Claims:

1. An antibody comprising a mature heavy chain variable region having an amino acid sequence designated SEQ ID NO:23 and a mature light chain variable region having an amino acid sequence designated SEQ ID NO: 33 or 37.

2. The antibody of claim 1, wherein the mature light chain variable region has an amino acid sequence designated SEQ ID NO:37.

3. The antibody of claim 1, wherein the mature light chain variable region has an amino acid sequence designated SEQ ID NO:33.

4. The antibody of any one of the preceding claims, wherein the mature heavy chain variable region is fused to a heavy chain constant region and the mature light chain constant region is fused to a light chain constant region.

5. The antibody of claim 4, wherein the heavy chain constant region has the amino acid sequence designated SEQ ID NO:52 provided the C-terminal lysine residue may be omitted.

6. The antibody of claim 4, wherein the light chain constant region has the amino acid sequence designated SEQ ID NO:49.

7. The antibody of any one of the preceding claims, wherein the heavy chain constant region is of human IgG1 isotype.

8. A nucleic acid encoding a mature heavy chain variable region and/or a mature light chain variable region as defined by any one of the preceding claims.

9. The nucleic acid of claim 8 having a sequence comprising any one of SEQ ID NO:22, 32, or 36.

10. A host cell comprising a vector comprising the nucleic acid of claim 8 or 9.

11. A pharmaceutical composition comprising an antibody as defined by any one of claims 1 to 7.

12. An antibody as defined by any one of claims 1 to 7, for use in treating a patient having or at risk of a Lewy body disease, in reducing Lewy body formation in a patient having or at risk of a Lewy body disease, or of inhibiting synuclein aggregation or clearing Lewy bodies or synuclein aggregates in a patient having or at risk of a Lewy body disease.

13. The antibody for the use of claim 12 wherein the disease is Parkinson's disease.

14. Use of an antibody as defined by any one of claims 1 to 7, in the preparation of a medicament for treating a patient having or at risk of a Lewy body disease.

15. Use of 14, wherein the medicament reduces Lewy body formation in the patienthaving or at risk of a Lewy body disease.

16. Use of claim 14, wherein the medicament inhibits synuclein aggregation or clears Lewy bodies or synuclein aggregates in the patient having or at risk of a Lewy body disease.

17. An antibody as defined by any one of claims 1 to 7 for use in a method of detecting Lewy bodies in a patient having or at risk of a Lewy body disease, wherein the method comprises administering to the patient an effective amount of the antibody, wherein the antibody binds to Lewy bodies; and detecting bound antibody in the patient.

18. The antibody for the use of claim 17, wherein the antibody is labeled.

19. The antibody for the use of claim 17 or 18, wherein the Lewy body disease is Parkinson's disease.

20. Use of an antibody as defined by any one of claims 1 to 7 in the preparation of an agent for detecting Lewy bodies in a patient having or at risk of a Lewy body disease, wherein the agent comprising an effective amount of the antibody is administered to the patient, wherein the antibody binds to Lewy bodies and wherein antibody bound to Lewy body is detected in patient.

21. The use of claim 21, wherein the antibody is labelled.

22. The use of claim 20 or 21, wherein the Lewy body disease is Parkinson's disease.

23. A method of producing an antibody, comprising culturing cells transformed with nucleic acids encoding the heavy and light chains of the antibody, so that the cell secrete the antibody; and purifying the antibody from cell culture media; wherein the antibody is defined by any one of claims 1 to 7.

24. A method of producing a cell line producing an antibody, comprising introducing a vector encoding heavy and light chains of an antibody and a selectable marker into cells; propagating the cells under conditions to select for cells having increased copy number of the vector; isolating single cells from the selected cell; and banking cells cloned from a single cell selected based on yield of antibody; wherein the antibody is an antibody as defined by any one of claims 1 to 7.

25. The method of claim24, further comprising propagating the cells under selective conditions and screening for cell lines naturally expressing and secreting at least 100 mg/L/106 cells/24 h.

