

WHAT IS CLAIMED IS:

1. A chimeric receptor, comprising an extracellular antigen-binding domain that binds to ADGRE2, a transmembrane domain, and an intracellular domain, wherein the extracellular antigen-binding domain comprises:
 - a) a heavy chain variable region comprising a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 33 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 34 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 35 or a conservative modification thereof; and/or
 - b) a light chain variable region comprising a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 36 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 37 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 38 or a conservative modification thereof.
2. The chimeric receptor of claim 1, wherein the extracellular antigen-binding domain comprises a single-chain variable fragment (scFv), a Fab, or a F(ab)₂.
3. The chimeric receptor of claim 2, wherein the extracellular antigen-binding domain comprises a single chain variable fragment (scFv).
4. The chimeric receptor of claim 3, wherein the scFv is a humanized scFv.
5. The chimeric receptor of any one of claims 1-4, wherein the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 33, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 34, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 35.
6. The chimeric receptor of any one of claims 1-5, wherein the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 36, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 37, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 38.

7. The chimeric receptor of any one of claims 1-6, wherein the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 33, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 34, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 35; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 36, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 37, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 38.

8. The chimeric receptor of any one of claims 1-7, wherein the heavy chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 39, SEQ ID NO:43, SEQ ID NO:46, SEQ ID NO:49, SEQ ID NO: 52, SEQ ID NO: 55, or SEQ ID NO: 146.

9. The chimeric receptor of any one of claims 1-8, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 39, SEQ ID NO:43, SEQ ID NO:46, or SEQ ID NO:49.

10. The chimeric receptor of any one of claims 1-9, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 39.

11. The chimeric receptor of any one of claims 1-10, wherein the light chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 40, SEQ ID NO: 44, SEQ ID NO: 47, SEQ ID NO: 50, SEQ ID NO: 53, SEQ ID NO: 56, or SEQ ID NO: 147.

12. The chimeric receptor of any one of claims 1-11, wherein the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 40, SEQ ID NO: 44, SEQ ID NO: 47, or SEQ ID NO: 50.

13. The chimeric receptor of any one of claims 1-12, wherein the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 40.
14. The chimeric receptor of any one of claims 1-13, wherein the heavy chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 39, SEQ ID NO:43, SEQ ID NO:46, SEQ ID NO:49, SEQ ID NO: 52, SEQ ID NO: 55, or SEQ ID NO: 146; and the light chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 40, SEQ ID NO: 44, SEQ ID NO: 47, SEQ ID NO: 50, SEQ ID NO: 53, SEQ ID NO: 56, or SEQ ID NO: 147.
15. The chimeric receptor of any one of claims 1-14, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 39, SEQ ID NO:43, SEQ ID NO:46, or SEQ ID NO:49; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 40, SEQ ID NO: 44, SEQ ID NO: 47, or SEQ ID NO: 50.
16. The chimeric receptor of any one of claims 1-15, wherein:
- a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 39; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 40;
 - b) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 43; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 44;
 - c) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 46; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 47;
 - d) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 49; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 50;

- e) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 52; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 53;
- f) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 55; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 56; or
- g) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 146; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 147.

17. The chimeric receptor of any one of claims 1-16, wherein:

- a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 39; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 40;
- b) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 43; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 44;
- c) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 46; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 47; or
- d) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 49; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 50;

18. The chimeric receptor of any one of claims 1-17, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 39; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 40.

19. The chimeric receptor of any one of claims 1-18, wherein the extracellular antigen-binding domain comprises a linker between the heavy chain variable region and the light chain variable region.

20. The chimeric receptor of claim 19, wherein the linker consists of the amino acid sequence set forth in SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, or SEQ ID NO: 149.

