

Effect of Exercise Training on Endothelium-Dependent Vasodilation in Cerebral Arteries

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ABSTRACT

Endothelial function and expression of endothelial nitric oxide synthase (eNOS) have been shown to increase with exercise training in the peripheral vasculature. However, the effect of exercise training on endothelial function in the cerebral vasculature is poorly understood. **PURPOSE:** The purpose of this study was to determine the effect of exercise training on endothelium-dependent vasodilation of large cerebral arteries. **METHODS:** Three-month-old male Fischer 344 rats were assigned to either a sedentary (SED, n=4) or exercise-trained (ET, n=4) group. ET rats ran on a motorized rodent treadmill 60 min/day at 15 m/min (15° incline), 5 d/wk for 10 wk. Posterior communicating arteries (PCoA) were isolated from the brain of both SED and ET rats. The isolated arteries were cannulated and pressurized to 90 cm H₂O via hydrostatic reservoirs. Luminal diameter changes were determined in response to the endothelium-dependent vasodilator, Bradykinin (BK) (10^{-13} – 10^{-7} M) and the direct vascular smooth muscle dilator, sodium nitroprusside (SNP, 10^{-10} – 10^{-4} M). **RESULTS:** Responsiveness to the endothelium-dependent vasodilator BK was enhanced in PCoA of ET rats compared to SED rats, whereas responsiveness to the endothelium-independent vasodilator SNP was not different between PCoA of SED and ET rats. **CONCLUSION:** These data demonstrate that exercise training is associated with enhanced endothelium-mediated vasodilation in PCoA of young rats, whereas vascular smooth muscle responsiveness of PCoA is unaffected by exercise training.

