

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ  
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



## **МАТЕРІАЛИ**

**104-ї підсумкової науково-практичної конференції  
з міжнародною участю  
професорсько-викладацького персоналу  
БУКОВИНСЬКОГО ДЕРЖАВНОГО МЕДИЧНОГО УНІВЕРСИТЕТУ  
06, 08, 13 лютого 2023 року**

Конференція внесена до Реєстру заходів безперервного професійного розвитку,  
які проводитимуться у 2023 році №5500074

**Чернівці – 2023**

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**THE INFLUENCE OF LIPIN ON THE FUNCTIONAL STATUS OF THE KIDNEYS IN RATS UNDER THE CONDITIONS OF THE GLYCEROL MODEL OF ACUTE RENAL FAILURE WITH LONG-TERM USE**

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**Introduction.** The topical direction of modern medicine is the use of drugs with minimal side effects. A promising direction of increasing the selectivity of the action of the medicinal product is the creation of a carrier capable of retaining the medicinal (active) substance in its structure and purposefully delivering it to the necessary organ with its subsequent release, which reduces toxicity and protects the substance from the neutralizing effect of the physiological environment. Currently, the attention of many researchers in pharmacotherapy is focused on the practical use of liposomes, which are carriers of active substances.

**The aim of the study** was to determine the influence of lipin on the functional status of the kidneys in rats under the conditions of the glycerol model of acute renal failure with long-term use.

**Materials and methods.** Liposomal drug lipin is a drug of natural origin, which is lyophilized egg phosphatide choline.

**Results.** At the stage of the extemporaneous study, the effect of lipin on the functional state of the kidneys in rats was studied under the conditions of the glycerol model of acute renal failure with long-term use. Experiments were performed on 28 non-linear white outbred rats (weighing 120-180g). The kidney pathology model was induced by intramuscular injection of 50% glycerol solution at a dose of 10 mg/kg. Lipin was administered at a dose of 50 mg/kg. To assess the functional state of the kidneys under conditions of induced diuresis, urine was collected for 2 hours in exchange cages, after which blood was collected by decapitation of rats on the 7th day of the experiment. It was established that in this model of acute renal failure, there were profound changes in the functional state of the kidneys. Violation of the excretory function of the kidneys was manifested in polyuria. The concentration of creatinine in urine was significantly higher than the control. Thus, according to the data of the experiment, the studied drugs reduce diuresis by almost 1.2 times compared to the indicators of untreated rats, which indicates the possibility of the drugs to restore the kidney's ability to remove water load. In animals with renal pathology, the rate of glomerular filtration has increased by 1.3 times on the 7th day, and the use of lipin has reduced this indicator by 1.4 times compared to the pathology, returning the fan function to the control level. The concentration of creatinine in the blood plasma decreased when using the drug, however it remained high in the urine compared to the control. The concentration and excretion of protein decreased in comparison with untreated animals when using lipin by 1.4 and 2 times.

**Conclusions.** Long-term administration of lipin in the treatment regimen has a somewhat positive effect on the ion-regulatory function of the kidneys, as evidenced by a 1.2-fold decrease in the excretion of sodium ions in the urine compared to untreated animals. So, the seven-day use of lipin confirmed its nephroprotective activity due to its antioxidant properties. However, the introduction of lipin is not accompanied by a complete recovery of glomerulo-cannular processes, which requires complex use, and it is also promising to use it as a carrier base, which will allow to increase the concentration of the active substance in the focus of inflammation, due to the high bioavailability of the liposomal form, as well as due to the synergism of effects.

**Kopchuk T.G.**

**STUDY OF THE FEVER-INDUCED CHANGES IN KIDNEY FUNCTION**

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**Introduction.** Kidney and urinary tract diseases, especially of microbial-inflammatory origin, occupy one of the leading places in the structure of somatic pathology. The kidneys play an important role in the maintaining homeostasis, which is characterized by a constant volume of fluid,

its osmotic concentration and ionic composition. Therefore, any renal dysfunction can lead to significant changes in electrolyte and water-salt homeostasis. According to the literature, about 90% of kidney diseases are accompanied by fever, which often develops in response to the effects of pyrogens of viral or bacterial nature, which in general significantly impairs the body's compensatory capacity and affects the course and consequences.

