

Early warning: Key Alzheimer's brain changes observed in unimpaired older humans

July 29 2009

New research has uncovered an early disruption in the process of memory formation in older humans who exhibit some early brain changes associated with Alzheimer's disease (AD) but show little or no memory impairment. The work, published by Cell Press in the July 30th issue of the journal *Neuron*, sheds light on the role of amyloid protein in memory impairment and may lead to development of strategies for predicting and treating cognitive decline in individuals who are at-risk for AD.

Amyloid β -protein plays a major pathogenic role in AD, a devastating [neurodegenerative disorder](#) characterized by progressive cognitive impairment and [memory](#) loss. In fact, one of the primary characteristics of AD is the accumulation and deposition of neuron-damaging clumps of amyloid protein. Previous studies have led to the suggestion that amyloid deposition begins many years prior to the onset of clinical symptoms. However, the exact link between amyloid deposition and memory impairment has not been clearly demonstrated in humans.

"Two recent advances in neuroimaging now allow us to explore the early, asymptomatic phase of AD, the ability to measure amyloid distribution in living humans and the identification of sensitive markers of brain dysfunction in AD," explains lead study author, Dr. Reisa Sperling from the Center for Alzheimer's Research and Treatment at Brigham and Women's Hospital in Boston. In addition to amyloid accumulation, AD

has been associated with functional alterations in a specific network of brain regions that are intimately linked with [memory formation](#).

Dr. Sperling and colleagues combined amyloid imaging with an associative memory functional brain imaging paradigm to study older humans who did not exhibit significant [memory impairment](#).

Importantly, the researchers found that a significant number of nondemented older individuals exhibited amyloid deposition and abnormal [neural activity](#) in key areas of the brain network thought to be involved in successful memory function. These results demonstrate for the first time that amyloid pathology in asymptomatic older humans is linked with aberrant neural responses during the process of memory formation.

"Longitudinal studies are certainly needed, but our findings are consistent with the premise that cognitively intact older individuals with amyloid pathology may already be in the early stages of AD," explains Dr. Sperling. "The combination of molecular and functional imaging techniques may prove useful in monitoring disease progression prior to significant clinical symptoms, as well as the response to amyloid-modifying therapeutic agents in subjects at-risk for developing AD."

Source: Cell Press ([news](#) : [web](#))

Citation: Early warning: Key Alzheimer's brain changes observed in unimpaired older humans (2009, July 29) retrieved 26 April 2024 from <https://medicalxpress.com/news/2009-07-early-key-alzheimer-brain-unimpaired.html>

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