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**MORPHOLOGICAL CHANGES OF THE LIVER UNDER THE
INFLUENCE OF LOW-CONCENTRATION ACETIC ACID IN
ONE-MONTH-OLD OUTBRED WHITE RATS**

Allayeva Aziza Nasridinovna

Bukhara State Medical Institute

Assistant at the Department of Anatomy and

Clinical Anatomy (OSTA)

<https://orcid.org/0009-0004-2661-5078>

+99897 305-31-05

aziza_allayeva@bsmi.uz

azizaallayeva@gmail.com

Annotation: This article presents experimental findings showing that administration of 6% acetic acid without biocorrection caused significant morphological alterations in the liver parenchyma of albino rats. Histological observations revealed hepatocyte shrinkage, an increased nucleus-to-cytoplasm ratio, cytoplasmic vacuolization, venous stasis in central veins, dilation of interlobular vessels, sinusoidal deformation, and proliferative-dysplastic processes in the biliary epithelium. Overall, within one month, dystrophic, inflammatory, and compensatory changes developed simultaneously in the liver tissue. These results confirm the hepatotoxic effect of acetic acid and indicate the high sensitivity of hepatocytes in young organisms to this exposure.

Keywords: albino rats, acetic acid, liver, histology, hepatocytes, morphological changes, hepatotoxicity.

**BIR OYLIK OQ ZOTSIZ KALAMUSHLARDA PAST KONSENTRATSIYADAGI
SIRKA KISLOTASINING TA’SIRI OSTIDAGI JIGARNING
MORFOLOGIK O’ZGARISHLARI**

Allayeva Aziza Nasridinovna

Buxoro davlat tibbiyot institute Anatomiya va klinik anatomiya

(OXTA) kafedra assistenti

<https://orcid.org/0009-0004-2661-5078>

aziza_allayeva@bsmi.uz

azizaallayeva@gmail.com

Annotatsiya: Ushbu maqolada tajribadan so‘ng kuzatilgan natijalariga ko‘ra, 6% li sirka kislotasi yuborilgan va biokorreksiya qilinmagan oq zotsiz kalamushlarning

jigar parenximasida sezilarli morfologik o'zgarishlar kuzatildi. Gistologik kuzatuvlarda gepatotsitlarning kichrayishi, yadro-sitoplazma nisbatining ortishi, sitoplazmada vakuolizatsiya, markaziy venalarda venoz staz, bo'laklararo qon tomirlarining kengayishi, sinusoidlarning deformatsiyasi hamda biliar epiteliyda proliferativ-displastik jarayonlar aniqlangan. Umuman olganda, 1 oy davomida jigar to'qimalarida distrofik, yallig'lanishli va kompensator o'zgarishlar birgalikda kechdi. Ushbu topilmalar sirka kislotasining gepatotoksik ta'sirga ega ekanligini hamda yosh organizmlarda jigar hujayralarining ushbu ta'sirga sezgirligini ko'rsatadi.

Kalit so'zlar: oq zotsiz kalamush, sirka kislotasi, jigar, gistologiya, gepatotsit, morfologik o'zgarishlar, gepatotoksik.

МОРФОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ ПЕЧЕНИ ПОД ВОЗДЕЙСТВИЕМ НИЗКОКОНЦЕНТРИРОВАННОЙ УКСУСНОЙ КИСЛОТЫ У МЕСЯЧНЫХ БЕЛЫХ БЕСПОРОДНЫХ КРЫС

Аллаева Азиза Насридиновна

Бухарский государственный медицинский институт

Ассистент кафедры Анатомии и клинической анатомии (ОХТА)

<https://orcid.org/0009-0004-2661-5078>

+99897 305-31-05

aziza_allayeva@bsmi.uz

azizaallayeva@gmail.com

Аннотация: В данной статье по результатам эксперимента установлено, что у белых беспородных крыс, которым вводилась 6% уксусная кислота без биокоррекции, выявлены выраженные морфологические изменения в паренхиме печени. Гистологические наблюдения показали уменьшение гепатоцитов, увеличение ядерно-цитоплазматического соотношения, вакуолизацию цитоплазмы, венозный стаз в центральных венах, расширение междольковых сосудов, деформацию синусоидов, а также пролиферативно-диспластические процессы в билиарном эпителии. В целом, в течение одного месяца в тканях печени одновременно протекали дистрофические, воспалительные и компенсаторные изменения. Полученные данные подтверждают гепатотоксическое действие уксусной кислоты и указывают на высокую чувствительность печёночных клеток молодых организмов к данному воздействию.

Ключевые слова: белые беспородные крысы, уксусная кислота, печень, гистология, гепатоциты, морфологические изменения, гепатотоксичность.

After oral administration of 6% acetic acid via a gastric probe for one month to 1-month-old outbred white rats as the experimental group, pronounced morphometric and histological changes were observed in the liver tissue.

The organometric parameters of the liver were reduced compared to the control group: the height ranged from 7.0 to 8.5 mm, while the thickness ranged from 3.5 to 4.3 mm. These changes indicate the development of atrophic processes in the hepatic parenchyma.

Micromorphometric analysis demonstrated that the interhepatocytic distance (center-to-center) ranged from 14.5 to 18.0 μm , with a mean value of $16.2 \pm 0.6 \mu\text{m}$. The reduction of intercellular spaces reflects increased cellular density. The average cytoplasmic area of hepatocytes was $268.5 \pm 15.5 \mu\text{m}^2$, which was significantly reduced against the background of dystrophic changes and cellular atrophy.

Marked pathological alterations were also detected in the hepatic microcirculatory system. The diameter of the central vein ranged from 66.3 to 69.3 μm (mean $67.8 \pm 1.5 \mu\text{m}$), and its dilation indicates venous stasis. The diameters of interlobular veins ranged from 47.2 to 49.8 μm (mean $48.5 \pm 1.3 \mu\text{m}$), while interlobular arteries ranged from 26.9 to 28.9 μm (mean $27.9 \pm 1.0 \mu\text{m}$), reflecting hyperemia and localized inflammatory responses.

The height of the biliary epithelium ranged from 6.5 to 9.0 μm (mean $7.6 \pm 0.2 \mu\text{m}$), and the diameter of the bile ducts ranged from 13.8 to 15.4 μm (mean $14.6 \pm 0.8 \mu\text{m}$). These findings are consistent with epithelial hyperplasia and mild dysplastic changes.

The mean diameter of sinusoidal capillaries ranged from 53.2 to 55.0 μm (mean $54.1 \pm 0.9 \mu\text{m}$). Dilated sinusoids and activation of Kupffer cells confirm disturbances in intrahepatic hemodynamics and immunological status of the liver.

Histological examination revealed reduced hepatocyte size, an increased nuclear-to-cytoplasmic ratio, cytoplasmic vacuolization, elements of venous stasis in the central veins, dilation of interlobular vessels, deformation of sinusoidal capillaries, and proliferative-dysplastic changes in the biliary epithelium.

The results obtained from outbred white rats subjected to chemically induced injury without biocorrective treatment demonstrated that all experimental animals (100.0%, $n = 30$) receiving 6% acetic acid developed morphological alterations of the liver.

In conclusion, exposure to 6% acetic acid for one month resulted in a combination of dystrophic, inflammatory, and compensatory changes in the hepatic parenchyma. These findings confirm the hepatotoxic properties of acetic acid and indicate increased sensitivity of liver cells in young organisms to this chemical insult.

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