21. The chimeric receptor of any one of claims 1-20, wherein the heavy chain variable region and the light chain variable region are positioned from the N- to the C-terminus: V_H-V_L.
22. The chimeric receptor of any one of claims 1-21, wherein the extracellular antigen-binding domain comprises or is an scFv, which comprises or consists of the amino acid sequence set forth in SEQ ID NO: 41, SEQ ID NO: 45, SEQ ID NO: 48, SEQ ID NO: 51, SEQ ID NO: 54, SEQ ID NO: 57, or SEQ ID NO: 148.
23. The chimeric receptor of any one of claims 1-22, wherein the extracellular antigen-binding domain comprises or is an scFv, which comprises or consists of the amino acid sequence set forth in SEQ ID NO: 41, SEQ ID NO: 45, SEQ ID NO: 48, or SEQ ID NO: 51.
24. The chimeric receptor of any one of claims 1-23, wherein the extracellular antigen-binding domain comprises or is an scFv, which comprises or consists of the amino acid sequence set forth in SEQ ID NO: 41.
25. The chimeric receptor of any one of claims 1-24, wherein the extracellular antigen-binding domain binds to ADGRE2 with a disassociation constant (K_D) of than less than about 10⁻⁸ M, less than about 10⁻⁹ M, less than about 10⁻¹⁰ M, less than about 10⁻¹¹ M, less than about 10⁻¹² M, or less than about 10⁻¹³ M.
26. The chimeric receptor of any one of claims 1-25, wherein the extracellular antigen-binding domain binds to ADGRE2 with an EC50 of between about 1 nM and about 100 nM.
27. The chimeric receptor of claim 26, wherein the EC50 is between about 10 nM and about 95 nM.
28. The chimeric receptor of claim 26, wherein the EC50 is between about 25 nM and about 75 nM.
29. The chimeric receptor of any one of claims 1-28, wherein the transmembrane domain comprises a CD8 polypeptide, a CD28 polypeptide, a CD3ζ polypeptide, a CD4 polypeptide, a 4-1BB polypeptide, an OX40 polypeptide, an ICOS polypeptide, a CTLA-4 polypeptide, a PD-1 polypeptide, a LAG-3 polypeptide, a 2B4 polypeptide, or a BTLA polypeptide.

30. The chimeric receptor of claim 29, wherein the transmembrane domain comprises a CD28 polypeptide.
31. The chimeric receptor of any one of claims 1-30, wherein the intracellular domain comprises a CD3 ζ polypeptide.
32. The chimeric receptor of claim 31, wherein the CD3 ζ polypeptide is a modified CD3 ζ polypeptide.
33. The chimeric receptor of claim 32, wherein the modified CD3 ζ polypeptide comprises a native ITAM1, an ITAM2 variant consisting of two loss-of-function mutations, and an ITAM3 variant consisting of two loss-of-function mutations.
34. The chimeric receptor of claim 33, wherein the native ITAM1 consists of the amino acid sequence set forth in SEQ ID NO: 15.
35. The chimeric receptor of claim 33 or 34, wherein the ITAM2 variant consists of the amino acid sequence set forth in SEQ ID NO: 21.
36. The chimeric receptor of any one of claims 33-35, wherein the ITAM3 variant consists of the amino acid sequence set forth in SEQ ID NO: 25.
37. The chimeric receptor of any one of claims 32-36, wherein the modified CD3 ζ polypeptide comprises or consists of the amino acid sequence set forth in SEQ ID NO: 27.
38. The chimeric receptor of any one of claims 31-37, wherein the intracellular domain further comprises at least one co-stimulatory signaling region.
39. The chimeric receptor of claim 38, 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.
40. The chimeric receptor of claim 39, wherein the at least one co-stimulatory signaling region comprises a CD28 polypeptide.
41. The chimeric receptor of any one of claims 1-40, wherein the chimeric receptor is a chimeric antigen receptor (CAR), a chimeric co-stimulating receptor (CCR), or a TCR like fusion molecule.

