Visualization of Alzheimer's Disease on MRI

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SUMMARY

UCLA researchers have developed a novel compound that can be used to diagnose and monitor Alzheimer's Disease (AD) using magnetic resonance imaging (MRI).

BACKGROUND

An estimated 5.3 million Americans have AD, the most common form of dementia. For decades, diagnosis of AD has relied on the evaluation of cognitive impairment by neuropsychological tests. However, most medical experts now agree that AD actually begins long before patients exhibit clinical symptoms. Beta-amyloid (A-beta) plaques and neurofibrillary tangles, the pathological hallmarks of the disease, actually appear in the brain much earlier. Recent efforts to identify these brain lesions early, including by positron emission tomography (PET) imaging or by cerebral spinal fluid (CSF) testing, have met with some success. Additional methods for early AD diagnosis may yield new progress in the development of therapeutics that can slow or stop the disease.

INNOVATION

Researchers at UCLA have developed a targeted and non-radioactive compound that produces MRI image contrast enhancement of specific brain tissues containing A-beta plaques and neurofibrillary tangles. This compound can pass through the blood brain barrier and has demonstrated both differential affinity for these diseased tissues and effective MRI contrast resolution. This innovation is designed to use a non-invasive method and widely available equipment to help physicians diagnose AD patients and monitor their disease progression and/or response to treatment objectively and quantitatively.

APPLICATIONS

- Diagnosis of AD in the earliest stages of the disease using standard MRI equipment.
- Assessment of the efficacy of future experimental drugs in removing lesions or preventing their formation.

ADVANTAGES

- Wider clinical availability of MRI compared to other imaging techniques, including PET
- Utilizes better anatomical resolution capability of MRI compared to other imaging techniques, including PET
- Does not require cyclotron or similar equipment or entail special training for MRI personnel
- Relatively long shelf-life compared to radioactive probes (order many months) improves availability for administration at any facility with MRI equipment access
- Relatively long blood half-life compared to radioactive probes (hours to days) facilitates monitoring of AD related tissue changes with a single administration
- Lack of radioactivity allows repeated administration in patients and healthy research subjects
- Minimally invasive diagnostic method, in contrast to CSF collection by spinal tap

STATE OF DEVELOPMENT

The researchers have developed this compound. Experiments using a rodent model of triple transgenic human plaques associated with AD have demonstrated the efficacy of this compound in rendering these specific brain tissues readily visible on MRI. Manuscript on this work is being prepared for publication.

PATENT STATUS

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OTHER INFORMATION

KEYWORDS

Alzheimers; Neurodegenerative Disease; CNS; Medical Imaging; Neurology; Neurological Disease; AD Diagnostics

CATEGORIZED AS

- **Imaging**
  - Medical
- **Medical**
  - Diagnostics
  - Disease: Central Nervous System
  - Imaging

RELATED CASES

2010-669-0

Country	Type	Number	Dated	Case
Canada	Issued Patent	3,058,702	11/07/2023	2010-669
Germany	Issued Patent	3345545	10/20/2021	2010-669
European Patent Office	Issued Patent	3345545	10/20/2021	2010-669
France	Issued Patent	3345545	10/20/2021	2010-669
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Japan	Issued Patent	6038122	11/11/2016	2010-669
United States Of America	Issued Patent	9,272,055	03/01/2016	2010-669
Canada	Published Application			2010-669

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Glucose-conjugated magnetonanoparticles for visualization and treatment of neoplasms and neurological disorders by MRI
- Non-Invasive Method For Determination Of Tissue Electrical Conductivity

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