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Effects of spike exposure of methylmercury on mercury accumulation and neuronal degeneration in the brain

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The purpose of this study was to evaluate the effects of “spike” (short-term peak) in methylmercury (MeHg) exposure on mercury (Hg) accumulation and neuronal degeneration in the brain. In first experiment, six groups of male Wistar rats were orally administered daily (0.3, 1.5 and 3.0 mg/kg/day) and intermittent (2.1, 10.5 and 21 mg/kg/week) dosages of methylmercury, respectively. Blood Hg concentrations increased gradually in the daily exposed groups. On the other hand, intermittently dosed groups showed repeated rapid increase and decline in Hg blood concentrations. The mercury concentrations in the brain on the days of dissection were almost the same between the groups given daily or intermittent dosages. The degrees of the degeneration in the sensory nerve fibres on the days of dissection were almost the same between the groups given daily or intermittent dosages. In second experiment, two groups of pregnant female Wistar rats were orally administered daily (1.0 mg/kg/day) and intermittent (5 mg/kg/day) dosages of methylmercury from pregnant day 1 to pregnant day 20, respectively. On 21 day, pregnant rats were sacrificed then Hg concentrations and neuronal degeneration in the fetal brain were observed. Hg concentrations and the degrees of the degeneration in the brain stem were almost the same between the groups given daily or intermittent dosages. These results suggested that intermittent MeHg exposure which caused the “spike” in blood mercury levels would not cause any difference in Hg accumulation in the brain and neuronal damage compared to the daily exposure when the amount of MeHg added is the same.