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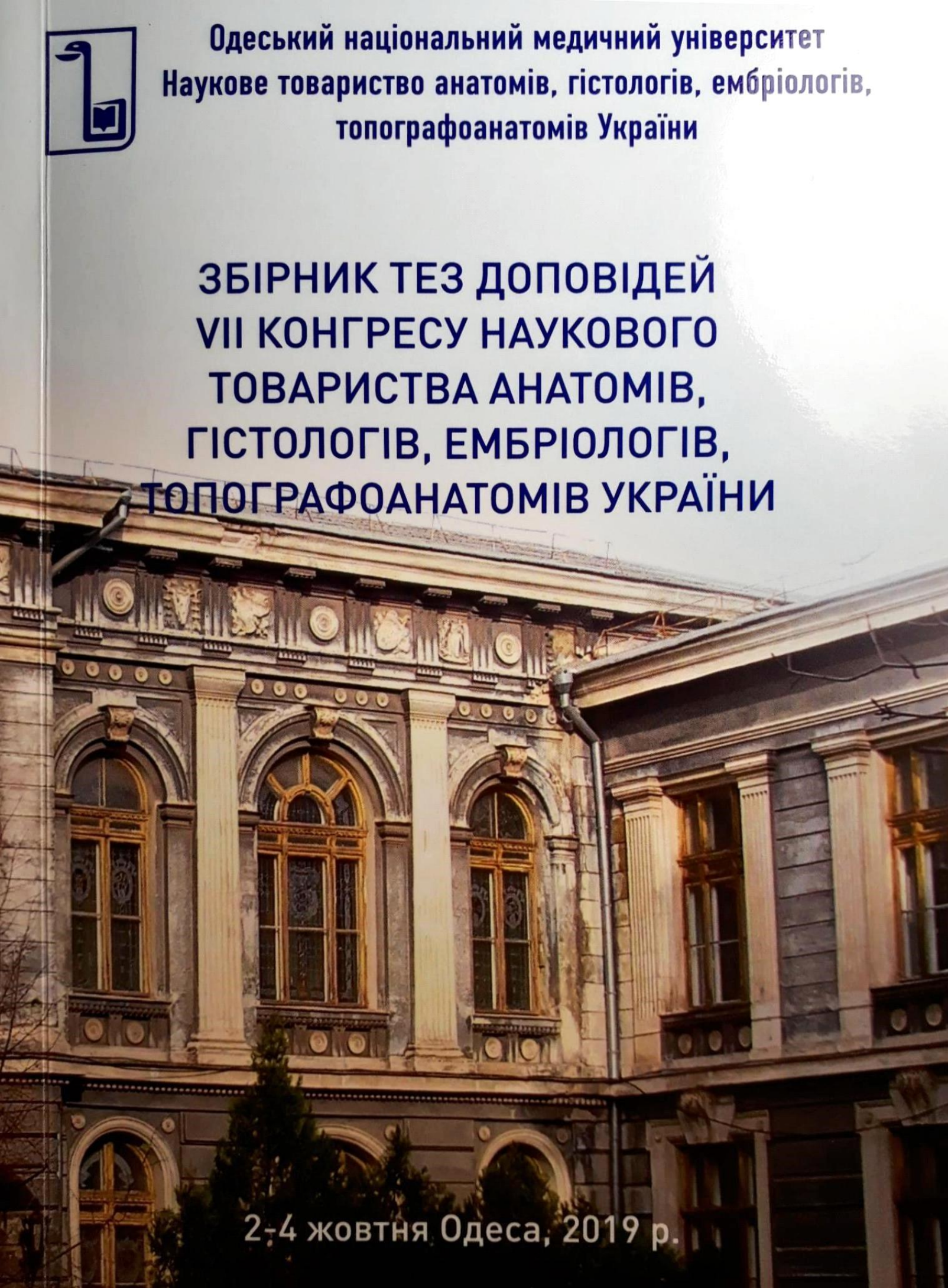

