

DEVELOPMENTAL ORGANOCHLORINE COMPOUND EXPOSURE, THYROID FUNCTION, AND NEUROPSYCHOLOGICAL FUNCTION UP TO AGE 5½ YEARS

Jordi Julvez, *Harvard School of Public Health, Boston, MA, United States*

Frodi Debes, *Faroese Hospital System, Tórshavn, Faroe Islands*

Pal Weihe, *Faroese Hospital System, Tórshavn, Faroe Islands*

Anna L Choi, *Harvard School of Public Health, Boston, MA, United States*

Philippe Grandjean, *Harvard School of Public Health, Boston, MA, United States*

Background and Aims: Exposure to organochlorine compounds can alter thyroid function in humans (Alvarez-Pedrerol et al. 2009), and hypothyroidism during early in life can adversely affect a child's neurodevelopment (Haddow et al. 1999). This study aims to assess the relationship between developmental organochlorine exposures and thyroid function in regard to subsequent neurodevelopment.

Methods: A population-based birth cohort of 182 children was followed annually up to age 66 months. The assessments included organochlorine compound concentrations in maternal pregnancy serum and milk, clinical thyroid function parameters in maternal and cord serum, and subsequent neuropsychological outcomes of the child, along with socio-demographic cofactors.

Results: The findings showed consistent, negative and monotonic associations between organochlorine and resin-triiodothyronine uptake ratio after covariate adjustments. No associations were observed with other thyroid function parameters. Increased resin-triiodothyronine uptake ratio was associated with improved performance on most of the neuropsychological tests. For other thyroid function parameters, the findings were less consistent. The regression coefficients between resin-triiodothyronine uptake ratio and neuropsychological outcomes were slightly increased after adjustment for polychlorinated biphenyl exposure as a covariate, although the latter did not have a clear independent effect.

Conclusions: The results are in accordance with a plausible neurotoxic pathway of organochlorine compound exposures by negatively affecting resin-triiodothyronine uptake ratio during early life. Even minor changes linked to decreases of the resin-triiodothyronine uptake ratio during early life may adversely impact a child's neurodevelopment.

References:

Alvarez-Pedrerol M, Guxens M, Ibarluzea J, Rebagliato M, Rodriguez A, Espada M, et al. 2009. Organochlorine compounds, iodine intake, and thyroid hormone levels during pregnancy. *Environ Sci Technol* 15;43:7909-7915.

Haddow JE, Palomaki GE, Allan WC, Williams JR, Knight GJ, Gagnon J, et al. 1999. Maternal thyroid deficiency during pregnancy and subsequent neuropsychological development of the child. *N Engl J Med* 341:549-555.