THE METHOD OF DETERMINING THE FUNCTIONAL CONDITION OF ERYTHROPOESIS IN FROGS

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The morphology of a cellular surface is individual for each type of cell and undergoes essential changes during various phases of the cellular cycle, the transformation of cells, influences of various chemical agents. At the same time, various endocellular processes are morphologically reflected on the cellular surface that is one of the fundamental positions of evolutionary physiology about connecting the processes of form with the function of the cell. The purpose of this research is the study of cellular-system mechanisms which regulate the membrane of the homeostasis and the function of the erythrocyte line hemopoesis in frogs.

Peripheral blood of Rana ridibunda frogs served as material for research. The mechanisms of membrane regulation of cellular geometry were investigated according to the methodology developed by us (patent of the Russian Federation № 22268463 «Ways of estimating the activity of erythropoesis»). From each sample (the sample was incubated into 0,2 % a solution of sodium chloride) and control (control was incubated into 0,65 % a solution of sodium chloride, in the ratio blood/incubatory environment 1:50 within an hour) a single-layered suspension for preparations was prepared. From the preparations images with the «Videotest» system were registered every 30 sec for 10 minutes and then in addition every 10 minutes during an hour. The dimensions of all nuclear erythrocyte were measured. The biometric indices of cells were counted based on the given parameters and the erythrocyte population were classified as two functional groups: recytus and letaliocytus. An estimation of erythropoesis activity was carried out at a value time interval during which there was a transition of the greater part of cells to the letaliocytus class, which coincided with the starting point of incubation.

The results of our research established, that it takes 30 sec for the incubation samples to reach the correlation of 8:22 of the letaliocytus to the recytus, Accordingly, in 60 sec of incubation the quantity of recytus decreased, but the correlation reached 8:14, and within 150 sec of incubation - 14:9. Thus, the system of hemopoesis was in a state of activating the erythropoesis. A growing percentage of the letaliocytus over the recytus was observed on the 150-th second concerning the equilibrium condition (from 30 sec up to 60 sec). The circulation of functionally young cells having a sufficient membrane potential point out to the activation of erythropoesis. The percentage of the letaliocytus and the recytus during each time interval will be in straight dependence on the metabolic potential of the process of erythropoesis as a whole, defining the biochemical maturity of the cell.

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MORPHOLOGICAL ALTERATIONS IN THE LUNGS DURING WEST NILE VIRUS INFECTION

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West Nile virus (WNV) is an enveloped, neurotropic, single stranded (+) sense RNA flavivirus, first isolated from a woman in Uganda in 1937 (Smithburn K.C. et al., 1940). Since then it has reemerged multiple times: first in Europe, Asia and most recently during the 1999 in the Volgograd Region of Russia and in the United States (Hubalek Z., Halouzka J., 1999; Lanciotti R.S. et al., 1999; Pisarev V.B. et al., 2000). The virus, which has spread rapidly throughout Volgograd Region, may cause severe illness especially in the elderly (manifested by meningitis and encephalitis) that may lead to paralysis, coma, and death. During the 1999–2002 outbreaks of WNV in the Volgograd Region, more 1,000 cases were reported, including 18 deaths (~1.8%) (Lvov D.K. et al., 2004). Central nervous system (CNS) expression of the chemokine receptor CCR5 and its ligand CCL5 was prominently up-regulated by WNV,