYLQMNSLRAEDTAVYYCARGQGQYDYWGQGLTVTSSTSGQAGQH HHHH<br>HGAYPYDVPDYAS [SEQ ID NO: 772]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 167

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-017</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Tcctatgtgctgactcagccaccctcgggtgtcagtggccccaggaaagacggccaggattacctgtgggggaacaaca<br>ttggaagtaaaaagtgtgcactggtaccagcagaagccaggccaggccctgtgctggtcgtctatgatgatagcgaccgg<br>ccctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgagcatcagcagggtcgaagccg<br>gggatgaggccgactattactgtcaggtgtgggtagtagtagtgatcatactgtcttcggaactgggaccaaggtcacctg<br>cctaggttctagagggtggtggtgtagcggcggcggcggcgtctggtggtggtgatccctcgagatggcccaggtgcag<br>ctacagcagtggggcgaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagtg |

|                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| gttactactggagctggatccgccagccccaggggaaggggctggagtggttggggaatcaatcatagtgaagcac<br>caactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgagctct<br>gtgaccgccgcggacacggccgtgtattactgtgcgcgtactaccgggtatggatatgtggggtcaagggtactctggtg<br>accgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccggtacgacgttccggacta<br>cgcttct [SEQ ID NO: 773] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                             |
| SYVLTQPPSVSVAPGKTARITCGNNIGSKSVHWYQQKPGQAPVLLVYDDSD<br>RPSGIPERFSGSNSGNTATLSISRVEAGDEADYYCQVWDSSSDHTVFGTGTKV<br>TVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAVYG<br>GSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRTISVDTSKNQFSL<br>KLSSVTAADTAVYYCARYYPGMDMWGQGTLVTVSSTSGQAGQHSHHHHHG<br>AYPYDVPDYAS [SEQ ID NO: 774]                                                    |

Table 168

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-018</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Caggctgtgctgactcagccgccctcaacgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctc<br>caacatcgggagaaatggtgtaaactgttaccagcagctccaggagcggccccaaagtctcatctataatgataatca<br>ggcaccctcaggggtccctgaccgagctcttggtctccagcttggtctcaggcacccctggccatcgaagggtctggtc<br>tgaggatgaggctgattattactgtgcggcatgggatgacagcctgcatggtgtggtattcggcggaggggaccaagctgac<br>cgtcctaggttctagagggtggtggtgtagcggcgggcggtctggtggtggtgatccctcagatggcccagggtcc<br>agctggtacagtctggggctgaggtgaagaagcctggggcctcagtgaagggtctcctgcaaggttccggatacacccctc<br>aatgaattatccatgcactgggtgcgacaggctcctggaaaagggttgagtggatgggaggttttgatctgaagatggtg<br>aaacaatctacgcacagaagtccagggcagagtcaccatgaccgaggacacatctacagacacagcctacatggagct<br>gagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcggtggttacgggtattcttgggggtcaagggtactctg<br>gtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccggtacgacgttccgga<br>ctacgttct [SEQ ID NO: 775] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| QAVLTQPPSTSGTPGQRVTISCSGSSSNIGRNGVNWYQQLPGAAPKVLINYN<br>QRPSGVPDRVSGSQSGSSGTLAIDGLRSEDEADYYCAAWDDSLHGVVFGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK<br>VSGYTLNELSMHWVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMTED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

TSTDTAYMELSSLRSEDVAVYYCARGGYGDSWGQGLVTVSSTSGQAGQHH  
HHHHGAYPYDVPDYAS [SEQ ID NO: 776]

Table 169

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-019</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctctgcacccgcagcagtggc<br>agcattgccagcaactatgtgcagtgggtaccagcagcggccgggcagtggccccaccactgtgatctataggataacca<br>aagacctctgggggtccctgatcgggttctctgggtccatcgacagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactgtcagctcttatgatagcagcaattctgggtgttcggcggagggaaccaagctga<br>ccgtcctaggttctagaggtgggtgggtgtagcggcggcgggcggctctgggtgggtggatccctcgagatggcccagggtg<br>cagctgggtgcaatctggggctgaggtgaagaggcctgggtcctcgggaaggtctctgcacggcttctggaggcacctt<br>cagcagcgatgctatcagctgggtgacagggccctggacaagggttgagtggatgggaggaatcatccctatgtttg<br>gtacagcaaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatgga<br>gctgagcagcctgagatctgaggacacggcgtgtattactgtgcgcgcgaaggttactactaccgtctgcttacctgggt<br>tctgttctgaacgacatcttctgtttacgatgaatgggggtcaagggtactctgggtgaccgtctcctcaactagtggccaggcc<br>ggccagcaccatcaccatcaccatggcgcataccgtacgacgttccggactacgcttct [SEQ ID NO: 777] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNSWVFGGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKRPGSSVKVSCA<br>SGGTFFSSDAISWVRQAPGQGLEWMGGIIPMFGTANYAQKFQGRVTITADEST<br>STAYMELSSLRSEDVAVYYCAREGYYYPSAYLGSVLNDISSVYDEWGQGLV<br>TVSSTSGQAGQHHHHHHGAYPYDVPDYAS [SEQ ID NO: 778]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 170

|                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-020</b>                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                        |
| Cagtctgtcgtgacgcagccgcctcagtgtctcggccccaggacagaaggtcaccatctctgctctggaagcacctc<br>caacattggaaataatgatgtatcctgggtaccagcagctcccggaacagccccaaactcctcatttatgacaataataagc<br>gacctcagggattcctgaccgattctctgggtccaagtctggcacgtcagccaccctgggcatcaccggactccagactg<br>gggacgaggccgattattactgcggaacatgggatagcagcgtgagtgttcttgggtcttcggcagagggaccaagctg |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| accgtcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtgcagctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctggttacaccttaccagctatggtatcagctgggtgcgacaggcccctggacaagggttgagtggatgggatggatcagcgcttacaatggtaacacaaactatccacagaagctccaggggcagagtcaccatgaccacagacccatccacgagcacagcctacatggagctgaggagcctgagatctgacgacacggccgtgtattactgtgcgcgctctatgacttcttcgattactggggtaaggtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggttcgggactacgcttct [SEQ ID NO: 779] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| QSVVTQPPSVSAAPGQKVTISCSGSTSNIGNNDVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSSVSASWVFGRGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK<br>ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYPQKLQGRVTMTTDP<br>STSTAYMELRSLRSDDTAVYYCARSMTSFDYWGQGLTVTSSTSGQAGQHH<br>HHHHGAYPYDVPDYAS [SEQ ID NO: 780]                                                                                                                                                                                                          |

Table 171

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-021</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Cagtctgtgtgacgcagccgcctcagtgtctgcccagggacagaaggtcaccatctcctgctctggaagcaactccaacattgggaataattatgtatcctggtatcagcaactcccaggacagccccaaactcctcatttatgacaataataagcgaccctcagggaattctgaccgattctctggctccagggtctggcacgtcagccacctgggcacaccggactccagactggggacgaggccgattattactgcggaacatggaataccactgtgactcctggctatgtcttcggaactgggaccaaggtcacctcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccgaagtgcagctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctggttacaccttaccagctatggtatcagctgggtgcgacaggcccctggacaagggttgagtggatgggatggatcagcgcttacaatggtaacacaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctgaggagcctgagatctgacgacaccgcatgtattactgtgcgcgctctgtttacgacctggatacttggggtaaggtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggttcgggactacgcttct [SEQ ID NO: 781] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| QSVLTQPPSVSAAPGQKVTISCSGSNSNIGNNYVSWYQQLPGTAPKLLIYDNN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

KRPSGIPDRFSGSRSGTSATLGITGLQTGDEADYYCGTWNTTVTPGYVFGTGT  
 KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSCK  
 ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTD  
 TSTSTAYMELRSLRSDDTAMYYCARSVYDLDTWGQGTLLVTVSSTSGQAGQH  
 HHHHHGAYPYDVPDYAS [SEQ ID NO: 782]

Table 172

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-022</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| cagtctgtcgtgacgcagccgcctcagtgtctgcggccccaggacagaaggtcaccatctctgctctggaagcagctc<br>caacattgggaataattatgtatcctggtaccagcagctcccaggaaacagccccaaactcctcattatgacaataataagc<br>gacctcagggattcctgaccgattctctggctccaagtctggcacgtcagccaccctgggcatcaccggactccagactg<br>gggacgaggccgattattactgcggaacatgggatagcagcctgggggccccttatgtcttcggaactgggaccaaggctc<br>accgtcctaggttctagaggtggtggtgtagcggcggcggcggcctctggtggtggtggatccctcgagatggccgaggt<br>gcagctggtgcagtcttggggaggctcggaaacagcctggcaggtccctgagactctctgtgcagcctctggattcacctt<br>gatgattatgccatgcactgggtccggcaagctccagggaagggcctggagtgggtctcaggtattagttggaatagcgggt<br>agcataggctatcgggactctgtgaagggccgattcaccatctccagagacaacgccaagaattccctgtatctgcaaatg<br>aacagtctgagagctgaggacaccgccatgtattactgtgcgcgctaccgtcaggttggttctgcttacgattcttgggggtca<br>aggtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacg<br>acgttcgggactacgcttct [SEQ ID NO: 783] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNNYVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSSLGAPYVFGTGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSWGGSEQPGRSLRLSCAA<br>SGFTFDDYAMHWVRQAPGKGLEWVSGISWNSGSIGYADSVKGRFTISRDN<br>KNSLYLQMNSLRAEDTAMYYCARYRQVGSAYDSWGQGTLLVTVSSTSGQAG<br>QH HHHHHH GAYPYDVPDYAS [SEQ ID NO: 784]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 173

|                                                                                  |
|----------------------------------------------------------------------------------|
| <b>ET200-023</b>                                                                 |
| <u>DNA Sequence</u>                                                              |
| ctgcctgtgctgactcagccaccctcggtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacat |

tggaagtaaaagtgtgcactggtatcagcagaagccaggccagggccctgtgctggtcgtctatgctgatagcgaccggc  
cctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggtcgaagccgg  
ggatgaggccgactattactgtcaggtgtgggtagtagtagttatcataattatgtcttcggaactgggaccaagggtcaccg  
tcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtggtatccctcagatggccgaggtgcag  
ctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacca  
gctatggtatcagctgggtgcgacaggcccctggacaaggggcttgagtggatgggatggatcagcgcttacaatggtaac  
acaaactatgcacagaagctccaggggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga  
gcagcctgagatctgaggacaccgcatgtattactgtgcgcgctactgggggttctggtgttctgatcgttgggggtcaaggt  
actctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccggtacgacgtt  
ccggactacgcttct [SEQ ID NO: 785]

#### Amino Acid Sequence

LPVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLLVYADSD  
RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSYHNHYVFGTGTK  
VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSKKAS  
GYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDTST  
TSTAYMELSSLRSEDTAMYYCARYWGFGVSDRWGQGTLVTVSSTSGQAGQ  
HHHHHHGAYPYDVPDYAS [SEQ ID NO: 786]

Table 174

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-024</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctcctgcaccggcagcagtggc<br>agcattgccagcaactatgtgcagtgtgtaccagcagcgccccgggcagtgccccaccactgtgatctataggataacca<br>aagacctctgggggtccccgatcgggtctctgggtccatcgacagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactactgtcagtccttatgacagcagcaatctttgggtgttcggcggaggggaccaagctga<br>ccgtcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtggtatccctcagatggcccagatg<br>cagctggtgcagtctggggctgaggtgaagaagcctgggtcctcgggtgaaggtctcctgcaaggcttctggaggcacctt<br>cagcagctatgctatcagctgggtgcgacaggcccctggacaagggttgagtggatgggagggatcatccctatctttgg<br>tacagcaaactacgcacagaagtccaggggcagagtcacgattaccggcgacgaatccacgagcacagcctacatggag<br>ctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgtacaactactactactacattcttgggggtcaagg<br>tactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccggtacgacgt<br>tccggactacgcttct [SEQ ID NO: 787] |

| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNLWVFGGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQMQLVQSGAEVKKPGSSVKVSCK<br>ASGGTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADEST<br>STAYMELSSLRSEDTAVYYCARYNYYYYDSWGQGTLLTVSSTSGQAGQH<br>HHHHGAYPYDVPDYAS [SEQ ID NO: 788] |

Table 175

| <b>ET200-025</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| gacatccagatgacccagtcctccctcctgtctgcatctgtaggagacagagtcaccatcacttgccgggcaagtcaga<br>gcattagcagctatttaaattggtatcagcagaaaccagggaagccctaagctcctgatctatgctgcatccagtttgcaa<br>agtgggggtcccatcaagggtcagtggcagtggtatctgggacagattcactctcaccatcagcagctctgcaacctgaagatt<br>tgcaacttactactgtcaacagagttacagtacccattcactttcggccctgggaccaaagtgatatcaaacgttctagag<br>gtggtggtggtagcggcggcggcggcctctggtggtggtggtatccctcgagatggccgaggtgcagctggtgcagctctgg<br>ggctgaggtgaagaagcctgggtcctcgtgaaggtctcctgcaaggcttctggaggcaccttcagcagctatgctatcag<br>ctgggtgcgacaggccctggacaagggttgagtggtgggagggatcatccctatcttggtagcaaaactacgcac<br>agaagttccagggcagagtcacgattaccggcgacgaatccacgagcacagcctacatggagctgagcagcctgagatc<br>tgaggacaccgccatgtattactgtgcgcgctactggggttacgactcttacgatgaatggggtcaagggtactctggtgacc<br>gtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggtccggactacgc<br>ttct [SEQ ID NO: 789] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSL<br>QSGVPSRFSGSGSGTDFTLTISLQPEDFATYYCQQSYSTPFTFGPGTKVDIKRS<br>RGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSCKASGGTFSS<br>YAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTSTAYMELS<br>SLRSEDTAMYYCARYWGYDSYDEWGQGTLLTVSSTSGQAGQH<br>HHHHHHHGA<br>YPYDVPDYAS [SEQ ID NO: 790]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 176

| <b>ET200-026</b> |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>DNA Sequence</u></p> <p>aattttatgctgactcagccccactctgtgtcggagctccgggggaagacggtaaccatctcctgcaccggcagcagtggc<br/> agcattgccagcaactatgtgcagtggtaccagcagcggccgggcagtgccccaccactgtgatctatgaggataacca<br/> aagaccctctggggtcctgatcgggttctctgggtccatcgacagctctccaactctgcctccctcaccatctctggactga<br/> agactgaggacgaggctgactactactgtcagtttatgatagcagcaattgggtgttcggcggaggggaccaagctgacc<br/> gtcctagggttctagagggtggtggtgtagcggcggcggcggtctgtggtggtggatccctcgagatggccgaggtcca<br/> gctggtgcagttctggggctgaggtgaagaagcctgggtctcgggtgaaggtctcctgcaaggcttctggaggcacctta<br/> gcagctatgctatcagctgggtgcgacaggccctggacaagggcttgagtggatgggagggatcatccctatctttgta<br/> cagcaaaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagct<br/> gagcagcctgagatctgaggacacggccgtgtattactgtgcgcgaacaaccattactacaacgattactggggtaagg<br/> tactctggtgaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcagct<br/> tccggactacgcttct [SEQ ID NO: 791]</p> |
| <p><u>Amino Acid Sequence</u></p> <p>NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br/> QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNWVFGGGTK<br/> LTVLGSRGGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSKAS<br/> GGTFSSYAISWVRQAPGQGLEWMGGIIPFGTANYAQKFQGRVTITADESTST<br/> AYMELSSLRSEDNAVYYCARNNHYYNDYWGGQGLTVTSSTSGQAGQHAAA<br/> HHGAYPYDVPDYAS [SEQ ID NO: 792]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 177

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-027</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcaggggggtcaccatcccctgcactgggagcagct<br>ccaacatcgggggcagggttatgatgtacactggtaccagcagcttcagggaagccccaaactcctcatctatggtaac<br>acaatcggccctcaggggtccctgaccgcttctctgggtccagggtctgggtcctcagcctccctggccatcactgggctcca<br>ggctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtgatgtggtattcggcggagggaaccaagg<br>caccgtcctaggttctagagggtggtggtgtagcggcgggcggtctggtggtggtggatccctcagatggccgag<br>gtccagctggtgcagtctggggctgagggtgaagaagcctggggctacagtgaaaatctcctgcaaggtttctggatacacc<br>ttcaccgactactacatgcactgggtgcaacaggccctggaaaagggttgagtggatgggacttggtgatcctgaagat<br>gggtgaaacaatatagcagagaagttccagggcagagtcaccataaccgcggacacgtctacagacacagcctacatgg<br>agctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcgctactgggttactcttcgactacctgtacatg |

|                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ccggaaggtaacgattggtggggtaagggtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcacatcaccatggcgcataccctacgacgttccggactacgcttct [SEQ ID NO: 793]                                                                                                                                                                                      |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                         |
| QSVLTQPPSVSGAPGQGVTIPCTGSSSNIGAGYDVHWYQQLPGTAPKLLIYGN<br>NNRPSGVPDRFSGSRSGSSASLAITGLQAEDEADYYCQSYDSSLSDVVFGGGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGATVKISCKV<br>SGYTFTDYMHVWVQQAPGKGLEWMGLVDPEDGETIYAEKFQGRVTITADTS<br>TDTAYMELSSLRSEDNAVYYCARYWSYSFDYLYMPEGNDWWGQGTLLVTVS<br>STSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 794] |

Table 178

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-028</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| cagtctgtgtgactcagccaccgcagcgtctgggacccccggacagagagtcaccatctctgttctggggcgctctcc<br>aacatcgggagtggtgctctaaattggtaccagcaactcccagggaacggccccaaactcctcatctatagtacaatcagc<br>ggccctcaggggtctctgaccgattctctggtccaggctctgccacctcagcctccctggccatcagtgggctccagtctga<br>ggatgaggctgattattactgtgcaacctgggatgatagtgtgaatggttgggtgttcggcggaggggaccaagctgaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccagggtccag<br>ctggtacagtctggagctgaggtgaagaagcctggggattcagtgaaggtctcctgcaagccttctggttacaattttctcaa<br>ctatggtatcaactgggtgcgacaggcccctggacaagggcttgagtggatgggatggattagcacttacaccggtaacac<br>aaactatgcacagaagctgcagggcagagtcacctcaccacagacacatccacgagcagacctacatggagatgagg<br>agcctgagatctgacgacacggccgtgtattactgtgcgcgcgacctgtactactacgaagggtgttgattactggggtaag<br>gtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccctacgac<br>gttccggactacgcttct [SEQ ID NO: 795] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| QSVLTQPPAASGTPGQRTVISCSSGVSNI GSGALNWYQQLPGTAPKLLIYSYN<br>QRPSGVSDRFSGSR SATSASLAISGLQSEDEADYYCATWDDSVNGWVFGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGDSVKVSCKP<br>SGYNFLNYGINWVRQAPGQGLEWMGWISTYTGNTNYAQKLQGRVTFTTDS<br>TSTAYMEMRSLRSDDNAVYYCARDLYYEGVDYWGQGTLLVTVSSTSGQAG<br>QHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 796]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 179

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| <b>ET200-029</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| caggctgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccagggttacctgtgggggaaacaaca<br>ttggaagtgaaagtgtgactggtaccagcagaagccaggccaggccccctgtgttggtcatctattatgataccgaccggc<br>cctcagggatccctgagcgattctctggctcccactctgggaccacggccaccctgaccatcagcagggtcgaagccgg<br>ggatgagggccgactattactgtcaggtgtgggatatagtagggatcatgtggtattcggcggagggaaccaagctgaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccagggtgcag<br>ctggtgcagtctgggggaggcgtggtccagcctgggagggtccctgagactctcctgtgcggcctctggattcaccttcagt<br>agctatgctatgcactgggtccggcagggtccaggcaagggaactggagtgggtggcagttatatcatatgatggaagcaat<br>aaatactacgcagactccgtgaagggcctattcaccatctccagagacaattccaagaacacgctgtatctgcaaatgaaca<br>gcctgagagctgaggacacggcctgtattactgtgcgcgcttacttcacttctggtttctacgattactgggggtcaaggta<br>ctctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtacgacgttc<br>cggactacgcttct [SEQ ID NO: 797] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| QAVLTQPPSVSVAPGKTARVTCGGNNIGSESVHWYQQKPGQAPVLVIYYDTD<br>RPSGIPERFSGSHSGTTATLTISRVEAGDEADYYCQVWDSSRDHVVFGGGTKL<br>TVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGGTVVQPGSLRLSCAASG<br>FTFSSYAMHWVRQAPGKGLEWVAVISYDGSNKYYADSVKGLFTISRDN SKN<br>TLYLQMNSLRAEDTAVYYCARSYFTSGFYDYWGQGLVTVSSTSGQAGQHH<br>HHHHGAYPYDVPDYAS [SEQ ID NO: 798]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 180

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| <b>ET200-030</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctcctgcactgggagcagttc<br>caacatcggggcaggttatgatgtaaattggtatcagcagttccaggaaacagccccaaactcctcatctatggttaacagc<br>aatcggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctccag<br>gctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtggctcttatgtcttcggaactgggaccaaggt<br>caccgtcctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccaga<br>tgcagctggtgcagtctggggctgaggtgaagaagcctggggcctcagtgaaggctcctgcaaggctccggatacacc<br>ctcactgaattatccatgcactgggtgcacaggctcctggaaaagggttgagtggatgggaggtttgatcctgaagatg |

|                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| gtgaaacaatctacgcacagaaggtccaggggcagagtcaccatgaccgaggacacatctacagacacagcctacatgga<br>gctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgcgatgtcttctatgtactacgattgggggtcaaggta<br>ctctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggttc<br>cggactacgcttct [SEQ ID NO: 799]                          |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                 |
| QSVVTQPPSVSGAPGQQRVTISCTGSSSNIGAGYDVNWYQQFPGTAPKLLIYGN<br>SNRPSGVPDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSLSGSYVFGTG<br>TKVTVLGSRRGGGSGGGGSGGGGSLEMAQMQLVQSGAEVKKPGASVKVSC<br>KASGYTLTELSMHVVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMTE<br>DTSTDTAYMELSSLRSEDVAVYYCARMSSMYDWDWGQGLTVTVSSTSGQAGQ<br>HHHHHHGAYPYDVPDYAS [SEQ ID NO: 800] |

