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No Impact of Biological Sex on Cutaneous Vascular Response to 39°C Local Heating

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Purpose: Local skin heating is utilized to investigate mechanisms of vasodilation in health and disease states, specifically to elucidate the role of endothelial nitric oxide (NO)-dependent vasodilation. The 39°C local heating protocol best isolates the endothelial NO-synthase (eNOS) pathway. It is unclear if biological sex influences the vascular response to 39°C local heating.

Methods: An intradermal microdialysis fibers were placed in the ventral forearms of 13 men and 13 women (24 ± 4.5 years). Local heaters and laser-Doppler flowmetry probes were used to measure red blood cell flux (perfusion units, PU). Cutaneous vascular conductance (CVC) was calculated as laser-Doppler PU/mean arterial pressure. A standardized 39°C local heating protocol was conducted. After PU reached a steady plateau (40 minutes), 15 mM N^G-nitro-L-arginine methyl ester (L-NAME) was used to quantify NO-dependent vasodilation. Maximal vasodilation was induced by heating to 43°C and perfusion of 28 mM sodium nitroprusside to normalize CVC to maximum (%CVC_{max}). **Results:** There was no interaction of sex with either absolute CVC (two-way repeated measures ANOVA, men 0.69 ± 0.29 PU, women 0.72 ± 0.48 PU at 39°C phase) or %CVC_{max} (men $67 \pm 31\%$, women $54\% \pm 20\%$) at any stage of the 39°C local heating protocol ($P = 0.21$ and $P = 0.14$, respectively). The percentage of NO-dependent vasodilation was also not different between groups (men = $43 \pm 22\%$, women = $39 \pm 17\%$; $P = 0.60$). **Conclusion:** These data indicate there is no impact of biological sex on the vasodilatory response of the cutaneous vasculature to 39°C local heating in young healthy adults.