



CHARACTERISTICS OF HEAT-INDUCED HYPERVENTILATION AT REST AND DURING EXERCISE IN HUMANS

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Abstract

In humans, hyperthermia leads to activation of a set of thermoregulatory responses that includes cutaneous vasodilation and sweating. Hyperthermia also increases ventilation in humans, as is observed in panting animals (e.g. dogs, sheep), but the physiological significance and characteristics of the hyperventilatory response in humans remain unclear. The relative contribution of respiratory heat loss to total heat loss in a hot environment in humans is much small as compared with those of sweating and cutaneous vasodilation, and this hyperventilation usually causes a concomitant reduction in arterial CO₂ pressure (hypocapnia), which can cause cerebral hypoperfusion. Consequently, hyperventilation in humans may not contribute to the maintenance of physiological homeostasis (i.e., thermoregulation). To gain some insight into the physiological significance of hyperthermia-induced hyperventilation in humans, in this talk, we discuss 1) the mechanisms underlying hyperthermia-induced hyperventilation, 2) the factors modulating this response, 3) the physiological consequences of the response, and 4) the physiological responses of the voluntary breathing control to suppress the hyperthermia-induced hyperventilation.

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