Maternal fatty acid desaturase genotype correlates with infant immune responses at 6 months - DTU Orbit (12/12/2018)

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Breast milk long-chain PUFA (LCPUFA) have been associated with changes in early life immune responses and may modulate T-cell function in infancy. We studied the effect of maternal fatty acid desaturase (FADS) genotype and breast milk LCPUFA levels on infants' blood T-cell profiles and ex vivo-produced cytokines after anti-CD3/CD28 stimulation of peripheral blood mononuclear cells in 6-month-old infants from the Copenhagen Prospective Study of Asthma in Childhood birth cohort. LCPUFA concentrations of breast milk were assessed at 4 weeks of age, and FADS SNP were determined in both mothers and infants (n 109). In general, breast milk arachidonic acid (AA) levels were inversely correlated with the production of IL-10 (r = -0.25; P = 0.004), IL-17 (r = -0.24; P = 0.005), IL-5 (r = -0.21; P = 0.014) and IL-13 (r = -0.17; P = 0.047), whereas EPA was positively correlated with the counts of blood regulatory T-cells and cytotoxic T-cells and decreased T-helper cell counts. The minor FADS alleles were associated with lower breast milk AA and EPA, and infants of mothers carrying the minor allele of FADS SNP rs174556 had higher production of IL-10 (r = -0.23; P = 0.018), IL-17 (r = -0.25; P = 0.009) and IL-5 (r = -0.21; P = 0.038) from ex vivo-activated immune cells. We observed no association between T-cell distribution and maternal or infant FADS gene variants. We conclude that increased maternal LCPUFA synthesis and breast milk AA are associated with decreased levels of IL-5, IL-13 (type-2 related), IL-17 (type-17 related) and IL-10 (regulatory immune responses), but not with interferon-γ and TNF-α, which could be due to an effect of the maternal FADS variants on the offspring immune response transferred via breast milk LCPUFA. Copyright © The Authors 2015.