

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
ВИЩИЙ ДЕРЖАВНИЙ НАВЧАЛЬНИЙ ЗАКЛАД УКРАЇНИ
«БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



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Загальна редакція: професор Бойчук Т.М., професор Івашук О.І., доцент Безрук В.В.

Наукові рецензенти:

професор Братенко М.К.

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професор Тодоріко Л.Д.

професор Юзько О.М.

д.мед.н. Годованець О.І.

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Petryshen O.I.

**MORPHOFUNCTIONAL CONDITION OF ANIMAL KIDNEYS UNDER THE ACTION
OF HEAVY METAL SALTS BY PHOTOPERIODISM DISTURBANCE**

*Department of Histology, Cytology and Embryology
Higher State Educational Establishment of Ukraine
«Bukovinian State Medical University»*

In order to investigate and study peculiarities of morphological alteration and functional changes in the kidneys with combined action of aluminum and lead salts under conditions of altered functional activity of the pineal gland, 50 sexually mature nonlinear males of white rats (weighing 0,15-0,20 kg) have been used. The complex of morphological (histological study of structural and functional elements of the kidney), biochemical (determination of sodium cations, potassium, creatinine and protein concentrations in blood and urine) and physiological (determination of glomerular filtration rate, excretory sodium fraction, clearance of monovalent cations, processes of proximal and distal reabsorption of sodium ions) methods of research and statistical analysis have been used.

Chemicals containing aluminum and lead were found to be able to cause functional and morphological alterations in the kidneys. As a result, complete reorganization of acid-containing, ion-regulating and excretory renal functions occurs, which in its turn promotes development of excretory and systemic acidosis.

The thesis highlights the issues of the influence of aluminum chloride and lead against the background of stress-factor and kidney compensatory possibilities under conditions of altered photoperiod. Structural organization of this organ under conditions of morphological reconstruction has been studied by means of a number of methods. The functional ability of morphologically changed kidneys under the influence of negative factors under conditions of various functional state of the pineal gland has been determined. In particular, increase of sodium ions excretion has been observed in the experimental groups ($0,03 \pm 0,04$, $0,05 \pm 0,06$ versus $0,03 \pm 0,01$ mmol/24 hours in the animals of the control group $p < 0,001$). Filtration charge of sodium in comparison with the control one decreased. The restriction of filtration potential of nephrons by sodium occurred against the ground of significant inhibition of tubular transport of this cation. It is distinctly observed on the absolute and relative reabsorption indices, which decreased compared to intact animals. At the same time a tendency to increase of creatinine concentration was noted in all experimental subgroups compared to the control ($p < 0,001$). A significant sudden increase of this rate in animals was observed, the animals were in altered photoperiod conditions ($135,4 \pm 3,6$ and $120,5 \pm 5,7$ mmol/L, respectively). Additionally, the received data were indicative of decreased glomerular filtration rate ($p < 0,001$), which was clearly observed in all the subgroups compared with those of intact animals.

Injection of exogenous melatonin to animals at the dose of 1,0 mg/kg against the ground of intoxication with aluminum and lead salts, has reduced manifestations of impaired renal function 1.5-2 times. General regularities of reorganization of morphological components in the kidneys, which lead to disorders of excretory, ion regulatory and acid-dependent functions are revealed. In 3rd series of experimental animals, undergoing pineal gland hyperfunction, the less pronounced dystrophic changes in structural elements of the kidneys were observed, in comparison with animals in which the hypofunction of the pineal gland was modeled: plethora in capillaries, as well as granular dystrophy of tubular epithelium, which has covered ($47,08 \pm 1,1$) % of cells against the ground of pineal gland hyperfunction (in animals with hypofunction it was ($75,2 \pm 1,3$) % and ($65,3 \pm 1,01$) % in animals with normal function).

A combined influence of aluminium and lead salts results in morphofunctional and dystrophic changes of the renal tissue with the occurrence of hydropic and ballooning dystrophy in the epithelocytes of the nephron canaliculi which is accompanied by stasis and sludge with a sharp hyperemia and lymphectasy, stromal and perivascular edema, small foci of diapedetic hemorrhages.

Further studying of the influence of combined action of aluminum, lead salts on the kidney morphology will give the opportunity to find the dynamics of development of compensatory-adaptive and reparative mechanisms, and develop methods of their correction.