42. The chimeric receptor of claim 41, wherein the chimeric receptor is a CAR.
43. A chimeric receptor, comprising an extracellular antigen-binding domain that binds to CLEC12A, a transmembrane domain, and an intracellular domain, wherein the extracellular antigen-binding domain comprises:
- a) a heavy chain variable region comprising:
 - i) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71 or a conservative modification thereof;
 - ii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 82 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83 or a conservative modification thereof;
 - iii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 91 or a conservative modification thereof;
 - iv) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 98 or a conservative modification thereof;
 - v) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 103 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83 or a conservative modification thereof;
 - vi) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 109 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 103 or a conservative modification

- thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83 or a conservative modification thereof;
- vii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 114 or a conservative modification thereof;
 - viii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 120 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 121 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 122 or a conservative modification thereof; or
 - ix) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 129 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 130 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 131 or a conservative modification thereof; and/or
- b) a light chain variable region comprising:
- i) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74 or a conservative modification thereof;
 - ii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 84 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85 or a conservative modification thereof;
 - iii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 92 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 94 or a conservative modification thereof;

- iv) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 99 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 151 or a conservative modification thereof;
- v) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 104 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 105 or a conservative modification thereof;
- vi) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 110 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85 or a conservative modification thereof;
- vii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 115 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 116 or a conservative modification thereof;
- viii) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 123 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 124 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 125 or a conservative modification thereof; or
- ix) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 132 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 133 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 134 or a conservative modification thereof.

44. The chimeric receptor of claim 43, wherein the extracellular antigen-binding domain comprises a single-chain variable fragment (scFv), a Fab, or a F(ab)₂.

45. The chimeric receptor of claim 44, wherein the extracellular antigen-binding domain comprises a single chain variable fragment (scFv).
46. The chimeric receptor of claim 45, wherein the scFv is a human scFv.
47. The chimeric receptor of any one of claims 43-46, wherein the heavy chain variable region comprises:
- a) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71;
 - b) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 82, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83;
 - c) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 91;
 - d) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 98;
 - e) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 103, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83;
 - f) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 109, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 103, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83;
 - g) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 114;
 - h) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 120, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 121, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 122; or
 - i) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 129, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 130, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 131.

48. The chimeric receptor of any one of claims 43-47, wherein the heavy chain variable region comprises:

- a) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71;
- b) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 82, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83;
- c) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 91; or
- d) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 98.

49. The chimeric receptor of any one of claims 43-48, wherein the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71.

50. The chimeric receptor of any one of claims 43-49, wherein the light chain variable region comprises:

- a) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74;
- b) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 84, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85;
- c) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 92, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 94;
- d) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 99, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 151;

- e) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 104, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 105;
- f) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 110, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85;
- g) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 115, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 116;
- h) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 123, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 124, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 125; or
- i) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 132, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 133, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 134.

51. The chimeric receptor of any one of claims 43-50, wherein the light chain variable region comprises:

- a) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74;
- b) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 84, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85;
- c) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 92, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 94; or
- d) a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 99, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 151.

52. The chimeric receptor of any one of claims 43-51, wherein the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72, a

CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74.

53. The chimeric receptor of any one of claims 43-52, wherein:

- a) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74;
- b) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 82, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 84, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85;
- c) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 91; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 92, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 94;
- d) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 98; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 99, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 151;
- e) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81, a CDR2 comprising the amino acid

- sequence set forth in SEQ ID NO: 103, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 104, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 105;
- f) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 109, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 103, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 110, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85;
- g) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 114; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 115, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 116;
- h) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 120, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 121, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 122; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 123, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 124, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 125; or
- i) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 129, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 130, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 131; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 132, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 133, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 134.

54. The chimeric receptor of any one of claims 43-53, wherein:

- a) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74;
- b) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 81, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 82, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 83; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 84, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 85;
- c) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 91; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 92, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 94; or
- d) the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 89, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 90, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 98; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 99, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 93, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 151.

55. The chimeric receptor of any one of claims 43-54, wherein the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71; and the light chain variable

region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74.

