



THE SELECTED ABSTRACTS

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145 Skin physiology-based events in thermoregulation following exposure to simulated solar radiant heat

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Abstract

Objectives: The exposure to solar radiant heat (SRH) presents a risk of thermal stress. The risk is exacerbated when people have to experience an instantaneous change in the thermal environment in form of a temperature step due to loss of SRH, e.g., when walking into a thermal transient near a building entrance. This study investigated the skin physiology-based thermoregulation in response to SRH exposure and that occurred when experiencing a temperature step.

Methods: The study was conducted in twin climate-controlled chambers, with the first chamber simulating a thermal exposure involving SRH (the outdoor chamber) and the second an environment maintained at a constant 24°C without SRH exposure (the indoor chamber). The temperature in the outdoor chamber was 28°C, with the SRH present being equivalent to an increase in globe temperature of 4°C. Ten male and female participants each first sat in the outdoor chamber for 30 min and were monitored for change in skin capillary blood flow (SCBF), skin moisture, and transepidermal water loss (TEWL), and then moved swiftly into the indoor chamber and were monitored for another 30 min.

Results: Following SRH exposure the SCBF increased in females but not in males. When experiencing the temperature drop, the SCBF required a longer period to decrease than the reduction observed when the drop was attributed entirely to loss of convective heat. For males, the most pronounced change in thermoregulation was in skin moisture and TEWL, suggesting a greater thermal load from SRH exposure in males that required water evaporation from the skin to regain thermal balance.

Conclusions: The exposure to SRH presented unique influences to core metabolism and thermoregulation compared to those from exposure to convective heat. Adequate clothing protecting against temperature step and the residual influence of SRH was necessary in thermal transient.

Abstract

Abstract title Skin physiology-based events in thermoregulation following exposure to simulated solar radiant heat

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Topic Exposure assessment

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