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Cerebral Amyloid Angiopathy and Alzheimer's Disease Diagnosis and Treatment (20130341, Dr. Karunya Kandimalla)

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Technology ID
20130341

Category
Life Sciences/Diagnostics & Imaging
Life Sciences/Therapeutics

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Removing Beta Amyloid Plaques Using Nanovehicles

Disc-shaped nanovehicles have been developed to diagnose and treat cerebral amyloid angiopathy (CAA) and Alzheimer's disease (AD). The nanovehicles may be able to act as a diagnostic probe, to help relieve symptoms caused by cerebrovascular inflammation, and to promote Aβ plaque removal in the brain.

The 200nm, disc-shaped nanovehicles consist of a polymeric core that contains polycarbophil, Technetium-99m ($Tc^{99}m$) chitosan, and cyclophosphamide. The nanovehicles diagnostic potential is due to $Tc^{99}m$, which is attached to chitosan, and serves as a radioactive tracer for single photo emission computer tomography (SPECT). This aspect could be a highly sensitive and specific diagnostic method to detect Aβ deposits. The chitosan coating increases cellular uptake and the nanovehicles design allows them to escape phagocytic destruction. The nanovehicles are assembled through a "single pot" three-step process with high conjugation efficiency.

Cerebral Amyloid Angiopathy and Alzheimer's Disease Lack Effective Treatments

Cerebral amyloid angiopathy and Alzheimer's disease affect millions of people worldwide. CAA is characterized by amyloid beta (Aβ) deposits in the brain, which increases the patient's risk of stroke and dementia. Aβ plaques are also present in all AD patients. Effective treatments for either disease continue to evade researchers. Although the initial cause of Aβ buildup is unknown, targeting Aβ plaques is a promising treatment strategy.

BENEFITS AND FEATURES OF NANOVEHICLES:

- $Tc^{99}m$ acts as a radioactive tracer for SPECT imaging
- Nanovehicles may act as a diagnostic probe
- Chitosan coating increases cellular uptake and helps prevent phagocytic destruction
- Promote Aβ plaque removal to reduce inflammation and improve symptoms

Phase of Development Pre-clinical validation

Researchers

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