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STUDY OF NORMAL MORPHOMETRIC PARAMETERS OF THE LIVER

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Abstract: At the present stage of the development of medicine, biological modeling of diseases is becoming the most important method of scientific knowledge, which necessitates the creation of such experimental models on laboratory animals that would most adequately reflect the mechanisms of the onset and development of human diseases, as well as the mechanisms of recovery. Setting up such experiments is unthinkable without a detailed knowledge of the biology of laboratory animals, which, being the most important part of the modeling experiment, remain poorly understood to date.
Key words: We set the task to study the age-related histological features of the liver of outbred laboratory rats.

Material and methods. The material for this study was the liver of outbred rats of 3 months and 1 years of age, laboratory rats. After the animals were slaughtered and the abdominal cavity was opened, the studied organs were removed and fixed in a 10% neutral formalin solution. Paraffin sections were stained with hematoxylin-eosin. Histological preparations were studied under a light-optical microscope.

Results. Microscopically, the liver of 3-month-old rats is characterized by a lobed structure. The hepatocytes of the lobules in the vast majority of cases have a multifaceted shape. Cell borders are difficult to detect, and the cytoplasm contains coarse granules. The diameter of hepatocytes is 13.53±0.35 μm. The hepatic cells are arranged in irregular rows that branch out from the periphery of the lobule towards the central vein. The nuclei of hepatocytes are rounded. They have a well-defined karyolemma and contain clearly visible nucleoli and clumps of chromatin. The diameter of the nuclei is 7.37±0.29 μm. Among hepatic cells there are binuclear, the diameter of which reaches 23.4 microns and trinuclear, with a diameter of up to 25.74 microns.

Conclusion. The liver of white rats undergo noticeable morphological changes with age.
Key words: liver, hepatocytes.

INTRODUCTION

Today alcohol addiction is one of the most pressing problems of modern human society. Alcohol, as a psychotropic drug, occupies one of the leading positions in the world in terms of consumption, which has become a serious problem for public health in most countries, including Uzbekistan .
However, despite the large number of studies devoted to the effects of alcohol, insufficient attention has been paid to the study of morphofunctional changes in the tissues of internal organs, namely the liver, against the background of chronic alcohol intoxication.
Every year, mortality from diseases associated with alcohol abuse reaches 700 thousand people, and about 40 thousand people die from poisoning with alcohol surrogates in the country .
At the present stage of the development of medicine, biological modeling of diseases is becoming

the most important method of scientific knowledge, which necessitates the creation of such experimental models on laboratory animals that would most adequately reflect the mechanisms of the onset and development of human diseases, as well as the mechanisms of recovery. Setting up such experiments is unthinkable without a detailed knowledge of the biology of laboratory animals, which, being the most important part of the modeling experiment, remain poorly understood to date. The lack of necessary information about the structural and functional features of the organs of laboratory animals in different age periods reduces the possibility of choosing the right animal for purposeful modeling, and increases the likelihood of errors in interpreting the results of the experiment. Therefore, the study of the organ morphology of laboratory animals as experimental objects is an important task.

An analysis of the literature shows that the available information on the structural and functional state of the liver and thyroid gland of laboratory rats is fragmentary [1, 2, 3, 4, 5, 6,7]. Based on the foregoing, we set the task to study the age-related histological features of the liver of outbred laboratory rats.

Material and methods. The material for this study was the liver of outbred rats of 3 months and 1 years of age, laboratory rats. After the animals were slaughtered and the abdominal cavity was opened, the studied organs were removed and fixed in a 10% neutral formalin solution. Paraffin sections were stained with hematoxylin-eosin. Histological preparations were studied under a light-optical microscope.

Results. Microscopically, the liver of 3-month-old rats is characterized by a lobed structure. The hepatocytes of the lobules in the vast majority of cases have a multifaceted shape. Cell borders are difficult to detect, and the cytoplasm contains coarse granules. The diameter of hepatocytes is 13.53±0.35 μm. The hepatic cells are arranged in irregular rows that branch out from the periphery of the lobule towards the central vein. The nuclei of hepatocytes are rounded. They have a well-defined karyolemma and contain clearly visible nucleoli and clumps of chromatin. The diameter of the nuclei is 7.37±0.29 μm. Among hepatic cells there are binuclear, the diameter of which reaches 23.4 microns and trinuclear, with a diameter of up to 25.74 microns.

Between the rows of hepatocytes are sinusoids, in which blood cells are found in significant quantities. From the inside, the sinusoids are lined with endothelium with oval-elongated hyperchromic nuclei. The average diameter of the sinusoids is 7.41±0.39 μm. Sinusoids flow into the central veins, the inner surface of which is lined with endothelium with oval-elongated and rod-shaped nuclei, densely stained with hematoxylin.

The connective tissue layers in the liver of 3-month-old animals are very weakly expressed, which is why the boundaries between the lobules are indistinguishable. The available few layers consist of thin fibers and cellular elements surrounding the interlobular blood vessels and bile ducts. The interlobular veins are relatively large. They have a wide lumen and a thin wall, lined from the inside with a flat endothelium with densely stained rod-shaped nuclei.

