Claims

1. An antigen binding protein which is capable of binding Lymphocyte Activation Gene 3 (LAG-3) and which comprises CDRL1, CDRL2 and CDRL3 from SEQ ID No. 5.

2. An antigen binding protein according to claim 1, which comprises CDRL1 of SEQ ID NO. 1.

3. An antigen binding protein according to claim 1 or 2, which comprises CDRL2 of SEQ ID NO. 2 and/or CDRL3 of SEQ ID NO. 3, or a CDR variant thereof.

4. An antigen binding protein according to any of claims 1 to 3, which comprises one or more of CDRH1, CDRH2 and CDRH3 from SEQ ID NO. 10.

5. An antigen binding protein according to any of claims 1 to 4, which comprises one or more CDRs selected from the group comprising CDRH1 of SEQ ID NO. 6, CDRH2 of SEQ ID NO. 7 and CDRH3 of SEQ ID NO. 8.

6. An antigen binding protein according to any of claims 1 to 5, which comprises the following CDRs:

CDRL1: SEQ ID NO. 1
CDRL2: SEQ ID NO. 2
CDRL3: SEQ ID NO. 3
CDRH1: SEQ ID NO. 6
CDRH2: SEQ ID NO. 7
CDRH3: SEQ ID NO. 8

7. An antigen binding protein according to any of claims 1 to 6, which comprises a) the variable light chain (VL) of SEQ ID NO. 4 and b) the variable heavy chain (VH) of SEQ ID No. 9.

8. An antigen binding protein according to any of claims 1 to 7, which is capable of binding recombinant human LAG-3 His of SEQ ID NO. 51 with a KD of less than 1nM when determined by Biacore™ surface Plasmon resonance analysis.

9. An antigen binding protein which is capable of binding recombinant human LAG-3 His of SEQ ID NO. 51 with a KD of less than 1nM when determined by Biacore™ surface Plasmon resonance analysis.

10. An antigen binding protein according to any of claims 1 to 9, wherein the antigen binding protein is capable of binding LAG-3 expressed on activated T-cells.

11. An antigen binding protein according to any of claims 1 to 10, wherein the antigen binding protein is capable of depleting LAG-3+ activated human T cells.

12. An antigen binding protein according to claim 11, wherein the antigen binding protein is capable of causing greater than 40% depletion of antigen specific CD4 and/or CD8 LAG-3^{+} human T cells by ADCC in an *in-vitro* assay using primary human T cells.

13. An antigen binding protein according to any of claims 1 to 12, wherein the antigen binding protein is a humanised antibody.

14.A humanised antibody according to claim 13, wherein the humanised antibody comprises a human IgG1 constant region.

15.A humanised antibody according to claim 14, which comprises a) a light chain sequence with at least 97% identity to SEQ ID NO. 5, and b) a heavy chain sequence with at least 97% identity to SEQ ID NO. 10.

16.A humanised antibody according to claim 15, which comprises a) a light chain sequence of SEQ ID NO. 5, and b) a heavy chain sequence of SEQ ID NO. 10.

17.A humanised antibody according to any of claims 14 to 16, which is non-fucosylated.

18.A humanised antibody comprising the variable light chain (VL) of SEQ ID NO. 4 and the variable heavy chain (VH) of SEQ ID NO. 9, wherein the antibody does not comprise fucose on the core carbohydrate structure attached to Asn297.

19.An isolated nucleic acid molecule which encodes an antigen binding protein according to any of claims 1 to 13 or a humanised antibody according to any of claims 14 to 18.

20.An expression vector comprising a nucleic acid molecule according to claim 19.

21.A host cell comprising an expression vector according to claim 20.

22.A host cell comprising an expression vector according to claim 20, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the host cell.

23.An antigen binding protein as produced by the host cell of claim 21 or 22.

24.A method of producing an antigen binding protein according to any of claims 1 to 13 or a humanised antibody according to any of claims 14 to 16, comprising a) culturing a host cell according to claim 21 under conditions suitable to express the antigen binding protein or antibody and b) isolating the antigen binding protein or antibody.

25. A method of producing a humanised antibody according to claim 17 or 18, comprising a) culturing a host cell according to claim 22 under conditions suitable to express the antigen binding protein or antibody, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell, and b) isolating the antibody.

26.A pharmaceutical composition comprising a) an antigen binding protein according to any of claims 1 to 13 or an antibody according to any of claims 14 to 18, and b) a pharmaceutically acceptable carrier.

27.A use of an antigen binding protein as defined in any of claims 1 to 13 or a humanised antibody as defined in any of claims 14 to 18, in therapy.

28.A use of an antigen binding protein as defined in any of claims 1 to 13 or a humanised antibody as defined in any of claims 14 to 18, in the treatment of diseases associated with the involvement of pathogenic T cells.

29.A use of an antigen binding protein according to claim 28, wherein the disease is an auto-immune disease, infectious disease, allergic disease or cancer.

30.A use according to claim 29, wherein the autoimmune disease is selected from the group consisting of psoriasis, Crohn's disease, rheumatoid arthritis, primary biliary cirrhosis, systemic

lupus erythematosus (SLE), Sjogren's syndrome, multiple sclerosis, ulcerative colitis and autoimmune hepatitis.

