WHAT IS CLAIMED IS:

1. An antibody that binds to human transferrin receptor, comprising a heavy chain variable region (VH) comprising VH complementarity determining region (CDR)1, VH CDR2, and VH CDR3, and a light chain variable region (VL) comprising VL CDR1, VL CDR2, and VL CDR3, wherein:

the VH CDR1 comprises the amino acid sequence GFTFSSYX$_1$MN (SEQ ID NO:18) or the amino acid sequence SYX$_1$MN (SEQ ID NO:26), wherein X$_1$ is S or A;

the VH CDR2 comprises the amino acid sequence SISX$_2$SSSX$_3$IYYADSVKG (SEQ ID NO:19), wherein X$_2$ is S or A, and wherein X$_3$ is Y or S; and

the VH CDR3 comprises the amino acid sequence KX$_4$X$_5$X$_6$GDFDY (SEQ ID NO:20), wherein X$_4$ is Y or S, wherein X$_5$ is R or S, and wherein X$_6$ is A or Y;

the VL CDR1 comprises the amino acid sequence RASQSVSSX$_7$X$_8$LA (SEQ ID NO:21), wherein X$_7$ is S or N, and wherein X$_8$ is Y or N;

the VL CDR2 comprises the amino acid sequence GASX$_9$RAT (SEQ ID NO:22), wherein X$_9$ is N or S; and

the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8).

2. The antibody of claim 1, wherein at least one of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the mutant CDRs depicted in Table 1, and any of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, or VL CDR3 that are not selected from the mutant CDRs depicted in Table 1 are selected from the parental CDRs depicted in Table 1.

3. The antibody of claim 1, wherein one of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, or VL CDR3 is selected from the mutant CDRs depicted in Table 1 and five of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the parental CDRs depicted in Table 1.

4. The antibody of claim 1, wherein two of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the mutant CDRs depicted in Table 1 and

four of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the parental CDRs depicted in Table 1.

5. The antibody of claim 1, wherein three of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the mutant CDRs depicted in Table 1 and three of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the parental CDRs depicted in Table 1.

6. The antibody of claim 1, wherein four of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the mutant CDRs depicted in Table 1 and two of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the parental CDRs depicted in Table 1.

7. The antibody of claim 1, wherein five of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, and/or VL CDR3 are selected from the mutant CDRs depicted in Table 1 and one of VH CDR1, VH CDR2, VH CDR3, VL CDR1, VL CDR2, or VL CDR3 is selected from the parental CDRs depicted in Table 1.

8. The antibody of claim 1, wherein:

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8); or

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8).

9. The antibody of claim 1, wherein:

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8), wherein the VL comprises a Y57S conservative substitution;

the VH CDR1 comprises the amino acid sequence GFTFSSYAMN (SEQ ID NO:9); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8), wherein the VL comprises a Y57S conservative substitution;

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSNYLA (SEQ ID NO:15); the VL CDR2

comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSSIYYADSVKG (SEQ ID NO:11); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KSRAGDFDY (SEQ ID NO:12); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYSAGDFDY (SEQ ID NO:13); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRYGDFDY (SEQ ID NO:14); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISASSSSIYYADSVKG (SEQ ID NO:25); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2

comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYSAGDFDY (SEQ ID NO:13); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSNYLA (SEQ ID NO:15); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSNLA (SEQ ID NO:16); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence GFTFSSYSMN (SEQ ID NO:3); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASSRAT (SEQ ID NO:17); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises

the amino acid sequence QQQSSSPPT (SEQ ID NO:8), wherein the VL comprises a Y57S conservative substitution;

the VH CDR1 comprises the amino acid sequence SYAMN (SEQ ID NO:24); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8), wherein the VL comprises a Y57S conservative substitution;

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSNYLA (SEQ ID NO:15); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSSIYYADSVKG (SEQ ID NO:11); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2

comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KSRAGDFDY (SEQ ID NO:12); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYSAGDFDY (SEQ ID NO:13); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRYGDFDY (SEQ ID NO:14); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISASSSSIYYADSVKG (SEQ ID NO:25); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISASSSYIYYADSVKG (SEQ ID NO:10); the VH CDR3 comprises the amino acid sequence KYSAGDFDY (SEQ ID NO:13); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2

comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSNYLA (SEQ ID NO:15); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8);

