Omega-3 Fatty Acids Supplementation Reduces Episodes and Severity of Illness in School children: A Double Blind Randomized Placebo Control Trial.

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Background: Our previous study showed that omega-3 fatty acid supplementation could reduce absenteeism from school in Thai school children aged between 10-12 years old. However it is not known whether such supplementation affects their immune system.

Methods: 180 Thai primary schoolchildren in Ratchaburi province, Thailand were recruited and allocated in control (n=86) or omega-3 fatty acids supplemented (n=94) groups in a double blind fashion. On five days per week for 6 months they received two boxes of 200 ml UHT milk fortified either by placebo oil (2 g soybean oil) or tuna oil; the latter provided 1 g DHA plus 200 mg EPA each day. Episodes and duration of illness and symptoms were recorded. Prior to and at the end of the intervention blood was drawn for the determination of plasma IL-2 receptor, IL-6, IL-10, and TGF-β1 concentrations and of the fatty acid profile in plasma phospholipids.

Results: After intervention, EPA, DPA and DHA in plasma phospholipids were significantly higher in the tuna oil group than in the control group (all $p<0.001$). Episodes and severity of illness in the tuna oil were significantly less than in placebo control group ($p=0.05$). Plasma IL-6 concentration tended to decrease in the tuna oil group, but this did not reach significance. Plasma TGF-β1 concentration increased in both groups, but the increase was significantly less in the tuna oil group. At the end of supplementation TGF-β1 concentration was lower in the tuna oil group ($p<0.001$). Plasma IL-2 receptor and IL-10 concentrations were not affected by either treatment.

Conclusion: Omega-3 fatty acid supplementation reduces episodes and severity of illness in school children. They modify the circulating concentrations of some cytokines involved in cellular immunity. Whether this is due to reduced disease-induced inflammation or a direct effect on cytokine production remains to be determined.