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### **EFFECTS OF HYPERVOLEMIA BY PROTEIN AND GLUCOSE SUPPLEMENTATION DURING AEROBIC TRAINING ON THERMAL AND ARTERIAL PRESSURE REGULATIONS IN HYPERTENSIVE OLDER MEN**

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In Japan, the incidence of heat illness in older people has rapidly increased during midsummer in the last decade, and we suggested that whey-protein + carbohydrate supplementation during aerobic training increased plasma volume (PV) to enhance thermoregulatory adaptation in older men (J Appl Physiol, 107: 725-733, 2009); however, >60% of people age 65 and older suffer from hypertension and the symptoms may be worsened by the hypervolemia.

To examine this, we randomly divided 21 older men (~69 years) with ~160 mmHg for systolic and ~90 mmHg for diastolic blood pressure at rest into two groups; Glc (N=11) consuming glucose alone (25g) and Pro-Glc (N=10) consuming whey-protein (10g) + glucose (15g), immediately after cycling exercise at 60-75% of peak aerobic capacity ( $VO_{2peak}$ ) for 60 min·day<sup>-1</sup>, 3 days·week<sup>-1</sup>, for 8 wk. Before and after training, we measured PV (dye dilution), baroreflex sensitivity (BRS) of heart rate (Valsalva maneuver), and carotid arterial compliance (CAC) from carotid arterial diameter (ultrasound imaging) responses to pulsatile arterial pressure change (photoplethysmography) at rest. Additionally, we measured esophageal temperature ( $T_{es}$ ) and forearm skin blood flow (plethysmography) during exercise at 60% pre-training  $VO_{2peak}$  for 20 min in a warm environment.

We found that the forearm skin vascular conductance response to increased  $T_{es}$  was enhanced in Pro-Glc with increased PV, but this was not found in Glc; however, despite the increased PV, arterial blood pressures rather decreased with increased CAC and BRS in Pro-Glc.

Thus, the prescription was applicable to older men with hypertension to prevent heat illness during exercise.

**Key words:** aerobic training, hypertension, older men, supplement, thermoregulation