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Dietary N-6/N-3 PUFA Ratios Affect the Homeostasis of CD4+ T Cells in Mice with Dextran Sulfate Sodium-Induced Colitis

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Abstract : This study evaluated the effect of different dietary n-6/n-3 polyunsaturated fatty acid (PUFA) ratios on modulating helper T (Th) and regulatory T (Treg) lymphocytes in mice with dextran sulfate sodium (DSS)-induced colitis. There were 3 control and 3 colitis groups in this study. Mice were fed for 24 d with an AIN-93G diet either with soybean oil (S), a mixture of soybean oil and low fish oil content (LF) or high fish oil content (HF). The ratio of n-6/n-3 PUFA in the LF diet was 4:1, and that in the HF diet was 2:1. The control groups drank distilled water while colitis groups provided 2% DSS in drinking water during day 15-19. All mice drank distilled water from day 20-24 for recovery and sacrificed on day 25. The results showed that colitis resulted in higher Th1, Th2, and Th17 and lower Treg percentages in the blood. Also, plasma haptoglobin and proinflammatory chemokines were elevated in colon lavage fluid. Colitic groups with fish oil had lower inflammatory mediators in the plasma and colon lavage fluid. Further, the percentages of Th1, Th2, and Th17 cells in the blood were lower, whereas Treg cell percentages were higher than those in the soybean oil group. The colitis group with n-6/n-3 PUFA ratio 2:1 had more pronounce effects than ratio 4:1. These results suggest that diets with an n-6/n-3 PUFA ratio of 2:1 or 4:1 regulate the Th/Treg balance and attenuate inflammatory mediator production in colitis. Compared to the n-6/n-3 PUFA ratio 4:1, the ratio of 2:1 was more effective in reducing inflammatory reactions in DSS-induced colitis.

Keywords : inflammatory bowel disease, n-3 polyunsaturated fatty acids, helper T lymphocyte, regulatory T lymphocyte
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