Effects of dietary arginine supplementation on nutrient

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Abstract

This study investigated the effect of arginine (Arg) supplementation on nutrient metabolism and splenocyte response in burned mice. Also, the survival of burned mice complicated with Pseudomonas aeruginosa was evaluated. Experiment 1: Sixty male BALB/c mice were assigned to 2 groups. One group was fed with casein as the protein source, the other group was supplemented with 2.4% (w/w) Arg in addition to casein. After 4 weeks, all mice received a 30% body surface area burn injury. Mice in each group were sacrificed for 3 consecutive days after the burn with 10 mice on each respective day. Plasma blood chemistry and amino acid profiles were analyzed. Spleens were removed aseptically from mice 1 day after the burn, interferon (IFN)-γ and interleukin (IL)-4 concentrations secreted by cultured splenocytes were measured. Experiment 2: Thirty mice were divided into 2 groups as described in experiment 1. After 4 weeks, burn injury was induced, and mice were challenged with P. aeruginosa. Survival of the burned mice was observed for 7 days. In experiment 1, no differences in plasma glucose, non-esterified fatty acids, and lactic acid concentrations were observed between the 2 groups on each respective day. Arg group had higher levels of alanine and branched-chain amino acids on day 2, also, plasma Arg and glutamine levels were higher in the Arg group on days 2 and 3 after the burn than in the control group. IFN-γ concentrations in mitogen stimulated splenocyte cultures were higher in the Arg group than the control group. No difference in IL-4 concentrations was observed. In experiment 2, the survival did not differ between the 2 groups. These results suggest that Arg supplementation had no beneficial effect on glucose and lipid metabolism, nor had any effect on survival when burned mice were complicated with P. aeruginosa infection. However, Arg supplementation reduced the depletion of plasma Arg and glutamine levels at the hypercatabolic stage after the burn, and may have potential benefit on enhancing cellular immune response.