

$\gamma$ -radiation in a dose of 1Gy and the state of calcium metabolism in platelets was studied on the 3rd, 10th and 30th days after irradiation.

**Methods.** The fluorescent pathfinder Fura-2/AM was used for the quantitation of calcium concentration in platelets. The concentration of  $Ca^{2+}$  is calculated based on the measurement of fluorescence upon excitation of these two wavelengths according to the formula:

$$[Ca^{2+}] = K_d \frac{R_{\max 380}}{R_{\min 380}} \frac{F - F_{\min}}{F_{\max} - F}, \quad (1)$$

where is the dissociation constant of the complex Fura-2/AM,  $F = \frac{R_{340}}{R_{380}}$  – calcium – current ratio of fluorescent

signals,  $F_{\min}$  – the same ratio in the solution with low concentration of  $Ca^{2+}$ ,  $F_{\max}$  – the same ratio in a solution with a high concentration of  $Ca^{2+}$  (max and min when adding Triton (10 %) and EGTA (100 mmol/l), respectively).  $K_d = 224$  nmol/l.

An increase of the basal level of calcium ions ( $85,9 \pm 5,2$  nmol/l) in calcium-free environment (100 mM EGTA) in platelets of rats was recorded after irradiation on 3rd day. There is a decrease in the basal level on the 10th day after exposure to calcium-free environment.

There is a greater than normal ( $111,4 \pm 5,8$  nmol/l) increase ( $289,5 \pm 11,7$  nmol/l) in the concentration of calcium ions in the platelets of irradiated rats on the 3rd and 10th day in response to the action of physiological inducers of platelet aggregation – ADP (20  $\mu$ M) in the presence of 1 mM  $CaCl_2$ .

The content of cytoplasmic calcium by the action of thrombin (0,2 IU/ml) was increased only on day 3th ( $561,9 \pm 12,1$  nmol/l) and on 10th ( $374,4 \pm 15,66$  nmol/l) day did not differ from the norm ( $383,2 \pm 15,2$  nmol/l).

The concentration of calcium ions in the cytoplasm of platelets suspended in calcium-free and calcium-containing (1 mmol) in platelets of irradiated rats 30 days ( $49,6 \pm 3,2$  nmol/l and  $79,1 \pm 4,0$  nmol/l) after irradiation was not substantially different from the values in the control group ( $44,8 \pm 3,6$  nmol/l and  $67,6 \pm 7,1$  nmol/l).

**Conclusion.** The change in indices of calcium metabolism was revealed in the early and late periods after irradiation under the action of  $\gamma$ -radiation on platelets of rats: on the 3rd day after irradiation, an increase in the basal level of calcium ions in the platelets of irradiated rats in calcium-free and calcium-containing medium, and at 10-th and 30-th day its normalization. An increase in the intracellular concentration of  $Ca^{2+}$  ions under the action of ADP and thrombin is presented on 3rd and 10-th day, and did not differ from the norm on 30-th day.

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## MULTIPLE CONFORMATION STATES OF HUMAN HEMOGLOBIN

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Hemoglobin (Hb) is one of the vital biomolecules in nature that plays a central role in binding, transporting and offloading oxygen from the lungs to the tissues to respiring cells, and represents the most well-defined and intensely studied allosteric protein. Hb exists in equilibrium between unliganded or deoxygenated Hb possessing low oxygen affinity, and the liganded or oxygenated Hb, which has a high oxygen affinity. Monod et al. assigned the deoxygenated Hb to the T (tense) and oxygenated Hb to the R (relaxed) states.

Our purpose is to study a number of intense and relaxed states of hemoglobin, which determine the degree of affinity of this protein to oxygen.

**Keywords:** hemoglobin (Hb), allosteric protein, deoxygenated Hb, oxygenated Hb, allostery, hemoglobin's affinity, conformation, ligand.

The presence of two allosteric states: R (relaxed) and T (tense) is postulated for hemoglobin. The state of R is high and T is low affinity for oxygen (molecular oxygen is more strongly bound and molecular oxygen is more weakly bound).

Quaternary structures of the T and R forms were used to substantiate the model of two states of the mechanism of functioning of allosteric proteins, which suggests that, upon ligand binding the T-form passes into the R-form without intermediate states.

At present, the obtained functional, thermodynamic, spectroscopic and structural studies suggest the existence of individual varieties of the T-state and / or discrete multiple states that are in the path of the  $T \rightarrow R$  transition. The relaxed state of hemoglobin is not a single-valued classical R-state, but it is a set of completely liganded states, each of which has an individual quaternary structure. The most well-known examples are R2-, RR2- and R3-states [1]. The transition  $T \rightarrow R2$  was initially assumed to lay on the transition path  $T \rightarrow R$  with the R-conformation as the final state. However, further studies have shown that the R2-state is not intermediate, but rather a finite structure in the  $T \rightarrow R2$  transition series, passing first through the  $T \rightarrow R$ -state, and then through the  $R \rightarrow RR2$  transition. The RR3 structure exhibits some intermediate structural features between the R and R3 states. The researchers found that R-, R2- and RR2-conformations are involved in the transport of the ligand to the gem, while the R3 and RR3 conformations can be involved in the liberation of the ligand. The transition states have a greater affinity than the states R and T [2].

Multiple conformational states contribute either to the high affinity of hemoglobin to oxygen or, conversely, to a decrease in affinity for oxygen. These states are determining the binding strength, which is necessary for the performance of hemoglobin functions.

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### ANALYSIS OF GENITOURINARY INFECTION PREVALENCE IN DIFFERENT AGE AND SOCIAL GROUPS

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Statistical analysis of genitourinary infection prevalence in different age and social groups in the town of Drogichin and Drogichin district in 2011–2016, based on the data collected by the Drogichin Central District Hospital, demonstrated decline in incidence of all reviewed genitourinary infections: genitourinary trichomoniasis by 58 %, genitourinary chlamidiosis by 58 %, genitourinary candidosis by 15 %.

**Keywords:** genitourinary infections, sexually-transmitted diseases, trichomoniasis, chlamidiosis, candidosis.

Infectious inflammatory diseases hold a special position in the world total disease incidence. Inflammatory conditions rank first among gynecological disorders. Genitourinary infections are the trigger of inflammation in 80 % cases. Reportedly, about 90 % of world population suffer from genitourinary infections or carry them. Infectious inflammatory genitourinary tract diseases are among main reasons of degradation of the quality of life and fertility.

The required data for analysis of genitourinary infection prevalence in different age and social groups were collected from documents of the dermatovenerologic service of the Drogichin Central District Hospital. I use information from Reports on Registered Sexually-Transmitted Diseases as well as The Structure of Control Group in 2011–2016. The Control Group includes residents of Drogichin and Drogichin district, men and women, age groups 0–14, 15–17, 18–19, 25–29, 30–39, 40–49, over 50.

Based on the analysis, we may say that in 2011–2016, the prevailing infection among the population of Drogichin district was candidosis (18–27 cases per 10 000 people), the trichomoniasis infection rate was 8–20 cases per 10 000 people, the chlamidiosis rate – 4–10 cases per 10 000 people. In Drogichin and Drogichin district the highest trichomoniasis sick rate is observed in the age group 30–40, the highest chlamidiosis sick rate is registered