CLAIMS

WHAT IS CLAIMED IS:

1. An isolated antigen binding protein that binds IL-23, comprising at least one heavy chain variable region comprising a CDRH1, a CDRH2 and a CDRH3 selected from the group consisting of:

a) a CDRH1 that differs by no more than one amino acid substitution, insertion or deletion from a CDRH1 as shown in TABLE 3;

b) a CDRH2 that differs by no more than three amino acid substitutions, insertions and/or deletions from a CDRH2 as shown in TABLE 3;

c) a CDRH3 that differs by no more than three amino acid substitutions, insertions and/or deletions from a CDRH3 as shown in TABLE 3; and

comprising at least one light chain variable region comprising a CDRL1, a CDRL2 and a CDRL3 selected from the group consisting of:

d) a CDRL1 that differs by no more than three amino acid substitutions, insertions and/or deletions from a CDRL1 as shown in TABLE 3;

e) a CDRL2 that differs by no more than one amino acid substitution, insertion or deletion from a CDRL2 as shown in TABLE 3;

f) a CDRL3 that differs by no more than one amino acid substitution, insertion or deletion from a CDRL3 as shown in TABLE 3.

2. An isolated antigen binding protein of claim 1, comprising at least one heavy chain variable region comprising a CDRH1, a CDRH2 and a CDRH3 selected from the group consisting of:

a) a CDRH1 that differs by no more than one amino acid substitution, insertion or deletion from a CDRH1 as shown in TABLE 3;

b) a CDRH2 that differs by no more than two amino acid substitutions, insertions and/or deletions from a CDRH2 as shown in TABLE 3;

c) a CDRH3 that differs by no more than two amino acid substitutions, insertions and/or deletions from a CDRH3 as shown in TABLE 3; and

also comprising at least one light chain variable region comprising a CDRL1, a CDRL2 and a CDRL3 selected from the group consisting of:

d) a CDRL1 that differs by no more than two amino acid substitutions, insertions and/or deletions from a CDRL1 as shown in TABLE 3;

e) a CDRL2 that differs by no more than one amino acid substitution, insertions or deletion from a CDRL2 as shown in TABLE 3;

f) a CDRL3 that differs by no more than one amino acid substitution, insertions or deletion from a CDRL3 as shown in TABLE 3.

3. An isolated antigen binding protein of claim 1, comprising at least one heavy chain variable region comprising a CDRH1, CDRH2 and a CDRH3 selected from the group consisting of:

a) a CDRH1 that differs by no more than one amino acid substitution, insertion or deletion from a CDRH1 as shown in TABLE 3;

b) a CDRH2 that differs by no more than one amino acid substitution, insertion or deletion from a CDRH2 as shown in TABLE 3;

c) a CDRH3 that differs by no more than one amino acid substitution, insertion or deletion from a CDRH3 as shown in TABLE 3; and

also comprising at least one light chain variable region comprising a CDRL1, a CDRL2 and a CDRL3 selected from the group consisting of:

d) a CDRL1 that differs by no more than one amino acid substitution, insertion or deletion from a CDRL1 as shown in TABLE 3;

e) a CDRL2 that differs by no more than one amino acid substitution, insertion or deletion from a CDRL2 as shown in TABLE 3;

f) a CDRL3 that differs by no more than one amino acid substitution, insertion or deletion from a CDRL3 as shown in TABLE 3.

4. An isolated antigen binding protein that binds IL-23 selected from the group consisting of

a) an antigen binding protein having CDRH1 of SEQ ID NO:129, CDRH2 of SEQ ID NO:132, CDRH3 of SEQ ID NO:136, and CDRL1 of SEQ ID NO:123, CDRL2 of SEQ ID NO:81, and CDRL3 of SEQ ID NO: 76;

b) an antigen binding protein having CDRH1 of SEQ ID NO:131, CDRH2 of SEQ ID NO: 134, CDRH3 of SEQ ID NO:137 and CDRL1 of SEQ ID NO:124, CDRL2 of SEQ ID NO126 and CDRL3 of SEQ ID NO:128;

c) a) an antigen binding protein having CDRH1 of SEQ ID NO:130, CDRH2 of SEQ ID NO:133, CDRH3 of SEQ ID NO:99 and CDRL1 of SEQ ID NO:68, CDRL2 of SEQ ID NO:69, and CDRL3 of SEQ ID NO:67; and

d) an antigen binding protein having CDRH1 SEQ ID NO:91, CDRH2 SEQ ID NO: 135, CDRH3 SEQ ID NO:138 and CDRL1 SEQ ID NO:125, CDRL2 SEQ ID NO:127, and CDRL3 SEQ ID NO:64.

