

A molecular warning sign of dementia?

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A study of mice entering their twilight years has identified specific changes in the brain that impair these elderly mice during learning—and researchers say that their findings might benefit people struggling with age-related memory impairment in the future.

This discovery could be particularly important since this kind of age-related impairment is becoming more common as the average human life span increases.

Shahaf Peleg and colleagues first subjected groups of three-, eight-, and 16-month-old [mice](#) to various learning tasks in order to determine when age-related [cognitive impairment](#) begins to set in. After identifying the 16-month-old mice as the slowest learners, the researchers studied [gene expression](#) in their brains and found that these older mice showed changes in the modification of proteins packaging the genome, specifically altered histone H4K12 acetylation.

Peleg and colleagues then explored just how this failed H4K12 acetylation affected the expression of genes in the older mice.

They discovered that the 16-month-old mice were severely impaired in regulating the genetic expression associated with learning and memory, and that these mice were unable to utilize the same key signaling pathways that the younger mice relied upon. However, 16-month-old mice were able to learn and store memories once again, just like the younger mice, when H4K12 acetylation was reinstated and the associated learning [genes](#) were expressed.

This discovery suggests that, over time, changes in the way our genomes are expressed can lead to impaired [learning](#) when we're older—and that the sudden deregulation of H4K12 acetylation could be considered an early warning sign of this cognitive decline.

More information: -- "Altered Histone Acetylation Is Associated with Age-Dependent Memory Impairment in Mice," by S. Peleg; et al. *Science* 7 May 2010: Vol. 328. no. 5979, pp. 753 - 756. DOI: 10.1126/science.1186088. [www.sciencemag.org/cgi/content ... bstract/328/5979/753](http://www.sciencemag.org/cgi/content...bstract/328/5979/753)

-- "Epigenetics and Cognitive Aging," by J.D. Sweatt at University of Alabama at Birmingham in Birmingham, AL.
[www.sciencemag.org/cgi/content ... ary/sci:328/5979/701](http://www.sciencemag.org/cgi/content...ary/sci:328/5979/701)

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