56. The chimeric receptor of any one of claims 43-55, wherein the heavy chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 75, SEQ ID NO: 86, SEQ ID NO: 95, SEQ ID NO: 100, SEQ ID NO: 106, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 126, or SEQ ID NO: 135.

57. The chimeric receptor of any one of claims 43-56, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 75, SEQ ID NO: 86, SEQ ID NO: 95, SEQ ID NO: 100, SEQ ID NO: 106, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 126, or SEQ ID NO: 135.

58. The chimeric receptor of any one of claims 43-57, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 75, SEQ ID NO: 86, SEQ ID NO: 95, or SEQ ID NO: 100.

59. The chimeric receptor of any one of claims 43-58, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 75.

60. The chimeric receptor of any one of claims 43-59, wherein the light chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 76, SEQ ID NO: 87, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 107, SEQ ID NO: 112, SEQ ID NO: 118, SEQ ID NO: 127, or SEQ ID NO: 136.

61. The chimeric receptor of any one of claims 43-60, wherein the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 76, SEQ ID NO: 87, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 107, SEQ ID NO: 112, SEQ ID NO: 118, SEQ ID NO: 127, or SEQ ID NO: 136.

62. The chimeric receptor of any one of claims 43-61, wherein the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 76, SEQ ID NO: 87, SEQ ID NO: 96, or SEQ ID NO: 101.

63. The chimeric receptor of any one of claims 63-62, wherein the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 76.

64. The chimeric receptor of any one of claims 43-63, wherein:

- a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 75; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 76;
- b) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 86; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 87;
- c) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 95; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 96;
- d) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 100; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 101;
- e) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 106; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 107;
- f) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 111; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 112;
- g) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 117; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 118;
- h) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 126; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 127; or

- i) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 135; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 136.
65. The chimeric receptor of any one of claims 43-64, wherein:
- a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 75; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 76;
 - b) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 86; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 87;
 - c) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 95; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 96; or
 - d) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 100; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 101.
66. The chimeric receptor of any one of claims 43-65, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 75; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 76.
67. The chimeric receptor of any one of claims 43-66, wherein the extracellular antigen-binding domain comprises a linker between the heavy chain variable region and the light chain variable region.
68. The chimeric receptor of claim 67, wherein the linker consists of the amino acid sequence set forth in SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, or SEQ ID NO: 149.
69. The chimeric receptor of any one of claims 43-68, wherein the heavy chain variable region and the light chain variable region are positioned from the N- to the C-terminus: V_H-V_L.
70. The chimeric receptor of any one of claims 43-69, wherein the extracellular antigen-binding domain comprises or is an scFv, which comprises or consists of the amino acid

sequence set forth in SEQ ID NO: 79, SEQ ID NO: 88, SEQ ID NO: 97, SEQ ID NO: 102, SEQ ID NO: 108, SEQ ID NO: 113, SEQ ID NO: 119, SEQ ID NO: 128, or SEQ ID NO: 137.

71. The chimeric receptor of any one of claims 43-70, wherein the extracellular antigen-binding domain comprises or is an scFv, which comprises or consists of the amino acid sequence set forth in SEQ ID NO: 79, SEQ ID NO: 88, SEQ ID NO: 97, or SEQ ID NO: 102.

72. The chimeric receptor of any one of claims 43-71, wherein the extracellular antigen-binding domain comprises or is an scFv, which comprises or consists of the amino acid sequence set forth in SEQ ID NO: 79.

73. The chimeric receptor of any one of claims 43-72, wherein the extracellular antigen-binding domain comprises or is an scFv binding to CLEC12A with a disassociation constant (K_D) of less than about 10^{-8} M, less than about 10^{-9} M, less than about 10^{-10} M, less than about 10^{-11} M, less than about 10^{-12} M, or less than about 10^{-13} M.

