

CLAIMS

1. An anti-CD166 antibody or antigen-binding polypeptide thereof comprising a heavy chain variable domain and a light chain variable domain, wherein: (i) the heavy chain variable domain comprises:
a heavy chain complementarity-determining region 1 (HCDR1) comprising an amino acid sequence that is identical to SEQ ID NO: 3,
a heavy chain complementarity-determining region 2 (HCDR2) comprising an amino acid sequence that is identical to SEQ ID NO: 4, and
a heavy chain complementarity-determining region 3 (HCDR3) comprising an amino acid sequence that is identical to SEQ ID NO: 5; and
(ii) the light chain variable domain comprises:
a light chain complementarity-determining region 1 (LCDR1) comprising an amino acid sequence of SEQ ID NO: 13,
a light chain complementarity-determining region 2 (LCDR2) comprising an amino acid sequence of SEQ ID NO: 14, and
a light chain complementarity-determining region 3 (LCDR3) comprising an amino acid sequence of SEQ ID NO: 15.
2. The antibody or the antigen-binding polypeptide thereof 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.
3. The antibody or the antigen-binding polypeptide thereof of claim 1, wherein the heavy chain variable domain comprises an amino acid sequence of SEQ ID NO: 2.
4. The antibody or the antigen-binding polypeptide thereof of any one of claims 1-3, 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.

5. The antibody or the antigen-binding polypeptide thereof of any one of claims 1-3, wherein the light chain variable domain comprises an amino acid sequence of SEQ ID NO: 12.
6. The anti-CD166 antibody or the antigen-binding polypeptide thereof 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.
7. The anti-CD166 antibody or the antigen-binding polypeptide thereof 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.
8. The anti-CD166 antibody or the antigen-binding polypeptide thereof of any one of claims 1-7, wherein the antibody or antigen-binding polypeptide is conjugated to an agent.
9. The anti-CD166 antibody or the antigen-binding polypeptide thereof of claim 8, wherein the agent is a detectable moiety or a therapeutic moiety.
10. The anti-CD166 antibody or the antigen-binding polypeptide thereof of claim 9, wherein the agent is a detectable moiety that is or comprises a label.
11. The anti-CD166 antibody or the antigen-binding polypeptide thereof of claim 10, 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.
12. The anti-CD166 antibody or the antigen-binding polypeptide thereof of claim 10, wherein the label is or comprises an enzymatic reporter selected from peroxidase, alkaline phosphatase (AP), glucose oxidase, or β -galactosidase.

13. The anti-CD166 antibody or the antigen-binding polypeptide thereof of claim 10, wherein the label 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 (^{99m}Tc), gallium-67 (⁶⁷Ga), indium-111 (¹¹¹In), or thallium-201 (²⁰¹Tl).
14. A composition comprising the anti-CD166 antibody or the antigen-binding polypeptide thereof of any one of claim 1-13.
15. The composition of claim 14, further comprising a pharmaceutically acceptable carrier or excipient.
16. A nucleic acid sequence comprising a sequence encoding the heavy chain variable domain and the light chain variable domain of the anti-CD166 antibody or the antigen-binding polypeptide thereof of any one of claims 1-7.
17. A vector comprising the nucleic acid sequence of claim 16.
18. A host cell comprising the nucleic acid sequence of claim 16 or the vector of claim 17.
19. A method of producing an anti-CD166 antibody or the antigen-binding polypeptide thereof comprising culturing the host cell of claim 18 under conditions that allow the host cell to express the anti-CD166 antibody or the antigen-binding polypeptide thereof.
20. The method of claim 19, further comprising isolating the anti-CD166 antibody or the antigen-binding polypeptide thereof.
21. A kit comprising the anti-CD166 antibody or the antigen-binding polypeptide thereof of any one of claims 1-13.

22. The kit of claim 21, further comprising a secondary antibody characterized by an ability to bind to the anti-CD166 antibody or the antigen-binding polypeptide thereof.
23. The kit of claim 22, wherein the secondary antibody is conjugated to an agent.
24. The kit of claim 23, wherein the agent is a detectable moiety.
25. The kit of claim 24, 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.
26. The kit of claim 24, wherein the detectable moiety is or comprises an enzymatic reporter selected from peroxidase, alkaline phosphatase (AP), glucose oxidase, or β -galactosidase.
27. The kit of claim 24, 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).
28. The kit of any one of claims 21 to 27, further comprising one or more of:
 - (i) a nuclei staining reagent;
 - (ii) a blocking buffer;
 - (iii) a wash buffer; and
 - (iv) a mounting medium.
29. A method of detecting CD166 in a sample comprising:

contacting the sample with the anti-CD166 antibody or the antigen-binding polypeptide thereof of any one of claims 1-13; and

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

30. A method of detecting an CD166-expressing cell in a tissue sample comprising:
contacting the tissue sample with the anti-CD166 antibody or the antigen-binding polypeptide of any one of claims 1-13; and
detecting the presence or absence of the anti-CD166 antibody or the antigen-binding polypeptide thereof 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.
31. The method of claim 30, wherein the CD166 is a mammalian CD166.
32. The method of claim 30, wherein the CD166 is a primate CD166.
33. The method of claim 30, wherein the CD166 is a human CD166.
34. The method of any one of claims 30-33, wherein the sample comprises cells from a tumor cell line.
35. The method of any one of claims 30-34, wherein the sample is from a subject.
36. The method of any one of claims 30-35, wherein the sample comprises cancer cells.
37. The method of claim 36, wherein the cancer cells are solid tumor cells.
38. The method of any one of claims 30-37, wherein the sample is embedded in a medium.
39. The method of any one of claims 30-38, wherein the sample is fixed.

40. The method of any one of claims 30-39, wherein the sample is a formalin-fixed paraffin-embedded sample.