EFFECT OF MODE OF EXERCISE AND CHO INGESTION ON IL-6 GENE EXPRESSION IN HUMAN SKELETAL MUSCLE
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Exercise increases plasma concentrations of the pro-inflammatory cytokine interleukin (IL)-6. It has been demonstrated that this increase is augmented when comparing running with cycling exercise and blunted by carbohydrate (CHO) ingestion, irrespective of exercise mode (Nieman et al., 1998). Although it has been hypothesised that monocytes are the source of the rise in plasma IL-6, we have demonstrated that neither exercise nor CHO ingestion affects monocyte intracellular IL-6 production (Starkie et al., 2000). In addition, IL-6 mRNA is elevated in skeletal muscle after exercise, suggesting that contracting muscle is a probable source of the exercise induced increase in IL-6 (Ostrowski et al., 1998). Hence, the aim of the present study was to examine the effect of mode of exercise and CHO ingestion on IL-6 gene expression in human skeletal muscle.

Seven moderately trained men (31 ± 2 yrs, 83.2 ± 3.7 kg, VO₂ peak = 4.39 ± 0.23 l min⁻¹, mean ± SD) completed four randomised exercise trials for one hour at a workload corresponding to each individuals lactate threshold. Two trials were conducted on a bicycle ergometer (Cy) and two on a running treadmill (Ru) either with (CHO) or without (CON) the ingestion of a CHO beverage throughout the exercise. Muscle biopsies were obtained before and immediately after exercise in all trials and these samples were measured for IL-6 gene expression using real time PCR. In addition, blood samples were collected at rest, 30 min during and at the cessation of exercise, which were analysed for plasma IL-6. Exercise resulted in a 21 ± 4 fold increase in IL-6 mRNA expression. However, this increase was not affected by either mode of exercise or CHO ingestion (see Figure). In contrast, whilst mode did not influence plasma IL-6 concentration, CHO ingestion blunted the plasma cytokine response (P<0.01 for beverage x time interaction) (see Figure).

These data demonstrate that CHO ingestion attenuates plasma IL-6 concentration during both cycling and running exercise. However, since IL-6 gene expression was unaffected by CHO ingestion it is probable that the ingestion of CHO attenuates IL-6 production by other tissues.