5. An isolated antigen binding protein of claim 1 comprising:

a CDRH1 selected from the group consisting of SEQ ID NO: 91, 94, 97, 100, and 103;

a CDRH2 selected from the group consisting of SEQ ID NO:92, 95, 98, 101, 104, 107, and 110;

a CDRH3 selected from the group consisting of SEQ ID NO: 93, 96, 99, 102, and 105;

a CDRL1 selected from the group consisting of SEQ ID NO: 62, 65, 68, 71, and 74;

a CDRL2 selected from the group consisting of SEQ ID NO:63, 66, 69, 72, 75, and 78; and

a CDRL3 selected from the group consisting of SEQ ID NO:64, 67, 70 and 73.

6. An isolated antigen binding protein of claim 1, comprising:

a CDRH1 selected from the group consisting of SEQ ID NO: 91, 106, 109, 112, and 115;

a CDRH2 selected from the group consisting of SEQ ID NO: 113, 116, 118, 120, 121, and 122;

a CDRH3 selected from the group consisting of SEQ ID NO: 108, 111, 114, 117, and 119;

a CDRL1 selected from the group consisting of SEQ ID NO: 77, 80, 83, 85, 86, 87, 88, 89 and 90;

a CDRL2 is SEQ ID NO: 81; and

a CDRL3 selected from the group consisting of SEQ ID NO: 76, 79, 82 and 84.

7. An isolated antigen binding protein that binds IL-23 comprising at least one heavy chain variable region and at least one light chain variable region, selected from the group consisting of:

a) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 99-113 of SEQ ID NO:31; and

a light chain variable region comprising amino acid residues 23-36, 52-58 and 91-101 of SEQ ID NO:1;

b) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 99-110 of SEQ ID NO:34 and heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-110 of SEQ ID NO:36; and

a light chain variable region comprising amino acid residues 23-36, 52-62 and 97-105 of SEQ ID NO:4 ;

c) a heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-114 of SEQ ID NO:38; and

a light chain variable region comprising amino acid residues 23-34, 50-61 and 94-106 of SEQ ID NO:7;

d) a heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-114 of SEQ ID NO:40; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 94-106 of SEQ ID NO:9;

e) a heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-114 of SEQ ID NO:42; and

a light chain variable region comprising amino acid residues 23-34, 50-61 and 94-106 of SEQ ID NO:11;

f) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 98-107 of SEQ ID NO:44; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:13;

g) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:46 or 153; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO15 ;

h) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:48; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:17 ;

i) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 101-109 of SEQ ID NO:50; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:19;

j) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 98-107 of SEQ ID NO: 52; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 98-107 of SEQ ID NO:21;

k) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:54; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:23;

l) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:56; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:25; and

m) a heavy chain variable region comprising amino acid residues 31-37, 52-57 and 100-109 of SEQ ID NO:58; and

a light chain variable region comprising amino acid residues 24-34, 500-56 and 89-97 of SEQ ID NO:27.

8. An isolated antigen-binding protein of claim 1 that comprises at least one heavy chain variable region and at least one light chain variable region.

9. An isolated antigen-binding protein of claim 1 that comprises at least two heavy chain variable regions and at least two light chain variable regions.

10. An isolated antigen binding protein that binds IL-23 comprising a heavy chain variable region and a light chain variable region, wherein the heavy chain variable region sequence differs by no more than 13 amino acid substitutions, additions and/or deletions from a heavy chain variable region sequence as shown in TABLE 2; and wherein the light chain variable region sequence differs by no more than 13 amino acid substitutions, additions and/or deletions from a light chain variable region sequence as shown in TABLE 1.

11. An isolated antigen binding protein of claim 10, wherein the heavy chain variable region sequence differs by no more than 11 amino acid substitutions, insertions and/or deletions from a heavy chain variable region sequence as shown in TABLE 2.

12. An isolated antigen binding protein of claim 10, wherein the heavy chain variable region sequence differs by no more than 5 amino acid substitutions, insertions and/or deletions from a heavy chain variable region sequence as shown in TABLE 2.

