A study of associations between early DHA status and fatty acid desaturase (FADS) SNP and developmental outcomes in children of obese mothers

DHA from diet or endogenous synthesis has been proposed to affect infant development, however, results are inconclusive. In this study, we aim to verify previously observed fatty acid desaturase gene cluster (FADS) SNP-specific associations with erythrocyte DHA status in 9-month-old children and sex-specific association with developmental outcomes. The study was performed in 166 children (55 % boys) of obese mothers. Erythrocyte fatty acid composition was analysed in blood-samples obtained at 9 months of age, and developmental outcomes assessed by the Ages and Stages Questionnaire at 3 years. Erythrocyte DHA level ranged from 4·4 to 9·9 % of fatty acids, but did not show any association with FADS SNP or other potential determinants. Regression analysis showed associations between erythrocyte DHA and scores for personal-social skills (β 1·8 (95 % CI 0·3, 3·3), P=0·019) and problem solving (β 3·4 (95 % CI 1·2, 5·6), P=0·003). A tendency was observed for an association in opposite direction between minor alleles (G-variant) of rs1535 and rs174575 and personal-social skills (P=0·062 and 0·068, respectively), which became significant when the SNP were combined based on their previously observed effect on erythrocyte DHA at 9 months of age (β 2·6 (95 % CI 0·01, 5·1), P=0·011). Sex-SNP interaction was indicated for rs174575 genotype on fine motor scores (P=0·016), due to higher scores among minor allele carrying girls (P=0·043), whereas no effect was seen among boys. In conclusion, DHA-increasing FADS SNP and erythrocyte DHA status were consistently associated with improved personal-social skills in this small cohort of children of obese mothers irrespective of sex, but the sample was too small to verify potential sex-specific effects.

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n-3 PUFA, FADS fatty acid desaturase gene cluster, FA% percentage of the overall chromatogram area, LCPUFA long-chain PUFA (≥20 carbon atoms and ≥3 double bonds), SKOT Småbørns Kost Og Trivsel, equivalent to percentage of fatty acids by weight, Child development, Cognitive function, Fish oil, Programming

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