The interlobular arteries are much smaller in diameter than the veins. They have a narrow lumen and a thicker (in relation to the diameter of their lumen) wall, in which the largest proportion is media. The interlobular bile ducts are lined with cuboidal and low-prismatic epithelium with a weak basement membrane. The boundaries of epitheliocytes are quite well distinguishable. Rounded and oval cell nuclei are weakly stained with hematoxylin, but have a well-defined membrane.
Liver tissue of 3-month-old outbred rats.

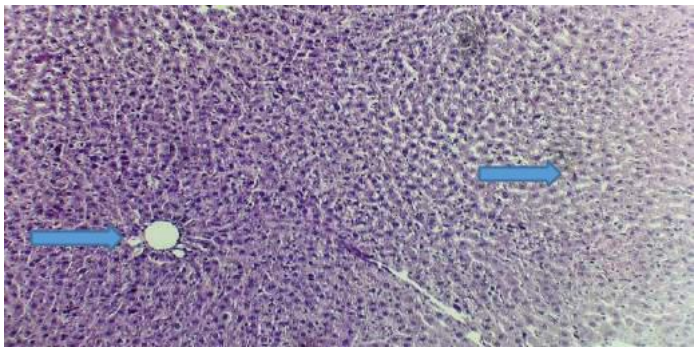

Figure 1. Morphological structure of the liver. G-E paint. about 4x10 approx.

1. Hepatocytes around the central vein Expansion of sinusoids from the periphery to the central vein.
2. Hepatocyte cells (small round nuclei, stained with hyperchrome, cytoplasm stained with eosinophils).
3. Space in the perisinusoidal region (Disse), Kupffer cells.
4. Expansion of the Hepping (Goering) canal (cholangiols).

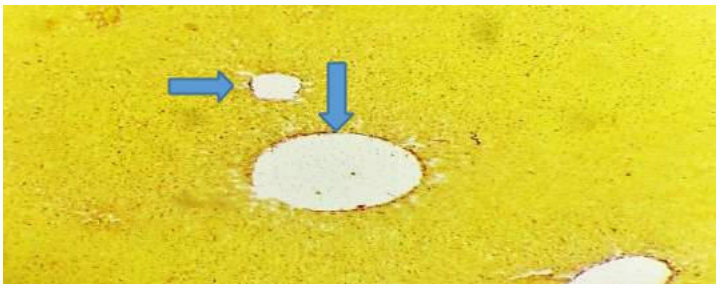

Figure 2. Morphological structure of the liver. Paint Van Gieson. about 4x10 approx.

1. The wall of the central vein is rarely lined with thin collagen (pink).
2. Sinusoids directed from the periphery to the central vein.
3. Hepatocyte cells (small rounded nucleus is stained dark, the cytoplasm is stained yellow).
4. Very thin collagen fibers around sinusoids

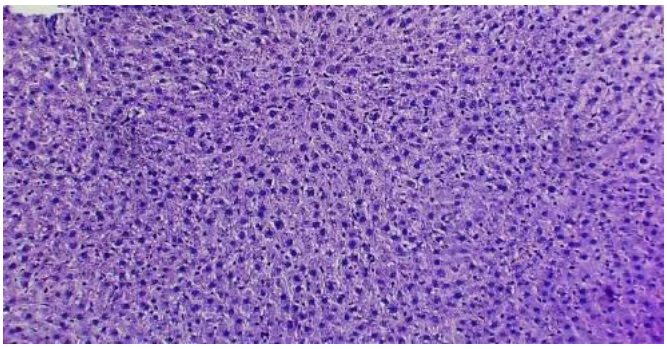

Figure 3. Morphological structure of the liver. Paint G-E. ob 4x10 ok.

1. Hepatocyte cells (nucleus is larger and round, stained with hyperchrome, cytoplasm is stained with eosinophils).
2. Expansion of space in the perisinusoid area (Disse), Kupffer cells.
3. Pit cells (lymphocytes) in the perisinusoid area

The general structure of the liver of 1-year-old rats is similar to that of 3-month-old animals. The diameter of hepatocytes does not differ significantly from the diameter of hepatocytes in the

previous age group and is 13.4 ± 0.31 μm, however, in most cases, the boundaries of the cells are more pronounced. Picture 1,2,3

There is no pronounced difference in the diameter of the nuclei of hepatocytes. This indicator in 1-year-old animals is 7.18±0.18 μm. But often liver cells are found, the nuclei of which do not have distinct contours.

Also, the average diameter of the sinusoids (7.49±0.34 μm) does not differ significantly, which in 1-year-old rats is characterized by a markedly lower blood filling. The contours of the sinusoids become more distinct due to the greater severity of the boundaries of the hepatocytes surrounding them. Interlobular connective tissue layers are found less frequently than in the liver of the previous age group.

Conclusions. The liver of white rats undergo noticeable morphological changes with age.

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