

Arginine Modulates both Hyperammonemia and Lymphocyte Appearance in Blood after High-Intensity Exercise.

Bessa, A.^{1,3}; Gonçalves, L. C. O.^{1,2}; Freitas-Dias, R.^{1,2}; Bassini-Cameron, A.^{1,3}; Werneck-de-Castro, J. P. S.^{1,4,5} and Cameron, LC.^{1,2,3}.

¹Laboratório de Bioquímica de Proteínas, Universidade Federal do Estado do Rio de Janeiro, Brazil; ²Universidade Castelo Branco, Rio de Janeiro, Brazil; ³Instituto de Genética e Bioquímica, Universidade Federal de Uberlândia, Brazil; ⁴Laboratório de Biologia Muscular e do Exercício, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil; ⁵Instituto de Biofísica Carlos Chagas Filho, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil

Exercise is a good model to study hyperammonemia in humans without requiring external ammonia exposure. Here we used a new fight-based model to better understand arginine modulation of both hyperammonemia and the appearance of leukocytes in the blood. Brazilian Jiu-Jitsu practitioners (men, n = 39) volunteered to this study. The subjects followed a ketogenic diet for four days before the trials and received either arginine supplementation (100 mg/kg of body mass/day) or a placebo. We used an experimental model consisting of a six-minute fight with athletes wearing full gear. The rate of ammonia increase during the fight in the control group was almost twice that of the arginine group (25 $\mu\text{mol/L}\cdot\text{min}^{-1}$ and 13 $\mu\text{mol/L}\cdot\text{min}^{-1}$, respectively). The exercise induced an increase in leukocytes of almost 75%. An even greater difference was observed in the lymphocyte counts, which rose 2.2-fold in the control group; this increase was partially prevented by arginine. The ammonia curve shape suggests that arginine is helping to prevent ammonia increase. In this study, we showed a high correlation between increases in both lymphocytes and ammonia, prevented by arginine supplementation. We also propose that an increase in lymphocytes could be a metabolic mechanism to protect from hyperammonemia. Key words: WBCs; Amino Acids; Immune Response