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Racial Differences in the RAAS and its Relationship to Electrolyte Losses in Collegiate Athletes

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Racial differences in the Renin-Angiotensin-Aldosterone system (RAAS) have been implicated in the racial disparity in the prevalence of hypertension in Americans. **PURPOSE:** To investigate racial differences in the RAAS and its relationship to sweat and urine electrolyte losses during exercise in a young athletic population. **METHODS:** Twelve Caucasian (CA) (Age: 21.3 ± 1.5 yrs, Height: 184.2 ± 4.7 cm, Mass: 102.8 ± 20.6 kg, BSA: 220.3 ± 33.3 cm²) and 12 African-American (AA) (Age: 21.1 ± 1.4 yrs, Height: 179.7 ± 7.5 cm, Mass: 95.9 ± 27.1 kg, BSA: 209.3 ± 38.7 cm²) male division II collegiate football and soccer players provided a venous blood sample (8 mL) before the first pre-season practice (baseline) and before and after practice on day 10 of practices when players were acclimatized. Serum and plasma were prepared and frozen until assayed. Sweat loss was calculated as Δ body weight (kg) adjusted for fluid intake (L) and total urine volume produced (L). Forearm and low-back sweat samples were collected using standard procedures. Sweat and urine electrolyte concentrations (mmol/L) were analyzed by ion-selective electrodes, and total electrolyte losses (mg) were calculated. **RESULTS:** Significant differences were found in pre-practice renin (CA: 1.49 ± 0.55 ng/dL/hr, AA: 0.98 ± 0.65 ng/dL/hr, $P < 0.05$) and post-practice urine sodium (Na⁺) concentrations (CA: 47.5 ± 30.9 mmol/L, AA: 81.5 ± 43.2 mmol/L, $P < 0.05$). When considering both sweat losses during practice and urine losses immediately following practice, AA athletes experienced significantly higher total Na⁺ loss (CA: 2917.9 ± 1145.7 mg, AA: 4435.5 ± 2085.7 mg, $P < 0.05$). Additionally, no significant correlations between renin or aldosterone and sweat or urine electrolyte concentrations were found to be significant in both races, simultaneously. **CONCLUSION:** Greater total Na⁺ loss in AA players, as well as racial discrepancies in the relationships found between the RAAS and measures of electrolyte losses, suggest a potential racial difference in the mechanism by which electrolytes are lost in AA versus CA athletes and the involvement of the RAAS.

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