

Maintaining brain PUFA concentrations: uptake and rapid metabolism

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The brain is particularly enriched in glycerophospholipids with either arachidonic or docosahexaenoic acid esterified in the stereospecifically numbered-2 position. In this talk, I will review how polyunsaturated fatty acids (PUFA) enter the brain, and the mechanisms that regulate their concentrations within brain phospholipids. Whereas little evidence exists to support the incorporation of PUFA from lipoproteins into the brain, the incorporation rates of arachidonic and docosahexaenoic acid from the plasma unesterified pool into brain phospholipids closely approximate independent measures of their consumption rates by the brain. Upon entry into the brain, certain PUFA are highly conserved with extensive recycling within phospholipids, whereas others, such as eicosapentaenoic acid, are rapidly and extensively removed from the brain, in part, due to β -oxidation. Altered PUFA metabolism has been implicated in several neurological disorders, including bipolar disorder and Alzheimer's disease. Identifying the mechanisms by which PUFA enter and are handled within the brain could lead to new therapeutic approaches for these disorders and novel imaging methods.