Claims:

1. An isolated antibody, or fragment thereof, that specifically binds human 5T4 antigen, wherein the antibody or antibody fragment comprises an antigen binding domain of, competes for 5T4 binding with, or binds a 5T4 epitope bound by, an antibody comprising a heavy chain variable region having an amino acid sequence set forth as SEQ ID NO:2 and a light chain variable region having an amino acid sequence set forth as SEQ ID NO:4.

2. The antibody of claim 1, which is a chimeric antibody, a humanized antibody, a single chain antibody, a Fab fragment, a $F(ab)_2$ fragment, a Fv fragment, a tetrameric antibody, a tetravalent antibody, a multispecific antibody, or a fusion protein.

3. The antibody of claim 1, which is a murine monoclonal antibody.

4. The antibody of claim 1, which has a binding affinity for human 5T4 antigen of at least about 1×10^{-7} M to about 1×10^{-12} M.

5. The antibody of claim 1, which specifically targets 5T4-expressing cells *in vivo*.

6. The antibody of claim 3, wherein the murine monoclonal antibody comprises a heavy chain variable region comprising an amino acid sequence of residues 20-138 of SEQ ID NO:2.

7. The antibody of claim 3, wherein the murine monoclonal antibody comprises a heavy chain variable region comprising an amino acid sequence of residues 21-127 of SEQ ID NO:4.

8. The antibody of claim 3, wherein the murine monoclonal antibody comprises a heavy chain variable region comprising an amino acid sequence of residues 20-138 of SEQ ID NO:2, and wherein a light chain variable region of the murine monoclonal antibody comprises an amino acid sequence of residues 21-127 of SEQ ID NO:4.

9. The antibody of claim 2, which is a chimeric or humanized anti-5T4 antibody.

10. The chimeric or humanized antibody of claim 9, which comprises human constant regions.

11. The chimeric or humanized antibody of claim 10, which comprises a human kappa light chain constant region.

12. The chimeric or humanized antibody of claim 10, which comprises a human IgG1, IgG2, IgG3, or IgG4 heavy chain constant region.

13. The chimeric or humanized antibody of claim 12, wherein the human IgG4 heavy chain constant region comprises proline at position 241.

14. The humanized antibody of claim 9, which comprises at least one light chain variable region and at least one heavy chain variable region comprising, framework regions comprising human residues of a human antibody framework region; and wherein the at least one light chain variable region comprises 3 CDRs of SEQ ID NO:4.

15. The humanized antibody of claim 14, wherein the human residues are human framework residues selected from the group consisting of:

(a) a human antibody heavy chain framework region of any one of SEQ ID NOs:14-23, 77, and 88-93;

(b) a human antibody light chain framework region of any one of SEQ ID NOs:28-34, 35-44, and 94-99;

(c) a consensus sequence of a heavy chain framework region of (a); and

(d) a framework region that is at least 63% identical to a framework region of (a)-(c).

16. The humanized antibody of claim 14, wherein the at least one heavy chain of the humanized antibody comprises a variable region comprising three CDRs of SEQ ID NO:2.

17. The chimeric or humanized antibody of claim 9, which comprises a heavy chain variable region sequence comprising:

(a) an amino acid sequence of residues 20-138 of SEQ ID NO:2; or

(b) an amino acid sequence of any one of SEQ ID NOs:49, 51, 52, 54, or 56.

18. The chimeric or humanized antibody of claim 9, which comprises a light chain variable region sequence comprising:

(a) an amino acid sequence of residues 21-127 of SEQ ID NO:4; or

(b) an amino acid sequence of any one of SEQ ID NOs:58, 60, 62, 64, 66, 68, 70, 72, 74 or 76.

19. An antibody/drug conjugate for drug delivery comprising:

(a) an antibody according to claim 1; and

(b) a drug, which is directly or indirectly bound to the antibody.

20. The antibody/drug conjugate of claim 19, wherein the drug is a therapeutic agent selected from the group consisting of a cytotoxin, a radioisotope, an immunomodulatory agent, an anti-angiogenic agent, an anti-proliferative agent, a pro-apoptotic agent, a chemotherapeutic agent, and a therapeutic nucleic acid.

