

Claims

1. An antibody or antigen binding fragment binding to the human GARP/human TGF- β 1 complex, comprising a heavy chain variable region VH which comprises the HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 2, the HCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 3, and the HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 4; and a light chain variable region VL which comprises the LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 44, the LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 45, and the LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 12.
2. The antibody or antigen binding fragment of claim 1, comprising a light chain variable region VL which comprises the LCDR1 comprising an amino acid sequence as set forth in any one of SEQ ID NO: 10 and SEQ ID NO: 27, the LCDR2 comprising an amino acid sequence as set forth in any one of SEQ ID NO: 11 and SEQ ID NO: 28, and the LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 12.
3. The antibody or antigen binding fragment of claim 1, wherein the LCDR1, LCDR2, and LCDR3 comprise amino acid sequences selected from any one of the groups consisting of:
 - a) LCDR1: SEQ ID NO: 10, LCDR2: SEQ ID NO: 11, and LCDR3: SEQ ID NO: 12;
 - b) LCDR1: SEQ ID NO: 27, LCDR2: SEQ ID NO: 28, and LCDR3: SEQ ID NO: 12.
4. The antibody or antigen binding fragment of claim 1, wherein the HCDR1, HCDR2, HCDR3, LCDR1, LCDR2 and LCDR3 are selected from any one of groups of amino acid sequences as follows:
 - a) SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:10, SEQ ID NO:11 and SEQ ID NO:12; or
 - b) SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:27; SEQ ID NO:28 and SEQ ID NO:12.
5. The antibody or antigen-binding fragment of claim 1, comprising the H-FR1, H-FR2, H-FR3, and H-FR4 which comprise amino acid sequences selected from any one of the groups consisting of:
 - a) H-FR1: SEQ ID NO: 5, H-FR2: SEQ ID NO: 6, H-FR3: SEQ ID NO: 7, and H-FR4: SEQ

ID NO: 8;

b) H-FR1: SEQ ID NO: 22, H-FR2: SEQ ID NO: 23, H-FR3: SEQ ID NO: 24, and H-FR4: SEQ ID NO: 25.

6. The antibody or antigen-binding fragment of any one of claims 1-5, wherein the VH comprises an amino acid sequence as set forth in any one of SEQ ID NO: 1 and SEQ ID NO: 21.
7. The antibody or antigen binding fragment of any one of claims 1-6, comprising the L-FR1, L-FR2, L-FR3, and L-FR4 which comprise amino acid sequences selected from any one of the groups consisting of:
 - a) L-FR1: SEQ ID NO: 13, L-FR2: SEQ ID NO: 14, L-FR3: SEQ ID NO: 15, and H-FR4: SEQ ID NO: 16;
 - b) L-FR1: SEQ ID NO: 29, L-FR2: SEQ ID NO: 14, L-FR3: SEQ ID NO: 30, and H-FR4: SEQ ID NO: 31.
8. The antibody or antigen binding fragment of any one of claims 1-7, comprising a light chain variable region VL comprising an amino acid sequence as set forth in any one of SEQ ID NO: 9 and SEQ ID NO: 26.
9. The antibody or antigen binding fragment of any one of claims 1-8, comprising a heavy chain variable region VH and a light chain variable region VL, wherein the VH comprises or consists of an amino acid sequence as set forth in SEQ ID NO: 1, and the VL comprises or consists of an amino acid sequence as set forth in SEQ ID NO:9; or VH comprises or consists of an amino acid sequence as set forth in SEQ ID NO: 21 and the VL comprises or consists of an amino acid sequence as set forth in SEQ ID NO:26.
10. The antibody or antigen binding fragment of any one of claims 1-9, comprising a heavy chain constant region comprising an IgG-derived constant region or an IgY-derived constant region, optionally the heavy chain constant region comprises a human IgG4-derived constant region, and optionally the heavy chain constant region comprises an amino acid sequence as set forth in SEQ ID NO: 17.
11. The antibody or antigen binding fragment of any one of claims 1-10, comprising a light chain constant region, and wherein the antibody light chain constant region comprises an

- Igk-derived constant region or an Igλ-derived constant region, optionally, the light chain constant region comprises a human Igk-derived constant region, and optionally the light chain constant region comprises an amino acid sequence as set forth in SEQ ID NO: 18.
12. The antibody or antigen binding fragment of any one of claims 1-11, comprising a heavy chain HC comprising an amino acid sequence as set forth in any one of SEQ ID NO: 19 and SEQ ID NO: 32.
 13. The antibody or antigen binding fragment of any one of claims 1-12, comprising a light chain LC comprising an amino acid sequence as set forth in any one of SEQ ID NO: 20 and SEQ ID NO: 33.
 14. The antibody or antigen binding fragment of any one of claims 1-13, comprising a heavy chain HC and a light chain LC, wherein the HC and LC comprise amino acid sequences selected from any one of the groups consisting of:
 - a) HC: SEQ ID NO: 19 and LC: SEQ ID NO: 20;
 - b) HC: SEQ ID NO: 32 and LC: SEQ ID NO: 33.
 15. The antibody or antigen binding fragment of any one of claims 1-14, wherein the antigen-binding fragment comprises Fab, Fab', F(ab)2, Fv fragments, F(ab')2, scFv, di-scFv, VHH, and/or dAb.
 16. The antibody or antigen binding fragment of any one of claims 1-15, wherein the antibody is selected from the group consisting of: monoclonal antibodies, single chain antibodies, murine antibodies, chimeric antibodies, humanized antibodies, and fully human antibodies.
 17. A polypeptide comprising the antibody or antigen binding fragment of any one of claims 1-16.
 18. An immunoconjugate comprising the antibody or antigen binding fragment of any one of claims 1-16 or the polypeptide of claim 17, preferably, the immunoconjugate further comprises a pharmaceutically acceptable therapeutic agent, optionally the therapeutic agent is selected from the group of a cytotoxic agent and a cytostatic agent.
 19. An isolated nucleic acid molecule encoding the antibody or antigen binding fragment of any one of claims 1-16 or the polypeptide of claim 17.

