News Release

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A Joint Regional Cohort Study by Shimadzu, Eisai, Oita University, and Usuki City Medical Association
Demonstrating the Utility of Blood Biomarkers in Predicting Amyloid Beta Accumulation in the Brain

Shimadzu Corporation, Eisai Co., Ltd., Oita University, and Usuki City Medical Association have demonstrated the utility of blood biomarkers in predicting the accumulation of amyloid beta (Aβ) (Note 1) in the brain, a noted cause of Alzheimer's disease (Note 2), in a cohort study conducted in Usuki City, Oita from November 2022. A research paper reporting the details of this study was published on October 10, 2024, in the journal *Alzheimer's & Dementia: Translational Research & Clinical Interventions*.

This joint research attempts to develop Japan's first diagnostic workflow for mild cognitive impairment (MCI) due to Alzheimer's disease and mild dementia based on blood biomarkers. Comprising a phase 1 and phase 2 study, the phase 1 study uses frozen samples of blood plasma from a regional cohort collected by a prospective cohort study performed in Usuki City between 2015 and 2019 to evaluate the utility of blood biomarkers in predicting Aβ accumulation in the brain. The phase 2 study is a prospective study that uses blood plasma samples collected from 100 newly recruited subjects through diagnostic workflows adopted at all levels of health care, from primary care physicians to specialists certified by dementia-related societies, to evaluate the psychological impact on participants of different results and who discloses them.

The research paper primarily compiles results from the phase 1 study. The ability of blood biomarkers to predict the results of amyloid PET scans (Note 3) was evaluated in terms of an area under the curve (AUC) value. Blood biomarker measurements performed by Shimadzu resulted in an AUC value of 0.94 and identified PET-positive patients in the regional cohort with a high degree of accuracy. The joint research also revealed the possibility to predict the progression of clinical symptoms using baseline blood biomarker results, i.e., the progression from MCI due to Alzheimer's disease to Alzheimer's dementia from analysis of participant data over a seven-year observation period. Blood biomarker testing is less invasive than amyloid PET and cerebrospinal fluid testing (Note 4), and could reduce patient stress and help predict the future onset of dementia if used as an alternative to these two diagnostic methods. The data collection stage of phase 2 is complete with plans in place to carry out data analysis and draft an overall report of the results of both phases of the joint research.

The four parties involved in this joint research are committed to building an ecosystem that improves

the early diagnosis of Alzheimer's through diagnostic workflows adopted at all levels of health care from primary care physicians to specialists who are members of dementia-related societies, and through this research develop social infrastructure that ensures patients and their families live happy and fulfilling lives.

Note 1: Amyloid beta is a protein believed to cause Alzheimer's disease that accumulates in the brain to form senile plaques beginning around 20 years before the onset of Alzheimer's disease.
Note 2: Alzheimer's disease is the most common cause of dementia and its key pathological hallmarks are senile plaques, neurofibrillary tangles, and neuronal cell death.
Note 3: Amyloid PET is a brain imaging test that can visualize amyloid beta accumulation in the brain.
Note 4: Cerebrospinal fluid testing collects cerebrospinal fluid and tests it for amyloid-β 42, amyloid-β 40, phosphorylated tau protein, and total tau protein, which are biomarkers of Alzheimer's disease.

Comment by Noriyuki Kimura, an Associate Professor at the Department of Neurology, Faculty of Medicine, Oita University
Treatment of Alzheimer's disease is approaching a new turning point with the emergence of anti-amyloid beta antibodies that will require the diagnosis of Alzheimer's disease at the MCI or early dementia stage. Biomarker-based tests to detect amyloid accumulation in the brain include amyloid PET scans and cerebrospinal fluid testing, but PET scans are expensive and cerebrospinal fluid testing is highly invasive. Blood biomarker testing is low-cost and less invasive, and its adoption promises to reduce the financial and physical burden on patients.

Research Paper Information
Journal name: Alzheimer's & Dementia: Translational Research & Clinical Interventions
Title of paper: Plasma amyloid beta biomarkers predict amyloid positivity and longitudinal clinical progression in mild cognitive impairment.
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Related Information
November 22, 2022 Press release
To Develop Japan's First Blood Biomarker-Based Diagnostic Workflow for Dementia
Shimadzu, Eisai, Oita University, and Usuki City Medical Association Commence Joint Research
https://www.eisai.com/news/2022/news202280.html

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