26. The use of any one of claims 14 to 16, wherein decline of cognitive function in the patient is inhibited.

27. The use of any one of claims 14 to 16, wherein neuritic and/or axonal alpha synuclein aggregates are reduced.

28. The use of any one of claims 14 to 16, wherein neuritic dystrophy in the patient is reduced.

29. The use of any one of claims 14 to 16, wherein synaptic and/or dendritic density is preserved.

30. The use of any one of claims 14 o 16, wherein synaptophysin and/or MAP2 is preserved in the patient.

Claims:

1. An antibody comprising a mature heavy chain variable region comprising the three Kabat CDRs of SEQ ID NO:44, and being at least 90% identical to SEQ ID NO:44, and a mature light chain variable region comprising the three Kabat CDRs of SEQ ID NO:45, and being at least 90% identical to SEQ ID NO:45, wherein the antibody specifically binds to human alpha synuclein.

2. The antibody of claim 1, wherein the mature heavy chain variable region is at least 95% identical to SEQ ID NO:44 and the mature light chain variable region is at least 95% identical to SEQ ID NO:45.

3. The antibody of claim 1, wherein the mature heavy chain variable region is at least 98% identical to SEQ ID NO:44 and the mature light chain variable region is at least 95% identical to SEQ ID NO:45.

4. The antibody of claim 1, wherein the mature heavy chain variable region is at least 99% identical to SEQ ID NO:44 and the mature light chain variable region is at least 95% identical to SEQ ID NO:45.

5. The antibody of claim 1, wherein the mature heavy chain variable region has the amino acid sequence of SEQ ID NO:44 and the mature light chain variable region is at least 95% identical to SEQ ID NO:45.

6. The antibody of claim 1, wherein the mature heavy chain variable region is at least 95% identical to SEQ ID NO:44 and the mature light chain variable region is at least 98% identical to SEQ ID NO:45.

7. The antibody of claim 1, wherein the mature heavy chain variable region is at least 95% identical to SEQ ID NO:44 and the mature light chain variable region is at least 99% identical to SEQ ID NO:45.

8. The antibody of claim 1, wherein the mature heavy chain variable region is at least 95% identical to SEQ ID NO:44 and the mature light chain variable region has the amino acid sequence of SEQ ID NO:45.

9. The antibody of claim 1, wherein the mature heavy chain variable region is at least 98% identical to SEQ ID NO:44 and the mature light chain variable region is at least 98% identical to SEQ ID NO:45.

10. The antibody of claim 1, wherein the mature heavy chain variable region is at least 99% identical to SEQ ID NO:44 and the mature light chain variable region is at least 99% identical to SEQ ID NO:45.

11. The antibody of claim 1, provided that position L46 (Kabat numbering) is occupied by F.

12. The antibody of claim 1, provided that position L49 (Kabat numbering) is occupied by C.

13. The antibody of claim 1, provided that position L83 (Kabat numbering) is occupied by A.

14. The antibody of claim 1, provided that position H11 (Kabat numbering) is occupied by L.

15. The antibody of claim 1, provided that position H28 (Kabat numbering) is occupied by S.

16. The antibody of claim 1, provided that position H38 (Kabat numbering) is occupied by K.

17. The antibody of claim 1, provided that position H48 (Kabat numbering) is occupied by I.

18. The antibody of claim 1, provided that position H67 (Kabat numbering) is occupied by A.

19. The antibody of claim 1, provided that position H69 (Kabat numbering) is occupied by L.

20. The antibody of claim 1, provided that position H71 (Kabat numbering) is occupied by A.

21. The antibody of claim 1, provided that position H91 (Kabat numbering) is occupied by F.

22. An antibody comprising a mature heavy chain variable region and a mature light chain variable region, wherein the amino acid sequence of the mature heavy chain variable region is SEQ ID NO:44 and the amino acid sequence of the mature light chain variable region is SEQ ID NO:45 except provided that position L46 (Kabat numbering) can be occupied by L or F, and/or position L49 (Kabat numbering) can be occupied by Y or C, and/or position L83 (Kabat numbering) can be occupied by F or A, and/or position H11 (Kabat numbering) can be occupied by V or L, and/or position H28 (Kabat numbering) can be occupied by T or S, and/or position H38 (Kabat numbering) can be occupied by R or K, and/or position H48 (Kabat numbering) can be occupied by M or I, and/or position H67 (Kabat numbering) can be occupied by V or A, and/or position H69 (Kabat numbering) can be occupied by M or L, and/or position H71 (Kabat numbering) can be occupied by T or A, and/or position H91 (Kabat numbering) can be occupied by Y or F, and/or H97 (Kabat numbering) can be occupied by C or S, and wherein the antibody specifically binds to human alpha synuclein.