13. An isolated antigen binding protein of claim 10, wherein the heavy chain variable region sequence differs by no more than 2 amino acid substitutions, insertions and/or deletions from a heavy chain variable region sequence as shown in TABLE 2.

14. An isolated antigen binding protein of claim 10, wherein the heavy chain variable region sequence differs by no more than 1 amino acid substitution, insertion or deletion from a heavy chain variable region sequence as shown in TABLE 2.

15. An isolated antigen binding protein of claim 10, wherein the light chain variable region sequence differs by no more than 7 amino acid substitutions, insertions and/or deletions from a light chain variable region sequence as shown in TABLE 1.

16. An isolated antigen binding protein of claim 10, wherein the light chain variable region sequence differs by no more than 4 amino acid substitutions, insertions and/or deletions from a light chain variable region sequence as shown in TABLE 1.

17. An isolated antigen binding protein of claim 10, wherein the light chain variable region sequence differs by no more than 2 amino acid substitutions, insertions and/or deletions from a light chain variable region sequence as shown in TABLE 1.

18. An isolated antigen binding protein of claim 10, wherein the light chain variable region sequence differs by no more than 1 amino acid substitutions, insertions and/or deletions from a light chain variable region sequence as shown in TABLE 1.

19. An isolated antigen binding protein that binds IL-23 selected from the group consisting of

a) a heavy chain variable region of SEQ ID NO:140 and a light chain variable region of SEQ ID NO: 30;

b) a heavy chain variable region of SEQ ID NO:141 and a light chain variable region of SEQ ID NO:61;

c) a heavy chain variable region of SEQ ID NO:142 and a light chain variable region of SEQ ID NO:4; and

d) a heavy chain variable region of SEQ ID NO:143 and a light chain variable region of SEQ ID NO:139.

20. An isolated antigen binding protein that binds IL-23 comprising

a heavy chain variable region comprising of an amino acid sequence having at least 90% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 90% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

21. An isolated antigen binding protein of claim 20,

a heavy chain variable region comprising of an amino acid sequence having at least 95% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 95% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

22. An isolated antigen binding protein of claim 20, comprising

a heavy chain variable region comprising of an amino acid sequence having at least 97% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 97% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

23. An isolated antigen binding protein of claim 20, comprising

a heavy chain variable region comprising of an amino acid sequence having at least 98% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 98% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

24. An isolated antigen binding protein of claim 20, comprising

a heavy chain variable region selected from the group consisting of SEQ ID NO: 44, 46, 48, 50, 52, 54, 56, 58 and 153, and

a light chain variable region selected from the group consisting of SEQ ID NO:13, 15, 17, 19, 21, 23, 25, and 27.

25. An isolated antigen binding protein of claim 20, comprising

a heavy chain variable region selected from the group consisting of SEQ ID NO: 31, 34, 36, 38, 40 and 42, and

a light chain variable region selected from the group consisting of SEQ ID NO: 1, 4, 7, 9 and 11.

26. An isolated antigen binding protein that binds IL-23 comprising a heavy chain variable region and a light chain variable region selected from the group consisting of:

a) a heavy chain variable region of SEQ ID NO:31 and a light chain variable region of SEQ ID NO:1;

b) a heavy chain variable region of SEQ ID NO:34 or 36 and a light chain variable region of SEQ ID NO:4;

c) a heavy chain variable region of SEQ ID NO:38 and a light chain variable region of SEQ ID NO: 7;

d) a heavy chain variable region of SEQ ID NO:40 and a light chain variable region of SEQ ID NO:9;

e) a heavy chain variable region of SEQ ID NO:42 and a light chain variable region of SEQ ID NO: 11;

f) a heavy chain variable region of SEQ ID NO:44 and a light chain variable region of SEQ ID NO:13;

g) a heavy chain variable region of SEQ ID NO:46 or 153 and a light chain variable region of SEQ ID NO:15;

h) a heavy chain variable region of SEQ ID NO:48 and a light chain variable region of SEQ ID NO:17;

i) a heavy chain variable region of SEQ ID NO:50 and a light chain variable region of SEQ ID NO: 19;

j) a heavy chain variable region of SEQ ID NO:52 and a light chain variable region of SEQ ID NO:21;

k) a heavy chain variable region of SEQ ID NO:54 and a light chain variable region of SEQ ID NO:23;

l) a heavy chain variable region of SEQ ID NO:56 and a light chain variable region of SEQ ID NO:25; and

m) a heavy chain variable region of SEQ ID NO:58 and a light chain variable region of SEQ ID NO:27.

