

herein may be used in methods of slowing memory loss or retaining or increasing memory capacity, memory function, or cognitive function in an individual. The isolated antibodies described herein may be used in methods of reducing the level of Tau protein.

[0014] In any of the examples described herein, the antibody may be an IgG1 or an IgG4 antibody. In any of the examples described herein, the antibody may be an IgG4 antibody. In some such examples, the antibody comprises M252Y, S254T, and T256E mutations. In any of the examples described herein, the antibody may comprise an S228P mutation. In any of the examples described herein, the antibody may comprise S228P, M252Y, S254T, and T256E mutations. In any of the examples described herein, the antibody may be an IgG4 antibody comprising S228P, M252Y, S254T, and T256E mutations. In some examples, the antibody is an antibody fragment. In any of the examples described herein, the antibody may be an IgG4 antibody comprising S228P, M252Y, S254T, and T256E mutations, and lacking the C-terminal lysine of the heavy chain constant region. The C-terminal lysine of the heavy chain constant region may be removed, for example, during purification of the antibody or by recombinant engineering of the nucleic acid encoding the antibody such that the C-terminal lysine is not encoded.

[0015] In some examples, an isolated antibody that binds human Tau is provided, wherein the antibody binds each of monomeric Tau, phosphorylated Tau, non-phosphorylated Tau, and oligomeric Tau with a K_D of less than 100 nM, less than 75 nM, or less than 50 nM. In some examples, the antibody binds cynomolgus monkey Tau (SEQ ID NO: 4).

[0015a] In one aspect, the present disclosure refers to use of a monoclonal antibody that binds human tau at a dose of 4500 mg, in the manufacture of a medicament for treating a Tau protein associated disease in an individual with a Tau protein associated disease, wherein the antibody comprises HVR-H1 comprising the amino acid sequence of SEQ ID NO: 20; HVR-H2 comprising the amino acid sequence of SEQ ID NO: 21; HVR-H3 comprising the amino acid sequence of SEQ ID NO: 22; HVR-L1 comprising the amino acid sequence of SEQ ID NO: 23; HVR-L2 comprising the amino acid sequence of SEQ ID NO: 24; and HVR-L3 comprising the amino acid sequence of SEQ ID NO: 25; wherein the Tau protein associated disease is Alzheimer's Disease or progressive supranuclear palsy.

[0016] In some examples, a method of treating a Tau protein associated disease is provided, comprising administering to an individual with a Tau protein associated disease an antibody described herein or a pharmaceutical composition comprising an antibody described herein. In some examples, the Tau protein associated disease is a tauopathy. In some examples, the tauopathy is a neurodegenerative tauopathy. In some examples, the tauopathy is selected from Alzheimer's Disease, amyotrophic lateral sclerosis, Parkinson's disease, Creutzfeldt-Jacob disease, Dementia pugilistica, Down's Syndrome, Gerstmann-Sträussler-Scheinker disease, inclusion-body myositis, prion protein cerebral amyloid angiopathy, traumatic brain injury, amyotrophic lateral sclerosis/parkinsonism-dementia complex of Guam, Non-Guamanian motor neuron disease with neurofibrillary tangles, argyrophilic grain dementia, corticobasal degeneration, diffuse neurofibrillary tangles with calcification, frontotemporal dementia, frontotemporal dementia with parkinsonism linked to chromosome 17, Hallevorden-Spatz disease, multiple system atrophy, Niemann-Pick disease type C, Pallido-ponto-nigral degeneration, Pick's disease, progressive subcortical gliosis, progressive supranuclear palsy, Subacute sclerosing panencephalitis, Tangle only dementia,

Postencephalitic Parkinsonism, and Myotonic dystrophy. In some examples, the tauopathy is Alzheimer's Disease (AD) or progressive supranuclear palsy. In some examples, the AD is early, prodromal, prodromal to mild, mild, mild to moderate or moderate.

[0017] In some examples, treating a Tau protein associated disease comprises slowing memory loss or retaining or increasing memory capacity, memory function, or cognitive function in the individual.

