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# Postnatal Development Of The Thyroid Gland Under Intrauterine Exposure To Low Doses Of Pyrethroid Pesticides

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The aim of the study was to identify the structural and functional features of the early postnatal development of the pituitary-thyroid system in offspring exposed to chronic pesticide exposure through the maternal organism.

**The study's goal necessitated solving the following tasks:**

1. To study the morphological, morphometric, and ultrastructural features of the thyroid gland during the offspring's development under chronic pesticide exposure through the maternal organism.
2. To evaluate the proliferative activity and degree of apoptosis in thyroid cells using immunohistochemistry under chronic pesticide exposure through the maternal organism.
3. To determine the concentration of marker hormones of the anterior pituitary (TSH) and thyroid gland (T4, T3) in mothers and during the offspring's development under chronic pesticide exposure.
4. To establish the morphological, morphometric, and ultrastructural features of the adrenal cortex during offspring development under chronic pesticide exposure through the maternal organism.

## INTRODUCTION.

### Research Object:

The study was conducted on sexually mature nulliparous Wistar rats weighing 150-180 g and their offspring. The experimental groups of female rats received the pesticide fipronil (Vigor) daily at a dose of 3.6 mg/kg until the end of the experiments. Offspring samples were collected on days 3, 7, 14, 21, and 30 after birth. The study examined the pituitary gland, thyroid gland, adrenal glands, and blood serum of mothers and their offspring.

Research Subject:

A comprehensive analysis of early postnatal development of the pituitary-thyroid system in offspring under low-dose pesticide exposure through the maternal organism; the structural and functional mechanisms of the toxic effects of intrauterine and early postnatal pesticide exposure.

Research Methods:

To achieve the objectives, the following methods were used: light microscopy, morphometry, transmission electron microscopy, immunohistochemistry, enzyme-linked immunosorbent assays (ELISA), and statistical variation analysis.

Scientific Novelty of the Study:

-Established the dynamics of postnatal structural and functional development of the endocrine glands of the pituitary-thyroid-adrenal system in offspring under maternal pesticide exposure.

-Confirmed the validity of the concept of "endocrine-disrupting" effects in offspring due to

intrauterine and early postnatal low-dose pesticide exposure.

-Demonstrated that exposure to the pyrazole-based pesticide fipronil during intrauterine and lactation periods has a consistent negative impact on the offspring's endocrine system development.

-Found that hypothyroidism and oxidative stress induce apoptosis in thyroid and adrenal gland cells, leading to an imbalance between cell proliferation and death, slowing postnatal gland development.

-Revealed that the structural and functional mechanisms underlying postnatal thyroid and adrenal gland disruptions due to pesticide exposure can serve as a basis for developing preventive, diagnostic, and therapeutic strategies for hidden toxic effects in pregnant women and newborns under environmental pollution risk.

Practical Outcomes of the Study:

Based on findings showing the "endocrine-disrupting" effects of low-dose pesticide exposure during intrauterine and early postnatal periods, methods for early diagnosis and prognosis of endocrine disorders in newborns and children have been developed.

The data justify conducting monitoring studies to detect hidden toxic effects of low-dose pesticide exposure in the absence of clinical signs of intoxication.

Identified mechanisms of disrupted postnatal development of the pituitary-thyroid-adrenal system provide a scientific basis for preventive and therapeutic interventions.

Preventive and therapeutic measures should focus on early detection and pharmacological correction of hypothyroidism and oxidative stress in pregnant women and newborns using thyroid hormones and antioxidant therapy.

Demonstrated the fundamental and applied significance of the study by providing new data for predicting the effects of environmental pollutants on human and animal health.

Developed a concept for the pathogenesis of endocrine-disrupting effects of low-dose pesticides on offspring through intrauterine and early postnatal maternal exposure.

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