Table 181

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-031</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| tcctatgtgctgactcagccaccctcagtgtcagtggccccaggaaagacggccaggattacctgtgggggaaacaacatt<br>ggaagtaaaagtgtgcaactggtaccagcagaagccaggccaggcccctgtgctggtcatctattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggtcgaagccggg<br>gatgaggccgactattactgtcaggtgtgggatagtagtgtgattatgtcttcggaactgggaccaaggtcaccgtcctag<br>gttctagaggtggtggtggtagcggcggcggcggcgtctggtggtggtggatccctcagatggccgaggtgcagctggt<br>ggagactgggggaggcttggtcaagcctggagggtccctgagactctcctgtgcagcctctggattcaccgtcagtgacta<br>ctacatgagctggatccgccagggtccaggggaaggcctggagtggatttcatacattagtggtagtggtaatagcatatac<br>tacgcagactctgtgaaggggccgattcaccatctccagggacaacgccaagaactcactggatctgcaaatgaccagcct<br>gagagccgaggacacggccgtatattactgtgcgcgctctactaaattcgattactggggtcaagggtactctggtgaccgtc<br>tcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagacgttccggactacgcttct<br>[SEQ ID NO: 801] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDS<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDYVFGTGTKVT<br>VLGSRGGGSGGGGSGGGGSLEMAEVQLVETGGGLVKPGGSLRLSCAASGF<br>TVSDYYMSWIRQAPGKGLEWISYISGSGNSIYYADSVKGRFTISRDNAKNSLD<br>LQMTSLRAEDTAVYYCARSTKFDYWGGQGLTVTSSTSGQAGQH HHHHHGA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                              |
|------------------------------|
| YPYDVDPDYAS [SEQ ID NO: 802] |
|------------------------------|

Table 182

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-032</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ctgcctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacgtcggaaagtacactgtaaactggtaccggcaactcccaggaacggccccacactcctcatctataataataatcagc<br>ggcctcaggggtccctgaccgattctctgactccaagtctggcacctcggcctccctgaccattagtgggtccagcctga<br>ggatgaggctgattattattgtgcagcatgggatgacaggctgggtggtatgtcttcggaactgggaccaaggtcaccgtc<br>ctaggttctagaggtgggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtgcagct<br>ggtgcagctctggagcagaggtgaaaaagccgggggagctctgaaatctcctgtaagggttctggatacagctttaccaa<br>ctactggatcggtggtgcgccagatccccgggaaaggcctggagtggtgggatcatctatcctggtgactctgatac<br>cagatacagcccgctcctccaaggccaggtcaccatctcagccgacaagtccatcagcaccgectacctacagtggagca<br>gcctgaaggcctcggacaccgccatgtattactgtgcgcgctctactggttcttctcatatgtctgatgaatggggtaaggtg<br>ctctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacgttc<br>cggactacgcttct [SEQ ID NO: 803] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| LPVLTQPPSASGTPGQRVTISCSGSSSNVGSYTVNWyRQLPGTAPTLIIYNNN<br>QRPSGVPDRFSDSKSGTSASLTISGLQPEDEADYYCAAWDDRLLGGYVFGTGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGESLKISCKG<br>SGYSFTNYWIGWVRQMPGKGLEWMGIIPGDS DTRYSPSFQGGVTVISADKSI<br>TAYLQWSSLKASDTAMYYCARSTGSSHMSDEWGQGLVTVSSTSGQAGQH<br>HHHHHGAYPYDVDPDYAS [SEQ ID NO: 804]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 183

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-033</b>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                               |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcaccggcagcagtggtc<br>agcattgccagcaactatgtgcagtggtaccagcagcggcgggagtgccccaccactgtgatctatgaggataacca<br>aagacctctggggtcctgatcgggttctctggctccatcagagctcctccaactctgcctccctcaccatctctggactga<br>agactgaggacgaggctgactactgtcagtccttatgatagcagcaatcattgggtgttcggcggaggggaccaagctga<br>ccgtcctaggttctagaggtggtggtgtagcggcggcggcggcgtctggtggtggtggatccctcgagatggcccaagtg |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cagctacagcagtggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggccttc<br>agtgggtactactggagctggatccgccagccccaggggaaggggctggagtggttggggagatcactcatagtggaa<br>ggtccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctga<br>gctctgtgaccgccgcggacacggccgtgtattactgtgcgcgctcttctatcatgtctgattactggggtaaggtactctg<br>gtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagacgttccgga<br>ctacgtttct [SEQ ID NO: 805] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| NFMLTQPHSVSESPGKTVTISCTGSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNHVVFGGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAY<br>YGGSFSGYYWSWIRQPPGKGLEWIGEITHSGRSNYPNPSLKSRVTISVDTSKNQ<br>FSLKLSSVTAADTAVYYCARSSIMSDYWQGQTLVTVSSTSGQAGQH HHHHH<br>GAYPYDVPDYAS [SEQ ID NO: 806]                                                                                                                                       |

Table 184

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-034</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| cagtctgtgtgacgcagccgccctcagtgctctggggccccagggcagagggtcaccatctcctgcactgggagcacctc<br>caacatcggggcaggttatgatgtacactggtaccagcagcttcagggaacagccccaaactcctcatcaacaataacg<br>gaatcggccctcaggggtccctgaccgattctctggctccaagtctggcacgtcagccaccctgggcatcaccggactcc<br>agactggggacgagggcgattattactgcggaacatgggatggcagcctgactggtgcagtgttcggcggaggggaccaa<br>gctgaccgtcctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccg<br>aggtccagctggtgcagtctggggctgaggtgaagaagcctgggtcctcggtgaaggtctcatgcaaggcttctggaggc<br>accttcagcagctatgctatcagctgggtgcgacaggccctggacaagggttgagtggatgggagggatcatccctatc<br>tttggtacagcaactacgcacagaagtccagggcagagtcacgattaccggcgacgaatccacgagcacagcctacat<br>ggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgcggttctgctctggaccattacgatcgttg<br>gggtcaagggtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacc<br>cgtagcaggttccggactacgtttct [SEQ ID NO: 807] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| QSVLTQPPSVSGAPGQRVTISCTGSTSNIGAGYDVHWYQQLPGTAPKLLINNN<br>RNRPSGVPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDGSLTGAVFGGG<br>TKLTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

ASGGTFSSYAISWVRQAPGQGLEWMGGIIPFGTANYAQKFQGRVTITADEST  
STAYMELSSLRSEDТАVYYCARGSALDHYDRWGQGTLVTVSSTSGQAGQH  
HHHHGAYPYDVPDYAS [SEQ ID NO: 808]

Table 185

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-035</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| aattttatgctgactcagccccactctgtgtcggagtcctccggggaagacggtaaccatctcctgcacccgcagcagtgga<br>gcattgccagcaactatgtgcagtggtaccagcagcggccgggcagtgccccaccactgtgatctatgaggataaccaa<br>agacctctggggctcctgatcggttctctggctccatcgacagctcctcaactctgcctccctcaccatctctggactgaa<br>gactgaggacgaggctgactactactgtcagtttatgtagcaccaattgggtgtcggcggaggggaccaagctgacct<br>cctaggttctagagggtgggtggttagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtgcag<br>ctggtgcagtcctggggctgaggtgaagaagcctgggtcctcggtaaggtctcctgcaaggcttctggaggcaccttcag<br>cagctatgctatcagctgggtgcgacaggcccctggacaagggcttgagtggatgggagggatcatccctatctttgtac<br>agcaaacacgcacagaagtccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagctg<br>agcagcctgagatctgaggacactgccgtgtattactgtgcgcgctacaactactacttaacgattactggggtaaggt<br>ctctggtgacctctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcggtc<br>cggactacgcttct [SEQ ID NO: 809] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTNWFVGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSKKAS<br>GGTFSSYAISWVRQAPGQGLEWMGGIIPFGTANYAQKFQGRVTITADESTST<br>AYMELSSLRSEDТАVYYCARYNYYFNDYWQGTLVTVSSTSGQAGQH<br>HHGAYPYDVPDYAS [SEQ ID NO: 810]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Table 186

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-037</b>                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                         |
| tcctatgtgctgactcagccacctcagtgctcagtggtcccccaggaaagacggccaggattacctgtgggggaaacaacatt<br>ggaagtaaaaagtgtgcactggtaccagcagaagccaggccaggcccctgtgctggtcatctattatgatagcgaccggcc<br>ctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcagggctgaagccggg |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>gatgaggccgactattactgtcaggtgtgggatagtagtagtgcaccccttatgtcttcggaactgggaccaaggtcaccgt<br/> cctaggttctagaggtggtggtgtagcggcggcggcggtctgtggtggtggatccctcgagatggcccagatgcag<br/> ctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacca<br/> gctatggtatcagctgggtgcgacaggcccctggacaagggcttgagtggatgggatgacgcgcttacaatggtaac<br/> acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga<br/> ggagcctgagatctgacgacactgccgtgtattactgtgcgcgctctatgttcggtgctcatgattcttggggtaaggtactc<br/> tggtgaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccggtacgacgtccg<br/> gactacgcttct [SEQ ID NO: 811]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>SYVLTQPPSVSVAPGKTARITCGGNNIGSKSVHWYQQKPGQAPVLVIYYDS<br/> RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK<br/> VTVLGSRRGGGSGGGGSGGGGSLEMAQMQLVQSGAEVKKPGASVKVSCA<br/> SGYTFTSYGISWVRQAPGQGLEWMGWISA YNGNTNYAQKLQGRVTMTTDT<br/> STSTAYMELRSLRSDDTAVYYCARSMFGAHSWGQGLVTVSSTSGQAGQH<br/> HHHHHGAYPYDVPDYAS [SEQ ID NO: 812]</p>                                                                                                                                                                                                                                                                                                                        |

Table 187

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-038</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>cagtctgtgtgacgcagccgccctcagtgtctggggccccagggcagagggtcaccatctctgcactgggagcagctc<br/> caacatcggggcaggttttgatgtacactggtaccagctacttccaggaaacagccccaaactcctcatctatgtaacagc<br/> aatcggccctcaggggtccctgaccgattctctggtccaagtctggcacctcagcctccctggccatcactgggctcctgg<br/> ctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtgtgtggtattcggcggaggggaccaagctga<br/> ccgtcctaggttctagaggtggtggtgtagcggcggcggcggtctgtgtggtggtggatccctcgagatggcccaggtg<br/> cagctggtgcaatctggggctgaggtgaagaagcctgggtcctcgtgaaggtctcctgcaaggcttctggaggcaccttc<br/> agcagctatgctatcagctgggtgcgacaggcccctggacaagggcttgagtggatgggagggatcatccctatctttggt<br/> acagcaactacgcacagaagttccagggcagagtcacgattaccggcgacgaatccacgagcacagcctacatggag<br/> ctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgggtgcttcttcgaccgtcatgataactggggta<br/> aggtactctggtgaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccggtacg<br/> acgttccggactacgcttct [SEQ ID NO: 813]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>QSVLTQPPSVSGAPGQRVTISCTGSSSNIGAGFDVHWYQLLPGTAPKLLIYANS</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



NRPSGVPDRFSGSKSGTSASLAITGLLAEDEADYYCQSYDSSLGCVVFGGGTK  
 LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSCKAS  
 GGTFFSSYAISWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTST  
 AYMELSSLRSEDTAVYYCARGASFDRHDNWGQGTLLVTVSSTSGQAGQH  
 HHHGAYPYDVPDYAS [SEQ ID NO: 814]

Table 188

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-039</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaccatctcctgcacccgcagcagtgga<br>gcattgccagcaactatgtgcagtggtaccagcagcggccgggcagttccccaccactgtgatctatgaggataacaaa<br>gacctctgggggtcctgatcggttctctgggtccatcgacagctcctccaactctgcctccctcaccatctctggactgaag<br>actgaggacgaggctgactactactgtcagttatgatagcagcaattgggtgttcggcggaggggaccaagctgaccgtc<br>ctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtccagct<br>ggtgcagctctggggctgaggtgaagaagcctgggtcctcggtgaaggctcctgcaaggcttctggaggcaccttcagca<br>gctatgctatcagctgggtgcgacaggccctggacaagggttgagtggatgggagggatccctatctttggtacag<br>caaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagctgag<br>cagcctgagatctgaggacacggcgtgtattactgtgcgcgtctaactactactacaacgattactgggggtcaaggtact<br>ctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcgttcc<br>ggactacgcttct [SEQ ID NO: 815] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSSPTTVIYEDNQ<br>RPSGVPDRFSGSIDSSNSASLTISGLKTEDEADYYCQSYDSSNWVFGGGTKLT<br>VLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSCKASGG<br>TFSSYAISWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTSTAY<br>MELSSLRSEDTAVYYCARSNYYYNDYWGQGTLLVTVSSTSGQAGQH<br>HHHHHHHH<br>GAYPYDVPDYAS [SEQ ID NO: 816]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 189

|                                                                                 |
|---------------------------------------------------------------------------------|
| <b>ET200-040</b>                                                                |
| <u>DNA Sequence</u>                                                             |
| cagtctgtgtgacgcagccgcctcagtgctctggggccccagggcagagggtcaccatctcctgcactgggagcagctc |

caacatcggggcaggttatgatgtacactggtaccagcagcttcagggaacagcccccactcctcatctatggtaacag  
 caatcggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggtcca  
 ggctgaggatgaggctgattattactgccagtcctatgacagcagcctgagtggttatgtcttcggaactgggaccaaggtc  
 accgtctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggtatccctgagatggcccaggt  
 gcagctggtgcagctctggggctgaggtgaagaagcctggggcctcagtgaaaggtctcctgcaaggtttccggatacacc  
 tctactgaattatccatgcactgggtgcgacaggctcctggaaaagggttgagtggtggtggtggtttgatcctgaagatgg  
 tgaacaatctacgcacagaagttccagggcagagtcacatgaccgaggacacatctacagacacagcctacatggag  
 ctgagcagcctgagatctgaggacactgccgtgtattactgtgcgcgctactctggtgtttactacgattggggtaaggtac  
 tctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggtcc  
 ggactacgttct [SEQ ID NO: 817]

#### Amino Acid Sequence

QSVLTQPPSVSGAPGQRVTISCTGSSSNIGAGYDVHWYQQLPGTAPKLLIYGN  
 SNRPSGV PDRFSGSKSGTSASLAITGLQAEDEADYYCQSYDSSLSGYVFGTGT  
 KVTVLGSRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK  
 VSGYTLTELSMHWVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMTED  
 TSTD TAYMELSSLRSEDTAVYYCARYSGVYYDWGQGT LVTVSSTSGQAGQH  
 HHHHHGAYPYDVPDYAS [SEQ ID NO: 818]

Table 190

#### **ET200-041**

#### DNA Sequence

aattttatgctgactcagccccactctgtgtcgggggtctccggggaagacggtaaccatctcctgcaccggcagcagtggc  
 agcattgccgacaactttgtgcagtggtaccagcagcggcggcggtgtccccaccactgtgatctttaatgatgacgaa  
 agacctctggcgtccctgatcggttctctggctccatcgacacctcctccaattctgctccctcaccatctctggactgaag  
 actgaggacgaggctgactactactgtcagtccttatgataataataatcagggggtgttcggcggaggggaccaagctgacc  
 gtctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggtatccctcagatggcccaggtcca  
 gctggtgcagctctggggctgaggtgaagaagcctgggtcctcgggtgaagggtctcctgcaaggcttctggaggcaccttca  
 gcagctatgctatcagctgggtgcgacaggccctggacaagggttgagtggtggtggtggtggtgaaccctaacagtgggt  
 aacacaggctatgcacagaagttccagggcagagtcacatgaccaggaacacctccataagcacagcctacatggagc  
 tgagcaacctgagatctgaggacacggccgtgtattactgtgcgcgctactactcttacgggttacgattggggtaaggtact  
 ctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggtcc  
 ggactacgttct [SEQ ID NO: 819]

| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>NFMLTQPHSVSGSPGKTVTISCTGSSGSIADNFVQWYQQRPGGVPTTVIFNDD<br/> ERPSGVPDRFSGSIDTSSNSASLTISGLKTEDEADYYCQSYDNNNRGVFGGGT<br/> KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKKPGSSVKVSCKA<br/> SGGTFSSYAISWVRQAPGQGLEWMGWMNPNSGNTGYAQKFQGRVTMTRNT<br/> SISTAYMELSNLRSEDTAVYYCARYYSYGYDWGQGTLVTVSSTSGQAGQHH<br/> HHHHGAYPYDVPDYAS [SEQ ID NO: 820]</p> |

Table 191

| <b>ET200-042</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>cagtctgtcgtgacgcagccgccctcagtgtctggggccccagggcagacggtcaccatctcctgcactgggggcagct<br/> ccaacatcgggacaggtattttgtaaattgtaccagcaggtccaggaaaagcccccactcctcctcctgggtaacaa<br/> taatcgccctcgggggtccctgaccgactctccggctccacgtccggcacctcagcctccctggccatcactgggctcca<br/> ggctgaggatgagggtacttattactgccagtcctatgacagcagcctgagtggttatgtcttcggaactgggaccaaggtc<br/> accgtcctaggttctagaggtggtggtgtagcggcgggcggcgtctggtggtggtgatccctcgagatggcccaggt<br/> acagctgcagcagtcaggtccaggactggtgaagccctgcagaccctctcactcacctgtggcatctccggggacagtg<br/> tctctaccaacagtgttgcttggcactggatcaggcagtcctccatcgagaggccttgagtggctgggaaggacatactaca<br/> ggccaagtggctaatgactatggagtatctgtgaaaagtcgaatcaccatcatccagacacatccaagaaccagttctcc<br/> ctgcagctgaactctgtgactcccaggacacggctgtgtattactgtgcgcgtcttcttcttggtaccagatcttcgattact<br/> gggggtcaagggtactctggtgaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatac<br/> ccgtacgacgttcggactacgcttet [SEQ ID NO: 821]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>QSVVTQPPSVSGAPGQTVTISCTGGSSNIGTGYFVNWYQQVPGKAPKLLILGN<br/> NNRPSGVPDRLSGSTSGTSASLAITGLQAEDEGTYYCQSYDSSLSGYVFGTGT<br/> KVTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQSGPGLVKPSQTLSTLCGIS<br/> GDSVSTNSVAWHWIRQSPSRGLEWLGRITYRSKWSNDYGVSVKSRITIIPDTS<br/> KNQFSLQLNSVTPEDTAVYYCARSSSWYQIFDYWGQGTLVTVSSTSGQAGQ<br/> HHHHHHGAYPYDVPDYAS [SEQ ID NO: 822]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 192

| <b>ET200-043</b> |
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| aattttatgctgactcagccccactctgtgtcggagctctccggggaagacggtaaccatctcctgcaccggcagcagcgac<br>agcatagccaacaactatgttcagtgggtaccagcagcgccccgggcagtgccccaccaatgtgatctacgaagatgtcca<br>aagacctcttgggggtccctgatcgggttcttgggtccatcgacagctcctccaactctgcctccctcaccatcttggactga<br>agactgaggacgaggctgtctactattgtcagttatcatagcgacaatcgttgggtgttcggcggcgaggaccaagctgac<br>cgtcctaggttctagagggtgtgtgtgttagcggcgggcggtctgtgtgtgtgtgatccctcgagatggcccagggtgc<br>agctgggtggagtctgggggaggcttgggtacagcctgggggggtccctgagactctcctgtgcagccttggattcacctttag<br>cagctatgccatgagctgggtccgccagggtccagggaaggggctggagtgggtctcagctattagtggtagtgggtgta<br>gcacatactacgcagactccgtgaaggggccggtcaccatctccagagacaattccaagaacacgctgtatctgcaaatga<br>acagcctgagagccgaggacacggccgtatattactgtgcgcgctctgtgtgcttactgggactactctgtttacgatgaatg<br>gggtcaagggtactctgggtaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacc<br>cgtacgacgttccggactacgttct [SEQ ID NO: 823] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| NFMLTQPHSVSESPGKTVTISCTGSSDSIANNYVQWYQQRPGSAPTNVIYEDV<br>QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEAVYYCQSYHSDNRWVFGGGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVESGGGLVQPGGSLRLSCAA<br>SGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNK<br>NTLYLQMNSLRAEDTAVYYCARSGAYWDYSVYDEWQGQTLVTVSSTSGQA<br>GQH HH HH HHGAYPYDVPDYAS [SEQ ID NO: 824]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 193

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-044</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| cagtctgtgtgactcagccaccctcagtgtccgtgtccccaggacagacagccaccatcgctgttctggacataaattgg<br>gggataaatatgcttctgtgtatcagcagaagtcgggccagtcacctgtgtgtatcatctatcaggataataagcggccctca<br>gggattcctgagcgattcttggctccaactctgggaacacagccactctgaccatcagcgggacccaggctctggatgag<br>gctgactattattgtcaggcgtgggacagtagtacttatgtggcattcggcggaggggaccaagctgaccgtcctaggttcta<br>gagggtgggtggtagcggcgggcgggcgtctgtgtgtgtggatccctcgagatggcccagggtgcagctgcaggagt<br>ccggcccaggactggtgaagccttcggagaccctgtccctcacctgcgtgtctctgtgtggtccatcagcagtagtaactg<br>gtggagctgggtccgccagccccagggaaggggctggagtggattgggaaatctatcatagtgggagccccaactac<br>aaccatccctcaagagtcgagtcaccatatcagtagacaagtccaagaaccagttctccctgaagctgagctctgtgacc<br>ggcgcgacacggccgtgtattactgtgcgcgatgactactcatacttccggttacgatgcttgggtcaagggtactctggt |



