



Mid Atlantic Regional Chapter of the American College of Sports Medicine

45th Annual Scientific Meeting, November 4th- 5th, 2022
Conference Proceedings

International Journal of Exercise Science, Issue 9, Volume 11



Chronic Ultraviolet Radiation Exposure Does Not Effect Nitric Oxide-Mediated Vasodilation in the Cutaneous Microvasculature

Kat G. Fisher, W. Larry Kenney, and S. Tony Wolf. The Pennsylvania State University, University Park, PA

Ultraviolet radiation (UVR) exposure acutely reduces nitric oxide (NO)-dependent cutaneous vasodilation. However, the impact of chronic UVR exposure (e.g., seasonal tanning) has not been investigated. **PURPOSE:** To investigate the effect of chronic UVR exposure on the NO-dependent cutaneous vasodilation response to local heating. **METHODS:** Three intradermal microdialysis fibers were placed in the upper arm (least sun exposed), ventral forearm (moderately sun exposed), and dorsal forearm (most sun exposed) of four adults with light-to-moderate constitutive skin pigmentation. Differences in sun exposure among the sites was confirmed using the melanin-index (M-index; an index of skin pigmentation), measured via skin reflectance spectrophotometry. Lactated Ringer's solution was perfused through the microdialysis fibers while local heating to 42°C induced cutaneous vasodilation. After attaining a stable plateau in cutaneous blood flow, 15mM N^G-nitro-L-arginine methyl ester (L-NAME; NO synthase inhibitor) was perfused at all sites to quantify NO-mediated vasodilation. Red cell flux was measured using laser-Doppler flowmetry (LDF). Cutaneous vascular conductance (CVC=LDF/mean arterial pressure) was calculated for each phase of the local heating response (baseline, local heating plateau, NO-mediated vasodilation) and expressed as percent maximum (%CVC_{max}; 28mM sodium nitroprusside + 43°C local heating). **RESULTS:** M-index was highest (i.e., skin pigmentation was darkest) in the dorsal forearm (54.6 ± 14.0 a.u.) compared to the ventral forearm (39.5 ± 6.0 a.u.) and upper arm (33.1 ± 4.6 a.u.), although there were no statistical differences among the sites ($p \geq 0.03$). There were no baseline ($p \geq 0.06$) or maximal CVC ($p \geq 0.06$) differences across the three sites. Likewise, the magnitude of the local heating plateau was not different among the 3 sites (dorsal: 85.03±20.79%; ventral: 69.77±20.89%; upper: 87.28±15.00%; $p \geq 0.16$), nor was NO-mediated vasodilation (dorsal: 63±19%; ventral: 49±16%; upper: 61±6%; $p \geq 0.28$). **CONCLUSION:** These data suggest that, in contrast to the previously demonstrated effects of *acute* UVR exposure, chronic UVR exposure sufficient to cause substantial skin tanning does not alter NO-mediated vasodilation.