

عنوان مقاله:

Antiapoptotic and antioxidative effects of cerium oxide nanoparticles on the testicular tissues of streptozotocin-induced diabetic rats: An experimental study

محل انتشار:

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خلاصه مقاله:

Background: Cerium dioxide nanoparticles (CNPs) due to the antidiabetic and antioxidant activities are proposed for the treatment of oxidative stress-associated diseases. Objective: To examine the impact of CNPs on hyperglycemia-induced apoptosis and oxidative stress in the testis of diabetic rats. Materials and Methods: Twenty-four male rats were divided into four groups (n = ۶/each) as diabetic rats, CNPs group, diabetic + CNPs rats, and controls. The control group was fed only with mouse food and water. Rats became diabetic through receiving streptozotocin (STZ) ۶۰ mg/kg. CNPs were given to the rats at a dose of ۳۰ mg/kg daily for two weeks. Malondialdehyde and total thiol group (TTG) levels were measured using spectrofluorometer. Expression of b-cell lymphoma protein ۲-associated X protein (BAX) and b-cell lymphoma protein ۲ (Bcl-۲) were investigated using quantitative real-time polymerase chain reaction. Western blot analysis was used to examine caspase ۳ protein levels. Results: The content of malondialdehyde significantly increased in the STZ-diabetic rats, while TTG levels demonstrated a remarkable decrease. Caspase-۳, BAX, and BAX/Bcl-۲ mRNA ratio raised significantly in the STZ-diabetic rats. On the other hand, Bcl-۲ mRNA levels reduced in the testis of diabetic rats (p = ۰.۰۰۶). Intervention with CNPs caused a substantial increase in the TTG levels, while the malondialdehyde contents, caspase-۳, BAX levels, as well as BAX/Bcl-۲ mRNA ratio were considerably decreased following CNPs treatment. Administration of CNPs increased mRNA levels of Bcl-۲ (p < ۰.۰۰۰۱). Conclusion: CNPs treatment attenuates testicular apoptosis and oxidative stress induced by diabetes. This nanoparticle might be suggested for the treatment of diabetes-associated reproductive disorders

کلمات کلیدی:

Apoptosis, Nanoceria, Diabetes, Oxidative stress, Testis بیضه, آپوپتوز, CNP, دیابت, استرس اکسیداتیو,

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