74. The chimeric receptor of claim 73, wherein the K_D is about 0.1 pM or below.

75. The chimeric receptor of claim 73, wherein the K_D is between about 0.05 pM and about 0.5 pM.

76. The chimeric receptor of claim 73, wherein the K_D is between about 0.1 nM and about 5.0 nM.

77. The chimeric receptor of claim 76, wherein the K_D is between about 0.3 nM and about 3.5 nM.

78. The chimeric receptor of any one of claims 43-77, wherein the extracellular antigen-binding domain comprises or is an scFv binding to CLEC12A with an EC50 is between about 1 nM and about 100 nM.

79. The chimeric receptor of any one of claims 43-78, wherein the transmembrane domain comprises a CD8 polypeptide, a CD28 polypeptide, a CD3 ζ 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, or a BTLA polypeptide.

80. The chimeric receptor of claim 79, wherein the transmembrane domain comprises a CD8 polypeptide.
81. The chimeric receptor of any one of claims 43-80, wherein the chimeric receptor is a chimeric antigen receptor (CAR), a chimeric co-stimulating receptor (CCR), or a TCR like fusion molecule.
82. The chimeric receptor of claim 81, wherein the chimeric receptor is a chimeric co-stimulating receptor (CCR).
83. The chimeric receptor of any one of claims 43-82, wherein the intracellular domain does not comprise a CD3 ζ polypeptide.
84. The chimeric receptor of any one of claims 43-83, wherein the intracellular domain comprises at least one co-stimulatory signaling region.
85. The chimeric receptor of claim 84, 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.
86. The chimeric of claim 85, wherein the at least one co-stimulatory signaling region comprises a 4-1BB polypeptide.
87. The chimeric receptor of any one of claims 1-86, wherein the chimeric receptor is expressed from a vector.
88. The chimeric receptor of claim 87, wherein the vector is a viral vector.
89. The chimeric receptor of claim 88, wherein the viral vector is a retroviral vector.
90. A cell comprising the chimeric receptor of any one of claims 1-89.
91. A cell comprising a) a first chimeric receptor that is the chimeric receptor of any one of claims 1-42 and 87-89, and b) a second chimeric receptor that is the chimeric receptor of any one of claims 43-89.
92. The cell of claim 91, wherein the first chimeric receptor is a chimeric antigen receptor (CAR), and b) the second chimeric receptor is a chimeric co-stimulatory receptor (CCR).

93. The cell of claim 92, wherein the CAR comprises an extracellular antigen-binding domain that binds to ADGRE2 and comprises:
- a) a heavy chain variable region comprising a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 33 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 34 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 35 or a conservative modification thereof; and/or
 - b) a light chain variable region comprising a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 36 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 37 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 38 or a conservative modification thereof.
94. The cell of claim 93, wherein the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 33, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 34, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 35; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 36, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 37, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 38.
95. The cell of claim 93 or 94, wherein
- a) the heavy chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 39; and/or
 - b) the light chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about

99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 40.

96. The cell of claim 95, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 39; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 40.

97. The cell of any one of claims 92-96, wherein the CCR comprises an extracellular antigen-binding domain that binds to CLEC12A and comprises:

- a) a heavy chain variable region comprising a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71 or a conservative modification thereof; and/or
- b) a light chain variable region comprising a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72 or a conservative modification thereof, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73 or a conservative modification thereof, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74 or a conservative modification thereof.

98. The cell of claim 97, wherein the heavy chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 69, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 70, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 71; and the light chain variable region comprises a CDR1 comprising the amino acid sequence set forth in SEQ ID NO: 72, a CDR2 comprising the amino acid sequence set forth in SEQ ID NO: 73, and a CDR3 comprising the amino acid sequence set forth in SEQ ID NO: 74.

99. The cell of claim 97 or 98, wherein

- a) the heavy chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about

99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 75; and/or

- b) the light chain variable region comprises an amino acid sequence that is at least about 80%, about 81%, about 82%, about 83%, about 84%, about 85%, about 86%, about 87%, about 88%, about 89%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98% or about 99% identical or homologous to the amino acid sequence set forth in SEQ ID NO: 76.