Table 195

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| <b>ET200-069</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| cagtctgtcgtgacgcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaagtaattatgtatactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggcctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccgggtccg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgagtggttatgtcttcggaactgggaccaagctgaccgt<br>cctaggttctagagggtgggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtgcag<br>ctacagcagtggggcgcaggactgttgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagt<br>gttactactggagctggatccgccagccccagggaaggggctggagtggattggggaaatcaatcatagtgaagcac<br>caactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgagctct<br>gtgaccgccgcggacacggccgtgtattactgtgcgcgcctgtacgaaggtggttaccatggttgggggttcttgggtctctt<br>ctgattcttggggtaaggtactctggtgaccgtctcctcaactagtggccagggccggccagcaccatcaccatcaccatgg<br>cgcataccctgtagcaggttccggactacgcttct [SEQ ID NO: 829] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| QSVVTQPPSASGTPGQRVTISCSGSSSNIGSNYVYWYQQLPGTAPKLLIYSNN<br>QRPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAA WDDSLSGYVFGTGT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAY<br>YGGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRVTISVDTSKNQ<br>FSLKLSSVTAADTAVYYCARLYEGGYHGWGSWLSSDSWGQGLTVTVSSTSG<br>QAGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 830]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 196

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-078</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| cagtctgtgtgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaagtaatactgtaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggcctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttattgggtgttcggcggagggaaccaagctga<br>ccgtcctaggttctagagggtgggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtg<br>cagctacagcagtggggcgcaggactgttgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttc<br>agtggttactactggagctggatccgccagccccagggaaggggctggagtggattggggaaatcaatcatagtggaa |

gcaccaactacaacccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctga  
gctctgtgaccgccgcggacacggctgtgtattactgtgcgcgcgaagggcatttgatgctttgatatactggggccaagg  
gacaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcagc  
ttccggactacgcttct [SEQ ID NO: 831]

Amino Acid Sequence

QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ  
RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYWVFGGT  
KLTVLGSRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAV  
YGGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRVTISVDTSKNQ  
FSLKLSSVTAADTAVYYCAREGAFDAFDIWGQGTMTVVSSTSGQAGQHFFF  
HHGAYPYDVPDYAS [SEQ ID NO: 832]

Table 197

**ET200-079**

DNA Sequence

tcctatgagctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc  
aacatcggaagtaattatgtatactgtaccagcagctcccaggaacggccccaaactcttcatctataggaataatcagc  
ggccctcaggggtccctgaccgattctctggctccaagcttggcacctcagcctccctggccatcagtgggctccggctcg  
aggatgaggctgattattactgtgcagcatgggatgacagcctgagtggttatctcttcggaactgggaccaaggtcaccgt  
cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcagatggccgaggtgcag  
ctggtggagtctgggggaggcttggtacagcctggcaggctcctgagactctctgtgcagcctctggattcaccttgatg  
attatgccatgcactgggtccggcaagctccagggaagggcctggagtgggtctcagggtattagtggaatagtggtagca  
taggctatgcggactctgtgaaggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaaca  
gtctgagagctgaggacacggccttgattactgtgcaaatggcactccaactactactacgggtatggacgtctggggcca  
agggaccacggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagc  
gacgttccggactacgcttct [SEQ ID NO: 833]

Amino Acid Sequence

SYELTQPPSASGTPGQRVTISCSGSSSNIGSNYVYWYQQLPGTAPKLFYRNNQ  
RPSGVPDRFSGSKSGTSASLAISGLRSEDEADYYCAAWDDSLSGYLFGTGTKV  
TVLGSRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGRSLRLSCAASG  
FTFDDYAMHWVRQAPGKGLEWVSGISWNSGSGYADSVKGRFTISRDNANK  
SLYLQMNSLR AEDTALYYCANGDSNYYYGMDVWGQGT VTVSSTSGQAGQ

HHHHHHGAYPYDVPDYAS [SEQ ID NO: 834]

Table 198

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| <b>ET200-081</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| cagtctgccctgactcagcctgcctccgtgtccgggtctctggacagtcgatcaccatctctgcactggaaccagcagtg<br>acattggtggtataactatgtctcctggtaccaacaacaccaggcaagccccaaactcatgatttatgatgtcagtaate<br>ggcctcaggggttttaatcgcttctctggctccaagtctggcaacacggcctcctgaccatctctgggtccaggctga<br>ggacgaggctgattattactgcattcatatacacgcacctggaaccctatgtcttcgggagtgaggaccaaggtcaccgtc<br>ctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtgcagct<br>ggtgcagctctgggggagggcgtggtacagcctgggggggtccctgagactctctgtgcagcctctggattcacctttgatgat<br>tatgccatgcactgggtccgtcaagctccagggaagggtctggagtggtctctcttattagtggggatggtggtgacacat<br>actatgcagactctgtgaagggccgattcaccatctccagagacaacagcaaaaactcctgtatctgcaaatgaacagtct<br>gagaactgaggacaccgccttgattactgtgaaaagatcgggcagcagctggctactactactacggtatggacgtctg<br>gggccaagggaccacggtcaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatac<br>ccgtacgacgttccggactacgettct [SEQ ID NO: 835] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| QSALTQPASVSGSPGQSITISCTGTSSDIGGYNYVSWYQQHPGKAPKLMIYDV<br>SNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCISYTRTWNPYVFGSGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGGGVVQPGGSLRLSCAA<br>SGFTFDDYAMHWVRQAPGKGLEWVSLISGDGGSTYYADSVKGRFTISRDNS<br>KNSLYLQMNSLRTEDTALYYCAKDRAAAGYYYYGMDVWGQGTTVTVSSTS<br>GQAGQH HHHHHH GAYPYDVPDYAS [SEQ ID NO: 836]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 199

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-097</b>                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                            |
| ctgcctgtgctgactcagccaccctcagtgtccgtgtccccaggacagacagccatcatcacctgctctggagataaattgg<br>gggaaaaatatgttctctggtatcagcagaagccaggccagtcacctgtactggtcatcgaataaccaggaggccct<br>cagggatccctgagcgattctctggctccaactctgggaccacagccactctgaccatcagcgggaccaggctatggat<br>gaggctgactattactgtcaggcgtgggacaggggtgtggtattcggcggaggggaccaagctgaccgtcctaggttctag<br>aggtggtggtgtagcggcggcggcggctctggtggtggtggtatccctcgagatggccgaggtgcagctggtggagtct |



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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>gggggagacttggtacagcctggcaggctccctgagactctcctgtgcagcctctggattcacctttaatgattatgccatgca<br/>ctgggtccggcaagctccagggaaggcctggagtggtctcagggtattagttggagtggtaataacataggctatgcgg<br/>actctgtgaaggccgattcaccatctccagagacaacgccaaactccctgtatctgcaaatgaacagctctgagagctg<br/>aggacacggccttgattactgtgaaaagatagtatacgggtatggcatcacctggggagggtttgactactggggccaggg<br/>aaccctggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacg<br/>ttccggactacgcttct [SEQ ID NO: 837]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>LPVLTQPPSVSVSPGQTAITCSGDKLGEKYVSWYQQKPGQSPVLVIDQDTRR<br/>PSGIPERFSGSNSGTTATLTISGTQAMDEADYYCQAWDRGVVFGGGTKLTVL<br/>GSRGGGGSGGGGSGGGGSLEMAEVQLVESGGDLVQPGRSLRLSCAASGFTF<br/>NDYAMHWVRQAPGKGLEWVSGISWSGNNIGYADSVKGRFTISRDNAKNSLY<br/>LQMNSLRAEDTALYYCAKDSIRYGITWGGFDYWGGTGLVTVSSTSGQAGQH<br/>HHHHHGAYPYDVPDYAS [SEQ ID NO: 838]</p>                                                                                                                                                  |

Table 200

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| <b>ET200-098</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>cagcctgtgctgactcagccaccctcgggtccaagggttgagacagaccgccacactcacctgactgggaacagca<br/>acaatgttgcaacctaggagtagcttggtgcagcagcaccaggccaccctccaaactcctatcctacaggaataaca<br/>accggccctcagggatctcagagagattatctgcatccagggtcaggaaacacagcctccctgaccattactggactccagc<br/>ctgaggacgaggctgactattactgctcagcatgggacagtagcctcagtgttggtgttcggcggagggaaccaagctg<br/>accgtcctaggttctagaggtggtggtgtagcggcggcggcggcctctggtggtggtggatccctcgagatggccgaggt<br/>gcagctggtggagtctgggggagtcgtgtacagcctggggggtccctgagactctcctgtgcagcctctggattcacctt<br/>gatgattatgccatgcactgggtccgtcaagctccggggaagggtctggagtgggtctctcttattaattgggatggtgtag<br/>cacctactatgcagactctgtgaagggtcattcaccatctccagagacaacagcaaaaactccctgtatctgcaaatgaac<br/>agtctgagagctgaggacaccgccttgattactgtgaaaagggtaggcctgaggcgcttgactactggggccaggg<br/>aaccctggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacg<br/>ttccggactacgcttct [SEQ ID NO: 839]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>QPVLTQPPSVSKGLRQTATLTCTGNSNNVGNLGVAWLQQHQGHPPKLLSYR<br/>NNNRPSGISERLSASRSGNTASLTITGLQPEDEADYYCSAWDSSLSAWVFGGG<br/>TKLTVLGSRRGGGGSGGGGSGGGGSLEMAEVQLVESGGVVVQPGGSLRLSCA</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

ASGFTFDDYAMHWVRQAPGKGLEWVSLINWDGGSTYYADSVKGRFTISRDN  
SKNSLYLQMNSLRAEDTALYYCAKGMGLRAFDYWGQGTLVTVSSTSGQAG  
QH HHHHHHGAYPYDVPDYAS [SEQ ID NO: 840]

Table 201

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| <b>ET200-099</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| cagctgtgttgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctctgttctggaagcagctcc<br>aacatcgggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaatgatcagc<br>ggcctcaggggtccctgaccgattctctggctccaagtccggcacctcagcctccctggccatcagtgggctccagtctg<br>aggatgaggctgattattactgtgcttcatgggatgacagcctgaatggcgttatgtcttcggaactgggaccaaggtcacc<br>gtcctaggttctagagggtggtggtgtagcggcggcgggcgtctggtggtggtggtgatccctcagatggcccagggtcca<br>gctggtacagtctggggctgaggtgaggaagcctggggcctcagtgaaggtttctgcaagacttctggatacaccttcag<br>ttggtatgctatacattgggtgcgccaggccccggacaaaggcttgagtggatgggatggatcaacgctggcaatggaa<br>acacaaaatattcacagaaatttcagggcagagtcagttaccaggggacacatccgcgagcacagcctacatggagctg<br>agcagcctgagatctgatgacacggctgtgtattactgtgcgagacccgataattatggttcgggtggggatgttttgatatac<br>tggggccaagggacaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatggcgcata<br>cccgtacgacgttcggactacgcttct [SEQ ID NO: 841] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNDQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCASWDDSLNGRYVFGTGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVRKPGASVKVSKK<br>TSGYTFSWYAIHWVRQAPGQRLEWMGWINAGNGNTKYSQKFQGRVSLTRD<br>TSASTAYMELSSLRSDDTAVYYCARPDNYGSGGDVFDIWGQGTMTVTSSTS<br>GQAGQH HHHHHHGAYPYDVPDYAS [SEQ ID NO: 842]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 202

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-100</b>                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                        |
| aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctctgcacccgcagcagtgga<br>gcattgccagcaactttgtgcagtggtaccagcagcggccgggcagtgccccaccctatgatctatgaggataacaaca<br>gacccctgggggtccctgatcggttctctgcctccgtcgacagctcctccaactctgcctccctcaccatctctggactgaag |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| actgaggacgagggctgactactactgtcagtccttatgataccagcaatgtggtattcggcggggggaccaagctgaccgtc<br>ctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtgcagct<br>ggtggagctctgggggagggcttggtacagcctggaggggtccctgagactctctgtgcagcctctggattcaccttcagtagt<br>tatgaaatgaactgggtccgccaggtccaggggaaggggctggagtgggttcatacattagtagtagtggttagtaccatat<br>actacgcagactctgtgaagggccgattcacctctccagagacaacgccaaagaactcactgtatctgcaaatgaacagcc<br>tgagagccgaggacacggctgtttattactgtgcacgctgggactacgggtatggacgtctggggccaagggaaccacggctc<br>accgtctcctcaactagtgccagggccggccagcaccatcaccatcaccatggcgcataccggtacgacgttcgggacta<br>cgcttct [SEQ ID NO: 843] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| NFMLTQPHSVSESPGKTVTISCTRSSGSIASNFVQWYQQRPGSAPTPMIYEDN<br>NRPPGVPDRFSASVDSSSNSASLTISGLKTEDEADYYCQSYDTSNVVFGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGGSLRLSCAAS<br>GFTFSSYEMNWVRQAPGKGLEWVSYISSSGSTIYYADSVKGRFTISRDNKNS<br>LYLQMNSLRAEDTAVYYCARWDYGMDVWGQGTTVTVSSTSGQAGQHFFFH<br>HHGAYPYDVPDYAS [SEQ ID NO: 844]                                                                                                                                                                                                                                                                                                                          |

Table 203

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| <b>ET200-101</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| caggctgtgctgactcagccaccctcagcgtctggggccccgggcagaggggtcaccgtctcttgttctggaagcaactc<br>caacatcggagtaactacgttaactgttaccagcagttcccagggaacggccccaaactcctcatgtatagtagtagtcag<br>cggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccactctg<br>aggatgaggctgattattactgtgctacatgggatgacagcctgaatgcttgggtgttcggcggaggggaccaagctgaccg<br>tcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtccag<br>ctggtgcagctctggggctgaggtgaggaagcctggggcctcagtgaaggttcctgcaagacttctggatacaccttcactt<br>gggtatgctatacattgggtgcgccaggccccggacaaaggcttgagtggatgggatggatcaacgctggcagtgga<br>cacaaaatattcacagaaattcagggcagagtcacccttaccagggaacacatccgcgagcacagcgtacatggagctga<br>gcagcctgagatctgatgacacggctgtgtattactgtgcgagaccaataactatggttcgggtggggatgttttgatatct<br>ggggccaagggaacatgggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatggcgcata<br>cccgtacgacgttcgggactacgttct [SEQ ID NO: 845] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| QAVLTQPPSASGAPGQRVTVSCSGSNSNIGSNYVNWYQQFPGTAPKLLMYSS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

SQRPSGVPDFRFSGSKSGTSASLAISGLHSEDEADYYCATWDDSLNAWVFGGG  
TKLTVLGSRGGGSGGGSGGGGSLEMAEVQLVQSGAEVRKPGASVKVSKK  
TSGYTFTWYAIHWVRQAPGQRLEWMGWINAGSGNTKYSQKFQGRVTLTRD  
TSASTAYMELSSLRSDDTAVYYCARPNNYGSGGDVFDIWGQGTMTVSSTS  
GQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 846]

Table 204

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-102</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| cagtctgtcgtgacgcagccgccctcagtgctcgcgccccaggacagaaggtcaccatctcctgctctggaagcagctc<br>caacattgggaataattatgtatcctggtaccagcagctcccaggaacagccccc aaactcctcatttatgacaataataagc<br>gacctcagggattcctgaccgattctctggctccaagtctggcacgtcagccaccctgggcatcaccggactccagactg<br>gggacgagggccgattattactgcggaacatgggatagcagcctgagtgcttatgtcttcggaactgggaccaagggtcacc<br>gtcctaggttctagaggtggtggtggtagcggcggcggcggtctggtggtggtggatccctcagatggcccaggtcca<br>gctggtgcagctctggggctgaggtgaagaagcctggggcctcagtgaaagtctcctgcaaggcttctggatacaccttcac<br>gaactatgctctgcattgggtgcgccaggccccggacaagggttgagtgatggcatggatcaacggtggcaatggta<br>acacaaaatattcacagaacttccagggcagagtcaccattaccagggacacatccgcgagcacagcctatatggagctg<br>agcagcctgagatctgaagacacggctgtgtattactgtgcgaaaccggaggaaacagctggaacaatccactttgactac<br>tggggccaggggaaccccggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcgat<br>accggtacgacgttccggactacgcttct [SEQ ID NO: 847] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN<br>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSLSAYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCKA<br>SGYTFTNYALHWVRQAPGQGLEWMAWINGGNGNTKYSQNFQGRVTITRDT<br>SASTAYMELSSLRSEDVAVYYCAKPEETAGTIHFDYWQGTPVTVSSTSGQA<br>GQH HHHHHH GAYPYDVPDYAS [SEQ ID NO: 848]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Table 205

|                                                                                 |
|---------------------------------------------------------------------------------|
| <b>ET200-103</b>                                                                |
| <u>DNA Sequence</u>                                                             |
| caggctgtgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctcctgcaccgcagcagtgg |

cagcattgccagcaactatgtgcagtggtaccagcagcggcggcagtgccccaccactgtgatctatgaggataacc  
 aaagacctctggggtcctgatcgggtctctggctccatcgacagctcctccaactctgcctccctaccatctctggactg  
 aagactgaggacgaggctgactactactgtcagtttatgatagcaccatcacgggtttcggcggaggggaccaagctgac  
 cgtcttaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggtgatccctcgagatggcccaggctc  
 agctggtacagtctggggctgaggtgaagaagcctgggtcctcgggaaggtctcctgcaaggcttctggaggcacctca  
 gcagctatgctatcagctgggtgacagggccctggacaagggtgagtgatggaggggatcatccctatctttgta  
 cagcaaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagct  
 gagcagcctgagatctgaggacacggcgtgtattactgtcgggggagggttactatgatagtagtgttattcaacgggt  
 gatgcttttgatatctggggccaagggaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatc  
 accatggcgcatacccgtagcaggtccggactacgcttct [SEQ ID NO: 849]

#### Amino Acid Sequence

QAVLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN  
 QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTITVFGGGTKL  
 TVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSKASG  
 GTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTSTA  
 YMELSSLRSEDYAVYYCAGEGYDSSGYNGDAFDIWGQGTMTVTSSTSGQ  
 AGQHSHHHHGA YPYDVPDYAS [SEQ ID NO: 850]

Table 206

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-104</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>aattttatgctgactcagccccactctgtgtcggagtctccggggaagacggtaaccatctcctgcacccgcagcagtgga<br/>           gcattgccagcaactatgtgcagtggtaccagcagcggcggcagtgccccaccactgtgatctatgaggataacaa<br/>           agacctctggggtcctgatcgggtctctggctccatcgacagctcctccaactctgcctccctaccatctctggactgaa<br/>           gactgaggacgaggctgactactactgtcagtttatgatagcagcaatgtggtattcggcggaggggaccaaggtcaccgt<br/>           cctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtgcag<br/>           ctggtggagtctgggggagggttggtacagcctggagggtccctgagactctcctgtgcagcctctggattcaccttcagta<br/>           gttatgaaatgaactgggtccgccagggtccagggaaggggctggagtgggtttcatacattagtagtagtgtagtaccat<br/>           atactacgcagactctgtgaagggccgattcaccatctccagagacaacgccaaagaactcactgtatctgcaaatgaacag<br/>           cctgagagccgaggacacggctgtttattactgtgcacgtgggactacgggtatggacgtctggggccaagggaaccag<br/>           gtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggtccgga<br/>           ctacgcttct [SEQ ID NO: 851]</p> |

| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>NFMLTQPHSVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSAPTTVIYEDN<br/>         QRPSGVPDRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSSNVVFGGGTKV<br/>         TVLGSRGGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGGSLRLSCAASG<br/>         FTFSSYEMNWVRQAPGKGLEWVSYISSSGSTIYYADSVKGRFTISRDNAKNSL<br/>         YLQMNSLRAEDTAVYYCARWDYGMDVWGQGTTVTVSSTSGQAGQH HHHH<br/>         HGAYPYDVPDYAS [SEQ ID NO: 852]</p> |

