EFFECT OF STRENGTH TRAINING SESSION ON BLOOD LEUCINE CONCENTRATION FOLLOWING ORAL INGESTION OF LEUCINE OR BCAAS IN MEN

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The amino acid absorption rate from different protein sources ranges from 1.3 to 10.0 g/h (1). It has been shown earlier (2,3) that after ingestion of 3.9-4.0 g single amino acid arginine or taurine the peak concentration in plasma occurs at 60 min. The one hour strength training session (STS) is shown to delay the peak concentration of arginine and taurine (3). The purpose of the present study was to investigate the acute effects of STS on leucine concentration in blood after orally ingested capsules of either single leucine or a combination of branched chain amino acids (BCAAs: leucine, isoleucine and valine).

Subjects were nine physically active men (24 ± 3 yrs; 1.78 ± 0.06 m; 76 ± 7 kg) who participated in a double blind, randomized, and cross-over experiment. They fasted for 10 hours before the 120 min measurement period at 8:00-10:00 a.m. After the first blood sample each subject took leucine capsules (50 mg/kg body weight) or BCAA capsules (leucine 50 mg, isoleucine 12.5 mg and valine 12.5 mg per kg body weight) or placebo randomly with water (400g) in either rest or STS condition before carrying out the respective measurements. The treatment was repeated six times and the wash-out period between the measurements was seven days. The 60 min STS included five minutes warm-up with a row-ergometer and six strength exercises aimed to induce muscle hypertrophy. Blood samples were taken just before leucine or BCAAs or placebo ingestion and at 30, 60, 90 and 120 minutes after the beginning of the treatment and they were assayed for amino acids using standard HPLC methodology. Data were analyzed by repeated measures ANOVA.

The concentration of plasma leucine increased significantly (p<0.05 – 0.001) following both leucine and BCAAs ingestion in both rest and STS conditions. In the placebo group the leucine concentration was similar at rest and decreased (p<0.05 – 0.001) in the STS condition. The peak concentration following both leucine and BCAAs treatment was similar and occurred in the rest condition at 60 min whereas in the STS condition the peak concentration was smaller than at rest and occurred at 90 min in both treatments.

After the oral ingestion of either leucine (3.8 g) or BCAA (leucine 3.8 g, isoleucine 0.95 g and valine 0.95 g) capsules the peak concentrations of leucine were similar at rest and occurred at 60 min. The one hour hypertrophic whole body strength training session delayed the peak concentration by 30 min. This delay is probably due to mechanical factors in gastric emptying during movements in STS and/or a decrease in splanchnic area circulation during STS. The peak concentration was smaller than at rest perhaps due to oxidative role of leucine in exercise.

References
3. Mero et al., Strength Training for Sport, Health, Aging and Rehabilitation. The 5th International Conference on Strength Training. 358-359, 2006

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