

Claims

1. An antibody construct comprising in an amino to carboxyl order:
 - a first domain which binds to PSMA,
 - a second domain which binds to an extracellular epitope of the human and the *Macaca* CD3 ϵ 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 of the third domain 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 claim 4, wherein each of said polypeptide monomers of the third domain has an amino acid sequence selected from SEQ ID NOs: 17-24.
6. The antibody construct of claim 5, wherein each of said polypeptide monomers of the third domain comprises the amino acid sequence of SEQ ID NO: 17.
7. The antibody construct of any one of the preceding claims, wherein the CH2 domain comprises an intra domain cysteine disulfide bridge.

8. 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.
9. 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.
10. The antibody construct of any one of the preceding claims, wherein the antibody construct comprises 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.
11. The antibody construct of any one of the preceding claims, wherein the antibody construct comprises in an amino to carboxyl order:

(a) the first domain having an amino acid sequence selected from the group consisting of SEQ ID NOs: 50, 56, 68, 74, 86, 92, 104, 110, 122, 128, 140, 146, 158, 164, 176, 182, 194, 200, 212, 218, 230, 236, 248, 254, 266, 272, 284, 290, 302, 308, 320, 335, 350, 365, 380, 395, 410, 425, 440, 455, 470;

(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 as depicted in 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 a polypeptide 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 a polypeptide sequence selected from the group consisting of SEQ ID NOs: 17-24.

12. The antibody construct of claim 11, having an amino acid sequence selected from the group consisting of SEQ ID NOs: 52, 53, 58, 59, 70, 71, 76, 77, 88, 89, 94, 95, 106, 107, 112, 113, 124, 125, 130, 131, 142, 143, 148, 149, 160, 161, 166, 167, 178, 179, 184, 185, 196, 197, 202, 203, 214, 215, 220, 221, 232, 233, 238, 239, 250, 251, 256, 257, 268, 269, 274, 275, 286, 287, 292, 293, 304, 305, 310, 311, 322, 323, 325, 326, 337, 338, 340, 341, 352, 353, 355, 356, 367, 368, 370, 371, 382, 383, 385, 386, 397, 398, 400, 401, 412, 413, 415, 416, 427, 428, 430, 431, 442, 443, 445, 446, 457, 458, 460, 461, 472, 473, 475 and 476.

13. The antibody construct of claim 12, comprising the amino acid sequence of SEQ ID NO: 220.

14. The antibody construct of claim 12, comprising the amino acid sequence of SEQ ID NO: 304.
15. The antibody construct of claim 12, comprising the amino acid sequence of SEQ ID NO: 382.
16. A polynucleotide encoding an antibody construct as defined in any one of the preceding claims.
17. A vector comprising the polynucleotide as defined in claim 16.
18. A host cell transformed or transfected with the polynucleotide as defined in claim 16 or with the vector as defined in claim 17.
19. A process for the production of the antibody construct of any one of claims 1 to 15, said process comprising culturing the host cell as defined in claim 18 under conditions allowing the expression of the antibody construct as defined in any one of claims 1 to 15 and recovering the produced antibody construct from the culture.
20. A pharmaceutical composition comprising the antibody construct of any one of claims 1 to 15, or produced according to the process of claim 19.
21. The pharmaceutical composition of claim 20, which is stable for at least four weeks at about -20°C.
22. The antibody construct of any one of claims 1 to 15, or produced according to the process of claim 19, for use in the prevention, treatment or amelioration of a disease selected from a proliferative disease, a tumorous disease, cancer or an immunological disorder.

23. The antibody construct for use according to claim 22, wherein the cancer is prostate cancer.
24. Use of the antibody construct of any one of claims 1 to 15 or produced according to the process of claim 19 in the manufacture of a medicament for the treatment or amelioration of a proliferative disease, a tumorous disease, cancer, or an immunological disorder.
25. The use of claim 24, wherein the cancer is prostate cancer.