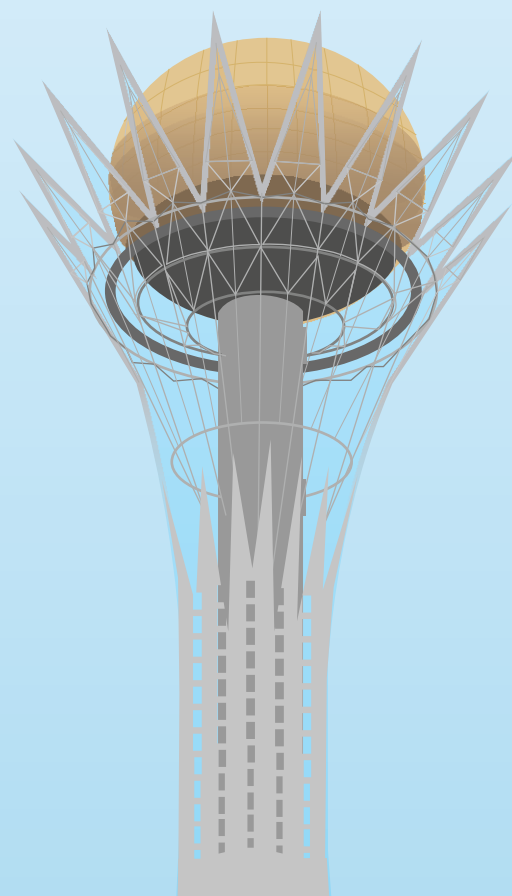


# АСТАНА МЕДИЦИНАЛЫҚ ЖУРНАЛЫ



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## HISTOLOGICAL STUDY OF KIDNEYS AND LIVER OF RAT AT ALCOHOL INTOXICATION

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Nowadays poisoning by alcohol and its surrogates occupy one of the leading places among household toxic injuries. The main danger of toxins lies not in the manifestation of acute poisoning, but in permanent ability as a cumulation in the tissues of a living organism throughout life, which leads gradually in organs and body systems to pathological processes of varying severity.

In recent years, the use of enterosorbents as therapeutic and phylactic agents for toxicosis of the human body becomes of paramount importance. The article presents the results of a study of the morphological changes in the liver and kidneys in case of poisoning with ethyl alcohol.

It was established that morphological changes in the liver and kidneys under conditions of ethanol poisoning in rats, which were fed by the bioadditive, are compensatory-adaptive and completely reversible, and in animals not receiving the combined bioadditives there are seen such strong destructive changes in the liver and kidney cells as edema, necrosis, fatty degeneration, karyolysis.

**Key words:** liver, kidney, necrosis, hepatocytes, nephron, destruction, edema.

## ГИСТОЛОГИЧЕСКОЕ ИЗУЧЕНИЕ ПОЧЕК И ПЕЧЕНИ КРЫС ПРИ АЛКОГОЛЬНОЙ ИНТОКСИКАЦИИ

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В статье представлены результаты исследования морфологических изменений печени и почек при отравлении этиловым спиртом. Установлено, что морфологические изменения печени и почек в условиях отравления этанолом у крыс, получавших биодобавку изменения носят компенсаторно-приспособительный характер и полностью обратимы, а у животных не получавших в сочетании биодобавки видны сильные деструктивные изменения в клетках печени и почек в виде отёка, некроза, жировой дистрофии, кариолизиса.

**Ключевые слова:** печень, почки, некроз, гепатоциты, нефрон, деструкция, отёк.

## ЕГЕУҚҰЙРЫҚТАРДЫҢ БҮЙРЕГІНІҢ ЖӘНЕ БАУЫРЫНЫҢ АЛКОГОЛЬДЫ ИНТОКСИКАЦИЯ КЕЗІНДЕ ГИСТОЛОГИЯЛЫҚ ЗЕРТТЕУ

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Мақалада этил спиртінiң улануынан пайда болатын бауыр мен бүйректің морфологиялық өзгерістерінің нәтижесі көрсетілген. Этанолмен уланған егеуқұйрықтардың бауыры мен бүйрегінiң өзгерістері биокоспа алған жағдайда компенсаторлы – бейімделген түрде толық қайтымды болған, ал биокоспа алмаған жануарларда ісік, некроз, майлы дистрофия, кариолизис түріндегі бауыр мен бүйректің ауқымды деструктивті өзгерістері байқалғандығы анықталған.

