

Effects of Detraining on Resting Cerebral Blood Flow in Master Athletes

Alfonso J. Alfini, Hyuk Oh, Lauren R. Weiss, Theresa J. Smith, Brooks P. Leitner, Ryan Toledo, Steven Saheb, Lisa M. Guth, Rian Q. Landers-Ramos, Kelsey Corrigan, Espen E. Spangenburg, FACSM, James M. Hagberg, FACSM, J. Carson Smith, FACSM.

University of Maryland, College Park, MD

Exercise training has shown to improve cerebrovascular health and brain function. Conversely, the effects of exercise detraining on the brain remain largely unknown. This experiment investigated the impact of a 10-day exercise training cessation period on resting cerebral blood flow (rCBF) in highly trained physically fit older adults. We measured the change in rCBF over time using a non-invasive magnetic resonance technique called Arterial Spin Labeling. **PURPOSE:** The purpose of this study was to measure changes in rCBF after 10-days of detraining in healthy active older adults. **METHODS:** Ten master athletes (men=7), defined as 50 years of age or older with a 15-year history of endurance exercise training were recruited from local running clubs. Endurance exercise training criteria included four training sessions per week, and at least four weekly hours of high intensity exercise embedded within those sessions. Before and immediately after the 10-days of exercise detraining, CBF was measured using interleaved, multi-sliced, perfusion weighted magnetic resonance imaging. Paired T-tests were used to assess CBF changes over time. **RESULTS:** We found that 10-days of exercise detraining altered CBF in several brain areas with general decreases in the frontal, temporal, and parietal lobules ($p < 0.05$). The strongest alterations were decreases in the bilateral precuneus and right cerebellar tonsil; and increases in the right insula and superior temporal gyrus ($p < 0.01$). Additional decreases also were found in the left thalamus, bilateral posterior cingulate, and parahippocampal gyri ($p < 0.05$). **CONCLUSION:** Ten-days of exercise detraining in healthy physically fit older adults decreased resting parenchymal blood flow in several brain regions. This suggests that the cerebrovascular system may be particularly responsive to the effects of exercise, and that even short-term decreases in exercise training in healthy older adults may reverse these effects.