27. An isolated antigen binding protein that binds human IL-23, wherein the covered patch formed when said antigen binding protein is bound to human IL-23 comprises residue contacts 30, 31, 32, 49,

50, 52, 53, 56, 92 and 94 of SEQ ID NO:15, wherein said residue contacts have a difference value of greater than or equal to 10 $Å^2$ as determined by solvent exposed surface area.

28. An isolated antigen binding protein that binds human IL-23, wherein the covered patch formed when said antigen binding protein is bound to human IL-23 comprises residue contacts 31-35, 54, 58-60, 66, and 101-105 of SEQ ID NO:46, wherein said residue contacts have a difference value of greater than or equal to 10 $Å^2$ as determined by solvent exposed surface area.

29. An isolated antigen binding protein that binds human IL-23, wherein the covered patch formed when said antigen binding protein is bound to human IL-23 comprises residue contacts 31-34, 51, 52, 55, 68, 93 and 98 of SEQ ID NO:1, wherein said residue contacts have a difference value of greater than or equal to 10 $Å^2$ as determined by solvent exposed surface area.

30. An isolated antigen binding protein that binds human IL-23, wherein the covered patch formed when said antigen binding protein is bound to human IL-23 comprises residue contacts 1, 26, 28, 31, 32, 52, 53, 59, 76, 101, 102 and 104-108 of SEQ ID NO:31, wherein said residue contacts have a difference value of greater than or equal to 10 $Å^2$ as determined by solvent exposed surface area.

31. An isolated antigen binding protein that binds human IL-23, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5Å or less from residues 32-35, 54, 58-60, 66 and 101-105 of SEQ ID NO:46, as determined by X-ray crystallography.

32. An isolated antigen binding protein according to claim 31, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5Å or less from residues 31-35, 54, 56, 58-60, 66 and 101-105 of SEQ ID NO:46.

33. An isolated antigen binding protein that binds human IL-23, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5 Å or less from residues 30-32, 49, 52, 53, 91-94 and 96 of SEQ ID NO:15, as determined by X-ray crystallography.

34. An isolated antigen binding protein according to claim 33, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5 Å or less from residues 30-32, 49, 50, 52, 53, 56, 91-94 and 96 of SEQ ID NO:15.

35. An isolated antigen binding protein that binds human IL-23, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5 Å or less from residues 26-28, 31, 53, 59, 102 and 104-108 of SEQ ID NO:31, as determined by X-ray crystallography.

36. An isolated antigen binding protein according to claim 35, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5 Å or less from residues 1, 26-28, 30-32, 52, 53, 59, 100, and 102-108 of SEQ ID NO:31.

37. An isolated antigen binding protein that binds human IL-23, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5 Å or less from residues 31-34, 51, 52, 55, 68 and 93 of SEQ ID NO:1 as determined by X-ray crystallography.

38. An isolated antigen binding protein according to claim 37, wherein when said antigen binding protein is bound to human IL-23, said antigen binding protein is 5 Å or less from residues 29, 31-34, 51, 52, 55, 68, 93 and 100 of SEQ ID NO:1.

39. An isolated antigen binding protein of claim 1, 4, 7, 10, 19, 20, 26-31, 33, 35 or 37, wherein said antigen binding protein is an antibody.

40. An isolated antigen binding protein of claim 39, wherein said antibody is a monoclonal antibody, a recombinant antibody, a human antibody, a humanized antibody, a chimeric antibody, a multispecific antibody, or an antibody fragment thereof.

41. An isolated antigen binding protein of claim 40, wherein said antibody fragment is a Fab fragment, a Fab' fragment, a $F(ab')_2$ fragment, a Fv fragment, a diabody, or a single chain antibody molecule.

42. An isolated antigen binding protein of claim 40, wherein said antigen binding protein is a human antibody.

43. An isolated antigen binding protein of claim 40, wherein said antigen binding protein is a monoclonal antibody.

44. An isolated antigen binding protein of claim 39, wherein said antigen binding protein is of the IgG1-, IgG2- IgG3- or IgG4-type.

