1-O-14 The Inhibitory Effects of branched -chain amino acids (BCAA) administration on central fatigue during prolonged aerobic exercise

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Purpose: Previous studies showed that prolonged exercise (PE) causes an increase in the plasma concentration ratio of free triptophan (fTrp) to BCAA. This would favor the transport of fTrp into the brain and the synthesis of serotonin, which contributes to central fatigue during PE. We tested the effects of BCAA ingestion, which leads to a decrease of the fTrp/BCAA ratio, against central fatigue during PE. **Methods**: Nine female volleyball players received BCAA (90 mg/kg x 2) or placebo (cross -over design) during 2 hours treadmill running at 80 % HR level of anaerobic threshold. The values from advanced trial making test (ATMT), critical flicker frequency (CFF), blood sampling (blood sugar, lactic acid, free fatty acid, ammonia and BCAA), which were examined before and after PE, were compared between the BCAA-treated group and controls. **Results**: The average response time of ATMT after PE was significantly faster in the BCAA-treated group compared with controls (1.98 ±0.15 sec vs 2.29±0.41 sec, $p< 0.05$). Furthermore, the deterioration of visual acuity estimated by CFF was inhibited in the BCAA-treated group. BCAA ingestion elevated the plasma level of BCAA dramatically, however, it was accompanied by the significant increase of plasma ammonia. **Discussion**: These results suggested that BCAA is effective to repress central fatigue during PE. Adjustment of BCAA and other amino acids composition, which do not induce plasma ammonia elevation, may provide a novel strategy to improve physical performance of athletes during PE.

Key words: BCAA, central fatigue, ATMT

1-O-15 Effect of hydrogen saturated alkaline electrolyzed water on urinary oxidative stress markers after an acute exercise in humans

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Purpose: Alkaline electrolyzed water, generated by alkaline ionized water apparatus, contains molecular hydrogen and has been suggested to have various cytoprotective functions. In particular, recent studies have shown that molecular hydrogen can selectively react with the hydroxyl radicals, the most highly reactive oxygen species, to produce water and powerfully protects against oxidative stress. However, there are no reports to investigate the importance of molecular hydrogen dissolved water as antioxidative properties in humans. Thus, the purpose of this study was to examine the effect of hydrogen-saturated alkaline electrolyzed water on exercise-induced oxidative damage evaluated by some urinary biomarkers for oxidative stress.

Methods: Twenty-one healthy males (20.8 ± 0.2 years) were recruited this 2-week double-blinded randomized study. They were randomly assigned to one of three groups: Control (purified normal water, n=7), AEW (alkaline electrolyzed water, n=7), HAEW (molecular hydrogen-saturated alkaline electrolyzed water, n=7) and drunk respective experimental waters every day (0.9L/day) throughout 2-week intervention. All subjects underwent 2 treadmill-running tests (30 min) before and after the intervention, at the intensity corresponding to their 70% heart rate reserve. Twenty-four hour urine sample was collected pre and post exercise session. Urinary hexanoyl-lysine (HEL) and 8-hydroxy-2'-deoxyguanosine (8-OHdG) contents were measured.

Results & Discussion: Before the intervention, no significant differences among groups were observed in changes of both HEL and 8-OHdG levels. On the other hand, there was a trend for HEL change from pre-exercise level to be lower in HAEW compared with Control and AEW, after the intervention. The change of 8-OHdG from pre-exercise level in HAEW was significantly lower than that in Control ($P<0.05$). These results support the hypothesis that hydrogen-saturated alkaline electrolyzed water prevents oxidative damage induced by an acute severe exercise in humans.

Key Words: Hydrogen, Alkaline electrolyzed water, Oxidative stress, Exercise