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Permanent effects on monoaminergic neurotransmitters biosynthesis and metabolism after prenatal and postnatal exposure to chlordimeform, in female and male rat's hippocampus

Javier Del Pino, Paula Moyano¹, Matilde Ruiz, José Manuel García, María Jesús Díaz, Gloria Gomez, María José Anadón, Margarita Lobo, Jimena García² and María Teresa Frejo¹

¹Complutense University, Spain

²Alfonso X University, Spain

Chlordimeform is a pesticide from the formamidine family. Such family of pesticides has been shown to permanently alter monoaminergic neurotransmitter systems in a sex- and region-dependent way. Those effects may be related to monoamine oxidase (MAO) inhibition, although chlordimeform has been shown to be a very weak MAO inhibitor, suggesting that other mechanism should be involved. Thus, chlordimeform may alter the expression of enzymes that control synthesis and metabolism of monoaminergic neurotransmitters systems, which could mediate the observed effects. In order to confirm that chlordimeform produces an alteration on the enzymes that synthesize and/or metabolize monoaminergic neurotransmitters systems, thus inducing permanent alterations of the monoamine neurotransmitter systems, we evaluated, in hippocampus of male and female rats, the effect on the expression of MAO, COMT, BDH, TH, TRH, and AD enzymes at 60 days of age after maternal exposure to chlordimeform (5mg/kg body weight). Our results show that MAO and BDH enzymes expression was not altered by chlordimeform treatment, but TH enzyme expression was decreased and COMT, BDH, and TRH enzymes expression were increased in both males and females after treatment with chlordimeform. Besides, females showed a bigger increase in the expression of COMT [58.83% (P<0.001)], AD [46.74% (P<0.001)], TH [43.65% (P<0.001)] and TRH [37.85% (P<0.001)] enzymes. Our findings show that maternal exposure to formamidines in general, and chlordimeform in particular, induces a permanent alteration of monoaminergic neurotransmitters, through alteration of the enzymes that synthesize these neurotransmitters, in the hippocampus.

Biography

Javier Del Pino received his PharmD degree at the University Complutense University of Madrid in 2004. He has two Masters in Sciences 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 Associate Professor of Toxicology at the Complutense University of Madrid.

jdelpino@pdi.ucm.es

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