WHAT IS CLAIMED IS:

1. An antigen-binding site that binds FLT3, comprising:
(a) a heavy chain variable domain (VH) comprising complementarity-determining region 1 (CDR1), complementarity-determining region 2 (CDR2), and complementarity-determining region 3 (CDR3) comprising the amino acid sequences of SEQ ID NOs: 11, 4, and 55, respectively; and
(b) a light chain variable domain (VL) comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 6, 7, and 8, respectively.

2. The antigen-binding site of claim 1, wherein the CDR3 of the VH comprises the amino acid sequence of SEQ ID NO:5 or SEQ ID NO:50.

3. The antigen-binding site of claim 1 or 2, wherein
(i) the VH comprises an amino acid sequence at least 95% identical to SEQ ID NO:37, and the VL comprises an amino acid sequence at least 95% identical to SEQ ID NO:38; or
(ii) the VH comprises the amino acid sequence of SEQ ID NO:53, and the VL comprises the amino acid sequence of SEQ ID NO:42.

4. The antigen-binding site of claim 3, wherein the VH and the VL comprise the amino acid sequences of SEQ ID NOs: 9 and 10; 13 and 10; 17 and 10; 9 and 22; 9 and 26; 9 and 30; 9 and 34; 37 and 38; 41 and 42; 45 and 42; or 49 and 42, respectively.

5. An antigen-binding site that binds FLT3, comprising:
(a) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 59, 63, and 54, respectively; and
(b) a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 86, 66, and 67, respectively.

6. The antigen-binding site of claim 5, wherein
(i) the VH comprises CDR1, CDR2, and CDR3 of SEQ ID NO: 78, 63, 79, respectively, and the VL comprises CDR1, CDR2, and CDR3 of SEQ ID NO: 80, 66, 67, respectively;

(ii) the VH comprises CDR1, CDR2, and CDR3 of SEQ ID NO: 62, 63, 64, respectively, and the VL comprises CDR1, CDR2, and CDR3 of SEQ ID NO: 65, 66, 67, respectively; or
(iii) the VH comprises an amino acid sequence at least 95% identical to SEQ ID NO:76, and the VL comprises an amino acid sequence at least 95% identical to SEQ ID NO:77.

7. The antigen-binding site of claim 5 or 6, wherein the VH comprises the amino acid sequence of SEQ ID NO:29, and the VL comprises the amino acid sequence of SEQ ID NO:84.

8. The antigen-binding site of claim 7, wherein the VH and the VL comprise the amino acid sequences of SEQ ID NOs: 68 and 69; 72 and 73; or 76 and 77, respectively.

9. An antigen-binding site that binds FLT3, comprising:
(i) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 87, 88, and 89, respectively; and a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 91, 92, and 93, respectively;
(ii) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 97, 99, and 100, respectively; and a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 101, 102, and 103, respectively;
(iii) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 87, 98, and 89, respectively; and a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 106, 92, and 93, respectively;
(iv) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 109, 110, and 111, respectively; and a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 112, 113, and 114, respectively;
(v) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 117, 118, and 119, respectively; and a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 120, 121, and 122, respectively.
(vi) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 87, 98, and 89, respectively; and a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 106, 92, and 93, respectively;
(vii) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 62, 33, and 127, respectively; and a VL comprising CDR1, CDR2, and CDR3

comprising the amino acid sequences of SEQ ID NOs: 128, 129, and 130, respectively; or (viii) a VH comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 132, 133, and 134, respectively; and a VL comprising CDR1, CDR2, and CDR3 comprising the amino acid sequences of SEQ ID NOs: 65, 66, and 46, respectively.

10. An antigen-binding site that competes with the antigen-binding site of claim 9.

11. The antigen-binding site of any one of the preceding claims, wherein the antigen-binding site binds human FLT3 with a dissociation constant (K_D) smaller than or equal to 20 nM as measured by surface plasmon resonance (SPR).

