MORPHOLOGICAL TRANSFORMATION OF NERVOUS AND ENDOCRINE COMPONENTS OF DIGESTIVE ORGANS UNDER THE INFLUENCE OF TOXIC CHEMICALS.

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Annotation: The negative impact of toxic chemicals on the human body, particularly on the developing fetus and infants, is one of the pressing issues. Given the insufficient study of the effects of toxic chemicals on the body's regulatory systems, the impact of certain widely used agricultural toxic chemicals (insecticides, herbicides, fungicides, and bactericides) on the digestive organs was investigated.
Keywords: herbicide, fungicide, chemical, vacuole, endocrine system, 5 DOK, nerve endings, poisoning, pesticide.

ТРАНСФОРМАЦИЯ МОРФОЛОГИЧЕСКИХ ХАРАКТЕРИСТИК НЕРВНЫХ И ЭНДОКРИННЫХ КОМПОНЕНТОВ ОРГАНОВ ПИЩЕВАРЕНИЯ ПОД ВОЗДЕЙСТВИЕМ ЯДОВИТЫХ ХИМИКАТОВ.

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Аннотация: Негативное воздействие токсичных химикатов на организм человека, особенно на развивающийся плод и организм детей грудного возраста, является одной из актуальных проблем. Учитывая недостаточную изученность влияния токсичных химикатов на системы управления организмом, было исследовано воздействие некоторых широко применяемых в сельском хозяйстве токсичных химикатов (инсектицидов, гербицидов, фунгицидов и бактерицидов) на органы пищеварения.
Ключевые слова: гербицид, фунгицид, химикат, вакуоль, эндокринная система, 5 DOK, нервные окончания, отравление, пестицид.

Relevance of the Topic: Due to the penetration of chemical plant protection agents used in agriculture into biosphere components, it is impossible to fully protect humanity from their negative effects. Therefore, the relevance of this topic is underscored by the focus of scientific research on understanding the mechanisms of the impact of chemical plant protection agents on the body and preventing their harmful effects.

Aim and Objectives of the Study: To investigate reactive changes in the nervous and endocrine systems of the digestive tract organs during prenatal and early postnatal periods under the influence of pesticides.

Materials and Methods: Fragments of various sections of the digestive tract of experimental animals poisoned with herbicides were used as research material. Poisoning was induced by administering a 5-fold dose of herbicides dissolved in water via a gastric tube. Experiments were conducted on rabbits, dogs, and cats in two directions. First, the digestive system organs of experimentally poisoned animals were studied. Second, the nervous and endocrine systems of the digestive tract organs of embryos exposed to pesticides at different stages of pregnancy were examined. The stomach, gallbladder, bile ducts, and small intestine were studied. The material was fixed in 12% neutralized formalin and Bouin's solution. To study adrenergic and cholinergic nerve elements, as well as endocrine cells containing monoamines (EC, ECL), sections obtained from unfixed material on a cryostat were used. The nervous system of the organs was studied using the Bielschowsky-Gross, Campos, and Rasskazova methods, while endocrine cells were analyzed using the Grimelius and Masson-Hamperl methods. Sections from unfixed material were treated with glyoxylic acid solution, and adrenergic nerve structures and fluorescent endocrine cells were examined using a LUMAM-I2 luminescent microscope with FS 1-4 and FS 1-6 filters. The density of their distribution was determined using an ocular grid with 256 cells. Numerical data were statistically processed using the Montsevichute-Eringene method.

Results and Analysis: In the middle part of the digestive tract, particularly in the walls of the bile ducts, gallbladder, duodenum, and small intestine, the largest number of large intramural nerve ganglia and the densest arrangement of nerve cells were observed. Adrenergic and cholinergic nerve elements were distributed in the organ walls with varying density. Adrenergic nerve fibers reached the organs via the main arteries supplying blood. A large number of open and closed-type endocrine cells were found in the epithelium of the mucous membrane of the digestive organs. In the initial period after herbicide administration (3–5 days), pronounced reactive changes were observed in the nervous and endocrine systems of the digestive organs. Hyperimpregnated and varicose nerve fibers were found in nerve bundles. With prolonged poisoning (7–10 days), degenerative changes were observed in nerve elements: fragmentation and mummification of nerve fibers, and the appearance of vacuoles in the cytoplasm. Synaptic nerve endings underwent degenerative changes, with presynaptic fibers fragmenting, synaptic endings detaching, leading to deformation and loss of the neurofibrillar structure. The prefibrillar space expanded. In the diffuse endocrine system cells, an extrusion block was observed. Under the influence of herbicides, secretion sharply ceased and then abruptly resumed. With prolonged exposure, the relative number of endocrine cells significantly decreased, with signs of degeneration. Tumor-like protrusions appeared at the basal part of the cells, and vacuoles were observed in the cytoplasm. The study of rabbit embryos exposed to herbicides during pregnancy showed that reactive and degenerative changes in the nervous and endocrine systems of the digestive organs occurred due to herbicides transmitted through the maternal organism. This was fully confirmed by comparison with a control group of rabbit embryos, whose nervous and endocrine systems of the digestive organs showed no changes. The degree of changes in the nervous and endocrine systems of the embryos' digestive organs corresponded to the duration of maternal poisoning, further confirming this conclusion.

Conclusions:1. Chemical plant protection agents exert a reactive effect on the body's regulatory systems (nervous and endocrine) in the initial period of poisoning and a degenerative effect starting from the fifth day.

2.Poisoning of pregnant animals with chemical plant protection agents negatively affects embryo development, including the formation of its nervous and endocrine systems.

3.The degree of changes in the nervous and endocrine systems of internal organs under the influence of herbicides is directly proportional to the duration of poisoning.

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