21. The antibody/drug conjugate of claim 20, wherein the therapeutic agent is a cytotoxin.

22. The antibody/drug conjugate of claim 20, wherein the cytotoxin is an antibiotic, an inhibitor of tubulin polymerization, an alkylating agent, a protein synthesis inhibitor, a protein kinase inhibitor, a phosphatase inhibitor, a topoisomerase inhibitor, or an enzyme.

23. The antibody/drug conjugate of claim 20, wherein the cytotoxin is an antibiotic.

24. The antibody/drug conjugate of claim 23, wherein the antibiotic is calicheamicin.

25. The antibody/drug conjugate of claim 24, wherein the calicheamicin is an N-acetyl derivative or disulfide analog of calicheamicin.

26. The antibody/drug conjugate of claim 25, wherein the calicheamicin is N-acetyl-γ-calicheamicin.

27. The antibody/drug conjugate of claim 19, wherein the drug is bound to the antibody via a linker.

28. The antibody/drug conjugate of claim 27, wherein the linker is selected from the group consisting of 4-(4'acetylphenoxy)butanoic acid (AcBut), 3-acetylphenyl acidic acid (AcPac), 4-mercapto-4-methyl-pentanoic acid (Amide), and derivatives thereof.

29. An isolated antibody that specifically binds to a human 5T4 epitope comprising residues 173-252 and 276-355of SEQ ID NO:87.

30. The chimeric or humanized antibody of claim 9, which comprises:

(a) a light chain variable region comprising an amino acid sequence selected from the group consisting of an amino acid sequence of residues 21-127 of SEQ ID NO:4 and any one of SEQ ID NOs: 58, 60, 62, 64, 66, 68, 70, 72, 74, or 76; and

(a) a heavy chain variable region comprising an amino acid sequence selected from the group consisting of residues 20-138 of SEQ ID NO:2 and any one of SEQ ID NOs:49, 51, 52, 54, or 56.

31. The chimeric or humanized antibody of claim 9, which comprises:

(a) a light chain variable region comprising an amino acid sequence of SEQ ID NO: 70; and

(a) a heavy chain variable region comprising an amino acid sequence of SEQ ID NO: 54.

Claims:

1. An isolated antibody, or fragment thereof, that specifically binds human 5T4 antigen, wherein the antibody or antibody fragment comprises an antigen binding domain of, competes for 5T4 binding with, or binds a 5T4 epitope bound by, an antibody comprising a heavy chain variable region having an amino acid sequence set forth as SEQ ID NO:2 and a light chain variable region having an amino acid sequence set forth as SEQ ID NO:4.

2. The antibody of claim 1, which is a chimeric antibody, a humanized antibody, a single chain antibody, a Fab fragment, a $F(ab)_2$ fragment, a Fv fragment, a tetrameric antibody, a tetravalent antibody, a multispecific antibody, or a fusion protein.

3. The antibody of claim 1, which is a murine monoclonal antibody.

4. The antibody of claim 1, which has a binding affinity for human 5T4 antigen of at least about $1x10^{-7}$ to about $1x10^{-12}$ M.

5. The antibody of claim 1, which specifically targets 5T4-expressing cells in vivo.

6. The antibody of claim 3, wherein the murine monoclonal antibody comprises a heavy chain variable region comprising an amino acid sequence of residues 20-138 of SEQ ID NO:2.

7. The antibody of claim 3, wherein the murine monoclonal antibody comprises a light chain variable region comprising an amino acid sequence of residues 21-127 of SEQ ID NO:4.

8. The antibody of claim 3, wherein the murine monoclonal antibody comprises a heavy chain variable region comprising an amino acid sequence of residues 20-138 of SEQ ID NO:2, and wherein the light chain variable region of the murine monoclonal antibody comprises an amino acid sequence of residues 21-127 of SEQ ID NO:4.

9. The antibody of claim 2, which is a chimeric or humanized anti-5T4 antibody.

10. The chimeric or humanized antibody of claim 9, which comprises human constant regions.

11. The chimeric or humanized antibody of claim 10, which comprises a human kappa light chain constant region.

12. The chimeric or humanized antibody of claim 10, which comprises a human IgG1, IgG2, IgG3, or IgG4 heavy chain constant region.

