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Five days exposure to high dietary fat intake has no impact on the performance of a preloaded 5km treadmill based time trial in endurance-trained women.
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Manipulating the dietary intake of carbohydrate and fat results in differences in the circulating hormonal and metabolic milieu alongside differences in the myocellular substrate storage profile. These divergent profiles can dramatically impact substrate utilisation during exercise, potentially impacting endurance performance. However, at least in men, improvements in endurance performance following a high fat diet are equivocal. Women compared to men, however, demonstrate a greater ability to oxidise fat and so may respond more favourably to high dietary fat intake. Previous studies employing a high fat diet are typically restricted in carbohydrate, and so a change in performance could be attributed to the manipulation of either macronutrient. The current investigation sought to determine if a high fat diet both with (HF) and without restricting carbohydrate intake (N+HF) impacts endurance performance in women compared to a control diet that reflects normal intake (N). Over three separate periods of 5 days, in a randomised counterbalanced order, women (means ± SD: age 34 ± 8 y; V\dot{O}_2max 55.1 ± 2.5 ml/kg/min) were provided with 3 diets designed with the following macronutrient composition (% of energy intake [carbohydrate/fat/protein]); N (50/35/15); HF (20/65/15), and a hypercaloric (130% energy intake) N+HF (50/65/15). Post-diet intervention, in the overnight fasted state, subjects completed a 90min treadmill run at 65% V\dot{O}_2max immediately followed by a self-paced 5km time trial (TT). Data was assessed for differences using a repeated-measures one-way ANOVA. There were no significant differences in the time taken to complete the TT (N - 1328 ± 83s; HF - 1349 ± 76s and NHF - 1333 ± 76s). Within the ranges of macronutrients provided, the total amount and proportion of dietary fat or carbohydrate consumed over five days had no impact on preloaded 5km treadmill running performance in endurance-trained women runners. This work was funded through a BBSRCi CASE studentship with GlaxoSmithKline the industrial partner.

Unclear effect of omega-3 polyunsaturated fatty acid supplementation on speed-skating performance
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Elite speed skaters need to be able to generate a high peak power output and to sustain a high power output for the duration of the race; they therefore combine resistance-type training with endurance training. Combining these training modalities results in a smaller increment in muscle strength than when only resistance-type training is performed. An increase in, among others, myoglobin concentration can possibly reduce this interference effect. Omega-3 fatty acid supplementation and hypoxia may increase myoglobin expression. As, speed skating is by nature a sport in which the active leg muscles become easily hypoxic; the goal of this study was to investigate the effect of omega-3 fatty acids on speed-skating performance and performance-determining variables. Competitive speed skaters (n=27) were, based on performance and , randomly assigned to the placebo (corn oil) or experimental group (2400 mg omega-3 fatty acids per day). Speed skaters performed a maximal incremental test, jump tests, a Wingate, and a 3000-m skating race before and after a ~7-weeks supplementation period. The magnitude-based inferences approach was used for the statistical analysis. The average change in 3000-m speed-skating performance time, due to the supplementation period, was -0.5±2.2% in the placebo group and -0.7±2.3% in the experimental group. The difference in change scores between groups was unclear (-0.2%, 90% CL 2.2%). A likely positive effect of the intervention was found on squat jump height (difference in change scores 4.9%, 90% CL 4.2%), with likely and very likely negative effects on at
Leucine availability regulates p70S6K activity when carbohydrate availability is sufficient in recovery from low carbohydrate training.

