

**ENVIRONMENTALLY TOXIC SUBSTANCES AND HUMAN HEALTH: ON THE ROAD
FROM HUMAN BIOMONITORING TO HEALTH ASPECTS**

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Environmental pollutants, including selected toxic elements and their species and organic compounds, are among the known causes for neurodevelopmental diseases, the prevalence of which seem to be increasing worldwide. Subclinical decrements in neuropsychological functions are even more common than neurodevelopmental disorders and can play an important role in aetiology of neurological disorders later in life. Response depends strongly on the individual's compensation mechanisms, particularly at low, environmentally relevant exposures, and may include (epi)genetic predisposition. The case of environmentally relevant toxic compounds will be demonstrated on the case study involving a long-term cohort study PHIME (Public Health Impact of long-term, low-level mixed element exposure in susceptible population strata to toxic metals, 2000 -) in which child neurodevelopment in relation to mercury (Hg) exposure among residents in the Mediterranean coastal regions of Italy, Slovenia, Croatia and Greece was assessed. The results of the neurodevelopment performance at the 18 months have shown that higher fish consumption during pregnancy was associated with cognitive and language (but not motor) neurodevelopment performance. The subset of children from this cohort was further assessed at 6 to 8 years of age in three countries Slovenia, Croatia and Italy. Additional chemical, biochemical and molecular analysis were performed to establish associations between environmental exposure, human (epi)genome and neuropsychological performance. The study demonstrated an importance of accounting for mixed exposures of chemicals, essential elements, as well as child's cognitive activities along the critical periods of development when estimating their neuropsychological impacts at low levels of chemical exposures.