

Consuming fish during pregnancy improves offspring's cognitive development and prosocial conduct

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Can pregnant women improve their progeny's intelligence by eating fish? A study recently submitted to the American Journal of Clinical Nutrition and coordinated by the University of Granada professor Cristina Campoy Folgoso revealed that infants born to mothers who consumed more fish during pregnancy score higher in verbal intelligence and fine motor skill tests, and present an increased prosocial behaviour.

This study was conducted within the framework of the NUTRIMENTHE project ("Effect of diet on offspring's cognitive development"), which received funding of 5.9 million Euros from the European 7th Framework Programme (7PM). This study was coordinated by the University of Granada professor Cristina Campoy Folgoso. Fish oil is the primary source of long-chain omega-3 fatty acids as docosahexaenoic acid (DHA), the main component of brain cell membranes. The European Commission has confirmed and supports the healthy effects of DHA as "it contributes to the normal development of the brain and eye of the foetus and breastfed infants".

Effects of Fish Intake

The NUTRIMENTHE project is focused on the effects that genetic variants and maternal fish intake have on the offspring's intellectual capacity. The researchers mainly focused on polymorphisms in the fatty acid desaturase (*FADS*) gene cluster that encodes the delta-5 and delta-6 desaturase enzymes involved in the synthesis of long-chain fatty acids of the series omega-3 and omega-6. The researchers collected blood samples from 2000 women at 20 gestational weeks and from the umbilical cord of the infant at birth, and analysed concentrations of long-chain fatty acids of the series omega-3 and omega-6. Then, they determined the genotype of 18 polymorphisms in the *FADS* gene cluster. The aim of this study was to assess the effects of maternal fish intake as a source of omega-3 and omega-6 fatty acids on foetal development, and to determine how the different genotypes affect long-chain fatty acid concentrations in the foetus.

Dr. Pauline Emmett (University of Bristol), Dr. Eva Lattka (Helmholtz Zentrum München, the German Research Center for Environmental Health) and their research teams have determined how *FADS* gene cluster polymorphisms affect long-chain polyunsaturated fatty acid concentrations in women during pregnancy.

Maternal Genotypes

According to the researchers, fatty acid concentrations in umbilical cord blood depend on maternal and offspring genotypes. Accordingly, maternal genotypes are mainly related with omega-6 fatty acid precursors, and offspring genotypes are related with the more highly elongated fatty acids of the omega-6 series. The study also revealed that concentrations of docosahexaenoic acid (DHA) of the omega-3 series main component of brain cell membranes depend on maternal and offspring genotypes. Dr Lattka states that "the foetal contribution of long-chain polyunsaturated fatty acids of the omega-6 series is more relevant than expected; foetal DHA concentrations depend on maternal and fetal metabolism", and concludes that "the amount of DHA transmitted to the foetus through the placenta might be crucial for foetal development". In a previous study, this research team proved that fish intake during pregnancy is correlated with the IQ in 8-year old children. But, what causes that effect? The study revealed that fish intake is correlated with maternal blood DHA concentrations. However, it has not been clarified whether maternal DHA concentrations are

directly correlated with the offspring's IQ. The NUTRIMENTHE project which is expected to conclude in 2013 is aimed at elucidating this question.

Last October, the researchers involved in the NUTRIMENTHE project coordinated by the University of Granada organised an International Symposium on "Nutrition and Cognitive Function" during the European Nutrition Conference held in Madrid. Researchers from Belgium, Germany, Hungary, Italy, Netherlands, Poland, UK, USA and Spain (Rovira i Virgili and Granada) involved in the NUTRIMENTHE consortium participated in this event.

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