

CLAIMS

1. A chimeric antigen receptor (CAR), comprising an anti-BCMA antigen binding region which comprises:

(i) a light chain variable region (V_L) having an amino acid sequence set forth in SEQ ID NO: 1, and a heavy chain variable region (V_H) having an amino acid sequence set forth in SEQ ID NO: 2;

(ii) a light chain variable region (V_L) having an amino acid sequence set forth in SEQ ID NO: 3, and a heavy chain variable region (V_H) having an amino acid sequence set forth in SEQ ID NO: 4; or

(ii) a light chain variable region (V_L) having an amino acid sequence set forth in SEQ ID NO: 5, and a heavy chain variable region (V_H) having an amino acid sequence set forth in SEQ ID NO: 6;

wherein V_L is located at the N-terminus of V_H .

2. The CAR of claim 1, wherein the anti-BCMA antigen-binding region comprises a V_L having an amino acid sequence set forth in SEQ ID NO: 1, and a V_H having an amino acid sequence set forth in SEQ ID NO: 2.

3. The CAR of claim 1, wherein the anti-BCMA antigen-binding region is a single-chain variable fragment (scFv) that specifically binds BCMA.

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

- (a) a signal peptide,
- (b) a hinge region,
- (c) a transmembrane domain,
- (d) a co-stimulatory region, and
- (e) a cytoplasmic signaling domain.

5. The CAR of claim 4, wherein the co-stimulatory region comprises a co-stimulatory region of 4-1BB (CD137), CD28, or a combination thereof.

6. The CAR of claim 4, wherein the cytoplasmic signaling domain comprises a cytoplasmic signaling domain of CD3 ζ .
7. The CAR of claim 4, wherein the transmembrane domain comprises a transmembrane domain of CD8 or CD28.
8. The CAR of claim 4, wherein the hinge region comprises a hinge region of CD8, CD28, or CD137.
9. A T cell expressing the CAR of claim 4.
10. Use of the T cell of claim 9 in the manufacture of a medicament for the treatment of cancer in a subject in need thereof.
11. The use of claim 10, wherein the cancer is a hematologic cancer.
12. The use of claim 10, wherein the cancer is a plasma-cell malignancy.
13. The use of claim 10, wherein the cancer is a BCMA-positive malignancy.
14. The use of claim 10, wherein the cancer is multiple myeloma (MM), or plasma cell leukemia.
15. The use of claim 10, wherein the T cell is to be administered by infusion, injection, transfusion, implantation, and/or transplantation.
16. The use of claim 1, wherein the T cell is to be administered intravenously, subcutaneously, intradermally, intranodally, intratumorally, intramedullary, intramuscularly, or intraperitoneally.
17. The use of claim 1, wherein the T cell is to be administered via intravenous infusion.

18. The use of claim 1, wherein the T cell is allogeneic or autologous.
19. The use of claim 1, wherein the subject is a human.
20. The T cell of claim 9 for use in the treatment of cancer.