12. The antigen-binding site of any one of claims 1-4, and 9, wherein the antigen-binding site binds human FLT3 with a K_D smaller than or equal to 10 nM as measured by SPR.

13. The antigen-binding site of any one of claims 1-4, wherein the antigen-binding site binds a human FLT3 variant comprising the amino acid sequence of SEQ ID NO:25 or SEQ ID NO:18.

14. The antigen-binding site of any one of claims 1-13, wherein the antigen-binding site
(i) binds cynomolgus FLT3; or
(ii) does not compete with FLT3L for binding FLT3.

15. The antigen-binding site of any one of the preceding claims, wherein the antigen-binding site is present as a single-chain fragment variable (scFv).

16. The antigen-binding site of claim 15, wherein the scFv comprises an amino acid sequence selected from SEQ ID NOs: 3, 12, 15, 16, 19, 20, 23, 24, 27, 28, 31, 32, 35, 36, 39, 40, 43, 44, 47, 48, 51, 52, 70, 71, 74, 75, 81, and 82.

17. A protein comprising the antigen-binding site of any one of the preceding claims.

18. The protein of claim 17, further comprising an antibody heavy chain constant region.

19. The protein of claim 18, wherein the antibody heavy chain constant region is a human IgG heavy chain constant region.

20. The protein of claim 19, wherein

(i) each polypeptide chain of the antibody heavy chain constant region comprises an amino acid sequence at least 90% identical to SEQ ID NO:21;

(ii) at least one polypeptide chain of the antibody heavy chain constant region comprises one or more mutations, relative to SEQ ID NO:21, at one or more positions selected from Q347, Y349, L351, S354, E356, E357, K360, Q362, S364, T366, L368, K370, N390, K392, T394, D399, S400, D401, F405, Y407, K409, T411, and K439, numbered according to the EU numbering system;

(iii) at least one polypeptide chain of the antibody heavy chain constant region comprises one or more mutations, relative to SEQ ID NO:21, selected from Q347E, Q347R, Y349S, Y349K, Y349T, Y349D, Y349E, Y349C, L351K, L351D, L351Y, S354C, E356K, E357Q, E357L, E357W, K360E, K360W, Q362E, S364K, S364E, S364H, S364D, T366V, T366I, T366L, T366M, T366K, T366W, T366S, L368E, L368A, L368D, K370S, N390D, N390E, K392L, K392M, K392V, K392F, K392D, K392E, T394F, D399R, D399K, D399V, S400K, S400R, D401K, F405A, F405T, Y407A, Y407I, Y407V, K409F, K409W, K409D, T411D, T411E, K439D, and K439E, numbered according to the EU numbering system; or

(iv) one polypeptide chain of the antibody heavy chain constant region comprises one or more mutations, relative to SEQ ID NO:21, at one or more positions selected from Q347, Y349, L351, S354, E356, E357, K360, Q362, S364, T366, L368, K370, K392, T394, D399, S400, D401, F405, Y407, K409, T411 and K439; and the other polypeptide chain of the antibody heavy chain constant region comprises one or more mutations, relative to SEQ ID NO:21, at one or more positions selected from Q347, Y349, L351, S354, E356, E357, S364, T366, L368, K370, N390, K392, T394, D399, D401, F405, Y407, K409, T411, and K439, numbered according to the EU numbering system.

21. The protein of claim 20, wherein one polypeptide chain of the antibody heavy chain constant region comprises K360E and K409W substitutions relative to SEQ ID NO:21; and the other polypeptide chain of the antibody heavy chain constant region comprises Q347R, D399V and F405T substitutions relative to SEQ ID NO:21, numbered according to the EU numbering system.

22. The protein of claim 20 or 21, wherein one polypeptide chain of the antibody heavy chain constant region comprises a Y349C substitution relative to SEQ ID NO:21; and the other polypeptide chain of the antibody heavy chain constant region comprises an S354C substitution relative to SEQ ID NO:21, numbered according to the EU numbering system.