13. The chimeric or humanized antibody of claim 12, wherein the human IgG4 heavy chain constant region comprises proline at position 241.

14. The humanized antibody of claim 9, which comprises at least one light chain variable region and at least one heavy chain variable region comprising,

framework regions comprising human residues of a human antibody framework region; and wherein the at least one light chain variable region comprises three CDRs of SEQ ID NO:4.

15. The humanized antibody of claim 14, wherein the human residues are human framework residues selected from the group consisting of:

(a) a human antibody heavy chain framework region of any one of SEQ ID NOs:14-23, 77, and 88-93;

(b) a human antibody light chain framework region of any one of SEQ ID NOs:28-34, 35-44, and 94-99;

(c) a consensus sequence of a heavy chain framework region of (a); and

(d) a framework region that is at least 63% identical to a framework region of (a)-(c).

16. The humanized antibody of claim 14, wherein the at least one heavy chain of the humanized antibody comprises a variable region comprising three CDRs of SEQ ID NO:2.

17. The chimeric or humanized antibody of claim 9, which comprises a heavy chain variable region sequence comprising:

(a) an amino acid sequence of residues 20-138 of SEQ ID NO:2; or

(b) an amino acid sequence of any one of SEQ ID NOs: 49, 51, 52, 54, or 56.

18. The chimeric or humanized antibody of claim 9, which comprises a light chain variable region sequence comprising:

(a) an amino acid sequence of residues 21-127 of SEQ ID NO:4; or

(b) an amino acid sequence of any one of SEQ ID NOs: 58, 60, 62, 64, 66, 68, 70, 72, 74, or 76.

19. An antibody/drug conjugate for drug delivery comprising:

(a) an antibody according to claim 1; and

(b) a drug, which is directly or indirectly bound to the antibody.

20. The antibody/drug conjugate of claim 19, wherein the drug is a therapeutic agent selected from the group consisting of a cytotoxin, a radioisotope, an immunomodulatory agent, an anti-angiogenic agent, an anti-proliferative agent, a pro-apoptotic agent, a chemotherapeutic agent, and a therapeutic nucleic acid.

21. The antibody/drug conjugate of claim 20, wherein the therapeutic agent is a cytotoxin.

22. The antibody/drug conjugate of claim 20, wherein the cytotoxin is an antibiotic, an inhibitor of tubulin polymerization, an alkylating agent, a protein synthesis inhibitor, a protein kinase inhibitor, a phosphatase inhibitor, a topoisomerase inhibitor, or an enzyme.

23. The antibody/drug conjugate of claim 20, wherein the cytotoxin is an antibiotic.

24. The antibody/drug conjugate of claim 23, wherein the antibiotic is calicheamicin.

25. The antibody/drug conjugate of claim 24, wherein the calicheamicin is an N-acetyl derivative or disulfide analog of calicheamicin.

26. The antibody/drug conjugate of claim 25, wherein the calicheamicin is N-acetyl-□-calicheamicin.

27. The antibody/drug conjugate of claim 19, wherein the drug is bound to the antibody via a linker.

28. The antibody/drug conjugate of claim 27, wherein the linker is selected from the group consisting of 4-(4'acetylphenoxy)butanoic acid (AcBut), 3-acetylphenyl acidic acid (AcPac), 4-mercapto-4-methyl-pentanoic acid (Amide), and derivatives thereof.

29. An isolated antibody that specifically binds to a human 5T4 epitope comprising residues 173-252 and 276-355 of SEQ ID NO:87.

30. The chimeric or humanized antibody of claim 9, which comprises:

(a) a light chain variable region comprising an amino acid sequence selected from the group consisting of an amino acid sequence of residues 21-127 of SEQ ID NO:4 and any one of SEQ ID NOs: 58, 60, 62, 64, 66, 68, 70, 72, 74, or 76; and

(b) a heavy chain variable region comprising an amino acid sequence selected from the group consisting of residues 20-138 of SEQ ID NO:2and any one of SEQ ID NOs:49, 51, 52, 54, or 56.

31. The chimeric or humanized antibody of claim 9, which comprises:

(a) a light chain variable region comprising an amino acid sequence of SEQ ID NO: 70; and

(b) a heavy chain variable region comprising an amino acid sequence of SEQ ID NO: 54.