Table 207

| <b>ET200-105</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>tcctatgtgctgactcagccaccctcagtgtccgtgtccccaggacagacagccagcatcacctgctctggagatagattga<br/>         cgaataaatatgtttctggtatcaacagaagccaggccagtcacctgtgttggtcatctatgaggatgccaagcggccctc<br/>         agggatccctgcgcgattctctggctcaactctgggaacacagccactctgaccatcagcgggacccaggctatggatg<br/>         agtctgaatattactgtcaggcgtgggacagcagtggtggtgttttggcggagggaaccaagctgaccgtcctaggttctag<br/>         aggtggtggtggtagcggcggcggcggcctctggtggtggtggatccctcgagatggccgaggtgcagctggtggagtct<br/>         gggggaggccttggtacagcctggcaggtccctgagactctcctgtgcagcctctggatttacctttgatgattatgccatgca<br/>         ctgggtccggcaagctccagggaaggcctggagtggtgtcaggtattagttggaatagtggtagtataggctatgcgga<br/>         ctctgtgaagggccgattcaccatctccagagacaacccaagaactccctgtatctgcaaatgaacagctctgagagatga<br/>         ggacacggccttgattactgtgaaaagaccgaggggggggagttatcgttaaggatgcttttgatatctggggccaagg<br/>         gacaatggtcaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcagc<br/>         ttccggactacgcttct [SEQ ID NO: 853]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>SYVLTQPPSVSVSPGQTASITCSGDRLTNKYVSWYQQKPGQSPVLVIYEDAKR<br/>         PSGIPARFSGSNSGNTATLTISGTQAMDESEYYCQAWDSSVVVFGGGTKLTVL<br/>         GSRGGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQGRSLRLSCAASGFTF<br/>         DDYAMHWVRQAPGKGLEWVSGISWNSGSIGYADSVKGRFTISRDNAKNSLY<br/>         LQMNSLRDEDTALYYCAKDRGGGVIVKDAFDIWGQGTMTVSSTSGQAGQ<br/>         HHHHHHGAYPYDVPDYAS [SEQ ID NO: 854]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 208

| <b>ET200-106</b> |
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| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tcctatgagctgactcagccacccgcagcgtctgggacccccggacagagagtcaccatctcttgttctgggggcgtctcc<br>aacatcgggagtgggtctctaaattggtaccagcaactcccaggaacggccccaaactcctcatctatagttaaatcagc<br>ggccctcaggggtctctgaccgattctctggctccaggtctgccacctcagcctccctggccatcagtgggctccagtctga<br>ggatgaggctgattattactgtgcaacctgggatgatagtgtgaatggttgggtgttcggcggaggggaccaagctgaccgt<br>cctaggttctagaggtgggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccgaggtgcag<br>ctggtggagtctggagctgaggtgaagaagcctggggattcagtgaaaggtctctctgcaagccttctggttacaattttctaa<br>ctatggtatcaactgggtgcgacaggccccctggacaagggttgagtggatgggattagcacttacaccggtaacac<br>aaactatgcacagaagctgcagggcagagtcacctcaccacagacacatccacgagcacagcctacatggagatgagg<br>agcctgagatctgacgacacggccgtgtattactgtgcgcgccagcaggggtggtggtgtacgatgtttgggtcaaggt<br>actctggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggtt<br>ccggactacgcttct [SEQ ID NO: 855] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SYELTQPPAASGTPGQRVTISCSGGVSNIGSGALNWFYQQLPGTAPKLLIYSYN<br>QRPSGVSDRFSGRSATSASLAISGLQSEDEADYYCATWDDSVNGWVFGGTT<br>KLTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGAIEVKKPGDSVKVSKP<br>SGYNFLNYGINWVRQAPGQGLEWMGWISTYTGNTNYAQLQGRVTFTTDS<br>TSTAYMEMRSLRSDDTAVYYCARQQGGGWYDVWGQGTLLTVSSTSGQAG<br>QHHHHHHGAYPYDVPDYAS [SEQ ID NO: 856]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 209

| <b>ET200-107</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| cagtctgtcgtgacgcagccgccctcagtgtctgcggccccaggagagaaggtcaccatctctctgctctggaagcaacttc<br>aatgttgaaataatgatgtatcctggtatcagcaactcccaggtgcagccccaaactcctcatttatgacaataataagcg<br>accctcagggattctgaccgattctctggctccaagtctggcacgtcagccaccctggacatcaccgggctccacagtga<br>cgacgaggccgattattactgcggaacatgggatagcagcctgaatactgggggggtcttcggaactgggaccaaggtca<br>ccgtcctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccgaggtc<br>cagctggtgcagtctggagctgaggtgaagaagcctggggcctcagtgaaaggtctctgcaaggcttctggttacacctta<br>ccagctatactatcagctgggtacgacaggccccctggacaagggttgagtggatgggatgagcacttacaatggtc<br>tcacaaactatgcacagaacctccagggcagagtcacatgactacagacacattcacgaccacagcctacatggagctg<br>aggagcctcagatctgacgacacggccgtgtattactgtgtgagagaggggtccccgactacggtgacttcgcgtccttt |

|                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| gactactggggccagggaaacctggcaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatg<br>gcgcatacccgtagcaggtccggactacgcttct [SEQ ID NO: 857]                                                                                                                                                                                            |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                      |
| QSVVTQPPSVSAAPGEKVTISCSGSNFNVGNNDSWYQQLPGAAPKLLIYDN<br>NKRPSGIPDRFSGSKSGTSATLDITGLHSDDEADYYCGTWDSSLNTGGVFGTG<br>TKVTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSC<br>KASGYTFTSYTISWVRQAPGQGLEWMGWISTYNGLTNYAQNQLQGRVTMTTD<br>TFTTTAYMELRSLRSDDTAVYYCVREGSPDYGDFASFDYWQGQTLVTVSSTS<br>GQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 858] |

Table 210

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-108</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| cagtctgtgtgacgcagccgccctcagtgtctgccccgggacagaaggtcaccatctctgctctggaagcagctcc<br>aacattgggaataattatgtatcctggtaccagcagttccaggaacagccccaaactcctcatttatgacaataataagcg<br>accctcagggatttctgaccgattctctggctccaagtctggcacgtcagccaccctgggcatcgccggactccagactgg<br>ggacgaggccgattattactgcggaacatgggataccagcctgagtggttttatgtcttcggaagtgggaccaaggtcacc<br>gtcctaggttctagaggtggtggtgtagcggcggcggcgctctggtggtggtgatccctcgagatggccgaggtcca<br>gctggtacagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacacctttacc<br>agctatactatcagctgggtacgacagggccctggacaagggttgagtggatgggatgagcagcacttacaatggtctc<br>acaaactatgcacagaacctccagggcagagtcaccatgactacagacattcacgaccacagcctacatggagctgag<br>gagcctcagatctgacgacacggcgtgtattactgtgtgagagaggggtccccgactacgggtgacttcgctcctttga<br>ctactggggccagggaaacctggcaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatggc<br>gcatacccgtagcaggtccggactacgcttct [SEQ ID NO: 859] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| QSVLTQPPSVSAPPGQKVTISCSGSSSNIGNNNYVSWYQQFPGTAPKLLIYDNN<br>KRPSGISDRFSGSKSGTSATLGIAGLQTGDEADYYCGTWDTSLSGFYVFGSGT<br>KVTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSCK<br>ASGYTFTSYTISWVRQAPGQGLEWMGWISTYNGLTNYAQNQLQGRVTMTTDT<br>FTTTAYMELRSLRSDDTAVYYCVREGSPDYGDFASFDYWQGQTLVTVSSTSG<br>QAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 860]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



Table 211

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-109</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ctgcctgtgtgactcagccaccctcagcgtctgcgacccccgggcagagggtcaccatctcttgttctggaaccacctcc<br>aacatcgggaagtaatactgtacactggtaccagcagctcccaggacggccccaaactcctcatctataataataatcagc<br>ggccctcaggggtccctgaccgattctctggtccaagtctggcacctcagcctccctggccatcagtgggctccgggtccg<br>aggatgaggctacatattcctgtgcaacatgggatgacagcctgagtggtgtggtcttcggcggaggggaccaagctgacc<br>gtcctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggccgagggtcca<br>gctggtgcagctctggggctgaggtgaagaagcctgggtcctcgggtgaaggctcctgcaaggcttctggaggcaccttca<br>gcagctatgctatcagctgggtgcgacaggccctggacaagggtgagtggtggaggatcatccctatctttgta<br>cagcaaactacgcacagaagttccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagct<br>gagcagcctgagatctgaggacacggccgtgtattactgtgcgagagatcccgcctacggtgactacgagtatgatgctttt<br>gatatctggggccaaggggacaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatgg<br>cgcataccctgtagcaggttccggactacgcttct [SEQ ID NO: 861] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| LPVLTQPPSASATPGQRVTISCSGTTSNIGSNTVHWYQQLPGTAPKLLIYNNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLRSEDEATYSCATWDDSLSGVVFGGGTKL<br>TVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSKASG<br>GTFSSYAIWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTSTA<br>YMELSSLRSEDVAVYYCARDPAYGDYEYDAFDIWGQGTMTVSSTSGQAGQ<br>HHHHHHGAYPYDVPDYAS [SEQ ID NO: 862]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 212

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-110</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| cagctctgtgtgacgcagccgccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcgggaactaatggtgtaactggtccagcagttcccaggacggccccaaactcctcatctataactaatgatcagc<br>ggccctcaggggtccctgaccgattctctggtccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>cggatgaggctgattattactgtgcagtgtgggaccacagcctgaatggtccggtgttcggcggaggggaccaagctgacc<br>gtcctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtgca<br>gctggtgcagctctggggctgaggtgaagaagcctgggtcctcgggtgaaggctcctgcaaggcttctggaggcaccttca<br>gcagctatgctatcagctgggtgcgacaggccctggacaagggttgaagtggtggaggatcatccctatctttgta |

|                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cagcaaaactacgcacagaagtccagggcagagtcacgattaccgcggacgaatccacgagcacagcctacatggagctgagcagcctgagatctgaggacacggccgtgtattactgtgcgagagggggccggttttgatgctttgatatctggggccaa<br>gggacaatggtcaccgtctcttcaactagtggccagggccggccagcaccatcaccatcaccatggcgcatacccgtacgacgttcgactacgcttct [SEQ ID NO: 863]                                  |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                |
| QSVLTQPPSASGTPGQRVTISCSGSSSNIGTNGVNWFFQQFPGTAPKLLIYTNDQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSADEADYYCAVWDHSLNGPVFGGGTK<br>LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGSSVKVSKAS<br>GGTFSSYAISWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTST<br>AYMELSSLRSEDYAVYYCARGAGFDADFIDWGQGTMTVTSSTSGQAGQH HHH<br>HHGAYPYDVPDYAS [SEQ ID NO: 864] |

Table 213

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-111</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttcttctggaagcagctcc<br>aacatcgggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>aggatgagactgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcagatggcccaggtgcag<br>ctacagcagtgggggcgcaggactgtgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagt<br>gttactactggagctggatccgccagccccagggaaggggctggagtggattggggaatcaatcatagtggaagcac<br>caactacaaccgtccctcaagagtcgagtcaccatatcagtagacagctccaagaaccagttctccctgaagctgagctct<br>gtgaccgccgcggacacggctgtgtattactgtgcgagagaggggctagatgcttttgatatctggggccaagggacaat<br>ggtcaccgtctcttcaactagtggccagggccggccagcaccatcaccatcaccatggcgcatacccgtacgacgttcggg<br>actacgcttct [SEQ ID NO: 865] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRFSGSKSGTSASLAISGLQSEDETDYYCAAWDDSLNGYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAVY<br>GGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRTISVDTSKNQF<br>SLKLSSVTAADTAVYYCAREGLDAFDIDWGQGTMTVTSSTSGQAGQH HHHHHH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                               |
|-------------------------------|
| GAYPYDVPDYAS [SEQ ID NO: 866] |
|-------------------------------|

Table 214

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-112</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaagtaatactgtaaactggtaccagcagctcccaggaacggccccaactcctcatgtatagtaatgatcag<br>cggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtct<br>gaggatgaggctgattattattgtgcagcatgggatgacagcctgaatggttatgtcttcgcagctgggacccagctcaccg<br>ttttaagttctagagggtggtggtggtagcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtgcagc<br>tacagcagtgggggcgcaggactgttgaagccttcggagaccctgtccctcacctgcgctgtctatggtgggtccttcagtgg<br>ttactactggagctggatccgccagccccaggaaggggctggagtgattggggaaatcaatcatagtgggaagcacc<br>aactacaaccgtccctcaagagtcgagtcaccatatcagtagacacgtccaagaaccagttctccctgaagctgagctctg<br>tgaccgccgcggacacggctgtgtattactgtgcgagagaggggctagatgctttgatatctggggccaagggacaatg<br>gtcacctgtcttcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagacgttccgga<br>ctacgcttct [SEQ ID NO: 867] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTNVNWWYQQLPGTAPKLLMYSND<br>QRPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFAAGT<br>QLTVLSSRGGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCAV<br>YGGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYPNPSLKSRVTISVDTSKNQ<br>FSLKLSSVTAADTAVYYCAREGLDAFDIWGQGTMTVVSSTSGQAGQH HHHH<br>HGAYPYDVPDYAS [SEQ ID NO: 868]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 215

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-113</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| cagtctgtcgtgacgcagccgccctcagtgtctgcgccccaggacagaagggtcaccatctctgtcttgaagcagctc<br>caacattgggaataattatgtatcctggtaccagcagctcccaggaacagccccaaactcctcatttatgacaataataagc<br>gacctcagggattctgaccgattctctggctccaagtctggcacgtcagccaccctgggcatactggactccagactg<br>gggacgaggccgattattactgcggaacatgggatatagcagcctgagtgtctgcttatgtcttcggaactgggaccaaggtca<br>ccgtcctaggttctagagggtggtggtggtagcggcggcggcggcggctctggtggtggtggatccctcgagatggcccaggtc |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>cagctggtacagtctggagctgaggtgaagaagcctggggcctcagtgaaggtctcctgcaaggcttctggttacagcttta<br/>ccagctatactatcagctgggttcgacaggcccctggacaaggccttgagtggatgggatgggtcagcacttacaatggtc<br/>tcagaaactatgcacagaacctccaggggcagagtcacatgactacagacacactcacgaccacagcctacatggagctg<br/>aggagcctcagatctgacgacacggcgtgtattattgtgtgagagaggggtccccgactacggtgacttcgcggccttt<br/>gactactggggccaggggcacctggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatg<br/>gcgcatacccgtagcaggtccggactacgcttct [SEQ ID NO: 869]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>QSVVTQPPSVSAAPGQKVTISCSGSSSNIGNNYVSWYQQLPGTAPKLLIYDNN<br/>KRPSGIPDRFSGSKSGTSATLGITGLQTGDEADYYCGTWDSLSAAYVFGTGT<br/>KVTVLGSRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCK<br/>ASGYSFTSYTISWVRQAPGQGLEWMGWVSTYNGLRNYAQNQLQGRVTMTTD<br/>TLTTTAYMELRSLRSDDTAVYYCVREGSPDYGDFAAFDYWGQGLTVTVSST<br/>SGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 870]</p>                                                                                                                                                           |

Table 216

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-114</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>caggctgtgctgactcagccaccctcagcgtctgagacccccgggcagagggtcaccatctcttcttctggaagcaggtcc<br/>aacatcggaactaatattgtactgtgtaccagcagcggccagggaatggccccaaactcctcacttatggtatgcggcgg<br/>ccctcaggggtcccgaccgattctctggtccaaagtgtggcacctcagcctccctggccatcagtggggtccagtctgag<br/>gatgaggctgattattattgtgcagcatgggatgacagtctgaatgggtccggcttctggcggagggaaccaagctgaccgtc<br/>ctaggttctagaggtggtggtgtagcggcggcggcggcgtctggtggtggtggtggtccctcagatggccaggtgcagct<br/>acagcagtggggcgagcaggactgtgaagccttcggagacacctgtccctcacctgcgctgtctatggtgggtccttcagtgg<br/>tactactggagctggatccgccagccccaggggaaggggctggagtggttggggaaatcaatcatagtggaagcacca<br/>actacaacccgtccctcaagagtcgagtcacatatacagtagacacgtccaagaaccagttctccctgaagctgagctctgt<br/>gaccgccgggacacggctgtgtattactgtgcgagagacgggtgggggctactttgactactggggccagggaaccctg<br/>gtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtagcaggtccgga<br/>ctacgcttct [SEQ ID NO: 871]</p> |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>QAVLTQPPSASETPGQRVTISCSGSRSNIGNIVHWYQQRPGMAPKLLTYGSR<br/>RPSGVPDRFSGSKFGTSASLAISGLQSEDEADYYCAAWDDSLNGPAFGGGTK<br/>LTVLGSRRGGGSGGGGSGGGGSLEMAQVQLQQWGAGLLKPSETLSLTCVY</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

GGSFSGYYWSWIRQPPGKGLEWIGEINHSGSTNYNPSLKSRVTISVDTSKNQF  
SLKLSSVTAADTAVYYCARDGGGYFDYWGGTLVTVSSTSGQAGQH HHHH  
HGAYPYDVPDYAS [SEQ ID NO: 872]

Table 217

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-115</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| cagctctgtgtgacgcagccgccctcagtgctctggggccccagggcagagggtcaccatctctgcactgggagcagctc<br>caatatcggggcacgttatgatgtacactggtaccagcaactcccaggaacagcccccgactcctcatctctgctaactac<br>gatcggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcactgggctccag<br>gctgaggatgaggctgattattactgccagtcctatgacagcagtgtagtgcttgggtgttcggcggaggggaccaaggctc<br>accgtcctaggttctagagggtggtggtgtagcggcgggcgggcctctggtggtggtggatccctcgagatggccgaagt<br>gcagctggtgcagctctggggctgaagtgaaggagcctggggcctcagtgaggatctcctgccaggcatctggatacaact<br>tcatcagttattatgcactgggtgcggcagggcccctgggcaaggctctgagtggatgggcaccatcaaccaggcagtg<br>gtgagacagactactcacagaagttgcagggcagagtcaccatgaccagggaccgctccacgggtacattcgacatggg<br>gctgagcagcctgacatctggggacacggcctctattattgtcgacaggtctcatcagaggagctagc gatgctttta<br>atctggggccgggggacaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatggcg<br>catacccgtagcaggttccggactacgcttct [SEQ ID NO: 873] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| QSVLTQPPSVSGAPGQRVTISCTGSSSNIGARYDVHWYQQLPGTAPRLLISAN<br>YDRPSGVPDRFSGSGSKSGTSASLAITGLQAEDEADYYCQSYDSSVSAWVFGGG<br>TKVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKEPGASVRISCQ<br>ASGYNFISYYMHWVRQAPGQGLEWMGTINPGSGETDYSQKLQGRVTMTRDP<br>STGTFTDMLSSLTSGDTAVYYCATGLIRGASDAFNIWGRGTMVTVSSTSGQA<br>GQH HHHHHHGAYPYDVPDYAS [SEQ ID NO: 874]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 218

|                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-116</b>                                                                                                                                                                                                                                             |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                          |
| cagcctgtgctgactcagccaccctcagtgctccgtgtccccaggacagacggccgccatccccctgttctggagataaagtg<br>ggggataaatttgcttctggtatcagcagaagccaggccagtcctctgtgctggtcatctatcaagataactaagcggccct<br>cagggatccctgagcgattctctggctccaactctgggaacacagccactctgaccatcagcgggaccagcctatggat |

gaggctgactattactgtcagacgtggggccagcggcattgtggtgttcggcggaggggaccaagctgaccgtcctaggttct  
agaggtggtggtggtagcggcggcggcggcgtctgtggtggtggatccctcagatggccaggtacagctgcagcagt  
cagggtccaggactggtgaagccctcgcagaccctctcactcacctgtgccatctccggggacagtgtctctagcaacagt  
ctgcttggaaactggatcaggcagtcctccatcgagaggccttgagtggctgggaaggacatactacaggtccaagtggata  
atgattatgcagtatctgtgaaaagtcgaataacctcaaccagacacatccaagaaccagttctccctgcagctgaactct  
gtgactcccaggacacggctgtgtattactgtgcaagagagcgcagtggtggaagggaatttgactactggggccagggg  
aacctggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcagc  
ttccggactacgcttct [SEQ ID NO: 875]

### Amino Acid Sequence

QPVLTQPPSVSVSPGQTAAIPCSGDKLGDKFASWYQQKPGQSPVLVIYQDTRK  
PSGIPERFSGSNSGNTATLTISGTQAMDEADYYCQTWASGIVVFGGGTKLTVL  
GSRGGGGSGGGGSGGGGSLEMAQVQLQQSGPGLVKPSQTLSTCAISGDSVS  
SNSAAWNWIRQSPSRGLEWLGRITYYRSKWYNDYAVSVKSRITINPDTSKNQF  
SLQLNSVTPEDTAVYYCARERSGWKGFDYWGQGLVTVSSTSGQAGQH  
HHH  
HHHGAYPYDVPDYAS [SEQ ID NO: 876]

Table 219

## ET200-117

### DNA Sequence

gatgttgatgactcagtcaccacctccctgtccgtcaccctggagagccggcctccatcacctgcaggctcagtcaga  
gcctcctggaaagaaatgcatacaactacttggattggtacctgcagaggccaggacagtctccacagctcctgatctactt  
gggttctaatcggggccgccgggggtccctgacagggtcagtggcagtggtatcaggcagagattttactgaaaatcagca  
gagtgaggacctgaggatgttgggggtttattactgcatgcaagctctacaagctccgttcactttcggcggaggggaccaaggt  
ggagatcaaacgttctagagggtggtggtgtagcggcggcggcggcgtctggtggtggtggatccctcagatggccgaa  
gtgcagctggtgcagtctgggggaggcttgggtacagcctgggggggtccctgagactctcctgtgcagcctctggattcacc  
tttagcagctatgccatgagctgggtccgccaggctccagggaaggggctggagtgggtctcagctattagtggtagtggt  
ggtagcacatactacgcagactccgtgaaggggcgggttcaccatctccagacaaattccaagaacacgctgtatctgcaa  
atgaacagcctgagagccgaggacacggccgtatattactgtgcgaaatggggcccgttcaggatgcttttgatatctggg  
gccaaagggacaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccg  
tacgacgttccggactacgttct [SEQ ID NO: 877]

## Amino Acid Sequence

DVVMTQSPPSLSVTPGEPASITCRSSOSLLERNAYNYLDWYLQRPQSPOLLI

YLGSNRAAGVPDRFSGSGSGRDFTLKISRVEPEDVGVYYCMQALQAPFTFGG  
 GTKVEIKRSRGGGSGGGGSGGGGSLEMAEVQLVQSGGGLVQPGGSLRLSC  
 AASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDN  
 SKNTLYLQMNSLRAEDTAVYYCAKWGPFQDAFDIWGQGTMVTVSSTSGQA  
 GQHHHHHHGAYPYDVPDYAS [SEQ ID NO: 878]

