The DHA content of a cell membrane can have a significant influence on cellular behaviour and responsiveness to signals

Docosahexaenoic Acid
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Key insights
Docosahexaenoic acid (DHA) is a long-chain omega-3 (n-3) polyunsaturated fatty acid that is a critical component of lipid structures. DHA plays important roles throughout the body and is essential for maintaining the structure and function of the brain and eye. Fetal development and infancy are key windows during which sufficient DHA levels are necessary for optimal mental and visual development and performance in later life.

Current knowledge
Humans have a limited ability to synthesise DHA from essential fatty acids; the main source of DHA is from the diet. Transferred in the blood as a component of lipoproteins, DHA can be stored in adipose tissues. Compared to other bodily tissues, the eye and brain contain a high proportion of DHA. Due to its highly unsaturated composition, DHA adopts a three-dimensional shape that is different from that of other fatty acids in cell membranes. In the rod cells of retinal photoreceptors for example, DHA within the membrane facilitates the conformational change triggered by a light signal. In addition to its effects in the eye and brain, DHA also reduces inflammation, improves immune function, and optimises cellular metabolism.

Practical implications
Maternal plasma phospholipids are an important source of DHA for the fetus. Indeed, DHA is highly concentrated in the fetal circulation and in fetal tissues through the process of bio-magnification. DHA is naturally found in breast milk. The DHA content of breast milk can be increased by maternal consumption of DHA-rich foods such as fish, eggs, fish oil, or DHA-rich oil. Higher consumption of DHA by lactating women results in increased DHA in breast milk, ultimately raising the infant’s DHA status. Therefore, ensuring sufficient dietary DHA in pregnant women is key for optimal fetal development.

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