Total red blood cell concentrations of omega-3 fatty acids are associated with emotion-elicited neural activity in adolescent boys with attention-deficit hyperactivity disorder.


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OBJECTIVE: Affective impairment is observed in children and adolescents with attention-deficit hyperactivity disorder (ADHD). Low levels of long-chain polyunsaturated fatty acids (LC-PUFA), specifically omega-3 (omega-3) fatty acids in blood measures have been linked to a range of behavioural and mood disorders including ADHD. However, nothing is known about the relationship between omega-3 and brain function in children with ADHD.

METHODS: In the current study, 20 adolescent boys with ADHD were assessed for total lipid fractions in red blood cells and their event-related potential (ERP) response to the presentation of facial expressions of happiness, sadness and fearfulness.

RESULTS: The results supported the hypothesis of a positive association between eicosapentaenoic acid (EPA) and a cognitive bias in orientation to overt expressions of happiness over both sad and fearful faces as indexed by midline frontal P300 amplitude. Additional exploratory analyses revealed a positive association between levels of docosahexaenoic acid (DHA) and the right temporal N170 amplitude in response to covert expressions of fear. The arachidonic (AA)/DHA ratio was negatively associated with the right temporal N170 amplitude also to covert expressions of fear.

CONCLUSIONS: These findings indicate that EPA and DHA may be involved in distinct aspects of affect processing in ADHD and have implications for understanding currently inconsistent findings in the literature on EFA supplementation in ADHD and depression.

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