23. The antibody of claim 22, wherein position H71 (Kabat numbering) is occupied by A.

24. The antibody of claim 22, wherein position H67 (Kabat numbering) is occupied by A and position H71 (Kabat numbering) is occupied by A.

25. The antibody of claim 22, wherein position L46 (Kabat numbering) is occupied by F.

26. The antibody of claim 22, wherein position L46 (Kabat numbering) is occupied by F and position L49 (Kabat numbering) is occupied by C.

27. The antibody of claim 22, wherein position L46 (Kabat numbering) is occupied by F and position L49 (Kabat numbering) is occupied by Y.

28. The antibody of claim 22, wherein position H67 (Kabat numbering) is occupied by A, position H71 (Kabat numbering) is occupied by A, position L46 (Kabat numbering) is occupied by F, and position L49 (Kabat numbering) is occupied by C.

29. The antibody of claim 22, wherein position H11 (Kabat numbering) is occupied by L and position H38 (Kabat numbering) is occupied by K.

30. The antibody of claim 22, wherein position H11 (Kabat numbering) is occupied by V and position H38 (Kabat numbering) is occupied by R.

31. The antibody of claim 22, wherein position H28 (Kabat numbering) is occupied by S, position H48 (Kabat numbering) is occupied by I, position H69 (Kabat numbering) is occupied by L, and position H91 (Kabat numbering) is occupied by F.

32. The antibody of claim 22, wherein position H28 (Kabat numbering) is occupied by T, position H48 (Kabat numbering) is occupied by M, position H69 (Kabat numbering) is occupied by M, and position H91 (Kabat numbering) is occupied by Y.

33. The antibody of claim 22, wherein position L83 (Kabat numbering) is occupied by A.

34. The antibody of claim 22, wherein position L83 (Kabat numbering) is occupied by F.

35. The antibody of claim 22, wherein position H97 (Kabat numbering) is occupied by S.

36. The antibody of claim 22, wherein position H97 (Kabat numbering) is occupied by C.

37. The antibody of claim 22, wherein position L46 (Kabat numbering) is occupied by F, position L49 (Kabat numbering) is occupied by C and position L83 (Kabat numbering) is occupied by A.

38. The antibody of claim 22, wherein position L46 (Kabat numbering) is occupied by F, position L49 (Kabat numbering) is occupied by Y and position L83 (Kabat numbering) is occupied by A.

39. The antibody of claim 22, wherein position L46 (Kabat numbering) is occupied by F, position L49 (Kabat numbering) is occupied by C and position L83 (Kabat numbering) is occupied by F.

40. The antibody of claim 22, wherein position L46 (Kabat numbering) is occupied by F, position L49 (Kabat numbering) is occupied by Y and position L83 (Kabat numbering) is occupied by F.

41. The antibody of claim 22, wherein position H11 (Kabat numbering) is occupied by L, position H28 (Kabat numbering) is occupied by S, position H38 (Kabat numbering) is occupied by K, position H48 (Kabat numbering) is occupied by I, position H67 (Kabat numbering) is occupied by A, position H69 (Kabat numbering) is occupied by L, position H71 (Kabat numbering) is occupied by A, position H91 (Kabat numbering) is occupied by F and position H97 (Kabat numbering) is occupied by C.

42. The antibody of claim 22, wherein position H11 (Kabat numbering) is occupied by V, position H28 (Kabat numbering) is occupied by S, position H38 (Kabat numbering) is occupied by R, position H48 (Kabat numbering) is occupied by I, position H67 (Kabat numbering) is occupied by A, position H69 (Kabat numbering) is occupied by L, position H71 (Kabat numbering) is occupied by A, position H91 (Kabat numbering) is occupied by F and position H97 (Kabat numbering) is occupied by C.

43. The antibody of claim 22, wherein position H11 (Kabat numbering) is occupied by V, position H28 (Kabat numbering) is occupied by T, position H38 (Kabat numbering) is occupied by R, position H48 (Kabat numbering) is occupied by M, position H67 (Kabat numbering) is occupied by A, position H69 (Kabat numbering) is occupied by M, position H71 (Kabat numbering) is occupied by A, position H91 (Kabat numbering) is occupied by Y and position H97 (Kabat numbering) is occupied by C.

