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AEROBIC EXERCISE MAY REVERSE AGING EFFECTS ON THE BRAIN

Barcelona, Spain, November 6, 2015. Aerobic exercise appears to improve brain function and reduce markers of neurodegeneration in older adults at risk of developing Alzheimer's disease (AD), according to research being presented at the 8th International Conference on Clinical Trials for Alzheimer's Disease (CTAD). Laura Baker, Ph.D., principal investigator of the study and a cognitive neuroscientist at Wake Forest Baptist Medical Center said these results suggest that aerobic exercise may represent a promising disease-modifying therapeutic intervention for people in the earliest stages of AD.

The study assessed levels of two proteins in the cerebrospinal fluid (CSF) – beta amyloid and tau. Previous studies have shown that in the presence of a neurodegenerative process such as AD, CSF levels of tau increase, while levels of beta amyloid decline as the amyloid protein is deposited as plaques in the brain. But aerobic exercise seems to reverse this trend, particularly in people who are older and start with higher levels of cognitive impairment. “We don’t know yet if we are reversing the process, protecting the brain, or just buying some time,” said Baker.

To test the effects of aerobic exercise on the brain, Baker and colleagues enrolled adults between the ages of 55 and 89 with mild cognitive impairment (MCI) and prediabetes. Participants were assigned randomly to take part in a structured exercise program involving either moderate-to-high intensity aerobics or stretching for 45-60 minutes, four times per week, for six months, under the supervision of a trainer. CSF and blood were collected from participants at the beginning of the study and after completion of the exercise program. At both time points, participants also completed assessments of cognition, how long it took to walk 400 meters, body fat and glucose tolerance. Forty participants also underwent magnetic resonance imaging (MRI) scans.

Participants in the aerobic exercise group showed, in addition to higher cognitive scores, faster walk times, and improved glucose tolerance. Aerobic exercise also had beneficial effects on tau and beta amyloid levels in the CSF and led to significant increases in blood flow to certain areas of the brain, not when participants were exercising, but when they were at rest. “Resting blood flow was increased in those areas of brain where blood flow is typically decreased with aging and with the onset and progression of MCI due to Alzheimer's disease,” said Baker. The brain imaging group at Wake Forest is now analyzing these data further to learn more about how brain cells change their communication patterns in response to exercise. “The question we are going to ask next is whether the increased blood flow reflects improved health of the vessels in specific regions of the brain, or increased volume of blood to these regions.”

The next phase of the study will extend the exercise program to 18 months and will be conducted, under the auspices of the Alzheimer's Disease Cooperative Study (ADCS), at 14 sites around the country. For the first 12 months, participants will be supervised by a trainer at their local YMCA; followed by a six-month unsupervised period designed to test the sustainability of the intervention.

Baker said she is hopeful that the results of the study will help motivate people to think about exercise in a different way. “We all know that exercise is good for us, but maybe seeing observable, objective brain changes will provide the impetus to get us out the door to exercise.”

Other researchers involved in this study included Suzanne Craft, Ph.D., Kaycee M. Sink, M.D., and Valerie M. Wilson, M.D., from the Wake Forest School of Medicine; Jeannine Skinner, Ph.D., from Vanderbilt School of Medicine; Brenna Cholerton, Ph.D., from University of Washington Health Sciences; and Maureen Callaghan, M.D., Angela Hanson, M.D., from the VA Puget Sound.