23. An antibody-drug conjugate comprising the protein of any one of claims 17-22 and a drug moiety.

24. The antibody-drug conjugate of claim 23, wherein the drug moiety is selected from the group consisting of auristatin, N-acetyl-γ calicheamicin, maytansinoid, pyrrolobenzodiazepine, and SN-38.

25. An immunocytokine comprising the antigen-binding site of any one of claims 1-16 and a cytokine.

26. The immunocytokine of claim 25, wherein the cytokine is selected from the group consisting of IL-2, IL-4, IL-10, IL-12, IL-15, TNF, and IFNα.

27. A bispecific T-cell engager comprising the antigen-binding site of any one of claims 1-16 and an antigen-binding site that binds CD3.

28. A chimeric antigen receptor (CAR) comprising:
(a) the antigen-binding site of any one of claims 1-16;
(b) a transmembrane domain; and
(c) an intracellular signaling domain.

29. The CAR of claim 28, wherein
(i) the transmembrane domain is selected from the transmembrane regions of the alpha, beta or zeta chain of the T-cell receptor, CD28, CD3 epsilon, CD45, CD4, CD5, CD8, CD9, CD16, CD22, FLT3, CD37, CD64, CD80, CD86, CD134, CD137, CD152, and CD154;
(ii) the intracellular signaling domain comprises a primary signaling domain comprising a functional signaling domain of CD3 zeta, common FcR gamma (FCER1G), Fc gamma RIIa, FcR beta (Fc Epsilon R1b), CD3 gamma, CD3 delta, CD3 epsilon, CD79a, CD79b, DAP10, and DAP12; or

(iii) the intracellular signaling domain further comprises a costimulatory signaling domain comprising a functional signaling domain of a costimulatory receptor.

30. The CAR of claim 29, wherein the costimulatory receptor is selected from the group consisting of OX40, CD27, CD28, CD30, CD40, PD-1, CD2, CD7, CD258, NKG2C, B7-H3, a ligand that binds to CD83, ICAM-1, LFA-1 (CD11a/CD18), ICOS and 4-1BB (CD137), or any combination thereof.

31. An isolated nucleic acid encoding the CAR of any one of claims 28-30.

32. An expression vector comprising the isolated nucleic acid of claim 31.

33. An immune effector cell
(i) comprising the nucleic acid of claim 31 or the expression vector of claim 32; or
(ii) expressing the CAR of any one of claims 28-30.

34. The immune effector cell of claim 33, wherein the immune effector cell is a T cell or an NK cell.

35. A pharmaceutical composition comprising the protein of any one of claims 17-22, the antibody-drug conjugate of claim 23 or 24, the immunocytokine of claim 25 or 26, the bispecific T-cell engager of claim 27, or the immune effector cell of claim 33 or 34; and a pharmaceutically acceptable carrier.

36. Use of the protein of any one of claims 17-22, the antibody-drug conjugate of claim 23 or 24, the immunocytokine of claim 25 or 26, the bispecific T-cell engager of claim 27, the immune effector cell of any one of claim 33 or 34, or the pharmaceutical composition of claim 35 in the manufacture of a medicament for treating a cancer.

37. The use of claim 36, wherein the cancer is a hematologic malignancy.

38. The use of claim 37, wherein the hematologic malignancy is leukemia.

39. The use of claim 37 or 38, wherein the cancer is selected from the group consisting of acute myeloid leukemia (AML), acute lymphoblastic leukemia (ALL), myelodysplasia, acute T-lymphoblastic leukemia, and acute promyelocytic leukemia.

40. The use of any one of claims 36-39, wherein the cancer expresses FLT3.

41. The protein of any one of claims 17-22, the antibody-drug conjugate of claim 23 or 24, the immunocytokine of claim 25 or 26, the bispecific T-cell engager of claim 27, the immune effector cell of claim 33 or 34, or the pharmaceutical composition of claim 35 in the manufacture of a medicament for use in therapy.