**The aim of the study** was to research the effect of fever on the structural and functional state of kidney and possible mechanisms of renal dysfunction; the function of kidney during the first stage of fever, the renal mechanism of autoregulation – glomerular- tubular and tubular-tubular balance in the stage of temperature decrease.

**Material and methods.** Experiments on 30 male white nonlinear rats weighing 160-180 g. Aseptic fever was induced by a single intraperitoneal injection of pyrogenal at a dose of 25 µg/kg. The state of glomerular-tubular and tubular-tubular balance was assessed by correlation analysis between glomerular filtration processes, absolute, proximal, and distal reabsorption of sodium ions.

**Results.** In the first stage of fever (temperature rise), the administration of pyrogenal showed positive correlations between glomerular filtration and absolute ( $r=0.981$ ;  $p<0.001$ ) and proximal reabsorption of sodium ions ( $r=0.981$ ;  $p<0.001$ ). Absolute reabsorption of sodium ions correlated directly with its proximal reabsorption ( $r=0.999$ ;  $p<0.001$ ). The positive correlations indicate the functional ability of nephrocytes in the first stage of fever to maintain the mechanisms of glomerular-tubular balance. At the same time, there was a loss of correlation between diuresis and glomerular filtration ( $r=0.621$ ;  $p>0.05$ ), absolute and distal reabsorption of sodium ions ( $r=0.604$ ;  $p>0.05$ ), proximal and distal reabsorption of the studied cation ( $r=0.711$ ;  $p>0.05$ ) and between glomerular filtration and distal reabsorption of sodium ions ( $r = 0.642$ ;  $p>0.05$ ). Disruption of the relationship in the first stage of fever is explained by the ischemic effect of angiotensin II on the cortex of the kidneys was hypoxia with energy deficiency of the renal tubules. In this case, damage to the proximal nephron should have led to compensatory activation of the reabsorption of sodium ions in the distal part of the tubule by the tubular-tubular negative feedback mechanism.

However, in the conditions of pathology, inhibition of both proximal and distal transport of sodium ions was observed, probably due to the fact that reabsorption in the distal nephron is more energy-dependent due to high activity of succinate dehydrogenase and Na/K-ATPase. This explains the established new positive correlation between distal reabsorption of sodium ions and diuresis ( $r=0.981$ ;  $p<0.001$ ), as a significant decrease in distal reabsorption of sodium ions due to energy deficiency led to the fact that the part of the primary urine was practically not reabsorbed at introduction of pyrogenal and made actually volume of secondary urine with adequate loss of sodium ions.

**Conclusions.** During the first stage of fever, pathological changes contribute to the establishment of positive correlations of relative water reabsorption with glomerular filtration, absolute, proximal reabsorption of sodium ions, but a violation of negative correlations of relative water reabsorption with diuresis, and distal reabsorption.

**Kostyshyn L. V.**

## **RESEARCH OF MEDICINAL PROPERTIES SAPONARIA OFFICINALIS**

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**Introduction.** The pharmaceutical industry, despite the large range of products, pays great attention to the study of plant raw materials, since phyto remedies are better absorbed by the human body and have practically no side effects. One of these plants is *Saponaria officinalis*, widely known in folk medicine and practically the first plant in which saponins were discovered. People call this plant dog soap, Tatar soap, stringer, soap root. It is most often recommended in traditional medicine for diseases of the urinary bladder, as a diaphoretic, expectorant, laxative, blood-cleansing and metabolism-improving agent, for diseases of the liver, kidneys, spleen, and jaundice. It is used externally for toothache, sore throat, runny nose, in the form of ointments or lotions - for ringworm, eczema and boils. Despite the wide range of uses of soapwort in folk medicine, it is practically not