

Analytical methods for determination of neurotoxic compounds in small amounts of biological material from human cohorts and *in vivo* tests

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Environmental pollutants such as pesticides and flame retardants are responsible for many diseases, the key is to find mutual correlation and detect their effects on human health. One of the many effects is neurodevelopmental neurotoxicity. With increasing amount of neurotoxic chemicals in environment epidemiology gains importance and therefore new human cohorts, especially focused on mother and child, are formed. Moreover, as a toxicological model *in vivo* experiments using rodents (female and cub) are also performed. Main goal of our work was to create effective, quick and cheap analytical tools for determination of neurotoxic compounds in different types of limited biological samples from cohort and *in vivo* studies and to find way to evaluate and compare the results.

The analytical procedures for determination of group of neurotoxic pesticides (carbaryl, chlorpyrifos, cypermethrin, α , β -endosulfan) in small amount of mice and rat tissue such as perirenal fat, liver, parts of brain - cerebral cortex, hippocampus, striatum, cerebellum and plasma have been developed. For extraction of tissues special mini-extractor was developed, for following extract clean-up non-destructive methods were needed - gel permeation chromatography and SPE columns due to removing of lipids. For plasma samples liquid-liquid extraction was used. The method for determination of metabolites of pesticides and PBDEs in urine was developed. Firstly, analytes in urine were deconjugated with concentrated hydrochloric acid, extracted with methyl-*tert*-butylether and derivatized with diazomethane prior to clean-up step on solid phase (SPE). GC-HRMS was used for final instrumental analysis. The absolute limits of detection for each compound were in pg levels, which allowed us to measure trace concentrations of pollutants in small amounts of samples. The results of analyses shown that neurotoxic pesticides (cypermethrin, α , β -endosulfan) are transported from female to cub and can act neurotoxically through generation.