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Normal Macroscopic and Histological Properties of Rat Liver

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Annotation: In the morphogenesis of the liver during prenatal development of white non-breeding bats, there are regularly changing stages of human-like organ formation. In rats, the liver is an organ with a large mass, despite the presence of many liver fragments and the absence of a gallbladder, the microscopic structure of the rat liver and the cytophysiological properties of human hepatocytes are not fundamentally different. Taking into account this, it is considered in every possible way convenient to carry out many experimental experiments in rats without a white breed.

For this purpose, the normal parameters of the liver tissue of white-breed rats were studied. The purpose of the work was calculated to supplement the data on macroscopic parameters in the liver tissue.

Keywords: macroscopy, histology, liver, hepatocyte, parenchyma, polypragmasia.

Relevance. One member of human importance is the liver gland, which can be used to list metabolic, toxic, microbiological, circulatory disorders and neoplastic factors from factors that have a detrimental effect on it.

Many scientific works are being carried out with the aim of studying and preventing these pathological changes. At a time when such scientific work cannot necessarily be carried out in a person, the similarity of the organ of white-breed rats to the human organ makes it easier for us to do our work. Therefore, we set ourselves the goal of studying the macroscopic parameters of the liver of rats without white breeds and replenishing the data obtained before us.

Goals and objectives. Histological methods for analyzing the macroscopic and morphofunctional state of the liver are widely used in the diagnosis and differential diagnosis of liver diseases of various etiologies. However, their results do not always reflect a violation of the structure of the entire organ. All this together increases the interest of researchers in looking for new ways to assess liver pathology, which can be associated with a microscopic assessment of the criteria for changes in liver pathomorphological structures, in the case of several anti-inflammatory agents, namely polypragmasia. Therefore, from the point of view of the possibility of studying the data of liver tissue in the norm and comparing it with pathological processes, the macroscopic and microscopic study of the liver of white-breed rats was aimed at, and 46 white-breed rat liver macroscopic and microscopic studies were carried out.

Material and methods. During the examination, a total of 46 liver tissue pathogistological studies were carried out, based on macroscopic and microscopic studies of liver tissue. For general morphology, 2 pieces were cut from each liver,i.e. a large piece and 1.5 × 1.5 cm from the middle,and hardened in a 10% neutralized formalin. After 2-4 hours of washing in running water, the concentrate was dehydrated in increased alcohols and xylol, then paraffin was poured and blocks were prepared. 5-8 µm incisions were made from paraffin blocks and painted in hematoxylin and eosin.

Results and conclusions. Control group bats ranged in weight from 130g to 140g, with an average of -135 g. The control group of rats has a liver mass of 7.6 g to 9.8 g, on average – 8.50 G, up to 0.36 g. the average mass coefficient is up to -6.68 G, up to 0.20 g.

The liver is externally covered with a connective tissue capsule, which penetrates the liver parenchyma to form a lumpy and lumpy structure. Only in the area of the portal tracts does the sectional appearance clearly stand out. As in humans, fibrosis in rats is not separated by fibrous folds. The boundaries of the fragments are conditional lines between the portal tracts. Liver cells and hepatocytes are arranged in relatively regular rows within the compartments, forming two rows of radial liver plates.

The transverse size of hepatocytes (the distance from the center of one hepatocyte nucleus to the center of the nearby nucleus of another) varies from 21.0 to 28.0 µm, with an average of -25.1 to 0.45 µm. They have a polygonal shape with clear boundaries. Cytoplasm amphophilic, granular. In the perinuclear zone and on the side of the sinusoidal Polyus, against the background of a relatively pale cytoplasm, there is a small granular basophilic substance corresponding to the granular endoplasmic network.

The average cross-section of hepatocyte cytoplasm ranges from 403.0 mm2 to 731.0 mm2, with an average of 594.5 to 21.6 mm2. The hepatocyte nuclei are located centrally, contain one or two well-distinguished nucleols, vary in size and shape, are often rounded. The nuclei are usually located in the center of the liver cells, but can be moved around them. A large proportion of hepatocytes are mononuclear, along with binuclear hepatocytes. Periportal hepatocytes are somewhat small, with hyperchromic nuclei and basophilic cytoplasm.