**Кілтті сөздер:** бауыр, бүйрек, некроз, гепатоциттер, нефрон, деструкция, ісік.

### Introduction

Of great importance in maintaining the constancy of the internal environment of the body is the liver, which plays an important role in the metabolism of proteins, fats, carbohydrates, bile formation, biliary excretion and detoxification.

An important organ for maintaining homeostasis are the kidneys, which leads to an age-related decline in the kidney functions due to a decrease in the average blood flow velocity, glomerular filtration, a decrease in the excretory functions of nitrogen compounds. The digestive canal, kidneys, and liver are the main participants in detoxic processes. When detoxification of organs is insufficient, functional metabolic processes deteriorate, leading to an increase in the frequency of intoxication of the body, and slowdown of detoxification processes [1-4]. The study of pathological changes and the action of toxic substances at the intercellular and interstitial levels play an important role in understanding the pathogenesis of various diseases. One of the most efficient methods of detoxification of animal organism is the use of enterosorbing biologically active additives, which contributes to the binding and excretion of endogenous and exogenous substances from gastrointestinal tract for therapeutic and preventive purpose.

Ethyl alcohol has a narcotic and toxic effect on the human and animal bodies, initially causing excitement, and then inhibition, suppression. The systematic use of alcoholic beverages even in small doses leads to the violation of the most important functions of the body and the most severe damage to all organs and tissues. As a result, diseases of the nervous, cardiovascular, digestive systems, liver, kidneys, pancreas, etc. occur. Moreover, when these systems are affected, ethyl alcohol in each case selectively acts on any organ in which pathological changes are most pronounced. Microscopic examination reveals individual non-specific morphological changes in the internal organs: impaired permeability of the walls of blood vessels of all calibers, expressed in loosening of the vascular wall, desquamation of endothelium cells, and plasma impregnation of artery walls. However, the evaluation of the effectiveness of bioactive substances of natural origin as a means of prevention and treatment of acute severe alcohol poisoning is not well understood at the morphological level, which served as the basis for carrying out this work on the study of the kidneys and liver of rats with alcohol intoxication while using the balm "Revival Plus". For more than a decade, the Kazakh company MTI MEDICAL has been studying the therapeutic properties of ionic and molecular iodine compounds. Balsam "Revival Plus" is a unique complex of low molecular weight compounds of iodine and auxiliary substances. Under certain pathological conditions, the general therapeutic efficacy of oxidatively free radical detoxification may be superior.

### Purpose

To study the histological structure of the kidneys and liver of rats during alcohol intoxication in the experiment.

### Material and research methods

Investigations were carried out on 30 white outbred male rats, divided into 3 groups of 10 animals each. The first group is the control group, the second is group, whose members were taken orally every day a 40% aqueous solution of ethanol at a dose of 15 ml/kg of body weight, the third group members were taken a 40% aqueous solution of ethanol at a dose of 15 ml / kg of body weight using the balm BAA "Revival plus 0,5 mg/kg.

Samples of the liver and kidney of animals were fixed in 10% formalin, embedded in paraffin + wax, sections of 5  $\mu$ m thick were prepared and stained with hematoxylin-eosin. The viewing and photographing of the obtained histological specimens were carried out using a Leica DFS 280 light microscope. Photos were processed on a Pentium 4 computer.

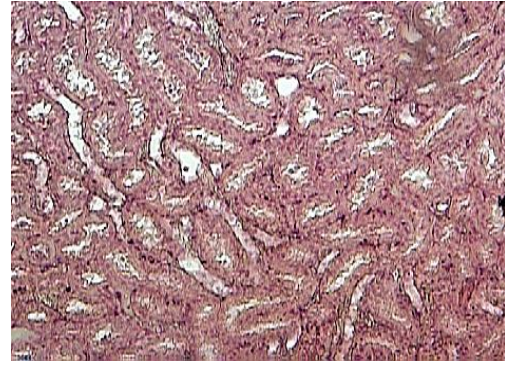
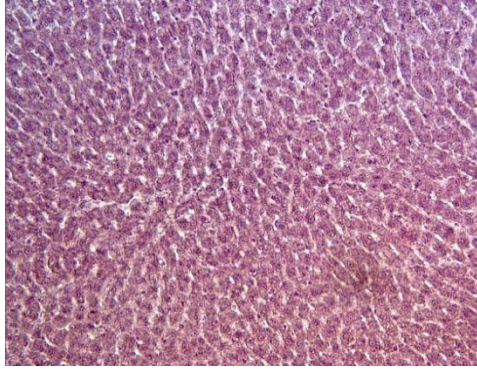
### Results and its discussion

