

Prenatal exposure to POPs and age of puberty

INFLUENCE OF PERFLUORINATED COMPOUNDS (PFCs) EXPOSURE ON DEVELOPMENT AND HORMONES OF CHILDREN FROM THE DUISBURG BIRTH COHORT STUDY

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Among the Duisburg Birth Cohort Study which was initiated 2000-02 (Wilhelm et al., 2008, Mutat. Res. 659, 83-92) we studied associations between prenatal and postnatal PFOS and PFOA exposure and infants development and hormones. 149 mother-newborn pairs were included in the PFC study. Blood PFC levels were measured in pregnant women, in newborns, and in children at ages 6-8 years. Outcome measurements were birth weight, neurodevelopment (Bayley scales motor and mental development of infants) at 12 and 24 months, assessment of the gender role behavior in young children (Pre-School Activities Inventory (PSAI) at 6-8 years. Estradiol, testosterone, thyroid hormones (TSH, T3, T4, fT3, fT4), were measured in cord serum and at ages 6-8 and 8-10 years, dihydroxyepiandrosteronesulphate (DHEA-S) was analyzed at ages 8-10 years. Median PFOA and PFOS concentrations in serum samples were as follows: pregnant women 2.7 (PFOA) and 8.9 (PFOS) µg/l, cord serum 2.0 (PFOA) and 2.9 (PFOS) µg/l, at age 6-8 yrs 4.6 (PFOA) and 3.6 (PFOS) µg/l. The prenatal PFOS/PFOA concentrations are correlated with the concentrations at 6-8 yrs after birth. Multivariate regression analysis revealed no significant associations between the birth outcomes and thyroid hormones of the newborns and the prenatal PFOA/PFOS exposures. Prenatal PFOS exposure was negatively associated with the mental development at 12 months of infants. This effect was more pronounced in German children (mean decrease 1.7%; 95% CI 0.2% - 3.1% per doubling of exposure). We also found associations between the prenatal PFOA/PFOS concentrations, and the gender role behaviour at 6-8 yrs, the sexual hormones and the DHEA-S levels at age of 8-10 years. Conclusion: PFOS influences early mental development at a low level of effect. This effect disappears when the children are getting older. PFOA and PFOS seem to be involved in adrenal maturation and pubertal development.