2908 Board #11 June 5 8:00 AM - 9:30 AM
Oxidative Stress In The Liver Of Exercised Rats Supplemented With Creatine
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PURPOSE: There is evidence that creatine may exert antioxidant activities. To verify this hypothesis, this study examines the effects of aerobic training and creatine supplementation on biomarkers of oxidative stress in the liver of rats.

METHODS: Adults (90 day) male wistar rats were submitted to Maximal Lactate State (MLSS) test in order to identify the aerobic/anerobic metabolic transition during treadmill running. Forwards, the rats were divided into 4 groups: Trained Supplemented (TS), Trained (T), Sedentary Supplemented (SS) and Sedentary (S). Trained rats ran on a treadmill for 40 minutes/5 days a week, in the speed equivalent to individual MLSS during 8 weeks. Supplemented rats received creatine monohydrate 5 days a week at a dose 1.5 g/kg body weight, by gavage during 8 weeks. At the end, all rats were sacrificed for analysis of biomarkers of lipid peroxidation: amount of substances that react with thiobarbituric acid (TBARs) and of the antioxidant defense system: catalase activity (CAT) and superoxide dismutase activity (SOD) in liver. The statistical procedure consisted of two-way ANOVA. When necessary, the Bonferroni post hoc comparison test was used. In all cases, the statistical significance was set at P<0.05.

RESULTS: The amount of TBARs (mmol MDA/mg protein) was higher in the Sedentary SS (12.11 + 4.59) and S (15.21 + 5.81) groups than in the trained groups (ST 8.20 + 3.2; T 7.89 + 3.1). CAT activity (umol/min.mg protein) was higher in the Sedentary SS (0.59 + 0.16), S (0.49 + 0.09) groups and Trained group T (0.46 + 0.14) than in the ST group (0.37 + 0.10). There were no significant differences between groups in relation to the SOD activity (U/mL) (ST 15.43 + 3.16; T 13.84 + 3.75; SS 12.92 + 2.77 S 11.34 + 2.18).

CONCLUSION: The results of this study suggest that physical activity decreases membrane lipid peroxidation in the liver of rats, independently of creatine supplementation. This adaptation was not associated with the components of the antioxidant system evaluated in the present study.

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2909 Board #12 June 5 8:00 AM - 9:30 AM
Oral Supplementation With Alanyl-glutamine Or Glutamine Prevents Muscle Damage And Oxidative Stress In Trained Rats
Eder Ricardo Petry Ricardo Petry 1, Mariana Lindenberg Alvarenga 2, Thiago Gomes Heck 3, Paulo Ivo Homem de Bittencourt 3, 4, Vinícius Fernandes Cruzat 3, Julio - Jose Tirapegui 1, 5, 6, 7, 8. 1University of São Paulo, São Paulo, Brazil. 2Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil. 3Universidade do Rio Grande do Sul, Porto Alegre, Brazil. 4(Faculty: Bernardino P.R.V. 2009/58222-8, 5Secretary (Bruno Reis): John L. Ivy, FACSM, 6University of São Paulo, São Paulo, Brazil. 7São Paulo State University, Rio Claro, Brazil. 8São Paulo State University, Rio Claro, Brazil.

PURPOSE: We investigated the effect of supplementation with alanyl-glutamine (DIP) and a solution containing L-glutamine plus L-alanine (GLN+ALA), both in the free form, on parameters of muscle damage and lipid peroxidation, in rats submitted to aerobic training.

METHODS: Wistar rats were subjected to 8-weeks of treadmill running training. During the last 21 days of training, the animals were supplemented with DIP (1.5 g/kg, n=8), GLN+ALA (1 and 0.61 g/kg, respectively; n=8) or water (CONTR, n=8). The rats were killed 12 hours after the last training session, when plasma, skeletal muscle and livers were collected for analysis. One-way ANOVA, with post-test Tukey (HSD), and Levene’s Test of Homogeneity were used and p<0.05 was considered significant.

RESULTS: Supplementation with DIP or GLN+ALA increased plasma glutamine concentration by 23% and 21% respectively, as compared to CONTR group (p=0.0001). Plasma ammonia concentration was lower in both supplemented groups (DIP, 3.8 ± 0.1 μM and GLN+ALA, 4.1 ± 0.2 μM), compared with CONTR group (5.3 ± 0.2 μM) (p=0.0001). DIP and GLN+ALA groups exhibited in the soleus muscle high glutamine (33.4% and 28%), glutamate (21.7% and 10.8%) and glutathione (GSH, 52.2% and 48.4%), compared to controls. In the gastrocnemius muscle also more glutamine (42.6 and 24.8%), glutamate (10.2 and 13.1%) and GSH (51.3 and 47.2%) were observed, compared to controls. In the liver of the supplemented groups high concentration of glutamine (36.9% and 32.7%), glutamate (4.6% and 2.8%) and GSH (47.1% and 46.4%) were observed. Plasma concentration of malondialdehyde (MDA), an index of plasma lipoperoxidation, was lower in both nutritional treatments (DIP 46.6% and GLN+ALA, 37.6%). Additionally, lower activity of plasma creatine kinase (CK) was observed in the DIP (25.1%) and GLN+ALA (24.3%) groups, as compared to controls, which was in parallel by a marked decrease in the liberation of muscle myoglobin towards in the plasma (DIP, 43.9% and GLN+ALA, 35.3%).

CONCLUSIONS: Oral supplementation, with either alanyl-glutamine or glutamine plus alanine solution represents an efficient way to supply glutamine for GSH biosynthesis during strenuous exercise training leading to reduced muscle damage and systemic oxidative stress.

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2910 Board #13 June 5 8:00 AM - 9:30 AM
Attenuation of Hepatic Oxidative Damages in Exhaustive Exercised Rats by Dammarane Saponins Supplementation
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PURPOSE: Oxidative damage of proteins and lipids may further impair other cellular functions after exhaustive exercise. This study investigated the effect of different concentrations of Dammarane Saponins supplementation to cope the exhaustive exercise-induced oxidative damages in liver of rats.

METHODS: Dammarane saponins (DS), exclusively extracted from ginseng were given to rats at different dosages (20, 60 and 120 mg/kg b.w.) for 2 months and treated as placebo, DS-20, DS-60 and DS-120 groups. Each group consists ten and five rats performed exhausted swimming exercise from each group.

RESULTS: Glutathione (GSH), a foot marker of oxidative stress was dramatically decreased after exhausted exercise in placebo group, and the same was elevated in DS treated groups even after exercise. No significant changes in oxidized GSH (GSSG) levels were reported after exercise. In this study proteins and lipids peroxidation was clearly observed in exercised liver as shown as elevated protein carbonyls and MDA (malondialdehyde) levels respectively. However, we found that elevated protein and lipid peroxidation levels were attenuated in all DS pretreated groups after exercise. Furthermore, we also found significant (p <0.05) increase in xanthine oxidase (XO) activities after exercise in placebo groups. Whereas, XO activities were controlled in DS pretreated groups than placebo exercised rats, which indicates diminished free radical production.

CONCLUSIONS: For the first time, we demonstrated that exhausted exercise-induced oxidative damage in liver was significantly reversed by DS pre-supplementation. This was evidenced by improved intracellular GSH status, controlled protein and lipids oxidation, and XO values. These results further suggest that DS as a nutritional supplement to athletes could be helpful to cope with the oxidative damages induced by exhaustive performance.

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