Original Article

Differential neurotoxic effects of *in utero* and lactational exposure to hydroxylated polychlorinated biphenyl (OH-PCB 106) on spontaneous locomotor activity and motor coordination in young adult male mice

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ABSTRACT — We investigated whether *in utero* or lactational exposure to 4-hydroxy-2',3,3',4',5'-pentachlorobiphenyl (OH-PCB 106) affects spontaneous locomotor activity and motor coordination in young adult male mice. For *in utero* exposure, pregnant C57BL/6J mice received 0.05 or 0.5 mg/kg body weight of OH-PCB 106 or corn oil vehicle via gavage every second day from gestational day 10 to 18. For lactational exposure, the different groups of dams received 0.05 or 0.5 mg/kg body weight of OH-PCB 106 or corn oil vehicle via gavage every second day from postpartum day 3 to 13. At 6-7 weeks of age, the spontaneous locomotor activities of male offspring were evaluated for a 24-hr continuous session in a home cage and in an open field for 30-min. Motor coordination function on an accelerating rotarod was also measured. Mice exposed prenatally to OH-PCB 106 showed increased spontaneous locomotor activities during the dark phase in the home cage and during the first 10-min in the open field compared with control mice. Mice exposed lactationally to OH-PCB 106, however, did not show a time-dependent decrease in locomotor activity in the open field. Instead, their locomotor activity increased significantly during the second 10-min block. In addition, mice exposed lactationally to OH-PCB 106 displayed impairments in motor coordination in the rotarod test. These results suggest that perinatal exposure to OH-PCB 106 affects motor behaviors in young adult male mice. Depending on the period of exposure, OH-PCB 106 may have different effects on neurobehavioral development.

Key words: Hydroxylated polychlorinated biphenyl, Developmental neurotoxicity, Locomotor activity, Open field, Rotarod, Mouse

INTRODUCTION

Polychlorinated biphenyls (PCBs) are a group of persistent organic pollutants that are ubiquitously present in the environment (Brevik *et al.*, 2002; Tehrani and Van Aken, 2014; Winneke *et al.*, 2002). PCBs bioaccumulate through the food chain. Although the production of PCBs was banned in 1970s, they have been detected in samples of human blood and tissues (Donato *et al.*, 2006; Koopman-Esseboom *et al.*, 1994; Pinto *et al.*, 2008) because of their chemical stability and high lipophilicity. PCB congeners are endocrine disruptors that can cause adverse effects on reproductive, immune, and neurological systems in humans (Carpenter, 1998; Swanson *et al.*, 1995). In addition, epidemiological and animal studies have suggested that perinatal exposure to PCBs

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