

CLAIMS

1. An antibody or fragment thereof that specifically binds to stem cell factor (SCF), wherein the antibody comprises a heavy chain CDR1, CDR2, and CDR3 comprising SEQ ID NOs: 1, 2, and 3, respectively.
2. The antibody or fragment thereof of claim 1, wherein the antibody further comprises a light chain CDR1, CDR2, and CDR3 comprising SEQ ID NOs: 4, 5, and 6, respectively.
3. The antibody or fragment thereof of claim 1 or claim 2, wherein the antibody comprises a heavy chain variable region having at least 80% identity to a sequence selected from SEQ ID NOs: 7, 8, 9, 10, and 11.
4. The antibody or fragment thereof of claim 3, wherein the antibody comprises a heavy chain variable region having at least 90% identity to a sequence selected from SEQ ID NOs: 7, 8, 9, 10, and 11.
5. The antibody or fragment thereof of claim 1 or claim 2, wherein the antibody comprises a light chain variable region having at least 80% identity to a sequence selected from SEQ ID NOs: 13, 14, 15, and 16.
6. The antibody or fragment thereof of claim 5, wherein the antibody comprises a light chain variable region having at least 90% identity to a sequence selected from SEQ ID NOs: 13, 14, 15, and 16.
7. The antibody or fragment thereof of claim 1, wherein the antibody or fragment thereof comprises a heavy chain variable region amino acid sequence selected from SEQ ID NOs: 7, 8, 9, 10, and 11; and a light chain variable region amino acid sequence selected from SEQ ID NOs: 13, 14, 15, and 16.

8. The antibody or fragment thereof of claim 1, wherein the antibody or fragment thereof comprises a heavy chain variable region amino acid sequence according to SEQ ID NO: 7 and a light chain variable region amino acid sequence according to SEQ ID NO: 16.
9. The antibody or fragment thereof of claim 1, wherein the antibody or fragment thereof comprises a heavy chain variable region amino acid sequence according to SEQ ID NO: 8 and a light chain variable region amino acid sequence according to SEQ ID NO: 16.
10. The antibody or fragment thereof of claim 1, wherein the antibody or fragment thereof comprises a heavy chain variable region amino acid sequence according to SEQ ID NO: 9 and a light chain variable region amino acid sequence according to SEQ ID NO: 16.
11. The antibody or fragment thereof of claim 1, wherein the antibody or fragment thereof comprises a heavy chain variable region amino acid sequence according to SEQ ID NO: 10 and a light chain variable region amino acid sequence according to SEQ ID NO: 16.
12. The antibody or fragment thereof of claim 1, wherein the antibody or fragment thereof comprises a heavy chain variable region amino acid sequence according to SEQ ID NO: 11 and a light chain variable region amino acid sequence according to SEQ ID NO: 16.
13. The antibody or fragment thereof of claim 1 or 2, wherein the antibody is humanized.
14. The antibody or fragment thereof of any one of claims 1 to 13, wherein the antibody is a monoclonal antibody.
15. The antibody of claim 14, wherein the antibody comprises a human IgG4 domain.
16. The antibody of claim 15, wherein the IgG4 domain comprises a S241P mutation at amino acid residue 241 and an L248E mutation at amino acid residue 248, wherein the numbering of the residues is that of the Kabat numbering system.

17. The antibody of any one of claims 14-16, wherein the antibody comprises a heavy chain according to SEQ ID NO: 42 and a light chain according to SEQ ID NO: 49.
18. The antibody of any one of claims 14-16, wherein the antibody comprises a heavy chain according to SEQ ID NO: 43 and a light chain according to SEQ ID NO: 49.
19. The antibody or fragment thereof of any one of claims 1 to 18, wherein the antibody or fragment thereof blocks the interaction between SCF and c-Kit.
20. The antibody or fragment thereof of any one of claims 1 to 18 wherein the antibody or fragment thereof causes internalization of SCF.
21. The antibody or fragment thereof according to any one of claims 1 to 20, wherein the antibody specifically binds to SCF248.
22. The antibody or fragment thereof of any one of claims 1 to 21, wherein the antibody does not bind to SCF220.
23. The antibody or fragment thereof of any one of claims 1 to 14 or 17 to 22, wherein the fragment is selected from a Fab, F(ab')₂, Fab', scFv, and single domain antibody (sdAb).
24. An isolated nucleic acid molecule encoding the antibody or fragment thereof of any one of claims 1 to 23.
25. An expression vector comprising a nucleic acid segment encoding the antibody or fragment thereof of any one of claims 1 to 23.
26. A recombinant host cell comprising the expression vector of claim 25.

