Assessing the impact of dietary protein on recovery indices from resistance exercise when nutrient timing is controlled for.

Justin Roberts1,Anastasia Zinchenko2,3, Craig Suckling1, Lee Smith1, James Johnstone1, Menno Henselmans3.

1Anglia Ruskin University, Cambridge; 2University of Cambridge, Cambridge;

3Bayesian Bodybuilding R&D Department, Netherlands.

Previous research has demonstrated that peri-exercise protein ingestion is beneficial for adaptive gains following resistance training (Cribb and Hayes, 2006, Medicine and Science in Sports and Exercise, 38 (11), 1918-1925). High protein intakes (in excess of 2.0g.kg-1.d-1) have also been reported to enhance recovery indices (Hoffman et al., 2010, Amino acids, 38 (3), 771-778), contrary to evidence that no further training benefits are observed above 1.8g.kg-1.d-1 (Lemon et al., 1992, Journal of Applied Physiology, 73 (188), 767-775). This study investigated the effect of total dietary protein, whilst controlling for protein timing, on recovery indices from resistance exercise. Following University Faculty Ethics Committee approval, fourteen strength-trained individuals were randomised to two 10-day dietary regimes with a protein content of 1.8g.kg-1.d-1 (PROMOD) or 2.9g.kg-1.d-1 (PROHIGH) in a cross-over design. On three consecutive days at the end of each regime (days 8,9,10), participants performed 3 sets of squat, bench press and bent-over rows at 80% 1 repetition maximum until volitional exhaustion. A 0.4g.kg-1 whey protein concentrate/isolate beverage was provided 30minutes before and after training sessions to control for nutrient timing. Recovery was assessed across days 8-10 via assessment of perceived muscle soreness, bioelectrical impedance phase angle (as a proxy measure of muscle integrity), plasma creatine kinase (CK) and tumor necrosis factor-α (TNF-α) levels prior to daily exercise; as well as repetition performance count for each exercise. A two-way repeated measures ANOVA was performed for the main analyses, with Bonferonni post-hoc pairwise comparisons where applicable. For repetition count, no significant differences were reported between conditions (P>0.05). For squat performance, total repetition count was lower at day 10 (19.7±1.8) compared to day 8 (23.0±2.0; P=0.006, ƞp2 = 0.335; 95% CI for difference -5.65 to -0.92) within PROMOD only. Post-exercise CK concentrations significantly increased across test days (P<0.001, ƞp2 = 0.583) increasing from 293±48U.L-1 to 718±140U.L-1 within PROHIGH and from 281±45U.L-1 to 656±155U.L-1 within PROMOD, although no differences were reported between groups. No differences for TNF-α or muscle soreness were reported between groups. Phase angle was significantly greater at day 10 for PROHIGH (8.26 ± 0.82°) compared with PROMOD (8.08 ± 0.80°, P=0.012, ƞp2 = 0.237; 95% CI for difference -0.55 to -0.08). Protein intake at 2.9g.kg-1.d-1 did not enhance indices of recovery following resistance exercise when peri-exercise protein consumption was controlled for. This finding suggests that daily protein intakes of 1.8g.kg-1 may be sufficient for consecutive days of resistance exercise in habitually trained individuals.