The morphological structure of the liver and kidneys of rats of the control first group as a whole met the criteria of the norm. Special pathological changes were not found. The hepatic

## ТӘЖІРИБЕЛІК МЕДИЦИНА МӘСЕЛЕЛЕРІ

lobules are well defined, separated from each other by interlobular connective tissue septa. Hepatocytes of the many-sided form, sodim and more rounded nuclei.

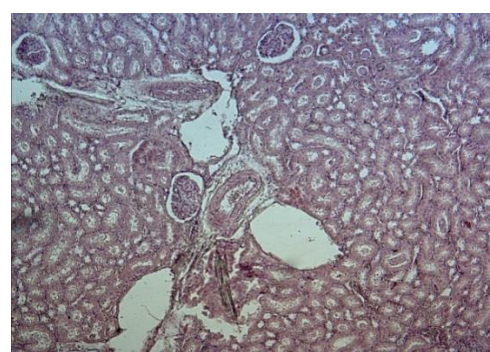
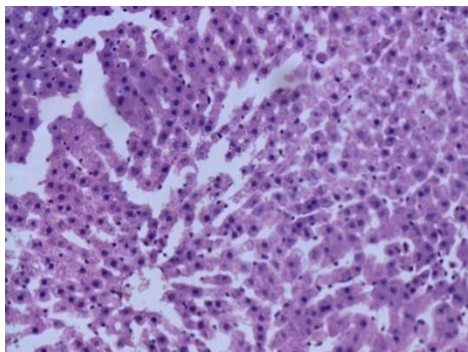
The bile canals on the periphery of the lobules are covered with a single-layer cubic epithelium, forming an interlobular bile duct (figure 1). The parenchyma of the kidneys of the first group consists of a clearly defined peripheral cortical substance and an internal cerebral; the structure is normal and preserved. The cells are light, the borders of the cells are clearly defined (figure 2).



*Figure 1 – The normal histological structure. Stained by hematoxylin - eosin. Evolution x 400. Semi-thin section.*

*Figure 2 - The normal histological structure of a rat liver of a rat kidney. Stained by hematoxylin - eosin. Evolution x 400. Semi-thin section.*

As a result of the histological examination of animals that received 40% ethanol daily for a month, it was observed that the liver had multiple manifestations of tissue structure disorders in the form of focal necrosis, karyolysis of hepatocytes, fatty degeneration, blurring, cell destruction (figure 3). In the kidneys pronounced focal necrosis of the epithelium of the tubules, interstitial edema. A change in the interstitial tissue, numerous foci scattered among normal tissue (figure 4).

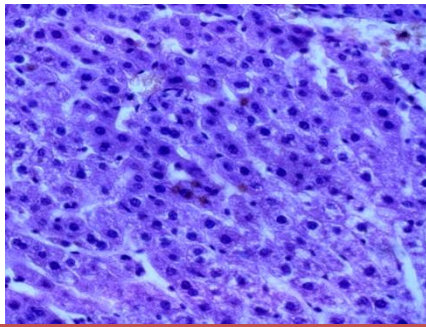


*Figure 3 – Karyolysis of Hepatocyte of poisoned rat liver Stained by hematoxylin - eosin. Evolution x 400. Semi-thin section.*

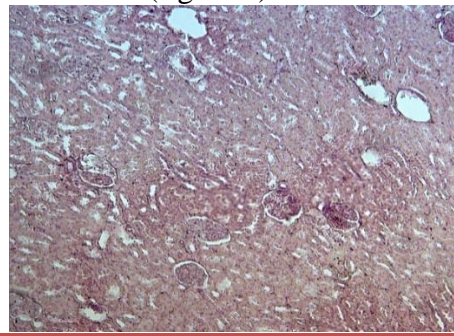
*Figure 4 - Interstitial Edema in poisoned rat kidney Stained by hematoxylin - eosin. Evolution x 400. Semi-thin section.*

The microscopic picture of the structure of the liver parenchyma in experimental animals of the third group thanks to the intake of Balsam “Revival Plus” is close to normal. The investigated Balsam Revival Plus had a significant effect on the microscopic structures of the liver. In the liver, the structure of the organ is preserved. Mild interstitial edema was observed, but the beam structure was preserved. Separate hepatocytes in the state of hydrolytic dystrophy, the nuclei were clearly contoured (figure 5). In the kidneys against the background of the use of biological active additive, it was shown that the cortical substance is formed mainly of renal bodies and convoluted tubules and looks darker on the preparation. The brain substance located

closer to the center of the body is colored lighter. Swelling of the stroma, small parenchymal protein dystrophy of the tubule epithelium was observed (figure 6).



