Hippocampal testosterone and estradiol disruption in rats, after prenatal and postnatal exposure to chlordimeform.

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Abstract

Chlordimeform, as well as other formamidine pesticides, induce permanent sex- and region-dependent effects on development of monoaminergic neurotransmitter systems. These effects could be related to monoamine oxidase (MAO) inhibition. However, chlordimeform is a very weak MAO inhibitor, which suggests that other mechanism should be involved. In this regard, formamidines, in general, and chlordimeform, in particular, alter the serum levels of steroid hormones, which regulate the expression of enzymes that mediate the synthesis and metabolism of monoaminergic neurotransmitters. Therefore, an alteration of these hormones in the brain could mediate the effects observed. In order to confirm that the formamidines produce disruption of sex hormones in the brain, we evaluated, in hippocampus of male and female rats, the effect on the levels of testosterone and estradiol at 11 days of age, after maternal exposure to chlordimeform (5 mg/kg body weight). Chlordimeform induced a significant decrease in testosterone levels and a significant increase in estradiol levels in hippocampus of rats at 11 days of age. We observed sex interaction with treatment in the content of T and E2. The present findings indicate that after maternal exposure to chlordimeform, a sex hormones disruption, in hippocampus, is induced.

Recent Publications

1. Del Pino J, Moyano P, Anadon MJ, García JM, Díaz MJ, Gómez G, García J, Frejo MT (2016) SN56 basal forebrain cholinergic neuronal loss after acute and long-term chlorpyrifos exposure through oxidative stress generation; P75(NTR) and α7-nAChRs alterations mediated partially by AChE variants disruption. Toxicology 353-354, 48-57.
2. Del Pino J, Zeballos G, Anadon MJ, Díaz J, Moyano P, Gomez G, Garcia J, Lobo M, Frejo MT (2016) Muscarinic M1 receptor partially modulates higher sensitivity to cadmium induced cell death in primary basal forebrain cholinergic neurons: a cholinesterase variants dependent mechanism. Toxicology. 361-361, 1-11.
3. Del Pino J, Clements KJ, Suvorov A, Krishnan S, Adams HL, Petersen SL (2016) Developmental exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin may alter LH release patterns by abolishing sex differences in GABA/glutamate cell number and modifying the transcriptome of the male anteroventral periventricular nucleus. Neuroscience. 329, 239-253.
4. Moyano P, Del Pino J, Anadon MJ, Díaz MJ, Gómez G, Frejo MT (2017) Toxicogenomic profile of apoptotic and necrotic SN56 basal forebrain cholinergic neuronal loss after acute and long-term chlorpyrifos exposure. Neurotoxicology and Teratology, 59, 68–73.
5. Del Pino J, Moyano P, Matilde R, Anadon MJ, Díaz J, Garcia JM, Labajo-Gonzalez E, Frejo MT. (2017). Amitraz changes NE, DA and 5-HT biosynthesis and metabolism mediated by alterations in estradiol content in CNS of male rats. Chemosphere, 18:518-529

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 Associated Professor of Toxicology at the Complutense University of Madrid

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