



MORPHOLOGICAL CHANGES IN THE LIVER AFTER ACUTE EXPOSURE TO PESTICIDES

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To identify characteristic morphological features of the liver in rats acutely poisoned with the pesticide Ento Defol

ABSTRACT

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Relevance. The widespread chemicalization of the human environment facilitates scientific research in this area. The study of the effects of pesticides is particularly relevant.

Study Objective: To identify characteristic morphological features of the liver in rats acutely poisoned with the pesticide Ento Defol.

Material and Methods. The experiment was conducted on two groups of mongrel laboratory rats: a control group (6 rats) and a group (6 rats) exposed to the pesticide Ento Defol at a dose of 1/10 LD₅₀. The study methods included staining the histological specimens with hematoxylin and eosin, van Gieson staining, and toluidine blue.

Results. Hematoxylin and eosin staining reveals significant changes in the histoarchitectonic structure of the liver tissue. The boundaries between functional zones are expressed as undefined structures. Hepatocytes in the centrilobular region exhibit predominantly dystrophic and necrobiotic changes, including vacuolar cytoplasmic degradation, hydropic edema, granular degeneration, and foci of coagulative necrosis in some cells. The nuclei exhibit varying degrees of pyknosis, karyorrhexis, and karyolysis, as well as an increased number of apoptotic bodies. The sinusoids are dilated, exhibiting plethora and stasis, and dysfunctional changes are noted in the endothelial layer. Kupffer cells show signs of hyperplasia. In the middle lobular zone, hepatocyte cytoplasmic eosinophilia is reduced, small and large vacuoles form in some cells, and in some areas, binucleated hepatocytes and mitotic figures are relatively more numerous. Granular degeneration and minor hydropic changes in the hepatocyte cytoplasm are observed in the periportal region. Interstitial edema and a small amount of lymphohistiocytic infiltration are observed in the portal tracts.

When stained using the Van Gieson method, collagen fibers in the liver tissue are typically located around the portal tracts, and in some areas they are uneven and fragmented. In the centrilobular region, the cytoplasm of hepatocytes shows signs of granularity and vacuolar degeneration. Around foci of necrosis, the parenchymal structure is fragmented, and the cell contours are unclear. Sinusoids are dilated and filled with blood, and the number of Kupffer cells is increased. In the middle lobular zone, the intensity of hepatocyte cytoplasm is

reduced, and the cells exhibit a mixture of regenerative and destructive processes. In the periportal region, increased collagen fiber density and signs of reactive fibrosis, edema, and mild inflammatory infiltration are observed. Signs of endothelial dysfunction and elements of plasmorrhagia are noted in the vessel walls.

Toluidine blue staining reveals granular and vacuolar changes in the hepatocyte cytoplasm and an uneven distribution of basophilia in the centrilobular region. Numerous cases of chromatin condensation, pyknosis, and karyorrhexis are present in the nuclei, with signs of metachromasia observed in some stromal elements. Signs of plethora and stasis are present in the sinusoidal spaces, with an increased number of Kupffer cells. In the middle lobular zone, basophilia of the hepatocyte cytoplasm decreased, with signs of vacuolization and structural damage observed in some cells. Necrobiotic changes and regenerative processes are also observed in this area. Although changes in the periportal region are relatively less pronounced, signs of interstitial edema and moderate infiltration are observed. Metachromatic reactions around portal tract elements are increased.

Conclusion. Thus, a single exposure to the pesticide Ento Defol at a dose of $1/10$ LD₅₀ causes severe toxic liver damage in rats, characterized by a combination of dystrophic, necrobiotic, vascular, and inflammatory changes, most pronounced in the centrilobular regions of the liver lobules. The identified morphological abnormalities indicate the high hepatotoxic activity of the studied pesticide and the development of toxic hepatopathy with activation of compensatory and regenerative processes.