45. An isolated antigen binding protein of claim 44, wherein said antigen binding protein is of the IgG1- or IgG2-type.

46. An isolated nucleic acid molecule encoding an antigen binding protein of claim 1, 4, 7, 10, 19, 20 or 26.

47. An isolated nucleic acid molecule of claim 46, wherein at least one heavy chain variable region is encoded by an isolated nucleic acid molecule selected from the group consisting of SEQ ID NOs:32, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59 and 152 and at least one light chain variable region is encoded by an isolated nucleic acid molecule selected from the group consisting of SEQ ID NOs:2, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, and 28.

48. A nucleic acid molecule according to claim 47, wherein said nucleic acid molecule is operably linked to a control sequence.

49. A vector comprising a nucleic acid molecule according to claim 46.

50. A host cell comprising the nucleic acid molecule according to claim 46.

51. A host cell comprising the vector according to claim 49.

52. Use of an isolated polynucleotide as a hybridization probe, PCR primer or sequencing primer that is a fragment of the nucleic acid molecule of claim 47 or its complement.

53. A method of making the antigen binding protein of claim 1, 4, 7, 10, 19, 20 or 26 comprising the step of preparing said antigen binding protein from a host cell that secretes said antigen binding protein.

54. An isolated antigen binding protein that binds human IL-23, wherein the covered patch formed when said antigen binding protein is bound to human IL-23 comprises a residue contact within residues 46-58, a residue contact within residues 112-120, and a residue contact within residues 155-163 of the human IL-23p19 subunit as described in SEQ ID NO:145, wherein said residue contact has a difference value greater than or equal to 10Å^2 as determined by solvent exposed surface area.

55. An isolated antigen binding protein according to claim 54, wherein the covered patch formed when said antigen binding protein binds to human IL-23 further comprises a residue contact within residues 121-125 of the human IL-23p40 subunit as described in SEQ ID NO:147, wherein said residue contact has a difference value greater than or equal to 10Å^2 as determined by solvent exposed surface area.

56. An isolated antigen binding protein that binds human IL-23, wherein when said antigen binding protein is bound to human IL-23 said antigen binding protein is 5Å or less from a residue within residues 46-58, from a residue within residues 112-123, and from a residue within residues 155-163 of the human IL-23p19 subunit as described in SEQ ID NO:145, as determined by X-ray crystallography.

57. An isolated antigen binding protein according to claim 56, wherein when said antigen binding protein is bound to human IL-23 said antigen binding protein is 5Å or less from a residue within residues 121-125, of the human IL-23p40 subunit as described in SEQ ID NO:147, as determined by X-ray crystallography.

58. An isolated antigen binding protein of claim 1, 4, 7, 10, 19, 20, 26-31, 33, 35, 37, 54 or 56 wherein said antigen binding protein has at least one property selected from the group consisting of:

a) reducing human IL-23 activity;

b) reducing production of a proinflammatory cytokine;

c) binding to human IL-23 with a K_D of ≤ $5x10^{-8}$ M;

d) having a K_{off} rate of ≤ $5x10^{-6}$ 1/s; and

e) having an IC_{50} of ≤ 400 pM.

59. A pharmaceutical composition comprising at least one antigen binding protein of claim 1, 4, 7, 10, 19, 20 or 26 and pharmaceutically acceptable excipient.

60. A pharmaceutical composition of claim 59, further comprises a labeling group or an effector group.

61. A pharmaceutical composition of claim 60, wherein said labeling group is selected from the group consisting of isotopic labels, magnetic labels, redox active moieties, optical dyes, biotinylated groups and predetermined polypeptide epitopes recognized by a secondary reporter.

62. A pharmaceutical composition of claim 60, wherein said effector group is selected from the group consisting of a radioisotope, radionuclide, a toxin, a therapeutic group and a chemotherapeutic group.

63. An isolated antigen binding protein of claim 60, wherein said antigen binding protein is coupled to a labeling group.

64. Use of at least one isolated antigen binding protein of claim 1, 4, 7, 10, 19, 20 or 26 in the manufacture of a medicament for treating or preventing a condition associated with IL-23 in a patient.

65. The use of claim 64, wherein the condition is selected from the group consisting of an inflammatory disorder, a rheumatic disorder, an autoimmune disorder, an oncological disorder and a gastrointestinal disorder.

66. The use of claim 65, wherein the condition is selected from the group consisting of multiple sclerosis, rheumatoid arthritis, cancer, psoriasis, inflammatory bowel disease, Crohn's disease, ulcerative colitis, systemic lupus erythematosus, psoriatic arthritis, autoimmune myocarditis; type 1 diabetes and ankylosing spondylitis.

