# Study finds why women with Alzheimer's disease experience faster memory decline

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L-R: LKCMedicine Research Fellow Dr Jessica Ruth Gaunt; LKCMedicine Asst Prof Ch'ng Toh Hean, Nanyang Assistant Professor; Associate Professor Sajikumar Sreedharan, Department of Physiology, NUS Yong Loo Lin School of Medicine; and LKCMedicine Senior Research Fellow Dr Sheeja Navakkode. Credit: Nanyang Technological University

Alzheimer's disease is the world's most common neurodegenerative disease, affecting the memory, thinking and behavior of over 40 million people worldwide. It accounts for 60 to 70 percent of dementia cases and is known to affect more women than men.

A joint study by NTU Singapore and National University of Singapore (NUS) scientists sought to examine why women develop Alzheimer's-related symptoms earlier and exhibit a faster decline in memory compared to men.

By experimenting on mice brain samples, the research team found that as female mice age, they experienced a faster decay in their information processing ability compared to male mice, resulting in weaker memory formation and increased memory loss.

The study, led by Assistant Professor Ch'ng Toh Hean from NTU's Lee Kong Chian School of Medicine and Associate Professor Sajikumar Sreedharan from the NUS Yong Loo Lin School of Medicine's Department of Physiology, showed that the brains of female mice with the Alzheimer's genetic mutation were less flexible, or "plastic," in adapting to new information and forming new memories.

This lowered plasticity of the brain's synapses—the connections between brain cells, or neurons—likely contributes to greater cognitive impairment and increased vulnerability to Alzheimer's disease in females, say the scientists.

The team's lab experiments revealed that female mice with mutations associated with Alzheimer's disease had a faster decline in long-term potentiation (LTP) compared to the mutant male mice. LTP is the process by which synaptic strength is increased between neurons that form long-term memories, making it one of the major cellular mechanisms guiding how the brain forms memories and learns new things.

The rapid decay in LTP shown in mice experiments correlates to a corrupted and weakened memory, much like what happens in an Alzheimer's patient.

The research was published in *Aging Cell*.

**More information:** Sheeja Navakkode et al, Sex?specific accelerated decay in time/activity?dependent plasticity and associative memory in an animal model of Alzheimer's disease, *Aging Cell* (2021). DOI: 10.1111/acel.13502

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