Impact of salt loading and exercise on vascular function in healthy participants

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Hypertension is a prevalent risk factor of cardiovascular disease, with high dietary sodium intake being a predictor. Sodium regulation, absorption and excretion, may involve the buffering of sodium by the glycosaminoglycan-coated surface of endothelial cells, the glycocalyx. When disrupted, sodium may enter endothelial cells, alter their stiffness, and reduce their ability to produce nitric oxide, a vasodilatory molecule. The purpose of this study was to determine the effect of acute salt-loading on vascular endothelial function and to induce local glycocalyx disruption using local acute exercise. Eleven young, healthy participants (age: 21.7 ± 0.8 years) completed one week of either dietary salt loading or placebo conditions. Baseline and post-condition sessions were conducted to assess flow-mediated dilation (FMD), a determinant of endothelial function, prior, immediately after, and 30 minutes post local forearm exercise using ultrasonography. Repeated measures analysis of variance was used to analyze the data. There were significant reductions in relative FMD following salt-loading at baseline before exercise (p < 0.05), whereas placebo had no impact (p > 0.05). However, there were no further reductions in FMD during recovery from the 30-minute exercise bout suggesting the glycocalyx was not significantly disrupted. Future studies should focus on larger exercise stimuli and monitoring of the shedding of the glycocalyx.