The number of binuclear hepatocytes per 100 hepatocytes ranges from 10-18, with an average of 0.72 compared to 14.2 hepatocytes. Rat control group hepatocyte core cross-sectional indicators range from 102.0 mm2 to 143.0 mm2, average – 119.4%, to 2.58 mm2.

In the center of the liver fragments there are central veins, which are the initial connection of the liver vessels. The diameter of the central veins ranges from 48.0 to 76.0 µm, with an average of 60.55 to 1.74 µm. The portal tracts surround the artery, the vein, and the cleft containing the axial path.

The intercostal veins range in diameter from 22.0 to 36.0 µm, with an average of 30.1 to 00.870 µm. These vessels give very small branches in diameter, resulting in the passage to the venules, where a small labyrinth-like blood vessel of the liver compartment splits into branches of the sinusoidal capillaries that make up the bundle. Interstitial arteries give most of their branches to the blood supply of the bile ducts, are involved in the formation of peribiliary Scrolls, whose density increases as the diameter of the bile ducts increases.

The interstitial arteries range in diameter from 9.9 to 16.3 µm, with an average of 14.2 to 0.40 µm. A smaller portion of the terminal arteries are involved in the formation of sinusoidal veins (capillaries) by crossing into arterioles less than the diameter of the intercostal veins (2 times or more). They settle between the liver fragments.

The sinusoidal capillaries are mainly oriented radially towards the center of the segments, which flow into the central veins. These hemocapillaries have sizes ranging from 9.0 to 13.0 µm in cross – section, with an average of -11 µm to 0.26 µm. One side of the hepatocyte is exposed to the sinusoid (towards the sinusoid) and the other side to the adjacent hepatocyte formed by the bile capillaries (towards the bile).

The axial pathways of the triad are covered by a single-layer cuboid epithelium, ranging in height from 4 to 6 µm, with an average of 4.77 µm, to 0.17 µm. The size of the bile ducts ranges from 16.0 to 35.0 µm, with an average of 22.5 to 1.18 µm. The parenchyma between the portal tracts and the central veins is represented by two rows of vesicles of liver cells.

Conclusion. These data allow the macroscopic visualization of normal liver pointers to distinguish between pathologies and compare them with one another.

This information can be used in the Departments of anatomy, Clinical Anatomy and pathanatomy of medical institutions to complement microscopic and macroscopic information in the educational process of students

Figure 1. The location of the liver(1) in the abdominal cavity of a white-breed rat

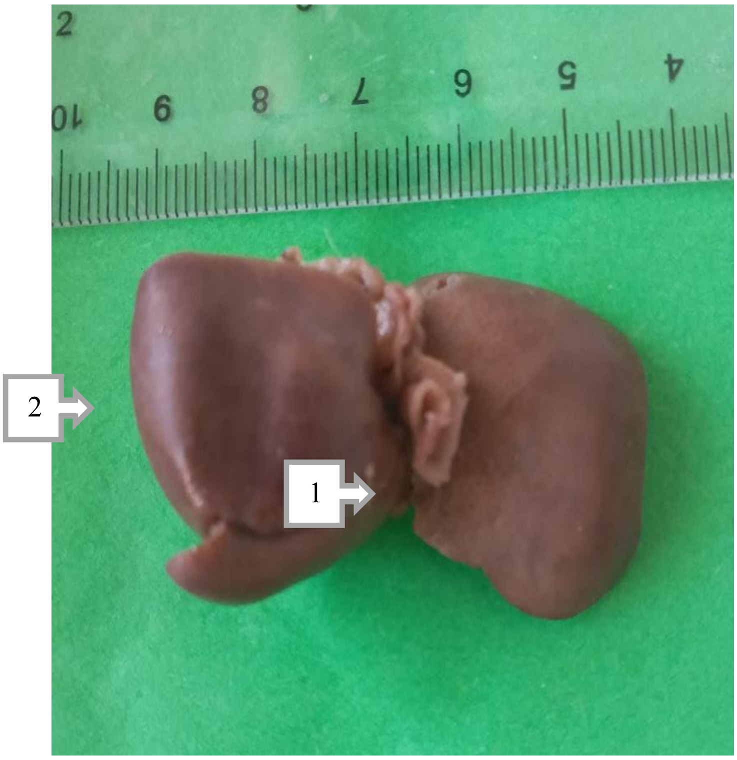

Figure 2. Anatomical parameters of the liver. Preview.

