Fisetin improves pancreatic beta-cell function by ameliorating oxidative stress in streptozotocin induced experimental diabetes in rats.

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ABSTRACT

Hyper physiological burden of free radicals causes imbalance in homeostatic phenomena between oxidants and antioxidants in the body. Oxidative stress is an imbalance between the generation of reactive oxygen species and antioxidant defense capacity of the body and is closely associated with aging and a number of diseases including cancer, cardiovascular diseases and diabetes complications. The sensitivity of pancreatic β-cells to oxidative stress has been attributed to their low levels of antioxidants compared with other tissues. Fisetin (3, 3', 4, 7 tetrahydroxyflavone), a bioflavonoid was examined for its antioxidant potential in plasma and pancreatic tissues of streptozotocin (STZ)-induced diabetic rats. Diabetes was induced in experimental rats by a single intraperitoneal injection of STZ (50 mg/kg). The levels of fasting plasma glucose and insulin were estimated. The levels of lipid peroxidative products and antioxidants were estimated in plasma and pancreas. A significant increase in the levels of fasting plasma glucose and lipid peroxidative products and a significant decrease in plasma insulin, enzymatic antioxidants, and nonenzymatic antioxidants in plasma and pancreas of the diabetic rats were observed. Oral administration of fisetin (10 mg/kg) for a period of 30 days significantly decreased fasting plasma glucose, increased insulin levels, and improved the antioxidant status in diabetic rats. Histopathological studies of the pancreas revealed the tissue protective role of fisetin. Thus, the present study clearly illustrate that fisetin possess potent antioxidant effect in STZ induced diabetic rats.

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