[0018] In some examples, a method of slowing memory loss or retaining or increasing memory capacity, memory function, or cognitive function in an individual is provided, comprising administering an antibody described herein or a pharmaceutical composition comprising an antibody described herein.

[0019] In some examples, memory capacity, memory function, cognitive function, or memory loss is assessed using one or more of Clinical Dementia Rating–Sum of Boxes (CDR-SB), Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), and Alzheimer's Disease Assessment Scale–Cognitive Subscale (ADAS-Cog). In some examples, ADAS-Cog is ADAS-Cog 13.

[0020] In some examples, a decrease in CDR-SB score, or an increase in RBANS score, or a decrease in ADAS-Cog score following administration of one or more doses of the antibody indicates increased cognitive memory capacity in the individual. In some examples, a stable CDR-SB score, RBANS score, or ADAS-Cog score following administration of one or more doses of the antibody indicates retained memory capacity, memory function, cognitive function, or slowed memory loss in the individual. In some examples, a slowing of the rate of increase of a CDR-SB score or ADAS-Cog score, or a slowing of the rate of decrease of a RBANS score indicates retained memory capacity, memory function, cognitive function, or slowed memory loss in the individual.

[0021] In some examples, the CDR-SB score, RBANS score, or ADS-Cog score is compared to the respective score at baseline. In some examples, baseline is prior to administration of the antibody. In some examples, the memory capacity, memory function, cognitive function, or memory loss is assessed at least 13 weeks, at least 24 weeks, at least 25 weeks, at least 37 weeks, at least 49 weeks, at least 61 weeks, at least 69 weeks, at least 73 weeks, at least 85 weeks, at least 97 weeks, at least 109 weeks, at least 121 weeks, at least 133 weeks, at least 145 weeks, at least 157 weeks, or at least 169 weeks after the beginning of treatment with the antibody.

[0021a] In one aspect, the present disclosure refers to use of a monoclonal antibody that binds human tau at a dose of 4500 mg, in the manufacture of a medicament for reducing the level of Tau protein, non-phosphorylated Tau protein, phosphorylated Tau protein, or hyperphosphorylated Tau protein in an individual with a Tau protein associated disease, wherein the antibody comprises HVR-H1 comprising the amino acid sequence of SEQ ID NO: 20; HVR-H2 comprising the amino acid sequence of SEQ ID NO: 21; HVR-H3 comprising the amino acid sequence of SEQ ID NO: 22; HVR-L1 comprising the amino acid sequence of SEQ ID NO: 23; HVR-L2 comprising the amino acid sequence of SEQ ID NO: 24; and HVR-L3 comprising the amino acid sequence of SEQ ID NO: 25; wherein the Tau protein associated disease is Alzheimer's Disease or progressive supranuclear palsy.

[0022] In some examples, a method of reducing the level of Tau protein, non-phosphorylated Tau protein, phosphorylated Tau protein, or hyperphosphorylated Tau protein

in an individual is provided, comprising administering an antibody described herein or a pharmaceutical composition comprising an antibody described herein.

[0023] In some examples, an isolated antibody described herein is provided for use as a medicament. In some examples, an isolated antibody described herein is provided for use in treating a tauopathy in an individual. In some examples, the tauopathy is a neurodegenerative tauopathy. In some examples, the tauopathy is selected from Alzheimer's Disease, amyotrophic lateral sclerosis, Parkinson's disease, Creutzfeldt-Jacob disease, Dementia pugilistica, Down's Syndrome, Gerstmann-Sträussler-Scheinker disease, inclusion-body myositis, prion protein cerebral amyloid angiopathy, traumatic brain injury, amyotrophic lateral sclerosis/parkinsonism-dementia complex of Guam, Non-Guamanian motor neuron disease with neurofibrillary tangles, argyrophilic grain dementia, corticobasal degeneration, diffuse neurofibrillary tangles with calcification, frontotemporal dementia, frontotemporal dementia with parkinsonism linked to chromosome 17, Hallevorden-Spatz disease, multiple system atrophy, Niemann-Pick disease type C, Pallido-ponto-nigral degeneration, Pick's disease, progressive subcortical gliosis, progressive supranuclear palsy, Subacute sclerosing panencephalitis, Tangle only dementia, Postencephalitic Parkinsonism, and Myotonic dystrophy. In some examples, the tauopathy is Alzheimer's Disease (AD) or progressive supranuclear palsy. In some examples, the AD is AD is early, prodromal, prodromal to mild, mild, mild to moderate or moderate.

