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The anabolic hormone response to a lower-body resistance exercise bout in conjunction with oral BCAA supplementation

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Background

BCAAs (leucine, isoleucine, and valine), particularly leucine, activate key enzymes in protein synthesis after physical exercise. Research has demonstrated that BCAAs increase mTOR phosphorylation and activate p70 S6 kinase in human muscle via an Akt-independent pathway. The extent to which BCAAs influence the anabolic hormone response in conjunction with resistance exercise is not well established. A randomized, double-blind, placebo-controlled study was performed to evaluate the effects of BCAA ingestion in conjunction with an acute bout of lower-body resistance exercise (RE) on various anabolic hormones.

Methods

20 recreationally active males ingested a BCAA supplement (120 mg/kg/bw) (n = 10; 24.4 years; 178.3 cm; 85.4 kg) or a placebo (n = 10; 21 years; 176.8 cm; 83 kg) at 3 time points: 30 minutes prior to RE, and immediately pre-RE and immediately post-RE. Subjects performed 4 sets of leg press and 4 sets of leg extension at 80% 1 RM to failure. Rest periods between sets and exercises was approximately 150 seconds. Venous blood was sampled at baseline; 30 min later, immediate postexercise, 30 min post-exercise; 2 hrs post-exercise, and 6 hrs post-exercise for serum insulin, growth hormone (GH), and free insulin-like growth factor-1 (IGF-1). A two-way ANOVA with repeated measures was utilized to analyze the data.

Results

Data are reported as means ± SD at baseline; 30 min later, immediate postexercise, 30 min post-exercise; 2 hrs post-exercise, and 6 hrs post-exercise. Insulin values were 19.2 ± 7.8, 23.0 ± 9.6, 25.3 ± 12.9, 24.8 ± 14.3, 19.0 ± 9.0, 15.8 ± 6.4 and 22.0 ± 10.5, 22.0 ± 10.9, 27.8 ± 9, 24.1 ± 8.7, 17.9 ± 8.8, 21.2 ± 12.8 uIU/mL for the BCAA and Placebo groups, respectively. A significant main effect for time was observed ($p < .001$), but no significant main effect for group ($p = .758$) or significant interaction ($p = .465$) was observed for insulin. GH values were .41 ± .81, .64 ± .97, 1.9 ± 2.2, 1.5 ± 2.6, .23 ± .32, 2.6 ± 4.0 and .07 ± .09, .84 ± 1.3, 2.2 ± 1.9, 2.2 ± 3.8, .28 ± .76, .36 ± .56 ng/ml for the BCAA and Placebo groups, respectively. A significant main effect for time was observed ($p = .021$), but no significant main effect for group ($p = .672$) or significant interaction ($p = .217$) was observed for GH. Free IGF-1 values were 1.3 ± .83, 1.2 ± .72, 1.2 ± .77, 1.4 ± .91, 1.1 ± .74, .95 ± .64 and 1.3 ± .43, 1.2 ± .43, 1.6 ± .54, 1.5 ± .57, 1.4 ± .46, 1.1 ± .53 ng/ml for the BCAA and Placebo groups, respectively. A significant main effect for time was observed ($p = .014$), but no significant main effect for group ($p = .569$) or significant interaction ($p = .356$) was observed for free IGF-1.

Conclusion

An acute bout of lower-body RE significantly increases insulin, GH, and IGF-1 in the immediate post-exercise

time period, but oral ingestion of BCAA at a dosage of 120 mg/kg/bw does not impart an additional effect of the hormonal response to the resistance exercise stimulus.