

Claims

1. An antibody or antigen binding fragment which is capable of specifically binding to a sialic acid-binding immunoglobulin-like lectin (Siglec) or a functionally active fragment thereof, comprising

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 2, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 10, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 14;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 3, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 12, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 3, SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7 or SEQ ID NO: 8, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 10, SEQ ID NO: 12, or SEQ ID NO: 11, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13 or SEQ ID NO: 14;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 2, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 10, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 2, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 8, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 10, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 3, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set

forth in SEQ ID NO: 10, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 4, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 10, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 5, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 10, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13;

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 6, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 10, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13; or

HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 1, HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 3, HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 7, LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 9, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 11, and LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 13.

2. The antibody or antigen binding fragment according to claim 1, comprising VH comprising an amino acid sequence as set forth in SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 27, SEQ ID NO: 28 or SEQ ID NO:37.

3. The antibody or antigen binding fragment according to claim 1 or claim 2, comprising VL comprising an amino acid sequence as set forth in SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 29, SEQ ID NO: 31, or SEQ ID NO:38.

4. The antibody or antigen binding fragment according to any one of claims 1-2, comprising VH comprising an amino acid sequence as set forth in SEQ ID NO: 23, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 30;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 25, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 32;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 37, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 38;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 23, SEQ ID NO: 24, SEQ ID NO: 25, SEQ ID NO: 26, SEQ ID NO: 27, or SEQ ID NO: 28, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 29, SEQ ID NO: 30, SEQ ID NO: 31, or SEQ ID NO: 32;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 23, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 29;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 24, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 29;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 25, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 29;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 26, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 29;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 27, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 29;

VH comprising an amino acid sequence as set forth in SEQ ID NO: 28, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 29; or

VH comprising an amino acid sequence as set forth in SEQ ID NO: 25, and VL comprising an amino acid sequence as set forth in SEQ ID NO: 31.

5. The antibody or antigen binding fragment according to any one of claims 1-4, comprising an antibody heavy chain constant region, preferably a heavy chain constant region derived from a human antibody, more preferably a heavy chain constant region derived from an IgG, more preferably a heavy chain constant region derived from an IgG1.

6. The antibody or antigen binding fragment according to any one of claims 1-5, comprising an antibody light chain constant region, preferably a light chain constant region derived from a human antibody, more preferably a constant region derived from an Igκ.

7. The antibody or antigen binding fragment according to any one of claims 1-6, wherein the antibody is a monoclonal antibody.

8. The antibody or antigen binding fragment according to any one of claims 1-7, wherein the antibody is selected from one or more of the groups consisting of a murine antibody, a chimeric antibody, a humanized antibody, and a fully human antibody.

9. The antibody or antigen binding fragment according to any one of claims 1-8, wherein the antigen-binding fragment is selected from one or more of the groups consisting of Fab, Fab', a Fv fragment, F(ab')₂, F(ab)₂, scFv, di-scFv, VHH, and dAb.

10. The antibody or antigen binding fragment according to any one of claims 1-9, wherein the Siglec includes Siglec-15, preferably the Siglec includes human Siglec, monkey Siglec, and/or murine Siglec, preferably the Siglec-15 or functional fragment thereof includes Siglec-15 or a functional fragment thereof expressed on a cell, and optionally, the antibody or antigen binding fragment have the ability to bind to Siglec-15 or a functional fragment thereof with a K_D value of about 1.56×10^{-10} M or less;

have the ability to bind to Siglec-15 or a functional fragment thereof with an EC_{50} value of about 3.25 nM or less;

have the ability to affect immune cells proliferation, preferably the affecting immune cells proliferation includes reducing the Siglec-15-associated immune cell proliferation inhibition, more preferably the immune cells include immune cells derived from human, more preferably the immune cells include lymphocytes, peripheral blood lymphocytes, T cells, CD4+ and/or CD8+ cells;

have tumor inhibition ability, preferably the tumor inhibition ability includes affecting the tumor volume;

have the ability to inhibit a tumor with a tumor volume inhibition rate of about 23% or more; or

have the ability to affect cytokine secretion, preferably the secretion includes in vivo, ex vivo, and/or in vitro secretion, preferably the cytokine secretion includes lipopolysaccharide-induced cytokine secretion, preferably the cytokine includes an inflammatory factor, TNF- α and/or IL-6.

11. A nucleic acid molecule encoding the antibody or antigen binding fragment according to any one of claims 1 to 10.

12. A vector comprising the nucleic acid molecule of claim 11.

13. An immunoconjugate comprising the antibody or antigen binding fragment according to any one of claims 1 to 10.

14. A cell comprising and/or expressing the antibody or antigen binding fragment according to any one of claims 1 to 10, comprising the nucleic acid molecule of claim 11, comprising the vector of claim 12, and/or comprising the immunoconjugate of claim 13.

15. A pharmaceutical composition comprising the antibody or antigen binding fragment according to any one of claims 1 to 10, the nucleic acid molecule of claim 11, the vector of claim 12, the immunoconjugate of claim 13, and/or the cell of claim 14, and an optional pharmaceutically acceptable vehicle.

16. A pharmaceutical combination comprising the antibody or antigen binding fragment according to any one of claims 1 to 10, the nucleic acid molecule of claim 11, the vector of claim 12, the immunoconjugate of claim 13, the cell of claim 14, and/or the pharmaceutical

composition of claim 15.

17. A kit comprising the antibody or antigen binding fragment according to any one of claims 1 to 10, the nucleic acid molecule of claim 11, the vector of claim 12, the immunoconjugate of claim 13, the cell of claim 14, the pharmaceutical composition of claim 15, and/or the pharmaceutical combination of claim 16, preferably for detecting the presence and/or amount of Siglec in a sample, more preferably the Siglec includes Siglec-15.

18. A method of preparing the antibody or antigen binding fragment according to any one of claims 1 to 10, comprising culturing the cell of claim 14 under conditions capable of expressing the antibody or antigen binding fragment and/or the polypeptide.

19. A method of detecting Siglec in a sample, comprising administering the antibody or antigen binding fragment according to any one of claims 1 to 10, administering the nucleic acid molecule of claim 11, administering the vector of claim 12, administering the immunoconjugate of claim 13, administering the cell of claim 14, administering the pharmaceutical composition of claim 15, administering the pharmaceutical combination of claim 16, and/or using the kit according to claim 17, preferably, the Siglec includes Siglec-15.

20. Use of the antibody or antigen binding fragment according to any one of claims 1 to 10, the nucleic acid molecule of claim 11, the vector of claim 12, the immunoconjugate of claim 13, the cell of claim 14, the pharmaceutical composition of claim 15, the pharmaceutical combination of claim 16, and/or the kit according to claim 17 in the manufacture of a medicament for the prevention and/or treatment of a disease and/or condition, preferably the disease and/or condition includes a tumor, preferably the tumor includes a Siglec-associated tumor, preferably the Siglec includes Siglec-15, optionally the disease and/or condition includes a solid tumor, preferably colon cancer.