

**TITLE Randomized controlled trial of brain-specific fatty acid supplementation in pregnant women increases brain volumes on MRI scans of their newborn infants**

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**Abstract**

Docosahexaenoic acid (DHA) and arachidonic acid (ArA) are essential brain specific fatty acids (BSFA) for mammalian central nervous system development. Human brains have accelerated growth with significant increase in cerebral content of ArA and DHA during the last trimester of pregnancy and first postnatal months. This randomized double blind placebo controlled single centre trial assessed the impact of BSFA supplementation in pregnancy on newborn infants' brain volumes. Eighty six infants born to study mothers had brain magnetic resonance imaging (MRI) scans soon after birth. Total and regional brain volumes were analyzed and related to maternal supplementation group. Males born to the BSFA supplemented mothers had significantly larger total brain volumes, total gray matter, corpus callosum and cortical volumes when compared to the placebo group. This is the first study to show maternal BSFA supplementation enhances newborn infants' brain size and suggests differential sex sensitivity of fetal brains to pregnancy BSFA status.

**Keywords:** Arachidonic acid; Brain MRI; Brain specific fatty acids (BSFA); Docosahexaenoic acid; Human newborn; Maternal supplementation.

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