EFFECT OF EXERCISE INTENSITY ON SALIVARY LYSOZYME, CHROMOGRAFIN A AND CORTISOL IN ACTIVE MEN

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The responses of saliva flow rate and composition during exercise appear to be influenced by the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis (Chicharro et al. 1998). Yet how these systems relate to changes in salivary antimicrobial proteins following exercise at different intensities remains unclear. Lysozyme represents the main antimicrobial enzyme of the non-specific mucosal immune defence and is produced by granulocytes, monocytes and macrophages (West et al., 2006). The present study investigated the effects of exercise intensity on salivary lysozyme (s-Lys) and examined how these responses related to salivary markers of adrenal activation: chromogranin A (CgA) and cortisol. Using a randomised design, 10 healthy active men (mean ± SEM; age: 21 ± 1 years, mass 76.2 ± 2.2 kg, VO2max 51.4 ± 1.9 mL/kg/min) volunteered to participate in 3 experimental trials of different intensities: 50%VO2max, 75%VO2max and an incremental test to exhaustion (EXH). The durations of the trials were the same as an initial preliminary incremental test to exhaustion (22.3 ± 0.8 min). Timed, unstimulated saliva samples were collected at pre-exercise, post-exercise and 1 hour post-exercise. Samples were analysed for s-Lys, CgA and cortisol and saliva flow rates were determined gravimetrically to calculate the s-Lys and CgA secretion rates. Salivary data were analysed using a two factor repeated measures ANOVA and post hoc t-tests with Holm-Bonferroni correction applied where appropriate. End-exercise heart rate was 128 ± 4, 170 ± 3 and 186 ± 2 beats/min for the 50%VO2max, 75%VO2max and EXH trials, respectively. No significant changes in saliva flow rate were observed in any of the exercise trials. Salivary-Lys secretion rate increased in the 75%VO2max trial from 1.76 ± 0.42 microgram (mcg)/min pre-exercise to 4.60 ± 1.12 mcg/min post-exercise (P<0.05) and EXH trial (from 1.66 ± 0.49 mcg/min pre-exercise to 4.27 ± 1.07 mcg/min post-exercise; P<0.05), but there was no change in the 50%VO2max trial (from 2.61 ± 1.00 mcg/min pre-exercise to 2.31 ± 0.52 mcg/min post-exercise). Chromogranin A concentration and secretion rate increased 3.5 fold post-exercise in both the 75%VO2max and EXH trials (P<0.05), but were unchanged in the 50%VO2max trial. There was no change in salivary cortisol immediately post-exercise but significantly higher values were observed at 1 hour post-exercise in the 75%VO2max and EXH trials compared with the 50%VO2max trial (P<0.05). These findings suggest that short duration, high intensity and exhaustive exercise can result in increases in both the concentration and secretion rate of s-Lys post-exercise despite no change in the saliva flow rate. These effects appear to be associated with changes in sympathetic activity and not the HPA axis.

References
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