BODY TEMPERATURE AND SWEAT RESPONSE AND ITS EFFECT ON HORMONAL
AND IMMUNE SYSTEM DURING AND AFTER PASSIVE HEAT STRESS IN
DIFFERENT SEASON IN HEALTHY VOLUNTEERS


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We investigated seasonal changes in interleukin-6 (IL-6), adrenocorticotrophic hormone (ACTH), cortisol, metabolites of catecholamine (VMA, HVA, and 5-HIAA), antidiuretic hormone (ADH), angiotensin II, aldosterone and plasma renin activity (PRA) in humans. Seasonal changes in the thermoregulatory responses were assessed by measuring core and skin temperatures, sweat rate and blood flow during immersion of the leg in hot water (mild heat at 42°C) for 30 min. Eight volunteers were investigated at four times during the year at latitude 35°N (i.e., February, May, August and November). The mean atmospheric temperature in the collection periods was higher in the order of summer ≈ autumn > spring > winter. Tympanic temperature during water immersion showed significant differences between seasons. Sweat rate and the skin blood flow were significantly higher in summer compared with the other seasons. The concentration of ADH and aldosterone was significantly higher in summer compared to the other seasons. The concentration of IL-6 was significantly higher in the winter and summer than in the spring and autumn. The concentrations of ACTH, HVA and VMA were significantly higher in summer. No seasonal variation was detected in cortisol. The results of this study indicate that concentrations of ADH and aldosterone as well the sweat rate increased in summer compared with the other seasons, suggesting that the change in those parameters are attributable to heat acclimatization induced by natural hot climate during the summer.