Dietary fish oil reduces the acute inflammatory response and enhances resolution of inflammation in antigen-induced peritonitis in mice

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Dietary n-3 polyunsaturated fatty acids influence the inductive phase of inflammation but less is known about their effects on resolution of inflammation. This study examined the effects of dietary fish oil on induction and resolution of antigen-induced inflammation in mice. Mice were fed a control or fish oil diets, immunized twice with mBSA and peritonitis induced. Peritoneal exudate was collected at different time points and expression of surface molecules determined with flow cytometry. Concentrations of chemokines, cytokines and soluble cytokine receptors were determined by ELISA.

Mice fed the fish oil diet had fewer peritoneal neutrophils, shorter resolution interval and lower levels of pro-inflammatory cytokines and chemokines than mice fed the control diet. In mice fed the fish oil diet there was an early peak in peritoneal levels of the immunosuppressive molecules sIL-6R and TGF-β, that was not seen in mice fed the control diet. In the resolution phase, peritoneal macrophages from mice fed the fish oil diet expressed more of the atypical chemokine receptor D6 and peritoneal TGF-β levels were higher than that in mice fed the control diet. Furthermore, in the late-resolution phase there were more peritoneal eosinophils and macrophages in mice fed the fish oil diet than in mice fed the control diet.

These results demonstrate a suppressive effect of fish oil on the inductive phase of inflammation and indicate an enhancing effect on resolution of inflammation.