

CLAIMS

1. An antibody or antigen-binding polypeptide comprising a heavy chain variable domain and a light chain variable domain, wherein the heavy chain variable domain comprises one or more of:
 - (i) a heavy chain complementarity-determining region 1 (HCDR1) comprising an amino acid sequence that is identical to SEQ ID NO: 3 or SEQ ID NO: 23 at 5 of 5, 4 of 5, or 3 of 5 amino acid positions;
 - (ii) a heavy chain complementarity-determining region 2 (HCDR2) comprising an amino acid sequence that is identical to SEQ ID NO: 4, SEQ ID NO: 24, SEQ ID NO: 43, or SEQ ID NO: 44 at 17 of 17, 16 of 17, 15 of 17, 14 of 17, 13 of 17, or 12 of 17 amino acid positions; and
 - (iii) a heavy chain complementarity-determining region 3 (HCDR3) comprising an amino acid sequence that is identical to SEQ ID NO: 5 or SEQ ID NO: 25 at 6 of 6, 5 of 6, or 4 of 6 amino acid positions;and wherein the light chain variable domain comprises one or more of:
 - (i) a light chain complementarity-determining region 1 (LCDR1) comprising an amino acid sequence that is identical to SEQ ID NO: 13 or SEQ ID NO: 33 at 16 of 16, 15 of 16, 14 of 16, 13 of 16, or 12 of 16 amino acid positions;
 - (ii) a light chain complementarity-determining region 2 (LCDR2) comprising an amino acid sequence that is identical to SEQ ID NO: 14 or SEQ ID NO: 34 at 7 of 7, 6 of 7, or 5 of 7 amino acid positions; and
 - (iii) a light chain complementarity-determining region 3 (LCDR3) comprising an amino acid sequence that is identical to SEQ ID NO: 15, SEQ ID NO: 35, or SEQ ID NO: 45 at 9 of 9, 8 of 9, or 7 of 9 amino acid positions.
2. The antibody or antigen-binding polypeptide of claim 1, wherein the heavy chain variable domain comprises an amino acid sequence having at least 90% identity to the amino acid sequence of SEQ ID NO: 2, SEQ ID NO: 22, or SEQ ID NO: 41.

3. The antibody or antigen-binding polypeptide of any one of claims 1-2, wherein the heavy chain variable domain comprises an amino acid sequence of SEQ ID NO: 2, SEQ ID NO: 22, or SEQ ID NO: 41.
4. The antibody or antigen-binding polypeptide of any one of claims 1-3, wherein the light chain variable domain comprises an LCDR1 comprising the amino acid sequence of SEQ ID NO: 13, an LCDR2 comprising the amino acid sequence of SEQ ID NO: 14, and an LCDR3 comprising the amino acid sequence of SEQ ID NO: 15.
5. The antibody or antigen-binding polypeptide of any one of claims 1-4, wherein the light chain variable domain comprises an amino acid sequence having at least 90% identity to the amino acid sequence of SEQ ID NO: 12, SEQ ID NO: 32, or SEQ ID NO: 42.
6. The antibody or antigen-binding polypeptide of any one of claims 1-4, wherein the light chain variable domain comprises an amino acid sequence of SEQ ID NO: 12, SEQ ID NO: 32, or SEQ ID NO: 42.
7. The antibody or antigen-binding polypeptide of claim 1, wherein the heavy chain variable domain comprises:
 - (i) the HCDR1 comprising the amino acid sequence of SEQ ID NO: 3,
 - (ii) the HCDR2 comprising the amino acid sequence of SEQ ID NO: 4,
 - (iii) the HCDR3 comprising the amino acid sequence of SEQ ID NO: 5; andwherein the light chain variable domain comprises:
 - (i) the LCDR1 comprising the amino acid sequence of SEQ ID NO: 13,
 - (ii) the LCDR2 comprising the amino acid sequence of SEQ ID NO: 14,
 - (iii) the LCDR3 comprising the amino acid sequence of SEQ ID NO: 15.
8. The antibody or antigen-binding polypeptide of claim 1, wherein the heavy chain variable domain comprises the amino acid sequence of SEQ ID NO: 2 and the light chain variable domain comprises the amino acid sequence of SEQ ID NO: 12.

9. The antibody or antigen-binding polypeptide of claim 1, wherein antibody or antigen-binding polypeptide comprises a heavy chain comprising the amino acid sequence of SEQ ID NO: 1 and a light chain comprising the amino acid sequence of SEQ ID NO: 11.
10. The antibody or antigen-binding polypeptide of any one of claims 1-9, wherein the antibody or antigen-binding polypeptide is conjugated to an agent.
11. The antibody or antigen-binding polypeptide of claim 10, wherein the agent is a detectable moiety or a therapeutic moiety.
12. The antibody or antigen-binding polypeptide of claim 11, wherein the agent is a detectable moiety that is or comprises a label.
13. The antibody or antigen-binding polypeptide of claim 12, wherein the label is or comprises biotin, an enzymatic reporter, a fluorescent label, a chemiluminescent label, an in vivo imaging agent, or a radioactive label.
14. The antibody or antigen-binding polypeptide of claim 12, wherein the label is or comprises an enzymatic reporter selected from peroxidase, alkaline phosphatase (AP), glucose oxidase, or β -galactosidase.
15. The antibody or antigen-binding polypeptide of claim 12, wherein the label is or comprises a radioactive label that comprises zirconium-89 (^{89}Zr), iodine-124 (^{124}I), iodine-131 (^{131}I), iodine-125 (^{125}I), bismuth-212 (^{212}Bi), bismuth-213 (^{213}Bi), astatine-221 (^{221}At), copper-67 (^{67}Cu), copper-64 (^{64}Cu), rhenium-186 (^{186}Re), rhenium-188 (^{188}Re), phosphorus-32 (^{32}P), samarium-153 (^{153}Sm), lutetium-177 (^{177}Lu), technetium-99m ($^{99\text{m}}\text{Tc}$), gallium-67 (^{67}Ga), indium-111 (^{111}In), or thallium-201 (^{201}Tl).
16. A composition comprising the antibody or antigen-binding polypeptide of any one of claims 1-15.

