

4th Global Summit on **Toxicology**

August 24-26, 2015 Philadelphia, USA

Environmental exposure to BDE47 is associated with the risk of diabetes: A community-based case-control study and an animal experiment

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The study aims to illustrate the association of 2, 2', 4, 4'-tetrabromodiphenyl ether (BDE47) with diabetes in a two-stage case-control study and animal experiment. All the participants received a questionnaire, health examination, and the detection of 7 PBDE congeners in serum. Then, male rats were exposed to BDE47 for 8 weeks to explore its effects on glucose homeostasis, and potential mechanisms using high-throughput genomic analysis. Detection rate of serum Σ PBDEs in cases was significantly higher than controls, which presented a higher risk in the 3rd tertile of Σ PBDEs, particularly in Study II (OR=2.32, $p_{\text{trend}}=0.031$). Among the 7 congeners, BDE47 showed significant high detection rate and concentration in cases in both two studies and their combination. Every tertile of BDE47 significantly increased the risk of diabetes, particularly in Study II ($p_{\text{trend}}=0.006$) and the combined study ($p_{\text{trend}}=0.002$). Animal experiments confirmed that BDE47 treatments induced hyperglycemia in male rats. Furthermore, gene microarray analysis showed that type 1 diabetes (T1D) pathways and three gene ontology (GO) terms involved in glucose transport were enriched. The study first demonstrated that environmental exposure to BDE47 might increase the risk of diabetes through activation of T1D pathways and upregulation of genes involved in glucose transport.

Biography

Shou-Lin Wang has completed his PhD in 2006 from Nanjing Medical University (NMU), China, and Postdoctoral studies from Rutgers University School of Public Health. He is the Head and Professor of Department of Occupational Medicine and Environmental Health, NMU. He has published more than 100 papers in reputed journals and got several scientific awards in China.

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