

Claims

[Claim 1]

An antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody comprising:

(a) a light chain CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 1;

(b) a light chain CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 2;

(c) a light chain CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 3;

(d) a heavy chain CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 4;

(e) a heavy chain CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 5; and

(f) a heavy chain CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 6.

[Claim 2]

The antibody according to claim 1, wherein a heavy chain constant region is a heavy chain constant region of human IgG4, and has a mutation that reduces an ADCC and/or ADCP activity.

[Claim 3]

The antibody according to claim 1 or 2, wherein a heavy chain constant region is a heavy chain constant region of human IgG4, and phenylalanine at position 234, as numbered according to the EU index as in Kabat et al., is substituted by alanine, leucine at position 235 is substituted by alanine, and serine at position 228 is substituted by a proline.

[Claim 4]

The antibody according to claim 3, wherein an amino acid sequence of the heavy chain constant region is an amino acid sequence consisting of amino acid residues 140 to 466 in SEQ ID NO: 25.

[Claim 5]

An antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody comprising:

(ai) a light chain variable region consisting of an amino acid sequence consisting of amino acid residues 21 to 126 in SEQ ID NO: 23; or

(aai) a light chain variable region consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 21 to 126 in SEQ ID NO: 23 and having a binding activity to human SIRP α ; and

(bi) a heavy chain variable region consisting of an amino acid sequence consisting of amino acid residues 20 to 139 in SEQ ID NO: 25; or

(bii) a heavy chain variable region consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 20 to 139 in SEQ ID NO: 25 and having a binding activity to human SIRP α ,

(a) a light chain CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 1;

(b) a light chain CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 2;

(c) a light chain CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 3;

(d) a heavy chain CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 4;

(e) a heavy chain CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 5; and

(f) a heavy chain CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 6.

wherein a heavy chain constant region is a heavy chain constant region of human IgG4, and has a mutation that reduces an ADCC and/or ADCP activity.

[Claim 6]

The antibody according to claim 5, wherein the heavy chain constant region is the heavy chain constant region of human IgG4, and phenylalanine at position 234, as numbered according to the EU index as in Kabat et al., is substituted by alanine, leucine at position 235 is substituted by alanine, and serine at position 228 is substituted by proline.

[Claim 7]

The antibody according to claim 6, wherein an amino acid sequence of the heavy chain constant region is an amino acid sequence consisting of amino acid residues 140 to 466 in SEQ ID NO: 25.

[Claim 8]

The antibody according to any one of claims 1 to 4, which is any of the following (1) to (8):

(1) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 41; and a light chain consisting of an amino acid sequence consisting of amino acid residues 21 to 234 in SEQ ID NO: 37;

(2) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 41 and having a binding activity to human SIRP α ; and a light chain consisting of an amino acid sequence having at least 95% sequence identity with amino acid residues 21 to 234 in SEQ ID NO: 37 and having a binding activity to human SIRP α ;

(3) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid

sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 41; and a light chain consisting of an amino acid sequence consisting of amino acid residues 21 to 234 in SEQ ID NO: 39;

(4) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 41 and having a binding activity to human SIRP α ; and a light chain consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 21 to 234 in SEQ ID NO: 39 and having a binding activity to human SIRP α ;

(5) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 43; and a light chain consisting of an amino acid sequence consisting of amino acid residues 21 to 234 in SEQ ID NO: 35;

(6) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 43 and having a binding activity to human SIRP α ; and a light chain consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 21 to 234 in SEQ ID NO: 35 and having a binding activity to human SIRP α ;

(7) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 43; and a light chain consisting of an amino acid sequence consisting of amino acid residues 21 to 234 in SEQ ID NO: 37; and

(8) an antibody that binds specifically to human SIRP α to inhibit binding of human SIRP α to CD47, the antibody consisting of: a heavy chain consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 20 to 466 in SEQ ID NO: 43 and having a binding activity to human SIRP α ; and a light chain consisting of an amino acid sequence having at least 95% sequence identity with the amino acid sequence consisting of amino acid residues 21 to 234 in SEQ ID NO: 37 and having a binding activity to human SIRP α .

[Claim 9]

The antibody according to claim 8, wherein the ADCC and/or ADCP activity is reduced.