Left (1) and Right (2) branch.

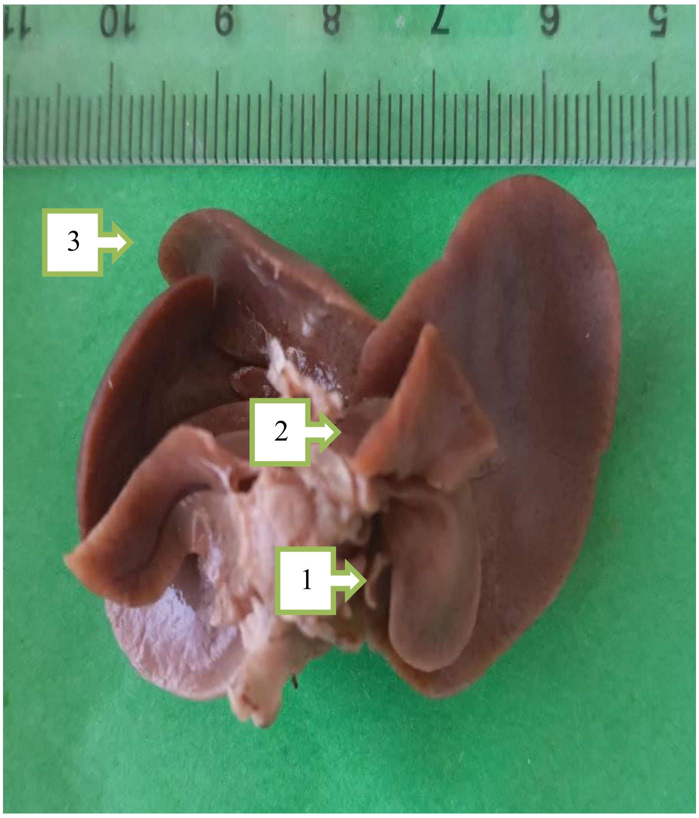

Figure 3. The tail(1) and middle(2) (extra), left Central(3) segment of the liver.

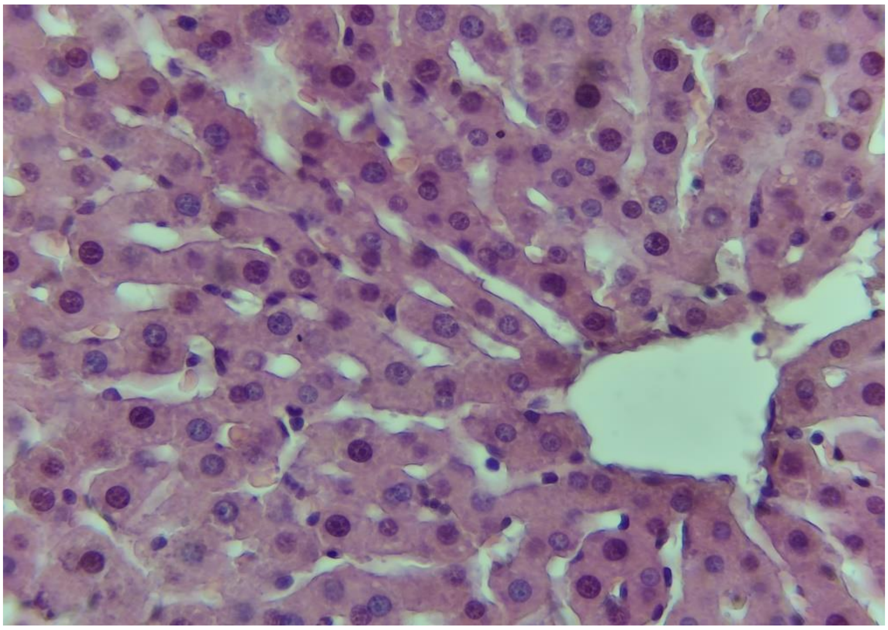

Figure 4. The microscopic appearance of the liver is in the norm.