**Figure 5 - Separate hepatocytes in the state of hydrolytic dystrophy. Stained by hematoxylin - eosin. Evolution x 400. Semi-thin section.**



**Figure 6 - Parenchymal Protein of the kidneys of rats. Stained by hematoxylin - eosin. Evolution x 400. Semi-thin section.**

### Conclusion

During the experimental study on 30 male rats we revealed morphostructural changes in the liver, which occurred by influencing 40% ethanol and 40% ethanol + BAA balm "Revival Plus". In the rats of control group the particular changes in the form of weakness, malaise, behavior change were not observed, the general condition is normal, the total weight, pupils and coat are normal, no physiological abnormalities were observed.

The animals of the second group, which experienced the conditions of toxic poisoning, show agitation and even some aggressiveness. The mass of the studied organs in the rats of control group was unchanged, and in aggressive ones it decreased. Morpho-functional changes are expressed in rats treated with 40% ethanol. In the liver and kidneys of animals after taking 40% of ethanol for a month, cell dystrophy, blurring, disturbance of compensatory-adaptive reactions were detected. In animals of the third group in the study of the liver and kidneys a partial change in organs was observed. Thus, the conducted research led to the following conclusions.

### Summary

1. The use of dietary supplement balm "Revival Plus" in the experiment of the third group does not cause any special destructive changes in the studied organs of rats. Minor changes in histological structure are completely reversible and are compensatory-adaptive in nature.

2. BAA balm "Revival Plus" has hepatoprotective properties, has an antioxidant, detoxifying effect, responsible for the development of metabolic toxicosis, blocking the action of aggressive free radicals and plays an important corrective role.

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### MORPHOLOGICAL STUDY OF EDILBAY TESTICLE IN EARLY AGE

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Preserving animal biodiversity with the use of new biotechnological methods is an important task of modern agricultural science. One of the priority directions of development of agricultural science in Kazakhstan is the preservation and rational use of the animal gene pool. In this regard, the assessment of the morphological and functional state of the genital organs at the morphological level will allow a deeper understanding of the development of the organism of an animal that can reproduce offspring. As a result of studying the testes of the Edilbay breed in rams of 1.9 months, it was shown that they have a typical structure for all mammals. The main part of the testicular parenchyma is occupied by convoluted seminiferous tubules, in which intensive spermatogenesis occurred. The thickness of the spermatogenic epithelium was not the same in different parts of the tubules. This, apparently, was associated with the periodic release of tubules from mature sperm. This assumption was confirmed by a large number of sperm in the outflowing tubules of the appendage, which were literally “stuffed” with sex products. Histochemical study of testes showed that in moderate quantities proteins are present in tissues, neutral and acid mucopolysaccharides. It was concluded that for breeding the Edilbay breed it can be allowed to mate sheep at the age of 1.9 months.

**Key words:** spermatozoid, Edilbay breed, testis, convoluted tubules, spermatozoid.

### МОРФОЛОГИЧЕСКОЕ ИЗУЧЕНИЕ СЕМЕННИКОВ БАРАНОВ ЭДИЛЬБАЙ В РАННЕМ ВОЗРАСТЕ

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Одним из приоритетных направлений развития сельскохозяйственной науки в Казахстане является сохранение и рациональное использование генофонда животных. В этой связи оценка морфофункционального состояния половых органов на морфологическом уровне позволит глубже понять становление организма животного, способного воспроизвести потомство. В результате исследования семенников Эдильбайской породы у баранов 1,9 месяцев было показано, что они имеют типичное для всех млекопитающих строение. Основную часть паренхимы семенника занимают извитые семенные каналы, в которых происходил интенсивный сперматогенез. Толщина сперматогенного эпителия была