

# GRAPE POLYPHENOLS IMPROVE GLUTATHIONE METABOLISM IN THE RAT LIVER UNDER EXPERIMENTAL INSULIN RESISTANCE

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**Introduction.** Glutathione (GSH) is a tripeptide L- $\gamma$ -glutamyl-L-cysteinyl-glycine. Glutathione has several additional functions in cells: it participates in the metabolism of estrogens, the reduction of ribonucleotides to deoxyribonucleotides, involved in redox signaling and the detoxification endogenous compounds and xenobiotics. It acts as an antioxidant either directly by interacting with reactive oxygen/nitrogen species and as a cofactor for various enzymes. Elevated ROS levels are a key finding in many diseases including cardiovascular diseases, insulin resistance, diabetes mellitus, etc. GSH can interact directly with ROS to reduce their levels and delay the development of pathologies. Plant polyphenols increase the GSH level by exhibiting antioxidant activity. Grape polyphenols activate signaling mechanisms in the cell and may affect the glutathione metabolism enzymes.

**Aim.** The aim of the work was to investigate the GSH level and glutathione reductase activity in the liver of rats under experimental insulin resistance.

**Materials and Methods.** The experimental study was conducted on 3 months male rats and weight that were procured from vivarium NUPh. Animals were kept on a high-fat and high-fructose diet during 5 weeks to induce experimental insulin resistance. Grape polyphenols were administered two weeks in dose 9 mg polyphenols/kg/day. The animals were decapitated under chloralose-urethane anesthesia. The liver was perfused with cold physiological solution and homogenized. In the liver, GSH level and glutathione reductase activity were determined. The protein level was determined by the Lowry method.

**Results and discussion.** It was shown that glutathione reductase activity was reduced by 1.5 times in rats under experimental insulin resistance. GSH level was also reduced by a factor of 1.69 in comparison with intact animals. GSH level decrease is due to both a decrease in the activity of glutathione reductase and the enhancement of free radical oxidation under these conditions. Grape polyphenols administration increases of glutathione reductase activity and normalizes the GSH level in the liver of rats under experimental insulin resistance.

**Conclusions.** Thus, grape polyphenols improve GHS content and glutathione reductase activity in rats under experimental insulin resistance. The findings suggested that the grape polyphenols could ameliorate the consequences of insulin resistance, diabetes and its complications.