Dye hematoxylin-eosin.

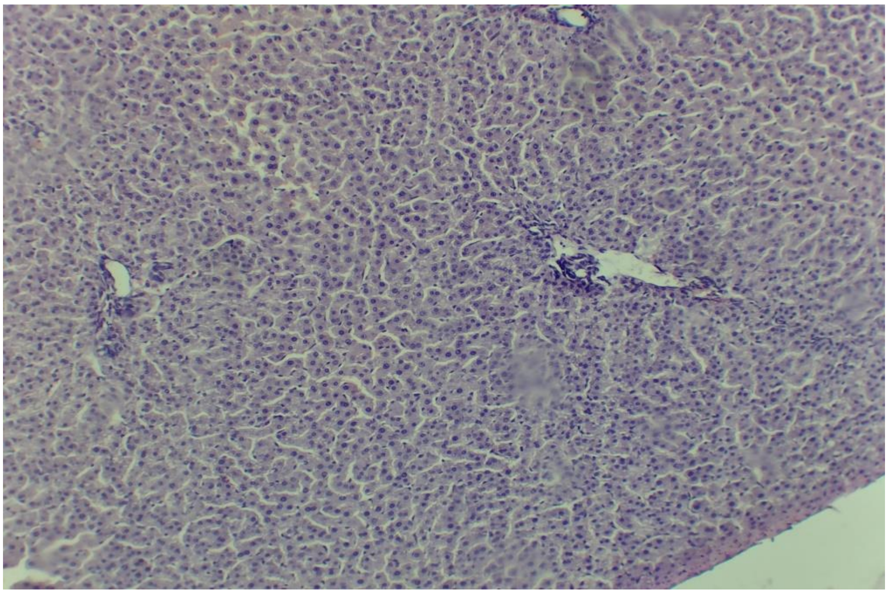

Figure 5. Microscopic appearance of the liver is the norm.

Dye hematoxylin-eosin.

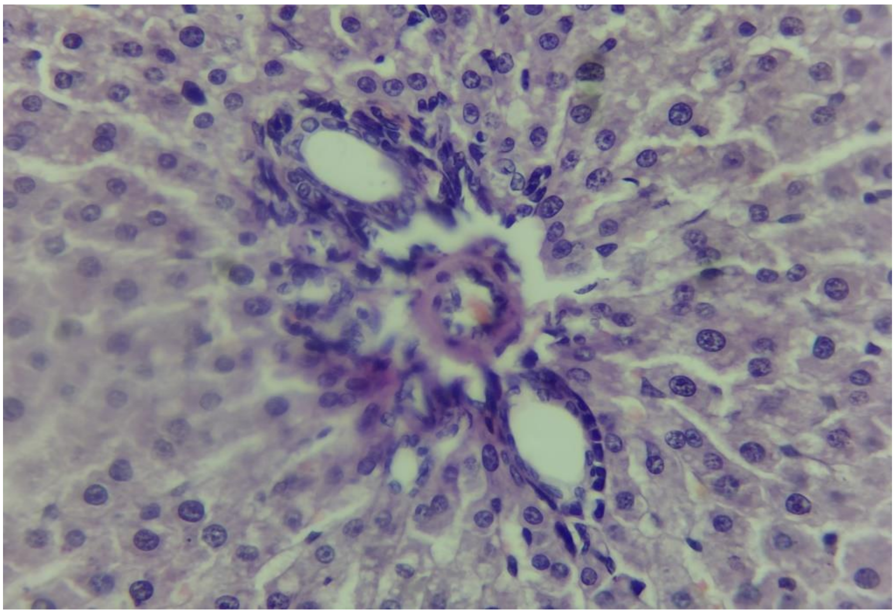

Figure 6. Microscopic appearance of the liver is the norm.

Dye hematoxylin-eosin.

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