DHA in Pregnancy Benefits Child Development

A review of: Helland IB, Smith L, Saarem K, *et al.* 2003 Maternal supplementation with very-long-chain fatty acids during pregnancy and lactation augments children's IQ at 4 years of age. Pediatrics 2003 111:e39-e44; and Myers GJ, Davidson PW, Cox C, *et al.* 2003 Prenatal methylmercury exposure from ocean fish consumption in the Seychelles child development study. Lancet 361:1686–1692

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The functional role of docosahexaenoic acid (DHA: C22:6 n-3) for the structural and functional development of young infants seems to be at least partly established. During pregnancy DHA is preferentially transferred from the mother to the foetus, particularly in the last trimester of pregnancy, and impairments in this passage are associated with intrauterine growth retardation (1). In infancy, brain DHA levels are higher if the infant has some dietary sources of DHA (for instance, human milk) and neurodevelopmental scores are associated with DHA levels in body pools represented by blood indices (2). Recently, DHA intake in early infancy has also been associated with lower blood pressure values at 5 years of age (3).

On the other hand, mercury, particularly methylmercury, is an established worldwide environmental pollutant with known toxicity in humans. Recent data suggest that fetal exposure to methylmercury at high levels results in subtle decrements in several measures of neurologic development at 7 years of age (4).

Human consumption of fish provides a unique dietary source of DHA and methylmercury. DHA is stored primarily in ocean fish species found in deep sea levels, while mercurials in seafood are mainly derived from pollutants. What is the net benefit of eating fish on infants' neural development? Enrichment of maternal diet with DHA sources has been hypothesized to have beneficial effects for enhancing fetal and infant development in spite of the lack of direct evidence (2). Conversely, a consumer advisory from the Food and Drug Administration has recommended that pregnant women avoid fish species with the highest average amounts of methylmercury (5).

A recent study from the University of Oslo, shows a developmental advantage at 4 years of age for children born to breastfeeding mothers supplemented with cod liver oil from the 18th week of pregnancy to 3 months after delivery, compared with a placebo-supplemented group (6). Moreover, other investigators reported the results from the Seychelles child development study, showing that most domains of cognitive performance of 9-year-old children were not associated with methylmercury concentrations in their mothers' hair at the end of pregnancy (7). The concentrations of methylmercury in fish from the Seychelles were reported to be similar to that in fish consumed in most of the world.

On balance, the existing evidence suggests that methylmercury exposure from fish consumption during pregnancy may have no measurable detrimental cognitive or behavioral effects in later childhood. It may be that DHA could have a neuroprotective effect, as suggested by the association of better neurofunctional indices at 12 months and higher blood DHA for hyperphenylalaninemic infants before diagnosis, when their blood levels of phenylalanine are well beyond the limits of safety for the brain (8). Nonetheless, data of Helland et al show a positive effect on infant development with a daily consumption of greater than 1 gram DHA per day, a limit almost impossible to reach by just eating fish (unless consumed in quite large and unusual daily amounts).

In conclusion, although the safety of eating fish during pregnancy is not firmly established, there is now evidence that DHA supplementation during pregnancy may be beneficial.

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