100. The cell of claim 95, wherein the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 75; and the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO: 76.

101. The cell of any one of claims 90-100, wherein the cell is transduced with the chimeric receptor.

102. The cell of any one of claims 90-101, wherein the chimeric receptor is constitutively expressed on the surface of the cell.

103. The cell of any one of claims 90-102, wherein the cell is an immunoresponsive cell.

104. The cell of any one of claims 90-103, wherein the cell is a cell of the lymphoid lineage or a cell of the myeloid lineage.

105. The cell of any one of claims 90-104, wherein the cell is selected from the group consisting of a T cell, a Natural Killer (NK) cell, a stem cell from which a lymphoid cell may be differentiated, and a stem cell from which a myeloid cell may be differentiated.

106. The cell of any one of claims 90-105, wherein the cell is a T cell.

107. The cell of claim 105 or claim 106, wherein the T cell is selected from the group consisting of helper T cells, cytotoxic T cells, memory T cells, regulatory T cells, tumor-infiltrating lymphocyte (TIL), Natural Killer T cells, mucosal associated invariant T cells, and $\gamma\delta$ T cells.

108. The cell of any one of claims 90-105, wherein the cell is a Natural Killer (NK) cell.

109. The cell of claim 108, wherein the NK cell is derived from a stem cell.
110. The cell of claim 105 or 109, wherein the stem cell is a pluripotent stem cell.
111. The cell of claim 110, wherein the pluripotent stem cell is an embryoid stem cell or an induced pluripotent stem cell.
112. A nucleic acid molecule encoding the chimeric receptor of any one of claims 1-89.
113. A nucleic acid molecule encoding the chimeric receptor of any one of claims 1-42 and 87-89.
114. A nucleic acid molecule encoding the chimeric receptor of any one of claims 43-89.
115. The nucleic acid molecule of any one of claims 112-114, further comprising a promoter that is operably linked to the chimeric receptor.
116. The nucleic acid molecule of claim 115, wherein the promoter is endogenous or exogenous.
117. The nucleic acid molecule of claim 116, wherein the exogenous promoter is selected from the group consisting of an elongation factor (EF)-1 promoter, a cytomegalovirus immediate-early promoter (CMV) promoter, a simian virus 40 early promoter (SV40) promoter, a phosphoglycerate kinase (PGK) promoter, a metallothionein promoter, and Ubiquitin C promoter.
118. The nucleic acid molecule of claim 117, wherein the promoter is an inducible promoter.
119. The nucleic acid molecule of claim 118, wherein the inducible promoter is selected from the group consisting of a NFAT transcriptional response element (TRE) promoter, a CD69 promoter, a CD25 promoter, an IL-2 promoter, a 4-1BB promoter, a PD1 promoter, and a LAG3 promoter.
120. The nucleic acid molecule of claim 116, wherein the promoter is an endogenous promoter.
121. The nucleic acid molecule of claim 120, wherein the endogenous promoter is selected from a TCR alpha promoter, a TCR beta promoter, and a beta 2-microglobulin promoter.

