

Study finds aerobic exercise improves memory, brain function and physical fitness

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A new study conducted by researchers at the Center for BrainHealth at The University of Texas at Dallas published online in the open-access journal *Frontiers in Aging Neuroscience* found that engaging in a physical exercise regimen helps healthy aging adults improve their memory, brain health and physical fitness. This finding is significant considering that among adults 50 and older, "staying mentally sharp" outranks social security and physical health as the top priority and concern in the United States.

"Science has shown that aging decreases mental efficiency and memory decline is the number one cognitive complaint of older adults," said Sandra Bond Chapman, Ph.D., founder and chief director of the Center for BrainHealth, Dee Wylie Distinguished University Chair and lead author of the paper. "This research shows the tremendous benefit of aerobic exercise on a person's memory and demonstrates that aerobic exercise can reduce both the biological and cognitive consequences of aging."

For the study, sedentary adults ages 57-75 were randomized into a physical training or a wait-list control group. The physical training group participated in supervised aerobic exercise on a stationary bike or treadmill for one hour, three times a week for 12 weeks. Participants' cognition, resting [cerebral blood flow](#), and cardiovascular fitness were assessed at three time points: before beginning the [physical exercise](#) regimen, mid-way through at 6 weeks, and post-training at 12 weeks.

"By measuring [brain blood flow](#) non-invasively using arterial spin labeling (ASL) MRI, we can now begin to detect [brain](#) changes much earlier than before," said Sina Aslan, Ph.D., founder and president of Advance MRI and collaborator on the study. "One key region where we saw increase in brain [blood flow](#) was the anterior cingulate, indicating higher neuronal activity and metabolic rate. The anterior cingulate has been linked to

superior cognition in late life."

Exercisers who improved their memory performance also showed greater increase in brain blood flow to the hippocampus, the key brain region affected by Alzheimer's disease. Chapman pointed out that, using noninvasive brain imaging techniques, brain changes were identified earlier than memory improvements, implicating brain blood flow as a promising and sensitive metric of brain health gains across treatment regimens.

"Physical exercise may be one of the most beneficial and cost-effective therapies widely available to everyone to elevate memory performance," says Dr. Chapman. "These findings should motivate adults of all ages to start exercising aerobically."

Chapman cautioned that while physical exercise is associated with a selective or regional brain blood flow, it did not produce a change in global brain blood flow.

"In another recent study, we have shown that complex mental training increases whole brain blood flow as well as regional brain blood flow across key brain networks," Chapman said. "The combination of physical and mental [exercise](#) may be the best health measures to improve overall cognitive [brain health](#). We have just begun to test the upper boundaries of how we can enhance our brain's performance into late life. To think we can alter and improve the basic structure of the mature brain through [aerobic exercise](#) and complex thinking should inspire us to challenge our thinking and get moving at any age."

More information: Shorter term aerobic exercise improves brain, cognition and cardiovascular fitness in aging, *Frontiers in Aging Neuroscience*, [DOI: 10.3389/fnagi.2013.00075](https://doi.org/10.3389/fnagi.2013.00075)

Provided by Center for BrainHealth

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