

自覚的に“汗っかき”な人の実際の発汗機能と 熱中症リスクに関する研究

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Sweating Function and Heat Disease Risks During a Passive Heating in Subjectively Good Sweaters

by

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ABSTRACT

Sweating is a vital physiological function to dissipate heat from the body during heat stresses and is known to be largely different among individuals to individuals. The purpose of the study was to investigate sweating responses and the contribution of nitric oxide synthase (NOS) enzyme activities to sweating during a passive heating in subjectively good sweaters (Subjective sweaters) and poor-sweaters (Subjective poor-sweaters). Eight subjective Sweaters and 7 poor-sweaters were passively heated until an oral temperature was elevated to 1.0 °C above baseline resting. Forearm sweat rate was measured at two skin sites continuously perfused with either lactated Ringer's solution (Control) or 10 mmol/L N^G-nitro-L-arginine methyl ester (L-NAME, non-selective NOS inhibitor) via intradermal microdialysis. Sweat rate at L-NAME site was attenuated relative to the Control in both Subjective sweaters and poor-sweaters ($P < 0.05$). The sweat rate on both Control and L-NAME sites achieved during passive heating were similar between the groups ($P > 0.05$). The magnitude of oral temperature elevation at 40 min of the heating which maybe an index of heat-diseases risk were

similar between Subjective sweaters and poor-sweaters. Mean skin temperature, mean body temperature, and heart rate during passive heating were not different between the groups. These results suggest that the subjective difference in sweaters or poor-sweaters do not affect sweating response and its underlying mechanisms associated with NOS during a passive heating. In addition, the subjective difference in sweating response is unlikely affecting an index of heat-related disease assessed from a magnitude of oral temperature elevation during passive heating. Further studies are required to determine the method to classify subjective sweaters and poor-sweaters as well as establishing a better heating protocol.

要 旨

本研究では、自覚的に汗っかきな人とそうではない人の安静温熱負荷時の発汗反応およびそれに対する一酸化窒素合成酵素の寄与を比較した。自覚的汗っかき群8名と自覚的非汗っかき群7名が安静温熱負荷を舌下温が1.0℃上昇するまで行った。前腕部には2本のマイクロダイアリシス用ファイバーを留置し、1本には乳酸リンゲル液を(Control)、もう1本にはL-NAME(非選択的一酸化窒素合成酵素阻害薬)を循環させて、その皮膚上の発汗量を計測した。安静温熱負荷時の発汗量は両群ともL-NAME部位でControl部位よりも有意に低下したが、いずれの部位においても両群間の発汗量に差は認められなかった。また、加温40分間における舌下温の上昇程度にも両群間に差は認められなかった。これらの結果は、自覚的に汗っかきな人の発汗反応およびそれに対する一酸化窒素合成酵素の寄与程度は自覚的に汗っかきではない人と差がないことを示している。また、自覚的に汗っかきかどうかは、安静温熱負荷時の舌下温の上昇程度から推察される熱中症リスク指標にも影響しないようである。本研究より主観的な汗っかきの分類方法や加温の方法に関する課題を抽出することができた。