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The Effects of Dietary Nitrate on Endothelial Resistance to Ischemia Reperfusion Injury in Postmenopausal Women

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Regular aerobic exercise has been shown to enhance endothelial function in aging men, however, the same vascular benefits are not consistently observed in estrogen-deficient postmenopausal women. Consumption of nitrate and antioxidant-rich foods (beetroot, spinach, leafy greens, etc.) is an effective dietary strategy to increase bioavailability of the vasoprotective molecule, nitric oxide and improve endothelial function. **PURPOSE:** To determine if a single dose of nitrate-rich beetroot juice can improve endothelial *resistance to-* and *resilience following-* whole-arm ischemia-reperfusion (IR) injury (20 min. occlusion, 15 min. reperfusion) in postmenopausal women. **METHODS:** Healthy, physically active early- (1-6 years following their final menstrual period (FMP), MET-week: 2918 ± 3679, n=12) and late- (>6 years FMP, MET-week: 3116 ± 2240, n=12) postmenopausal women consumed a single dose of nitrate-rich (600 mg NO₃⁻/ 140 mL) and nitrate-depleted (placebo, 0 mg NO₃⁻/ 140mL) BR on two separate visits. Brachial artery flow-mediated dilation was measured pre-, post-IR, and recovery (30-minutes post-IR) for each drink. **RESULTS:** Analyses with general linear models revealed a significant (p<0.05) time*treatment interaction (p=0.014) effect for FMD. FMD was significantly lower post-IR in comparison to all other time points with BR_{placebo} (Early: BR_{placebo} 2.51 ± 1.18 %, p<0.001, Late: BR_{placebo} 1.30 ± 1.10 %, p<0.001) and was significantly lower than post-IR with BR_{nitrate} (Early: BR_{nitrate} 3.84 ± 1.21 %, Late: BR_{nitrate} 3.21 ± 1.13%, p=0.045). Recovery FMD with BR_{nitrate} (Early: BR_{nitrate} 6.71 ± 1.14 %, p=0.023) was significantly higher in the early postmenopausal group, and with BR_{placebo} (Early: BR_{placebo} 6.25 ± 1.16 %, p<0.001, Late: BR_{placebo} 5.11 ± 1.10%, p<0.001) in both groups. **CONCLUSION:** These results suggest that BR_{nitrate} improves endothelial *resistance* to whole arm IR injury in healthy, active postmenopausal women, however, given recovery FMD was significantly higher with BR_{placebo} in both groups might suggest that the high antioxidant capacity in BR plays an important role in endothelial *resilience* following IR injury. **SIGNIFICANCE:** Nitrate-rich beetroot juice enhances endothelial resistance to IR injury in healthy, active, postmenopausal women.

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