

The Effect of Branched-Chain Amino Acids, Arginine, and Citrulline on Repeated Swimming Performance

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Abstract : Introduction: Branched-chain amino acids (BCAA) could reduce cerebral uptake of tryptophan, leading to decreased synthesis of serotonin in the brain. Arginine and citrulline could reduce exercise-induced hyperammonemia by increasing nitric oxide synthesis and the urea cycle. The combination of these supplements could reduce exercise-induced central fatigue. The purpose of this study was to examine the effect of BCAA, arginine, and citrulline supplementation on repeated swimming performance in teenage athletes. Methods: Eight male and eight female high school swimmers ingested 0.085 g/kg BCAA, 0.05 g/kg arginine and 0.05 g/kg citrulline (AA trial) or placebo (PL trial) in a randomized cross-over design. One hour after the ingestion, the subjects performed a 50 m sprint with their best style every 2 min for 8 times in an indoor 25 m pool. The subjects were asked to swim with their maximal effort each time. The time, stroke frequency and stroke length in each sprint were recorded. Venous blood samples were collected before and after the exercise. The time for each sprint was analyzed by 2-way analysis of variance with repeated measurement. Results: When all subjects were pooled together, total time for the AA trial was significantly faster than the PL trial (AA: 244.02 ± 22.94 s; PL: 247.55 ± 24.17 s, $p < .001$). Individual sprint time showed significant trial ($p = .001$) and trial x time ($p = .004$) effects. The post-hoc analysis revealed that the AA trial was significantly faster than the PL trial in the 2nd, 5th, and 6th sprint. In female subjects, there is a significant trial effect ($p = .004$) with the AA trial being faster in the 1st, 2nd, and 5th sprint. On the other hand, the trial effect was not significant ($p = .072$) in male subjects. Conclusions: The combined supplementation could improve 8 x 50 m performance in high school swimmers. The blood parameters including BCAA, tryptophan, NH_3 , nitric oxide, and urea, as well as the stroke frequency and length in each sprint, are being analyzed. The results will be presented in the conference.

Keywords : central fatigue, hyperammonemia, tryptophan, urea

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