[0023a] In one aspect, the present disclosure refers to use of a monoclonal antibody that binds human tau at a dose of 4500 mg, in the manufacture of a medicament for retaining or increasing one or more of memory capacity, memory function, or cognitive function or slowing memory loss in an individual with a Tau protein associated disease, wherein the antibody comprises HVR-H1 comprising the amino acid sequence of SEQ ID NO: 20; HVR-H2 comprising the amino acid sequence of SEQ ID NO: 21; HVR-H3 comprising the amino acid sequence of SEQ ID NO: 22; HVR-L1 comprising the amino acid sequence of SEQ ID NO: 23; HVR-L2 comprising the amino acid sequence of SEQ ID NO: 24; and HVR-L3 comprising the amino acid sequence of SEQ ID NO: 25; wherein the Tau protein associated disease is Alzheimer's Disease or progressive supranuclear palsy.

[0024] In some examples, an isolated antibody described herein is provided for use in slowing memory loss or retaining or increasing memory capacity, memory function, or cognitive function in an individual. In some examples, an isolated antibody described herein is provided for use in reducing the level of Tau protein, phosphorylated Tau protein, non-phosphorylated Tau protein, or hyperphosphorylated Tau protein in an individual.

[0025] In some examples, use of an antibody described herein is provided for manufacture of a medicament for treating a Tau protein associated disease in an individual. In some examples, the Tau protein associated disease is a tauopathy. In some examples, the tauopathy is a neurodegenerative tauopathy. In some examples, the tauopathy is selected from Alzheimer's Disease, amyotrophic lateral sclerosis, Parkinson's disease, Creutzfeldt-Jacob disease, Dementia pugilistica, Down's Syndrome, Gerstmann-Sträussler-Scheinker disease, inclusion-body myositis, prion protein cerebral amyloid angiopathy, traumatic brain injury, amyotrophic lateral sclerosis/parkinsonism-dementia complex of Guam, Non-Guamanian motor neuron disease with neurofibrillary tangles, argyrophilic grain dementia, corticobasal degeneration, diffuse neurofibrillary tangles with calcification, frontotemporal dementia, frontotemporal dementia with parkinsonism linked to chromosome

WHAT IS CLAIMED IS:

1. Use of a monoclonal antibody that binds human tau at a dose of 4500 mg, in the manufacture of a medicament for treating a Tau protein associated disease in an individual with a Tau protein associated disease, wherein the antibody comprises HVR-H1 comprising the amino acid sequence of SEQ ID NO: 20; HVR-H2 comprising the amino acid sequence of SEQ ID NO: 21; HVR-H3 comprising the amino acid sequence of SEQ ID NO: 22; HVR-L1 comprising the amino acid sequence of SEQ ID NO: 23; HVR-L2 comprising the amino acid sequence of SEQ ID NO: 24; and HVR-L3 comprising the amino acid sequence of SEQ ID NO: 25; wherein the Tau protein associated disease is Alzheimer's Disease or progressive supranuclear palsy.
2. The use of claim 1, wherein the antibody is to be administered once every 1, 2, 4, 5, 6, 7, or 8 weeks.
3. The use of claim 1 or claim 2, wherein the antibody is to be administered twice every 1, 2, 4, 5, 6, 7, or 8 weeks.
4. The use of any one of claims 1-3, wherein the antibody is to be administered subcutaneously.
5. The use of any one of claims 1-3, wherein the antibody is to be administered intravenously.
6. The use of any one of the preceding claims, wherein the Tau protein associated disease is Alzheimer's Disease (AD).
7. The use of claim 6, wherein the AD is early, prodromal, prodromal to mild, mild, mild to moderate or moderate.
8. The use of any one of the preceding claims, wherein the treating comprises slowing memory loss or retaining or increasing memory capacity, memory function, or cognitive function in the individual.
9. The use of claim 8, wherein memory capacity, memory function, cognitive function, or memory loss is assessed using one or more of Clinical Dementia Rating–Sum of Boxes (CDR-SB), Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), and Alzheimer's Disease Assessment Scale–Cognitive Subscale (ADAS-Cog).
10. The use of claim 9, wherein ADAS-Cog is ADAS-Cog 13.

