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Effects of Tempol on Microvascular Function in Men and Women on Habitual High Sodium Diets

Zoe R. Lincoln, Jordan C. Patik, Justin D. Mehrer, Serena A. Schade, Shannon L. Lennon, William B. Farquhar, David G. Edwards. University of Delaware, Newark, Delaware

PURPOSE The average American consumes 3400 mg of sodium per day and thus far exceeds the recommended intake of 2300 mg/day. High sodium diets reduce nitric oxide (NO)-mediated vascular function, but this effect has been shown to be attenuated in women. The superoxide dismutase mimetic Tempol has been demonstrated to mitigate sodium-induced reductions in microvascular function, suggesting that high sodium diets impair vascular function via excess superoxide. We hypothesized that 1) Tempol would augment cutaneous vasodilation in response to local heating in healthy young adults who habitually consume 3400 mg or more of sodium per day, and 2) Tempol-induced improvements would be greater in men than women. **METHODS** We studied 83 healthy adults (39M/44W; 29±8 y) who self-reported sodium intake of ≥3400 mg/day via a 3-day diet record. Intakes were confirmed via 24h urinary sodium excretion. Two intradermal microdialysis fibers were inserted into the forearm for infusion of Ringer's solution (control) and 10 µM Tempol. A laser Doppler flowmeter probe was placed in a local heater and secured above each site, and a standard 42 °C local heating protocol was used to assess the plateau in cutaneous vasodilation in response to local heating which is largely dependent on NO. Sodium nitroprusside was then infused to induce maximum dilation. All data are presented as a percentage of maximum cutaneous vascular conductance (%CVCmax; CVC= LDF/mean arterial pressure) obtained at each site. A two-way ANOVA was used to analyze the sex by treatment interaction and main effects. **RESULTS** Self-reported sodium consumption was 4329±1180 mg/day and 24 h urinary sodium excretion was 143.3±65.4 mmol/24h. There was no significant interaction between sex and treatment (control: men 87.1±16.8, women 81.9±18.3 %CVCmax; Tempol: men 87.6±17.5, women 83.0±17.8 %CVCmax; p=0.90). Additionally, cutaneous vasodilation was not different between treatment sites (control: 84.3±17.7, Tempol: 85.2±17.7 %CVCmax; treatment effect, p=0.74) or between sexes (men: 87.4±17.0, women: 82.4±18.0 %CVCmax; sex effect, p=0.10). **CONCLUSION** Contrary to our hypothesis, Tempol did not augment cutaneous vasodilation in response to local heating. Furthermore, there were no sex differences in the response to local heating. **SIGNIFICANCE** The novelty of this study is that we examined sex differences in microvascular function under high sodium conditions reflective of the typical American diet. Since high sodium diets are a known risk factor for cardiovascular disease, future studies should explore its effects on NO-mediated microvascular function in older populations.

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