44. The antibody of claim 22, wherein position H11 (Kabat numbering) is occupied by V, position H28 (Kabat numbering) is occupied by S, position H38 (Kabat numbering) is occupied by R, position H48 (Kabat numbering) is occupied by I, position H67 (Kabat numbering) is occupied by A, position H69 (Kabat numbering) is occupied by L, position H71 (Kabat numbering) is occupied by A, position H91 (Kabat numbering) is occupied by F and position H97 (Kabat numbering) is occupied by S.

45. The antibody of claim 22, wherein position H11 (Kabat numbering) is occupied by V, position H28 (Kabat numbering) is occupied by T, position H38 (Kabat numbering) is occupied by R, position H48 (Kabat numbering) is occupied by M, position H67 (Kabat numbering) is occupied by A, position H69 (Kabat numbering) is occupied by M, position H71 (Kabat numbering) is occupied by A, position H91 (Kabat numbering) is occupied by Y and position H97 (Kabat numbering) is occupied by S.

46. An antibody comprising a humanized heavy chain variable region comprising the three Kabat CDRs of SEQ ID NO:44 and a humanized light chain variable region comprising the three Kabat CDRs of SEQ ID NO:45, provided that position L46 (Kabat numbering) is occupied by F, position L49 (Kabat numbering) is occupied by C, position H67 (Kabat

numbering) is occupied by A, and position H71 (Kabat numbering) is occupied by A, wherein the antibody specifically binds to human alpha synuclein.

47. The antibody of claim 46, wherein position H11 (Kabat numbering) is occupied by V and position H38 (Kabat numbering) is occupied by R.

48. The antibody of claim 46, wherein position H28 (Kabat numbering) is occupied by T, position H48 (Kabat numbering) is occupied by M, position H69 (Kabat numbering) is occupied by M, and position H91 (Kabat numbering) is occupied by Y.

49. The antibody of claim 46, wherein position L83 (Kabat numbering) is occupied by F.

50. The antibody of claim 46, wherein position H28 (Kabat numbering) is occupied by T, position H48 (Kabat numbering) is occupied by M, position H69 (Kabat numbering) is occupied by M, position H91 (Kabat numbering) is occupied by Y, and position L83 (Kabat numbering) is occupied by F.

51. The antibody of claim 46, wherein position L83 (Kabat numbering) is occupied by F, position H11 (Kabat numbering) is occupied by V, H28 (Kabat numbering) is occupied by T, position H38 (Kabat numbering) is occupied by R, position H48 (Kabat numbering) is occupied by M, position H67 (Kabat numbering) is occupied by A, position H69 (Kabat numbering) is occupied by M, position H71 (Kabat numbering) is occupied by A, and position H91 (Kabat numbering) is occupied by Y.

52. An antibody comprising a mature heavy chain variable region at least 90% identical to SEQ ID NO:23 and a mature light chain variable region at least 90% identical to SEQ ID NO:37, wherein any differences in CDRs of the mature heavy chain variable region and mature light chain variable region from SEQ ID NOs. 23 and 37, respectively, reside in positions H60-H65 and H97, and wherein the antibody specifically binds to human alpha synuclein.

53. The antibody of claim 52, wherein the mature heavy chain variable region comprises the three Kabat CDRs of SEQ ID NO:23 and the mature light chain variable region comprises the three Kabat CDRs of SEQ ID NO:37, and wherein position H67 (Kabat numbering) is occupied by A, H71 (Kabat numbering) is occupied by A, position L46 (Kabat numbering) is occupied by F, and position L49 (Kabat numbering) is occupied by C.

54. The antibody of claim 53, further provided position L83 (Kabat numbering) is occupied by F.

55. The antibody of claim 53, further provided position H97 (Kabat numbering) is occupied by C.

56. The antibody of claim 52, wherein the mature heavy chain has at least 95% sequence identity to SEQ ID NO:23 and the mature light chain has at least 95% sequence identity to SEQ ID NO:37.

57. The antibody of claim 52, wherein position L46 (Kabat numbering) is occupied by F, position L49 (Kabat numbering) is occupied by C, position L83 (Kabat numbering) is occupied by F or A, position H11 (Kabat numbering) is occupied by V, position H28 (Kabat numbering) is occupied by T, position H38 (Kabat numbering) is occupied by R, position H48 (Kabat numbering) is occupied by M, position H67 (Kabat numbering) is occupied by A, position H69 (Kabat numbering) is occupied by M, position H71 (Kabat numbering) is occupied by A, and position H91 (Kabat numbering) is occupied by Y.

