Extended Abstract Journal of Clinical and Bioanalytical Chemistry 2018
Vol.2 No.3

Analytica-2015 : Multi-residual determination of developmental neurotoxic compounds in human milk- Eliska Cechova-Masaryk University

Eliska Cechova
Masaryk University, Czech Republic

Recently, there is a growing number of children with developmental disorders (autism spectra disorders ASD, attention deficit hyperactivity disorder ADHD, learning problems). The EU project DENAMIC investigates harmful neurotoxic effects of selected compounds in order to reveal possible links between exposure to the compound mixtures and the cause of developmental problems of children. One part of the research includes development of a sensitive method for determination of possible neurotoxic compounds, i.e. persistent and non-persistent pesticides (organochlorine pesticides OCPs and pyrethroids), polybrominated diphenyl ethers (PBDEs), novel flame retardants (NFRs), marker polychlorinated biphenyls (PCBs) and PBDE and pyrethroid metabolites in human matrices, especially in breast milk and human urine. The chemical properties of many of these compounds (part of OCPs and NFRs, all pyrethroids and their metabolites) require non-destructive clean-up methods during sample preparation. After pressurized liquid extraction of a milk sample, the dialysis with LDPE membrane was chosen as a simple and efficient method for fat removal. Additional clean-up with solid phase column with two different sorbents was added for complete lipid removal. Different instrumental methods were tested in order to lower limits of quantification and reduce the effect of matrix. GC-HRMS and APGC-MS/MS for pyrethroid analysis with softer ionization allowed us to determine ultra-trace levels of developmental neurotoxicants in breast milk from European cohorts.

Past examinations have shown that organochlorine pesticide (OCP) presentation negatively affects the neurological capacity of newborn children. Just a couple of reports have researched the thyroid and development hormones and their relationship to neurodevelopment after human presentation to OCPs, particularly on account of newborn children. Our objective was to decide if breastmilk OCP buildups were related with negative effects and additionally modifications in the neurodevelopment of newborn children among explicit southern Taiwanese mother–breastfed baby sets. Our subjects (n = 55 sets) were enlisted from southern Taiwan somewhere in the range of 2007 and 2010. The thyroid and development hormone levels in the string blood tests gathered after labor were resolved. The breastmilk was assembled inside one month after labor for the assurance of OCP levels utilizing a high-goals gas chromatograph with mass spectrometry, and the neurodevelopment of 10 year old newborn children was analyzed utilizing the Bayley Scales of Infant and Toddler Development®, Third Edition (Bayley-III). It was seen that 4,4′-dichlorodiphenyl-dichloroethylene (4,4′-DDE) (mean = 10.3 ng/g lipid) was the most prevalent OCP compound in the breastmilk tests. At higher focuses (>75th percentile), explicit OCPs were related with fundamentally lower levels of thyroid and development hormones than at lower fixations (<75th percentile). Essentially higher chances proportions (ORs) were watched for double psychological (OR = 8.09, p = 0.025 for 4,4′-DDT), language (OR = 11.9, p = 0.013 for 4,4′-DDT) and social–passionate (OR = 6.06, p = 0.01 for trans-CHL) composite scores for explicit OCPs having a place with the lower introduction bunch when contrasted with the higher OCP presentation gathering. The five area Bayley-III newborn child neurodevelopment results were contrarily connected with explicit OCPs in the bosom milk tests dependent on the repetition examination (RDA) test. Bayley-III scales, which incorporate psychological, language, engine, social-passionate, and versatile conduct scales, could be anticipated by 4,4′-DDT, endrin, endosulfan I, heptachlor, or heptachlor epoxide utilizing multivariate straight relapse models with modification for maternal age, pre-pregnant BMI, equality, and newborn child sex.

Taking everything into account, despite the fact that our investigation demonstrated that postnatal presentation to bosom milk OCPs might be related with newborn child neurodevelopmental results and that pre-birth introduction, whenever extrapolated from breastmilk levels, is related with changes in thyroid and development hormones that may have impacts on neurodevelopment, these affiliations are just intriguing; in this way, further examinations are suggested for affirmation.

Biography

Eliska Cechova is a 3rd year PhD student of Environmental Chemistry in Masaryk University, Czech Republic with the main focus on development of new

analytical methods for determination of organic pollutants and their metabolites in human matrices such as human milk. She is working on EU project Denamic, which is looking for relationship between the presence of mixture of common environmental pollutants and possible effects to child health.

Email: cechova@recetox.muni.cz

This work is partly presented 6th International Conference and Exhibition on Analytical & Bioanalytical Techniques September 01-03, 2015 Valencia, Spain