Table 220

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-118</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| caggctgtgctgactcagcctgcctccgtgtctgggtctctggacagtcgatcaccatctctgcactggaaccagcagtg<br>acgttggtggttataactatgtctctgttaccacagcaccggggcaagccccaaactcatgatttatgaggtcagtaat<br>cggccctcaggggtttctaatacgttctctggctccaagtctggcaacacggcctcctgaccatctctgggtccaggctg<br>aggacgaggctgattattactgcagctcatatacaagcagcagcacccttatgtcttcggagcagggaccaaggcaccg<br>tcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtggatccctcgagatggccgaggtgcag<br>ctggtggagtctgggggaggcttggtacagcctggcaggctcctgagactctctgtgcagcctctggattcaccttgatg<br>attatgccatgcactgggtccggcaagctccagggaagggcctggagtgggtctcaggtattagttggaatagtggtagca<br>taggctatgcggactctgtgaagggccgattcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaaca<br>gtctgagagctgaggacacggccttgattactgtgaaaagccagggtggacagcagtggcacagaccaccactttgact<br>actggggccagggaacgctggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgc<br>atacccgtagcagcttccggactacgcttct [SEQ ID NO: 879] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| QAVLTQPASVSGSPGQSITISCTGTSSDVGGYNYVSWYQQHPGKAPKLMIE<br>VSNRPSGVSNRFSGSKSGNTASLTISGLQAEDEADYYCSSYTSSSTPYVFGAGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVESGGGLVQPGRSLRLSCAA<br>SGFTFDDYAMHWVRQAPGKGLEWVSGISWNSGSIGYADSVKGRFTISRDN<br>KNSLYLQMNSLRAEDTALYYCAKARWTAVASDHHFDYWQGTLTVSSTS<br>GQAGQHHHHHHGAYPYDVPDYAS [SEQ ID NO: 880]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 221

|                                                                                   |
|-----------------------------------------------------------------------------------|
| <b>ET200-119</b>                                                                  |
| <u>DNA Sequence</u>                                                               |
| caggctgtgcttactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc |

aacatcggaaagtaataactgtaaactggtaccagcagctcccaggaacggccccc aaactcctcatctatagtaataatcagc  
ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg  
aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaagctgaccgt  
cctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtgcag  
ctggtgcagtctggggctgaggtgaagaagcctgggtcctcggatgaagggtcctcgaaggcttctggaggcaccttcag  
cagctatgctatcagctgggtgcgacaggcccctggacaagggttgagtggatgggagggatcatccctatctttggtac  
agcaaaactacgcacagaagttccagggcagagtcacgattaccggcgacgaatccacgagcacagcctacatggagctg  
agcagcctgagatctgaggacacggcgtgtattactgtgcgagagattgggactacatggacgtctggggcaaagggga  
ccacggtcaccgtctcctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccgtacgacgtt  
ccggactacgcttct [SEQ ID NO:881]

#### Amino Acid Sequence

QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ  
RPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK  
LTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVCKAS  
GGTFSSYAISWVRQAPGQGLEWMGGIPIFGTANYAQKFQGRVTITADESTST  
AYMELSSLRSEDTAVYYCARDWDYMDVWGKGTITVTSSTSGQAGQH HHH  
HHGAYPYDVPDYAS [SEQ ID NO: 882]

Table 222

| <b>ET200-120</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| tctatgagctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcggaaagtaataactgtaaactggtaccagcagctcccaggaacggccccc aaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtggggtccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcaccgt<br>cctaggttctagaggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaggtgcag<br>ctggtggagtctggagctgaggtgaagaagcctggggcctcagtgaagggtcctcgaaggcttctgggttacacctttacca<br>gctatggtatcagctgggtgcgacaggcccctggacaagggttgagtggatgggatggatcagcgcttacaatggtaac<br>acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga<br>ggagcctgagatctgacgacacggcgtgtattactgtgcgagagacctatctcggggagctaaccgcattactactact<br>actacggtatggacgtctggggccaagggaaccacgggtcaccgtctcctcaactagtggccaggccggccagcaccatca<br>ccatcaccatggcgcataccgtacgacgttccggactacgcttct [SEQ ID NO: 883] |



Amino Acid Sequence

SYELTQPPSASGTPGQRTVISCSSSSNIGSNTVNWYQQLPGTAPKLLIYSNNQ  
RPSGVPPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK  
VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVESGAEVKKPGASVKVSCSKAS  
GYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTDTTS  
TSTAYMELRSLRSDDTAVYYCARDLSRGANPHYYYYYGMDVWGQGTTTVTV  
SSTSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 884]

Table 223

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-121</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| cagtctgtgttgacgcagccgccctcagtgctctggggcccccagggcagaggggtcaccgtctcctgcactgggagcagatc<br>caacatcggggcaggatatgatgtacactggtagcgaactccagggaacagccccaaactcctcatctatggaatatg<br>taatcggcctccaggggtccctgaccgattctctgggtctaagtctggcacctcagcctccctggtcactcactgggtccag<br>gctgaggatgccgctgattattactgccagtcctatgacaacactgtgcgtgaatcaccttatgtcttcggaactgggaccaa<br>ggtcaccgtcctaggttctagaggtgggtggttagcggcggcggcggtctgtgtggtggatccctcgagatggccg<br>aggtccagctggtacagtctggggctgaggtgaagaagcctggggcctcagtgaagggtctcctgcaaggtttccggatac<br>accctcactgaattatccatgcactgggtgcgacaggctcctggaaaagggcttgagtggatgggagggtttgatcctgaag<br>atggtgaaacaatctacgcacagaagtccagggcagagtcacatgaccgaggacacatctacagacacagcctacatg<br>gagctgagcagcctgagatctgaggacacggccgtgtattactgtgcaacagagagtaatttagtgtcccggcactactact<br>actacgggatggacgtctggggccaagggaccacggtcaccgtctcctcaactagtggccaggccggccagcaccatca<br>ccatcaccatggcgcatacccgtagcgacgttcggactacgcttct [SEQ ID NO: 885] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| QSVLTQPPSVSGAPGQRVTVSCTGSRSNIGAGYDVHWYQQLPGTAPKLLIYG<br>NSNRPPGVPDRFSGSKSGTSASLVITGLQAEDAADYYCQSYDNTVRESPYVFG<br>TGTKVTVLGSRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVS<br>CKVSGYTLTELSMHWVRQAPGKGLEWMGGFDPEDGETIYAQKFQGRVTMT<br>EDTSTDYAYMELSSLRSEDYAVYYCATESNLVSRHYYYGMDVWGQGTTVT<br>VSSTSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 886]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 224

ET200-122

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ctgcctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaaccagctcc<br>aacatcgggaagtaattctgtagactggtaccagcagctcccaggaacggccccaaactcctcatctatagtaataatcagc<br>ggccctcaggggtccctgaccgaatctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctgaatggttatgtcttcggaactgggaccaaggtcaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggccgaagtgcag<br>ctggtgcagctctggggctgagggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctggatacaccttcacc<br>ggctactatatgcactgggtgcgacaggcccctggacaagggcttgagtggatgggatggatcaaccctaacagtgggtg<br>cacaactatgcacagaagtttcagggcagggtcaccatgaccagggacagctccatcagcacagcctacatggagctg<br>agcaggctgagatctgacgacacggccgtgtattactgtgcgagagattacggatactatggttcggggagttattcagc<br>ggccccctttactactactacgggtatggacgtctggggccaagggaccacggtcaccgtctcctcaactagtggccaggcc<br>ggccagcaccatcaccatcaccatggcgcataccgtacgacgttcggactacgcttct [SEQ ID NO: 887] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| LPVLTQPPSASGTPGQRVTISCSGTSSNIGSNSVDWYQQLPGTAPKLLIYSNNQ<br>RPSGVPDRISGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGASVKVSKAS<br>GYTFTGYMHWRQAPGQGLEWMGWINPNSGGTNYAQKFQGRVTMTRDT<br>SISTAYMELSRRLSDDTAVYYCARDYGYGSGSYSSGPLYYYYGMDVWGQG<br>TTVTVSSTSGQAGQHSHHHHHGAYPYDVPDYAS [SEQ ID NO: 888]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 225

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-123</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| caggctgtgctgactcagccaccctcagcgtctgggacccccgggcagagggtcaccatctcttgttctggaagcagctcc<br>aacatcgggaagtaatactgtaactggtaccagcagctcccaggaacggccccaaactcctcatgtataataatgatcagc<br>ggccctcaggggtccctgaccgattctctggctccaagtctggcacctcagcctccctggccatcagtgggctccagtctg<br>aggatgaggctgattattactgtgcagcatgggatgacagcctcaatggttatgtcttcggacctgggaccaaggtcaccgt<br>cctaggttctagagggtggtggtgtagcggcggcggcggctctggtggtggtgatccctcgagatggcccagggtgcag<br>ctggtggagtctggagctgagggtgaagaagcctggggcctcagtgaaggctcctgcaaggcttctggttacacctttacca<br>gctatggtatcagctgggtgcgacaggcccctggacaagggcttgagtggatgggatgagcgttacatggtaac<br>acaaactatgcacagaagctccagggcagagtcaccatgaccacagacacatccacgagcacagcctacatggagctga<br>ggagcctgagatctgacgacacggccgtgtattactgtgcgagagacctatctcggggagctaaccgcattactactact |

|                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| actacggtatggacgtctggggccaaggaccacgggtaccgtctcctcaactagtggccaggccggccagcaccatca<br>ccatcaccatggcgcataccctacgacgtccggactacgcttct [SEQ ID NO: 889]                                                                                                                                                                                        |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                             |
| QAVLTQPPSASGTPGQRVTISCSGSSSNIGSNTNVNWWYQQLPGTAPKLLMYNND<br>QRPSGVPDRFSGSKSGTSASLAISGLQSEDEADYYCAAWDDSLNGYVFGPGT<br>KVTVLGSRGGGSGGGGSGGGGSLEMAQVQLVESGAEVKKPGASVKVSCK<br>ASGYTFTSYGISWVRQAPGQGLEWMGWISAYNGNTNYAQKLQGRVTMTTD<br>TSTSTAYMELRSLRSDDTAVYYCARDLSRGANPHYYYYYYGMDVWGQGTTV<br>TVSSTSGQAGQH HHHHHHGA YPYDVPDYAS [SEQ ID NO: 890] |

Table 226

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-125</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| aattttatgctgactcagccccacgtgtgtcggagtcctccggggaagacggtaaccatctcctgcacccgcagcagtggc<br>agtattgccagcaactatgtgcagtgggtaccagcagcggcgggaggtccccccgcactgtgatttatgaggataatcaaa<br>gacctctggggtcctgtgtcgggtctctgggtccatcgacagctcctccaactctgcctccctaccatctctggactgaag<br>actgaggacgaggctgactactactgtcagtccttatgattccaccagtgtgcttttcggcggaggggaccaagctgaccgtcc<br>taggttctagagggtggtggtgtagcggcggcggcggcgtctggtggtggtggatccctcgagatggccgaggtccagctg<br>gtgcagtcctggggctgaggtgaagaagccagggtcctcggtgaaggctcctcgaaggcctcgggaggcaccttcagca<br>gcaattctctcagctgggtgcgacaggccccctggacaagggttgagtgatgggaaggatcttccctatcctgggtataa<br>caaactatgcacagaagttccagggcagagtcacgattaccgggacaaatccacgagcacagcctacatggagctgag<br>cagcctgagatctgaggacacggcgtctattactgtgcgagaggaaactaccaatggtatgatgcttttgatatctggggc<br>caagggacaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatggcgcataccctga<br>cgacgttccggactacgcttct [SEQ ID NO: 891] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| NFMLTQPHAVSESPGKTVTISCTRSSGSIASNYVQWYQQRPGSSPRTVIYEDN<br>QRPSGVPGRFSGSIDSSSNSASLTISGLKTEDEADYYCQSYDSTSVLFGGGTKL<br>TVLGSRRGGGSGGGGSGGGGSLEMAEVQLVQSGAEVKKPGSSVKVSCKASG<br>GTFSSNSLSWVRQAPGQGLEWMGRIFPILGITNYAQKFQGRVTITADKSTSTA<br>YMESSLSRSED TAVYYCARGNYQWYDAFDIWGQGMVTVSSTSGQAGQH<br>HHHHGA YPYDVPDYAS [SEQ ID NO: 892]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 227

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-005</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| cagcctgtgctgactcagccaccctcagtgtcagtggtcccaggaaagacggccaggattacctgtgggggaaaaaacat<br>tggaagtaaaagtgtgactggtaccagcagaagccaggccaggccctgtggtggtcatccattatgatagtgaccggc<br>cctcagggatccctgagcgattctctggctccaactctgggaacacggccaccctgaccatcagcaggggtcgaagccgg<br>ggatgaggccgactattactgtcaggtgtgggatagtagtagtgatcatccttatgtcttcggaactgggaccaaggtcacc<br>gtcctaggttctagaggtggtggtgtagcggcggcggcggtctggtggtggtggatccctcagatggcccagggtgca<br>gctggtgcagctctggagctgaggtgaagaagcctggggcctcagtgaagggtctcctgcaaggcttctggttacacctttacc<br>aactatggtatcagctgggtgcgacaggcccctggacaagggcttgagtggatgggatggatcagcgcttacaatggtaa<br>cacaaactatgcacataagctccagggcagagtcaccatgaccacagacacatccacgagcacagccaacatggagctg<br>aggagcctgagacctgacgacactgccgtgtattactgtgcgcgtcttacttcggttctcatgattactgggggtcaagggtact<br>ctggtgaccgtctctcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgtagcaggttcc<br>ggactacgttct [SEQ ID NO: 893] |
| <u>Amino Acid Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| QPVLTQPPSVSVVPGKTARITCGGKNIGSKSVHWYQQKPGQAPVVVIHYDSD<br>RPSGIPERFSGSNSGNTATLTISRVEAGDEADYYCQVWDSSSDHPYVFGTGTK<br>VTVLGSRRGGGSGGGGSGGGGSLEMAQVQLVQSGAEVKKPGASVKVSCKA<br>SGYTFTNYGISWVRQAPGQGLEWMGWISAYNGNTNYAHKLQGRVTMTTDT<br>STSTANMELRSLRPDDTAVYYCARSYFGSHDYWGQGTLLTVSSTSGQAGQH<br>HHHHHGAYPYDVPDYAS [SEQ ID NO: 894]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 228

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ET200-124</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <u>DNA Sequence</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| tcctatgtgctgactcagccaccctcggtgtcagtggtgccccaggaaaagacggccaggatttcctgtgggggaaacgacatt<br>ggaagtaaaagtgtttctggtatcagcagaggccaggccaggccctgtgttggtcgtctatgatgatagcgaccggccct<br>cagggctccctgagcgaattctctggcttcaactctgggaacacggccaccctgaccatcagcagggtcgaagccggggat<br>gaggccgactattactgtcaagtgtgggatatgtagtagtgatcattatgtcttcggaactgggaccaaggtcaccgtcctagg<br>ttctagagggtggtggtggtagcggcggcggcggctctggtggtggtggatccctcgagatggcccagggtgcagctggtg<br>gagtctgggggaggccttggtacagcctggcaggtccctgagactctcctgtgcagcctctggattcacctttgatgattatgc<br>catgcactgggtccgggaagctccaggggaagggcctggagtggtctcagggtattagttggaatagtggtagcataggct<br>atgcggactctgtgaagggccgattcaccatctccagagacaacgccagaactccctgtatctgcaaatgaacagtctga |

gagctgaggacacggccttgattactgtgcaaaagatataacctatgggtcggggagttatggtgctttgatatctggggcc  
aagggacaatggtcaccgtctcttcaactagtggccaggccggccagcaccatcaccatcaccatggcgcatacccgta  
caggttcgggactacgcttct [SEQ ID NO: 895]

Amino Acid Sequence

SYVLTQPPSVSVAPGKTARISCGGNDIGSKSVFWYQQRPGQAPVLVYDDSD  
RPSGLPERFSGFN SGNTATLTISRVEAGDEADYYCQVWDSSSDHYVFGTGTK  
VTVLGSRGGGGSGGGGSGGGGSLEMAQVQLVESGGGLVQPGRSLRLSCAAS  
GFTFDDYAMHWVRQAPGKGLEWVSGISWNSGSIGYADSVKGRFTISRDNK  
NSLYLQMNSLRAEDTALYYCAKDITYGSGSYGAFDIWGQGTMTVTSSTSGQ  
AGQH HHHHHGAYPYDVPDYAS [SEQ ID NO: 896]

## XIII. CDR sequences of exemplary extracellular antigen-binding domains (e.g., scFvs)

Table 229

| Antibody  | V <sub>H</sub> CDR1         | V <sub>H</sub> CDR2          | V <sub>H</sub> CDR3               | V <sub>L</sub> CDR1           | V <sub>L</sub> CDR2     | V <sub>L</sub> CDR3             |
|-----------|-----------------------------|------------------------------|-----------------------------------|-------------------------------|-------------------------|---------------------------------|
| ET200-501 | GGFGGVY<br>[SEQ ID NO: 309] | INHGST<br>[SEQ ID NO: 310]   | AREGYNQFDS<br>[SEQ ID NO: 311]    | SSNIGNT<br>[SEQ ID NO: 312]   | SNV<br>[SEQ ID NO: 313] | AAWDSUNGIV<br>[SEQ ID NO: 314]  |
| ET200-502 | GYPNKYD<br>[SEQ ID NO: 315] | IIPIFRIT<br>[SEQ ID NO: 316] | ARENFYWC<br>[SEQ ID NO: 317]      | SGSIASNV<br>[SEQ ID NO: 318]  | EDN<br>[SEQ ID NO: 319] | QGYDSNGIV<br>[SEQ ID NO: 320]   |
| ET200-503 | GFTFSYV<br>[SEQ ID NO: 321] | ISHGSKK<br>[SEQ ID NO: 322]  | ARSNQWGGYFSFG<br>[SEQ ID NO: 323] | KLGTNY<br>[SEQ ID NO: 324]    | EDN<br>[SEQ ID NO: 325] | QAWDSDFV<br>[SEQ ID NO: 326]    |
| ET200-505 | GYFTNYG<br>[SEQ ID NO: 326] | ISAYNGT<br>[SEQ ID NO: 327]  | ARNFSSHDY<br>[SEQ ID NO: 328]     | NISGNS<br>[SEQ ID NO: 329]    | YDS<br>[SEQ ID NO: 330] | QWDSGSDHPV<br>[SEQ ID NO: 331]  |
| ET200-506 | GYFTTNG<br>[SEQ ID NO: 332] | INTYNGT<br>[SEQ ID NO: 333]  | ARVYSGGDY<br>[SEQ ID NO: 334]     | NISGNS<br>[SEQ ID NO: 335]    | YDS<br>[SEQ ID NO: 336] | QWDSGSDHPV<br>[SEQ ID NO: 337]  |
| ET200-507 | GYSSGVY<br>[SEQ ID NO: 338] | TVHGST<br>[SEQ ID NO: 339]   | ARGYGFYD<br>[SEQ ID NO: 340]      | NISGNT<br>[SEQ ID NO: 341]    | YDS<br>[SEQ ID NO: 342] | QWDSGSDHPV<br>[SEQ ID NO: 343]  |
| ET200-508 | GFTFGYV<br>[SEQ ID NO: 344] | INWNGST<br>[SEQ ID NO: 345]  | ARQYNHYVDY<br>[SEQ ID NO: 346]    | SSDYGGSY<br>[SEQ ID NO: 347]  | DVS<br>[SEQ ID NO: 348] | SSYTSSTSRV<br>[SEQ ID NO: 349]  |
| ET200-509 | GYFTSYG<br>[SEQ ID NO: 346] | ISAYNGT<br>[SEQ ID NO: 327]  | ARSSGNVYSHDM<br>[SEQ ID NO: 347]  | NSNIGSY<br>[SEQ ID NO: 348]   | RNV<br>[SEQ ID NO: 349] | AAWDSUNGIV<br>[SEQ ID NO: 350]  |
| ET200-510 | GYFTSYG<br>[SEQ ID NO: 346] | ISAYNGT<br>[SEQ ID NO: 327]  | ARGAVAYHD<br>[SEQ ID NO: 351]     | SSDYGGSY<br>[SEQ ID NO: 352]  | DVS<br>[SEQ ID NO: 353] | SSYTSSTSLV<br>[SEQ ID NO: 354]  |
| ET200-511 | GGLSGYA<br>[SEQ ID NO: 354] | IPNRGTA<br>[SEQ ID NO: 355]  | ARGYENASFGH<br>[SEQ ID NO: 356]   | SGNISTY<br>[SEQ ID NO: 357]   | SNV<br>[SEQ ID NO: 358] | GTWDSLSGV<br>[SEQ ID NO: 359]   |
| ET200-512 | GPRNFG<br>[SEQ ID NO: 360]  | ISAYNGT<br>[SEQ ID NO: 327]  | ARGAYGSDY<br>[SEQ ID NO: 362]     | SSNIGSY<br>[SEQ ID NO: 363]   | DVK<br>[SEQ ID NO: 364] | GTWDSRLDAYV<br>[SEQ ID NO: 365] |
| ET200-513 | GYMTSYG<br>[SEQ ID NO: 356] | ISANNKT<br>[SEQ ID NO: 367]  | ARRIGGTFDR<br>[SEQ ID NO: 368]    | TSNIGAGYD<br>[SEQ ID NO: 369] | TNN<br>[SEQ ID NO: 370] | GTWDSLSAYV<br>[SEQ ID NO: 371]  |
| ET200-514 | GFTFSYA<br>[SEQ ID NO: 372] | ISGSGST<br>[SEQ ID NO: 373]  | ARSHANLGGDW<br>[SEQ ID NO: 374]   | NISGNS<br>[SEQ ID NO: 375]    | YDS<br>[SEQ ID NO: 376] | QWDSGSDHPV<br>[SEQ ID NO: 377]  |
| ET200-515 | GYFTSYG<br>[SEQ ID NO: 346] | ISAYNGT<br>[SEQ ID NO: 327]  | ARWGGFGAYDH<br>[SEQ ID NO: 378]   | NISGNS<br>[SEQ ID NO: 379]    | YDS<br>[SEQ ID NO: 380] | QWDSGSDHPV<br>[SEQ ID NO: 381]  |
| ET200-516 | GFTFSYS<br>[SEQ ID NO: 378] | ISSSSSVY<br>[SEQ ID NO: 379] | ARGGQYDY<br>[SEQ ID NO: 380]      | SLTQNH<br>[SEQ ID NO: 381]    | ATN<br>[SEQ ID NO: 382] | NERDSATDEV<br>[SEQ ID NO: 383]  |
| ET200-517 | GGSFSSY<br>[SEQ ID NO: 384] | INHGST<br>[SEQ ID NO: 310]   | ARYFGNDM<br>[SEQ ID NO: 384]      | NISGNS<br>[SEQ ID NO: 379]    | DGS<br>[SEQ ID NO: 385] | QWDSGSDHPV<br>[SEQ ID NO: 386]  |

