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STUDY OF CHITOSAN DERIVATIVES ON THE LIVER STRUCTURE OF RATS WITH ACUTE TOXIC HEPATITIS

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ANNOTATION: *Chitosan with low and medium molecular weight exhibit higher antimicrobial properties, but their hepatoprotective properties have not yet been studied. Morphological study of the liver structure of rats with acute toxic hepatitis treated with low molecular weight chitosan and karsil.*

INTRODUCTION. *Chitosan belongs to the group of biocompatible and biodegradable polymers, absolutely safe, non-toxic. It is a cationic aminopolysaccharide of natural origin, a copolymer of glucosamine and N-acetylglucosamine, which is obtained by partial deacetylation of chitin. By molecular weight, chitosan can be divided into chitosan with a high molecular weight (BMX) of 190 to 375 kDa, witha deacetylation degree of more than 75%, and chitosan with a low molecular weight (NMX) of 20 to 190 kDa, with a deacetylation degreeof less than 75% [1]. With increasing molecular weight, the activity of chitosan increases. However, low-and medium-molecular-weight chitosans exhibit higher antimicrobial properties[2].Their hepatoprotective properties have not yet been studied.*

OBJECTIVE: *to study the effect of low-molecular chitosan obtained from silkworm pupaeBombyx morion liver structure in a model of acute carbon tetrachloride hepatitis.*

KEYWORDS: *low molecular chitosan, toxic hepatitis, histological structure of the liver.*

MATERIAL AND METHODS

Experimental studies were conducted in accordance with the requirements of the Helsinki Declaration on the Humane Treatment of Animals (Strasbourg, 1985). To solve these problems, experiments were conducted on 26 sexually mature male rats with an initial weight of 160-180 g. kept on a standard diet in the Laboratory of Pharmacology and toxicology of the Center for Biomedical Technologies of TMA. To reproduce acute toxic liver damage (AH), 20 CCI_4 $_{rats}$ were administered 4-fold at a dose of 2.5 ml/kg body weight subcutaneously for 4 days. No mortality was observed. AH pharmacotherapy was performed 24 hours after the final administration of the toxicant. 24 hours after the final administration of the toxicant, the animals were divided into 3 groups of 6 rats each: the control group – H_2O 0.5 ml, the comparison group-karsil at a dose of 100

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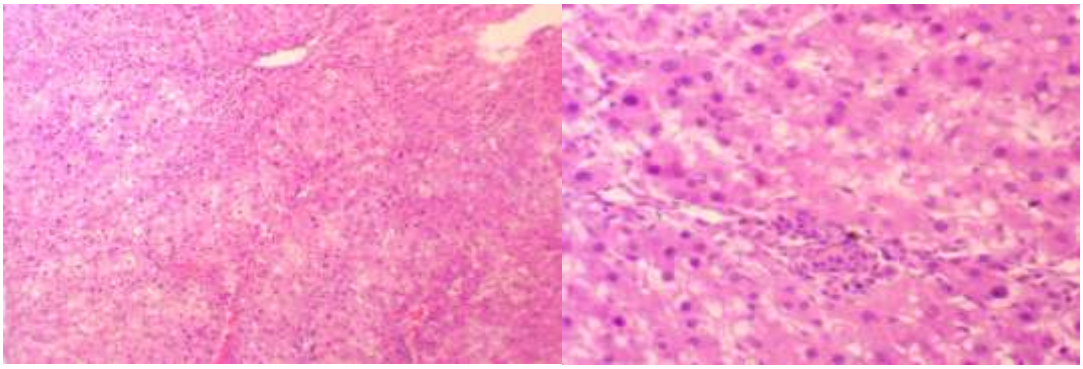
mg / kg and the main group-NMH at a dose of 25 mg/kg intragastrically for 12 days. 24 hours after the final administration of the drugs, the animals were decapitated under light ether anesthesia, and the liver was removed. For histological studies, liver fragments were fixed in a mixture of 10% formalin, ethyl alcohol and acetic acid, and embedded in paraffin. Sections толщиной4-5 microns thick were stained with hematoxylin and eosin. The samples were visualized микроскопах using Polyvar and Leica DMRE microscopes with a digital комплекс video surveillance system and программы анализа изображенийthe Videotest-4 image analysis program.

Results. The conducted studies showed that in the control group of animals, the morphological picture was characterized by the presence of diffuse periportal mesenchymalcell infiltration, lysis and fat transformation of hepatocytes with nuclear displacement. Pulverized fatty dystrophy of hepatocytes was detected in several lobes of the liver under small magnification (see Fig. 1a). Under a small magnification of the lens, liver lobules with a slit-like narrowing of the vascular lumen, small-drop fatty dystrophy of hepatocytes. In the lobules of the liver, the central vein is dilated, the beam structure of hepatocytes is preserved. In the periportal tracts, cellular response and single fat inclusions.



a b

1. Liver of a rat with AH. Under a small magnification of the lens, liver lobules with a slit-like narrowing of the vascular lumen, small-drop fatty dystrophy of hepatocytes (a). Uv. about 10.0. Color hematoxylin and eosin. Under a large magnification of the lens, periportal cell infiltration, lysis, and fat transformation in hepatocytes are noted (b). Color of hematoxylin and eosin. Uv. about 40.0.

