



Effect of melatonin prolonged infusion on the functioning of glutathione system in the blood of alloxan diabetic rats in lighting conditions around the clock

Abstract ID: #39-1/04

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Background: Melatonin is a lipophilic hormone produced by the Pineal gland during the night. In the presence of intracellular thiols alloxan generates reactive oxygen species (ROS) in a cyclic redox reaction.

Objectives: The aim was to determine the influence of two weeks melatonin infusion on basal levels of glucose, reduced glutathione (GSH), activity of glucose-6-phosphate dehydrogenase (G6PD), glutathione peroxidase (GPx) and glutathione reductase (GR) in the blood of alloxan diabetic rats under conditions of constant light.

Material and methods: The experiments were carried out on 60 sexually mature male albino, not thoroughbred rats with the body mass – 0,18 – 0,20 kg. Alloxan diabetes was evoked via injecting the rats with a 5% solution of alloxan monohydrate intraperitoneally in a dose of 170 mg/kg following a 24 hour period of fasting. On the third day the death of a part (50%) of the alloxan diabetic animals was observed.

Results: Insertion of melatonin for 14 days helped to reduce 2.5 times compared with the baseline, basal glucose level in the group of animals with overt diabetes, indicating its hypoglycemic action. In rat blood with overt diabetes occurred reduction of G-SH on 45% compared with those of control. Insertion of melatonin to diabetic rats helped in normalization of parameters that we studied. Melatonin is a powerful antioxidant that easily crosses the cell membranes and blood-brain barrier. It acts as a direct scavenger of OH[•], O₂^{•-}, and NO.

Conclusion: Under conditions of permanent light exogenous melatonin activates antioxidant glutathione dependent enzymes in the blood of alloxan diabetic rats that ultimately provides increased content of G-SH - one of the main endogenous antioxidant.