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Glutamine supplementation decreases intestinal permeability and preserves gut mucosa integrity in an experimental mouse model.

dos Santos Rd¹, Viana ML, Generoso SV, Arantes RE, Davisson Correia MI, Cardoso VN.

Author information

Abstract

BACKGROUND: Glutamine (GLN) is the preferred fuel for enterocytes, and GLN supplementation is critical during stressful conditions. The aim of this study was to evaluate the effect of GLN on intestinal barrier permeability and bacterial translocation in a murine experimental model.

METHODS: Swiss male mice (25-30 g) were randomized into 3 groups: (1) sham group; (2) intestinal obstruction (IO) group; (3) IO and GLN (500 mg/kg/d) group. Two different experiments were carried out to assess intestinal permeability and bacterial translocation. In the first experiment, the animals were divided into the 3 groups described above and received diethylenetriamine pentaacetate radiolabeled with technetium ((99m)Tc) on the eighth day. At different time points after intestinal obstruction, blood was collected to determine radioactivity. The animals were killed, and the small intestine was removed for histological analyses. In the bacterial translocation study, on the eighth day all groups received Escherichia coli labeled with (99m)Tc. After 90 minutes, the animals underwent intestinal obstruction and were killed 18 hours later. Blood, mesenteric lymph nodes, liver, spleen, and lungs were removed to determine radioactivity. Statistical significance was considered when $P < \text{or} = .05$.

RESULTS: The levels of intestinal permeability and bacterial translocation were higher in the IO group than in the sham and GLN groups ($P < .05$). GLN decreased intestinal permeability and bacterial translocation to physiologic levels in the treated animals and preserved intestinal barrier integrity.

CONCLUSIONS: GLN had a positive impact on the intestinal barrier by reducing permeability and bacterial translocation to physiologic levels and preserving mucosal integrity.

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