

CLAIMS

1. An antibody molecule that specifically binds to PD1 and VEGFR2, wherein the antibody molecule comprises:
 - 5 a heavy chain variable (VH) region comprising
 - a HCDR1 having an amino acid sequence of SEQ ID NO:1,
 - a HCDR2 having an amino acid sequence of SEQ ID NO:42, and
 - a HCDR3 having an amino acid sequence of SEQ ID NO:3; and
 - a light chain variable (VL) region comprising
 - 10 a LCDR1 having an amino acid sequence of SEQ ID NO:39,
 - a LCDR2 having an amino acid sequence of SEQ ID NO:40, and
 - a LCDR3 having an amino acid sequence of SEQ ID NO:11.
2. The antibody molecule of claim 1, wherein the VH region has an amino acid
15 sequence that is at least about 90%, at least about 91%, at least about 92%, at least about 93%, at least about 94%, at least about 95%, at least about 96%, at least about 97%, at least about 98% or at least about 99% identical to SEQ ID NO:49.
3. The antibody molecule of claim 1, wherein the VH region has an amino acid
20 sequence of SEQ ID NO:49.
4. The antibody molecule of claim 1, wherein the VL region has an amino acid sequence that is at least about 90%, at least about 91%, at least about 92%, at least about 93%, at least about 94%, at least about 95%, at least about 96%, at least about 97%, at least about
25 98% or at least about 99% identical to SEQ ID NO:45.
5. The antibody molecule of claim 1, wherein the VL region has an amino acid sequence of SEQ ID NO:45.
- 30 6. The antibody molecule of claim 1, wherein
 - the VH region has an amino acid sequence of SEQ ID NO:49, and
 - the VL region has an amino acid sequence of SEQ ID NO:45.
7. The antibody molecule of claim 6, wherein the antibody molecule further comprises
35 an IgG, IgE, IgM, IgD, IgA or IgY immunoglobulin constant region.

8. The antibody molecule of claim 7, wherein the IgG immunoglobulin constant region is IgG1, IgG2, IgG3, or IgG4; or wherein the IgA immunoglobulin constant region is IgA1 or IgA2.
- 5 9. The antibody molecule of claim 7 or 8, wherein the IgG immunoglobulin constant region is IgG1.
10. The antibody molecule of claim 1, wherein the antibody molecule comprises an IgG immunoglobulin constant region having an amino acid sequence of SEQ ID NO:25, SEQ ID
10 NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, or SEQ ID NO:31.
11. The antibody molecule of any one of claims 1 to 10, wherein the antibody molecule is a humanized or chimeric antibody molecule.
- 15 12. The antibody molecule of any one of claims 1 to 6, wherein the antibody molecule is an antigen-binding portion of the antibody molecule.
13. The antibody molecule of claim 12, wherein the antigen-binding portion is a Fab, a Fab', an F(ab')₂, an Fv, an scFv, a maxibody, a minibody, a diabody, a triabody, a
20 tetrabody, or a bis-scFv.
14. The antibody molecule of any one of claims 1 to 13, wherein the antibody molecule is further linked, fused, or conjugated to a therapeutic agent, wherein the therapeutic agent is a cytotoxin, a radioisotope, a chemotherapeutic agent, an immunomodulatory agent, a
25 cytostatic enzyme, a cytolytic enzyme, a therapeutic nucleic acid, an anti-angiogenic agent, an anti-proliferative agent, or a pro-apoptotic agent.
15. An antibody molecule that specifically binds to PD1 and VEGFR2, wherein the antibody molecule comprises:
- 30 (a) a heavy chain comprising a VH region having an amino acid sequence of SEQ ID NO:49, and an IgG1 immunoglobulin constant region having an amino acid sequence of SEQ ID NO:28; and
- (b) a light chain comprising a VL region having an amino acid sequence of
35 SEQ ID NO:45.
16. The antibody molecule of claim 15, wherein the light chain of the antibody molecule further comprises a human kappa light chain constant region.

