Currently, the appointment of most antitumor drugs is based on the statistical probability of obtaining a positive effect[4]. Medications in the human body undergo changes that directly depend on the functional state of the enzymes involved in the metabolism of drugs [3]. The effectiveness of the treatment often depends on the individual genetic characteristics of the patient[2, 1]. In this regard, we assessed the role of ethnicity in the indicators of the glutathione system in patients with lung cancer and those who do not suffer from oncopathology.

**Material and Methods.** A total of 50 people with lung cancer were examined, patients were admitted to the Yakut Republican Oncology Dispensary. The diagnosis of lung cancer was confirmed histologically. Patients were divided into two groups on ethnic grounds: the first group - the Yakuts, the second group - the Russians. The control group was selected taking into account age, gender and ethnicity, it included 50 people. The main criterion for selecting a control group was the absence of oncological diseases. The material of the study was venous blood, which was taken on an empty stomach from the ulnar vein. Determined using a spectrophotometer iSF-2000x: concentration - reduced glutathione, thiobarbituric acid reactive substances (TBARS); activity - glutathione reductase, glutathione-S-transferase, glutathione peroxidase. Statistical processing of results. Statistical processing of the data was carried out using the SPSS for Windows 10.0 application statistical software package.

**Results.** According to the data obtained by us in the group of relatively healthy people, the concentration of reduced glutathione changed depending on ethnicity: in the first group (Yakuts) - 2.50±0.05 μM/gHb, in the second group (Russians) - 2.04±0.06 μM/gHb. The level of reduced glutathione in the first group was higher by 18.4%, compared with the second group. The level of average activity of glutathione reductase in the first group was 20% higher (p<0.05) than in the second group (in the first group 7.55±10 μM GSSG/min*gHb, and in the second group 6.01±0.330 μM GSSG/min*gHb). We observed a decrease in the activity of glutathione-S-transferase in the first group by 9% in comparison with the second group: in the first group, the value was 2.20±0.06 μM GSH/min*gHb, in the second group - 2.42±0.03μM GSH/min*gHb. Depending on ethnicity, the activity of the enzyme in the first group was significantly higher by 35.4%: in the first group it was 6.50±0.009 μM GSH/min * gHb, in the second group it was 4.20±0.002 μM GSH/min*gHb. The level of TBARS depends on ethnicity: in the first group this indicator was 1.71±0.116 μM/L in the second group - 1.38±0.28 μM/L. In the first group, the level of TBARS was higher by 19.3% (p<0.05).

In the group of Yakuts, higher concentrations of reduced glutathione (18%), glutathione reductase activity (20%) and glutathione peroxidase (35.4%) are noted. We also noted the intensification of free radical oxidation of lipids in Yakut organisms, as evidenced by an increase in the concentration of TBARS by 19.3%. In the organism of cancer patients, we noted a change in the parameters of the glutathione system, depending on ethnicity. The content of reduced glutathione was less in patients with Yakut ethnicity by 34.4%, in contrast to Russians, who declined only by 18.6%. A significant decrease in the concentration of the reduced form of glutathione in Yakut patients in comparison with Russians is due to the activity of glutathione reductase. So in the group of patients with Yakut ethnicity, the activity of glutathione reductase decreased by 10.5%, and in Russians it increased by 13.0%. In both groups of patients with lung cancer, we noted a decrease in the activity of the antioxidant enzyme glutathione peroxidase, in the Yakuts by 70.7%, in Russians by 52.4%. It is possible that a decrease in the enzymatic link of antioxidant protection and a decrease in the level of reduced glutathione contributes to an increase in the intensity of lipid peroxidation in patients, which is confirmed by an increase in the concentration of TBARS (Yakuts by 27.2%, Russians by 43.6%). Statistically significant differences in the activity of the enzyme involved in detoxification - glutathione-S-transferase, depending on ethnicity, were not revealed.

Prospects for further research. Thus, the results of our study showed that in patients with lung cancer, the parameters of the glutathione system vary depending on ethnicity. In the patients the concentration of reduced glutathione decreases (the Yakuts by 34.4%, Russians by 18.6%), the activity of glutathione peroxidase decreases (Yakuts by 70.7%, Russians by 52.4%). The activity of glutathione reductase in the lung cancer patients decreased by 10.5% in the Yakuts, and in Russians it increased by 13.0%. The results obtained by us testify to a significant depletion of the glutathione system in the group of oncological Yakut ethnicity.

