Dietary glutamine supplementation modulates Th1/Th2 cytokine and interleukin-6 expressions in septic mice

Chiu Li Yeh, Chun-Sun Hsu, Sung-Ling Yeh and Wei-Jao Chen

Yeh CL;Hsu CS;Yeh SL;Chen WJ

Abstract

Glutamine (Gln) has been demonstrated to have benefit in the modulation of systemic immunity in sepsis. However, the effects of Gln on local immunity and intra-lymphocyte cytokine expression have not been investigated in mice with gut-derived sepsis. This study evaluated the influence of a Gln-enriched diet on interleukin (IL)-6 expression in organs and Th1/Th2 type cytokine production within lymphocytes in septic mice. Male ICR mice were assigned to control and Gln groups. The control group was fed a semi-purified diet, while in the Gln group, Gln replaced part of the casein. After feeding the respective diets for 3 weeks, sepsis was induced by cecal ligation and puncture (CLP). Mice were sacrificed at 0, 6, 12 and 24 h after CLP and their organs were harvested for further analysis. Results showed that IL-6 levels in the liver were decreased, whereas levels were increased in the lungs, kidneys and intestines with the progression of sepsis in both groups. Also, intra-lymphocyte interferon (IFN)-γ expression decreased and IL-4 expression increased during sepsis. Compared to the control group, the Gln group had higher levels of IL-6 in the liver and lower levels in other organs at various time points. Lymphocyte IFN-γ expression in the Gln group was higher, and IL-4 levels were lower than those of the control group after CLP. These results suggest that Gln supplementation decreased IL-6 production in non-hepatic organs, while reducing intra-lymphocyte IL-4 and enhancing IFN-γ expressions. This change may reverse the Th2 type response to a more-balanced Th1/Th2 response during sepsis.