# ULTRASTRUCTURAL CHANGES OF RAT'S ERYTHROCYTES IN THE CONDITION OF GENERAL DEHYDRATION

Bumeister L.V., *student*; MI SumDU, gr. 401

One of the modern areas of researchers of modern morphology is detection of morphological changes in organs and tissues of the human body, which are formed by influence of environmental factors, among which we can select and dehydration. The influence of dehydration on the body has a general nature, but the organs and tissues react to the dehydration differently. Even blood is a unique biological fluid, which supports the functional relationship of all structures of the body. The most numerous population of blood cells are erythrocytes, that provide oxygen from the lungs to body tissues and carbon dioxide in the opposite direction. Erythrocytes have the unique ability to change their size and shape. Structural and quantitative changes of erythrocytes, that arise from various diseases, external factors or the combined action of exogenous and endogenous factors, violate maintaining of homeostasis of the organism as a whole.

During performing the experiment, we have the purpose to establish the morphological changes of rat's erythrocytes in normal conditions and under conditions of total dehydration.

The experiment was conducted on white laboratory male rats of age of 8 months. Animals of all series before start of the research were on a normal food allowance and held in vivarium conditions in the Medical Institute of Sumy State University. Animals were divided into 2 groups: control and experimental. The control group - intact rats of the appropriate age and weight, which were on the general diet of vivarium. The experimental group - rats, total dehydration of which is modeled by keeping animals on a completely waterless diet, as a food they received the granulated mixed fodder. This group was divided into two subgroups. In the first subgroup the average degree of dehydration modeled and achieved within 7 days of the experiment. The second group, where the heavy (sublethal) degree of dehydration modeled. This degree of dehydration achieved within 10 days of the research. The decapitation of the rats under ether anesthesia was performed after the ending experiment, also there was fence of blood. Red blood cells of rats were the material for the research. The study was performed using scanning electron microscope (SEM). At the obtained electronic photographs with same magnification we evaluated the overall

structure of red blood cells and determined their morphological shapes. We allocate such types of erythrocytes as: diskocytes, stomatocytes, echinocytes, kodocytes, spherocytes, eleptocytes and degenerative forms. We calculated the percentage of each type of cell, recognizing from 500 cells of each rat.

Diskocytes stay the overwhelming majority of erythrocytes at influence to the rat's organism of experimental group of general dehydration of average degree. Their proportion has decreased, in comparison with the control group to 21.7%. Increasing of inversely deformed cells is as follows: the number of echinocytes has increased in 6 times, the number of stomatocytes has not changed. The number of kodocytes increase in 63 times among irreversibly deformed cells, erythrocytes – in 3 times, hypochromic cells – in 17 times, number of destructive forms has not changed. Significant changes of microrelief of erythrocytes take place with the advent of accurate grooves on the surface of erythrocytes and vesicular formations. This indicates to the cell metabolism, which is manifested of outer transformation of erythrocyte's plasma membrane. The heavy degree of dehydration is also characterized by a decrease in the number of diskocytes and a significant increase of inversely deformed cells and irreversibly deformed cells in comparison with the control group. Thus, the number of diskocytes decreased on 21.1% in comparison with the corresponding form of control, echinocytes – increased in 7.2 times, stomatocytes – increased in 7.2 times. Irreversibly deformed cells characterized by the increase in the number of kodocytes in 14 times and eleptocytes – in 2 times. The level of of hypochromic forms corresponded of $3,0 \pm 0,1\%$. Total number of destructive cells increased in 2.6 times. More pronounced changes observed in a detailed studying of the surface of the rat's erythrocytes in comparison with the previous experimental group: the height of the concavity increased as the number of vesiculosimilar formations.

Based on the obtained material we can conclude, that the number of different forms of rat's erythrocytes varies depending on the degree of dehydration. The influence of general dehydration of average and heavy degrees causes of decrease of discocytes and increase of inversely and irreversibly deformed cells.

Head: Prykhodko O.O., *docent*

*Секція «Сучасні технології в медицині »*