20. A vector comprising the isolated nucleic acid molecule of claim 19.
21. A cell comprising the antibody or antigen binding fragment of any one of claims 1-16, the polypeptide of claim 17, the immunoconjugate of claim 18, the isolated nucleic acid molecule of claim 19, and/or the vector of claim 20.
22. A method of preparing the antibody or antigen binding fragment of any one of claims 1-16 or the polypeptide of claim 17, the method comprising culturing the cell of claim 21 under conditions capable of expressing the antibody or antigen binding fragment of any one of claims 1-16 or the polypeptide of claim 17.
23. A pharmaceutical composition comprising the antibody or antigen binding fragment of any one of claims 1-16, the polypeptide of claim 17, the immunoconjugate of claim 18, the isolated nucleic acid molecule of claim 19, the vector of claim 20, the cell of claim 21, and/or a pharmaceutically acceptable adjuvant and/or excipient.
24. A pharmaceutical combination comprising the antibody or antigen binding fragment of any one of claims 1-16 and an immune checkpoint inhibitor, preferably, the immune checkpoint inhibitor comprises a substance that inhibits the interaction of PD-1/PD-L1, more preferably, the immune checkpoint inhibitor is selected from the group consisting of: PD-1/PD-L1 blocking agents, PD-1 antagonists, PD-L1 antagonists, PD-1 inhibitors, and PD-L1 inhibitors, most preferably, the immune checkpoint inhibitor comprises an anti-PD-L1 antibody.
25. The pharmaceutical combination of claim 24, wherein the anti-PD-L1 antibody comprises a heavy chain variable region VH which comprises HCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 35, HCDR2 comprising an amino acid sequence as set forth as SEQ ID NO: 36, and HCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 37; and a light chain variable region VL which comprises LCDR1 comprising an amino acid sequence as set forth in SEQ ID NO: 39, LCDR2 comprising an amino acid sequence as set forth in SEQ ID NO: 40, and LCDR3 comprising an amino acid sequence as set forth in SEQ ID NO: 41.
26. The pharmaceutical combination of any one of claims 24-25, wherein the anti-PD-L1 antibody comprises a heavy chain variable region VH comprising an amino acid sequence as

set forth in SEQ ID NO: 34.

27. The pharmaceutical combination of any one of claims 24-26, wherein the anti-PD-L1 antibody comprises a light chain variable region VL comprising an amino acid sequence as set forth in SEQ ID NO: 38.
28. The pharmaceutical combination of any one of claims 24-27, wherein the anti-PD-L1 antibody includes Atezolizumab.
29. The pharmaceutical combination of any one of claims 24-28, which can be a pharmaceutical composition.
30. A kit comprising the pharmaceutical combination of any one of claims 24-29.
31. The antibody or antigen binding fragment of any one of claims 1-16, the polypeptide of claim 17, the immunoconjugate of claim 18, the isolated nucleic acid molecule of claim 19, the vector of claim 20, the cell of claim 21, and/or the pharmaceutical composition of claim 23 for the prevention, remission, and/or treatment of a tumor, preferably the tumor includes a solid tumor, more preferably the tumor includes a tumor associated with the expression of GARP protein, most preferably the tumor includes a melanoma, a breast tumor, and/or a lung tumor.
32. The pharmaceutical combination of any one of claims 24-29 and/or the kit of claim 30 for the prevention, remission, and/or treatment of a tumor, preferably the tumor includes a solid tumor, more preferably the tumor includes a tumor associated with the expression of GARP, most preferably the tumor includes a melanoma, a breast tumor, and/or a lung tumor.
33. Use of the antibody or antigen binding fragment of any one of claims 1-16, the polypeptide of claim 17, the immunoconjugate of claim 18, the isolated nucleic acid molecule of claim 19, the vector of claim 20, the cell of claim 21, and/or the pharmaceutical composition of claim 23 in the manufacture of a medicament for the prevention, remission, and/or treatment of a tumor, preferably the tumor includes a solid tumor, more preferably the tumor includes a tumor associated with the expression of GARP, most preferably, the tumor includes a melanoma, a breast tumor, and/or a lung tumor.
34. Use of a pharmaceutical combination of any one of claims 24-29 and/or a kit of claim 30 in

the preparation of a medicament for the prevention, remission, and/or treatment of a tumor, preferably the tumor includes a solid tumor, more preferably the tumor includes a tumor associated with the expression of GARP, most preferably, the tumor includes a melanoma, a breast tumor, and/or a lung tumor.