CLAIMS

1. An isolated antibody or antigen binding fragment thereof that binds to human MARCO (SEQ ID NO: 384), comprising three heavy chain complementarity determining regions (CDRs) (CDR-H1, CDR-H2, and CDR-H3) and three light chain complementarity determining regions (CDRs) (CDR-L1, CDR-L2, and CDR-L3), wherein the CDR-H1, CDR-H2, and CDR-H3 are from a heavy chain variable domain (VH) comprising the amino acid sequence set forth in SEQ ID NO: 61, 21, 31, 41, 51, 91, 121, 474, 1, 11, 71, 81, 101, 111, 131, 434, or 444; and wherein the CDR-L1, CDR-L2, and CDR-L3 are from a light chain variable domain (VL) comprising the amino acid sequence set forth in SEQ ID NO: 66, 26, 36, 46, 56, 96, 126, 479, 6, 16, 76, 86, 106, 116, 136, 439, or 449.

2. The isolated antibody of claim 1, wherein

a. the CDR-H1, CDR-H2, and CDR-H3, and the CDR-L1, CDR-L2, and CDR-L3 are defined according to AbM;

b. the CDR-H1, CDR-H2, and CDR-H3, and the CDR-L1, CDR-L2, and CDR-L3 are defined according to Kabat;

c. the CDR-H1, CDR-H2, and CDR-H3, and the CDR-L1, CDR-L2, and CDR-L3 are defined according to Chothia;

d. the CDR-H1, CDR-H2, and CDR-H3, and the CDR-L1, CDR-L2, and CDR-L3 are defined according to IMGT.

3. The isolated antibody of claim 1, wherein:

a. CDR-H1 comprises the sequence GFSLTSYHVS (SEQ ID NO: 2),

b. CDR-H2 comprises the sequence AIWTGGSIA (SEQ ID NO: 3),

c. CDR-H3 comprises the sequence DLSDYYSSYTSFDY (SEQ ID NO: 4),

d. CDR-L1 comprises the sequence ASEGISNDLA (SEQ ID NO: 431) or XASEGISNDLA (SEQ ID NO: 383), wherein X is arginine (R) or leucine (L),

e. CDR-L2 comprises the sequence AASRLQS (SEQ ID NO: 528) or AASRLQD (SEQ ID NO: 8), and

f. CDR-L3 comprises the sequence QQSYKYPLT (SEQ ID NO: 9).

4. The isolated antibody of claim 1, wherein the VH comprises the sequence set forth in SEQ ID NO: 61; and the VL comprises the sequence set forth in SEQ ID NO: 66.

5. The isolated antibody of claim 1, wherein the VH chain sequence comprises the VH sequence shown in SEQ ID NO: 434; and the VL chain sequence comprises the VL sequence shown in SEQ ID NO: 439.

6. The isolated antibody of claim 1, wherein the VH comprises a sequence selected from the sequences set forth in SEQ ID NO: 61, 21, 31, 41, 51, 91, 121, 474, 1, 11, 71, 81, 101, 111, 131, 434, or 444.

7. The isolated antibody of claim 1, wherein the VH comprises the sequence set forth in SEQ ID NO: 61.

8. The isolated antibody of claim 1, wherein the VL comprises a sequence selected from the sequences set forth in SEQ ID NO: 66, 26, 36, 46, 56, 96, 126, 479, 6, 16, 76, 86, 106, 116, 136, 439, or 449.

9. The isolated antibody of claim 1, wherein the VL comprises the sequence set forth in SEQ ID NO: 66.

10. The isolated antibody of claim 1, wherein the VH comprises a sequence selected from the sequences set forth in SEQ ID NO: 61, 21, 31, 41, 51, 91, 121, 474, 1, 11, 71, 81, 101, 111, 131, 434, or 444 and the VL comprises a sequence selected from the sequences set forth in SEQ ID NO: 26, 36, 46, 56, 66, 96, 126, 479, 6, 16, 76, 86, 106, 116, 136, 439, or 449.

11. The isolated antibody of claim 1, wherein the antibody comprises a heavy chain wherein the sequence of the heavy chain comprises the heavy chain sequence set forth in SEQ ID NO: 65.

12. The isolated antibody of claim 1, wherein the antibody comprises a heavy chain wherein the sequence of the heavy chain comprises the heavy chain sequence set forth in SEQ ID NO: 65, 25, 35, 45, 55, 95, 125, 478, 5, 15, 75, 85, 105, 115, 135, 438, or 448.

13. The isolated antibody of claim 1, wherein the antibody comprises a light chain wherein the sequence of the light chain comprises the light chain sequence set forth in SEQ ID NO: 70.

14. The isolated antibody of claim 1, wherein the antibody comprises a light chain wherein the sequence of the light chain comprises the light chain sequence set forth in SEQ ID NO: 70, 30, 40, 50, 60, 100, 130, 483, 10, 20, 80, 90, 110, 120, 140, 443, or 453.

