Claims

1. A trispecific antibody or antibody fragment thereof comprising at least three binding portions, at least one of which binds to human CD3, at least one which binds to human BCMA and at least one of which binds to human CD38.

2. The trispecific antibody or antibody fragment thereof of claim 1 further comprising a common light chain.

3. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said at least one binding portion which binds to human CD3 comprises a heavy chain CDR set comprising an amino acid sequence selected from the group comprising: SEQ ID NO: 181, SEQ ID NO: 307, and SEQ ID NO: 433; SEQ ID NO: 184, SEQ ID NO: 310, and SEQ ID NO: 436; SEQ ID NO: 186, SEQ ID NO: 312, and SEQ ID NO: 438; SEQ ID NO: 188, SEQ ID NO: 314, and SEQ ID NO: 440; SEQ ID NO: 192, SEQ ID NO: 318, and SEQ ID NO: 444.

4. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said at least one binding portion which binds to human BCMA comprises a heavy chain CDR set comprising an amino acid sequence selected from the group comprising: SEQ ID NO: 234, SEQ ID NO: 360, and SEQ ID NO: 486; SEQ ID NO: 219, SEQ ID NO: 345, and SEQ ID NO: 471; SEQ ID NO: 227, SEQ ID NO: 353, and SEQ ID NO: 479; SEQ ID NO: 231, SEQ ID NO: 357, and SEQ ID NO: 483.

5. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said at least one binding portion which binds to human CD38 comprises a heavy chain CDR set comprising an amino acid sequence comprising: SEQ ID NO: 236, SEQ ID NO: 362, and SEQ ID NO: 712; SEQ ID NO: 239, SEQ ID NO: 365, and SEQ ID NO: 491; SEQ ID NO: 237, SEQ ID NO: 363, and SEQ ID NO: 700; SEQ ID NO: 248, SEQ ID NO: 374, and SEQ ID NO: 500.

6. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said at least one binding portion which binds to human CD3 comprises a heavy chain comprising an amino acid sequence at least about 85%, 86%, 87%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% or 100% identical to the amino acid sequence selected from the group comprising SEQ ID NOs: 55; 58; 60; 62 and 66.

7. The trispecific multispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said at least one binding portion which binds to human BCMA comprises

a heavy chain comprising an amino acid sequence at least about 85%, 86%, 87%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% or 100% identical to the amino acid sequence selected from the group comprising SEQ ID NOs: 93, 101, 105 and 108, or to an amino acid sequence selected from the group comprising SEQ ID NOs: 93, 101, 105 and 108 wherein said amino acid sequences further comprise the amino acid substitution N82aS.

8. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said at least one binding portion which binds to human CD38 comprises a heavy chain comprising an amino acid sequence at least about 85%, 86%, 87%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% or 100% identical to an amino acid sequence selected from the group comprising SEQ ID NOs: 110; 113, 122 and 111.

9. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said at least one binding portion which binds to human CD3 comprises a heavy chain CDR set comprising an amino acid sequence of SEQ ID NO: 181, SEQ ID NO: 307, and SEQ ID NO: 433, and a light chain CDR set comprising an amino acid sequence of SEQ ID NO: 721, SEQ ID NO: 722 and SEQ ID NO: 723; said at least one binding portion which binds to human BCMA comprises a heavy chain CDR set comprising an amino acid sequence of SEQ ID NO: 234, SEQ ID NO: 360, and SEQ ID NO: 486, and a light chain CDR set comprising an amino acid sequence of SEQ ID NO: 721, SEQ ID NO: 722 and SEQ ID NO: 723; and said at least one binding portion which binds to human CD38 comprises a heavy chain CDR set comprising an amino acid sequence of SEQ ID NO: 239, SEQ ID NO: 365, and SEQ ID NO: 491, and a light chain CDR set comprising an amino acid sequence of SEQ ID NO: 721, SEQ ID NO: 722 and SEQ ID NO: 723.

10. The trispecific antibody or antibody fragment thereof according to claim 9, comprising three amino acid chains having amino acid sequences of SEQ ID NO: 546, SEQ ID NO: 547 and SEQ ID NO: 1.

11. The trispecific antibody or antibody fragment thereof according to claims 1 to 10, wherein said at least one binding portion which binds to human BCMA is fused at the N-terminus to the C-terminus of said at least one binding portion which binds to human CD3 via a peptide linker.

12. The trispecific antibody or antibody fragment thereof according to claim 1, wherein said at least one binding portion which binds to human BCMA is fused at the C-terminus to the N-terminus of said at least one binding portion which binds to human CD3 via a peptide linker, or wherein said at least one binding portion which binds to human BCMA is fused at the C-terminus to the N-terminus of said at least one binding portion which binds to human CD38 via a peptide linker, or wherein said

at least one binding portion which binds to human BCMA is fused at the N-terminus to the C-terminus of said at least one binding portion which binds to human CD38 via a peptide linker.

13. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims, wherein said trispecific antibody or antibody fragment thereof comprises a non-naturally occurring Fc domain.

14. Use of the trispecific antibody or antibody fragment thereof according to any one of the preceding claims 1 to 13, in the manufacture of a medicament to treat a BCMA and/or a CD38 expressing cancer.

15. The use of the trispecific antibody or antibody fragment thereof according to claim 14, wherein the cancer is multiple myeloma, relapsed multiple myeloma, refractory multiple myeloma, relapsed/refractory multiple myeloma, smoldering multiple myeloma, active multiple myeloma, acute lymphoblastic leukemia, chronic lymphocytic leukemia, acute myeloid leukemia, lymphoma, breast cancer such as Her2+ breast cancer, prostate cancer, cervical cancer, germinal center B-cell lymphoma or B-cell acute lymphoblastic leukemia, Chronic lymphocytic leukemia (CLL), Myelodisplastic syndrome (MDS), Non-Hodgkin lymphoma, diffuse large B-cell lymphoma, non-small cell lung cancer (NSCLC), Hepatocellular carcinoma (HCC), High-grade serous ovarian carcinoma or peritoneal cancer.

16. The trispecific antibody or antibody fragment thereof according to any one of the preceding claims 1 to 13 for use in therapy.