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EARLY DETECTION OF ALZHEIMER'S DISEASE IN ACCESIBLE FLUIDS

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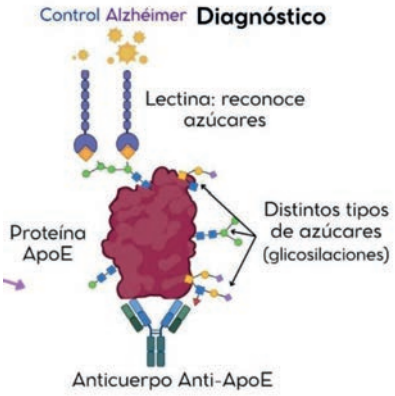
Executive Summary

Alzheimer's disease (AD) is a growing global health challenge, affecting millions and creating an urgent need for early, reliable, and accessible diagnostic tools. Current methods, such as cerebrospinal fluid (CSF) analysis or neuroimaging can be invasive, costly, and impractical for widespread screening. Apolipoprotein E (apoE) is a component of lipoprotein particles in plasma, as well as in cerebrospinal fluid (CSF) and interstitial fluid of the brain parenchyma in the central nervous system (CNS), playing a role in lipid transport, in addition to other functions. The apoE e4 allele has been identified as a very important risk factor for AD. However, no methods or kits for diagnosing AD based on alterations in the apoE protein have been described in the state of the art.

We have developed a biomarker method based on the detection of ApoE aggregates associated with the development of AD, using a specific molecule that recognizes the sugars present in ApoE. This biomarker can be detected in cerebrospinal fluid (CSF) and in accessible fluids, such as plasma or tears. This new asset aims to develop a non-invasive, cost-effective early diagnostic test using tear fluid, targeting the glycosylated protein apoE, which shows distinctive patterns in the early stages of AD and mild cognitive impairment (MCI). The expected outcome is a validated test ready for clinical demonstration and subsequent commercialization. This solution addresses the urgent need for early detection of Alzheimer's, providing a practical tool for clinicians, care facilities, pharmacies, and clinical trials, with potential impact at both national and international levels

Main innovation and advantages

The project's innovation lies in the use of accessible fluids combined with a glycosylation-based biomarker strategy. Unlike conventional AD diagnostics, this new method is non-invasive, low-cost, and patient-friendly, enabling repeated monitoring over time. The biomarker, glycosylated apoE, provides qualitative information based on sugar modifications, offering higher stability and reproducibility than traditional quantitative markers.



This glycosylation-based approach, widely used in cancer diagnostics, is largely unexplored in neurodegenerative diseases, making it a novel contribution to the field. Tear fluid, for instance, offers additional advantages, including minimal interference from other proteins and the absence of blood cells, reducing masking or degradation of the biomarker.

The test is designed to be simple, scalable, and suitable for diverse clinical settings, including primary care, specialized neurology units, long-term care facilities, and clinical trials. By combining scientific novelty, patient comfort, and practical applicability, this approach has the potential to become a widely adopted tool for early Alzheimer's detection, improving both diagnosis and patient monitoring.

Intellectual property

Patent title: "METHOD AND KIT FOR DIAGNOSING ALZHEIMER'S DISEASE BASED ON THE DETECTION OF APOLIPOPROTEIN E" (WO/2023/175225)
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For more information

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