Carbohydrate-protein beverage improves muscle damage and function versus isocarbohydrate and isocaloric carbohydrate-only beverages

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PURPOSE: Carbohydrate-protein beverages have previously been shown to attenuate post-exercise muscle damage compared to carbohydrate-only beverages. However, it is unclear from these studies whether these benefits were the result of carbohydrate/protein consumed during or immediately after exercise. The purpose of this study was to compare the effects of a carbohydrate/protein beverage (CHO-P) consumed during exercise to isocarbohydrate carbohydrate (HI-CHO), isocarbohydrate (LO-CHO), and a non-caloric flavored placebo (PLA) beverage on post-exercise muscle damage and muscular function. METHODS: Twelve male cyclists (age = 20.8 ± 2.4; VO2peak = 53.4 ± 7.2 ml·kg⁻¹·min⁻¹) performed four rides to exhaustion on a cycle ergometer at 75% of VO2peak. During the trials, subjects consumed 250mL of CHO-P (7.3%CHO, 1.8%P), HI-CHO (9.1%CHO), LO-CHO (7.3%CHO), or PLA every 15-minutes until cessation of exercise. Exercise sessions were performed five to ten days apart, in a randomly counterbalanced double-blind design. Baseline measures for biomarkers of muscle damage (plasma CK and Mb) and ratings of soreness were obtained prior to the first exhaustive bout. Post-exercise measures were obtained 6-9 hours (Mb), and 22-24 hours (CK and soreness) following cycling. In addition, post-exercise muscle function was assessed 22-24 hours post-exercise via the number of leg extension repetitions to fatigue with the right leg at 70% 1-RM.

RESULTS: Post-exercise changes in CK were significantly higher (p<.05) in HI-CHO (203 ± 343 IU), LO-CHO (224 ± 387 IU) and PLA (194 ± 336 IU) compared to CHO-P (-16 ± 83 IU). Similarly, increases in Mb were also higher (p<.05) in the HI-CHO (51 ± 70 IU), LO-CHO (46 ± 79 IU) and PLA (135 ± 216 IU) as compared to CHO-P (13 ± 34 IU). Significantly more leg extension repetitions were completed in the muscle function test for CHO-P (11.3 ± 4.1) than HI-CHO (9.7 ± 4.3), LO-CHO (9.5 ± 3.6) and PLA (8.8 ± 6.7). Pre-exercise values for Mb and CK were not different between treatments. CONCLUSION: These results indicate that a carbohydrate-protein beverage consumed during exercise attenuates post-exercise muscle damage, and improves subsequent muscle functioning compared to a placebo, or carbohydrate beverages matched for either carbohydrate or total calories.

This study was supported by a grant from PacificHealth Laboratories, Inc