11. The use of claim 9 or claim 10, wherein a decrease in CDR-SB score, or an increase in RBANS score, or a decrease in ADS-Cog score following administration of one or more doses of the antibody indicates one or more of increased memory capacity, memory function, or cognitive function in the individual.

12. The use of claim 9 or claim 10, wherein a stable CDR-SB score, RBANS score, or ADAS-Cog score, a slowing of the rate of increase of a CDR-SB score or ADAS-Cog score, or a slowing of the rate of decrease of a RBANS score following administration of one or more doses of the antibody indicates one or more of slowed memory loss or retained memory capacity, memory function, or cognitive function in the individual.

13. The use of any one of claims 9 to 12, wherein the CDR-SB score, RBANS score, or ADAS-Cog score is compared to the respective score at baseline.

14. The use of claim 13, wherein baseline is prior to administration of the antibody.

15. The use of any one of any one of claims 11 to 14, wherein the memory capacity, memory function, cognitive function, or memory loss is assessed at least 13 weeks, at least 24 weeks, at least 25 weeks, at least 37 weeks, at least 49 weeks, at least 61 weeks, at least 69 weeks, at least 73 weeks, at least 85 weeks, at least 97 weeks, at least 109 weeks, at least 121 weeks, at least 133 weeks, at least 145 weeks, at least 157 weeks, or at least 169 weeks after the beginning of treatment with the antibody.

16. Use of a monoclonal antibody that binds human tau at a dose of 4500 mg, in the manufacture of a medicament for retaining or increasing one or more of memory capacity, memory function, or cognitive function or slowing memory loss in an individual with a Tau protein associated disease, wherein the antibody comprises HVR-H1 comprising the amino acid sequence of SEQ ID NO: 20; HVR-H2 comprising the amino acid sequence of SEQ ID NO: 21; HVR-H3 comprising the amino acid sequence of SEQ ID NO: 22; HVR-L1 comprising the amino acid sequence of SEQ ID NO: 23; HVR-L2 comprising the amino acid sequence of SEQ ID NO: 24; and HVR-L3 comprising the amino acid sequence of SEQ ID NO: 25; wherein the Tau protein associated disease is Alzheimer's Disease or progressive supranuclear palsy.

17. The use of claim 16, wherein memory capacity, memory function, cognitive function, or memory loss is assessed using one or more of Clinical Dementia Rating–Sum of Boxes (CDR-SB), Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), and Alzheimer's Disease Assessment Scale–Cognitive Subscale (ADAS-Cog).

18. The use of claim 17, wherein ADAS-Cog is ADAS-Cog 13.
19. The use of claim 17 or claim 18, wherein a decrease in CDR-SB score, or an increase in RBANS score, or a decrease in ADS-Cog score following administration of one or more doses of the antibody indicates increased memory capacity, memory function, or cognitive function, in the individual.
20. The use of claim 17 or claim 18, wherein a stable CDR-SB score, RBANS score, or ADS-Cog score, a slowing of the rate of increase of a CDR-SB score or ADAS-Cog score, or a slowing of the rate of decrease of a RBANS score following administration of one or more doses of the antibody indicates one or more of slowed memory loss or retained memory capacity, memory function, or cognitive function in the individual.
21. The use of any one of claims 17 to 20, wherein the CDR-SB score, RBANS score, or ADS-Cog score is compared to the respective score at baseline.
22. The use of claim 21, wherein baseline is prior to administration of the antibody.
23. The use of any one of claims 16 to 22, wherein the memory capacity, memory function, cognitive function, or memory loss is assessed at least 13 weeks, at least 24 weeks, at least 25 weeks, at least 37 weeks, at least 49 weeks, at least 61 weeks, at least 69 weeks, at least 73 weeks, at least 85 weeks, at least 97 weeks, at least 109 weeks, at least 121 weeks, at least 133 weeks, at least 145 weeks, at least 157 weeks, or at least 169 weeks after the beginning of treatment with the antibody.
24. Use of a monoclonal antibody that binds human tau at a dose of 4500 mg, in the manufacture of a medicament for reducing the level of Tau protein, non-phosphorylated Tau protein, phosphorylated Tau protein, or hyperphosphorylated Tau protein in an individual with a Tau protein associated disease, wherein the antibody comprises HVR-H1 comprising the amino acid sequence of SEQ ID NO: 20; HVR-H2 comprising the amino acid sequence of SEQ ID NO: 21; HVR-H3 comprising the amino acid sequence of SEQ ID NO: 22; HVR-L1 comprising the amino acid sequence of SEQ ID NO: 23; HVR-L2 comprising the amino acid sequence of SEQ ID NO: 24; and HVR-L3 comprising the amino acid sequence of SEQ ID NO: 25; wherein the Tau protein associated disease is Alzheimer's Disease or progressive supranuclear palsy.

