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EFFECT OF MELATONIN ON OXIDATIVE AND INFLAMMATORY STRESS IN SPLEEN AND LIVER OF STREPTOZOTOCIN-INDUCED DIABETIC RATS

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Introduction: Oxidative stress and inflammation are involved in the pathogenesis of diabetes. Previously, we showed that melatonin exerts potent anti-oxidative and anti-inflammatory actions in the liver of streptozotocin (STZ)-induced diabetic rats, thus correcting diabetes-associated abnormalities. The concept of a liver-spleen axis has been proposed as an intersection linking immunity and metabolism in various conditions, including chronic liver diseases. We therefore compared the effect of melatonin on oxidative stress and the inflammatory response in the liver and spleen of STZ-induced diabetic rats.

Methods: Male Wistar rats were injected with 65 mg/kg STZ to induce diabetes. Melatonin was administrated daily (0.2 mg/kg/i.p) until the end of the study at 4 weeks after diabetes induction. Oxidative stress was assessed by measuring the level of lipid peroxidation and the changes in antioxidative enzyme activities. Inflammation was evaluated by examining the levels of proinflammatory cytokines, inflammatory mediators and the acute-phase protein haptoglobin (Hp).

Results: In both tissues, melatonin lowered oxidative stress, which was observed as a decrease in lipid peroxidation and increased expression and activity of CAT, MnSOD and CuZnSOD. By suppressing the activation of NF-κB p65 and MAPK (p38, JNK, ERK) signaling cascades and by decreasing the production of TNF-α, IL-6, HMGB1 and Hp, melatonin also reduced inflammation.

Conclusion: Melatonin stimulated the antioxidative defense in both, the spleen and liver of diabetic rats and attenuated inflammation via the same molecular mechanisms.

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