



## STRUCTURAL CHANGES IN THE KIDNEYS OF HIGHLY EMOTIONAL RATS WITH EXPERIMENTAL NEPHROLITHIASIS

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**Relevance.** Urolithiasis continues to occupy a leading position in the daily practice of urologists. The relevance of studying this disease is determined by its wide global prevalence (affecting at least 3% of the world's population) and the fact that it occurs most frequently in working-age individuals, particularly between 40 and 50 years of age [4]. According to Russian and international authors, the prevalence of urolithiasis worldwide ranges from 4% to 10%, while recurrence rates reach up to 50%. In the structure of urological inpatient facilities, this pathology accounts for up to 40% of patients, with as many as 70% being admitted on an emergency basis. The proportion of patients varies between 5% and 10% across different world regions, depending on geographic, racial, and ethnic factors [3]. According to Russian researchers, the prevalence of urolithiasis in different regions of the country ranges from 3.5% to 9.6% of the population, with an overall increase in incidence by 17.3% in recent years, which in absolute terms reaches 738,130 cases [1].

**Objective.** To study the early morphological signs in the kidneys of highly emotional animals in an experimental model of nephrolithiasis.

**Materials and Methods.** The experiments were conducted on 50 white outbred male rats (body weight 180–200 g) maintained on a standard laboratory diet under vivarium conditions. The study was performed in accordance with the ethical principles of animal handling outlined in the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (CETS No. 123).

The widely used ethylene glycol model of urolithiasis was employed (1% ethylene glycol solution in drinking water for 21 days) to induce experimental oxalate nephrolithiasis. Ethylene glycol is slowly oxidized in the body to form oxalic acid, which is then excreted by the kidneys. This model is considered the most common and adequately reproduces the pathogenesis of human nephrolithiasis [2].

**Results and Discussion.** Morphological examination of the kidneys and adrenal glands in the control group revealed no significant pathological changes.



The tissue structure preserved its normal architecture, with no signs of inflammation or destructive processes. The epithelium of the renal tubules remained intact, without evidence of degenerative changes. These findings confirm the validity of the experimental protocol and indicate that in the absence of induced pathology, the morphological picture corresponds to physiological norm.

In the second experimental group, consisting of animals with high emotional excitability and nervous tension, distinct inflammatory and degenerative changes were observed. In the stroma of the kidneys and adrenal glands, chronic inflammatory signs were detected, including cellular infiltration and moderate proliferation of connective tissue. At the tubular level, pronounced degenerative alterations were noted: cloudy swelling of the epithelium, indicating impaired intracellular metabolism and mitochondrial dysfunction. Additionally, vacuolar degeneration was observed in the parenchyma, suggesting deep metabolic alterations and stress-induced cellular injury.

On the 21st day of the experiment, morphological analysis of the kidneys in animals with nephrolithiasis revealed signs of congestion and degeneration compared with the control group. These processes reflect the negative impact of both the pathological state (stone formation) and psycho-emotional stress. The most pronounced changes were seen in highly emotional animals, where the combination of nephrolithiasis and stress-induced hormonal alterations exacerbated morphological damage.

Thus, the most significant pathological changes were detected in the second experimental group, highlighting the substantial influence of emotional factors on the development and progression of inflammatory-degenerative processes in the urinary system. The results support the hypothesis of a close relationship between the level of emotional stress and the severity of parenchymal organ damage in nephrolithiasis.

**Conclusions.** The above morphological features and chronic inflammatory infiltration observed in the highly emotional group of animals indicate a higher risk of stone formation, likely aggravated by stress-related factors.

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