Investigating plasma levels as a biomarker for Alzheimer's disease

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A Centre for Healthy Brain Ageing (CHeBA) paper published in *Current Alzheimer Research* presents the first detailed study of the relationship between plasma levels of two amyloid beta peptides (Aβ1-40 and Aβ1-42), brain volumetrics (measures studying the size of brain, which shrinks with Alzheimer's disease) and cognitive performance in an investigation of the usefulness of plasma levels as a biomarker for Alzheimer's disease (AD).

Lead author on the paper and head of CHeBA's Proteomics Group at the University of New South Wales, Dr Anne Poljak, said that since amyloid beta (Aβ) peptides are the main component of the amyloid plaques found in Alzheimer patients' brains, changes in levels of Aβ in blood plasma may provide a biomarker for detecting increased risk or early diagnosis of disease.

"While Aβ has traditionally been measured using cerebrospinal fluid, plasma presents a more accessible sample for routine collection and screening although results to date have been variable," Dr Poljak said.

The study examined age-matched cognitively normal controls (n=126), individuals with amnestic mild cognitive impairment (aMCI, n=89) from CHeBA's Sydney Memory & Ageing Study, as well as individuals with Alzheimer's disease (AD, n=39).

Plasma levels of the two peptides and the Aβ1-42/1-40 ratio were lower in aMCI and Alzheimer's disease than in cognitively normal controls,

and lower levels of Aβ1-42 were associated with lower global cognition and hippocampal volume and higher levels of white matter hyperintensities (which are believed to contribute to Alzheimer's disease). A genetic component was also identified, with associations between Aβ1-40 and cognitive and brain volume measures predominantly observed in individuals carrying the ε4 allele, while the opposite was observed in non-carriers. Longitudinal analysis revealed greater decline in global cognition and memory for the highest quintiles of Aβ1-42 and the ratio measure.

Director of CHeBA and co-author on the paper, Professor Perminder Sachdev, said he was encouraged by the findings.

"These findings certainly suggest that plasma Aβ measures may serve as biomarkers of Alzheimer's disease," he said.

More information: Anne Poljak et al. The Relationship Between Plasma Aβ Levels, Cognitive Function and Brain Volumetrics: Sydney Memory and Ageing Study, *Current Alzheimer Research* (2016). DOI: 10.2174/1567205013666151218150202

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