

Subacute effects on mice central nervous system of dimethyl isophthalate (DMIP)

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Phthalates are a family of chemical compounds primarily used to make PVC flexible. They are used in many products in homes, hospitals, cars, and businesses. Phthalates are known as toxic substances and they can affect the central nervous system. DMIP is used as a perfume fixative and as a plasticizer to make polyester resins. There is no information on DMIP toxicity. The aim of the study was to determine the histopathological effects and oxidative stress-inducing potential in the brain tissue by subacute exposure of DMIP. In the study, animals were orally fed with 150, 300, 600 mg/kg/day DMIP for 5 consecutive days per week for 28 days (OECD Guideline 407). At the end of the study, no significant changes were observed in body weight gains, absolute and relative organ weights of DMIP treated mice compared with the control. SOD activities in the tissues at the 150 and 300 mg/kg DMIP treatment groups were significantly higher than the control ($p < 0.05$). The degrees of lipid peroxidation changed dose-dependently. In GST activities, there is no significant difference in the groups. However, AChE activities significantly decreased dose-dependently in all exposure groups. Moreover, DMIP caused dose-dependent histological changes such as an expansion of capillary vessels in the brain cortex and medullar areas. Also, excessive vacuolization in stromal areas were observed. Pyknotic nucleus and atrophic degenerate cells were observed in most of the granular and pyramidal cells in the brain cortex and in the highest dose, astrocytic infiltration concentrating on the pia mater is noteworthy. These results suggested that DMIP exposure induces oxidative stress in the brain and exposure of DMIP during a long period of time could lead to serious brain damage. In conclusion, DMIP has been shown to have neurotoxic effect on brain tissue.

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