

**FEATURES OF ARACHIDONIC ACID METABOLISM IN
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Andijan Branch of Kokand University<https://doi.org/10.5281/zenodo.20728596>**ARTICLE INFO**Received: 12th June 2026Accepted: 12th June 2026Online: 16th June 2026**KEYWORDS**

The period of intrauterine development and the first year of a child's life are characterised by an unprecedented rate of brain growth and the development of the visual system

ABSTRACT

Arachidonic acid is a long-chain polyunsaturated fatty acid (PUFA) of the omega-6 class, containing 20 carbon atoms and four isolated double bonds. In the human body, AA is conditionally essential: it can be synthesised from linoleic acid, but this process is limited, which is why the majority of it must be obtained from animal-based foods (meat, eggs, offal). As a key component of cell membrane phospholipids, AFA performs vital regulatory, signalling and metabolic functions.

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The period of intrauterine development and the first year of a child's life are characterised by an unprecedented rate of brain growth and the development of the visual system. Arachidonic acid, along with docosahexaenoic acid (DHA, omega-3), is the predominant PUFA in the grey matter and the retina of the eye [1].

Immaturity of enzymatic systems in infants. Unlike in adults, the ability of newborns and infants to synthesise ALA endogenously from linoleic acid is extremely limited. The $\Delta 5$ - and $\Delta 6$ -desaturase enzymes exhibit low activity, and in preterm infants their expression is virtually absent [2]. Exogenous ALA deficiency during this critical period of synaptogenesis may lead to:

- slowed cognitive development;
- reduced visual acuity;
- impaired myelination of nerve fibres [3].

Breast milk as the gold standard and the adaptation of infant formula

Nature addresses the problem of the immaturity of an infant's enzyme systems through breastfeeding. Human breast milk consistently contains ready-to-use arachidonic acid (on average 0.4% to 0.7% of total fatty acids) regardless of the mother's diet, which highlights the evolutionary importance of this nutrient [4].

In modern paediatrics and nutrition, the enrichment of infant formula (breast milk substitutes) with long-chain PUFAs is a mandatory standard. According to international consensus documents (including EU Directives and WHO recommendations), if DHA (omega-3) is added to the formula, arachidonic acid (omega-6) must be added in at least equal proportions (a ratio of 1:1 or 1:2 in favour of AA) [5]. A disruption of this balance (for example, the isolated addition of DHA) leads to the competitive displacement of AA from cell membranes, which carries the risk of delayed weight and growth in infants and a reduction in immune resistance.

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