25. The use of claim 24, wherein the level of Tau protein, non-phosphorylated Tau protein, phosphorylated Tau protein, or hyperphosphorylated Tau protein is measured by positron emission tomography (PET) or by analysis of cerebrospinal fluid.

26. The use of any one of claims 16 to 25, wherein the antibody is to be administered once every 1, 2, 4, 5, 6, 7, or 8 weeks.

27. The use of any one of claims 16 to 25, wherein the antibody is to be administered twice every 1, 2, 4, 5, 6, 7, or 8 weeks.

28. The use of any one of claims 16 to 27, wherein the antibody is to be administered subcutaneously.

29. The use of any one of claims 16 to 27, wherein the antibody is to be administered intravenously.

30. The use of any one of claims 16 to 29, wherein the Tau protein associated disease is Alzheimer's Disease (AD).

31. The use of claim 30, wherein the AD is early, prodromal, prodromal to mild, mild, mild to moderate or moderate.

32. The use of any one of the preceding claims, wherein the medicament is to be administered with at least one additional therapy.

33. The use of claim 32, wherein the additional therapy is selected from neurological drugs, corticosteroids, antibiotics, antiviral agents, anti-Tau antibodies, Tau inhibitors, anti-amyloid beta antibodies, beta-amyloid aggregation inhibitors, anti-BACE1 antibodies, and BACE1 inhibitors.

34. The use of claim 33, wherein the additional therapy is an anti-amyloid beta antibody, wherein the anti-amyloid beta antibody is gantenerumab.

35. The use of claim 33, wherein the additional therapy is an anti-amyloid beta antibody, wherein the anti-amyloid beta antibody is crenezumab.

36. The use of any one of the preceding claims, wherein the antibody comprises a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 18 and a light chain variable region comprising the amino acid sequence of SEQ ID NO: 19.

37. The use of any one of the preceding claims, wherein the antibody comprises a heavy chain comprising the amino acid sequence of SEQ ID NO: 26 or SEQ ID NO: 27 and a light chain comprising the amino acid sequence of SEQ ID NO: 28.

38. The use of any one of the preceding claims, wherein the antibody comprises a heavy chain consisting of the amino acid sequence of SEQ ID NO: 26 or SEQ ID NO: 27 and a light chain consisting of the amino acid sequence of SEQ ID NO: 28.
39. The use of any one of claims 1-38, wherein the antibody is an IgG1 or an IgG4 antibody.
40. The use of claim 39, wherein the antibody is an IgG4 antibody.
41. The use of claim 40, wherein the antibody comprises M252Y, S254T, and T256E mutations.
42. The use of claim 40 or claim 41, wherein the antibody comprises an S228P mutation.
43. The use of any one of claims 1 to 42, wherein the antibody is an antibody fragment.
44. The use of any one of the preceding claims, wherein the antibody binds each of monomeric Tau, phosphorylated Tau, non-phosphorylated Tau, and oligomeric Tau with a K_D of less than 100 nM, less than 75 nM, or less than 50 nM.
45. The use of any one of the preceding claims, wherein the antibody binds cynomolgus monkey Tau (SEQ ID NO: 4).