A Biomarker for Cerebral Amyloid Angiopathy (CAA) and Amyloid Related Imaging Abnormality Risk

A biofluid biomarker to reliably diagnose Cerebral Amyloid Angiopathy (CAA) and predict the risk of Amyloid-Related Imaging Abnormalities (ARIA) in Alzheimer's disease patients.

Technology

Dr. Wisniewski's lab discovered a biofluid biomarker associated with CAA lesions. They conducted proteomic analyses of blood vessels from patients with early AD, known as mild cognitive impairment (MCI) and advanced AD, which revealed that the biomarker's protein levels are significantly elevated in CAA-positive (CAA+) vessels compared to CAA-negative (CAA-) vessels. This biomarker has been validated immunohistochemically and can be measured in both plasma and cerebrospinal fluid (CSF). It represents the first biofluid biomarker capable of specifically diagnosing CAA in AD patients. Beyond its diagnostic utility, this protein could also be used as a predictive biomarker for ARIA. Patients with higher levels of this biomarker may be at greater risk for developing ARIA when treated with anti-amyloid monoclonal antibodies (mAbs). This makes it a valuable tool for stratifying patients and personalizing treatment plans to minimize the risk of adverse effects.

Background

Alzheimer's disease (AD) is the most common cause of dementia, affecting 6.7 million people in the US and is projected to grow to 13 million by 2050. CAA is characterized by the accumulation of amyloid-beta (Aβ) plaques in the brain's blood vessels, leading to neurodegenerative changes. It is present in nearly all AD patients, with severe manifestations in about one-third of cases. CAA is also a significant independent risk factor for dementia and the leading cause of cerebral hemorrhage in the elderly. Despite the prevalence of CAA in AD, there are currently no biofluid biomarkers that can reliably diagnose CAA or assess the risk of ARIA, a complication seen in patients undergoing treatment with anti-amyloid monoclonal antibodies (MABs), such as lecanemab. ARIA can be a serious side effect of these treatments potentially leading to severe symptoms or even death in some cases. Therefore, identifying patients at higher risk for ARIA is crucial for improving treatment outcomes. The Alzheimer's Disease Diagnostic market industry is projected to grow from USD 4.5 billion in 2023 to USD 8.8 billion by 2032, highlighting the significant commercial potential for innovations in this area.

Applications

Technology ID

WIS02-27

Category

Life Sciences/Diagnostics

Life Sciences/Therapeutics/Neurodeg

Diseases

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Learn more

- Identifying individuals at risk for CAA before significant brain damage occurs through screening
- Differentiating CAA from other forms of amyloid β deposition, such as the amyloid plaques
- Identifying high-risk patients for ARIA
- Facilitating the development of new therapies targeting CAA Acting as a predictor of disease progression in AD

Advantages

- The first and only biomarker for detecting and diagnosing specifically CAA
- Monitoring CAA and ARIA disease progression
- Providing insights into Alzheimer's disease progression
- Identifying CAA early allows for timely interventions, potentially preventing severe complications such as brain hemorrhages
- The biomarker can help selecting and matching appropriate patients for clinical trials, ensuring that participants are those most likely to benefit from the intervention
- The biomarker analysis will be conducted in the plasma and CSF

Intellectual Property

A provisional patent application has been filed.