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We assessed the ability of protein with augmented leucine content to re-activate p70S6K following low CHO training. In a repeated measures cross-over design eight males completed 75 minutes of cycling exercise comprised of HIT and steady state intensity in a low carbohydrate but high protein state. Protein was provided before, during and after (20g per hour) in the form of collagen gel (GEL) or conventional whey protein (WHEY). Following exercise carbohydrate was provided in addition to protein so as to facilitate muscle glycogen synthesis. Muscle glycogen was comparable before (GEL: 354 ± 44; WHEY: 339 ± 66 mmol. kg dw) exercise and decreased post exercise (GEL: 141 ± 25; WHEY: 158 ± 80 mmol.kg dw) (P < 0.05). Exercise induced comparable PGC-1α (8-fold), ATG12 (1.3-fold) and Parkin (1.3-fold) increases in gene expression at 90 minutes’ post-exercise. Suppression of p70S6K activity was comparable between conditions post-exercise (~ 25 fmol.min⁻¹.mg⁻¹) (P < 0.05), while provision of carbohydrates and collagen protein was sufficient to re-activate p70S6K activity (GEL: 73 ± 42 fmol.min⁻¹.mg⁻¹), provision of leucine rich whey protein further augmented activity at 90 min post exercise (WHEY: 180 ± 105 fmol.min⁻¹.mg⁻¹) (P < 0.05). This augmented response occurred independent of insulin (WHEY AUC: 5296 ± 1478; GEL AUC: 3925 ± 602 AU) (P > 0.05) and PKB (WHEY: 47.7 ± 21.9; GEL: 40.4 ± 19.8 fmol. min⁻¹.mg⁻¹) (P > 0.05). These data support the notion of a critical glycogen threshold for augmented oxidative adaptations in addition to identifying optimal nutritional recommendations to augment signalling to facilitate recovery processes.

The effect of milk on recovery from repeated sprinting and jumping in female team-sport athletes

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Research has shown that consumption of milk post-eccentric exercise can attenuate the effects of exercise-induced muscle damage (EIMD) in team-sport athletes. However, these studies evoked damage using an intense eccentric protocol quite different to the exercise stress experienced by athletes during and after team sport training or competition. The aim of this study was to examine the effects of post-exercise milk consumption on recovery from activities that simulate those of team sport participation. Eighteen female team-sport athletes participated in an independent-groups investigation, completing 15x20m maximal sprints stopping within a 10m deceleration zone immediately after the sprint. Following a rest period, participants completed eight sets of 10 countermovement jumps, with one minute recovery between sets. On completion of the protocol participants consumed 500ml of milk or 500ml of an energy-matched carbohydrate drink. Muscle function (peak torque, rate of force development (RFD), 5, 10 and 20m sprint, countermovement jump (CMJ), reactive strength index (RSI), muscle soreness and tiredness; perception of recovery, and serum creatine kinase (CK) and high-sensitivity C-reactive protein (hsCRP) were determined pre- and 24h, 48h and 72h post-exercise. Results were analysed using magnitude based inferences.

Results indicated that consumption of milk had a likely beneficial effect on peak torque extension at 60s from baseline (B) to 24h (6.0 ± 7.7, Mean effect ± 90% CI), flexion at 60s from B- 24h (8.7 ± 13.5) and B-72h (9.4 ± 12.3). A likely benefit was seen for extension at 180s/B-24h (7.2 ± 6.4), B-48 (10.8 ± 9.6) and a very likely benefit B-72h (9.9 ± 6.8). A likely benefit of milk was seen for flexion at 180s/B-24h (12.4 ± 13.8) and B-72h (10.2 ± 12.1). Milk had a possible/likely benefit in limiting losses in 5m sprint time (2.7 ± 4.0) and RFD (22.7 ± 31.7) from B-24h, a very likely beneficial effect on perception of recovery (2.0 ± 2.4) from B- 24h and a likely beneficial effect on muscle soreness (1.0 ±1.3) from B- 72h. Comparison of the effects of milk and carbohydrate on 10m and 20m sprint time, RSI, muscle tiredness, CK and hsCRP were unclear. In conclusion, consumption of milk can limit decrements in muscle function, soreness and perception of recovery following repeated sprinting and jumping exercise.

Changes in dietary intake, immune function and performance monitors throughout a season in professional rugby league players

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