

CLAIMS

1. Use of a humanized antibody capable of binding to human Tim-3 in the preparation of a medicament for (1) stimulating an immune response, or (2) treating a cancer or a tumor, or (3) treating an infectious disease, wherein the antibody comprises:
 - (1) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 26 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 27;
 - (2) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 4 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 8;
 - (3) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 26 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 8; or
 - (4) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 4 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 27.
2. The use of claim 1, wherein the antibody comprises:
 - (1) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 26 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 27.

3. The use of Claim 1, wherein the antibody comprises:

- (1) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36;
- (2) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (3) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;
- (4) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30;
- (5) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36;
- (6) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (7) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;
- (8) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30;
- (9) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36;
- (10) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (11) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;
- (12) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30;
- (13) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (14) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;
- (15) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30; or
- (16) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36.

4. The use of Claim 1, wherein the antibody comprises:

- (1) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36.

5. The use of any one of Claims 1 to 4, wherein the antibody is a Fab, F(ab')₂, Fv, or a single chain Fv (scFv).
6. The use of any one of Claims 1 to 4, wherein the antibody comprises a heavy chain constant region of the subclass of IgG1, IgG2, IgG3, or IgG4 or a variant thereof, and a light chain constant region of the type of kappa or lambda or a variant thereof.
7. The use of Claim 6, wherein the antibody comprises a variant heavy chain constant region of the subclass of IgG1, IgG2, IgG3, or IgG4, wherein the variant heavy chain constant region provides a reduced or eliminated effector function.
8. The use of Claim 8, wherein the effector function is antibody-dependent cell-mediated cytotoxicity (ADCC) or complement-dependent cytotoxicity (CDC).
9. The use of Claim 6, wherein the antibody comprises a heavy chain constant region of human IgG1 or a variant thereof.
10. The use of Claim 9, wherein the variant heavy chain constant region of human IgG1 comprises one or more mutations selected from a group consisting of E₂₃₃P, L₂₃₄A, L₂₃₅A, L₂₃₆Δ and P₃₂₉A.
11. The use of Claim 10, wherein the variant human IgG1 heavy chain constant region comprising the amino sequence of SEQ ID NO 21, and a human kappa light chain constant region.
12. The use of any one of Claims 1 to 11, wherein the cancer is selected from a lung cancer, a liver cancer, a stomach cancer, a cervical cancer, a melanoma, a renal cancer, a breast cancer, a colorectal cancer, a leukemia, a lymphoma, an ovarian cancer, a head and neck cancer or a metastatic lesion of the cancer.
13. The use of any one of Claims 1 to 11, wherein the infectious disease is selected from HIV infection and HCV infection.
14. An antibody capable of binding to human Tim-3, comprising:
 - (1) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 26 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino

acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 27;

- (2) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 4 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 8;
- (3) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 26 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 8; or
- (4) a heavy chain variable region (VH) comprising a VH-CDR1 amino acid sequence of SEQ ID NO 3, a VH-CDR2 amino acid sequence of SEQ ID NO 4 and a VH-CDR3 amino acid sequence of SEQ ID NO 5; and a light chain variable region (VL) comprising a VL-CDR1 amino acid sequence of SEQ ID NO 6, a VL-CDR2 amino acid sequence of SEQ ID NO 7 and a VL-CDR3 amino acid sequence of SEQ ID NO 27.

15. The antibody of Claim 14, comprising:

- (1) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36;
- (2) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (3) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;
- (4) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30;
- (5) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 9, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36;
- (6) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (7) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;

- (8) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30;
- (9) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 17, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36;
- (10) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (11) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;
- (12) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 28, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30;
- (13) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 11;
- (14) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 19;
- (15) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 30; or
- (16) a heavy chain variable domain comprising the amino acid sequence of SEQ ID NO 40, and a light chain variable domain having the amino acid sequence of SEQ ID NO 36.
- 16.** The antibody of Claim 15 or 16, wherein the antibody is a Fab, F(ab')₂, Fv, or a single chain Fv (scFv).
- 17.** The antibody of Claim 15 or 16, wherein the antibody comprises a heavy chain constant region of the subclass of IgG1, IgG2, IgG3, or IgG4 or a variant thereof, and a light chain constant region of the type of kappa or lambda or a variant thereof.
- 18.** The antibody of Claim 17, wherein the antibody comprises a variant heavy chain constant region of the subclass of IgG1, IgG2, IgG3, or IgG4, wherein the variant heavy chain constant region provides a reduced or eliminated effector function.
- 19.** The antibody of Claim 18, wherein the effector function is antibody-dependent cell-mediated cytotoxicity (ADCC) or complement-dependent cytotoxicity (CDC).
- 20.** The antibody of Claim 17, wherein the antibody comprises a heavy chain constant region of human IgG1 or a variant thereof.
- 21.** The antibody of Claim 20, wherein the variant heavy chain constant region of human IgG1 comprises one or more mutations selected from a group consisting of E₂₃₃P, L₂₃₄A, L₂₃₅A, L₂₃₆Δ and P₃₂₉A.

22. The antibody of Claim 21, wherein the variant human IgG1 heavy chain constant region comprising the amino sequence of SEQ ID NO 21, and a human kappa light chain constant region.