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## Beta-Amyloid and Neurofibrillary Tangle Imaging Agents

Tech ID: 18767 / UC Case 2007-035-0

### BACKGROUND

Positron emission tomography (PET) is a non-invasive test that helps doctors diagnose abnormalities, determine the extent of disease, prescribe treatment, and track progress. The patient is given a positron-emitting radiopharmaceutical and the PET scan locates and measures radioactivity, thereby distinguishing the "hot spots" for brain activity related to the specific radiotracer.

Imaging agents using PET can greatly enhance chances of early diagnosis of Alzheimer's disease, which can then allow patients to obtain the best therapy and most efficient therapeutic drugs early in the disease progression. Development of imaging agents that can detect the senile plaques associated with Alzheimer's disease is currently underway. One major structural class of PET imaging agents recently developed is aminonaphthalene backbones, which has been shown to target the polymeric form of  $\beta$ -amyloid peptide that is associated with senile plaques (SP) and bind to neurofibrillary tangles (NFT). This radiofluorinated molecular imaging probe, known as [18F]FDDNP (FDDNP), became the first technique to image plaques and tangles. FDDNP showed specific binding to areas of SPs and NFTs. However, the radiotracer is highly lipophilic (therefore increases nonspecific binding) due to its structure, particularly the naphthalene ring which gives low target to nontarget ratios. This results in poor image quality and makes diagnosis difficult.

### TECHNOLOGY DESCRIPTION

In order to reduce the lipophilicity of FDDNP, researchers at the University of California have designed a new analog. Researchers have radiolabeled the new analog, designated 'FBM', and performed in vitro studies in mice. These studies indicate that FBM is less lipophilic than FDDNP, while still having structural similarities to FDDNP. Also, FBM is able to provide higher target to non-target ratios than FDDNP in the transgenic mice hippocampus. The Tg2576 and triple transgenic mice brains have been shown to be a good model for Alzheimer's disease, because of the similar accumulation of beta-amyloid plaques. Therefore, the success of FBM showing specific binding to amyloid plaques in transgenic mice hippocampus shows potential as a new radiotracer. FBM also showed specific binding in the frontal cortex of the transgenic mice brain. Further evaluation of FBM in other brain regions and in vitro binding affinity studies of FBM to the  $\beta$ -amyloid binding sites will help us better understand how FBM binds to plaques all over the brain.

### APPLICATIONS

The invention provides the following: (1) A new biochemical (FBM) that can be used for research studies; (2) A precursor molecule that can be radiolabeled; (3) An imaging agent that can be used for PET diagnostic imaging of various neurodegenerative disorders including Alzheimer's disease, minimal cognitive impairment, dementia, inflammation associated with these neurological processes, inflammation as a result of other injuries or pathophysiology related to cancer.

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,737,183	06/15/2010	2007-035

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### OTHER INFORMATION

#### CATEGORIZED AS

- » **Imaging**
- » Other
- » **Materials & Chemicals**
- » Composites
- » **Medical**
- » Diagnostics
- » Screening

#### RELATED CASES

2007-035-0

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