31.A method of treatment of a human or animal subject comprising administering a therapeutically effective amount of an antigen binding protein as defined in any of claims 1 to 13 or a humanised antibody as defined in any of claims 14 to 18.

32.A method of treatment of a disease associated with the involvement of pathogenic T cells in a human or animal subject comprising administering a therapeutically effective amount of an antigen binding protein as defined in any of claims 1 to 13 or a humanised antibody as defined in any of claims 14 to 18.

33.A method of treatment according to claim 32, wherein the disease is an autoimmune disease, infectious disease, allergic disease or cancer.

34.A method of treatment according to claim 33, wherein the autoimmune disease is selected from the group consisting of psoriasis, Crohn's disease, rheumatoid arthritis, primary biliary cirrhosis, systemic lupus erythematosus (SLE), Sjogren's syndrome, multiple sclerosis, ulcerative colitis and autoimmune hepatitis.

Claims

1. An antigen binding protein which is capable of binding Lymphocyte Activation Gene 3 (LAG-3) and which comprises CDRL1, CDRL2 and CDRL3 from SEQ ID No. 5 and CDRH1, CDRH2 and CDRH3 from SEQ ID NO. 10.
2. An antigen binding protein according to claim 1, which comprises the following CDRs:

   CDRL1: SEQ ID NO. 1

   CDRL2: SEQ ID NO. 2

   CDRL3: SEQ ID NO. 3

   CDRH1: SEQ ID NO. 6

   CDRH2: SEQ ID NO. 7

   CDRH3: SEQ ID NO. 8
3. An antigen binding protein according to claim 1 or 2, which comprises a) the variable light chain (VL) of SEQ ID NO. 4 and b) the variable heavy chain (VH) of SEQ ID No. 9.
4. An antigen binding protein according to any of claims 1 to 3, wherein the antigen binding protein is capable of binding LAG-3 expressed on activated T-cells.
5. An antigen binding protein according to any of claims 1 to 4, wherein the antigen binding protein is capable of depleting LAG-3+ activated human T cells.
6. An antigen binding protein according to any of claims 1 to 5, wherein the antigen binding protein is a humanised antibody.
7. A humanised antibody according to claim 6, wherein the humanised antibody comprises a human IgG1 constant region.
8. A humanised antibody according to claim 7, which comprises a) a light chain sequence with at least 97% identity to SEQ ID NO. 5, and b) a heavy chain sequence with at least 97% identity to SEQ ID NO. 10.
9. A humanised antibody according to claim 8, which comprises a) a light chain sequence of SEQ ID NO. 5, and b) a heavy chain sequence of SEQ ID NO. 10.
10. A humanised antibody according to any of claims 7 to 9, which is non-fucosylated.
11. A humanised antibody comprising the variable light chain (VL) of SEQ ID NO. 4 and the variable heavy chain (VH) of SEQ ID NO. 9, wherein the antibody does not comprise fucose on the core carbohydrate structure attached to Asn297.
12. An isolated nucleic acid molecule which encodes an antigen binding protein according to any of claims 1 to 6 or a humanised antibody according to any of claims 7 to 11.
13. An expression vector comprising a nucleic acid molecule according to claim 12.
14. A host cell comprising an expression vector according to claim 13.

15.A host cell comprising an expression vector according to claim 13, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the host cell.

16.An antigen binding protein as produced by the host cell of claim 14 or 15.

17.A method of producing an antigen binding protein according to any of claims 1 to 6 or a humanised antibody according to any of claims 7 to 11, comprising a) culturing a host cell according to claim 14 under conditions suitable to express the antigen binding protein or antibody and b) isolating the antigen binding protein or antibody.

18. A method of producing a humanised antibody according to claim 10 or 11, comprising a) culturing a host cell according to claim 15 under conditions suitable to express the antigen binding protein or antibody, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell, and b) isolating the antibody.

19.A pharmaceutical composition comprising a) an antigen binding protein according to any of claims 1 to 6 or an antibody according to any of claims 7 to 11, and b) a pharmaceutically acceptable carrier.

20.An antigen binding protein as defined in any of claims 1 to 6 or a humanised antibody as defined in any of claims 7 to 11, for use in therapy.

21.An antigen binding protein as defined in any of claims 1 to 6 or a humanised antibody as defined in any of claims 7 to 11 for use in the treatment of an autoimmune disease selected from the group consisting of psoriasis, Crohn's disease, rheumatoid arthritis, primary biliary cirrhosis, systemic lupus erythematosus (SLE), Sjogren's syndrome, multiple sclerosis, ulcerative colitis and autoimmune hepatitis; an infectious disease, an allergic disease or cancer.

22.Use of an antigen binding protein as defined in any of claims 1 to 6 or a humanised antibody as defined in any of claims 7 to 11 in the manufacture of a medicament for the treatment of an autoimmune disease selected from the group consisting of psoriasis, Crohn's disease, rheumatoid arthritis, primary biliary cirrhosis, systemic lupus erythematosus (SLE), Sjogren's syndrome, multiple sclerosis, ulcerative colitis and autoimmune hepatitis; an infectious disease, an allergic disease or cancer.