

Poster presentation

## Beta-alanine supplementation and high-intensity interval training augments metabolic adaptations and endurance performance in college-aged men

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### Background

A randomized, double-blind, placebo-controlled study was conducted to evaluate the effects  $\beta$ -alanine supplementation and high-intensity interval training (HIIT) on endurance performance.

### Methods

Forty-six college-aged men (Age:  $22.2 \pm 3.3$  yrs,  $VO_{2peak}$ :  $42.6 \pm 6.2$  ml  $\cdot$  kg  $\cdot$  min<sup>-1</sup>,  $3.3 \pm 0.6$  l  $\cdot$  min<sup>-1</sup>) volunteered to participate. In a random fashion, all subjects were placed into one of three groups: placebo (PL – 16.5 g of flavored dextrose powder per packet; n = 18),  $\beta$ -alanine (BA – 1.5 g  $\beta$ -alanine plus 15 g of flavored dextrose powder per packet; n = 18) or control (n = 10) groups. Each treatment group ingested one packet 4 times per day (total of 6 g/day) for the first 21-day adaptation phase, followed by 2 times per day (3 g/day) for the subsequent 21 days. All participants performed a continuous  $VO_{2peak}$  test on a cycle ergometer (Corval Lode, Gronigen, the Netherlands) which was further used to establish ventilatory threshold (VT), and total time to exhaustion ( $VO_{2TTE}$ , seconds) at pre-, mid- and post-testing. Total work done (TWD) was also measured, calculated from the total time (T; seconds) completed at a workload corresponding to 110% of their maximal power output (watt, W) determined from the  $VO_{2peak}$  test [ $TWD$  (kJ) = (T  $\times$  W)/1000]. Following ini-

tial testing, all participants in the BA and PL groups engaged in a 3 week supplementing and training adaptation phase. Each training session in the adaptation phase consisted of 5 bouts of a 2:1 minute cycling work to rest ratio, introduced in an undulating progression starting at 90%  $VO_{2peak}$  power output and reaching 110%. The second 3 week training phase progressed, reaching intensities up to 115% of  $VO_{2peak}$ . Body composition was assessed using air displacement plethysmography (Bod Pod®) at pre- mid- and post-testing. Separate one-way analyses of covariance were used to identify and group (BA vs. PL. vs. CON)  $\times$  time (Mid- vs. Post-) interactions, adjusting mean post-test values for differences in the mid-test scores, due to the supplementing and training adaptation phase.

### Results

There was a significant difference among all post-test GXT variables ( $VO_{2peak}$ ,  $VO_{2TTE}$ , and VT) and TWD, after adjusting for the mid-test adaptation values ( $p \leq 0.000$ ). However, there were no differences between treatment group means. Individual responses indicated a greater number of the BA participants improving in  $VO_{2peak}$  (83%) and  $VO_{2TTE}$  (72%) performance over the PL group (61% and 56%, respectively). Furthermore, bonferroni-corrected post-hoc pairwise comparisons indicated the significant increases in TWD were greater for the BA group

than the CON ( $p = 0.029$ ). There were no significant changes in body composition following training and supplementing.

### Conclusion

Three weeks of combined  $\beta$ -alanine supplementation and HIIT, following a 21-day  $\beta$ -alanine loading and HIIT adaptation phase, significantly improves aerobic performance. The improvements in performance may be attributed to a greater reliance on aerobic metabolism due to chronic adaptations to HIIT, in combination with an improved muscle buffering capacity as a result of an increase in intramuscular carnosine levels.

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