58. The antibody of claim 57, further provided position L83 (Kabat numbering) is occupied by F.

59. The antibody of claim 57, further provided position H97 (Kabat numbering) is occupied by C.

60. The antibody of claim 52, provided that any differences in the variable region framework of the mature heavy chain variable region and SEQ ID NO:23 are one or more of position H11 (Kabat numbering) occupied by V, H28 (Kabat numbering) occupied by T, position H38 (Kabat numbering) occupied by R, position H48 (Kabat numbering) occupied by M, position H69 (Kabat numbering) occupied by M, and position H91 (Kabat numbering) occupied by Y.

61. The antibody of claim 52, provided that any difference in the variable region framework of the mature light chain variable region and SEQ ID NO:37 is position L83 (Kabat numbering) occupied by F.

62. The antibody of claim 52, wherein the mature heavy chain variable region has the amino acid sequence designated SEQ ID NO:23 and the mature light chain variable region has the amino acid sequence designated SEQ ID NO:37.

63. The antibody of claim 1, wherein the mature heavy chain variable region has the amino acid sequence designated SEQ ID NO:44 and the mature light chain variable region has the amino acid sequence designated SEQ ID NO:45, 33, 35, 37, or 39.

64. The antibody of claim 1, wherein the mature heavy chain variable region has the amino acid sequence designated SEQ ID NO:19 and the mature light chain variable region has the amino acid sequence designated SEQ ID NO: 45, 33, 35, 37, or 39.

65. The antibody of claim 1, wherein the mature heavy chain variable region has the amino acid sequence designated SEQ ID NO:21 and the mature light chain variable region has the amino acid sequence designated SEQ ID NO:45, 33, 35, 37, or 39.

66. The antibody of claim 1, wherein the mature heavy chain variable region has the amino acid sequence designated SEQ ID NO:23 and the mature light chain variable region has the amino acid sequence designated SEQ ID NO: 45, 33, 35, 37, or 39.

67. The antibody of claim 22, wherein the mature heavy chain variable region has the amino acid sequence designated SEQ ID NO:25 and the mature light chain variable region has the amino acid sequence designated SEQ ID NO: 45, 33, 35, 37, or 39.

68. The antibody of claim 22, wherein the mature heavy chain variable region has the amino acid sequence designated SEQ ID NO:27 and the mature light chain variable region has the amino acid sequence designated SEQ ID NO: 45, 33, 35, 37, or 39.

69. The antibody of claim 62, wherein the mature heavy chain variable region is fused to a heavy chain constant region and the mature light chain constant region is fused to a light chain constant region.

70. The antibody of claim 69, wherein the heavy chain constant region has the amino acid sequence designated SEQ ID NO:52 provided the C-terminal lysine residue may be omitted.

71. The antibody of claim 69, wherein the light chain constant region has the amino acid sequence designated SEQ ID NO:49.

72. The antibody of claim 62, wherein the mature heavy chain variable region is fused to a heavy chain constant region having the amino acid sequence designated SEQ ID NO:52 provided the C-terminal lysine residue may be omitted and the mature light chain constant region is fused to a light chain constant region having the amino acid sequence designated SEQ ID NO:49.

73. The antibody of claim 72, wherein the mature light chain comprises SEQ ID NO:53 and the mature heavy chain comprises SEQ ID NO:56.

74. The antibody of any of claim 1, 22, 46 or 52, wherein the antibody comprises a heavy chain constant region which is a mutant form of a natural human constant region which has reduced binding to an Fc.gamma. receptor relative to the natural human constant region.

75. The antibody of any of claim 1, 22, 46 or 52, wherein the antibody comprises a heavy chain constant region of human IgG1 isotype.

76. A pharmaceutical composition comprising an antibody as defined by claim 1.

77. A method of detecting Lewy bodies in a patient having or at risk of a Lewy body disease, comprising administering to the patient an effective amount of an antibody as defined by claim 1, wherein the antibody binds to Lewy bodies; and detecting bound antibody in the

patient.

78. The antibody of any of claim 1, 22, 46, or 52, wherein the antibody specifically binds to an epitope within amino acid residues 91-99 of human alpha synuclein.