Immune-enhancing diet (IED) effects in endotoxemic rats

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The aim of this work was to compare the nutritional efficiency of a recently available enteral formula enriched in arginine, ω3 fatty acids and anti-oxidants and supplying nitrogen as peptides (Crucial®, Nestlé Clinical Nutrition (NCN)), with that of a standard polymeric formula (Sondalis HP®, NCN) in endotoxemic rats. METHODS: Male Wistar rats (209 ± 2 g) underwent catheter gastrostomy and received Sondalis HP® until they recovered their pre-operative weight. At this time (D0), an endotoxemic shock (ES) was induced by an intraperitoneal injection of LPS (E. coli, 8 mg/kg) and the rats then received 290 kcal/kg/day and 3.29 g N/kg/day in the form of either Crucial® (IED, n = 7) or Sondalis HP® (S, n = 6) for 3 days. An ad libitum group (AL) underwent no treatment and was fed ad libitum. Rats were sacrificed on D3. Results = mean ± SEM ; ANOVA + Newman-Keuls. RESULTS: The ES induced a weight loss in group S on D1 and D2, whereas the IED diet allowed weight gain (S: -3.5 ± 1.3 g vs IED: + 6.0 ± 2.2 g, p < 0.05). In the same way, atrophy of extensor digitorum longus muscle (EDL) was observed in the S group, whereas wasting was limited in the IED group (IED: 102 ± 4 mg vs S: 90 ± 3 mg vs AL: 119 ± 3 mg, p < 0.05). The muscular atrophy was associated with muscular glutamine depletion and correlated with hyperphenylalaninemia (R = 0.60), the latter being blunted in the IED group (AL: 57 ± 1 vs S: 77 ± 4 vs IED: 66 ± 2 µmol/L, p < 0.05). No difference was observed between the two groups of endotoxemic rats on nitrogen balance, urinary 3-MH excretion or total tissue protein content. CONCLUSION: Crucial® counteracts injury-mediated loss of weight, EDL atrophy and hyperphenylalaninemia in endotoxemic rats.