is seen in the layer II neurons of the entorhinal cortex, the CA1 and subicular regions of the hippocampus, the amygdala, and the deeper layers (layers III, V, and superficial VI) of the neocortex in Alzheimer's disease. Tau pathologies are known to correlate to cognitive decline.

[0006] Accordingly, there exists the need for new therapies and reagents for the prevention or treatment of Alzheimer's disease, in particular, therapies and reagents capable of causing an immune response to the tau present in patients.

SUMMARY

[0007] In ~~some embodiments~~one aspect, the disclosure is directed to a peptide comprising 3-13 amino acids from residues 244-400 of SEQ ID NO:01 or from residues 1-150 of SEQ ID NO:750. For example, the peptide may comprise an amino acid sequence of one of SEQ ID NO:02 to SEQ ID NO:19, SEQ ID NO:25 to SEQ ID NO:320, SEQ ID NO:411, SEQ ID NO:454, SEQ ID NO:456, SEQ ID NO:458 to SEQ ID NO:742, SEQ ID NO:747 to SEQ ID NO:749, or SEQ ID NO:755 to SEQ ID NO:776. In some embodiments, the peptide is from the microtubule binding region (MTBR) of tau (residues 244-372 of SEQ ID NO:01) and, as an example, comprise any one of SEQ ID NO:02 to SEQ ID NO:19, SEQ ID NO:28 to SEQ ID NO:102, SEQ ID NO:185 to SEQ ID NO:320 or SEQ ID NO:458 to SEQ ID NO:742, each optionally further comprising a C-terminal cysteine.

[0007a] In another aspect, the disclosure is directed to a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO:20 to SEQ ID NO:24, SEQ ID NO:312 to SEQ ID NO:457, each optionally further comprising a C-terminal cysteine.

[0007b] In another aspect, the disclosure is directed to a peptide comprising 5-13 amino acids from residues 244-400 of SEQ ID NO:01 or from residues 1-150 of SEQ ID NO:750, comprising at least one amino acid substitution.

[0007c] In another aspect, the disclosure is directed to an immunotherapy composition, comprising one or more of the peptides as described herein.

[0007d] In another aspect, the disclosure is directed to a pharmaceutical composition comprising (a) one or more of the peptides as described herein, or (b) the immunotherapy composition as described herein and at least one adjuvant.

[0007e] In another aspect, the disclosure is directed to a nucleic acid comprising a nucleic acid sequence encoding a peptide as described herein or the immunotherapy composition as described herein.

[0007f] In another aspect, the disclosure is directed to a nucleic acid immunotherapy composition comprising the nucleic acid as described herein and at least one adjuvant.

[0007g] In another aspect, the disclosure is directed to a use of the immunotherapy composition, or the pharmaceutical compositions in the manufacture of a medicament for treating or effecting prophylaxis of Alzheimer's disease in a subject.

[0007h] In another aspect, the disclosure is directed to a use of the immunotherapy composition, or the pharmaceutical formulations as described herein in the manufacture of a medicament for inhibiting or reducing aggregation of tau in a subject having or at risk of developing Alzheimer's disease.

[0007i] In another aspect, the disclosure is directed to a use of the nucleic acid immunotherapy composition as described herein in the manufacture of a medicament for treating or effecting prophylaxis of Alzheimer's disease in a subject.

[0007j] In another aspect, the disclosure is directed to a use of the nucleic acid immunotherapy composition as described herein in the manufacture of a medicament for inhibiting or reducing aggregation of tau in a subject having or at risk of developing Alzheimer's disease.

[0007k] In another aspect, the disclosure is directed to a use of the peptide, the immunotherapy composition, the pharmaceutical formulations or the nucleic acid immunotherapy composition as described herein in the manufacture of a medicament for inducing an immune response in an animal, wherein the medicament is to be administered in a regimen effective to generate an immune response comprising antibodies that specifically bind to tau.

[0007l] In another aspect, the disclosure is directed to immunization kit comprising the immunotherapy composition as described herein.

[0007m] In another aspect, the disclosure is directed to a kit comprising the nucleic acid immunotherapy composition as described herein.

[0007n] In another aspect, the disclosure is directed to a peptide, the immunotherapy composition, the pharmaceutical formulations, or the nucleic acid immunotherapy composition as described herein for use in therapy.

[0008] In some embodiments, the disclosure is directed to a peptide comprising, e.g., 3-13, 7-13, 7-10 or 8 amino acids from residues 244-400 of SEQ ID NO:01 or from residues 1-150 of SEQ ID NO:750, further comprising a C-terminal -GGC or -GGGC or an N-terminal CGG- or CGGG-. For example, the peptide can comprise an amino acid sequence of SEQ ID NO:777 to SEQ ID NO:785 or SEQ ID NO:786 to SEQ ID NO:908.

[0009] In some embodiments, the peptide may include a linker to a carrier at a C-terminal portion of the peptide or at a N-terminal portion of the peptide, which may include an amino acid sequence of, for example, AA, AAA, KK, KKK, SS, SSS AGAG, GG, GGG, GAGA, and KGKG, In addition, the linker to the carrier, if present, may include a terminal cysteine (C). As an example of a C-terminal linker, the polypeptide may include the amino acid sequence of NIKHVPG-XXC (SEQ ID NO:05), wherein XX and C are independently optional and, if present, XX can be, for example, AA, KK, SS, AGAG, GG, GAGA, or KGKG. In some embodiments, the peptide further comprises a blocked amine at the N-terminus.