

Oral Sapropterin Increases Reflex Vasodilation but Not Cardiac Output during Passive Heating in Older Adults

McMahon, L., Greaney, J., Stanhewicz, A., Alexander, L., and Kenney, WL. Penn State University, University Park, PA

PURPOSE: Reflex cutaneous vasodilation is attenuated in older adults, potentially resulting in reduced heat loss during hyperthermia. Acute oral sapropterin (Kuvan™) increases reflex cutaneous vasodilation in older adults. Despite this increase in cutaneous conductance, the blood pressure (MAP) and heart rate (HR) responses to heating remain unchanged compared to placebo treatment. The purpose of this study was to examine sapropterin-induced changes in cardiac output (Q_c) in older adults during supine passive heating. We hypothesized that Q_c would increase with increased cutaneous conductance to maintain MAP during sapropterin treatment. **METHODS:** 11 older adults (69 ± 3 yrs) ingested sapropterin (S, 10mg/kg) or placebo (P) in a randomized double-blind crossover study design. Skin blood flow (SkBF; laser Doppler flowmetry), heart rate (HR; polar monitor), MAP (brachial auscultation), and Q_c (open-circuit acetylene wash-in) were measured during supine passive heating (water-perfused suit) to increase esophageal temperature by 0.8°C . Cutaneous vascular conductance was calculated ($\text{CVC} = \text{LDF}/\text{MAP}$) and normalized to maximum. **RESULTS:** During supine passive heating, sapropterin increased SkBF compared to placebo (S: 57.2 ± 6.9 , P: $29.5 \pm 3.6\%$ CVC max; $p < 0.001$). As expected, there was no difference in HR (S: 76 ± 3 , P: 77 ± 3 bpm; $p = 0.7$) or MAP (S: 76 ± 3 , P: 79 ± 2 mmHg; $p = 0.1$) between treatments. The Q_c response to passive heating was not different between treatments (S: 7.4 ± 0.5 , P: 7.1 ± 0.4 L·min⁻¹; $p = 0.2$). **CONCLUSION:** Following oral sapropterin, older adults increase SkBF during supine passive heating but do not increase Q_c , suggesting that MAP is maintained via mechanisms other than increased Q_c .

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