

Effects of melatonin on the glutathione system in the blood of alloxan diabetic rats

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Alloxan diabetes was reported to induce oxidative stress and generates ROS. Melatonin is known to be involved in antioxidant defence, and the aim was to determine the influence of melatonin 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.

The study involved 67 male white rats weighting 180–200 g. Alloxan diabetes was evoked via single injecting the rats with 5% alloxan monohydrate solution in the dose of 170 mg/kg. The animals were divided into groups: I – intact animals, II – alloxan diabetic rats with overt (basal glycemia > 8.0 M) and latent glycemia (basal glycemia < 6.9 M) diabetes, III – animals with overt and latent diabetes were introduced melatonin intraperitoneally in the dose of 10 mg/kg at 8 a.m. daily during 6 weeks.

The introduction of melatonin promoted normalization of the level of basal glycemia in diabetic rats indicating hypoglycemic action of melatonin administration. In the blood of rats with overt diabetes GSH content decreased on 31%, while in animals with latent diabetes this index increased on 28% as compared with intact animals. Activity of G6PD, GPx and GR in the blood of rats with overt diabetes was on 25%, 22%, and 20% respectively lower than in intact rats. Increased content of GSH in rats with latent diabetes is probably induced by enhanced regeneration of the oxidized form. In the blood of rats of this group activity of G6PD, GPx and GR was on 30%, 27%, and 23% respectively higher than in intact ones. In the blood of alloxan diabetic rats receiving melatonin the indices mentioned above didn't differ from the control group.

Under conditions of overt diabetes exogenous melatonin activates glutathione dependent enzymes in the blood of alloxan diabetic rats that ultimately provides increased content of GSH – one of the main endogenous antioxidant.