

Oxidative stress in liver tissue of rat induced by chronic systemic hypoxia

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Abstrak

Adaptation mechanism to hypoxia in living organisms increases reactive oxygen species (ROS) formation that could exceed the capacity of anti oxidant. Glutathione (GSH) in which highest concentration present in liver, plays an important role in maintaining the intracellular redox equilibrium and protect tissues from oxidative stress. The aim of this study was to observe tissue response of rat that was exposed to chronic systemic hypoxia by analyzing the oxidative stress in liver tissue. Twenty male Sprague-Dawley rats were induced by chronic systemic hypoxia by kept them in hypoxic chamber (10% O₂:90% N₂) for 1, 3, 7 and 14 day(s). All rats were sacrificed with ether anesthesia after hypoxia treatment. Liver tissues were analyzed using parameters of oxidative stress, malondialdehyde (MDA) with tBARS test, and endogenous antioxidant, glutathione reduced form (GSH). The study showed that chronic systemic hypoxia induction caused oxidative stress in liver tissue, which was shown by increased concentration of MDA in liver tissue (nmol/mg liver tissue). Concentration of MDA in liver tissue was increased significantly on day-1, day-3, day-7 and day-14 compared to control group (ANOVA, LSD, $p < 0.05$). The differences between day-3, day-7 and day-14 was not significant. In contrast, liver GSH content ($\mu\text{g/mg}$ liver protein) was progressively decreased significantly since day-1 of hypoxia until the end of experiment (ANOVA, LSD, $p < 0.05$). Statistical analysis revealed that there is a strong correlation between MDA and GSH concentration in liver tissue (Pearson = - 0.993). It was concluded that oxidative stress present in liver tissue of rat induced by chronic systemic hypoxia.