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Amitraz alterations in estradiol content in CNS of male rats

Javier Del Pino[1], Matilde Ruiz[1], Paula Moyano[1], María Jesús Díaz[1], Gloria Gomez[1], María José Anadón[1], Margarita Lobo[1], Jose Manuel Garcia[1], María Teresa Frejo[1] and **Jimena García[2]**
[1]Complutense University, Spain
[2]Alfonso X University, Spain

Amitraz is a formamidine insecticide/acaricide that alters different neurotransmitters levels, among other neurotoxic effects. Oral amitraz exposure (20, 50 and 80 mg/kg bw, 5 days) has been reported to increase serotonin (5-HT), norepinephrine (NE) and dopamine (DA) content and to decrease their metabolites and turnover rates in the male rat brain, particularly in the striatum, prefrontal cortex, and hippocampus. However, the mechanisms by which these alterations are produced are not completely understood. One possibility is that amitraz monoamine oxidase (MAO) inhibition could mediate these effects. Alternatively, it alters serum concentrations of sex steroids that regulate the enzymes responsible for these neurotransmitters synthesis and metabolism. Thus, alterations in sex steroids in the brain could also mediate the observed effects. To test whether amitraz alter sex hormones in the brain, we treated male rats with 20, 50 and 80 mg/kg bw for 5 days and then isolated tissue from striatum, prefrontal cortex, and hippocampus. We then measured plasma and tissue levels of estradiol (E2) and testosterone (T) in these regions. Our results show that amitraz treatment did not alter the content of E2 in plasma and T in the brain regions studied. However, amitraz induced a dose-dependent increase in T content in plasma and E2 content in the regions of prefrontal cortex, striatum and hippocampus from highest to lowest in this order. Our present results provide new understanding of the mechanisms contributing to the harmful effects of amitraz.

Biography

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

jdelpino@pdi.ucm.es

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