

THAT WHICH IS CLAIMED IS:

1. An antibody that specifically binds to human SIRP α , and comprises one or more CDRs having an amino acid sequence that differs by not more than 3 amino acids as compared to a CDR amino acid sequence set forth in any of SEQ ID NOs: 2-4 and 6-8.

2. The antibody of claim 1, wherein the antibody comprises one or more CDR sequences of the 6 sequences set forth in SEQ ID NOs: 2-4 and 6-8.

3. The antibody of claim 1, wherein the antibody comprises a light chain comprising one or more of the CDR amino acid sequences set forth in SEQ ID NOs: 6-8.

4. The antibody of claim 3, wherein the antibody comprises a light chain comprising the 3 CDR amino acid sequences set forth in SEQ ID NOs: 6-8.

5. The antibody of claim 1, wherein the antibody comprises a heavy chain comprising one or more of the CDR amino acid sequences set forth in SEQ ID NOs: 2-4.

6. The antibody of claim 5, wherein the antibody comprises a heavy chain comprising the 3 CDR amino acid sequences set forth in SEQ ID NOs: 2-4.

7. The antibody of claim 1, comprising:

(i) a light chain comprising one or more of the CDR amino acid sequences set forth in SEQ ID NOs: 6-8; and

(ii) a heavy chain comprising one or more of the CDR amino acid sequences set forth in SEQ ID NOs: 2-4.

8. The antibody of claim 7, wherein the heavy chain comprises each of the CDR sequences set forth in SEQ ID NOs: 2-4, and the light chain comprises each of the CDR sequences set forth in SEQ ID NOs: 6-8.

9. The antibody of claim 1, comprising:

(i) a heavy chain having three CDRs, wherein CDR-H1 has the amino acid sequence set forth in SEQ ID NO: 2, CDR-H2 has the amino acid sequence set forth in SEQ ID NO: 3, and CDR-H3 has the amino acid sequence set forth in SEQ ID NO: 4; and

(ii) a light chain having three CDRs, wherein CDR-L1 has the amino acid sequence set forth in SEQ ID NO: 6, CDR-L2 has the amino acid sequence set forth in SEQ ID NO: 7, and CDR-L3 has the amino acid sequence set forth in SEQ ID NO: 8.

10. The antibody of claim 9, comprising an amino acid sequence as set forth in any one of SEQ ID NOs: 9-10.

11. The antibody of claim 9, wherein the heavy chain comprises an amino acid sequence as set forth in any one of SEQ ID NOs: 1, 11, 13, 15, and 17.

12. The antibody of claim 9, wherein the light chain comprises an amino acid sequence as set forth in any one of SEQ ID NOs: 5, 12, 14, 16, and 18.

13. The antibody of claim 9, wherein:

(a) the heavy chain comprises an amino acid sequence as set forth in any one of SEQ ID NOs: 1, 11, 13, 15, and 17; and

(b) the light chain comprises an amino acid sequence as set forth in any one of SEQ ID NOs: 5, 12, 14, 16, and 18.

14. The antibody of claim 9, wherein:

(a) the heavy chain comprises the amino acid sequence of SEQ ID NO: 1, and the light chain comprises the amino acid sequence of SEQ ID NO: 5;

(b) the heavy chain comprises the amino acid sequence of SEQ ID NO: 11, and the light chain comprises the amino acid sequence of SEQ ID NO: 12;

(c) the heavy chain comprises the amino acid sequence of SEQ ID NO: 13, and the light chain comprises the amino acid sequence of SEQ ID NO: 14;

(d) the heavy chain comprises the amino acid sequence of SEQ ID NO: 15, and the light chain comprises the amino acid sequence of SEQ ID NO: 16; or

(e) the heavy chain comprises the amino acid sequence of SEQ ID NO: 17, and the light chain comprises the amino acid sequence of SEQ ID NO: 18.

15. The antibody of any of claims 1-14, wherein the antibody does not activate SIRP α upon binding.

16. The antibody of any of claims 1-15, wherein the antibody is a chimeric or humanized antibody.

17. The antibody of claim 16, wherein the antibody is a humanized monoclonal antibody.

18. The antibody of any of claims 1-17, wherein the antibody is a multispecific antibody that specifically binds to SIRP α and at least a second antigen.

19. The antibody of claim 18, wherein the second antigen is a marker of a CD47-expressing cell.

20. The antibody of claim 19, wherein the second antigen is selected from: CD19, CD20, CD22, CD24, CD25, CD30, CD33, CD38, CD44, CD52, CD56, CD70, CD96, CD97, CD99, CD123, CD279 (PD-1), EGFR, HER2, CD117, C-Met, PTHR2, and HAVCR2 (TIM3).

21. A polynucleotide encoding an antibody set forth in any of claims 1-20.

22. A cell that produces an antibody set forth in any of claims 1-20.

23. A pharmaceutical composition comprising an antibody set forth in any of claims 1-20.

24. The pharmaceutical composition of claim 23, further comprising a second antibody that specifically binds to a marker of a CD47-expressing cancer cell.

25. The pharmaceutical composition of claim 24, wherein the second antibody specifically binds to one or more markers selected from the group consisting of: CD19, CD20, CD22, CD24, CD25, CD30, CD33, CD38, CD44, CD52, CD56, CD70, CD96, CD97, CD99, CD123, CD279 (PD-1), EGFR, HER2, CD117, C-Met, PTHR2, and HAVCR2 (TIM3).

26. The pharmaceutical composition of claim 23, comprising a pharmaceutically acceptable excipient.

27. A method of inducing phagocytosis in an individual, the method comprising:
administering to an individual a composition comprising an antibody set forth in any of claims 1-20 in a dose effective to induce phagocytosis.

28. The method according to claim 27, wherein the individual is human.

29. The method according to claim 28, wherein the individual has a condition or disease selected from: cancer, a solid tumor, leukemia, a lymphoma, a chronic infection, an inflammatory disease, multiple sclerosis, and arthritis.

30. The method according to claim 28 or claim 29, wherein the composition comprises a second antibody that specifically binds a marker of a CD47-expressing cell.

31. The method according to claim 30, wherein the second antibody specifically binds a cancer cell marker.

32. The method according to claim 31, wherein the cancer cell marker is selected from: CD19, CD20, CD22, CD24, CD25, CD30, CD33, CD38, CD44, CD52, CD56, CD70, CD96, CD97, CD99, CD123, CD279 (PD-1), EGFR, HER2, CD117, C-Met, PTHR2, and HAVCR2 (TIM3).

33. A method of detecting the presence of SIRP α in a biological sample or tissue, the method comprising: contacting the biological sample or tissue with the antibody set forth in any of claims 1-20, and determining the presence or absence of antibody bound to the biological sample or tissue.

34. A method of detecting SIRP α expressing cells in an individual, comprising:
administering to the individual an anti-SIRP α antibody set forth in any of claims 1-20, wherein the antibody is detectably labeled; and
detecting the presence or absence of the label in the individual.

35. The method according to claim 34, wherein the detectable label is a radioisotope label.

36. The method according to claim 35, wherein the detecting step comprises detecting the presence or absence of the label with positron emission tomography (PET).

37. The method according to any of claims 34 to 36, wherein the individual has or is suspected of having cancer, inflammation, an inflammatory disease, and/or a chronic infection.