

## Deciphering the Gut Microbiome's Role in Early-Life Immune Development

**Authors :** Xia Huo

**Abstract :** Children are more vulnerable to environmental toxicants compared to adults, and their developing immune system is among the most sensitive targets regarding toxicity of environmental toxicants. Studies have found that exposure to environmental toxicants is associated with impaired immune function in children, but only a few studies have focused on the relationship between environmental toxicant exposure and vaccine antibody potency and immunoglobulin (Ig) levels in children. These studies investigated the associations of exposure to polychlorinated biphenyls (PCBs), perfluorinated compounds (PFCs), heavy metals (Pb, Cd, As, Hg) and PM2.5 with the serum-specific antibody concentrations and Ig levels against different vaccines, such as anti-Hib, tetanus, diphtheria toxoid, and analyze the possible mechanisms underlying exposure-related alterations of antibody titers and Ig levels against different vaccines. Results suggest that exposure to these toxicants is generally associated with decreased potency of antibodies produced from childhood immunizations and an overall deficiency in the protection the vaccines provide. Toxicant exposure is associated with vaccination failure and decreased antibody titers, and increased risk of immune-related diseases in children by altering specific immunoglobulin levels. Age, sex, nutritional status, and co-exposure may influence the effects of toxicants on the immune function in children. Epidemiological evidence suggests that exposure-induced changes to humoral immunerelated tissue/cells/molecules response to vaccines may have predominant roles in the inverse associations between antibody responsiveness to vaccines and environmental toxicants. These results help us to conduct better immunization policies for children under environmental toxicant burden.

**Keywords :** environmental toxicants, immunotoxicity, vaccination, antibodies, children's health

**Conference Title :** ICT 2024 : International Conference on Toxicology

**Conference Location :** Lisbon, Portugal

**Conference Dates :** September 19-20, 2024