17. A pharmaceutical composition comprising the antibody molecule of any one of claims 1 to 16, and a pharmaceutically acceptable carrier, diluent or excipient.
- 5 18. A nucleic acid composition comprising:
(a) a first nucleotide sequence encoding the VH of the antibody molecule of any one of claims 1 to 14; and
(b) a second nucleotide sequence encoding the VL of the antibody molecule of any one of claims 1 to 14.
- 10 19. An expression vector system comprising the nucleic acid composition of claim 18.
20. A recombinant host cell comprising the expression vector system of claim 19.
- 15 21. A method of producing an antibody molecule that specifically binds to PD1 and VEGFR2, the method comprising:
culturing the recombinant host cell of claim 20 under conditions whereby the nucleic acid composition is expressed, thereby producing the antibody molecule; and
isolating the antibody molecule from the recombinant host cell or culture.
- 20 22. A nucleic acid composition comprising:
(a) a first nucleotide sequence encoding the heavy chain of the antibody molecule of claim 15; and
(b) a second nucleotide sequence encoding the light chain of the antibody molecule of claim 15.
- 25 23. An expression vector system comprising the nucleic acid composition of claim 22.
24. A recombinant host cell comprising the expression vector system of claim 23.
- 30 25. A method of producing an antibody molecule that specifically binds to PD1 and VEGFR2, the method comprising:
culturing the recombinant host cell of claim 24 under conditions whereby the nucleic acid composition is expressed, thereby producing the antibody molecule; and
isolating the antibody molecule from the recombinant host cell or culture.
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26. Use of the antibody molecule of any one of claims 1 to 16, or the pharmaceutical composition of claim 17 for use in the manufacture of a medicament for enhancing an immune response in a subject.
- 5 27. Use of a therapeutically effective amount of the antibody molecule of any one of claims 1 to 16, or the pharmaceutical composition of claim 17 in the manufacture of a medicament for the treatment of cancer, an infectious disease, or an immune disease in a subject, wherein the medicament is to be administered to the subject.
- 10 28. The use of claim 27, wherein the cancer is associated with expression or overexpression of PD1 and/or VEGFR2.
29. The use of claim 27 or 28, wherein the cancer is pancreatic cancer, melanoma, breast cancer, lung cancer, bronchial cancer, colorectal cancer, prostate cancer, stomach cancer, ovarian cancer, urinary bladder cancer, brain or central nervous system cancer, peripheral nervous system cancer, esophageal cancer, cervical cancer, uterine or endometrial cancer, cancer of the oral cavity or pharynx, liver cancer, kidney cancer, testicular cancer, biliary tract cancer, small bowel or appendix cancer, salivary gland cancer, thyroid gland cancer, adrenal gland cancer, osteosarcoma, chondrosarcoma, or cancer of hematological tissues.
- 15 30. The use of claim 27, wherein the infectious disease is viral, bacterial, fungal, or parasitic.
- 20 31. The use of claim 27, wherein the infectious disease is human immunodeficiency virus (HIV) infection.
- 25 32. The antibody molecule of any one of claims 1 to 16, or the pharmaceutical composition of claim 17 for use in the treatment of cancer, an infectious disease, or an immune disease.
- 30 33. The antibody molecule or the pharmaceutical composition for use according to claim 32, wherein the cancer is pancreatic cancer, melanoma, breast cancer, lung cancer, bronchial cancer, colorectal cancer, prostate cancer, stomach cancer, ovarian cancer, urinary bladder cancer, brain or central nervous system cancer, peripheral nervous system cancer, esophageal cancer, cervical cancer, uterine or endometrial cancer, cancer of the oral cavity or pharynx, liver cancer, kidney cancer, testicular cancer, biliary tract cancer,
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small bowel or appendix cancer, salivary gland cancer, thyroid gland cancer, adrenal gland cancer, osteosarcoma, chondrosarcoma, or cancer of hematological tissues.

5 34. The antibody molecule or the pharmaceutical composition for use according to claim 32, wherein the infectious disease is viral, bacterial, fungal, or parasitic.

35. The antibody molecule or the pharmaceutical composition for use according to claim 32, wherein the infectious disease is human immunodeficiency virus (HIV) infection.

10 36. The antibody molecule of any one of claims 1 to 16, or the pharmaceutical composition of claim 17, for use as a medicament.