

Role of salt intake in exercise-training induced hypervolemia

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We investigated the mechanisms of Na⁺ retention as a cause of hypervolemia induced by exercise training. Six male volunteers exercised with a cycle ergometer at 20 °C with relative humidity of 20%. The exercise intensity was increased in a ramp manner until subjects were exhausted. After the cessation of exercise, subjects rested without any fluids in a thermoneutral condition, and then subjects drank 0.8-1.0 l of 0.45% NaCl solution within 30 min. Plasma osmolality (Posm) increased by ~20 mOsm/kg H₂O at about 95% of maximum aerobic power of exercise (E), by ~4 mOsm/kg H₂O after 30min of rest (R), and returned to the control (C) value within 30 min after the start of fluid intake (F.I.). Change in sodium concentration in plasma ([Na]_p) paralleled that in Posm throughout an experiment and 60% of increase in Posm at E and 90% of that after R was explained by the increase in [Na]_p. The increase in [Na]_p showed high correlation with the increase in [Lac-]_p which explains the restriction of Na⁺ movement from the intravascular space. The change in ADH was well correlated with change in Posm. F.I. increased PV by 5% more than in C after 90 min of F.I.

These results suggest that the selective increase in [Na]_p during exercise stimulates ADH secretion, which may cause water and Na⁺ conservation after exercise.