67. The use of claim 64, wherein the isolated antigen-binding protein is to be administered alone or as a combination therapy.

68. Use of at least one antigen binding protein of claim 1, 4, 7, 10, 19, 20 or 26 in the manufacture of a medicament for reducing IL-23 activity in a patient.

69. The use of claim 68, wherein said IL-23 activity is inducing production of a proinflammatory cytokine.

CLAIMS

WHAT IS CLAIMED IS:

1. An isolated antigen binding protein that binds IL-23 selected from the group consisting of

a) an antigen binding protein having CDRH1 of SEQ ID NO:129, CDRH2 of SEQ ID NO:132, CDRH3 of SEQ ID NO:136, and CDRL1 of SEQ ID NO:123, CDRL2 of SEQ ID NO:81, and CDRL3 of SEQ ID NO: 76;

b) an antigen binding protein having CDRH1 of SEQ ID NO:131, CDRH2 of SEQ ID NO: 134, CDRH3 of SEQ ID NO:137 and CDRL1 of SEQ ID NO:124, CDRL2 of SEQ ID NO126 and CDRL3 of SEQ ID NO:128;

c) a) an antigen binding protein having CDRH1 of SEQ ID NO:130, CDRH2 of SEQ ID NO:133, CDRH3 of SEQ ID NO:99 and CDRL1 of SEQ ID NO:68, CDRL2 of SEQ ID NO:69, and CDRL3 of SEQ ID NO:67; and

d) an antigen binding protein having CDRH1 SEQ ID NO:91, CDRH2 SEQ ID NO: 135, CDRH3 SEQ ID NO:138 and CDRL1 SEQ ID NO:125, CDRL2 SEQ ID NO:127, and CDRL3 SEQ ID NO:64.

2. An isolated antigen binding protein of claim 1 comprising:

a CDRH1 selected from the group consisting of SEQ ID NO: 91, 94, 97, 100, and 103;

a CDRH2 selected from the group consisting of SEQ ID NO:92, 95, 98, 101, 104, 107, and 110;

a CDRH3 selected from the group consisting of SEQ ID NO: 93, 96, 99, 102, and 105;

a CDRL1 selected from the group consisting of SEQ ID NO: 62, 65, 68, 71, and 74;

a CDRL2 selected from the group consisting of SEQ ID NO:63, 66, 69, 72, 75, and 78; and

a CDRL3 selected from the group consisting of SEQ ID NO:64, 67, 70 and 73.

3. An isolated antigen binding protein of claim 1, comprising:

a CDRH1 selected from the group consisting of SEQ ID NO: 91, 106, 109, 112, and 115;

a CDRH2 selected from the group consisting of SEQ ID NO: 113, 116, 118, 120, 121, and 122;

a CDRH3 selected from the group consisting of SEQ ID NO: 108, 111, 114, 117, and 119;

a CDRL1 selected from the group consisting of SEQ ID NO: 77, 80, 83, 85, 86, 87, 88, 89 and 90;

a CDRL2 is SEQ ID NO: 81; and

a CDRL3 selected from the group consisting of SEQ ID NO: 76, 79, 82 and 84.

4. An isolated antigen binding protein that binds IL-23 comprising at least one heavy chain variable region and at least one light chain variable region, selected from the group consisting of:

a) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 99-113 of SEQ ID NO:31; and

a light chain variable region comprising amino acid residues 23-36, 52-58 and 91-101 of SEQ ID NO:1;

b) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 99-110 of SEQ ID NO:34 and heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-110 of SEQ ID NO:36; and

a light chain variable region comprising amino acid residues 23-36, 52-62 and 97-105 of SEQ ID NO:4 ;

c) a heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-114 of SEQ ID NO:38; and

a light chain variable region comprising amino acid residues 23-34, 50-61 and 94-106 of SEQ ID NO:7;

d) a heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-114 of SEQ ID NO:40; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 94-106 of SEQ ID NO:9;

e) a heavy chain variable region comprising amino acid residues 31-35, 50-66 and 99-114 of SEQ ID NO:42; and

a light chain variable region comprising amino acid residues 23-34, 50-61 and 94-106 of SEQ ID NO:11;

f) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 98-107 of SEQ ID NO:44; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:13;

g) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:46 or 153; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO15 ;

h) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:48; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:17 ;

i) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 101-109 of SEQ ID NO:50; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:19;

j) a heavy chain variable region comprising amino acid residues 31-35, 50-65 and 98-107 of SEQ ID NO: 52; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 98-107 of SEQ ID NO:21;

k) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:54; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:23;

l) a heavy chain variable region comprising amino acid residues 31-37, 52-67 and 100-109 of SEQ ID NO:56; and

a light chain variable region comprising amino acid residues 24-34, 50-56 and 89-97 of SEQ ID NO:25; and

m) a heavy chain variable region comprising amino acid residues 31-37, 52-57 and 100-109 of SEQ ID NO:58; and

a light chain variable region comprising amino acid residues 24-34, 500-56 and 89-97 of SEQ ID NO:27.

