

'Super' aged brains reveal first secrets of sharp memory in old age

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Maybe you have an 85-year-old grandfather who still whips through the newspaper crossword puzzle every morning or a 94-year-old aunt who never forgets a name or a face. They don't seem to suffer the ravages of memory that beset most people as they age.

Researchers at Northwestern University's Feinberg School of Medicine wondered if the brains of the elderly with still laser sharp memory -- called "super aged" -- were somehow different than everyone else's. So, instead of the usual approach in which scientists explore what goes wrong in a brain when older people lose their memory, they investigated what goes right in an aging brain that stays nimble.

Now they have a preliminary answer. Scientists examined the brains of five deceased people considered super aged because of their high performance on memory tests when they were more than 80 years old and compared them to the brains of elderly, non-demented individuals. Researchers found the super aged brains had many fewer fiber-like tangles than the brains of those who had aged normally. The tangles consist of a protein called tau that accumulates inside brain cells and is thought to eventually kill the cells. Tangles are found in moderate numbers in the brains of elderly and increase substantially in the brains of Alzheimer's disease patients.

"This new finding in super aged brains is very exciting," said Changiz Geula, principal investigator of the study and a research professor of neurology at the Cognitive Neurology and Alzheimer's Disease Center at

Northwestern's Feinberg School. "It was always assumed that the accumulation of these tangles is a progressive phenomenon through the aging process. But we are seeing that some individuals are immune to tangle formation and that the presence of these tangles seems to influence cognitive performance." Individuals who have few tangles perform at superior levels, while those who have more tangles appear to be normal for their age, Geula noted.

Geula will present his findings Sunday, November 16, at the Society for Neuroscience annual meeting in Washington, D.C.

The number of plaques in the brains of the super aged was similar to that in the brains of the normally aging group. The plaque is an aggregation of protein called amyloid that becomes deposited outside the brain cell and disrupts communication between neurons. Like tangles, plaques also are found in modest numbers in the brains of aged individuals and show a dramatic increase in number in Alzheimer's disease.

Geula said the lower number of tangles in the super aged appears to be the critical difference in maintaining memory skills.

Some of the super aged in the study performed memory tasks at the level of people who were about 50 years old. For example, after being told a story, they were able to remember it immediately after and still accurately recall its details 30 minutes later. They also remembered a list of 15 words and recalled these words equally well when tested after 30 minutes.

Geula said new research will focus on what makes cells in super aged brains more resistant to tangle formation. "We want to see what protects the brains of these individuals against the ravages that cause memory loss," he said. "Understanding the specific genetic and molecular characteristics of the brains that makes them resistant, someday may

lead to the ability to protect average brains from memory loss. "

Geula's research is part of a larger super aging study at Northwestern's Cognitive Neurology and Alzheimer's Disease Center (CNADC). The study's goal is to identify high functioning individuals over 80 and investigate what factors are important to maintain this ability into old age. A number of super aged individuals have been identified and are being followed up annually with tests of cognitive abilities. Recruitment continues for the study.

Source: Northwestern University

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