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Exercise and mental stimulation bothboost mouse memory late in life

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Physical exercise is known to be good for the aging brain, but what about mental stimulation" Does enrichment that helps older people work well for the young and middle aged, or do they need something else" A report in the August issue of *Behavioral Neuroscience* tells how, in an animal experiment, older adults appear to benefit from either or both mental and physical enrichment. For the young and middle-aged, exercise is key.

Behavioral Neuroscience is published by the American Psychological Association (APA).

At Yale University, neuroscientists randomly assigned 160 female mice who were young, middle-aged and old adults (about 3, 15, or 21 months old) to either an experimental (treatment) condition or a control group. Treatment conditions included cages where mice could exercise on running wheels, cages where they could play with toys, or cages with both for complex enrichment. The control mice cages were unadorned. All groups lived with their conditions around the clock for four weeks prior to the start of memory testing and then during testing.

After the initial four weeks of treatment, researchers tested the animals' ability to navigate a spatial water maze, a common test of learning and memory. Spatial memory is supported in part by the hippocampus, a brain region among the first to be affected both by normal aging and Alzheimer's disease. Thus, spatial memory is a good indicator of hippocampal health in both mice and humans.

For all of the experimental mice, spatial memory worsened with age. However, the various treatments differently affected the different age groups:

Exercise alone significantly improved the spatial memory of the young.

Both exercise alone and complex enrichment, but not cognitive stimulation alone, significantly improved memory among the middle aged.

For old mice, all enrichments (alone or combined) significantly improved performance.

The results suggest that as we get old and maybe less able to exercise, cognitive stimulation can help to compensate. If the trend holds, write the authors, “These data may suggest that enrichment initiated at any age can significantly improve memory function. And exercise plus mental challenge in middle age – when many people start to notice subtle memory changes – may offer the strongest, most widespread benefits for memory function.

The authors note that exercise was central to memory reinforcement in all age groups. Says lead author Karyn Frick, PhD, “It is important for people of all ages to do 20 to 30 minutes of aerobic exercise several times a week. Keeping a healthy and active brain may prevent memory decline in old age, but only a longitudinal study that follows mice over time could confirm this possibility.”

Source: American Psychological Association

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