

# Abstract

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## Significance of long-chain polyunsaturated fatty acids (PUFAs) for the development and behaviour of children.

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**BACKGROUND:** omega-6 and omega-3 polyunsaturated fatty acids (PUFAs) play a central role in the normal development and functioning of the brain and central nervous system. Long-chain PUFAs (LC-PUFAs) such as eicosapentaenoic acid (EPA, C20:5omega-3), docosahexaenoic acid (DHA, C22:6omega-3) and arachidonic acid (AA, C20:4omega-6), in particular, are involved in numerous neuronal processes, ranging from effects on membrane fluidity to gene expression regulation. Deficiencies and imbalances of these nutrients, not only during the developmental phase but throughout the whole life span, have significant effects on brain function.

**FINDINGS:** Numerous observational studies have shown a link between childhood developmental disorders and omega-6:omega-3 fatty acid imbalances. For instance, neurocognitive disorders such as attention-deficit hyperactivity disorder (ADHD), dyslexia, dyspraxia and autism spectrum disorders are often associated with a relative lack of omega-3 fatty acids. In addition to a high omega-6 fatty acid intake and, in many cases, an insufficient supply of omega-3 fatty acids among the population, evidence is increasing to suggest that PUFA metabolism can be impaired in individuals with ADHD.

**SUMMARY:** In this context, PUFA imbalances are being discussed as potential risk factors for neurodevelopmental disorders. Another focus is whether the nutritive PUFA requirements-especially long-chain omega-3 fatty acid requirements-are higher among some individuals. Meanwhile, several controlled studies investigated the clinical benefits of LC-PUFA supplementation in affected children and adolescents, with occasionally conflicting results.

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