CLAIMS

1. An anti-mesothelin antibody or antigen-binding fragment thereof, comprising a heavy chain variable region comprising the following heavy chain CDRs and a light chain variable region comprising the following light chain CDRs:

a heavy chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 1, a heavy chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 2, a heavy chain CDR3 consisting of an amino acid sequence consisting of SEQ ID NO: 3, and a light chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 4, a light chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 5, and a light chain CDR3 consisting of an amino acid sequence consisting of SEQ ID NO: 6; or

a heavy chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 13, a heavy chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 14, a heavy chain CDR3 consisting of an amino acid sequence consisting of SEQ ID NO: 15, and a light chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 16, a light chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 17, and a light chain CDR3 consisting of an amino acid sequence consisting of SEQ ID NO: 18.

2. The anti-mesothelin antibody or antigen-binding fragment thereof of claim 1, comprising:

a heavy chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 19 or 23.

3. The anti-mesothelin antibody or antigen-binding fragment thereof of claim 1, comprising:

a light chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 20 or 24.

4. The anti-mesothelin antibody or antigen-binding fragment thereof of claim 1, comprising:

a heavy chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 19; and a light chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 20.

5. The anti-mesothelin antibody or antigen-binding fragment thereof of claim 1, comprising:

a heavy chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 23; and a light chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 24.

6. An isolated nucleic acid encoding the anti-mesothelin antibody or antigen-binding fragment thereof of any one of claims 1 to 5.

7. A vector comprising the isolated nucleic acid of claim 6.

8. An isolated host cell transformed with the vector of claim 7.

9. A method of preparing an anti-mesothelin antibody, the method comprising expressing the antibody by culturing the host cell of claim 8.

10. A chimeric antigen receptor comprising an antigen-binding domain, a hinge domain, a transmembrane domain, and an intracellular signaling domain,

wherein the antigen-binding domain is an anti-mesothelin antibody or antigen-binding fragment thereof comprising a heavy chain variable region comprising the following heavy chain CDRs and a light chain variable region comprising the following light chain CDRs:

a heavy chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 1, a heavy chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 2, a heavy chain CDR3 consisting of an amino acid

sequence consisting of SEQ ID NO: 3, and a light chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 4, a light chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 5, and a light chain CDR3 consisting of an amino acid sequence consisting of SEQ ID NO: 6; or

a heavy chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 13, a heavy chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 14, a heavy chain CDR3 consisting of an amino acid sequence consisting of SEQ ID NO: 15, and a light chain CDR1 consisting of an amino acid sequence consisting of SEQ ID NO: 16, a light chain CDR2 consisting of an amino acid sequence consisting of SEQ ID NO: 17, and a light chain CDR3 consisting of an amino acid sequence consisting of SEQ ID NO: 18.

11. The chimeric antigen receptor of claim 10, wherein the antigen-binding domain is an anti-mesothelin antibody or antigen-binding fragment thereof comprising: a heavy chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 19; and a light chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 20.

12. The chimeric antigen receptor of claim 10, wherein the antigen-binding domain is an anti-mesothelin antibody or antigen-binding fragment thereof comprising: a heavy chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 23; and a light chain variable region comprising an amino acid sequence consisting of SEQ ID NO: 24.

13. The chimeric antigen receptor of claim 10, wherein the antigen-binding fragment is a single chain variable fragment (scFv).

14. A polynucleotide encoding the chimeric antigen receptor of claim 10.

15. The polynucleotide of claim 14, wherein the polynucleotide comprises a sequence consisting of SEQ ID NO: 26 or 27.

16. A vector comprising the polynucleotide of claim 14.

17. An isolated cell transformed with the vector of claim 16.

18. The isolated cell of claim 17, wherein the cell is a T cell, an NK cell, an NKT cell, or a gamma delta (γδ) T cell.

19. A pharmaceutical composition for treating cancer, the pharmaceutical composition comprising the isolated cell of claim 18.