INAL ALTERATIONS IN LIVER ANTIOXIDANT SYSTEMS FROM STREPTOZOTOCIN-INDUCED DIABETIC RATS


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Diabetes mellitus (DM) is one of the most common endocrine metabolic disorders with increasing incidence and clinical relevance. The DM type 1 (DM1) is caused by the destruction of pancreatic beta cells, with consequent reduced insulin production leading to hyperglycemia. Streptozotocin(STZ)-induced DM1 in rats is a commonly used model to investigate whole metabolism alterations that occur during this metabolic disorder, since STZ induces severe reduction in insulin levels by pancreatic cells destruction. This dysregulation of hormone levels in turn causes several changes to various parts of the body, especially the liver, which is the main organ in the glycaemia’s control. Several studies have demonstrated alterations in both redox homeostasis and activity of antioxidant enzymes associated with liver oxidative injury induced by DM1. Therefore, the aim of this study was to evaluate the initial changes of expression levels of antioxidant enzymes in liver of STZ-induced diabetic rats. Twenty-four rats were divided in two groups C (Control), and D (Diabetic). After 21 days of DM1 induction, animals were euthanized and liver samples were collected for evaluation of oxidative stress markers (Malondialdehyde and protein carbonylation); measurement of enzymatic activities; and mRNA expression of antioxidant enzymes (Catalase (CAT) and superoxide dismutase (SOD)). A histological analysis was also performed. As expected, it was observed that the initial induction time (3 weeks) causes hyperglycemia, which in turn is associated to significant changes in liver antioxidant systems. Our initial results strongly suggest that STZ-induced DM1 causes induction of antioxidant enzymes activities, especially SOD, and also in their mRNA expression. However, the induction does not seem to promote alleviation of liver oxidative damages, as observed by MDA content and histology. These alterations can induce a prooxidative status in liver and impair the metabolic functions of this important organ.