subject having or at risk of developing Alzheimer's disease. The methods include administrating to the subject an immunotherapy composition, a nucleic acids immunotherapy composition, or a pharmaceutical formulation of the disclosure.

[0018] The methods of the disclosure may include repeating the administering at least a second time, at least a third time, at least a fourth time, at least a fifth time, or at least a sixth time, and may include repeating the administering at an interval of about 21 to about 28 days.

[0018a] In one aspect, there is provided a use of an immunotherapy composition described herein or the pharmaceutical formulations described herein in the manufacture of a medicament for treating or effecting prophylaxis of Alzheimer's disease in a subject, wherein the immunotherapy composition is to be administered to the subject.

[0018b] In another aspect, there is provided a use of an immunotherapy composition as described herein or the pharmaceutical formulations as described herein in the manufacture of a medicament for inhibiting or reducing aggregation of at least one of Aβ and alpha-synuclein in a subject having or at risk of developing Alzheimer's disease, wherein the immunotherapy composition or pharmaceutical formulation is to be administered to the subject.

[0018c] In yet another aspect, there is provided a use of the nucleic acid immunotherapy composition described herein in the manufacture of a medicament for treating or effecting prophylaxis of Alzheimer's disease in a subject, wherein the nucleic acid immunotherapy composition is to be administered to the subject.

[0018d] In a further aspect, there is provided a use of the nucleic acid immunotherapy composition described herein in the manufacture of a medicament for inhibiting or reducing aggregation of at least one of Aβ and alpha-synuclein in a subject having, or at risk of developing Alzheimer's disease, wherein the nucleic acid immunotherapy composition is to be administered to the subject.

[0019] Still further, methods of the disclosure are directed to inducing an immune response in an animal. The methods include administering to the animal a polypeptide, an immunotherapy composition, a pharmaceutical formulation or a nucleic acid immunotherapy composition of the disclosure in a regimen effective to generate an immune response including antibodies that specifically bind to Aβ, alpha-

synuclein, or both Aβ and alpha-synuclein. The immune response may include antibodies that specifically bind to the N-terminal region of Aβ and/or the C-terminal region of alpha-synuclein.

[0019a] In another aspect, there is provided a use of the polypeptide as described herein, the immunotherapy composition as described herein, the pharmaceutical formulations as described herein 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 polypeptide, immunotherapy composition, pharmaceutical composition or nucleic acid immunotherapy composition is to be administered to the animal in a regimen effective to generate an immune response comprising antibodies that specifically bind to Aβ, alpha-synuclein, or both Aβ and alpha-synuclein.

[0020] In other embodiments, the disclosure is directed to an immunization kit including an immunotherapy composition of the disclosure and may include an adjuvant, wherein the immunotherapy composition may be in a first container and the adjuvant may be a second container.

[0021] Still further, the disclosure is directed to a kit including a nucleic acid immunotherapy composition of the disclosure and may include an adjuvant. The nucleic acid may be in a first container and the adjuvant may be in a second container.

BRIEF DESCRIPTION OF THE FIGURES

[0022] **FIG. 1** shows the results of an experiment comparing the titers of Guinea pig serum for immunogens DAEFRHDRRPDNEAYEGGC (SEQ ID NO:110), and DAEFRHDRRDPDNEAYEGGC (SEQ ID NO:111). All immunogens comprised a C-terminal linker of GG and a cysteine for coupling to maleimide activated CRM197 carrier. QS21 was utilized as an adjuvant in AddaVax squalene-based oil-in-water nano-emulsion.

[0023] **FIG. 2** shows the results of an experiment measuring the titer of murine serum for immunogens DAEFRHDRRPDNEAYEGGC (SEQ ID NO:110),