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Plasma tau as a window to the brain-negative associations with brain volume and memory function in mild cognitive impairment and early alzheimer's disease.

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Neurofibrillary tangles are associated with cognitive dysfunction, and hippocampal atrophy with increased CSF tau markers. However, the plasma tau levels of Alzheimer's disease (AD) have not been well studied. We investigated plasma tau by using an immunomagnetic reduction assay in 20 patients with mild cognitive impairment (MCI) due to AD, 10 early AD dementia, and 30 healthy elders (HE). All received a 3D-brain MRI scan and a set of cognitive function test. We explored their relationships with both brain structure and cognitive functions. Images were analyzed to determine the brain volumes and gray matter densities. Patients with MCI or early AD had significantly increased plasma tau levels compared with HE. Plasma tau levels were negatively associated with the performance of logical memory, visual reproduction, and verbal fluency; also negatively associated with volume of total gray matter, hippocampus, amygdala; and gray matter densities of various regions. Regression analyses indicated that logical memory explained 0.394 and hippocampus volume predicted .608 of the variance of plasma tau levels, both $P < 0.001$. Education years were negatively associated with the gray matter densities of the supramarginal ($r = -0.407$), middle temporal gyrus ($r = -0.40$) and precuneus ($r = -0.377$; all $P < 0.05$) in HE; and negatively associated with plasma tau levels in patients ($r = -0.626$). We propose that plasma tau may serve as a window to both structure and function of the brain. Higher education is a protective factor against AD and is associated with lower plasma tau levels in patients. Hum Brain Mapp, 2013. © 2013 Wiley Periodicals, Inc.

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