

# Preserving memory with age

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If you lived longer, would you still remember everything? It depends. Two methods of extending life span have very different effects on memory performance and decline with age, researchers at Princeton University have shown in a study publishing next week in the online, open-access journal *PLoS Biology*.

While the nematode *C. elegans* is already well known for its utility in longevity research, previously it was not known how the memory of *C. elegans* compares with that of other animals, or whether longevity treatments could improve [learning](#) and memory. To answer these questions, Amanda Kauffman and colleagues, of Coleen Murphy's lab at Princeton, designed new tests of learning and memory in *C. elegans*, then used these tests to identify the necessary components of learning, short-term memory, and long-term memory. They found that the molecules required for learning and memory appear to be conserved from *C. elegans* to mammals, suggesting that the basic mechanisms underlying learning and memory are ancient.

The authors also determined how each of the behaviors declines with [age](#), and tested the effects of two known regulators of longevity -- [dietary restriction](#) and reduced Insulin/IGF-1 signaling -- on these declines. Surprisingly, very different effects on memory were achieved with the two longevity treatments: dietary restriction impaired memory in early adulthood but maintained memory with age, while reduced Insulin/IGF-1 signaling improved early adult [memory performance](#) but failed to preserve it with age. These results suggest not only that longevity treatments could help preserve cognitive function with age, but

also that different longevity treatments might have very different effects on such declines.

"Since one of the most devastating age-related declines is the loss of memory, it is exciting that we now can use *C. elegans* as a model to understand not only longevity but also memory function," says Murphy. "We hope to use the system now to identify new drugs and treatments for age-related cognitive decline. Maybe targeting more than one longevity pathway would be the right approach."

**More information:** Kauffman AL, Ashraf JM, Corces-Zimmerman MR, Landis JN, Murphy CT (2010) Insulin Signaling and Dietary Restriction Differentially Influence the Decline of Learning and Memory with Age. PLoS Biol 8(5): e1000372.  
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