

Abstract

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Correlation between changes in blood fatty acid composition and visual sustained attention performance in children with inattention: effect of dietary n-3 fatty acids containing phospholipids.

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BACKGROUND: Increasing evidence supports n-3 fatty acid (FA) supplementation for patients with psychiatric disorders, such as attention deficit hyperactivity disorder. However, the exact metabolic fate of dietary eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) on different glyceride carriers remains unclear.

OBJECTIVE: We investigated whether conjugation of EPA and DHA to phospholipid (PL-n-3) or to triacylglycerol (fish oil; FO) affects their incorporation in blood compartments and influences executive functioning.

DESIGN: Children aged 8-13 y with impaired visual sustained attention performance received placebo, 250 mg/d EPA + DHA esterified to PL-n-3 (300 mg/d phosphatidylserine), or FO for 3 mo in a randomized double-blind manner. Main outcome measures included plasma and erythrocyte FA profile and continuous performance test results (Test of Variables of Attention; TOVA).

RESULTS: Sixty of the 83 children enrolled completed the interventions (n = 18-21 per group). There was an enrichment of EPA (1.5-2.2-fold), docosapentaenoic acid (DPA; 1.2-fold), and DHA (1.3-fold) in the PL fraction in the plasma of FO- and PL-n-3-fed children. In erythrocytes, only PL-n-3 resulted in a significant reduction (approximately 30%) of very-long-chain saturated FAs (C20-24) and in an increase (1.2- and 2.2-fold, respectively) in linoleic acid and DPA. Total TOVA scores increased in the PL-n-3 (mean +/- SD: 3.35 +/- 1.86) and FO (1.72 +/- 1.67) groups but not in the placebo group (-0.42 +/- 2.51) (PL-n-3 > FO > placebo; P < 0.001). A significant correlation between the alterations in FAs and increased TOVA scores mainly occurred in the PL-n-3 group.

CONCLUSION: Consumption of EPA+DHA esterified to different carriers had different effects on the incorporation of these FAs in blood fractions and on the visual sustained attention performance in children. This trial was registered at clinicaltrials.gov as NCT00382616.

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