penetrating peptides, radical induced polymerization, self-assembling nanoparticles as antigen-presenting platforms and gold nanoparticles.

[0012] Embodiments of the disclosure are also directed to nucleic acid sequences encoding the polypeptides and the immunotherapy compositions of the disclosure. The nucleic acids may be included in a nucleic acid immunotherapy composition including the nucleic acid and at least one adjuvant.

[0013] In some embodiments, the disclosure is directed to ~~a~~ methods for treating or effecting prophylaxis of Alzheimer's disease in a subject, and methods for inhibiting or reducing aggregation of Aβ in a 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.

[0013a] In one aspect, there is provided a use of the immunotherapy composition as described herein or the pharmaceutical compositions as described herein in the manufacture of a medicament for treating or effecting prophylaxis of Alzheimer's disease in a subject, wherein the immunotherapy composition or the pharmaceutical composition is to be administered to the subject.

[0013b] In another aspect, there is provided a use of the immunotherapy composition as described herein or the pharmaceutical composition as described herein in the manufacture of a medicament for inhibiting or reducing aggregation of Aβ in a subject having or at risk of developing Alzheimer's disease, wherein the immunotherapy composition or pharmaceutical composition is to be administered to the subject.

[0013c] In yet another aspect, there is provided 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, wherein the nucleic acid immunotherapy composition is to be administered to the subject.

[0013d] In a further aspect, there is provided a use of the nucleic acid immunotherapy composition as described herein in the manufacture of a medicament for inhibiting or reducing aggregation of Aβ 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.

[0014] 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 bimonthly, of about 21 to about 28 days, of about quarterly, of about biannually, or of about annually.

[0015] 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. The immune response may include antibodies that specifically bind to the N-terminal region of Aβ.

[0015a] In another aspect, there is provided a use of the peptide as described herein, the immunotherapy composition as described herein, the pharmaceutical compositions 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 peptide, 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.

[0016] 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.

[0017] 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