CLAIMS

We claim:

1. An isolated binding molecule that binds to human OX40R, wherein the binding molecule comprises:

A. (a) a heavy chain CDR1 comprising an amino acid sequence of SEQ ID NO: 1;
(b) a heavy chain CDR2 comprising an amino acid sequence of SEQ ID NO: 2;
(c) a heavy chain CDR3 comprising an amino acid sequence of SEQ ID NO: 3;
(d) a light chain CDR1 comprising an amino acid sequence of SEQ ID NO: 4;
(e) a light chain CDR2 comprising an amino acid sequence of SEQ ID NO: 5; and
(f) a light chain CDR3 comprising an amino acid sequence of SEQ ID NO: 6; or

B. (a) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 7; and
(b) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 8; or

C. (a) a heavy chain CDR1 comprising an amino acid sequence of SEQ ID NO: 13;
(b) a heavy chain CDR2 comprising an amino acid sequence of SEQ ID NO: 14;
(c) a heavy chain CDR3 comprising an amino acid sequence of SEQ ID NO: 15;
(d) a light chain CDR1 comprising an amino acid sequence of SEQ ID NO: 16;
(e) a light chain CDR2 comprising an amino acid sequence of SEQ ID NO: 17; and
(f) a light chain CDR3 comprising an amino acid sequence of SEQ ID NO: 18; or

D. (a) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 19; and
(b) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 20.

2. The binding molecule according to claim 1 wherein the binding molecule: (a) binds to human OX40R with a KD of 1 x 10-6 M or less; and (b) has agonist activity on human OX40R.

3. The binding molecule according to claim 1 wherein the binding molecule is a human antibody.

4. The binding molecule according to claim 1 or 2, wherein the binding molecule is a chimeric or humanized antibody.

5. The binding molecule according to claim 3, wherein the antibody binds to human OX40R with a KD of 100 nM or less.

6. An isolated human monoclonal antibody that binds to human OX40R, wherein the monoclonal antibody comprises:

(i) a heavy chain comprising the amino acid sequence of SEQ ID NO: 9 and a light chain comprising the amino acid sequence of SEQ ID NO: 10; or which comprises

(ii) a heavy chain comprising the amino acid sequence of SEQ ID NO: 21 and a light chain comprising the amino acid sequence of SEQ ID NO: 22.

7. A composition comprising a binding molecule according to any one of claims 1 to 6, and optionally a pharmaceutically acceptable carrier.

8. A binding molecule according to any of claims 1 to 6, for use in preventing or treating cancer in a mammal in need thereof.

9. The binding molecule for use according to claim 8, wherein the cancer is selected from the group of consisting of breast cancer, prostate cancer, colorectal cancer, lung cancer, or hematological cancer.

10. A binding molecule according to any of claims 1 to 6, for use in enhancing an immune response in a mammal.

11. The binding molecule for use according to any one of claims 8 to 10, wherein the binding molecule is a human antibody.

12. The binding molecule for use according to claim 11, wherein the binding molecule is the human antibody according to claim 6(i) or (ii).

13. An isolated nucleic acid molecule comprising a nucleotide sequence that encodes a binding molecule according to any one of claims 1 to 6.

14. The nucleic acid molecule according to claim 13, comprising a nucleotide sequence selected from SEQ ID Nos: 11, 12, 23 or 24.

15. A vector comprising the nucleic acid molecule of claim 13 or claim 14.

16. The vector according to claim 15, further comprising an expression control sequence operably linked to the nucleic acid molecule.

17. A host cell comprising the vector according to claim 15 or claim 16.

18. An in vitro method of inhibiting growth of tumor cells, comprising contacting the tumor cells with a binding molecule or with a composition comprising a binding molecule according to any one of claims 1 to 7, wherein the binding molecule is in an amount effective to inhibit the growth of the tumor cells.

CLAIMS

1. An isolated binding molecule that binds to human OX40R, comprising:

A.

(a) a heavy chain CDR1 comprising an amino acid sequence of SEQ ID NO: 1;
(b) a heavy chain CDR2 comprising an amino acid sequence of SEQ ID NO: 2;
(c) a heavy chain CDR3 comprising an amino acid sequence of SEQ ID NO: 3;
(d) a light chain CDR1 comprising an amino acid sequence of SEQ ID NO: 4;
(e) a light chain CDR2 comprising an amino acid sequence of SEQ ID NO: 5; and
(f) a light chain CDR3 comprising an amino acid sequence of SEQ ID NO: 6; or

B.

(a) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 7; and
(b) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 8; or

C.

(a) a heavy chain CDR1 comprising an amino acid sequence of SEQ ID NO: 13;
(b) a heavy chain CDR2 comprising an amino acid sequence of SEQ ID NO: 14;
(c) a heavy chain CDR3 comprising an amino acid sequence of SEQ ID NO: 15;
(d) a light chain CDR1 comprising an amino acid sequence of SEQ ID NO: 16;
(e) a light chain CDR2 comprising an amino acid sequence of SEQ ID NO: 17; and
(f) a light chain CDR3 comprising an amino acid sequence of SEQ ID NO: 18; or

D.

(a) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 19; and
(b) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 20.

2. An isolated binding molecule according to claim 1 that:

(a) binds to human OX40R with a K_D of 1×10^{-6} M or less; and
(b) has agonist activity on human OX40R.

3. The binding molecule according to claim 1, which is a human antibody.

4. The binding molecule according to any one of claims 1 or 2, which is a chimeric or humanized antibody.

5. The antibody of claim 3, wherein the antibody binds to human OX40R with a K_D of 100 nM or less.

6. An isolated human monoclonal antibody that binds to human OX40R, which comprises:

(i) a heavy chain comprising the amino acid sequence of SEQ ID NO: 9 and a light chain comprising the amino acid sequence of SEQ ID NO: 10; or which comprises
(ii) a heavy chain comprising the amino acid sequence of SEQ ID NO: 21 and a light chain comprising the amino acid sequence of SEQ ID NO: 22.

7. A composition comprising a binding molecule according to any one of claims 1 to 6, and optionally a pharmaceutically acceptable carrier.

8. A binding molecule according to any of claims 1 to 6, for use in preventing or treating cancer in a mammal in need thereof.

9. The binding molecule for use according to claim 8, wherein the cancer is selected from the group of consisting of breast cancer, prostate cancer, colorectal cancer, lung cancer, or hematological cancer.

10. A binding molecule according to any of claims 1 to 6, for use in enhancing an immune response in a mammal.

11. The binding molecule for use according to any one of claims 8 to 10, wherein the binding molecule is a human antibody.

12. The binding molecule for use according to claim 11, wherein the binding molecule is the human antibody according to claim 6(i) or (ii).

13. An isolated nucleic acid molecule comprising a nucleotide sequence that encodes a binding molecule according to any one of claims 1 to 6.

14. The nucleic acid molecule according to claim 13, comprising a nucleotide sequence selected from SEQ ID Nos: 11, 12, 23 or 24.

15. A vector comprising the nucleic acid molecule of claim 13 or claim 14.

16. The vector according to claim 15, further comprising an expression control sequence operably linked to the nucleic acid molecule.

17. A host cell comprising the vector according to claim 15 or claim 16.

18. An in vitro method of inhibiting growth of tumor cells, comprising contacting the tumor cells with a binding molecule according to any one of claims 1 to 7 or with a composition comprising a binding molecule according to any one of claims 1 to 7, wherein the binding molecule is in an amount effective to inhibit the growth of the tumor cells.