5. An isolated antigen-binding protein of claim 1 that comprises at least one heavy chain variable region and at least one light chain variable region.

6. An isolated antigen-binding protein of claim 1 that comprises at least two heavy chain variable regions and at least two light chain variable regions.

7. An isolated antigen binding protein that binds IL-23 selected from the group consisting of

a) a heavy chain variable region of SEQ ID NO:140 and a light chain variable region of SEQ ID NO: 30;

b) a heavy chain variable region of SEQ ID NO:141 and a light chain variable region of SEQ ID NO:61;

c) a heavy chain variable region of SEQ ID NO:142 and a light chain variable region of SEQ ID NO:4; and

d) a heavy chain variable region of SEQ ID NO:143 and a light chain variable region of SEQ ID NO:139.

8. An isolated antigen binding protein that binds IL-23 comprising

a heavy chain variable region comprising of an amino acid sequence having at least 90% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 90% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

9. An isolated antigen binding protein of claim 8,

a heavy chain variable region comprising of an amino acid sequence having at least 95% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 95% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

10. An isolated antigen binding protein of claim 8, comprising

a heavy chain variable region comprising of an amino acid sequence having at least 97% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 97% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

11. An isolated antigen binding protein of claim 8, comprising

a heavy chain variable region comprising of an amino acid sequence having at least 98% sequence identity to SEQ ID NO:31, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58; and

a light chain variable region comprising an amino acid sequence having at least 98% sequence identity to SEQ ID NO: 1, 4, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 and 27.

12. An isolated antigen binding protein of claim 8, comprising

a heavy chain variable region selected from the group consisting of SEQ ID NO: 44, 46, 48, 50, 52, 54, 56, 58 and 153, and

a light chain variable region selected from the group consisting of SEQ ID NO:13, 15, 17, 19, 21, 23, 25, and 27.

13. An isolated antigen binding protein of claim 8, comprising

a heavy chain variable region selected from the group consisting of SEQ ID NO: 31, 34, 36, 38, 40 and 42, and

a light chain variable region selected from the group consisting of SEQ ID NO: 1, 4, 7, 9 and 11.

14. An isolated antigen binding protein that binds IL-23 comprising a heavy chain variable region and a light chain variable region selected from the group consisting of:

a) a heavy chain variable region of SEQ ID NO:31 and a light chain variable region of SEQ ID NO:1;

b) a heavy chain variable region of SEQ ID NO:34 or 36 and a light chain variable region of SEQ ID NO:4;

c) a heavy chain variable region of SEQ ID NO:38 and a light chain variable region of SEQ ID NO: 7;

d) a heavy chain variable region of SEQ ID NO:40 and a light chain variable region of SEQ ID NO:9;

e) a heavy chain variable region of SEQ ID NO:42 and a light chain variable region of SEQ ID NO: 11;

f) a heavy chain variable region of SEQ ID NO:44 and a light chain variable region of SEQ ID NO:13;

g) a heavy chain variable region of SEQ ID NO:46 or 153 and a light chain variable region of SEQ ID NO:15;

h) a heavy chain variable region of SEQ ID NO:48 and a light chain variable region of SEQ ID NO:17;

i) a heavy chain variable region of SEQ ID NO:50 and a light chain variable region of SEQ ID NO: 19;

j) a heavy chain variable region of SEQ ID NO:52 and a light chain variable region of SEQ ID NO:21;

k) a heavy chain variable region of SEQ ID NO:54 and a light chain variable region of SEQ ID NO:23;

l) a heavy chain variable region of SEQ ID NO:56 and a light chain variable region of SEQ ID NO:25; and

m) a heavy chain variable region of SEQ ID NO:58 and a light chain variable region of SEQ ID NO:27.

