These data demonstrate, for the first time, that there is a lag in acetyl group accumulation at the onset of muscle contraction. The results also support our contention that the supply of acetyl groups to the TCA cycle is limited during this period (the so-called acetyl group deficit) which results in the activation of SLF and subsequent fatigue development.

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**Effect of high-carbohydrate diets on muscle glycogen and exercise performance during training in athletes**


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Glycogen depletion through exercise, followed by increased dietary carbohydrate (CHO) intake and a reduction in physical activity for several days will elevate muscle glycogen concentrations above normal (i.e. supercompensation) and hence improve endurance exercise performance. However, when performing daily exercise, muscle glycogen stores may decrease even with a moderate CHO intake. The purpose of the present study was to investigate the effect of increasing dietary CHO intake, in athletes training daily, on muscle glycogen content and exercise performance.

Nine well-trained cyclists were recruited to participate in this study, which was approved by the local Ethics Committee. Training was controlled for 20 days separated by one rest day. Each training session consisted of 2 h of cycling exercise per day at 64% $V_{O_{2\text{max}}}$ Subjects received a control diet for the first 10 days (Con: 35 En% fat, 15 En% protein and 50 En% CHO) followed by a 10 day high-CHO diet (HI: 5 En% fat, 15 En% protein and 80 En% CHO). To control 24 h energy balance, subjects stayed in a respiration chamber for 3 days in each dietary period. At the end of each period, subjects exercised for 90 min at 64% $V_{O_{2\text{max}}}$ followed by a 45 min time trial in order to measure exercise performance. Substrate oxidation was measured by indirect calorimetry and muscle biopsies were obtained from the vastus lateralis at the beginning of the study and at the last day of each dietary period before and after the 90 min regular exercise bout. All results are expressed as means ± s.e.m. Significant differences between the diets were identified with Student's paired t test. The level of significance was set at $P < 0.05$.

Increased CHO intake from 7.7 ± 0.1 to 11.9 ± 0.3 $g \text{ kg}^{-1} \text{ day}^{-1}$ ($P < 0.05$) resulted in elevated pre-exercise muscle glycogen contents (Con, 554 ± 66 vs. HI, 721 ± 62 mmol (kg dw)$^{-1}$ ($P < 0.05$). Muscle glycogen contents were similar at the end of a 90 min regular training bout (Fig. 1). Total CHO oxidation during exercise was higher after HI than after Con (296 ± 21 vs. 228 ± 15 g per 90 min) ($P < 0.05$). There was no difference in time trial performance (time to complete a preset amount of work was 47.4 ± 8.0 vs. 46.7 ± 8.9 min, and the averaged work rate was 271 ± 22 and 277 ± 21 W for HI and Con, respectively).

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**The effect of eccentric contractions on indirect markers of skeletal muscle connective tissue turnover in humans**

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Acute bouts of high force eccentric muscle contractions which result in muscle fibre damage may also increase muscle connective tissue turnover. The aim of this study was to assess connective tissue breakdown by measuring blood levels of three collagen subtypes (I, III and IV).

Eight healthy male volunteers, age 29 ± 7 years (mean ± s.e.m), performed 20 voluntary eccentric contractions of the knee