**References:**


Keywords: glutathione reductase, glutathione-S-transferase, glutathione peroxidase, lung cancer.

MARKERS OF ADAPTATION TO MUSCULAR ACTIVITY IN ATHLETES
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One of the most important problems of modern sports science and practice is the problem of adaptation to muscular activity. It is known that any adaptation is the output of the biosystem to a new level of homeostasis. Regulatory mechanisms are the first to be restructured. Only after this, physiological or morphological changes occur. Constantly increasing volumes of training loads can cause a number of violations of the functional condition of athletes, lead to overstrain of the body systems, increased injuries, decreased levels of sports results, as well as reduced duration of performances at the stage of preserving sport achievements. To prevent these phenomena, constant monitoring of the functional condition of athletes is required using a number of methods that allow assessing the readiness to perform significant workloads, the rate of recovery processes, the efficiency of the functioning of various physiological systems, the degree of mobilization and use of reserve capabilities of the organism, the direction and effectiveness of the training effect of the workloads. The aim of this work is to study the dynamics of free histamine and lactate levels in biological fluids at rest and after physical exercises in rowers on kayaks and canoes at the general preparatory stage of the preparatory period.

Materials and Methods. Investigations were conducted at the Republican scientific and practical center of sports medicine with the participation of 24 rowers on canoes and kayaks (men and women, age 19-25, with the sports qualifications of master of sports, master of sports of international level) who are at the preparatory period. The control group consisted of 16 functionally healthy students. To determine histamine, 1 ml of mouth fluid of athletes were collected in centrifuge tubes with 4 ml of 10% trichloroacetic acid. Then, the level of histamine was determined in these centrifuge fluids. Quantitative determinations of the histamine level in serum and oral fluids were carried out by gas chromatography coupled with mass spectrometry (GC-MS/MS) of Thermo Fisher Scientific TSQ 8000 EVO mass spectrometer. At the same time, the lactate content in the blood of athletes at rest and after physical exercises was determined using the ROSH biochemical analyzer COBAS-311, using reagents from the same company. The heart rate (HR) and the arterial pressure (AP) by the auscultatory method were determined to assess the functional state of the cardiovascular system at rest and after physical exercises of athletes. The testing was carried out on the “Tredmile” track (Germany). Pulse regimens were recorded using the “Sport Tester” heart rate monitor.

Results. In the process of stress loads in athletes rowing on canoes and kayaks, an individual “histamine profile” is formed, characterized by an increased content of free histamine in the body. In this situation, medical examination and electrocardiography did not detect any deviations in the health status of this contingent of athletes with constantly high concentrations of histamine in biological fluids. Obviously, a high level of free histamine in the blood in this case represents a long-term stable adaptation to regular physical loads. This is also true with respect to the adaptive increase in the level of histamine in the oral fluids of the athletes. With the daily conduct of training sessions, it is possible that each subsequent training falls on the phase of super-recovery in the histamine system after the previous one. In this case, as a result of the cumulative training effect, the histamine content in the body increases. As training improves, the recovery of consumed histamine during the work begins to occur at a faster rate. In this case, the super-recovery phase ends before the next training begins. Thus, the impact of regular training workloads leads to a steady increase in the level of free histamine in the body of athletes in conditions of rest. Accumulation of a substance with such a high biological activity cannot be influenced on one or other aspects of the vital activity of the athlete’s body. As the study showed, for each mode of operation there is an optimal level of histamine in the oral fluid and in the blood. Thus, the accumulation of free histamine in the body with a decrease in the oxygen capacity of the blood is aimed at preventing the weakening of the oxidative function, which is possible due to the ability of histamine to enhance coronary circulation, dilate blood vessels, increase local blood flow and, thus, improve the supply of the heart and other organs and tissues with blood and oxygen. Accumulating in the body, histamine inhibits acetylcholinesterase, thereby contributing to an increase in the concentration of acetylcholine and activation of the parasympathetic part of the autonomic nervous system. It is possible that the high level of histamine in the body of athletes (formed as an adaptation to high physical stress) in the future can lead to the development of an allergic disease. At the majority of surveyed athletes, the content of lactate at rest was in