15. An isolated antigen binding protein of claim 1, 4, 7, 8 or 14, wherein said antigen binding protein is an antibody.

16. An isolated antigen binding protein of claim 15, wherein said antibody is a monoclonal antibody, a recombinant antibody, a human antibody, a humanized antibody, a chimeric antibody, a multispecific antibody, or an antibody fragment thereof.

17. An isolated antigen binding protein of claim 16, wherein said antibody fragment is a Fab fragment, a Fab' fragment, a $F(ab')_2$ fragment, a Fv fragment, a diabody, or a single chain antibody molecule.

18. An isolated antigen binding protein of claim 16, wherein said antigen binding protein is a human antibody.

19. An isolated antigen binding protein of claim 16, wherein said antigen binding protein is a monoclonal antibody.

20. An isolated antigen binding protein of claim 15, wherein said antigen binding protein is of the IgG1-, IgG2- IgG3- or IgG4-type.

21. An isolated antigen binding protein of claim 20, wherein said antigen binding protein is of the IgG1- or IgG2-type.

22. An isolated nucleic acid molecule encoding an antigen binding protein of claim 1, 4, 7, 8 or 14.

23. An isolated nucleic acid molecule of claim 22, wherein at least one heavy chain variable region is encoded by an isolated nucleic acid molecule selected from the group consisting of SEQ ID NOs:32, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59 and 152 and at least one light chain variable region is encoded by an isolated nucleic acid molecule selected from the group consisting of SEQ ID NOs:2, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, and 28.

24. A nucleic acid molecule according to claim 23, wherein said nucleic acid molecule is operably linked to a control sequence.

25. A vector comprising a nucleic acid molecule according to claim 22.

26. A host cell comprising the nucleic acid molecule according to claim 22.

27. A host cell comprising the vector according to claim 25.

28. Use of an isolated polynucleotide as a hybridization probe, PCR primer or sequencing primer that is a fragment of the nucleic acid molecule of claim 23 or its complement.

29. A method of making the antigen binding protein of claim 1, 4, 7, 8 or 14 comprising the step of preparing said antigen binding protein from a host cell that secretes said antigen binding protein.

30. An isolated antigen binding protein of claim 1, 4, 7, 8 or 14 wherein said antigen binding protein has at least one property selected from the group consisting of:

a) reducing human IL-23 activity;

b) reducing production of a proinflammatory cytokine;

c) binding to human IL-23 with a K_D of $\leq 5x10^{-8}$ M;

d) having a K_{off} rate of $\leq 5x10^{-6}$ 1/s; and

e) having an IC_{50} of $\leq$ 400 pM.

31. A pharmaceutical composition comprising at least one antigen binding protein of claim 1, 4, 7, 8, 14 or 30 and pharmaceutically acceptable excipient.

32. A pharmaceutical composition of claim 31, further comprises a labeling group or an effector group.

33. A pharmaceutical composition of claim 32, wherein said labeling group is selected from the group consisting of isotopic labels, magnetic labels, redox active moieties, optical dyes, biotinylated groups and predetermined polypeptide epitopes recognized by a secondary reporter.

34. A pharmaceutical composition of claim 32, wherein said effector group is selected from the group consisting of a radioisotope, radionuclide, a toxin, a therapeutic group and a chemotherapeutic group.

35. A pharmaceutical composition of claim 32, wherein said antigen binding protein is coupled to a labeling group.

36. Use of at least one isolated antigen binding protein of claim 1, 4, 7, 8 or 14 in the manufacture of a medicament for treating or preventing a condition associated with IL-23 in a patient.

37. The use of claim 36, wherein the condition is selected from the group consisting of an inflammatory disorder, a rheumatic disorder, an autoimmune disorder, an oncological disorder and a gastrointestinal disorder.

38. The use of claim 37, wherein the condition is selected from the group consisting of multiple sclerosis, rheumatoid arthritis, cancer, psoriasis, inflammatory bowel disease, Crohn's disease, ulcerative colitis, systemic lupus erythematosus, psoriatic arthritis, autoimmune myocarditis; type 1 diabetes and ankylosing spondylitis.

39. The use of claim 36, wherein the isolated antigen-binding protein is to be administered alone or as a combination therapy.

40. Use of at least one antigen binding protein of claim 1, 4, 7, 8 or 14 in the manufacture of a medicament for reducing IL-23 activity in a patient.

41. The use of claim 40, wherein said IL-23 activity is inducing production of a proinflammatory cytokine.