| Antibody  | V <sub>H</sub> CDR1          | V <sub>H</sub> CDR2          | V <sub>H</sub> CDR3                              | V <sub>L</sub> CDR1           | V <sub>L</sub> CDR2     | V <sub>L</sub> CDR3              |
|-----------|------------------------------|------------------------------|--------------------------------------------------|-------------------------------|-------------------------|----------------------------------|
| ET200-018 | GYTLNELS<br>[SEQ ID NO: 387] | FDPELGET<br>[SEQ ID NO: 388] | ARGGYGDS<br>[SEQ ID NO: 389]                     | SSNIGRNG<br>[SEQ ID NO: 390]  | NDN<br>[SEQ ID NO: 391] | AAWDDSLHGIV<br>[SEQ ID NO: 392]  |
| ET200-019 | GGTFSSDA<br>[SEQ ID NO: 393] | ISPMFGTA<br>[SEQ ID NO: 395] | AREGYVPSAYLGGVINDIS<br>SVYOE<br>[SEQ ID NO: 394] | SGSIASNY<br>[SEQ ID NO: 398]  | EDN<br>[SEQ ID NO: 399] | QSYDSSNSWV<br>[SEQ ID NO: 400]   |
| ET200-020 | GYTFISYG<br>[SEQ ID NO: 346] | ISAYNGNT<br>[SEQ ID NO: 327] | AREMTSFQY<br>[SEQ ID NO: 396]                    | TSNIGNND<br>[SEQ ID NO: 397]  | DNN<br>[SEQ ID NO: 398] | GTWDSGSVAS<br>[SEQ ID NO: 399]   |
| ET200-021 | GYTFISYG<br>[SEQ ID NO: 346] | ISAYNGNT<br>[SEQ ID NO: 327] | ARSVDLDT<br>[SEQ ID NO: 400]                     | NSNIGNMY<br>[SEQ ID NO: 401]  | DNN<br>[SEQ ID NO: 398] | GTWNTTTPGVV<br>[SEQ ID NO: 402]  |
| ET200-022 | GTFDDYA<br>[SEQ ID NO: 403]  | ISWNSGSI<br>[SEQ ID NO: 404] | ARYRQVGSAYDS<br>[SEQ ID NO: 405]                 | SSNIGSNY<br>[SEQ ID NO: 406]  | DNN<br>[SEQ ID NO: 398] | GTWDSGLGAPYV<br>[SEQ ID NO: 407] |
| ET200-023 | GYTFISYG<br>[SEQ ID NO: 346] | ISAYNGNT<br>[SEQ ID NO: 327] | ARYWGFQVSDR<br>[SEQ ID NO: 408]                  | NIGGKS<br>[SEQ ID NO: 329]    | ADS<br>[SEQ ID NO: 409] | QVNDSSSYHNVV<br>[SEQ ID NO: 410] |
| ET200-024 | GGTFSSYA<br>[SEQ ID NO: 411] | NPPIFGTA<br>[SEQ ID NO: 412] | ARYNYTYDS<br>[SEQ ID NO: 413]                    | SGSIASNY<br>[SEQ ID NO: 398]  | EDN<br>[SEQ ID NO: 399] | QSYDSSNLWV<br>[SEQ ID NO: 414]   |
| ET200-025 | GGTFSSYA<br>[SEQ ID NO: 411] | ISPIFGTA<br>[SEQ ID NO: 417] | ARYWGYDSQEE<br>[SEQ ID NO: 415]                  | QSISY<br>[SEQ ID NO: 416]     | AAS<br>[SEQ ID NO: 417] | QQSYSTPFT<br>[SEQ ID NO: 418]    |
| ET200-026 | GGTFSSYA<br>[SEQ ID NO: 411] | NPPIFGTA<br>[SEQ ID NO: 412] | ARNHYNDY<br>[SEQ ID NO: 349]                     | SGSIASNY<br>[SEQ ID NO: 398]  | EDN<br>[SEQ ID NO: 399] | QSYDSSNLWV<br>[SEQ ID NO: 419]   |
| ET200-027 | GYTFQYY<br>[SEQ ID NO: 420]  | VDPELGET<br>[SEQ ID NO: 421] | ARYWGSFQNYLMPESNDW<br>[SEQ ID NO: 422]           | SSNIGAGYD<br>[SEQ ID NO: 423] | GNN<br>[SEQ ID NO: 398] | QSYDSSLSQVY<br>[SEQ ID NO: 424]  |
| ET200-028 | GYNPLNG<br>[SEQ ID NO: 425]  | ISTYTGNT<br>[SEQ ID NO: 426] | ARDLYYEGVY<br>[SEQ ID NO: 427]                   | VSNIGSGA<br>[SEQ ID NO: 428]  | SYN<br>[SEQ ID NO: 429] | ATWDDSVNG<br>[SEQ ID NO: 430]    |
| ET200-029 | GTFSSYA<br>[SEQ ID NO: 372]  | ISYDGSNN<br>[SEQ ID NO: 431] | ARSYTFSGFYDY<br>[SEQ ID NO: 432]                 | NIGSES<br>[SEQ ID NO: 433]    | YDT<br>[SEQ ID NO: 434] | QVNDSSRDHVV<br>[SEQ ID NO: 435]  |
| ET200-030 | GYTLIELS<br>[SEQ ID NO: 436] | FDPELGET<br>[SEQ ID NO: 388] | ARMSSMYD<br>[SEQ ID NO: 437]                     | SSNIGAGYD<br>[SEQ ID NO: 423] | GNS<br>[SEQ ID NO: 438] | QSYDSSLSQVY<br>[SEQ ID NO: 439]  |
| ET200-031 | GFTVSDYY<br>[SEQ ID NO: 440] | ISGGSNSI<br>[SEQ ID NO: 441] | ARSTFPDY<br>[SEQ ID NO: 442]                     | NIGGKS<br>[SEQ ID NO: 329]    | YDS<br>[SEQ ID NO: 390] | QVNDSSSDYV<br>[SEQ ID NO: 443]   |
| ET200-032 | GYSTNNW<br>[SEQ ID NO: 444]  | IVGGDSOT<br>[SEQ ID NO: 445] | ARSTGSHMEDE<br>[SEQ ID NO: 446]                  | SSNIGSYT<br>[SEQ ID NO: 447]  | MNN<br>[SEQ ID NO: 448] | AAWDDRLGGYV<br>[SEQ ID NO: 449]  |
| ET200-033 | GGFSFGY<br>[SEQ ID NO: 309]  | ITNSGRS<br>[SEQ ID NO: 450]  | ARSSMSDY<br>[SEQ ID NO: 451]                     | SGSIASNY<br>[SEQ ID NO: 398]  | EDN<br>[SEQ ID NO: 399] | QSYDSSNLWV<br>[SEQ ID NO: 452]   |

| Antibody  | V <sub>H</sub> CDR1            | V <sub>H</sub> CDR2          | V <sub>H</sub> CDR3                   | V <sub>L</sub> CDR1           | V <sub>L</sub> CDR2     | V <sub>L</sub> CDR3             |
|-----------|--------------------------------|------------------------------|---------------------------------------|-------------------------------|-------------------------|---------------------------------|
| ET200-034 | GGTFSSYA<br>[SEQ ID NO: 411]   | NIPIFGTA<br>[SEQ ID NO: 412] | ARGGALDHYOR<br>[SEQ ID NO: 453]       | TSNIGAGYO<br>[SEQ ID NO: 369] | NNR<br>[SEQ ID NO: 454] | GTWDSLTGAV<br>[SEQ ID NO: 455]  |
| ET200-035 | GGTFSSYA<br>[SEQ ID NO: 411]   | NIPIFGTA<br>[SEQ ID NO: 412] | ARNNYNDY<br>[SEQ ID NO: 456]          | SGSIASNY<br>[SEQ ID NO: 318]  | EDN<br>[SEQ ID NO: 319] | QSYDSTNNV<br>[SEQ ID NO: 457]   |
| ET200-037 | GVTFSYG<br>[SEQ ID NO: 346]    | ISAYNGNT<br>[SEQ ID NO: 327] | ARSMFGARDG<br>[SEQ ID NO: 458]        | NIGSKS<br>[SEQ ID NO: 329]    | YDS<br>[SEQ ID NO: 330] | QVWDSSSDHPV<br>[SEQ ID NO: 331] |
| ET200-038 | GGTFSSYA<br>[SEQ ID NO: 411]   | NIPIFGTA<br>[SEQ ID NO: 412] | ARGASFDRHON<br>[SEQ ID NO: 459]       | SSNIGAGFD<br>[SEQ ID NO: 460] | ANS<br>[SEQ ID NO: 461] | QSYDSSLSGV<br>[SEQ ID NO: 462]  |
| ET200-039 | GGTFSSYA<br>[SEQ ID NO: 411]   | NIPIFGTA<br>[SEQ ID NO: 412] | ARSNYYNDY<br>[SEQ ID NO: 463]         | SGSIASNY<br>[SEQ ID NO: 318]  | EDN<br>[SEQ ID NO: 319] | QSYDSSNNV<br>[SEQ ID NO: 419]   |
| ET200-040 | GVTLSL<br>[SEQ ID NO: 436]     | FDPEDGET<br>[SEQ ID NO: 368] | ARYSGVYD<br>[SEQ ID NO: 464]          | SSNIGAGYO<br>[SEQ ID NO: 423] | GNS<br>[SEQ ID NO: 438] | QSYDSSLSGV<br>[SEQ ID NO: 465]  |
| ET200-041 | GGTFSSYA<br>[SEQ ID NO: 411]   | MNPNSGNT<br>[SEQ ID NO: 466] | ARYSGYGD<br>[SEQ ID NO: 467]          | SGSIADNF<br>[SEQ ID NO: 468]  | NCE<br>[SEQ ID NO: 469] | QSYDNNNRGV<br>[SEQ ID NO: 470]  |
| ET200-042 | GGSVSTNSVA<br>[SEQ ID NO: 471] | TYRSKWSN<br>[SEQ ID NO: 472] | ARSSWYQIFY<br>[SEQ ID NO: 473]        | SSNIGTYF<br>[SEQ ID NO: 474]  | GNN<br>[SEQ ID NO: 358] | QSYDSSLSGV<br>[SEQ ID NO: 485]  |
| ET200-043 | GGTFSSYA<br>[SEQ ID NO: 372]   | IGSGSGST<br>[SEQ ID NO: 475] | ARSGAYWYSYDE<br>[SEQ ID NO: 476]      | SDSIANNY<br>[SEQ ID NO: 477]  | EDV<br>[SEQ ID NO: 478] | QSYHGNNRV<br>[SEQ ID NO: 479]   |
| ET200-044 | GGSLSSNNV<br>[SEQ ID NO: 480]  | TYRSRSP<br>[SEQ ID NO: 481]  | ARNTHTFGYDA<br>[SEQ ID NO: 482]       | KLGRVY<br>[SEQ ID NO: 483]    | QDN<br>[SEQ ID NO: 484] | QANDSTTYA<br>[SEQ ID NO: 485]   |
| ET200-045 | GVTFSYG<br>[SEQ ID NO: 346]    | ISAYNGNT<br>[SEQ ID NO: 327] | ARGVHLRW<br>[SEQ ID NO: 486]          | NIGSES<br>[SEQ ID NO: 488]    | DDA<br>[SEQ ID NO: 487] | QVWDRNSAQFV<br>[SEQ ID NO: 488] |
| ET200-069 | GGSPSGY<br>[SEQ ID NO: 309]    | INHSGST<br>[SEQ ID NO: 310]  | ARLYEGGYHGWGSLSES<br>[SEQ ID NO: 489] | SSNIGSNY<br>[SEQ ID NO: 490]  | SNN<br>[SEQ ID NO: 313] | AAWDDSLSGV<br>[SEQ ID NO: 491]  |
| ET200-076 | GGSPSGY<br>[SEQ ID NO: 309]    | INHSGST<br>[SEQ ID NO: 310]  | AREGADAFDI<br>[SEQ ID NO: 492]        | SSNIGSNT<br>[SEQ ID NO: 312]  | SNN<br>[SEQ ID NO: 313] | AAWDDSLNGY<br>[SEQ ID NO: 493]  |
| ET200-079 | GVTFDYA<br>[SEQ ID NO: 483]    | ISWNSGS<br>[SEQ ID NO: 484]  | AWGDSNYYGMDV<br>[SEQ ID NO: 494]      | SSNIGSNY<br>[SEQ ID NO: 495]  | RNN<br>[SEQ ID NO: 349] | AAWDDSLSGYL<br>[SEQ ID NO: 495] |
| ET200-081 | GVTFDYA<br>[SEQ ID NO: 483]    | ISDGGST<br>[SEQ ID NO: 496]  | AKDRAAGYYYGNEV<br>[SEQ ID NO: 497]    | SSDIGNY<br>[SEQ ID NO: 498]   | DVS<br>[SEQ ID NO: 344] | ISYTTATWNPV<br>[SEQ ID NO: 499] |
| ET200-097 | GVTNDYA<br>[SEQ ID NO: 500]    | ISWNSGN<br>[SEQ ID NO: 501]  | AKDSRYGTWGGFDY<br>[SEQ ID NO: 502]    | KLGEKY<br>[SEQ ID NO: 503]    | QDT<br>[SEQ ID NO: 504] | QANDRGV<br>[SEQ ID NO: 505]     |



| Antibody  | V <sub>H</sub> CDR1          | V <sub>H</sub> CDR2          | V <sub>H</sub> CDR3                   | V <sub>L</sub> CDR1          | V <sub>L</sub> CDR2     | V <sub>L</sub> CDR3              |
|-----------|------------------------------|------------------------------|---------------------------------------|------------------------------|-------------------------|----------------------------------|
| ET200-098 | GFTFDDYA<br>[SEQ ID NO: 403] | INWDGGST<br>[SEQ ID NO: 506] | AKNGGLRAFDY<br>[SEQ ID NO: 507]       | SNVGNLG<br>[SEQ ID NO: 508]  | RNN<br>[SEQ ID NO: 349] | SAWDSLSA<br>[SEQ ID NO: 509]     |
| ET200-099 | GYTFMWYA<br>[SEQ ID NO: 510] | INAGSNT<br>[SEQ ID NO: 511]  | ARPDWGGGDFDI<br>[SEQ ID NO: 512]      | ISNIGSNT<br>[SEQ ID NO: 513] | SND<br>[SEQ ID NO: 513] | ASWDSLNGRYV<br>[SEQ ID NO: 514]  |
| ET200-100 | GFTFSSYE<br>[SEQ ID NO: 515] | ISSSGST<br>[SEQ ID NO: 516]  | ARWDYGNVDY<br>[SEQ ID NO: 517]        | SGSIASNF<br>[SEQ ID NO: 518] | EDN<br>[SEQ ID NO: 319] | QSYDTSNVV<br>[SEQ ID NO: 519]    |
| ET200-101 | GYTFWYA<br>[SEQ ID NO: 520]  | INAGSNT<br>[SEQ ID NO: 521]  | ARPDWGGGDFDI<br>[SEQ ID NO: 522]      | ISNIGSNT<br>[SEQ ID NO: 523] | SSS<br>[SEQ ID NO: 523] | ATWDSLSNA<br>[SEQ ID NO: 524]    |
| ET200-102 | GYTFNYA<br>[SEQ ID NO: 525]  | INAGSNT<br>[SEQ ID NO: 526]  | AKPRTAGTHFDY<br>[SEQ ID NO: 527]      | SSNIGSNT<br>[SEQ ID NO: 406] | DNN<br>[SEQ ID NO: 398] | GTWDSLSAYV<br>[SEQ ID NO: 528]   |
| ET200-103 | GGTFSSYA<br>[SEQ ID NO: 411] | IPIFGTA<br>[SEQ ID NO: 412]  | AGEGYDSSGYNGDAFDI<br>[SEQ ID NO: 529] | SGSIASNY<br>[SEQ ID NO: 318] | EDN<br>[SEQ ID NO: 319] | QSYDSTTV<br>[SEQ ID NO: 530]     |
| ET200-104 | GFTFSSYE<br>[SEQ ID NO: 515] | ISSSGST<br>[SEQ ID NO: 516]  | ARWDYGNVDY<br>[SEQ ID NO: 517]        | SGSIASNY<br>[SEQ ID NO: 318] | EDN<br>[SEQ ID NO: 319] | QSYDSSNVV<br>[SEQ ID NO: 531]    |
| ET200-105 | GFTFDDYA<br>[SEQ ID NO: 403] | ISWNSGST<br>[SEQ ID NO: 484] | AKDRGGGYVWDAFDI<br>[SEQ ID NO: 532]   | RLTNKY<br>[SEQ ID NO: 533]   | EDA<br>[SEQ ID NO: 534] | QAWDSVAV<br>[SEQ ID NO: 535]     |
| ET200-106 | GYNFLNG<br>[SEQ ID NO: 425]  | ISTYNGT<br>[SEQ ID NO: 426]  | ARQGGGWVDY<br>[SEQ ID NO: 536]        | VSNIGSGA<br>[SEQ ID NO: 428] | SYN<br>[SEQ ID NO: 429] | ATWDSVNG<br>[SEQ ID NO: 430]     |
| ET200-107 | GYTFSTY<br>[SEQ ID NO: 537]  | ISTYNGT<br>[SEQ ID NO: 538]  | VREGSPYGFAGFDY<br>[SEQ ID NO: 539]    | NFVGNND<br>[SEQ ID NO: 540]  | DNN<br>[SEQ ID NO: 398] | GTWDSLSNTGGV<br>[SEQ ID NO: 541] |
| ET200-108 | GYTFSTY<br>[SEQ ID NO: 537]  | ISTYNGT<br>[SEQ ID NO: 538]  | VREGSPYGFAGFDY<br>[SEQ ID NO: 539]    | SSNIGSNT<br>[SEQ ID NO: 406] | DNN<br>[SEQ ID NO: 398] | GTWDSLSGFVY<br>[SEQ ID NO: 542]  |
| ET200-109 | GGTFSSYA<br>[SEQ ID NO: 411] | IPIFGTA<br>[SEQ ID NO: 412]  | ARPDWGGGDFDI<br>[SEQ ID NO: 543]      | TSNIGSNT<br>[SEQ ID NO: 544] | NNN<br>[SEQ ID NO: 448] | ATWDSLSGVV<br>[SEQ ID NO: 545]   |
| ET200-110 | GGTFSSYA<br>[SEQ ID NO: 411] | IPIFGTA<br>[SEQ ID NO: 412]  | ARGAGDFADI<br>[SEQ ID NO: 546]        | SGNIGTNG<br>[SEQ ID NO: 547] | TND<br>[SEQ ID NO: 546] | AAWDSHSLNRPV<br>[SEQ ID NO: 549] |
| ET200-111 | GGSPSSGY<br>[SEQ ID NO: 369] | INHSST<br>[SEQ ID NO: 310]   | AREGLDAFDI<br>[SEQ ID NO: 550]        | SSNIGSNT<br>[SEQ ID NO: 312] | SNN<br>[SEQ ID NO: 313] | AAWDSLNGYV<br>[SEQ ID NO: 314]   |
| ET200-112 | GGSPSSGY<br>[SEQ ID NO: 369] | INHSST<br>[SEQ ID NO: 310]   | AREGLDAFDI<br>[SEQ ID NO: 550]        | SSNIGSNT<br>[SEQ ID NO: 312] | SND<br>[SEQ ID NO: 513] | AAWDSLNGYV<br>[SEQ ID NO: 314]   |
| ET200-113 | GYSFTSYT<br>[SEQ ID NO: 551] | VSTYNGLR<br>[SEQ ID NO: 552] | VREGSPYGFAGFDY<br>[SEQ ID NO: 553]    | SSNIGSNT<br>[SEQ ID NO: 406] | DNN<br>[SEQ ID NO: 398] | GTWDSLSAAYV<br>[SEQ ID NO: 554]  |

| Antibody  | V <sub>H</sub> CDR1            | V <sub>H</sub> CDR2          | V <sub>H</sub> CDR3                    | V <sub>L</sub> CDR1             | V <sub>L</sub> CDR2     | V <sub>L</sub> CDR3               |
|-----------|--------------------------------|------------------------------|----------------------------------------|---------------------------------|-------------------------|-----------------------------------|
| ET200-114 | GGSFSGY<br>[SEQ ID NO: 309]    | INHSST<br>[SEQ ID NO: 310]   | ARDGGGYFDY<br>[SEQ ID NO: 555]         | RSNIGTNI<br>[SEQ ID NO: 556]    | GS<br>[SEQ ID NO: 557]  | AAWDDSLNGPA<br>[SEQ ID NO: 558]   |
| ET200-115 | GVNFISY<br>[SEQ ID NO: 359]    | INPSSGET<br>[SEQ ID NO: 560] | ATGLRGASDAFNI<br>[SEQ ID NO: 561]      | SSMIGARYD<br>[SEQ ID NO: 562]   | ANY<br>[SEQ ID NO: 563] | QSYDSSVSAWV<br>[SEQ ID NO: 564]   |
| ET200-116 | GDSVSSNSAA<br>[SEQ ID NO: 365] | TYRSRWYN<br>[SEQ ID NO: 566] | APERSGWKGFY<br>[SEQ ID NO: 567]        | KLGGKF<br>[SEQ ID NO: 568]      | QDT<br>[SEQ ID NO: 569] | QTWASGIVV<br>[SEQ ID NO: 570]     |
| ET200-117 | GFTFSYA<br>[SEQ ID NO: 372]    | ISGSGGST<br>[SEQ ID NO: 475] | AKWGFQDAFDI<br>[SEQ ID NO: 570]        | QSLLERNAYNY<br>[SEQ ID NO: 571] | LGS<br>[SEQ ID NO: 572] | NQALQAPT<br>[SEQ ID NO: 573]      |
| ET200-118 | GFTFDYA<br>[SEQ ID NO: 403]    | ISWNSGSI<br>[SEQ ID NO: 404] | AKARWTAVASDHFDY<br>[SEQ ID NO: 574]    | SSDVGGYNY<br>[SEQ ID NO: 575]   | EVS<br>[SEQ ID NO: 576] | SSYTSSSTPYV<br>[SEQ ID NO: 577]   |
| ET200-119 | GCTFSYA<br>[SEQ ID NO: 411]    | IIPIFGTA<br>[SEQ ID NO: 412] | ARDWDNDV<br>[SEQ ID NO: 577]           | SSNIGSNT<br>[SEQ ID NO: 578]    | SNN<br>[SEQ ID NO: 579] | AAWDDSLNGYV<br>[SEQ ID NO: 580]   |
| ET200-120 | GYTFSYG<br>[SEQ ID NO: 346]    | ISAYNGNT<br>[SEQ ID NO: 327] | ARDLSRGANRHYYYGMDV<br>[SEQ ID NO: 578] | SSNIGSNT<br>[SEQ ID NO: 312]    | SNN<br>[SEQ ID NO: 313] | AAWDDSLNGYV<br>[SEQ ID NO: 314]   |
| ET200-121 | GYTLFELS<br>[SEQ ID NO: 436]   | FDPEGET<br>[SEQ ID NO: 388]  | ATSNLYSRHHYYGMDV<br>[SEQ ID NO: 579]   | RSNIGARYD<br>[SEQ ID NO: 580]   | GNS<br>[SEQ ID NO: 438] | QSYDNTVRESPIV<br>[SEQ ID NO: 581] |
| ET200-122 | GYTFTGY<br>[SEQ ID NO: 582]    | INPNSGET<br>[SEQ ID NO: 583] | ARDYGYGGSGYSGLPLYV<br>[SEQ ID NO: 584] | SSNIGSNT<br>[SEQ ID NO: 585]    | SNN<br>[SEQ ID NO: 313] | AAWDDSLNGYV<br>[SEQ ID NO: 314]   |
| ET200-123 | GYTFTSYG<br>[SEQ ID NO: 346]   | ISAYNGNT<br>[SEQ ID NO: 327] | ARDLSRGANRHYYYGMDV<br>[SEQ ID NO: 578] | SSNIGSNT<br>[SEQ ID NO: 312]    | NND<br>[SEQ ID NO: 586] | AAWDDSLNGYV<br>[SEQ ID NO: 314]   |
| ET200-124 | GFTFDYA<br>[SEQ ID NO: 403]    | ISWNSGSI<br>[SEQ ID NO: 404] | AKDITYGSGSYGAFDI<br>[SEQ ID NO: 587]   | SIGSYV<br>[SEQ ID NO: 588]      | DDV<br>[SEQ ID NO: 385] | QWDDSSSDHYV<br>[SEQ ID NO: 375]   |
| ET200-125 | GCTFSNS<br>[SEQ ID NO: 582]    | IFPIIGT<br>[SEQ ID NO: 590]  | ARGNYQWYDAFDI<br>[SEQ ID NO: 591]      | SSSIASNY<br>[SEQ ID NO: 318]    | EDN<br>[SEQ ID NO: 319] | QSYDSTSVL<br>[SEQ ID NO: 592]     |

