



LIVER MORPHOCHARACTERISTICS EXPOSED TO DISTILLED WATER

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ARTICLE INFO

Received: 20th June 2026

Accepted: 22nd June 2026

Online: 24th June 2026

KEYWORDS

*To study the effects of distilled
water on rat liver*

ABSTRACT

Chemicals, especially pesticides, are widely used in agriculture. However, their adverse effects on the body have not been fully studied.

Relevance. Chemicals, especially pesticides, are widely used in agriculture. However, their adverse effects on the body have not been fully studied.

Study Objective: To study the effects of distilled water on rat liver.

Materials and methods. The experiment was conducted on two groups of mongrel laboratory rats—an intact group (6 rats) and a control group (6 rats)—which were administered distilled water. The study methods used included staining the specimens with hematoxylin and eosin, van Gieson staining, and toluidine blue.

Results. Hematoxylin and eosin staining of liver tissue specimens reveals that the histoarchitectonic structure is preserved within the physiological norm. The liver parenchyma is organized based on functional zonation, with morphologically distinct centrilobular, midlobular, and periportal regions. In the centrilobular region, hepatocytes are arranged radially around the central vein and are predominantly polygonal in shape, with eosinophilic cytoplasm and a fine-grained structure. Some cells exhibit signs of mild granular degeneration, and this condition is assessed within the framework of physiological variability. The nuclei are often centrally located, round or oval, and normochromic or slightly hyperchromic. In rare cases, the presence of binucleated hepatocytes reflects the natural regenerative potential of liver tissue. The sinusoids are open and contain endothelial cells and a small number of Kupffer cells. In the middle lobular zone, hepatocytes are arranged in an orderly fashion relative to one another; the eosinophilic cytoplasm may be somewhat less prominent. The presence of individual binucleated cells in this area also indicates the continuity of physiological renewal processes. In the periportal zone, hepatocytes are compact and densely packed, their cytoplasm characterized by intense eosinophilic staining. The nuclei are distinguished by clear contours, centralization, and uniform chromatin distribution. The elements of the portal tract—arteries, veins, and bile ducts—are clearly differentiated.

When stained using the Van Gieson method, collagen fibers appear bright red and are located predominantly around the portal tracts and in the vessel walls. Parenchymal elements are yellowish-brown, and the overall hepatocyte architecture is intact. In the centrilobular

region, hepatocytes have a normal polygonal shape, with slightly granular cytoplasm. The nuclei are usually centered and normochromic or slightly hyperchromic. Mitotic figures or binucleated hepatocytes are observed in some areas. The sinusoidal structure is open and not deformed, with a small number of Kupffer cells. In the middle lobular zone, the hepatocyte density has decreased, with the boundaries between the stroma and parenchyma preserved. In the periportal region, collagen fibers and hepatocytes are densely packed, and the cytoplasm exhibits marked eosinophilia.

Toluidine blue staining allows for clear visualization of cellular and subcellular structures in liver preparations. In the centrilobular region, hepatocytes are polygonal in shape, with basophilic and, in some cases, neutral cytoplasm. The nuclei are light, chromatin is evenly distributed, and there are no signs of pathological condensation. Some hepatocytes are binucleated. Kupffer cells are located in the sinusoidal space and are distinguished from other cells by their relatively darker color. In the midlobular zone, the cytoplasm of hepatocytes is somewhat less intense. In the periportal region, hepatocytes are arranged in ordered rows, with a relatively uniform and stable cytoplasm. The nuclei are oval, centrally located, and show minimal signs of hyperchromia. The components of the portal tract are clearly differentiated, and no inflammatory or fibrotic changes are observed.

Conclusion. Thus, the morphological picture of the liver of animals in the control group corresponds to the physiological norm, indicating the absence of a damaging effect of distilled water on the structural and functional state of liver tissue and allowing the obtained data to be used as a control for comparative evaluation of experimental effects.