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSNLA (SEQ ID NO:16); the VL CDR2 comprises the amino acid sequence GASNRAT (SEQ ID NO:7); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8); or

the VH CDR1 comprises the amino acid sequence SYSMN (SEQ ID NO:23); the VH CDR2 comprises the amino acid sequence SISSSSSYIYYADSVKG (SEQ ID NO:4); the VH CDR3 comprises the amino acid sequence KYRAGDFDY (SEQ ID NO:5); the VL CDR1 comprises the amino acid sequence RASQSVSSSYLA (SEQ ID NO:6); the VL CDR2 comprises the amino acid sequence GASSRAT (SEQ ID NO:17); and the VL CDR3 comprises the amino acid sequence QQQSSSPPT (SEQ ID NO:8).

10. The antibody of any one of the preceding claims, wherein:

(i) the VH is at least 80%, 85%, 90%, 95%, 99%, or 100% identical to any one of SEQ ID NOs:100-108; and

(ii) the VL is at least 80%, 85%, 90%, 95%, 99%, or 100% identical to any one of SEQ ID NOs:200-204.

11. The antibody of claim 1, wherein the VH comprises the amino acid sequence of any one of SEQ ID NOs:100-108 and the VL comprises the amino acid sequence of any one of SEQ ID NOs:200-204.

12. The antibody of any one of the preceding claims, wherein the antibody is (a) monovalent and has a monovalent affinity (K_D) for hTfR1 of > 10 nM or is bivalent and has a monovalent affinity (K_D) for hTfR1 of >100 nM and/or (b) has an off rate (k_d) of >= 0.01/s.

13. The antibody of claim 1, wherein:

the VH comprises the amino acid sequence of SEQ ID NO:100 and the VL comprises the amino acid sequence of SEQ ID NO:200.

14. The antibody of claim 1, wherein:

the VH comprises the amino acid sequence of SEQ ID NO:101 and the VL comprises the amino acid sequence of SEQ ID NO:200;

the VH comprises the amino acid sequence of SEQ ID NO:102 and the VL comprises the amino acid sequence of SEQ ID NO: 200;

the VH comprises the amino acid sequence of SEQ ID NO:102 and the VL comprises the amino acid sequence of SEQ ID NO:201;

the VH comprises the amino acid sequence of SEQ ID NO:102 and the VL comprises the amino acid sequence of SEQ ID NO:203;

the VH comprises the amino acid sequence of SEQ ID NO:103 and the VL comprises the amino acid sequence of SEQ ID NO:200;

the VH comprises the amino acid sequence of SEQ ID NO:104 and the VL comprises the amino acid sequence of SEQ ID NO:200;

the VH comprises the amino acid sequence of SEQ ID NO:105 and the VL comprises the amino acid sequence of SEQ ID NO:200;

the VH comprises the amino acid sequence of SEQ ID NO:106 and the VL comprises the amino acid sequence of SEQ ID NO:200;

the VH comprises the amino acid sequence of SEQ ID NO:107 and the VL comprises the amino acid sequence of SEQ ID NO:200;

the VH comprises the amino acid sequence of SEQ ID NO:108 and the VL comprises the amino acid sequence of SEQ ID NO:200;

the VH comprises the amino acid sequence of SEQ ID NO:100 and the VL comprises the amino acid sequence of SEQ ID NO:201;

the VH comprises the amino acid sequence of SEQ ID NO:100 and the VL comprises the amino acid sequence of SEQ ID NO:202;

the VH comprises the amino acid sequence of SEQ ID NO:100 and the VL comprises the amino acid sequence of SEQ ID NO:203; or

the VH comprises the amino acid sequence of SEQ ID NO:100 and the VL comprises the amino acid sequence of SEQ ID NO:204.

15. The antibody of any one of claims 1 to 14, which is a multispecific antibody, bispecific antibody, single chain antibody, an Fab fragment, an $F(ab')_2$ fragment, an Fab' fragment, an Fsc fragment, an Fv fragment, an scFv, an $sc(Fv)_2$, or a diabody.

16. The antibody of any one of claims 1 to 14, comprising a constant heavy chain (CH) domain and a constant light chain (CL) domain.