122. A nucleic acid composition comprising a first nucleic acid molecule that is the nucleic acid molecule of any one of claims 113 and 114-121, and a second nucleic acid molecule that is the nucleic acid molecule of any one of claims 114-121.
123. A vector comprising the nucleic acid molecule of any one of claims 112-121.
124. A vector comprising the nucleic acid composition of claim 122.
125. The vector of claim 123 or 124, wherein the vector is a viral vector.
126. The vector of claim 125, wherein the viral vector is as retroviral vector.
127. A cell comprising the nucleic acid molecule of any one of claims 112-121.
128. A cell comprising the nucleic acid composition of claim 122.
129. A cell comprising the vector of any one of claims 123-126.
130. The cell of any one of claims 127-129, wherein the cell is a T cell.
131. The cell of any one of claims 127-129, wherein the cell is a Natural Killer (NK) cell.
132. The cell of claim 131, wherein the NK cell is derived from a stem cell.
133. A composition comprising the cell of any one of claims 90-111, and 127-132.
134. The composition of claim 133, which is a pharmaceutical composition further comprising a pharmaceutically acceptable carrier.
135. The composition of claim 133 or claim 134, comprising between about 25×10^6 and about 150×10^6 cells.
136. The composition of any one of claims 133-135, comprising between about 25×10^6 and about 50×10^6 cells.
137. The composition of any one of claims 133-136, comprising about 2.5×10^6 cells.
138. Use of the cell of any one of claims 90-111, and 127-132 or the composition of any one of claims 133-137 in the manufacture of a medicament for reducing tumor burden in a subject.

139. The use of claim 138, wherein the medicament reduces the number of tumor cells, reduces tumor size, and/or eradicates the tumor in the subject.
140. Use of the cell of any one of claims 90-111, and 127-132 or the composition of any one of claims 133-137 in the manufacture of a medicament for increasing or lengthening survival of a subject having a tumor.
141. Use of the cell of any one of claims 90-111, and 127-132 or the composition of any one of claims 133-137 in the manufacture of a medicament for treating and/or preventing a tumor in a subject.
142. The use of any one of claims 138-141, wherein the tumor expresses ADGRE2 and/or CLEC12A.
143. The use of any one of claims 138-142, wherein the tumor is cancer.
144. The use of any one of claims 138-143, wherein the tumor is blood cancer.
145. The use of claim 144, wherein the tumor is selected from the group consisting of multiple myeloma, leukemia, lymphomas, and myeloid malignancies.
146. The use of claim 145, wherein the leukemia is selected from the group consisting of acute myeloid leukemia (AML), chronic myeloid leukemia (CML), acute lymphocytic leukemia (ALL), chronic lymphocytic leukemia (CLL), acute promyelocytic leukemia (APL), mixed-phenotype acute leukemia (MLL), hairy cell leukemia, and B cell prolymphocytic leukemia.
147. The use of claim 146, wherein the leukemia is acute myeloid leukemia (AML).
148. The use of claim 147, wherein the AML is relapsed/refractory acute myeloid leukemia (R/R AML).
149. The use of claim 145, wherein the myeloid malignancies are selected from the group consisting of myelodysplastic syndromes (MDS), myeloproliferative neoplasms (MPN), myeloid/lymphoid neoplasms (e.g., myeloid/lymphoid neoplasms with eosinophilia and rearrangement of Platelet Derived Growth Factor Receptor Alpha (PDGFRA), Platelet Derived Growth Factor Receptor Beta (PDGFRB), or Fibroblast Growth Factor Receptor 1 (FGFR1), or with PCM1-JAK2), acute myeloid leukemia (AML), blastic plasmacytoid

dendritic cell neoplasm, B-lymphoblastic leukemia/lymphoma, and T-lymphoblastic leukemia/lymphoma.

150. The use of claim 149, wherein the myeloid malignancies comprise myelodysplastic syndromes (MDS).

151. The use of any one of claims 138-150, wherein the subject is a human subject.

152. A method for producing a cell comprising the chimeric receptor of any one of claims 1-90, comprising introducing into the cell a nucleic acid molecule that encodes the chimeric receptor of any one of claims 1-90.

153. A method for producing a cell comprising the chimeric receptor of any one of claims 1-42 and 87-89 and the chimeric receptor of any one of claims 43-89, comprising introducing into the cell a nucleic acid molecule that encodes the chimeric receptor of any one of claims 1-42 and 87-89 and the chimeric receptor of any one of claims 43-89.

154. The cell of any one of claims 90-111, and 127-132 or the composition of any one of claims 133-137 for use in therapy.