Dysfunction of G-Protein-Coupled Receptor Kinases in Alzheimer's Disease

(VA Reference No. 02-079)

Novel method of detecting and preventing Alzheimer's disease, particularly at prodromal and early stages

Technology
Method of detecting and preventing Alzheimer's disease

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Key Features
- Detection of increasing levels of soluble beta-amyloid
- Multiple applications including diagnosis, vaccine development, and drug development
- May represent one of the earliest pathogenic events associated with the disease

Stage of Development
Reduced to practice with successful demonstration in both in vitro and animal models

Keywords
Diagnostic
- Alzheimer's disease
- Prevention
- G-protein receptor kinase
- GRK5
- Beta-amyloid

Patent Status
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Technology

The Department of Veterans Affairs has developed a method of detecting and potentially preventing Alzheimer's disease, particularly at prodromal and early stages. The method entails detecting a disruption or alteration in normal sub-cellular distribution of G-protein receptor kinases (GRKs), particularly GRK2 and GRK5. The disruption is caused by abnormal accumulation of soluble beta-amyloid. The prevention or suppression of the disease progression at prodromal or early stages includes correction of GRK dysfunction.

Description

Prominent pathological features of Alzheimer's involve the abnormal accumulation of a small peptide, beta-amyloid (Aβ). However, the pathogenesis mechanisms associated with this abnormal accumulation remain unclear. This has significantly hampered understanding of the prognosis, prophylaxis and therapeutic regimen for AD patients. However, the VA has discovered that decreasing expression level of G-protein-coupled receptor kinases, particularly GRK5, correlate with increasing levels of soluble Aβ that occurs prior to the onset of AD and remain elevated as the disease progresses. This has led to a method for detecting Alzheimer's pathogenesis that comprises measuring the content of G-protein receptor kinase 5 (GRK5) in membrane fractions from the brain of a patient and comparing the content to that of an unaffected control, wherein a decrease in membrane content of GRK5 indicates Alzheimer's pathogenesis.

Competitive Advantage

The novel technology developed opens potential new ground for the early diagnosis, prophylaxis, and therapy of AD.

This invention:

- May lead to a confirmatory diagnosis without confirmation on post mortem examination.
- May represent one of earliest pathogenic events associated with soluble Aβ.

Status

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license, and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).