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Brief exercise immediately enhances memory, researchers find

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(Medical Xpress)—A short burst of moderate exercise enhances the consolidation of memories in both healthy older adults and those with mild cognitive impairment, scientists with UC Irvine's Center for the Neurobiology of Learning & Memory have discovered.

Most research has focused on the benefits of a long-term exercise program on overall health and cognitive function with age. But the UC Irvine work is the first to examine the immediate effects of a brief bout of exercise on memory.

In their study, postdoctoral scholar Sabrina Segal and neurobiologists Carl Cotman and Lawrence Cahill had people 50 to 85 years old with and without memory deficits view pleasant images—such as photos of nature and animals—and then exercise on a stationary bicycle for six minutes at 70 percent of their maximum capacity immediately afterward.

One hour later, the participants were given a surprise recall test on the previously viewed images. Results showed a striking enhancement of memory by exercise in both the healthy and cognitively impaired adults, compared with subjects who did not ride the bike.

"We found that a single, short instance of moderately intense exercise particularly improved memory in individuals with memory deficits," Segal said. "Because of its implications and the need to better understand the mechanism by which exercise may enhance memory, we're following

up this study with an investigation of potential underlying biological factors."

She believes the improved memory may be related to the exercise-induced release of norepinephrine, a chemical messenger in the brain known to play a strong role in memory modulation. This hypothesis is based on previous work demonstrating that increasing norepinephrine through pharmacological manipulation sharpens memory and that blocking norepinephrine impairs memory.

In the more recent research, Segal and her colleagues discovered that levels of salivary alpha amylase, a biomarker that reflects norepinephrine activity in the brain, significantly increased in participants after exercise. This correlation was especially strong in people with memory impairment.

"The current findings offer a natural and relatively safe alternative to pharmacological interventions for memory enhancement in healthy older individuals as well as those who suffer from cognitive deficits," Segal noted. "With a growing population of the aged, the need for improvement of quality of life and prevention of mental decline is more important than ever before."

Study results appear in the November issue (Volume 32, Number 4) of the *Journal of Alzheimer's Disease*.

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