

## THE ACTIVITY OF ENZYMES OF TRANSSULFURATION IN KIDNEYS AND MYOCARDIUM OF RATS WITH EXPERIMENTAL OBESITY

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**Background and aims.** Obesity is a common metabolic disease, which is registered in almost 20% of population of Ukraine. Patients with obesity often have an impaired function of the cardiovascular system and kidneys, associated with dyslipidemia, insulin resistance and oxidative stress. Dysfunction of homocysteine and cysteine metabolism can be integrated in the pathogenesis of obesity. The transsulfuration process provides synthesis of vasodilator hydrogen sulfide.

The aim of work was to determine the activity of transsulfuration enzymes in kidneys and myocardium of rats with experimental obesity.

**Methods.** Experiments were fulfilled on 20 white laboratory male rats with an initial weight of 210-270 g. The control group of rats ( $n = 10$ ) received a standard diet within 60 days. It was balanced by all the macro- and micronutrients. The experimental group of rats ( $n = 10$ ) received a high-fat diet. The activity of enzymes of transsulfuration - cystathionine  $\beta$ -synthase (CBS, EC 4.2.1.22) and cystathionine  $\gamma$ -lyase (CSE, EC 4.4.1.1) was determined in the homogenate of myocardium and kidneys.

**Results.** The high-fat diet caused a significant increase in the body mass index of rats (by 50.2%) and an increase in the mass of visceral fat (by 37.8%,  $p < 0.05$ ). The progress of obesity was accompanied by a violation of transsulfuration and desulfuration processes in kidneys. The activity of CBS in the reaction of homocysteine and serine condensation decreased by 32.1%, and the activity of CSE in the reaction of cleavage of cystathionine decreased by 35.6% ( $p < 0.05$ ). In kidneys the desulfuration activity of CBS (in condensation of L-homocysteine with L-cysteine) and CSE (in desulfuration of L-cysteine to pyruvate) decreased by 25-28% ( $p < 0.05$ ). In myocardium the desulfuration activity of CSE decreased by 33.8% ( $p < 0.05$ ) but the cystathionase activity was not significantly changed. It should be noted that CBS is not expressed in the myocardium of rats.

**Conclusions.** Therefore, obesity is associated with a decreased activity of transsulfuration and desulfuration processes in kidneys and myocardium. Relationship of metabolic disorders of sulfur-containing amino acids with a functional state of kidneys and heart in obesity is a prospect for further research.