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Alteration in Rat Central Nervous System Following Prenatal and Lactational Exposure to Tributyltin and Bisphenol A

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Tributyltin (TBT) and bisphenol A (BPA) are well-known endocrine disruptors. The former is a common antifoulding biocide, and the latter is an additive used widely as flexibilizer in plastic industry, respectively. Reproductive failure has been paid their attentions in the endocrinal aspects. Recently, however, another toxicity of them are presumed, because TBT is accumulated into brain of marine mammals from environment and BPA is also detected into brain of fetus rats after administration of BPA to their dams. Nevertheless, it has not been cleared how these chemicals affect central nervous system of them. From the point of view, the present work aims to study an alteration in the central nervous system of rats exposed to TBT and BPA during their prenatal and lactational periods.

Pregnant rats were orally dosed with 0.01 or 1 mg/kg bw/day TBT or 0.025 or 0.25 mg/kg bw/day BPA, which are slightly higher concentrations detected in environment. Their pups were examined at 1 week, 1 month or 2 months old. The weight of each organ was measured. Northern blotting analysis was applied to observe mRNA expressions of neurotypic and gliotypic proteins as neurofilament, myelin basic protein and glial fibrillary acidic protein in cerebellum, cerebral cortex, hypothalamus and hippocampus.

The 1 week-old pups were found to decrease in their weights and neurofilament mRNA expression in cerebellum on exposure to TBT or BPA, although they were transient. The epididymis weights were decreased on the postnatal day 65. The serum total thyroxine level was also decreased around 24 days. Thus, these results suggest that the prenatal and lactational exposure of rats to TBT and BPA affects the central nervous system at their very low concentrations.