

## Impaired Sweating Responses to a Passive Whole-body Heat Stress in Individuals with Multiple Sclerosis

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### ABSTRACT

Multiple sclerosis (MS) is an autoimmune disease that affects the central nervous system (CNS), disrupting autonomic function. **PURPOSE:** The aim of this study was to test the hypothesis that individuals with MS have blunted control of thermoregulatory reflex increases in sweat rate (SR) and cutaneous vasodilation compared to controls during a passive whole-body heat stress (WBH). **METHODS:** Eighteen individuals with relapsing-remitting MS and 18 healthy controls (CON) participated in the study. Core temperature ( $T_{\text{core}}$ ), skin temperature, heart rate, arterial blood pressure (10 min intervals), skin blood flow (laser-Doppler flowmetry: LDF), and SR were continuously measured during normothermic baseline (34 °C water perfusing a tube-lined suit) and WBH (increased  $T_{\text{core}}$  0.8 °C via 48 °C water perfusing the suit). Following WBH, local heaters were warmed to 42 °C, inducing maximal cutaneous vasodilation at the site of LDF collection. Cutaneous vascular conductance (CVC) was calculated as the ratio of LDF to mean arterial pressure and expressed as a percentage of maximum. **RESULTS:** Individuals with MS had attenuated SR responses to WBH ( $\Delta$ SR from baseline: CON:  $0.65 \pm 0.27$ ; MS:  $0.42 \pm 0.17$  mg/cm<sup>2</sup>/min,  $p=0.003$ ), while  $\Delta\%CVC_{\text{max}}$  from baseline was similar between groups (CON:  $42 \pm 16\%$ ; MS:  $38 \pm 12\%$ ,  $p=0.39$ ). SR responses were blunted as a function of  $T_{\text{core}}$  in MS (interaction: group\* $T_{\text{core}}$ ,  $p=0.03$ ), of which differences were evident at  $\Delta T_{\text{core}}$  0.7 °C and 0.8 °C ( $p<0.05$ ). No interaction was observed in  $\Delta\%CVC_{\text{max}}$ . **CONCLUSION:** Taken together, MS blunts sweating responses, while control of the cutaneous vasculature is preserved in response to WBH.