Reduction of excess brain activity improves memory in amnestic mild cognitive impairment

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Research published in the May 10 issue of the journal *Neuron*, describes a potential new therapeutic approach for improving memory and modifying disease progression in patients with amnestic mild cognitive impairment. The study finds that excess brain activity may be doing more harm than good in some conditions that cause mild cognitive decline and memory impairment.

Elevated activity in specific parts of the hippocampus, a brain region involved in memory, is often seen in disorders associated with an increased risk for Alzheimer's disease. Amnestic mild cognitive impairment (aMCI), where memory is worse than would be expected for a person's age, is one such disorder. "In the case of early aMCI, it has been suggested that the increased hippocampal activation may serve a beneficial function by recruiting additional neural resources to compensate for those that are lost," explains senior study author, Dr. Michela Gallagher, from Johns Hopkins University. "However, animal studies have raised the alternative view that this excess activation may be contributing to memory impairment."

Dr. Gallagher and colleagues tested how a reduction of hippocampal activity would impact human patients with aMCI. The researchers used a low dose of a drug used clinically to treat epilepsy, for the purpose of reducing hippocampal activity in subjects with aMCI to levels that were similar to activity levels in healthy, age-matched subjects in a control

group. The researchers found that treatment with the drug improved performance on a memory task. These findings point to the therapeutic potential of reducing excess activation in the hippocampus in aMCI.

The results also have broader significance as elevated activity in the hippocampus is also observed in other conditions that are thought to precede Alzheimer's disease, and may be one of the underlying mechanisms of neurodegeneration. "Apart from a direct role in memory impairment, there is concern that elevated activity in vulnerable neural networks could be causing additional damage and, possibly, widespread disease-related degeneration that underlies cognitive decline and the conversion to Alzheimer's disease," concludes Dr. Gallagher. "Therefore, reducing the elevated activity in the hippocampus may help to restore memory and protect the brain."

More information: Bakker et al.: "Reduction of hippocampal hyperactivity improves cognition in amnestic mild cognitive impairment.", DOI:10.1016/j.neuron.2012.03.023

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