

Alterations of Gut Microbiota and Its Metabolomics in Child with 6PPDQ, PBDE, PCB, and Metal (Loid) Exposure

Authors : Xia Huo

Abstract : The composition and metabolites of the gut microbiota can be altered by environmental pollutants. However, the effect of co-exposure to multiple pollutants on the human gut microbiota has not been sufficiently studied. In this study, gut microorganisms and their metabolites were compared between 33 children from Guiyu and 34 children from Haojiang. The exposure level was assessed by estimating the daily intake (EDI) of polybrominated diphenyl ethers (PBDEs), polychlorinated biphenyls (PCBs), 6PPD-quinone (6PPDQ), and metal(loid)s in dust. Significant correlations were found between the EDIs of 6PPDQ, BDE28, PCB52, Ni, Cu, and both the alpha diversity index and specific metabolites in single-element models. The study found that the Bayesian kernel machine regression (BKMR) model showed a negative correlation between the EDIs of five pollutants (6PPDQ, BDE28, PCB52, Ni, and Cu) and the Chao 1 index, particularly beyond the 55th percentile. Furthermore, the EDIs of these five pollutants were positively correlated with the levels of the metabolite 2,4-diaminobutyric acid while negatively correlated with the levels of d-erythro-sphingosine and d-threitol. Our research suggests that exposure to 6PPDQ, BDE28, PCB52, Ni, and Cu in kindergarten dust is associated with alterations in the gut microbiota and its metabolites. These alterations may be associated with neurodevelopmental abnormalities in children.

Keywords : gut microbiota, 6PPDQ, PBDEs, PCBs, metal(loid)s, BKMR

Conference Title : ICEPPH 2026 : International Conference on Environmental Pollution and Public Health

Conference Location : Rome, Italy

Conference Dates : September 16-17, 2026