WHAT IS CLAIMED IS:

1. An antibody or antigen-binding fragment thereof that specifically binds to the same FOLR1 epitope as, or competitively inhibits the binding to FOLR1 of, an antibody selected from the group consisting of:

(a) an antibody comprising the polypeptide of SEQ ID NO:25 and the polypeptide of SEQ ID NO:29;

(b) an antibody comprising the polypeptide of SEQ ID NO:26 and the polypeptide of SEQ ID NO:30;

(c) an antibody comprising the polypeptide of SEQ ID NO:27 and the polypeptide of SEQ ID NO:31; and

(d) an antibody comprising the polypeptide of SEQ ID NO:28 and the polypeptide of SEQ ID NO:32.

2. The antibody or antigen-binding fragment of claim 1, wherein said antibody or antigen-binding fragment thereof comprises amino acid sequences selected from the group consisting of:

(a) SEQ ID NOs: 1, 2, and 3 and SEQ ID NOs: 13, 14, and 15;

(b) SEQ ID NOs: 4, 5, and 6 and SEQ ID NOs: 16, 17, and 18;

(c) SEQ ID NOs: 7, 8, and 9 and SEQ ID NOs: 19, 20, and 21;

(d) SEQ ID NOs: 10, 11, and 12 and SEQ ID NOs: 22, 23, and 24; and

(e) variants of (a) to (d) comprising 1, 2, 3, or 4 conservative amino acid substitutions.

3. The antibody or antigen-binding fragment thereof of claim 1 or 2, wherein said antibody or antigen-binding fragment thereof comprises amino acid sequences selected from the group consisting of:

(a) SEQ ID NO:25 and SEQ ID NO:29;

(b) SEQ ID NO:26 and SEQ ID NO:30;

(c) SEQ ID NO:27 and SEQ ID NO:31; and

(d) SEQ ID NO:28 and SEQ ID NO:32.

4. The antibody or antigen-binding fragment thereof of any one of claims 1-3, wherein said antibody or antigen-binding fragment thereof is murine, non-human, humanized, chimeric, resurfaced, or human.

5. A polypeptide that specifically binds FOLR1, wherein said polypeptide comprises the sequences selected from the group consisting of:

(a) SEQ ID NOs: 1, 2, and 3 and SEQ ID NOs: 13, 14, and 15;

(b) SEQ ID NOs: 4, 5, and 6 and SEQ ID NOs: 16, 17, and 18;

(c) SEQ ID NOs: 7, 8, and 9 and SEQ ID NOs: 19, 20, and 21;

(d) SEQ ID NOs: 10, 11, and 12 and SEQ ID NOs: 22, 23, and 24; and

(e) variants of (a) to (d) comprising 1, 2, 3, or 4 conservative amino acid substitutions.

6. A nucleic acid molecule encoding the antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-5.

7. A method of detecting FOLR1 protein in a sample comprising contacting said sample with the antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-5.

8. The method of claim 7, wherein the FOLR1 protein is detected by radioimmunoassay, Western blot assay, immunofluorescent assay, enzyme immunoassay, immunoprecipitation assay, chemiluminescent assay, cytometry, or immunohistochemical assay.

9. The method of claim 8, wherein the cytometry is flow cytometry.

10. The method of claim 7 or 8, wherein said FOLR1 protein is shed FOLR1 protein.

11. The method of claim 7 or 8, wherein said FOLR1 protein is detected on circulating tumor cells in said sample.

12. The method of claim 8, wherein the enzyme immunoassay is enzyme linked immunosorbent assay (ELISA).

13. The method of claim 8, wherein the FOLR1 protein is detected by immunohistochemical assay.

14. A cell producing the antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-5.

15. A method of making the antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-5, comprising (a) culturing the cell of claim 12; and (b) isolating said antibody, antigen-binding fragment thereof, or polypeptide from said cultured cell.

16. An immunoassay kit for detecting FOLR1 protein in a sample, the kit comprising: (a) a first reagent, wherein the first reagent is antibody or antigen-binding fragment thereof of any one of claims 1-4 or the polypeptide of claim 5, and (b) a second reagent, wherein the second reagent is a detection reagent.

17. Use of active agent comprising an antibody or antigen-binding fragment thereof that specifically binds to FOLR1 in the manufacture of a medicament for the treatment of cancer in a patient, wherein the treatment comprises detecting elevated FOLR1 protein levels in a sample from the patient using the antibody or antigen-binding fragment thereof of any one of claims 1-4 or the polypeptide of claim 5.

18. Use of an active agent comprising an antibody or antigen-binding fragment thereof that modulates FOLR1 activity in the manufacture of a medicament for the treatment of cancer in a patient with an elevated shed FOLR1 protein level.

19. Use of an active agent comprising an antibody or antigen-binding fragment thereof that modulates FOLR1 activity in the manufacture of a medicament for the treatment of cancer in a patient with elevated FOLR1 protein on circulating tumor cells.