Table 230

| CDR                 | CDR SEQUENCE      | SEQ ID NO     |
|---------------------|-------------------|---------------|
| V <sub>H</sub> CDR1 | IFGLH             | SEQ ID NO:923 |
| V <sub>H</sub> CDR2 | YISGDSNTIYYADTVKG | SEQ ID NO:924 |
| V <sub>H</sub> CDR3 | NSYYALDY          | SEQ ID NO:925 |
| V <sub>L</sub> CDR1 | RASSSVSSSYLH      | SEQ ID NO:926 |
| V <sub>L</sub> CDR2 | STSNLAS           | SEQ ID NO:927 |
| V <sub>L</sub> CDR3 | QQYSGYPWT         | SEQ ID NO:928 |
| V <sub>H</sub> CDR1 | SFGMH             | SEQ ID NO:929 |
| V <sub>H</sub> CDR2 | YISSGSNNIYFADTVKG | SEQ ID NO:930 |
| V <sub>H</sub> CDR3 | SEYYGSSHMDY       | SEQ ID NO:931 |
| V <sub>L</sub> CDR1 | KASQNVGTNVA       | SEQ ID NO:932 |
| V <sub>L</sub> CDR2 | SATYRNS           | SEQ ID NO:933 |
| V <sub>L</sub> CDR3 | QQYNRYPYT         | SEQ ID NO:934 |

### EXAMPLES

The practice of the present invention employs, unless otherwise indicated, conventional techniques of molecular biology (including recombinant techniques), microbiology, cell biology, biochemistry and immunology, which are well within the purview of the skilled artisan. Such techniques are explained fully in the literature, such as, "Molecular Cloning: A Laboratory Manual", second edition (Sambrook, 1989); "Oligonucleotide Synthesis" (Gait, 1984); "Animal Cell Culture" (Freshney, 1987); "Methods in Enzymology" "Handbook of Experimental Immunology" (Weir, 1996); "Gene Transfer Vectors for Mammalian Cells" (Miller and Calos, 1987); "Current Protocols in Molecular Biology" (Ausubel, 1987); "PCR: The Polymerase Chain Reaction", (Mullis, 1994); "Current Protocols in Immunology" (Coligan, 1991). These techniques are applicable to the production of the polynucleotides and polypeptides of the invention, and, as such, may be considered in making and practicing the invention. Particularly useful techniques for particular embodiments will be discussed in the sections that follow.

The following examples are put forth so as to provide those of ordinary skill in the art with a complete disclosure and description of how to make and use the assay, screening, and therapeutic methods of the invention, and are not intended to limit the

scope of what the inventors regard as their invention.

***Example 1 – FcRL5 Expression in various tissues***

The expression of human FcRL5 was assessed and evaluated in various  
5 tissues. As shown in Figure 1, human FcRL5 was highly expressed in lymphoma and  
multiple myeloma, but not in other tissues. Top panel of Figure 1 shows differential  
expression of human FcRL5 in tumor cell lines from the Cancer Cell Line  
Encyclopedia (CCLE). The bottom panel of Figure 1 shows differential expression of  
human FcRL5 in normal tissue from BioGPS. As shown in Figure 1, human FcRL5  
10 expression is limited to MM and lymphoma compared to other malignant cells.  
Normal expression appeared limited to B-cells and plasma cells. Potential FcRL5  
targeted CAR T cell eradication of these normal cell types may not have significant  
adverse effects based on inventors' patient experience with CD19 targeted CAR T  
cells. Any lack of physiologic antibody production can be addressed with intravenous  
15 immunoglobulin treatment.

***Example 2 – Selection of ScFv specific for FcRL5 using a fully human phage  
display library.***

Phage display selection against FcRL5 was conducted using a cell panning  
20 strategy with 31 human scFv naïve and semi-synthetic phage sub-libraries. FcRL5  
overexpressing 3T3 cells were used in positive panning, FcRL1, 2, 3, 4 and 6  
overexpressing 3T3 cells (5 cell lines in total) were used in negative panning (Figure  
2). Bound clones were then eluted and used to infect *E. Coli* XL1-Blue. The scFv  
phage clones expressed in the bacteria were purified as previously described  
25 (Yasmina, et al. Probing the binding mechanism and affinity of tanezumab, a  
recombinant humanized anti-NGF monoclonal antibody, using a repertoire of  
biosensors. Protein Science 2008, 17(8):1326-1335; Roberts, et al. Vaccination with  
CD20 peptides induces a biologically active, specific immune response in mice.  
Blood 2002, 99(10):3748-3755). Panning was performed for about 3 to about 4  
30 cycles to enrich scFv phage clones that bind to FcRL5 specifically. Positive clones  
were determined by an ELISA method against His-tag FcRL5.

Positive clones were further tested for their binding to FcRL5 on live cell  
surfaces by flow cytometry, using FcRL5-overexpressing cell lines, 3T3 and Raji.  
The cells were then washed, and the staining was performed using the following

steps: the cells can be first stained with purified scFv phage clones, and followed by staining with a mouse anti-M13 mAb, and finally the horse anti-mouse Ig's conjugate to PE. Each step of the staining was completed between 30-60 minutes on ice and the cells were washed twice between each step of the staining.

- 5           76 unique clones that were specific for FcRL5 were identified and confirmed by screening (*see* Tables 1-229 and Figure 2).

***Example 3 – Selection of ScFv specific for domain 9 of FcRL5.***

- 10           FcRL5 contains 9 extracellular immunoglobulin-like domains (domains 1-9) and can be present within a cell in a soluble isoform, a glycosyl-phosphatidylinositol (GPI)-anchor type isoform and a transmembrane-type isoform (Figure 3A). As shown in Figure 2A, the transmembrane-type isoform of FcRL5 has domain 9; whereas, the soluble isoform and the GPI-anchor type isoform do not.

- 15           To test if the scFvs were specific to domain 9 of FcRL5, the 76 clones were further screened on 3T3 cells overexpressing an vector encoding FcRL5 with a domain 9 deletion (FcRL5 $\Delta$ dom9) and further screened on Raji cells overexpressing full-length FcRL5 (Figure 4B-D). Some clones showed either reduced or diminished binding towards FcRL5-domain 9 deletion-overexpressing 3T3 cells compared to binding towards FcRL5-overexpressing 3T3 cells. Figure 4, 5, 6, 7 and 8 shows the specificity of ET200-39, ET200-104, ET200-105, ET200-109 and ET200-117 for  
20           domain 9 of FcRL5, respectively.

***Example 4 – Construct of murine FcRL5-specific CARs***

- 25           For generation of a scFv targeting human FcRL5, two commercially available mouse hybridomas binding different extracellular epitopes on human FcRL5 (Franco (2013); Ise *et al.* (2005); Ise *et al.* (2006)) were obtained. From these hybridomas, two scFvs targeting human FcRL5 were obtained. One scFv was generated by synthesizing the heavy and light chain variable region of murine anti-human FcRL5 antibody F56 as described in Ise *et al.* (2005) with a G4S linker having the amino acid  
30           sequence of SEQ ID NO:897. A second scFv was generated by synthesizing the heavy and light chain variable region of murine anti-human FcRL5 antibody F119 as described in Ise *et al.* (2005) with a G4S linker having the amino acid sequence of SEQ ID NO:897.

Two FcRL5 CARs were generated: F56 FcRL5-28z CAR and F119 FcRL5-

28z CAR. F56 FcRL5-28z CAR and F119 FcRL5-28z CAR have similar structure, *e.g.*, each has a transmembrane domain comprising a CD28 polypeptide, and an intracellular domain comprising a CD3 $\xi$  polypeptide and a co-stimulatory signaling region that comprises a CD28 polypeptide, as shown in Figure 9A. F56 FcRL5-28z CAR comprises an scFv derived from antibody F56, and F119 FcRL5-28z CAR comprises an scFv derived from antibody F119. Each of F56 FcRL5-28z CAR and F119 FcRL5-28z CAR were cloned into a retroviral vector 293galv9. Human T cells (unselected (CD4 and CD8) human T cells from a healthy donor) were transduced with each of F56 FcRL5-28z CAR and F119 FcRL5-28z CAR such that the T cells expressed F56 FcRL5-28z CAR or F119 FcRL5-28z CAR.

#### ***Example 5 – Construct of human FcRL5-specific CARs***

This Example discloses the generation of CARs targeting human FcRL5 using the fully human scFvs described herein. ET200-31 scFv, ET200-39 scFv, ET200-69 scFv, ET200-104 scFv, ET200-105 scFv, ET200-109 scFv and ET200-117 scFvs were used to generate second generation FcRL5-targeted CARs designated as 31 FcRL5 BBz CAR, 39 FcRL5 BBz CAR, 69 FcRL5 BBz CAR, 104 FcRL5 BBz CAR, 105 FcRL5 BBz CAR, 109 FcRL5 BBz CAR and 117 FcRL5 BBz CAR with either a 4-1BB co-stimulatory domain and a CD3 $\xi$  polypeptide (*see* Figures 9B-16). The FcRL5-targeted 4-1BB containing CARs have a similar structure, *e.g.*, each has a CD8a polypeptide transmembrane domain, and an intracellular domain comprising co-stimulatory signaling region consisting of a CD3 $\xi$  polypeptide and a 4-1BB polypeptide, as shown in Figure 9B. Each of these FcRL5-targeted CARs were cloned into an SFG retroviral vector, as an example the 4-1BB containing CAR vectors are shown in Figures 10-16. These viral vectors are then transduced into HEK 293galv9 viral packaging cells in order to generate a stable packaging line for generation of CAR+ T cells.

#### ***Example 6 – Expression of human FcRL5-specific CARs in T cells***

Human primary T cells were transduced using supernatant from retroviral galv9 HEK 293 packaging cells to express a FcRL5-targeted 4-1BBz CAR (generated using the anti-FcRL5 ET200-104 scFv). The cell surface expression of the FcRL5-targeted CAR was determined by binding to recombinant human FcRL5 which was modified to contain a His tag followed by the binding of a PE conjugated anti-HIS tag

secondary antibody, as shown in Figure 17. Cell surface detection was validated by flow cytometry. As shown in Figure 17, the FcRL5-targeted CAR was expressed on the transduced T cells.

#### 5 ***Example 7 – Cytotoxicity of human FcRL5-specific CARs***

The cytotoxic effects of the FcRL5-targeted 4-1BB CAR T cells were analyzed using Raji (a Burkett's lymphoma cell line) cells transduced to express luciferase and FcRL5 antigen or the control GPRC5D (an irrelevant antigen). T cells expressing the 4-1BB CAR generated using the anti-FcRL5 ET200-69 scFv were used  
10 in these experiments (referred to herein as “ $\alpha$ FcRL5-69 BBz”). The number of live cells is determined after 36h co-culture by bioluminescent imaging (BLI). As shown in Figure 18, FcRL5-targeted CAR T cells specifically lysed Raji cells transduced to express luciferase and FcRL5 antigen (Figure 18A) but not control GPRC5D expressing Raji cells which are lysed by GPRC5D-targeted CAR T cells (Figure  
15 18B).

#### ***Example 8 – Cytokine secretion of human FcRL5-specific CARs***

This Example describes the cytokine secretion of FcRL5-targeted CAR T cells. T cells expressing the 4-1BB CAR generated using the anti-FcRL5 ET200-69  
20 scFv were used in these experiments. IL-2, INF $\gamma$ , and TNF $\alpha$  secretion after 24h co-culture of FcRL5 targeted CAR T cells on a monolayer of 3T3 cells transduced with either FcRL5 or CD19 was assessed by Luminex multiplex analysis. As shown in Figure 19, signaling through the CAR of FcRL5-targeted CAR T cells induced cytokine secretion consistent with T cell activation.

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#### ***Example 9 – Proliferation of human FcRL5-specific CARs***

This Example describes the proliferation of FcRL5-targeted CAR T cells upon antigen stimulation. T cells expressing the 4-1BB CAR generated using the anti-FcRL5 ET200-69 scFv was used in these experiments. 500,000 FcRL5- or CD19-  
30 targeted CAR+ T cells/ml were placed on a monolayer of 3T3 cells that have been transduced with either FcRL5 or CD19 (3T3-FcRL; 3T3-CD19). After 4 days, CAR+ T cells were stained and counted by flow cytometry with the inclusion of a known concentration of counting microbeads. As shown in Figure 20, antigen stimulation of FcRL5-targeted CAR T cells induced proliferation. FcRL5-targeted CAR T cells co-

cultured with 3T3-FcRL5 cells expanded to be 2.9 times greater than FcRL5-targeted CAR T cells co-cultured with 3T3-CD19 cells, while control CD19 targeted CAR T cells co-cultured with 3T3-CD19 cells similarly expanded to be 2.5 fold greater than CD19 targeted CAR T cells co-cultured with 3T3-FcRL5 cells (Figure 20).

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**Example 10 – Epitope mapping of human anti-FcRL5 antibodies**

Two anti-FcRL5 bispecific antibodies, ET200-104 and ET200-117, were analyzed by Pepscan to determine epitope specificity. See Table 239. The target protein is human FcRL5 comprising amino acids 1-851 of SEQ ID NO: 899.

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**Table 239**

| Name                         | Origin | Concentration | Location |
|------------------------------|--------|---------------|----------|
| ET200-104<br>bispecific scFV | human  | 2.0 mg/ml     | +4°C/22  |
| ET200-117<br>bispecific scFV | human  | 1.6 mg/ml     | +4°C/22  |

*Methods*

The principles of clips technology. CLIPS technology structurally fixes peptides into defined three-dimensional structures. This results in functional mimics of even the most complex binding sites. CLIPS technology is now routinely used to shape peptide libraries into single, double or triple looped structures as well as sheet- and helix-like folds (Figure 21).

Combinatorial clips library screening in detail. CLIPS library screening starts with the conversion of the target protein into a library of up to 10,000 overlapping peptide constructs, using a combinatorial matrix design. On a solid carrier, a matrix of linear peptides is synthesized, which are subsequently shaped into spatially defined CLIPS constructs (Figure 22). Constructs representing both parts of the discontinuous epitope in the correct conformation bind the antibody with high affinity, which is detected and quantified. Constructs presenting the incomplete epitope bind the antibody with lower affinity, whereas constructs not containing the epitope do not bind at all. Affinity information is used in iterative screens to define the sequence and conformation of epitopes in detail.



Heat map analysis. A heat map is a graphical representation of data where the values taken by a variable in a two-dimensional map are represented as colors. For double-looped CLIPS peptides, such a two-dimensional map can be derived from the independent sequences of the first and second loops. For example, the sequences of the 16 CLIPS peptides depicted in Figure 24 are effectively permutations of 4 unique sub-sequences in loop 1 (colored in blue in Figure 23) and 4 unique sub-sequences in loop 2 (colored in green in Figure 23). Thus, the observed ELISA data (colored in red in Figure 24A) can be plotted in a 4x4 matrix, where each X coordinate corresponds to the sequence of the first loop, and each Y coordinate corresponds to the sequence of the second loop. For instance, the ELISA value observed for CLIPS peptide CLSSERERVEDLFEYECCELLTSEPIFHCRCQEDC (indicated with an arrow in Figure 23A) can be found at the third row, third column of Figure 24B (indicated with an arrow and a red square). To further facilitate the visualization, ELISA values can be replaced with colors from a continuous gradient. In this case, extremely low values are colored in green, extremely high values are colored in red, and average values are colored in black (see Figure 24C). For the aforementioned example, the average value is 0.71. When this color map is applied to the data matrix depicted in Figure 24B, a color heat map is obtained (see Figure 24D, the original data is still indicated for extra clarity).

Synthesis of peptides. To reconstruct epitopes of the target molecule a library of peptides was synthesized. An amino functionalized polypropylene support was obtained by grafting with a proprietary hydrophilic polymer formulation, followed by reaction with t-butyloxycarbonyl-hexamethylenediamine (BocHMDA) using dicyclohexylcarbodiimide (DCC) with Nhydroxybenzotriazole (HOBt) and subsequent cleavage of the Boc-groups using trifluoroacetic acid (TFA). Standard Fmoc-peptide synthesis was used to synthesize peptides on the amino-functionalized solid support by custom modified JANUS liquid handling stations (Perkin Elmer). Synthesis of structural mimics was done using Pepscan's proprietary Chemically Linked Peptides on Scaffolds (CLIPS) technology. CLIPS technology allows to structure peptides into single loops, doubleloops, triple loops, sheet-like folds, helix-like folds and combinations thereof. CLIPS templates are coupled to cysteine residues. The side-chains of multiple cysteines in the peptides were coupled to one or two CLIPS templates. For example, a 0.5 mM solution of the P2 CLIPS (2,6-bis(bromomethyl)pyridine) was dissolved in ammonium bicarbonate (20 mM, pH

7.8)/acetonitrile (1:3(v/v)). This solution was added onto the peptide arrays. The CLIPS template bound to side-chains of two cysteines as present in the solid-phase bound peptides of the peptide-arrays (455 wells plate with 3  $\mu$ l wells). The peptide arrays were gently shaken in the solution for 30 to 60 minutes while completely covered in solution. Finally, the peptide arrays were washed extensively with excess of H<sub>2</sub>O and sonicated in disrupt-buffer containing 1 % SDS/0.1 % beta-mercaptoethanol in PBS (pH 7.2) at 70°C for 30 minutes, followed by sonication in H<sub>2</sub>O for another 45 minutes. The T3 CLIPS carrying peptides were made in a similar way but now with three cysteines.

ELISA Screening. The binding of antibody to each of the synthesized peptides was tested in a PEPSCAN-based ELISA. The peptide arrays were incubated with primary antibody solution (overnight at 4°C). After washing, the peptide arrays were incubated with a 1/1000 dilution of an appropriate antibody peroxidase conjugate (SBA) for one hour at 25°C. After washing, the peroxidase substrate 2,2'-azino-di-3-ethylbenzthiazoline sulfonate (ABTS) and 2  $\mu$ l/ml of 3 percent H<sub>2</sub>O<sub>2</sub> were added. After one hour, the color development was measured. The color development was quantified with a charge coupled device (CCD) - camera and an image processing system.

Data processing. The values obtained from the CCD camera ranged from 0 to 3000 mAU, similar to a standard 96-well plate ELISA-reader. The results were quantified and stored into the Peplab database. Occasionally a well contained an air-bubble resulting in a false-positive value, the cards were manually inspected and any values caused by an air-bubble were scored as 0.

Synthesis quality control. To verify the quality of the synthesized peptides, a separate set of positive and negative control peptides was synthesized in parallel. These were screened with antibody 57.9 (ref. Posthumus et al., J. Virology, 1990, 64:3304-3309).

### *Results*

Screening. Antibody binding depends on a combination of factors, including concentration of the antibody and the amounts and nature of competing proteins in the ELISA buffer. Also, the pre-coat conditions (the specific treatment of the peptide arrays prior to incubation with the experimental sample) affected binding. These details are summed up in Table 240. For the Pepscan Buffer and Preconditioning

(SQ), the numbers indicate the relative amount of competing protein (a combination of horse serum and ovalbumin).