15. The isolated antibody of claim 1, wherein the antibody comprises a heavy chain and a light chain, wherein the sequence of the heavy chain comprises the heavy chain sequence set

forth in SEQ ID NO: 65; and the sequence of the light chain comprises the light chain sequence set forth in SEQ ID NO: 70.

16. The isolated antibody of claim 1, wherein the antibody comprises a heavy chain and a light chain, wherein the sequence of the heavy chain comprises the heavy chain sequence set forth in SEQ ID NO: 65, 25, 35, 45, 55, 95, 125, 478, 5, 15, 75, 85, 105, 115, 135, 438, or 448; and the sequence of the light chain comprises the light chain sequence set forth in SEQ ID NO: 70, 30, 40, 50, 60, 100, 130, 483, 10, 20, 80, 90, 110, 120, 140, 443, or 453.

17. The isolated antibody of claim 1, wherein the antibody comprises a human Fc region.

18. The isolated antibody of claim 1, wherein the human Fc region is a wild-type human IgG1 Fc.

19. The isolated antibody of claim 1, wherein the antibody comprises a wild type human IgG1 Fc, and wherein the VH comprises the sequence set forth in SEQ ID NO: 61, and the VL comprises the sequence set forth in SEQ ID NO: 66.

20. The isolated antibody of claim 1, wherein the antibody comprises a wild type human IgG1 Fc, and wherein the VH comprises the sequence set forth in SEQ ID NO: 434, and the VL comprises the sequence set forth in SEQ ID NO: 439.

21. The isolated antibody of claim 1, wherein the antibody binds to human MARCO with a K_D of less than or equal to about 0.5, 1, 2, 3, 4, 5, 6, or $7x10^{-9}$ M, as measured by surface plasmon resonance (SPR) assay.

22. The isolated antibody of claim 1, wherein the antibody is humanized.

23. A method of producing an antibody comprising expressing the antibody of claim 1 from a host cell and isolating the expressed antibody.

24. A pharmaceutical composition comprising the antibody of claim 1 and a pharmaceutically acceptable excipient.

25. A kit comprising the antibody of claim 1 and instructions for use.

26. Use of an antibody that competes for binding to human MARCO (SEQ ID NO: 384) in the manufacture of a medicament for treating cancer in a subject, wherein the medicament is to be administered to the subject with a reference antibody, wherein the reference antibody comprises three heavy chain complementarity determining regions (CDRs) (CDR-H1, CDR-H2, and CDR-H3) and three light chain complementarity determining regions (CDRs) (CDR-

L1, CDR-L2, and CDR-L3), wherein the CDR-H1, CDR-H2, and CDR-H3 are from a heavy chain variable domain (VH) comprising the amino acid sequence set forth in SEQ ID NO: 61, 21, 31, 41, 51, 91, 121, 474, 1, 11, 71, 81, 101, 111, 131, 434, or 444; and wherein the CDR-L1, CDR-L2, and CDR-L3 are from a light chain variable domain (VL) comprising the amino acid sequence set forth in SEQ ID NO: 66, 26, 36, 46, 56, 96, 126, 479, 6, 16, 76, 86, 106, 116, 136, 439, and 449.

27. The use of claim 26, wherein the subject has previously received, is concurrently receiving, or will subsequently receive an immunotherapy, wherein the immunotherapy is at least one of: a checkpoint inhibitor; a checkpoint inhibitor of T cells; anti-PD1 antibody; anti-PDL1 antibody; anti-CTLA4 antibody; adoptive T cell therapy; CAR-T cell therapy; a dendritic cell vaccine; a monocyte vaccine; an antigen binding protein that binds both a T cell and an antigen presenting cell; a BiTE dual antigen binding protein; a toll-like receptor ligand; a cytokine; a cytotoxic therapy; a chemotherapy; a radiotherapy; a small molecule inhibitor; a small molecule agonist; an immunomodulator; and an epigenetic modulator.

28. The use of claim 27, wherein the immunotherapy is an anti-PD1 antibody, an anti-PDL1 antibody, or an anti-CTLA4 antibody.

29. Use of an antibody that competes for binding to human MARCO (SEQ ID NO: 384) in the manufacture of a medicament for increasing an immune response in a subject, wherein the medicament is to be administered to the subject with a reference antibody, wherein the reference antibody comprises three heavy chain complementarity determining regions (CDRs) (CDR-H1, CDR-H2, and CDR-H3) and three light chain complementarity determining regions (CDRs) (CDR-L1, CDR-L2, and CDR-L3), wherein the CDR-H1, CDR-H2, and CDR-H3 are from a heavy chain variable domain (VH) comprising the amino acid sequence set forth in SEQ ID NO: 61, 21, 31, 41, 51, 91, 121, 474, 1, 11, 71, 81, 101, 111, 131, 434, or 444; and wherein the CDR-L1, CDR-L2, and CDR-L3 are from a light chain variable domain (VL) comprising the amino acid sequence set forth in SEQ ID NO: 66, 26, 36, 46, 56, 96, 126, 479, 6, 16, 76, 86, 106, 116, 136, 439, and 449.