phosphate phosphorus, temperature, chlorides, a hydrogen indicator, sulphates, ammonium nitrogen, oil products, nitrogen nitrate, nickel, synthetic surface-active agents, zinc, some chrome forms, copper, some iron forms, the dry residue, mercury, cadmium, lead, manganese.

According to the monitoring data obtained over the past 8 years the concentrations of pollutants in the groundwater has increased in general, however, in 2016 there was a recession of the concentrations of ammonium nitrogen, some iron forms, and sulphates. The increase in concentration has occurred in such indicators as oil products, nitrate nitrogen and dry residue. In the entire period of observation the concentrations of copper, cadmium, arsenic, mercury, and cobalt were below the detection limit. The data may vary a lot from well to well.

THE PROBLEM OF RADIATION SENSITIVITY OF ALBINO RATS MYOCARDIUM

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The effect of ionizing radiation on the myocardium is manifested by an increase in the variability of cardiovascular system reactions and the mechanisms of myocardial energy homeostasis, realized mainly in mitochondrial oxidation reactions. The combined effect of ionizing radiation and other damaging factors can initiate or exacerbate the already existing cardiac pathology.

Keywords: post-radiation, albino rats, myocardium, cardiac pathology, mitochondrial respiration, γ-irradiation.

Introduction. Numerous data of post-radiation complications development in heart and large vessels are not consistent with the opinion of high radiation resistance of the myocardium. The effect of ionizing radiation on the myocardium is manifested by an increase in the variability of the reactions of the cardiovascular system and the mechanisms of the energy homeostasis of the myocardium, realized mainly in mitochondrial oxidation reactions. The combined effect of ionizing radiation and other damaging factors can initiate or exacerbate the already existing cardiac pathology.

Aim of the study. To study the parameters of mitochondrial respiration of the myocardium of albino rats with a single general external γ-irradiation.

Materials and methods. The state of tissue respiration of pieces of myocardium of albino rats irradiated in doses of 0.5 Gy and 1 Gy (dose rate 0.92 Gy/min) was evaluated by polarography using Clark's closed platinum electrode in a thermostated cell (25°C) in Hanks solution. The rate of oxygen consumption (nmol O_2/(min×mg protein)) was measured on endogenous substrates, and also after exogenous substrates added – succinate and glutamate.

Results. A significant increase in the endogenous respiratory activity of myocardial tissue of irradiated rats at doses of 0.5 Gy and 1 Gy was observed. Thus, on 3rd day after γ-irradiation, the rate of endogenous respiration increased by 29.4% (0.5 Gy) and 43.1% (1 Gy), compared to a control of 2.11 ± 0.02 nmol O_2/min×mg of protein. Ten days after γ-irradiation, in doses of 0.5 and 1 Gy, this indicator increased compared to the control, respectively, by 49.3% and 60.7%. The greatest increase in the rate of respiration was observed when glutamate was applied on the 10th day after exposure up to 92.9% and 98.2%, respectively, for doses of 0.5 and 1 Gy.

Conclusions. The obtained data testify to the high sensitivity of the myocardium to γ-irradiation, as evidenced by the dynamics of changes in mitochondrial respiration on endogenous and exogenous substrates. Stimulation of respiratory activity of functionally unloaded irradiated myocardium makes its energy less effective and vulnerable to the action of other damage factors, which contributes to the development of cardiovascular pathology.