**Table 240. Screening conditions**

| Label     | Dilution | Sample Buffer | Pre-conditioning |
|-----------|----------|---------------|------------------|
| ET200-104 | 8 µg/ml  | PBS-Tween     | PBS-Tween        |
| ET200-117 | 3 µg/ml  | PBS-Tween     | 0.1% SQ          |

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Antibodies ET200-104 and ET200-117 were coated at 1 µg/ml on a Nunc Maxisorp plate for ELISA and detected with Goat Anti-Human Ig-HRP (Southern Biotech; #2010/05), the same conjugate that is used in minicard screenings. For ET200-104 and ET200-117 signal >1 OD was obtained for some dilutions of the secondary Ab, indicating that the secondary antibody is well suited for detection of these mAbs.

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Herceptin was used as an internal negative control at high concentration in the absence of blocking buffer. Herceptin bound peptides with common sequences LRGSPILLYRF, LRGSSPILYWF and APRGSPPILYW (Figure 25). Peptides containing aforementioned sequences were excluded from epitope candidates for test samples.

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When tested under low stringency conditions and at a high concentration antibody ET200-104 binds multiple peptide motifs in all sets (Figure 26). The majority of peptides bound were suspected to be the result of non-specific hydrophobic interactions based on the results obtained for Herceptin (internal negative control). However, binding of peptides containing motif <sup>657</sup>SRPILTFRAPR<sub>667</sub> was proposed to be specific, and was uniquely attributed to sample ET200-104.

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When tested under low stringency conditions antibody ET200-117 resulted in weak binding of multiple peptide motifs on all sets. Cumulative data analysis of data obtained for all sets suggests that the antibody uniquely recognizes a region containing peptide stretch <sup>829</sup>RSETVTLYITGL<sub>840</sub> in domain 9 of Fc receptor-like protein 5 distinct from the Herceptin internal negative control and ET200-104. Again the majority of other peptides bound were suspected to be the result of unspecific hydrophobic interactions that shared as the same binding pattern was recorded under low stringency conditions for antibody ET200-104.

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### Conclusions

Cumulative data analysis of results collected for ET200-104, and ET200-117 vs. Herceptin suggest that antibody ET200-104 targets residues <sub>657</sub>SRPILTFRAPR<sub>667</sub> within domain 8 of Fc receptor-like protein 5 and antibody ET200-117 targets residues <sub>829</sub>RSETVTLYITGL<sub>840</sub> within domain 9. Additionally, for both samples multiple signals were recorded with peptides non-specifically bound by Herceptin. The epitope candidate identified for ET200-104 was visualized using a publically available 3D model of Fc receptor-like protein 5 (Figure 27). The epitope candidate for ET200-117 lies within the non-modeled part of the target and therefore cannot be visualized.

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From the foregoing description, it will be apparent that variations and modifications may be made to the invention described herein to adopt it to various usages and conditions. Such embodiments are also within the scope of the following claims.

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All patents and publications and sequences referred to by accession or reference number mentioned in this specification are herein incorporated by reference to the same extent as if each independent patent and publication and sequence was specifically and individually indicated to be incorporated by reference.

**What is claimed is:**

1. A chimeric antigen receptor (CAR), comprising an extracellular antigen-binding domain, a transmembrane domain and an intracellular domain, wherein the extracellular antigen-binding domain that specifically binds to Fc Receptor-like 5 (FcRL5).
2. The CAR of claim 1, wherein the extracellular antigen-binding domain is a single-chain variable fragment (scFv).
3. The CAR of claim 2, wherein the extracellular antigen-binding domain is a murine scFv.
4. The CAR of claim 2, wherein the extracellular antigen-binding domain is a human scFv.
5. The CAR of claim 1, wherein the extracellular antigen-binding domain is a Fab, which is optionally crosslinked.
6. The CAR of claim 1, wherein the extracellular antigen-binding domain is a F(ab')<sub>2</sub>.
7. The CAR of any one of claims 2-6, one or more of the scFv, Fab and F(ab')<sub>2</sub> are comprised in a fusion protein with a heterologous sequence to form the extracellular antigen-binding domain.
8. The CAR of any one of claims 1-7, wherein the extracellular antigen-binding domain of the CAR binds to FcRL5 with a binding affinity ( $K_d$ ) of from about  $1 \times 10^{-9}$  M to about  $3 \times 10^{-6}$  M.
9. The CAR of any one of claims 1-8, wherein the extracellular antigen-binding domain of the CAR binds to domain 7, domain 8 or domain 9 of FcRL5 with a binding affinity ( $K_d$ ) of from about  $1 \times 10^{-9}$  M to about  $3 \times 10^{-6}$  M.
10. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID



NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917 and SEQ ID NO:921, wherein the extracellular antigen-binding domain binds to FcRL5.

11. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915 and SEQ ID NO:919, wherein the extracellular antigen-binding domain binds to FcRL5.

12. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a light chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917 and SEQ ID NO:921; and (b) a heavy chain variable region comprising an amino acid sequence that is at least 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188,

SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915 and SEQ ID NO:919, wherein the extracellular antigen-binding domain binds to FcRL5.

13. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917, SEQ ID NO:921 and conservative modifications thereof.

14. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72,

SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260, SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915, SEQ ID NO:919 and conservative modifications thereof.

15. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:915.

16. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:917.

17. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:919.

18. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:921.

19. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:144.

20. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:143.

21. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the

sequence set forth in SEQ ID NO:216.

22. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:215.

23. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:220.

24. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:219.

25. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:236.

26. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:235.

27. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:268.

28. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:267.

29. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:116.

30. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:115.

31. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:172.

32. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:171.

33. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a light chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:19, SEQ ID NO:23, SEQ ID NO:27, SEQ ID NO:31, SEQ ID NO:35, SEQ ID NO:39, SEQ ID NO:43, SEQ ID NO:47, SEQ ID NO:51, SEQ ID NO:55, SEQ ID NO:59, SEQ ID NO:63, SEQ ID NO:67, SEQ ID NO:71, SEQ ID NO:75, SEQ ID NO:79, SEQ ID NO:83, SEQ ID NO:87, SEQ ID NO:91, SEQ ID NO:95, SEQ ID NO:99, SEQ ID NO:103, SEQ ID NO:107, SEQ ID NO:111, SEQ ID NO:115, SEQ ID NO:119, SEQ ID NO:123, SEQ ID NO:127, SEQ ID NO:131, SEQ ID NO:135, SEQ ID NO:139, SEQ ID NO:143, SEQ ID NO:147, SEQ ID NO:151, SEQ ID NO:155, SEQ ID NO:159, SEQ ID NO:163, SEQ ID NO:167, SEQ ID NO:171, SEQ ID NO:175, SEQ ID NO:179, SEQ ID NO:183, SEQ ID NO:187, SEQ ID NO:191, SEQ ID NO:195, SEQ ID NO:199, SEQ ID NO:203, SEQ ID NO:207, SEQ ID NO:211, SEQ ID NO:215, SEQ ID NO:219, SEQ ID NO:223, SEQ ID NO:227, SEQ ID NO:231, SEQ ID NO:235, SEQ ID NO:239, SEQ ID NO:243, SEQ ID NO:247, SEQ ID NO:251, SEQ ID NO:255, SEQ ID NO:259, SEQ ID NO:263, SEQ ID NO:267, SEQ ID NO:271, SEQ ID NO:275, SEQ ID NO:279, SEQ ID NO:283, SEQ ID NO:287, SEQ ID NO:291, SEQ ID NO:295, SEQ ID NO:299, SEQ ID NO:303, SEQ ID NO:917, SEQ ID NO:921 and conservative modifications thereof; and (b) a heavy chain variable region comprising an amino acid sequence selected from the group consisting of SEQ ID NO:4, SEQ ID NO:8, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:24, SEQ ID NO:28, SEQ ID NO:32, SEQ ID NO:36, SEQ ID NO:40, SEQ ID NO:44, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:56, SEQ ID NO:60, SEQ ID NO:64, SEQ ID NO:68, SEQ ID NO:72, SEQ ID NO:76, SEQ ID NO:80, SEQ ID NO:84, SEQ ID NO:88, SEQ ID NO:92, SEQ ID NO:96, SEQ ID NO:100, SEQ ID NO:104, SEQ ID NO:108, SEQ ID NO:112, SEQ ID NO:116, SEQ ID NO:120, SEQ ID NO:124, SEQ ID NO:128, SEQ ID NO:132, SEQ ID NO:136, SEQ ID NO:140, SEQ ID NO:144, SEQ ID NO:148, SEQ ID NO:152, SEQ ID NO:156, SEQ ID NO:160, SEQ ID NO:164, SEQ ID NO:168, SEQ ID NO:172, SEQ ID NO:176, SEQ ID NO:180, SEQ ID NO:184, SEQ ID NO:188, SEQ ID NO:192, SEQ ID NO:196, SEQ ID NO:200, SEQ ID NO:204, SEQ ID NO:208, SEQ ID NO:212, SEQ ID NO:216, SEQ ID NO:220, SEQ ID NO:224, SEQ ID NO:228, SEQ ID NO:232, SEQ ID NO:236, SEQ ID NO:240, SEQ ID NO:244, SEQ ID NO:248, SEQ ID NO:252, SEQ ID NO:256, SEQ ID NO:260,

SEQ ID NO:264, SEQ ID NO:268, SEQ ID NO:272, SEQ ID NO:276, SEQ ID NO:280, SEQ ID NO:284, SEQ ID NO:288, SEQ ID NO:292, SEQ ID NO:296, SEQ ID NO:300, SEQ ID NO:304, SEQ ID NO:915, SEQ ID NO:919 and conservative modifications thereof.

34. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:915; and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:917.

35. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:919; and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:921.

36. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:144, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:143.

37. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:216, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:215.

38. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:220, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:219.

39. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:236, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:235.

40. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:268, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:267.

41. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having

the sequence set forth in SEQ ID NO:116, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:115.

42. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:172, and (b) a light chain variable region comprising amino acids having the sequence set forth in SEQ ID NO:171.

43. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 311, 317, 323, 328, 334, 337, 342, 347, 351, 356, 362, 368, 374, 376, 380, 384, 389, 394, 396, 400, 405, 408, 412, 415, 422, 427, 432, 437, 442, 446, 451, 453, 456, 458, 459, 463, 464, 467, 473, 476, 482, 486, 489, 492, 494, 497, 502, 507, 512, 517, 522, 527, 529, 532, 536, 539, 543, 546, 550, 553, 555, 561, 567, 570, 574, 577, 578, 579, 584, 578, 587, 591, 925 and 931; and (b) a light chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 314, 320, 325, 331, 339, 345, 350, 353, 359, 365, 371, 377, 383, 386, 392, 395, 399, 402, 407, 410, 414, 418, 419, 424, 430, 435, 439, 443, 449, 452, 455, 457, 462, 465, 470, 479, 485, 488, 491, 493, 495, 499, 505, 509, 514, 519, 524, 528, 530, 531, 535, 541, 542, 545, 549, 554, 558, 564, 569, 573, 576, 581, 592, 928 and 934.

44. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises:

(a) a heavy chain variable region CDR1 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 309, 315, 321, 326, 332, 335, 340, 346, 354, 360, 366, 372, 378, 387, 393, 403, 411, 420, 425, 436, 440, 444, 471, 480, 500, 510, 515, 520, 525, 537, 551, 559, 565, 582, 589, 923 and 929;

(b) a heavy chain variable region CDR2 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 310, 316, 322, 327, 333, 336, 341, 355, 361, 367, 373, 379, 388, 404, 412, 421, 426, 431, 441, 445, 450, 466, 472, 475, 481, 496, 501, 506, 511, 516, 521, 526, 538, 552, 560, 566, 583, 590, 924 and 930;

(c) a heavy chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 311, 317, 323, 328, 334, 337, 342, 347, 351, 356, 362, 368, 374, 376, 380, 384, 389, 394, 396, 400, 405, 408, 412, 415, 422, 427, 432, 437, 442, 446, 451, 453, 456, 458, 459, 463, 464, 467, 473, 476,



482, 486, 489, 492, 494, 497, 502, 507, 512, 517, 522, 527, 529, 532, 536, 539, 543, 546, 550, 553, 555, 561, 567, 570, 574, 577, 578, 579, 584, 578, 587, 591, 925 and 931;

(d) a light chain variable region CDR1 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 312, 318, 324, 329, 338, 343, 348, 352, 357, 363, 369, 381, 390, 397, 401, 406, 416, 423, 428, 433, 447, 460, 468, 474, 477, 483, 490, 498, 503, 508, 518, 533, 540, 544, 547, 556, 562, 568, 571, 580, 585, 588, 926 and 931;

(e) a light chain variable region CDR2 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 313, 319, 330, 344, 349, 358, 364, 370, 382, 385, 391, 398, 409, 417, 429, 434, 438, 448, 454, 461, 469, 478, 484, 487, 504, 513, 523, 534, 429, 448, 548, 557, 563, 572, 575, 586, 927 and 933; and

(f) a light chain variable region CDR3 comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 314, 320, 325, 331, 339, 345, 350, 353, 359, 365, 371, 377, 383, 386, 392, 395, 399, 402, 407, 410, 414, 418, 419, 424, 430, 435, 439, 443, 449, 452, 455, 457, 462, 465, 470, 479, 485, 488, 491, 493, 495, 499, 505, 509, 514, 519, 524, 528, 530, 531, 535, 541, 542, 545, 549, 554, 558, 564, 569, 573, 576, 581, 592, 928 and 934.

45. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:923 or conservative modifications thereof, (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:924 or conservative modifications thereof, (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:925 or conservative modifications thereof, (d) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:926 or conservative modifications thereof, (e) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:927 or conservative modifications thereof, and (f) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:928 or conservative modifications thereof.

46. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:929 or conservative modifications

thereof, (b) a heavy chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:930 or conservative modifications thereof, (c) a heavy chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:931 or conservative modifications thereof, (d) a light chain variable region CDR1 comprising amino acids having the sequence set forth in SEQ ID NO:932 or conservative modifications thereof, (e) a light chain variable region CDR2 comprising amino acids having the sequence set forth in SEQ ID NO:933 or conservative modifications thereof, and (f) a light chain variable region CDR3 comprising amino acids having the sequence set forth in SEQ ID NO:934 or conservative modifications thereof.

47. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:463 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:419.

48. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:515 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:516 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:517 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:318 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:319 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:531 or conservative modifications thereof.

49. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding

domain comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:403 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:404 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:532 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:533 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:534 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:535.

50. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:411 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:412 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:543 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:544 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:448 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:545 or conservative modifications thereof.

51. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:372 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:475 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:570 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:571 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:572 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:573 or conservative modifications thereof.

52. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:440 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:441 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:442 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:329 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:330 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:443 or conservative modifications thereof.

53. The CAR of any one of claims 1-9, wherein the extracellular antigen-binding domain comprises: (a) a heavy chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:309 or conservative modifications thereof; (b) a heavy chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:310 or conservative modifications thereof; (c) a heavy chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:489 or conservative modifications thereof; (d) a light chain variable region CDR1 comprising the amino acid sequence of SEQ ID NO:490 or conservative modifications thereof; (e) a light chain variable region CDR2 comprising the amino acid sequence of SEQ ID NO:313 or conservative modifications thereof; and (f) a light chain variable region CDR3 comprising the amino acid sequence of SEQ ID NO:491 or conservative modifications thereof.

54. The CAR of any one of claims 43-53, wherein one or more of the CDRs of the extracellular antigen-binding domain have up to about 5 amino acid substitutions.

55. The CAR of any one of claims 43-53, wherein one or more of the CDRs of the extracellular antigen-binding domain have up to about 3 amino acid substitutions.

56. The CAR of any one of claims 1-55, wherein the extracellular antigen-binding domain comprises a linker between a heavy chain variable region and a light chain variable region of the extracellular antigen-binding domain.

57. The CAR of claim 56, wherein the linker comprises an amino acid sequence selected from the group consisting of SEQ ID NO:307 and SEQ ID NO:897.

58. The CAR of any one of claims 1-57, wherein the extracellular antigen-binding

domain comprises a signal peptide that is covalently joined to the 5' terminus of the extracellular antigen-binding domain.

59. The CAR of any one of claims 1-58, wherein the FcRL5 comprises the amino acid sequence set forth in SEQ ID NO:899.

60. The CAR of any one of claims 1-59, wherein the extracellular antigen-binding domain binds an epitope comprising the amino acid sequence set forth in SEQ ID NO:964.

61. The CAR of any one of claims 1-59, wherein the extracellular antigen-binding domain binds to an epitope comprising the amino acid sequence set forth in SEQ ID NO:965.

62. The CAR of any one of claims 1-61, wherein the transmembrane domain comprises a CD8 polypeptide, a CD28 polypeptide, a CD3 $\zeta$  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 (not based on a protein associated with the immune response), or a combination thereof.

63. The CAR of any one of claims 1-62, wherein the transmembrane domain comprises a CD8 polypeptide.

64. The CAR of any one of claims 1-62, wherein the transmembrane domain comprises a CD28 polypeptide.

65. The CAR of any one of claims 1-62, wherein the intracellular domain comprises a CD3 $\zeta$  polypeptide.

66. The CAR of any one of claims 1-65, wherein the intracellular domain further comprises at least one signaling region.

67. The CAR of claim 66, 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 (not based on a protein associated with the immune response), or a combination thereof.

68. CAR of claim 66 or 67, wherein the signaling region is a co-stimulatory signaling region.

69. The CAR of claim 68, 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.
70. The CAR of claim 68, wherein the at least one co-stimulatory signaling region comprises a CD28 polypeptide.
71. The CAR of any one of claims 1-62, wherein the transmembrane domain comprises a CD28 polypeptide, the intracellular domain comprises a CD3 $\zeta$  polypeptide, and the co-stimulatory signaling domain comprises a CD28 polypeptide.
72. The CAR of any one of claims 1-62, wherein the transmembrane domain comprises a CD8 polypeptide, the intracellular domain comprises a CD3 $\zeta$  polypeptide, and the co-stimulatory signaling domain comprises a 4-1BB polypeptide.
73. The CAR of any one of claims 1-72, wherein the CAR is recombinantly expressed.
74. The CAR of any one of claims 1-73, wherein the CAR is expressed from a vector.
75. The CAR of claim 74, wherein the vector is a  $\gamma$ -retroviral vector.
76. An isolated immunoresponsive cell comprising the CAR of any one of the preceding claims.
77. The isolated immunoresponsive cell of claim 76, wherein the immunoresponsive cell is transduced with the CAR.
78. The isolated immunoresponsive cell of claim 76 or 77, wherein the CAR is constitutively expressed on the surface of the immunoresponsive cell.
79. The isolated immunoresponsive cell of any one of claims 76-78, wherein 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.
80. The isolated immunoresponsive cell of claim 79, 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.
81. The isolated immunoresponsive cell of any one of claims 76-80, wherein the isolated immunoresponsive cell is further transduced with at least one cytokine such that the immunoresponsive cell secretes the at least one cytokine.
82. The isolated immunoresponsive cell of claim 81, 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.

83. The isolated immunoresponsive cell of any one of claims 76-82, 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.

84. The isolated immunoresponsive cell of claim 83, wherein the immunoresponsive cell is a T cell.

85. An isolated nucleic acid molecule encoding the chimeric antigen receptor (CAR) of any one of claims 1-75.

86. The isolated nucleic acid molecule of claim 85, comprising a nucleic acid selected from the group consisting of SEQ ID NOs:951-959.

87. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:951.

88. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:952.

89. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:953.

90. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:954.

91. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:955.

92. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:956.

93. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:957.

94. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:958.

95. The isolated nucleic acid sequence of claim 85, comprising nucleic acids having the sequence set forth in SEQ ID NO:959.

96. A vector comprising the isolated nucleic acid molecule of any one of claims 85-95.

97. The vector of claim 96, wherein the vector is a  $\gamma$ -retroviral vector.

98. A host cell expressing the nucleic acid molecule of any one of claims 85-95.

99. The host cell of claim 98, wherein the host cell is a T cell.
100. A method of reducing tumor burden in a subject, comprising administering an effective amount of the immunoresponsive cell of any one of claims 76-84 to the subject, thereby inducing tumor cell death in the subject.
101. The method of claim 100, wherein the method reduces the number of tumor cells.
102. The method of claim 100, wherein the method reduces tumor size.
103. The method of claim 100, wherein the method eradicates the tumor in the subject.
104. The method of any one of claims 100-103, wherein 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.
105. The method of any one of claims 100-104, wherein the tumor is multiple myeloma.
106. The method of any one of claims 100-105, wherein the subject is a human.
107. The method of any one of claims 100-106, wherein the immunoresponsive cell is a T cell.
108. A method of increasing or lengthening survival of a subject having neoplasia, comprising administering an effective amount of the immunoresponsive cell of any one of claims 76-84 to the subject, thereby increasing or lengthening survival of the subject.
109. The method of claim 108, wherein 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.
110. The method of claim 108 or 109, wherein the neoplasia is multiple myeloma.
111. The method of any one of claims 108-110, wherein the method reduces or eradicates tumor burden in the subject.
112. A method for producing an immunoresponsive cell that binds to Fc Receptor-like 5 (FcRL5), comprising introducing into the immunoresponsive cell a nucleic acid sequence that encodes a chimeric antigen receptor (CAR) comprising an extracellular



antigen-binding domain, a transmembrane domain and an intracellular domain, wherein the extracellular antigen-binding domain that specifically binds to FcRL5.

113. A pharmaceutical composition comprising an effective amount of the immunoresponsive cell of any one of claims 76-84 and a pharmaceutically acceptable excipient.

114. The pharmaceutical composition of claim 113, wherein the pharmaceutical composition is for treating a neoplasia.

115. The pharmaceutical composition of claim 114, wherein 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, Burkett's Lymphoma, and Waldenstrom's Macroglobulinemia.

116. The pharmaceutical composition of claim 113, 114 or 115, wherein the neoplasia is multiple myeloma.

117. A kit for treating a neoplasia, comprising the immunoresponsive cell of any one of claims 76-84.

118. The kit of claim 117, wherein the kit further comprises written instructions for using the immunoresponsive cell for treating a subject having a neoplasia.

119. The kit of claim 117 or 118, wherein 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, Burkett's Lymphoma, and Waldenstrom's Macroglobulinemia.

120. The kit of claim 117, 118 or 119, wherein the neoplasia is multiple myeloma.