New findings reveal loss of smell function may predict early onset of Alzheimer's disease

January 12 2010

A study published in the January 13, 2010 issue of the *Journal of Neuroscience* links a loss of smell function in Alzheimer's disease (AD) model animals with amyloid ß (protein) accumulation in the brain, a distinguishing hallmark of Alzheimer's disease. Research conducted by NYU Langone Medical Center suggests that olfactory dysfunction, a common symptom of AD, may serve as an early diagnostic tool for the disease.

The formation of [amyloid plaques](#) and neurofibrillary tangles are believed to contribute to the degradation of the neurons in the brain and the subsequent symptoms of AD. In this newly published study, NYU Langone scientists used genetically engineered mice, which developed amyloids in their brains, reflecting a progressive Alzheimer's disease pathology similar to humans. They found that [Alzheimer's disease](#) amyloid pathology occurs first in a region of the mouse brain responsible for smelling—which is directly above their noses. This pathology also coincided with the animals having abnormal abilities to smell. The mice with a high concentration of amyloid in their brains had to sniff odors longer to "learn" them than mice with less amyloid. They also had problems differentiating between odors.

As the article in the [Journal of Neuroscience](#) suggests, since the behavioral symptoms of AD often occur early in life, it is possible that this new olfactory method, looking at olfactory perception across

multiple presentations of the same odor, may be advantageous in early detection of Alzheimer's -- prior to substantial degeneration of the brain.

"What was striking in our study, was that performance of the mouse in the olfactory behavior test was sensitive to even the smallest amount of amyloid presence in the brain as early as three months of age (equivalent to a young adult). This is a revealing finding because unlike a brain scan, a laboratory-designed olfactory test may be an inexpensive alternative to early diagnosis of Alzheimer's," noted co-author of the project, Daniel W. Wesson, PhD, of the NYU School of Medicine and the Nathan S. Kline Institute for Psychiatric Research in Orangeburg, New York. Presently, much scientific interest exists in establishing methods to diagnose Alzheimer's prior to the irreversible deterioration of the brain characteristic of the disease.

"These novel results provide a two-fold benefit, not only in confirming that olfactory problems may serve as an early indicator of Alzheimer's, but that further validation in humans could facilitate testing of new therapies for the disease," remarked study co-author Ralph A. Nixon, MD, PhD, Director of the Center of Excellence on Brain Aging at NYU Langone Medical Center and professor in the Departments of Psychiatry and Cell Biology.

Provided by New York University School of Medicine

Citation: New findings reveal loss of smell function may predict early onset of Alzheimer's disease (2010, January 12) retrieved 9 April 2024 from https://medicalxpress.com/news/2010-01-reveal-loss-function-early-onset.html