At high magnification of the lens, periportal cell infiltration, lysis of individual hepatocytes, and fat transformation in hepatocytes are observed (see Fig. In rats with AH, there was a decrease in the recovery response and increased signs of overgrowth of immature connective tissue with an abundance of cellular structures. The

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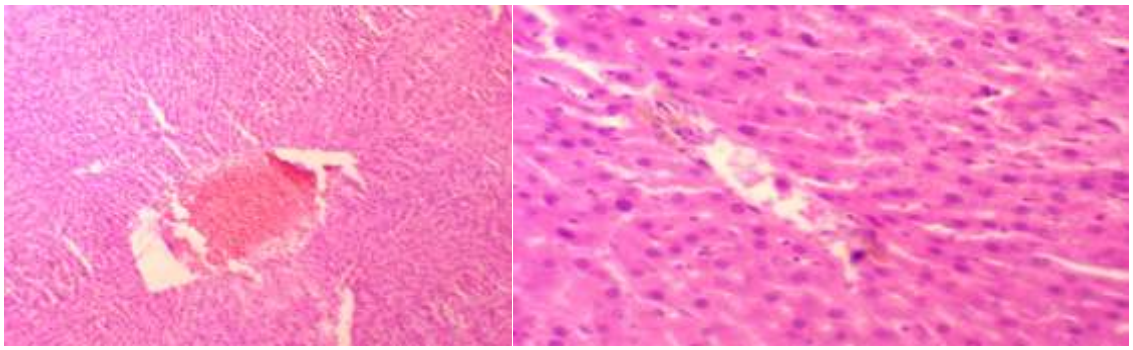
results obtained indicate the adequacy of the chosen model of acute AH.

Experimental pharmacotherapy of AH with hepatoprotector karsil at a dose of 100 mg / kg for 12 days showed signs of venous hyperemia, a sharp expansion of the central vein lumen, fullness of blood vessels, sinusoid spaces and Kupffer cells were determined. The hepatocytes had a bulbous structure, and in the middle parts of the lobule there were single hepatocytes with a pulverized fatty degeneration of a focal nature (see Fig. 2a).



A b

2. Liver of a rat with AH treated with karsil. The central vein is sharply expanded, full-blooded, in the middle parts of the lobule there are single hepatocytes with pulverized fatty dystrophy of a focal nature (a). Uv. about 4.0 (a). The beam structure of the liver is preserved, nuclei in hepatocytes are determined, in the lobule the lumen of the central vein is expanded, contains red blood cells (b). Uv. about 40.0. Coloration hematoxylin and eosin.

In some places, the girder structure of hepatocytes had a parallel oriented direction. Under a large magnification of the lens, single mononuclears were detected in the Disse spacемононуклеары. Hepatocytes are rounded-polygonal in shape, the cytoplasm is pink-reddish in color, and their nuclei are hyperchromically colored (see Fig. 2b).

In animals with AH, which underwent NMH pharmacotherapy under a high magnification of the lens, a focal accumulation of histiogenic cells гистиогеннойaround the vessels and fatty inclusions in hepatocytes were detected (see Fig. 3a). There were signs of mesenchymal-cellular reaction along the periportal tracts, accumulation of lymphocytes, histiocytes, slit-like lumen of vessels in the Disse space, as well as dystrophic changes in hepatocytes, Kaunsilmen's bodyКаунсильмена, but the girder structure was preserved (see Fig. 3b).

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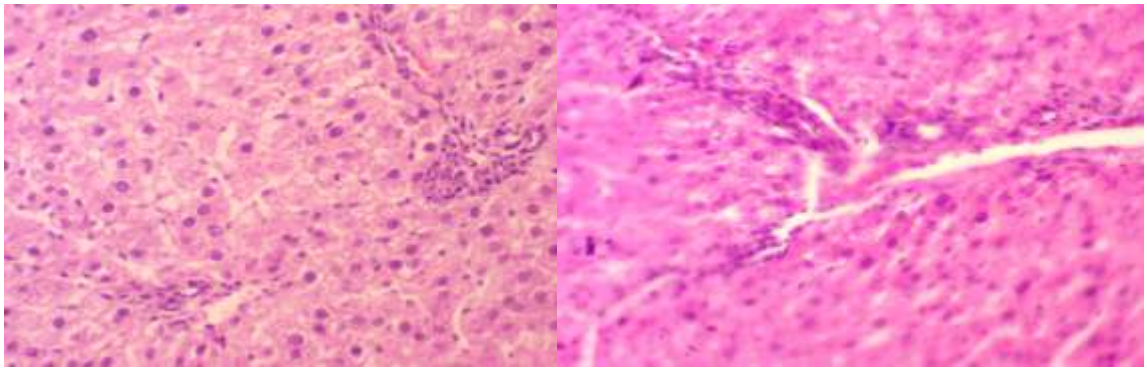

a b

3. Liver of a rat with AH treated with NMH. Focal accumulation of histiogenic cells гистиогеннойaround blood vessels fat inclusions in hepatocytes (a). Hematoxylin and eosin staining. Uv. about 40.0. Mesenchymal-cellular reaction along the periportal tracts, slit-shaped vessels, hepatocytes preserved (b). Color of hematoxylin and eosin. Uv. about 40.0.

Based on the results obtained, we can draw the following conclusion:

1. Low-molecular chitosan obtained from Bombyx mori pupae to a certain extent restores the histiostructures of the liver of rats with AH and is not inferior in morphological characteristics to the classical hepatoprotector karsil.

LIST OF LITERATURE:

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