

Abstract

Altern Med Rev. 2007 Sep;12(3):207-27.

Omega-3 DHA and EPA for cognition, behavior, and mood: clinical findings and structural-functional synergies with cell membrane phospholipids.

Kidd PM.

University of California, Berkeley, California, USA.

BACKGROUND: The omega-3 fatty acids docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) are orthomolecular, conditionally essential nutrients that enhance quality of life and lower the risk of premature death. They function exclusively via cell membranes, in which they are anchored by phospholipid molecules. DHA is proven essential to pre- and postnatal brain development, whereas EPA seems more influential on behavior and mood. Both DHA and EPA generate neuroprotective metabolites.

SUMMARY OF FINDINGS: In double-blind, randomized, controlled trials, DHA and EPA combinations have been shown to benefit attention deficit/hyperactivity disorder (AD/HD), autism, dyspraxia, dyslexia, and aggression. For the affective disorders, meta-analyses confirm benefits in major depressive disorder (MDD) and bipolar disorder, with promising results in schizophrenia and initial benefit for borderline personality disorder. Accelerated cognitive decline and mild cognitive impairment (MCI) correlate with lowered tissue levels of DHA/EPA, and supplementation has improved cognitive function. Huntington disease has responded to EPA. Omega-3 phospholipid supplements that combine DHA/EPA and phospholipids into the same molecule have shown marked promise in early clinical trials. Phosphatidylserine with DHA/EPA attached (Omega-3 PS) has been shown to alleviate AD/HD symptoms. Krill omega-3 phospholipids, containing mostly phosphatidylcholine (PC) with DHA/EPA attached, markedly outperformed conventional fish oil DHA/EPA triglycerides in double-blind trials for premenstrual syndrome/dysmenorrhea and for normalizing blood lipid profiles. Krill omega-3 phospholipids demonstrated anti-inflammatory activity, lowering C-reactive protein (CRP) levels in a double-blind trial.

CONCLUSIONS: Utilizing DHA and EPA together with phospholipids and membrane antioxidants to achieve a triple cell membrane synergy may further diversify their currently wide range of clinical applications.

PMID: 18072818

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