
Docosahexaenoic acid (DHA) is uniquely concentrated in the brain, and is essential for its function, but must be mostly acquired from diet. Most of the current supplements of DHA, including fish oil and krill oil, do not significantly increase brain DHA, because they are hydrolyzed to free DHA and are absorbed as triacylglycerol, whereas the transporter at blood brain barrier is specific for phospholipid form of DHA. Here we show that oral administration of DHA to normal adult mice as lysophosphatidylcholine (LPC) (40 mg DHA/kg) for 30 days increased DHA content of the brain by >2-fold. In contrast, the same amount of free DHA did not increase brain DHA, but increased the DHA in adipose tissue and heart. Moreover, LPC-DHA treatment markedly improved the spatial learning and memory, as measured by Morris water maze test, whereas free DHA had no effect. The brain derived neurotrophic factor increased in all brain regions with LPC-DHA, but not with free DHA. These studies show that dietary LPC-DHA efficiently increases brain DHA content and improves brain function in adult mammals, thus providing a novel nutraceutical approach for the prevention and treatment of neurological diseases....

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phosphatidylcholine is the major constituent of cell membranes such as the cell membranes of fish.