

### 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 hemopoiesis 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 erythropoiesis»). 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 erythropoiesis 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 hemopoiesis was in a state of activating the erythropoiesis. 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 erythropoiesis. 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 erythropoiesis as a whole, defining the biochemical maturity of the cell.

The article is admitted to the International Scientific Conference "Homeostasis and Endoecology", Egypt, Hurgada, February, 21-28, 2007; came to the editorial office on 17.01.07

### 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,

and this was associated with CNS infiltration of CD4+ and CD8+ T cells, NK1.1+ cells and macrophages expressing the receptor. It is considered CCR5 is a critical antiviral and survival determinant in WNV infection of mice that acts by regulating trafficking of leukocytes to the infected brain (Glass W.G. et al., 2005).

In the Volgograd Region 23.6% cases of West Nile fever during the 1999–2002 without meningitis and encephalitis were reported (Petrov V.A., 2004). WNV infection leads to morphological alterations in different organs. Postmortal examination has found mononuclear aggregations in bronchial walls, perivascular mononuclear infiltration, pulmonary edema and focal hemorrhages, but clinical alterations of respiratory functions were not detected (Grigoryeva N.V., 2005). The morphological pathogenesis of pulmonary WNV infection is poorly understood.

Here, we characterize a mouse model for WNV infection using a intraperitoneal route of infection. White mice were infected i.p. with  $10^3$  focus-forming units (ffu) of strain WNV Astr 986, identical to WNV-NY99, which imitates the natural route of WNV infection in man. Mortality was 20% at that dose. The grope of surviving mice constitutes 8 animals. Lungs obtained from mice at day 9 after induction of WNV infection were fixed in 10% (weight/volume) neutral buffered formalin, were embedded in paraffin and were cut into sections 5  $\mu$ m in thickness. Sections were stained with hematoxylin and eosin for routine histological analysis.

In pulmonary bronchi mononuclear aggregations in bronchial walls were found. They occupied all layers, but the most prominent density of small lymphocytes was in the adventitia. Lymphoid infiltration spreads on the surrounding tissues and was more prominent around small blood vessels. Hemodynamic changes were also found: hyperemia, stasis in capillaries, perivascular hemorrhages. Inter-alveolar septa were edematous, infiltrated by small lymphocytes and macrophages. Alveolocytes were edematous, some of them desquamated. Inside alveoli serous liquid was found, but in some cases hemorrhagic infarctions were detected.

Intrapulmonary autonomic ganglia contained polygonal neurons with vacuolated cytoplasm of perikarya. They nuclei were

rounded vesicular with one or two ectopic nucleoli. Part of neurons had hyperchromic cytoplasm of perikarya. Satellite neuroglial cells were with minimal dystrophic alterations. Lymphoid infiltration and interstitial edema of ganglionar capsule and stroma were found.

Our findings suggest that endothelial cells in the lungs of WNV infected mice regulate migration of leukocytes to the infected lung. The damage of peripheral nervous system participates in pathogenesis WNV infection. The data also raise important new questions about the potential roles of regulatory systems that are induced by WNV in this model and in man.

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### **DEMONSTRATION FEATURES OF SOMATIC MOTHERS' DISEASES WHO HAVE DAUGHTERS WITH BROKEN MENSTRUAL FUNCTIONS**

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Children's health is determined by somatic health of their mothers at the expense of both spontaneous communicate of genetic material and inside uterine (antenatalis) damages because of complicated flowing of pregnancy and childbirth. Infringement in the making of young girl's menstruation is the first clinic display of dysfunction of reproductive of reproductive system as a reflection of justifiability of their somatic health.

The aim of our work was lighting of demonstration peculiarity of mothers' somatic diseases who have daughters with broken menstrual function in pubescence (pubertatis) period.

Anamnesis and clinic characteristics of 232 women who have daughters at the age of 15-18 with gynaecological age duration more than 2 years were valued. The main group was 116 women who have daughters with broken menstrual function. Another