

Blood test predicts cognitive decline

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(PhysOrg.com) -- Low blood levels of beta-amyloid 42, a protein-like substance, were associated with the risk of significant cognitive decline within nine years in a group of elders, in a study led by Kristine Yaffe, MD, chief of geriatric psychiatry at the San Francisco VA Medical Center.

Beta-amyloid 42 has long been known to collect in the [brain](#) of patients with Alzheimer's disease.

The study also showed that, among the elders with low beta-amyloid 42, cognitive decline was less pronounced in those who had higher literacy, or more education, or who lacked the APOE e4 gene known to be associated with a greater risk of dementia. The researchers describe this set of conditions as “cognitive reserve.”

The study appears in the January 19, 2011 issue of the *Journal of the American Medical Association*.

“We show that a blood test for beta-amyloid 42 might be a good way to predict those at risk for cognitive decline,” said Yaffe. “Also, for the first time, we show that cognitive reserve – a general level of resiliency in the brain – might modify that risk in the elderly.”

Yaffe, who is also associate chair for clinical and translational research in psychiatry and professor of psychiatry, neurology, and epidemiology and biostatistics at University of California, San Francisco, described the findings as “potentially of great importance for clinical care of

Alzheimer's disease and dementia.”

Currently, she said, “there is no reliable method of predicting ahead of time who will experience cognitive decline and go on to develop dementia. A blood test would be a huge step forward.”

Yaffe noted that an experimental test for beta-amyloid in cerebral [spinal fluid](#) already exists, “but a [blood test](#) would be far easier, less invasive, and less expensive than the lumbar puncture required to obtain spinal fluid.” Low levels of beta-amyloid 42 in blood and spinal fluid, she said, indicate high levels in the brain, “which acts as a sink for beta amyloid in Alzheimer's disease.”

Almost as potentially significant was the finding that “we might actually be able to modify the risk of dementia before it becomes manifest,” Yaffe said. “If you find out that you have low beta-amyloid 42, but you haven't yet experienced any obvious cognitive decline, you might try and increase your cognitive reserve by staying mentally active – reading, taking classes – and thereby mitigate or at least delay the damage.”

Yaffe and her research team studied 997 community-dwelling older adults from Memphis, Tennessee and Pittsburgh, Pennsylvania who were enrolled in the Health ABC Study, a prospective observational study sponsored by the National Institute on Aging and coordinated by the San Francisco Coordinating Center at UCSF. The subjects' average age at the start of the study was 74.

The elders were first assessed in 1997-98 and followed for nine years. Their cognitive abilities were measured at the beginning and end of the study with a standard neurocognitive test. In 2010, the subjects' blood, which had been drawn at the beginning of the study and then frozen, was tested for beta-amyloid 42 as well as for the ratio of beta-amyloid 42 to beta-amyloid 40, a less toxic form of the substance.

Low beta-amyloid 42 and low ratio of 42 to 40 at the outset of the study were associated with greater cognitive decline over the next nine years, even after the researchers adjusted for age, race, and other confounding factors.

The association continued to hold after the 72 participants who developed full-blown dementia over the course of the study were excluded from the analysis. “This way, we knew the numbers would not be weighted by the subjects with dementia, and we would simply be looking at gradual cognitive decline,” explained Yaffe.

However, within the group of subjects with low beta-amyloid 42, the association with cognitive decline was less pronounced among those with at least a high school education, a literacy level higher than sixth grade, or no APOE e4 gene.

“This is in line with evidence from other research that if you have high education, high literacy, or other compensatory factors, your brain is more resilient to certain insults, whether they be vascular or Alzheimer’s,” Yaffe said.

Yaffe suggested that the next step for researchers would be to “look at people at risk for cognitive problems and see if a trial of mental training” would be helpful in reducing risk of [cognitive decline](#). “Can you increase cognitive reserve?” asked Yaffe. “We think so. It’s been shown that the brain can keep changing and growing and learning well into advanced old age. And we think you can do that with mental activities.”

Provided by University of California, San Francisco

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