17. The composition of claim 16, further comprising a pharmaceutically acceptable carrier or excipient.
18. A nucleic acid sequence comprising a sequence encoding the heavy chain variable domain and/or the light chain variable domain of the antibody or antigen-binding polypeptide of any one of claims 1-9.
19. A vector comprising the nucleic acid sequence of claim 18.
20. A host cell comprising the nucleic acid sequence of claim 18 or the vector of claim 19.
21. A method of producing an antibody or antigen-binding polypeptide comprising culturing the host cell of claim 20 under conditions that allow the host cell to express the antibody or antigen-binding polypeptide.
22. The method of claim 21, further comprising isolating the antibody or antigen-binding polypeptide.
23. A kit comprising the antibody or antigen-binding polypeptide of any one of claims 1-15.
24. The kit of claim 23, further comprising a secondary antibody characterized by an ability to bind to the antibody or antigen-binding polypeptide.
25. The kit of claim 24, wherein the secondary antibody is conjugated to an agent.
26. The kit of claim 25, wherein the agent is a detectable moiety.

27. The kit of claim 26, wherein the detectable moiety is or comprises biotin, an enzymatic reporter, a fluorescent label, a chemiluminescent label, an in vivo imaging agent, or a radioactive label.
28. The kit of claim 26, wherein the detectable moiety is or comprises an enzymatic reporter selected from peroxidase, alkaline phosphatase (AP), glucose oxidase, or β -galactosidase.
29. The kit of claim 26, wherein the detectable moiety is or comprises a radioactive label that comprises zirconium-89 (89Zr), iodine-124 (124I), iodine-131 (131I), iodine-125 (125I), bismuth-212 (212Bi), bismuth-213 (213Bi), astatine-221 (221At), copper-67 (67Cu), copper-64 (64Cu), rhenium-186 (186Re), rhenium-188 (188Re), phosphorus-32 (32P), samarium-153 (153Sm), lutetium-177 (177Lu), technetium-99m (99mTc), gallium-67 (67Ga), indium-111 (111In), or thallium-201 (201Tl).
30. The kit of any one of claims 23 to 29, further comprising one or more of:
 - (i) a nuclei staining reagent;
 - (ii) a blocking buffer;
 - (iii) a wash buffer; and
 - (iv) a mounting medium.
31. A method of detecting CD166 in a sample comprising:
 - contacting the sample with an antibody or antigen-binding polypeptide of any one of claims 1-15; and
 - detecting the presence or absence of antibody or antigen-binding polypeptide binding with a portion of the sample, thereby detecting the presence or absence of CD166.
32. A method of detecting an CD166-expressing cell in a tissue sample comprising:
 - contacting the tissue sample with an antibody or antigen-binding polypeptide of any one of claims 1-15; and

detecting the presence or absence of antibody or antigen-binding polypeptide binding with at least one cell in the tissue sample, thereby detecting the presence or absence of a CD166-expressing cell in the tissue sample.

33. The method of claim 32, wherein the CD166 is a mammalian CD166.
34. The method of claim 32, wherein the CD166 is a primate CD166.
35. The method of claim 32, wherein the CD166 is a human CD166.
36. The method of any one of claims 32-35, wherein the sample comprises cells from a tumor cell line.
37. The method of any one of claims 32-36, wherein the sample is from a subject.
38. The method of any one of claims 32-37, wherein the sample comprises cancer cells.
39. The method of claim 38, wherein the cancer cells are solid tumor cells.
40. The method of any one of claims 32-39, wherein the sample is embedded in a medium.
41. The method of any one of claims 33-40, wherein the sample is fixed.
42. The method of any one of claims 32-41, wherein the sample is a formalin-fixed paraffin-embedded sample.
43. Use of a therapeutic antibody or antigen-binding polypeptide of any one of claims 1-15 in the manufacture of a medicament for treating cancer,
wherein the therapeutic antibody or antigen-binding polypeptide is to be administered to a subject at risk of or suffering from cancer, wherein prior to

administration, the presence of CD166 was detected in a sample from the subject by performing the steps of:

- contacting the sample with an antibody or antigen-binding polypeptide of any one of claims 1-15; and

- detecting the presence or absence of antibody or antigen-binding polypeptide binding with a portion of the sample, thereby detecting the presence or absence of CD166.