Commentary on Viewpoint: Sweat electrolyte concentrations obtained from within occlusive coverings are falsely high because sweat itself leaches skin electrolytes

Lawrence E. Armstrong
Human Performance Laboratory, Department of Kinesiology, University of Connecticut, Farmington, Connecticut

TO THE EDITOR: All published comparisons of local sweat sampling techniques (e.g., filter paper, gauze, skin scraping, pipette, rubber glove, or arm bag collections) versus the whole body wash down method have reported that local samples contained higher electrolyte concentrations (4). The present paper by Weschler (5) provides a hypothetical mechanism for these findings [i.e., sweat leaches electrolytes from the stratum corneum (SC)] but does not consider a second testable and possibly concurrent mechanism. The following evidence supports absorption of water by the SC, increasing the tonicity of sweat irregardless of electrolyte leaching. 1) Skin swells when immersed in water for extended periods (4). 2) Hidromeiosis of eccrine glands, the progressive decrease of sweat rate, is proportional to skin wettedness and likely involves a mechanical obstruction of the sweat duct subsequent to SC swelling (3). Similarly, the skin disorder miliaria rubra (i.e., prickly heat) may involve SC swelling, closure of the sweat gland surface pore, bacterial infection, and inflammation (1). 3) Experimental evidence has shown that water diffuses into the SC, especially when air water vapor pressure is great or the skin is saturated with water; this diffusion increases in proportion to an increased sweat rate (2). 4) When sweat is collected in an impermeable arm bag, unrelated solutes (i.e., lactate, chloride, urea) concentrate in unison, as demonstrated by van Heyningen and Weiner (statistical $r^2 = 0.84$ to $0.94$; see Fig. 2 in Ref. 4). Indeed, these investigators recognized the absorption of water by the SC as a plausible explanation for their findings.

REFERENCES
5. Weschler L. Viewpoint: Sweat electrolyte concentrations obtained from within occlusive coverings are falsely high because sweat itself leaches skin electrolytes. J Appl Physiol; doi:10.1152/japplphysiol.00924.2007.