

Claims

1. An antibody construct comprising:
 - a first domain which binds to BCMA,
 - a second domain which binds to an extracellular epitope of the human and/or the *Macaca* CD3ε chain; and
 - a third domain which comprises two polypeptide monomers, each comprising a hinge, a CH2 domain and a CH3 domain, wherein said two polypeptide monomers are fused to each other via a peptide linker.
2. The antibody construct of claim 1, wherein the antibody construct is a single chain antibody construct.
3. The antibody construct of claim 1 or 2, wherein said third domain comprises in an amino to carboxyl order:

hinge-CH2-CH3-linker-hinge-CH2-CH3.
4. The antibody construct of any one of the preceding claims, wherein each of said polypeptide monomers has an amino acid sequence that is at least 90% identical to a sequence selected from the group consisting of SEQ ID NOs: 17-24.
5. The antibody construct of any one of the preceding claims, wherein each of said polypeptide monomers has an amino acid sequence selected from the group consisting of SEQ ID NOs: 17-24.
6. The antibody construct of any one of the preceding claims, wherein the CH2 domain comprises an intra-domain cysteine disulfide bridge.
7. The antibody construct of any one of the preceding claims, wherein
 - (i) the first domain comprises two antibody variable domains and the second domain comprises two antibody variable domains;
 - (ii) the first domain comprises one antibody variable domain and the second domain comprises two antibody variable domains;
 - (iii) the first domain comprises two antibody variable domains and the second domain comprises one antibody variable domain; or

- (iv) the first domain comprises one antibody variable domain and the second domain comprises one antibody variable domain.
8. The antibody construct of any one of the preceding claims, wherein the first and second domain are fused to the third domain via a peptide linker.
9. The antibody construct of any one of the preceding claims, comprising in an amino to carboxyl order:
- (a) the first domain;
 - (b) a peptide linker having an amino acid sequence selected from the group consisting of SEQ ID NOs: 1-3;
 - (c) the second domain;
 - (d) a peptide linker having an amino acid sequence selected from the group consisting of SEQ ID NOs: 1, 2, 3, 9, 10, 11 and 12;
 - (e) the first polypeptide monomer of the third domain;
 - (f) a peptide linker having an amino acid sequence selected from the group consisting of SEQ ID NOs: 5, 6, 7 and 8; and
 - (g) the second polypeptide monomer of the third domain.
10. The antibody construct of any one of the preceding claims, comprising in an amino to carboxyl order:
- (a) the first domain having an amino acid sequence selected from the group consisting of SEQ ID NOs: 53, 59, 71, 77, 89 or 95;
 - (b) a peptide linker having an amino acid sequence selected from the group consisting of SEQ ID NOs: 1-3;
 - (c) the second domain having an amino acid sequence selected from the group consisting of SEQ ID NOs: 23, 25, 41, 43, 59, 61, 77, 79, 95, 97, 113, 115, 131, 133, 149, 151, 167, 169, 185 or 187 of WO 2008/119567, or SEQ ID NO: 15;
 - (d) a peptide linker having an amino acid sequence selected from the group consisting of SEQ ID NOs: 1, 2, 3, 9, 10, 11 and 12;
 - (e) the first polypeptide monomer of the third domain having an amino acid sequence selected from the group consisting of SEQ ID NOs: 17-24;
 - (f) a peptide linker having an amino acid sequence selected from the group consisting of SEQ ID NOs: 5, 6, 7 and 8; and

- (g) the second polypeptide monomer of the third domain having an amino acid sequence selected from the group consisting of SEQ ID NOs: 17-24.
11. The antibody construct of any one of the preceding claims, having an amino acid sequence selected from the group consisting of SEQ ID NOs: 55, 56, 61, 62, 73, 74, 79, 80, 91, 92, 97 and 98.
 12. A polynucleotide encoding an antibody construct as defined in any one of the preceding claims.
 13. A vector comprising a polynucleotide as defined in claim 12.
 14. A host cell transformed or transfected with the polynucleotide as defined in claim 12 or with the vector as defined in claim 13.
 15. A process for the production of an antibody construct according to any one of claims 1 to 11, said process comprising culturing a host cell as defined in claim 14 under conditions allowing the expression of the antibody construct as defined in any one of claims 1 to 11 and recovering the produced antibody construct from the culture.
 16. A pharmaceutical composition comprising an antibody construct of any one of claims 1 to 11, or produced according to the process of claim 15.
 17. The pharmaceutical composition of claim 16, which is stable for at least four weeks at about -20°C.
 18. The antibody construct according to any one of claims 1 to 11, or produced according to the process of claim 15, for use in the prevention, treatment or amelioration of a disease selected from a B cell disorder correlating with BCMA expression, a plasma cell disorder, or an autoimmune disease.
 19. A method for the treatment or amelioration of a B cell disorder correlating with BCMA expression, a plasma cell disorder, or an autoimmune disease, comprising the step of administering to a subject in need thereof the antibody construct according to any one of claims 1 to 11, or produced according to the process of claim 15.

20. A kit comprising an antibody construct according to any one of claims 1 to 11, or produced according to the process of claim 15, a polynucleotide as defined in claim 12, a vector as defined in claim 13, and/or a host cell as defined in claim 14.