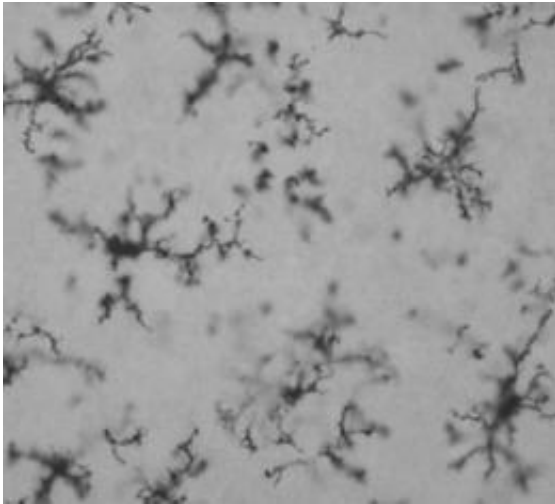


## A little exercise may protect the aging brain from memory loss following infection

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Microglia -- the immune defense cells of the brain shown here -- become more reactive to infection during aging. Researchers found a small amount of exercise protected older rats from memory loss following infection and prevented the exaggerated response of microglia in the brain's learning and memory center. Credit: Reprinted with permission: Milligan, et al., *The Journal of Neuroscience* 2001, 21(8):2808-19.

A small amount of exercise shields older animals from memory loss following a bacterial infection, according to a study in the August 10 issue of *The Journal of Neuroscience*. The findings suggest moderate exercise may lead to several changes in the brain that boost its ability to protect itself during aging — a period of increased vulnerability.

In the new study, researchers led by Ruth Barrientos, PhD, of the University of Colorado at Boulder, found running on an exercise wheel protected older rats from [memory loss](#) following an *Escherichia coli* (*E. coli*) [infection](#). Wheel-running also blunted changes in the hippocampus — an area of the brain involved in learning and memory — that typically follow [bacterial infection](#) in aging animals. In humans, older adults are more likely than the young to suffer memory impairment following severe bacterial infection or injury.

"This is the first study to show that exercise reduces susceptibility to the cognitive impairments that follow infection in aging animals, and the changes taking place in the brain thought to underlie these impairments," Barrientos said.

Bacterial infections kick off a cascade of events that signal the brain that something is wrong. Barrientos and colleagues previously found older rats experienced memory loss following *E. coli* infection, an outcome not seen in young adult rats. They also found the microglia — immune defense cells in the [brain](#) — of older animals became more reactive to infection, releasing more chemicals involved in inflammation in the hippocampus, in contrast with younger animals.

In the current study, the researchers allowed unlimited access to a running wheel to determine if exercise could help block the events that follow *E. coli* infection in the aging [animals](#). Although the old rats only ran an average of 0.43 miles per week (50 times less distance than the young rats), they performed better on a memory test than rats who only had access to a locked exercise wheel. Additionally, the runners performed as well on the memory test as rats that were not exposed to *E. coli*. The small amount of exercise performed by the aging rats also prevented the reactive response of microglia in the hippocampus.

"While many of us are hopeful about developing a pharmaceutical

intervention to reverse the effects of aging, this study provides exciting evidence that a little [moderate exercise](#) is protective against age-related problems with health and immunity," said Jonathan Godbout, PhD, an expert on aging at Ohio State University, who was unaffiliated with the study.

**More information:** [www.jneurosci.org/](http://www.jneurosci.org/)

Provided by Society for Neuroscience

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