

CLAIMS:

1. An antibody or a fragment thereof, having a variable region which binds a target molecule, and a constant region, wherein the light chain is a kappa light chain, and wherein the constant region comprises one or more mutations introducing a site specific conjugation site selected so as to permit conjugation of the antibody, or fragment to a payload, wherein the light chain comprises the amino acid sequence of SEQ ID NO: 40, where X is C; the heavy chain comprises one or more amino acid sequence selected from SEQ ID NOs: 23, 24, 25, 26, 27, or 28, where each X is C.

2. The antibody of claim 1, wherein the antibody is selected from IgG1, IgG2, IgG3, and IgG4.

3. The antibody of any preceding claim wherein the constant region comprises at least a portion of an IgG1 constant region.

4. The antibody of claim 3 wherein the constant region comprises one or more of the C_κ, CH1 and CH3 domains of the IgG1 constant region.

5. The antibody of any preceding claim wherein the antibody is selected from the group consisting of Fabs, bi specific antibody fragments (tandem scFv-Fc, scFv-Fc knobs-into-holes, scFv-Fc-scFv, F(ab')₂, Fab-scFv, (Fab'scFv)₂, scDiabody-Fc, or scDiabody-CH3), IgG-based bispecific antibodies (Hybrid hybridoma, Knobs-into-holes with common light chain, Two-in-one IgG, Dual V domain IgG, IgG-scFv, scFv-IgG, IgG-V, V-IgG), minibody, and tribi-minibody.

6. The antibody of any preceding claim wherein the antibody is human, humanised, or chimeric.

7. The antibody of any preceding claim comprising one or more mutations introducing a site specific conjugation site selected so as to permit conjugation of the antibody, wherein the antibody is selected from Abciximab; Rituximab; Basiliximab ;Daclizumab; Palivizumab; Infliximab; Trastuzumab; Alemtuzumab; Adalimumab; Efalizumab; Cetuximab; Ibritumomab; Omalizumab; Bevacizumab; Ranibizumab; Golimumab; Canakinumab; Ustekinumab; Tocilizumab; Ofatumumab; Belimumab; Ipilimumab; Brentuximab; Pertuzumab; Raxibacumab; Vedolizumab; Ramucirumab; Obinutuzumab; Siltuximab; Secukinumab; Dinutuximab.

8. The antibody of any preceding claim which lacks one or more Fc effector functions.

9. The antibody of claim 8 which lacks ADCC activity.

10. The antibody of any of claims 1 to 9 which has increased ADCC activity.

5 11. The antibody of any preceding claim further comprising a linker.

12. An immunoconjugate comprising an antibody according to any of claims 1 to 11, a payload, and a linker joining the payload to the antibody.

10 13. The antibody of claim 11, or the immunoconjugate of claim 12, wherein the linker is selected from 6-maleimidocaproyl (MC), maleimidopropanoyl (MP), valine-citrulline (val-cit), alanine-phenylalanine (ala-phe), p-aminobenzyloxycarbonyl (PAB), N-Succinimidyl 4-(2-pyridylthio) pentanoate (SPP), N-succinimidyl 4-(N-maleimidomethyl) cyclohexane-1 carboxylate (SMCC), N-Succinimidyl, (4-iodo-acetyl) aminobenzoate (SIAB), SPDB, hydrazone, maleimidocaproyl and 6-maleimidocaproyl-valine-citrulline-p-aminobenzyloxycarbonyl (MC-vc-PAB); or is a branched linker which comprises a peptide chain and is derived from o- hydroxy p-amino benzylic alcohol, wherein the peptide chain is connected to the phenyl ring via the p-amino group, the payload is connected to the phenyl ring via the benzylic alcohol moiety, and the antibody is connected to the phenyl ring via the o-hydroxy group.

20 14. The immunoconjugate of claim 12 or 13, wherein the payload is selected from the group consisting of a radionuclide, a chemotherapeutic agent, a cytotoxic agent, a microbial toxin, a plant toxin, a polymer, a carbohydrate, a cytokine, a fluorescent label, a luminescent label, an enzyme-substrate label, an enzyme, a peptide, a peptidomimetic, a nucleotide, an siRNA, a microRNA, an RNA mimetic, and an aptamer.

30 15. The immunoconjugate of claim 14 wherein the payload is selected from the group consisting of ⁹⁰Y, ¹³¹I, ⁶⁷Cu, ¹⁷⁷Lu, ²¹³Bi, ²¹¹At, dolastatin, vedotin, monomethyl auristatin F(MMAF), monomethyl auristatin E (MMAE); maytansinoids including DM1 and DM4, duocarmycin, duocarmycin analogs, calicheamicin, pyrrolobenzodiazepines (PBD), centanamycin, irinotecan, and doxorubicin, alpha-amanitin, melatonin, membrane disrupting peptide, Pseudomonas exotoxin A, Diphtheria toxin, ricin, polyethylene glycol, hydroxyethyl starch, and a mannosyl residue.

35 16. The immunoconjugate of claim 12 or 13, wherein the payload is a microtubule disrupting agent, or a DNA modifying agent.

40 17. A pharmaceutical composition comprising an antibody or an immunoconjugate according to any preceding claim, and a pharmaceutically acceptable diluent, carrier or excipient.

18. A method for generating an immunoconjugate, the method comprising conjugating an antibody according to any of claims 1 to 11 to a payload.

5 19. An isolated or recombinant polynucleotide encoding the antibody of any of claims 1-10.

20. A vector comprising the polynucleotide of claim 19.

10 21. The vector of claim 20 further comprising an inducible promoter operably linked to the polynucleotide.

22. A host cell comprising the vector of claim 20 or claim 21.

15 23. A method of producing an antibody comprising:
(a) providing a culture medium comprising the host cell of claim 22; and
(b) placing the culture medium in conditions under which the antibody is expressed, and optionally (c) isolating the antibody.