Claims

1. An antibody or antigen-binding fragment thereof that specifically binds to FOLR1, wherein said antibody or antigen-binding fragment thereof comprises the variable heavy chain CDR1, CDR2, and CDR3 and variable light chain CDR1, CDR2, and CDR3 amino acid sequences of SEQ ID NOs: 4, 5, and 6 and SEQ ID NOs: 16, 17, and 18, respectively.

2. The antibody or antigen-binding fragment thereof of claim 1, wherein said antibody or antigen-binding fragment thereof comprises the amino acid sequences of: SEQ ID NO:26 and SEQ ID NO:30.

3. The antibody or antigen-binding fragment thereof of claim 1 or 2, wherein said antibody or antigen-binding fragment thereof is murine, humanized, chimeric, resurfaced, or human.

4. A polypeptide that specifically binds FOLR1, wherein said polypeptide comprises the sequences of SEQ ID NOs: 4, 5, and 6 and SEQ ID NOs: 16, 17, and 18.

5. A nucleic acid molecule encoding the antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-4.

6. The antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-4, wherein the antibody or polypeptide comprises a detection agent.

7. The antibody, antigen-binding fragment thereof, or polypeptide of claim 6, wherein the detection agent is a chromogenic detection agent, a fluorogenic detection agent, an immunofluorescent detection agent, an enzymatic detection agent, or an electrochemiluminescent detection agent.

8. A method of detecting FOLR1 protein in a sample comprising contacting said sample with the antibody , antigen-binding fragment thereof, or polypeptide of any one of claims 1-4.

9. The method of claim 8, wherein the FOLR1 protein is detected by radioimmunoassay, Western blot assay, immunofluorescent assay, enzyme immunoassay, immunoprecipitation assay, chemiluminescent assay, cytometry, or immunohistochemical assay.

10. The method of claim 9, wherein the cytometry is flow cytometry.

11. The method of claim 8 or 9, wherein said FOLR1 protein is shed FOLR1 protein.

12. The method of claim 9, wherein the enzyme immunoassay is enzyme linked immunosorbent assay (ELISA).

13. The method of claim 9, wherein the FOLR1 protein is detected by immunohistochemical assay.

14. A cell producing the antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-4.

15. A method of making the antibody, antigen-binding fragment thereof, or polypeptide of any one of claims 1-4, comprising (a) culturing the cell of claim 14; and (b) isolating said antibody, antigen-binding fragment thereof, or polypeptide from said cultured cell.

16. An immunoassay kit for detecting FOLR1 protein in a sample, the kit comprising: (a) a first reagent, wherein the first reagent is antibody or antigen-binding fragment thereof of any one of claims 1-3 or the polypeptide of claim 4, and (b) a second reagent, wherein the second reagent is a detection reagent.

17. Use of active agent comprising an antibody or antigen-binding fragment thereof that specifically binds to FOLR1 in the manufacture of a medicament for the treatment of cancer in a patient, wherein the treatment comprises detecting elevated FOLR1 protein levels in a sample from the patient using the antibody or antigen-binding fragment thereof of any one of claims 1-3 or the polypeptide of claim 4;
and wherein the active agent is to be administered to the patient.

18. Use of an active agent comprising an antibody or antigen-binding fragment thereof that modulates FOLR1 activity in the manufacture of a medicament for the treatment of cancer in a patient with an elevated shed FOLR1 protein level;

wherein the active agent is to be administered to the patient;

and wherein the elevated shed FOLR1 protein level was detected using the antibody or antigen-binding fragment thereof of any one of claims 1-3, or polypeptide of claim 4.

19. The use of claim 17 or 18, wherein the active agent comprises a FOLR1 antibody or antigen-binding fragment thereof with a variable heavy chain comprising the amino acid sequence of SEQ ID NO:46 and a variable light chain comprising the amino acid sequence of SEQ ID NO:47.

20. The use of claim 19, wherein the active agent comprises a FOLR1 antibody comprising a heavy chain comprising the same amino acid sequence as the amino acid sequence of the heavy chain encoded by the plasmid deposited with the American Type Culture Collection (ATCC) as PTA-10772 and a light chain comprising the same amino acid sequence as the amino acid sequence of the light chain encoded by the plasmid deposited with the ATCC as PTA-10774.

21. The use of claim 19 or 20, wherein the active agent comprises the FOLR1 antibody or antigen-binding fragment thereof conjugated to a cytotoxic agent.

22. The use of claim 19 or 20, wherein the active agent comprises the FOLR1 antibody or antigen-binding fragment thereof conjugated to the maytansinoid DM4 via the cleavable sulfo-SPDB linker.

23. The use of any one of claims 19-22, wherein the cancer is selected from the group consisting of ovarian, uterine, endometrial, and cancer of the peritoneum.