27. A method for making an antibody that specifically binds to stem cell factor isoform 248 (SCF248), the method comprising immunizing a host animal with a peptide comprising SEQ ID NO: 30 or a fragment thereof, and obtaining an antibody from the immunized host animal.

28. The method of claim 27, wherein the fragment comprises at least 5 amino acids.

29. The method of claim 27, wherein the fragment comprises at least 10 amino acids.

30. The method of claim 27, wherein the peptide consists of SEQ ID NO: 30.

31. The method of claim 27, wherein the peptide comprises at least 5 amino acids and wherein the N-terminal amino acid of the peptide is the alanine at position 1 of SEQ ID NO: 30.

32. The method of claim 31, wherein the peptide comprises at least 10 amino acids.

33. The method of any one of claims 27 to 32, wherein the antibody from the immunized host animal is obtained from an immune cell isolated from the host animal.

34. The method of claim 33, further comprising generating a hybridoma using the immune cell.

35. An antibody prepared by a method according to any one of claims 27-34, wherein the antibody specifically binds to SCF248.

36. ~~A method for inhibiting chronic inflammation in a subject in need thereof, the method comprising administering to the subject~~ Use of an the antibody or fragment thereof according to any one of claims 1 to 23 in the manufacture of a medicament for the inhibition of chronic inflammation in a subject in need thereof, wherein the antibody or fragment thereof is to be administered to the subject.

37. ~~A method for inhibiting fibrosis in a subject in need thereof, the method comprising administering to the subject~~ Use of an the antibody or fragment thereof according to any one of

claims 1 to 23 in the manufacture of a medicament for the inhibition of fibrosis in a subject in need thereof, wherein the antibody or fragment thereof is to be administered to the subject.

38. ~~A method for treating a chronic inflammatory disease or a fibrotic disease in a subject in need thereof, the method comprising administering to the subject~~ Use of an the antibody or fragment thereof according to any one of claims 1 to 23 in the manufacture of a medicament for the treatment of a chronic inflammatory disease or a fibrotic disease in a subject in need thereof, wherein the antibody or fragment thereof is to be administered to the subject.

39. The ~~usemethod~~ of claim 38, wherein the chronic inflammatory disease or ~~the~~ fibrotic disease is selected from the group consisting of urticaria, atopic dermatitis, non-alcoholic steatohepatitis (NASH), primary sclerosing cholangitis, pulmonary fibrosis, chronic obstructive pulmonary disease (COPD), acute respiratory distress syndrome (ARDS), cystic fibrosis, peribronchial fibrosis, hypersensitivity pneumonitis, asthma, bleomycin lung, scleroderma, liver cirrhosis, endomyocardial fibrosis, fibromyalgia, and eosinophilic esophagitis.

40. The ~~usemethod~~ of claim 39, wherein the pulmonary fibrosis is idiopathic pulmonary fibrosis or scleroderma lung fibrosis.

41. The ~~usemethod~~ of claim 37, wherein ~~the method further comprises administering an~~ additional therapeutic agent is to be further administered to the subject.

42. An antibody or fragment thereof that specifically binds to SCF248, wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33, wherein the antibody inhibits the interaction of SCF248 with c-Kit.

43. The antibody or fragment thereof of claim 42, wherein the epitope comprises SEQ ID NO: 33.

44. The antibody or fragment thereof of claim 42, wherein the epitope consists of SEQ ID NO: 33.

45. The antibody or fragment thereof of claim 42, wherein the antibody or fragment thereof blocks binding of SCF248 to c-Kit on immune cells.

46. A method for inhibiting the activation of immune cells, comprising contacting the immune cells with an antibody or fragment thereof that specifically binds to SCF248, wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33 and wherein the antibody inhibits the interaction of SCF248 with c-Kit.

47. The method of claim 46, wherein the method is performed *in vitro*, *ex vivo*, or *in vivo*.

48. ~~A method for inhibiting inflammation in a subject in need thereof, the method comprising administering to the subject~~ Use of an antibody or fragment thereof that specifically binds to SCF248, in the manufacture of a medicament for the inhibition of inflammation in a subject in need thereof, wherein the antibody or fragment thereof is to be administered to the subject, and wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33 and wherein the antibody inhibits the interaction of SCF248 with c-Kit.

