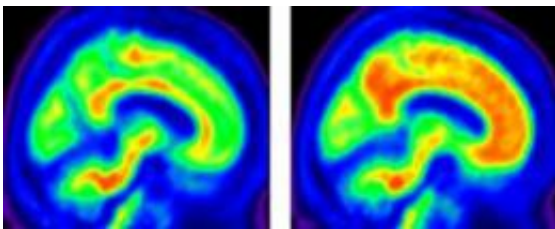


Study of Alzheimer's-related protein in healthy adults may shed light on earliest signs of disease

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These are positron emission tomography scans of the brains of healthy adults showing low (left) and high (right) levels of beta-amyloid protein. Credit: Image courtesy of the Center for Vital Longevity, The University of Texas at Dallas

Researchers from the Center for Vital Longevity at the University of Texas at Dallas and UT Southwestern Medical Center have completed a large-scale neuroimaging study of healthy adults from age 30 to 90 that measured beta-amyloid protein—a substance whose toxic buildup in the brain is a diagnostic marker for Alzheimer's disease.

The findings, published in the February 1, 2012 online issue of *Neurology*, the medical journal of the American Academy of Neurology, mark a crucial step toward being able to predict who may be at risk for developing Alzheimer's disease long before symptoms appear.

Relatively few studies have looked at levels of beta-amyloid in healthy

living adults, as until recently, beta-amyloid levels could only be measured at autopsy. Few, if any, studies have looked at beta-amyloid levels in middle-aged and younger adults. Many investigators now believe that the beginning stages of Alzheimer's disease can precede symptoms of dementia by a decade or more, so data on middle-aged adults is critically important to understanding the transition from a healthy brain to a diseased brain.

In the new study, researchers measured levels of beta-amyloid protein in the brains of 137 cognitively healthy adults between the ages of 30 and 89 using an amyloid imaging agent. The researchers found that beta-amyloid levels increased with age across the entire age span and that about 20% of adults aged 60 and older had particularly high levels of beta-amyloid.

"We found that this high-amyloid group showed deficits in cognitive performance even though the individuals were well educated and scored normally on our standard tests of cognition," said Dr. Karen Rodrigue, a postdoctoral fellow at the Center for Vital Longevity and lead author of the study. On tests of processing speed, working memory, and reasoning ability—three major aspects of cognition—higher levels of beta-amyloid correlated with lower test scores.

That beta-amyloid burden has detectable effects on cognitive function even in adults with apparently good cognitive health underscores the need to better understand the recently proposed preclinical phase of Alzheimer's disease, which suggests that beta-amyloid deposits in healthy adults do not exert a strong effect on cognition for some time.

"Our findings suggest that subtle effects on cognition occur early," said principal investigator Dr. Denise Park, co-director of the Center for Vital Longevity and Distinguished University Chair in the School of Behavioral and Brain Sciences at UT Dallas. "These are important

findings because imaging patients when they first show signs of very mild cognitive impairment could be essential to determining their risk of future disease."

Long-term follow-up studies led by Dr. Park as part of the Dallas Lifespan Brain Study, one of the nation's largest projects examining neural and cognitive aging across the entire adult lifespan, are already underway to help researchers determine whether high beta-amyloid burden in healthy people necessarily predetermines occurrence of Alzheimer's disease later in life.

"Knowing this information will help us determine at what stage potential interventions, once available, may be most critical and most effective," said Park. Many researchers believe that interventions to slow or halt the progression of Alzheimer's will be most effective during middle age, before irreparable damage to the brain is done. "Just as many adults take aspirin to lower their risk of heart disease or stroke, one day we may be able to help protect our brains and cognitive health by starting a treatment in our 40s or 50s," Park said.

Another of the study's interesting findings was that some people well into their 60s, 70s, and even 80s, had beta-amyloid levels as low or lower than people at middle age or younger.

"Another avenue of our future work will be to investigate what factors enable these individuals to maintain cognitive health well into old age, whether they be genetic factors, lifestyle factors, or environmental issues," said Park.

"Understanding how the brain and mind stay healthy and vital over the long term will help guide our efforts to delay or even prevent the devastation caused by diseases like Alzheimer's."

Provided by University of Texas at Dallas

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