INTERNATIONAL SUMMIT ON DIABETES, ENDOCRINOLOGY, AND METABOLIC DISORDERS

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Endocrine-disrupting activity of triktone herbicide in Wistar rat offspring

Abstract:

Tembotrione, as chemical allelopathic triketone herbicide approved by the European Commission in 2006, is used post-emergently to control broadleaf and grassy weeds. Today, many pesticides have been recognized as endocrine-disrupting chemicals (EDCs) that may interfere with sex hormones. Triketone herbicides are suspected as EDCs but so far there are no data about endocrine-disrupting effects of tembotrione. Since the most sensitive subpopulation to the adverse effects of pesticides are children, in this study we focused on the offspring that may not be exposed directly but can be through the placenta or maternal milk. The aim of this study was to evaluate the endocrine-disrupting potential of the tembotrione by studying the hormone status of Wistar rat offspring exposed through the treated dams. Three doses of tembotrione (0.0004, 0.0007, and 4.0 mg/kg b.w./day), relevant for both residental and occupational human exposure, were administered to dams during gestation and/or lactation period. The levels of 17β-estradiol and testosterone in the serum of newborn, weaning, and pubertal female and male offspring were determined using an enzyme-linked immunosorbent assay. A decrease in 17β-estradiol and testosterone was observed in female and male weaning and pubertal offspring exposed to all doses of tembotrione during gestation and lactation. In weaning offspring exposed only during lactation, 17β-estradiol dropped significantly after exposure to the two lower doses and testosterone after exposure to the lowest dose of tembotrione. The greatest effect was observed at the lowest dose of tembotrione. In newborns, we observed increased 17β-estradiol after exposure to two lower doses of tembotrione and significantly increased testosterone after exposure to the lowest dose. The highest dose of tembotrione decreased 17β-estradiol significantly in newborn females. In this study we have shown for the first time that tembotrione exposure during sensitive periods of development provoked proestrogenic or estrogen agonistic effects in rat offspring until puberty.

Keywords: tembotrione; pregnancy; lactation; 17β-estradiol; testosterone; rats

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Biography:

Anja Katić, Ph.D., graduated at the Faculty of Food Technology and Biotechnology, University of Zagreb in 2005. She acquired Ph.D. in Biomedicine and Health Sciences at the Faculty of Pharmacy and Biochemistry, University of Zagreb in 2015. She is employed in Division of Toxicology at the Institute for Medical Research and Occupational Health, Zagreb, Croatia, since 2007. Anja Katić published 25 original scientific papers and more than 30 abstracts at the international and national scientific meetings. She attended several courses at foreign institutions, for which she received scholarships, and she is a member of few scientific associations.

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