

Claims

1. A chimeric antigen receptor (CAR), characterized in that an antigen binding domain (i.e., scFv) of the chimeric antigen receptor comprises an antibody heavy chain variable region shown in SEQ ID NO.: 1 or 3 and an antibody light chain variable region shown in SEQ ID NO.: 2 or 4.

2. The CAR as described in claim 1, characterized in that the structure of the antigen binding domain is shown in formula I or II below:

V_L-V_H (I); V_H-V_L (II)

wherein V_H is the antigen heavy chain variable region; V_L is the antigen light chain variable region; "-" is a linking peptide or peptide bond; preferably, the structure of the antigen binding domain is as shown in formula I.

3. The CAR as described in claim 2, characterized in that the amino acid sequence of the V_L is shown in SEQ ID NO.: 1, and the amino acid sequence of the V_H is shown in SEQ ID NO.: 2.

4. The CAR as described in claim 2, characterized in that the amino acid sequence of the V_L is shown in SEQ ID NO.: 3, and the amino acid sequence of the V_H is shown in SEQ ID NO.: 4.

5. The CAR as described in claim 1, characterized in that the structure of the chimeric antigen receptor is shown in formula III below:

$L-V_L-V_H-H-TM-C-CD3\zeta$ (III)

wherein,

L is an optional leader sequence, i.e., a signal peptide;

H is a hinge region;

TM is the transmembrane domain;

C is a costimulatory signal molecule;

CD3 ζ is a cytoplasmic signaling sequence derived from CD3 ζ ; and

V_H, V_L and "-" are as defined above.

6. A nucleic acid molecule, characterized in that the nucleic acid molecule encodes the chimeric antigen receptor (CAR) as described in claim 1.

5 7. A vector, characterized in that the vector contains the nucleic acid molecule as described in claim 6.

8. A host cell, characterized in that the host cell contains the vector as described in claim 7 or a chromosome integrated with an exogenous nucleic acid molecule as described in claim 6 or expressing the CAR as described in claim 1.

10 9. A formulation, characterized in that the formulation contains the chimeric antigen receptor as described in claim 1, the nucleic acid molecule as described in claim 6, the vector as described in claim 7, or the host cell as described in claim 8, and a pharmaceutically acceptable carrier, diluent or excipient.

15 10. A use of the chimeric antigen receptor as described in claim 1, the nucleic acid molecule as described in claim 6, the vector as described in claim 7, or the host cell as described in claim 8, or the formulation as described in claim 9, which is used for preparing a drug or a preparation for preventing and/or treating cancers or tumors.

11. The CAR of claim 1, wherein the CAR further comprises one or more of the following:

- 20 (i) a signal peptide having an amino acid sequence set forth in SEQ ID NO: 9,
(ii) a hinge region having an amino acid sequence set forth in SEQ ID NO: 10,
(iii) a transmembrane domain having an amino acid sequence set forth in SEQ ID NO: 11,
(iv) a co-stimulatory region having an amino acid sequence set forth in SEQ ID
25 NO: 12, and
(v) a cytoplasmic signaling domain having an amino acid sequence set forth in SEQ ID NO: 13.

12. The CAR of claim 1, wherein the CAR has an amino acid sequence comprising the amino acid sequence set forth in SEQ ID NO: 14 or 15.