P055 Eicosapentaenoic acid confers neuroprotection in the rat hippocampus

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Evidence suggests that as the brain ages a cytokine imbalance develops; proinflammatory cytokine concentration increases (e.g. IL-1β) whereas antiinflammatory cytokine concentration decreases (e.g. IL-4 and IL-10). We investigated the possible influence of the polyunsaturated fatty acid, eicosapentaenoic acid (EPA) on the hippocampus of aged rats, because it has been proposed to have anti-inflammatory properties.

Aged Wistar rats were fed on a diet supplemented with EPA for four weeks. EPA modulated IL-1β mRNA and prevented the age-related increase in IL-1β protein. Caspase-1, an enzyme which cleaves IL-1β from the inactive to an active state, was decreased at the mRNA level in aged animals which received EPA; this may explain the observed decrease in IL-1β concentration.

We have already reported that IL-1β can be downregulated by IL-4 (Nolan *et al.*, 2004) so we considered that the EPA-induced change in IL-1β might be mediated by IL-4. We report that hippocampal IL-4 mRNA was decreased with age and that EPA treatment of aged rats significantly increased IL-4 mRNA. In parallel, IL-4 concentration was decreased in the hippocampus of aged, compared with young rats and EPA treatment significantly increased IL-4 concentration in aged animals.

We report that *in vitro*, EPA induced IL-4 mRNA expression in hippocampal glial cells which were treated with IL-1β. The data demonstrates that the antiinflammatory effects of EPA are mediated via IL-4.

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