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MACROELEMENTS CONTENT IN WHITE YOUNG RATS' BLOOD SERUM AND LIVER IN NORM AND UNDER THE INFLUENCE OF THE LITHIUM SALT

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The production and sale of lithium-ion batteries for industrial and household use is rapidly developing [1]. Currently, the recycling of lithium-ion batteries is very limited [2]. Uncontrolled penetration intake of lithium into the body with drinking water, food, air is a threat of toxic effects. Another source of lithium penetration into the human body are pharmacological drugs of lithium, which are widely used in the treatment and prevention of psychiatric disorders [3]. In the toxic doses of the lithium inhibits a number of glycolysis enzymes. It acts as a non-competitive inhibitor of the main electrolytes of the body: potassium, sodium, calcium, magnesium [4]. In the human body and animals, there are no mechanisms of lithium homeostasis, so its contents in the body should be monitored [5].

The purpose of our work was to determine the content of potassium, sodium, calcium, magnesium and lithium in the liver and blood serum of young rats' under the influence of lithium carbonate solution.

The studies has been conducting on young white laboratory male rats of experimental and control groups, six individuals in each. Food regimens for both groups were standard. Drinking water was given to animals ad libitum.

Into the standard drinking water of the experimental group was added a solution of lithium carbonate, to a content of lithium ions of 10 mg/l. At day 30, animals were extracted from the experiment by overdose of anesthesia and sampled organs and tissues to determine the content of macroelements. Organs and tissues samples were weighed and destructed by nitric acid in high-pressure autoclaves when heated.

The content of macroelements was determined by methods of atomic absorption and atomic emission spectrometry in the acetylene-air flame at the atomic absorption spectrophotometer S-115 M1. Spectral measurement conditions for all elements were standard [6].

Thus, the content of potassium in the liver was 0.48 ± 0.01 mg/g (1.81 ± 0.03 mg/g in norm), sodium – 0.39 ± 0.01 mg/g (1.22 ± 0.02 mg/g in norm), calcium - 0.15 ± 0.01 mg/g (0.28 ± 0.03 mg/g in norm), magnesium – 0.088 ± 0.002 mg/g (0.17 ± 0.01 mg/g in the norm). The concentration of lithium was 7.41 ± 0.02 μg/g (5.80 ± 0.04 μg/g in normal). The content of macroelements in serum was: potassium – 0.13 ± 0.01 mg/g (0.15 ± 0.01 mg/g in norm), sodium – 1.52 ± 0.02 mg/g (1.83 ± 0.04 mg/g in norm), calcium – 0.33 ± 0.01 mg/g (0.25 ± 0.02 mg/g in norm), magnesium – 0.013 ± 0.001 mg/g (0.016 ± 0.002 mg/g in norm). Blood lithium content was 3.92 ± 0.05 μg/g (2.72 ± 0.03 μg/g in norm). The ratio of K/Na in the liver of the experimental group was 1.23 ± 0.04 (1.50 ± 0.03 in norm), and the Ca/Mg ratio was 1.70 ± 0.03 (1.65 ± 0.02 in norm). In the blood serum of the experimental group, the K/Na ratio was 0.086 ± 0.002 (0.082 ± 0.004 in norm), and the Ca/Mg ratio was 25.4 ± 0.1 (15.6 ± 0.1 in norm).

Consequently, the concentrations of potassium, sodium, calcium and magnesium in the liver of young rats, under the influence of lithium carbonate solution, were significantly lower than the control group values. The content of potassium, sodium, and magnesium in the

blood serum of the experimental group is significantly lower, and calcium content is greater relative to the values of the control group. Under the influence of lithium salt, the ratio of K/Na in the liver of the experimental group was lower, and the Ca/Mg ratio was higher than the control group values. The ratio of K/Na and Ca/Mg in serum was higher than the control group values.

Therefore, under the conditions of consumption of lithium salts in the organs and tissues of experimental animals, the mineral composition substantially changes, which can cause a toxic effect.

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