CLAIMS

1. An immunocompetent cell that expresses a chimeric antigen receptor (CAR)specifically recognizing human mesothelin; interleukin 7 (IL-7); and chemokine (C-C motif) ligand 19 (CCL19),

the CAR comprising a single chain antibody, a transmembrane region, and a signaling region that induces activation of the immunocompetent cell,

wherein the single chain antibody in the CAR is (1-1) a single chain antibody comprising a heavy chain variable region comprising heavy chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 13, heavy chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 14, and heavy chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 15; and a light chain variable region comprising light chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 16, light chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 17, and light chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 18.

2. The immunocompetent cell according to claim 1, wherein the immunocompetent cell is an immunocompetent cell separated from a living body.

3. The immunocompetent cell according to claim 1 or 2, wherein the immunocompetent cell comprises an exogenous nucleic acid encoding a CAR specifically recognizing human mesothelin, an exogenous nucleic acid encoding IL-7, and an exogenous nucleic acid encoding CCL19.

4. The immunocompetent cell according to claim 3, wherein the exogenous nucleic acid encoding IL-7, and the exogenous nucleic acid encoding CCL19 are an exogenous nucleic acid encoding human IL-7, and an exogenous nucleic acid encoding human CCL19.

5. The immunocompetent cell according to claim 4, wherein the exogenous nucleic acid encoding a -CAR specifically recognizing human mesothelin, the exogenous nucleic acid

encoding human IL-7, and the exogenous nucleic acid encoding human CCL19 are integrated in a genome.

6. The immunocompetent cell according to any one of claims 1 to 5, wherein the single chain antibody in the CAR is a single chain antibody comprising a heavy chain variable region consisting of an amino acid sequence having 85% or higher sequence identity to the amino acid sequence shown by SEQ ID NO:1, and comprising heavy chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 13, heavy chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 14, and heavy chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 15; and a light chain variable region consisting of an amino acid sequence having 85% or higher sequence identity to the amino acid sequence shown by SEQ ID NO:2, and comprising light chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 16, light chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 17, and light chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 18.

7. The immunocompetent cell according to any one of claims 1 to 6, wherein the single chain antibody in the CAR is:
(1-3) a single chain antibody comprising a heavy chain variable region consisting of the amino acid sequence shown by SEQ ID NO: 1, and a light chain variable region consisting of the amino acid sequence shown by SEQ ID NO: 2.

8. The immunocompetent cell according to any one of claims 1 to 7, wherein the transmembrane region in the CAR comprises an amino acid sequence having 85% or higher sequence identity to the amino acid sequence shown by SEQ ID NO: 7, and comprises a polypeptide that has action equivalent to that of the amino acid sequence shown by SEQ ID NO: 7.

9. The immunocompetent cell according to any one of claims 1 to 8, wherein the signaling region that induces activation of the immunocompetent cell in the CAR comprises:

(i) a polypeptide that comprises an amino acid sequence having 85% or higher sequence identity to the amino acid sequence shown by SEQ ID NO:9, and that has action equivalent to that of the amino acid sequence shown by SEQ ID NO: 9, or a polypeptide that consists of an amino acid sequence derived from the amino acid sequence shown by SEQ ID NO: 9 by the deletion, substitution, insertion, and/or addition of one or several amino acids, and that has action equivalent to that of the amino acid sequence shown by SEQ ID NO: 9; and

(ii) a polypeptide that comprises an amino acid sequence having 85% or higher sequence identity to the amino acid sequence shown by SEQ ID NO:10, and that has action equivalent to that of the amino acid sequence shown by SEQ ID NO: 10, or a polypeptide that consists of an amino acid sequence derived from the amino acid sequence shown by SEQ ID NO: 10 by the deletion, substitution, insertion, and/or addition of one or several amino acids, and that has action equivalent to that of the amino acid sequence shown by SEQ ID NO: 10.

10. The immunocompetent cell according to claim 9, wherein the signaling region that induces activation of the immunocompetent cell in the CAR further comprises the amino acid sequence~~s~~ shown by SEQ ID NO: 8.

11. The immunocompetent cell according to any one of claims 1 to 10, wherein the heavy chain variable region and the light chain variable region are connected via a peptide linker consisting of a 2- to 30-amino acid sequence.

12. The immunocompetent cell according to claim 11, wherein the peptide linker consists of the amino acid sequence shown by SEQ ID NO: 26 or SEQ ID NO: 27.

13. The immunocompetent cell according to any one of claims 1 to 12, wherein the light chain variable region is positioned on a C-terminal side of the heavy chain

variable region.

14. The immunocompetent cell according to any one of claims 1 to 13, wherein the single chain antibody in the CAR is:
(1-4) a single chain antibody sequentially comprising a heavy chain variable region consisting of the amino acid sequence shown by SEQ ID NO: 1, a peptide linker consisting of the amino acid sequence shown by SEQ ID NO: 26, and a light chain variable region consisting of the amino acid sequence shown by SEQ ID NO: 2.

15. The immunocompetent cell according to any one of claims 1 to 14, wherein the signaling region that induces activation of the immunocompetent cell in the CAR comprises a polypeptide of a 4-1BB intracellular region, and a polypeptide of a CD3ζ intracellular region.

16. The immunocompetent cell according to claim 15, wherein the signaling region that induces -activation of the immunocompetent cell in the CAR further comprises a polypeptide of a CD28 intracellular region.

17. The immunocompetent cell according to any one of claims 1 to 16, wherein the immunocompetent cell is a T cell.

18. The immunocompetent cell according to any one of claims 1 to 17, wherein the immunocompetent cell is a T cell derived from a human or separated from a human.

19. A pharmaceutical composition comprising the immunocompetent cell according to any one of claims 1 to 18 and a pharmaceutically acceptable additive.

20. The pharmaceutical composition according to claim 19 for use in the treatment of a cancer type expressing mesothelin in a cancer tissue, or a cancer type derived from cancer cells expressing mesothelin.

21. An expression vector comprising a nucleic acid encoding a chimeric antigen receptor

(CAR) specifically recognizing human mesothelin, a nucleic acid encoding IL-7, and a nucleic acid encoding CCL19, the CAR comprising a single chain antibody, a transmembrane region, and a signaling region that induces activation of the immunocompetent cell, wherein the single chain antibody in the CAR is (1-1) a single chain antibody comprising a heavy chain variable region comprising heavy chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 13, heavy chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 14, and heavy chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 15; and a light chain variable region comprising light chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 16, light chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 17, and light chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 18.

22. A method for producing an immunocompetent cell that expresses a chimeric antigen receptor (CAR) specifically recognizing human mesothelin, IL-7, and CCL19, comprising introducing a nucleic acid encoding the CAR specifically recognizing human mesothelin, a nucleic acid encoding the IL-7, and a nucleic acid encoding the CCL19 to an immunocompetent cell, the CAR comprising a single chain antibody, a transmembrane region, and a signaling region that induces activation of the immunocompetent cell,
wherein the single chain antibody in the CAR is (1-1) a single chain antibody comprising a heavy chain variable region comprising heavy chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 13, heavy chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 14, and heavy chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 15; and a light chain variable region comprising light chain CDR1 consisting of the amino acid sequence shown by SEQ ID NO: 16, light chain CDR2 consisting of the amino acid sequence shown by SEQ ID NO: 17, and light chain CDR3 consisting of the amino acid sequence shown by SEQ ID NO: 18.