17. The antibody of claim 1, wherein the antibody comprises:

(a) a heavy chain comprising the amino acid sequence set forth in 400, and a light chain comprising the amino acid sequence set forth in 401;

(b) the amino acid sequences set forth in SEQ ID NOs: 401 and 402;

(c) the amino acid sequences set forth in SEQ ID NOs: 401, 404, and 406;

(d) the amino acid sequences set forth in SEQ ID NOs:400 and 401;

(e) the amino acid sequences set forth in SEQ ID NOs: 401, 405, and 406; or

(f) the amino acid sequences set forth in SEQ ID NOs: 401 and 403.

18. A nucleic acid or nucleic acids encoding the antibody of any one of claims 1 to 17.

19. An expression vector or expression vectors comprising the nucleic acid or nucleic acids of claim 18 operably linked to a promoter.

20. An isolated cell comprising the nucleic acid or nucleic acids of claim 18 or the expression vector or expression vectors of claim 19.

21. An isolated cell comprising a first expression vector comprising a first nucleic acid encoding a first polypeptide comprising the VH of the antibody of any one of claims 1 to 17 operably linked to a promoter, and a second expression vector comprising a second nucleic acid encoding a second polypeptide comprising the VL of the antibody of any one of claims 1 to 17 operably linked to a promoter.

22. A method of making the antibody of any one of claims 1 to 17, comprising culturing the cell of claim 20 or 21 and isolating the antibody.

23. A pharmaceutical composition comprising the antibody of any one of claims 1 to 17 and a pharmaceutically acceptable carrier.

24. A conjugate comprising the antibody of any one of claims 1 to 17 and an agent.

25. The conjugate of claim 24, wherein the agent is an antibody, protein, or peptide.

26. The conjugate of claim 24, wherein the agent is an anti-beta amyloid antibody.

27. The conjugate of claim 26, wherein anti-beta amyloid antibody is aducanumab, bapineuzumab, gantenerumab, solanezumab, donanemab, or lecanemab.

28. The conjugate of claim 24, wherein the agent is an anti-tau antibody, an anti-alpha synuclein antibody, an anti-TDP-43 antibody, an anti-LINGO-1 antibody, an anti-LINGO-2 antibody, an anti-LINGO-3 antibody, an anti-LINGO-4 antibody, an anti-TREM2 antibody, or an anti-C9orf72 dipeptide repeat poly-GA antibody.

29. The conjugate of claim 24, wherein the agent is protein.

30. The conjugate of claim 29, wherein the protein is progranulin.

31. The conjugate of claim 24, wherein the agent is an enzyme.

32. The conjugate of claim 31, wherein the enzyme is glucocerebrosidase.

33. The conjugate of any one of claims 24 to 32, wherein the conjugate is a recombinant fusion protein comprising the antibody and the agent.

34. The conjugate of claim 24, wherein the agent is a nucleic acid.

35. The conjugate of claim 34, wherein the nucleic acid is an mRNA, a siRNA, an antisense oligonucleotide, microRNA (miRNA), guide RNA (gRNA), or a phosphoroamidate morpholino oligomer (PMO).

36. The conjugate of claim 34 or 35, wherein the nucleic acid is linked to the antibody via a linker.

37. The conjugate of claim 24, wherein the agent is a nanoparticle, liposome, or viral vector.

38. Use of the conjugate of any one of claims 24 to 37 in the manufacture of a medicament for transporting an agent across the blood brain barrier via transcytosis.

39. Use of the conjugate of any one of claims 24 to 37 in the manufacture of a medicament for delivering an agent *in vivo* to a human subject.

40. The use of claim 39, wherein the human subject has a neurological disorder and the agent is to be delivered to brain tissue.

41. The use of claim 40, wherein the neurological disorder is Alzheimer's disease, Parkinson's disease, frontotemporal dementia, ALS, Huntington's disease, multiple sclerosis, spinal muscular atrophy, muscular dystrophy, spinal cord injury, stroke, an ophthalmological condition, acute or

chronic optic neuritis, a psychiatric disorder, Tourette's disease brain injury, a brain tumor, or epilepsy.

42. Use of the conjugate of claim 26 or 27 in the manufacture of a medicament for treating Alzheimer's disease.