

The emerging role of docosahexaenoic acid in neuroinflammation.

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Epidemiological studies have linked fish consumption to lower rates of neurological diseases. Fish contains high levels of omega-3 polyunsaturated fatty acids (n-3 PUFA), and several lines of evidence suggest that the n-3 PUFA docosahexaenoic acid (DHA; 22:6n-3) acts in the brain via anti-apoptotic and neurotrophic pathways. In addition, DHA may act through anti-neuroinflammatory pathways, as DHA possesses anti-inflammatory properties in the periphery. Evidence from animal models has indicated that DHA and its derivatives (resolvin D1 and protectin D1) attenuate colitis, peritonitis and ischemic stroke. n-3 PUFA deprivation in rats decreases brain levels of DHA and increases markers of the brain arachidonic acid (20:4n-6) cascade, a proinflammatory pathway. Thus, chronic low intake of n-3 PUFA may predispose the brain to weak anti-inflammatory, as well as strong proinflammatory signals. Neurological disorders, including Alzheimer's disease, Parkinson's disease and major depression, display a neuroinflammatory component. n-3 PUFA supplementation, as well as drugs targeting brain PUFA metabolism, are promising candidates in the prevention and treatment of neurological disorders.