49. ~~A method for inhibiting fibrosis in a subject in need thereof, the method comprising administering to the subject~~ Use of an antibody or fragment thereof that specifically binds to SCF248, in the manufacture of a medicament for the inhibition of fibrosis in a subject in need thereof, wherein the antibody or fragment thereof is to be administered to the subject, and wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33 and wherein the antibody inhibits the interaction of SCF248 with c-Kit.

50. ~~A method for treating an inflammatory disease or disorder in a subject in need thereof, the method comprising administering to the subject~~ Use of an antibody or fragment thereof that specifically binds to SCF248, in the manufacture of a medicament for the treatment of an inflammatory disease or disorder in a subject in need thereof, wherein the antibody or fragment

thereof is to be administered to the subject, and wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33 and wherein the antibody inhibits the interaction of SCF248 with c-Kit.

51. The ~~method~~use of claim 50, wherein the inflammatory disease or disorder is a chronic inflammatory disease or disorder.

52. ~~A method for treating a fibrotic disease in a subject in need thereof, the method comprising administering to the subject~~ Use of an antibody or fragment thereof that specifically binds to SCF248, in the manufacture of a medicament for the treatment of a fibrotic disease in a subject in need thereof, wherein the antibody or fragment thereof is to be administered to the subject, and wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33 and wherein the antibody inhibits the interaction of SCF248 with c-Kit

53. The ~~use~~method of any one of claims 50-52, wherein the inflammatory disease or disorder or the fibrotic disease is selected from the group consisting of urticaria, atopic dermatitis, non-alcoholic steatohepatitis (NASH), primary sclerosing cholangitis, pulmonary fibrosis, chronic obstructive pulmonary disease (COPD), acute respiratory distress syndrome (ARDS), cystic fibrosis, peribronchial fibrosis, hypersensitivity pneumonitis, asthma, bleomycin lung, scleroderma, liver cirrhosis, endomyocardial fibrosis, fibromyalgia, and eosinophilic esophagitis.

54. The ~~use~~method of claim 53, wherein the pulmonary fibrosis is idiopathic pulmonary fibrosis or scleroderma lung fibrosis.

55. An antibody or fragment thereof that specifically binds to SCF248, for use as a medicament,⁵ wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33 and wherein the antibody inhibits the interaction of SCF248 with c-Kit.

~~56. An antibody or fragment thereof that specifically binds to SCF248, for use in a method of treatment, wherein the antibody or fragment thereof binds to an epitope comprising at least 8 contiguous amino acids of SEQ ID NO: 33, and wherein the antibody inhibits the interaction of SCF248 with e-Kit, and wherein the method comprises the inhibition of the activation of immune cells in a subject, the inhibition of inflammation in a subject, the inhibition of fibrosis in a subject, the treatment of an inflammatory disease or disorder, the treatment of a chronic inflammatory disease or disorder, and/or the treatment of a fibrotic disease.~~

~~5657. An antibody or fragment thereof according to any one of claims 1-2123, 3534, or and 42-45, or the pharmaceutical composition of claim 22, for use as a medicament.~~

~~5758. Use of An the antibody or fragment thereof according to any one of claims 1-2123, 3534, or and 42-45, in the manufacture of a medicament for the inhibition of chronic inflammation, the inhibition of fibrosis, the treatment of chronic inflammatory disease, and/or the treatment of a fibrotic disease, in a subject in need thereof for the pharmaceutical composition of claim 22, for use in a method of inhibiting chronic inflammation, of inhibiting fibrosis, of treating a chronic inflammatory disease, and/or of treating a fibrotic disease in a subject.~~

~~5859. The antibody or fragment thereof for use according to claim 56 or use of claim 5758, wherein the chronic inflammatory disease or fibrotic disease is selected from the group consisting of urticaria, atopic dermatitis, non-alcoholic steatohepatitis (NASH), primary sclerosing cholangitis, pulmonary fibrosis, chronic obstructive pulmonary disease (COPD), acute respiratory distress syndrome (ARDS), cystic fibrosis, peribronchial fibrosis, hypersensitivity pneumonitis, asthma, bleomycin lung, scleroderma, liver cirrhosis, endomyocardial fibrosis, fibromyalgia, and eosinophilic esophagitis.~~

~~5960. The antibody or fragment thereof for use according to use of claim 5859, wherein the pulmonary fibrosis is idiopathic pulmonary fibrosis or scleroderma lung fibrosis.~~

6061. The ~~use~~antibody or fragment thereof for use according to any one of claims ~~5755-5960~~, wherein ~~the use further comprises administering~~ an additional therapeutic agent is to be further administered to the subject