

Acute Cheese Consumption Reduces Sodium-Induced Cutaneous Microvascular Dysfunction by Decreasing Oxidative Stress

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Chronic dairy consumption is associated with improved cardiovascular health; however, high dietary sodium (Na) intake impairs endothelial function through increased oxidative stress and attenuated nitric oxide (NO)-dependent mechanisms. **PURPOSE:** To determine if Na intake in dairy products (cheese) has a beneficial effect on microvascular function relative to other dietary Na sources due to the actions of milk-based macronutrients and proteins. We hypothesized that 1) acute cheese consumption would improve NO-dependent vasodilation (VD) compared to an equal amount of Na from non-dairy sources and 2) Na-induced reduction in NO-dependent VD is mediated by oxidant stress mechanisms. **METHODS:** On 5 separate visits, 14 subjects (61 ± 2 years) consumed 3 oz. cheddar cheese (560 mg Na), 3 oz. soy cheese (560 mg Na), 2.3 oz pretzels (560 mg Na), 6 oz. cheddar cheese (1120 mg Na), or 4.6 oz pretzels (1120 mg Na). Two intradermal microdialysis fibers were placed in the forearm skin for local delivery of 1) Ringer's solution to serve as control and 2) ascorbate to serve as antioxidant. Red cell flux was measured by laser-Doppler flowmetry (LDF) during a standard local heating protocol (42°C). Once a plateau in cutaneous vascular conductance ($\text{CVC} = \text{LDF}/\text{MAP}$) was reached, 20 mM L-NAME was perfused at all sites to quantify NO-dependent VD. Data were expressed as a percentage of maximum ($\% \text{CVC}_{\text{max}}$; 28mM SNP). **RESULTS:** The local heating plateau was not different among the dietary treatments. NO-dependent VD was greater after cheese consumption compared to a Na-equivalent in soy cheese (59 ± 5 vs. $44 \pm 6\%$; $p=0.03$) or pretzels (560 mg Na: 59 ± 5 vs. $45 \pm 4\%$; $p=0.03$, 1120 mg Na: 57 ± 4 vs. $46 \pm 5\%$; $p=0.02$). There was no difference in NO-dependent VD following ingestion of a Na-equivalent in cheddar cheese, pretzels, or soy cheese with local ascorbate administration (no main treatment effect). **CONCLUSION:** Na ingestion in cheese augmented NO-dependent VD compared to non-dairy Na ingestion and this difference was eliminated with a local antioxidant. These results suggest that macronutrients in cheese may protect against acute dietary Na-induced microvascular dysfunction through a reduction in oxidative stress.

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