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Effects of prenatal and postnatal exposure to chlordimeform on serotonin levels in brain regions of adult's male and female rats

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Formamidine pesticides have been described to induce permanent effects on development of monoaminergic neurotransmitters systems. The mechanisms that induce these effects are not known but it has been suggested that these effects could be related to monoamino oxidase (MAO) inhibition. Chlordimeform is a formamidine pesticide which is a very weak inhibitor of MAO, although it has been also described to produce neurodevelopmental toxicity. The effects of maternal exposure to chlordimeform on brain region serotonin levels of male and female offspring rats at 60 days of age were evaluated. Maternal and offspring body weight, physical and general activity development were unaffected by the exposure of dams to chlordimeform (5 mg/kg bw, orally on days 6–21 of pregnancy and 1–10 of lactation). Male and female offspring were sacrificed at 60 days of age and possible alterations in the content and metabolism of 5-HT was determined in brain regions by HPLC. The results showed that this neurotransmitter system was altered in a brain regional-related manner. In male and female offspring, chlordimeform induced a significant decrease in the striatum and prefrontal cortex 5-HT and its metabolite 5-HIAA levels. This effect was with statistical distinction of sex in the prefrontal cortex. In contrast, chlordimeform caused an increase in 5-HT and 5-HIAA content in the hippocampus in male and female offspring with sex interaction. Chlordimeform evoked increase in 5-HT turnover in the prefrontal cortex and hippocampus from females and males respectively but evoked a decrease in these regions from males and females respectively. The present findings indicated that maternal exposure to chlordimeform altered serotonergic neurochemistry in their offspring in prefrontal cortex, striatum and hippocampus, and those variations show that other mechanisms, different from MAO inhibition, are implicated.

Biography

Javier Del Pino received his PharmD degree at the University Complutense University of Madrid in 2004. He has two Master's in Sciences degrees, 2009 and 2010. He specialized in Neurotoxicology and Neurodevelopmental Toxicology and received his PhD in Toxicology in 2009. In 2010, he worked in Institute of Health Carlos III in the National Center of Environmental Health. From 2010 to 2012, he was Associated Researcher at University of Massachusetts (UMASS) working in Sandra Petersen's Lab in a National Institute of Health (NIH) project on developmental effects of TCDD endocrine disruptor on sexual differentiation. In 2016, he got a position as Associated Professor of Toxicology at the Complutense University of Madrid.

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