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[Pediatrics](#). 2003 Jan;111(1):e39-44.**Maternal supplementation with very-long-chain n-3 fatty acids during pregnancy and lactation augments children's IQ at 4 years of age.**Helland IB<sup>1</sup>, Smith L, Saarem K, Saugstad OD, Drevon CA.☒ **Author information**1 Institute for Nutrition Research, University of Oslo, Oslo, Norway. Peter Möller, avd Orkla, ASA, Oslo, Norway. [ingrid.helland@rikshospitalet.no](mailto:ingrid.helland@rikshospitalet.no)**Abstract**

**OBJECTIVES:** Docosahexaenoic acid (DHA; 22:6 n-3) and arachidonic acid (AA; 20:4 n-6) are important for development of the central nervous system in mammals. There is a growth spurt in the human brain during the last trimester of pregnancy and the first postnatal months, with a large increase in the cerebral content of AA and DHA. The fetus and the newborn infant depend on maternal supply of DHA and AA. Our hypothesis was that maternal intake of DHA during pregnancy and lactation is marginal and that high intake of this fatty acid would benefit the child. We examined the effect of supplementing pregnant and lactating women with very-long-chain n-3 polyunsaturated fatty acids (PUFAs; cod liver oil) on mental development of the children, compared with maternal supplementation with long-chain n-6 PUFAs (corn oil).

**METHODS:** The study was randomized and double-blinded. Pregnant women were recruited in week 18 of pregnancy to take 10 mL of cod liver oil or corn oil until 3 months after delivery. The cod liver oil contained 1183 mg/10 mL DHA, 803 mg/10 mL eicosapentaenoic acid (20:5 n-3), and a total of 2494 mg/10 mL summation operator n-3 PUFAs. The corn oil contained 4747 mg/10 mL linoleic acid (18:2 n-6) and 92 mg/10 mL alpha-linolenic acid (18:3 n-3). The amount of fat-soluble vitamins was identical in the 2 oils (117 micro g/mL vitamin A, 1 micro g/mL vitamin D, and 1.4 mg/mL dl-alpha-tocopherol). A total of 590 pregnant women were recruited to the study, and 341 mothers took part in the study until giving birth. All infants of these women were scheduled for assessment of cognitive function at 6 and 9 months of age, and 262 complied with the request. As part of the protocol, 135 subjects from this population were invited for intelligence testing with the Kaufman Assessment Battery for Children (K-ABC) at 4 years of age. Of the 135 invited children, 90 came for assessment. Six children did not complete the examination. The K-ABC is a measure of intelligence and achievement designed for children aged 2.5 years through 12.5 years. This multisubtest battery comprises 4 scales: Sequential Processing, Simultaneous Processing, Achievement (not used in the present study), and Nonverbal Abilities. The Sequential Processing and Simultaneous Processing scales are hypothesized to reflect the child's style of problem solving and information processing. Scores from these 2 scales are combined to form a Mental Processing

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Composite, which serves as the measure of intelligence in the K-ABC.

**RESULTS:** We received dietary information from 76 infants (41 in the cod liver oil group and 35 in the corn oil group), documenting that all of them were breastfed at 3 months of age. Children who were born to mothers who had taken cod liver oil (n = 48) during pregnancy and lactation scored higher on the Mental Processing Composite of the K-ABC at 4 years of age as compared with children whose mothers had taken corn oil (n = 36; 106.4 [7.4] vs 102.3 [11.3]). The Mental Processing Composite score correlated significantly with head circumference at birth (r = 0.23), but no relation was found with birth weight or gestational length. The children's mental processing scores at 4 years of age correlated significantly with maternal intake of DHA and eicosapentaenoic acid during pregnancy. In a multiple regression model, maternal intake of DHA during pregnancy was the only variable of statistical significance for the children's mental processing scores at 4 years of age.

**CONCLUSION:** Maternal intake of very-long-chain n-3 PUFAs during pregnancy and lactation may be favorable for later mental development of children.

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