

MONITORING EXPOSURE LEVELS TO BISPHENOLS IN JAPANESE SCHOOLCHILDREN

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Background: Bisphenol analogues such as bisphenol F (BPF) and bisphenol S (BPS) are currently replacing bisphenol A (BPA) in a number of industrial and consumer materials, such as epoxy resins and thermal paper. Although BPA is still the most prevalent bisphenol in human and environmental matrices, its analogues have also been detected frequently, in the environment and food products. Nevertheless, data regarding the human exposure levels of BPA analogues are scarce, particularly in children. To address this data gap, we assessed the exposure to 11 bisphenols through the analysis of urine samples from 200 children from Sapporo, Japan. Demographic variables and secular trends were studied in relation to urinary levels.

Methods: This study was part of a prospective birth cohort (Hokkaido Study). Morning void urine samples from 7-year-old children were collected from 2012 to 2017 and analyzed for bisphenols using solid-phase extraction and GC-MS/MS. Demographic characteristics of the study population were acquired. Multiple linear regression was used to evaluate secular exposure trends and possible associations between bisphenol concentrations and demographic aspects.

Results: Nine out of 11 measured bisphenol analogues were detected; frequencies ranged from 2.7 % for bisphenol E (BPE) to 94.6 % for both BPA and BPF. BPS (64.9 %) and bisphenol B (BPB, 48.6 %) were detected frequently as well. As expected, the highest median concentration was observed for BPA (1.5 ng/mL). The median concentration for BPS was 0.07 ng/mL and 0.11 ng/mL for BPF. Multivariate regression models were used to investigate a possible relation with demographic characteristics and to determine secular trends.

Short discussion/conclusions: So far, the results of our study indicated that exposure to these chemicals is ubiquitous, even for young children. BPA is still the most frequently detected bisphenol, showing the highest median concentration as well. This is the first time exposure levels to different bisphenols are assessed in Japanese children.