**Total red blood cell concentrations of ω-3 fatty acids are associated with emotion-elicited neural activity in adolescent boys with attention-deficit hyperactivity disorder**. Rachel V. Gow et al. PLEFA 2009;80(2-3):151-156.

**Abstract:** Affective impairment is observed in children and adolescents with attention-deficit hyperactivity disorder (ADHD). Low levels of long-chain polyunsaturated fatty acids (LC-PUFA), specifically omega-3 (ω-3) fatty acids in blood measures have been linked to a range of behavioural and mood disorders including ADHD. However, nothing is known about the relationship between ω-3 and brain function in children with ADHD. In the current study, 20 adolescent boys with ADHD were assessed for total lipid fractions in red blood cells and their event-related potential (ERP) response to the presentation of facial expressions of happiness, sadness and fearfulness. The results supported the hypothesis of a positive association between eicosapentaenoic acid (EPA) and a cognitive bias in orientation to overt expressions of happiness over both sad and fearful faces as indexed by midline frontal P300 amplitude. Additional exploratory analyses revealed a positive association between levels of docosahexaenoic acid (DHA) and the right temporal N170 amplitude in response to covert expressions of fear. The arachidonic (AA)/DHA ratio was negatively associated with the right temporal N170 amplitude also to covert expressions of fear. These findings indicate that EPA and DHA may be involved in distinct aspects of affect processing in ADHD and have implications for understanding currently inconsistent findings in the literature on EFA supplementation in ADHD and depression.
**Keywords:** Attention-deficit hyperactivity disorder; Brain function; Event-related potentials; Emotion processing; Omega-3 fatty acids.

**Early determinants of development: a lipid perspective**. Susan E Carlson. Am J Clin Nutr 2009;89(5):1523S-1529S.

This article results from an International Life Sciences Institute workshop on early nutritional determinants of health and development. The presentation on lipids focused mainly on the longer-chain products of the essential fatty acids, particularly docosahexaenoic acid (22:6n–3), and cognitive development as among the most studied lipids and outcomes, respectively, in early human nutrition. Because there have been several recent reviews on this topic, the present review takes a broader perspective with respect to both early development and lipids: an expanded research agenda is plausible on the basis of observations from some human studies and from animal studies. Other lipids known to be provided in variable amounts to infants through human milk are cholesterol and gangliosides. Short sections address the current state of knowledge and some questions that could be pursued.

**A Systemic Review of the Roles of n-3 Fatty Acids in Health and Disease.** Natalie D. Riediger et al. J Am Diet Ass 2009;109(4):668-679.

Attention to the role of n-3 long-chain fatty acids in human health and disease has been continuously increased during recent decades. Many clinical and epidemiologic studies have shown positive roles for n-3 fatty acids in infant development; cancer; cardiovascular diseases; and more recently, in various mental illnesses, including depression, attention-deficit hyperactivity disorder, and dementia. These fatty acids are known to have pleiotropic effects, including effects against inflammation, platelet aggregation, hypertension, and hyperlipidemia. These beneficial effects may be mediated through several distinct mechanisms, including alterations in cell membrane composition and function, gene expression, or eicosanoid production. A number of authorities have recently recommended increases in intakes of n-3 fatty acids by the general population. To comply with this recommendation a variety of food products, most notably eggs, yogurt, milk, and spreads have been enriched with these fatty acids. Ongoing research will further determine the tissue distribution, biological effects, cost-effectiveness, and consumer acceptability of such enriched products. Furthermore, additional controlled clinical trials are needed to document whether long-term consumption or supplementation with eicosapentaenoic acid/docosahexaenoic acid or the plant-derived counterpart (α-linolenic acid) results in better quality of life.

**Fetal learning and memory: Weak associations with the early essential polyunsaturated fatty acid status**. C.E.H. Dirix et al. PLEFA 2009;80(4):207-212.

**Abstract:** To study the potential associations between fetal brain functions and the early essential polyunsaturated fatty acid (ePUFA) status, fetal learning and memory were assessed by repeated habituation rate measurements (HR) in fetuses of 30, 32, 34 or 36 weeks gestational age (GA). HR tests were repeated 10 min later. Both measurements were replicated in a second session at GA 38. Fetal short-term memory (STM) and long-term memory (LTM) were calculated from these habituation rates and related to concentrations of ePUFAs and their status markers, measured in umbilical artery wall phospholipids. The only relevant associations observed were positive trends ($0.010<p<0.050$) between STM measured before 38 weeks GA and concentrations of the ePUFA status markers Mead acid and Mead acid+dihomo-Mead acid, and between LTM and levels of Osbond acid, a marker of the n-3 LCPUFA status. Although these weak associations may imply some negative relationships between fetal brain functions and the early ePUFA status, we concluded that physiological differences in the availability of these fatty acids may probably not determine the differences in these primitive brain functions during the third trimester of fetal development. Keywords: Fetal habituation; Fetal learning; Fetal memory; Umbilical artery wall phospholipids; Essential polyunsaturated fatty acid status; Linoleic acid; LCPUFA.