The role of heat shock protein 70 induced by geranylgeranylatedone in carbon tetrachloride-exposed adult rat testes.

Kamal MM, Omran OM. Ola Mahmoud Omran

Abstract:

Carbon tetrachloride (CCl4) induces testicular damage, through formation of free-radical metabolites. Molecular chaperone heat shock protein of 70kDa (HSP 70) protects cells from various stresses. This study was designed to investigate the potential role of induction of HSP70 using geranylgeranylatedone (GGA) on testicular damage caused by CCl4. Rats were divided into group I (control group), Group II (CCl4 group) received CCl4 s.c. for 4 weeks, group III received CCl4 s.c. for 4 weeks simultaneously with daily single oral dose of GGA (GGA - treated CCl4 group). Serum testosterone, testicular lactate dehydrogenase (LDH) and alkaline phosphatase (ALP), testicular malondialdehyde (MDA), total nitrite and total antioxidant capacity (T-AOC) were measured. Evaluation of histopathological changes and immunohistochemical HSP70 expression for testicular biopsies were performed. Group II showed lower values of gonado-somatic index, serum testosterone, testicular LDH, ALP, T-AOC and greater values of testicular MDA and total nitrite than in control. Testicular morphology showed widening of seminiferous lumen, less spermatogenesis, vacuolization of germinative epithelium. Group III had higher values of gonado-somatic index, serum testosterone, testicular LDH, ALP, T-AOC with less testicular MDA and total nitrite than in group II. They have less damage and restored the altered testicular morphology. Immunohistochemical HSP70 expression was increased in the testicular spermatogenic and sertoli cells in group II that was significantly accentuated in group III. These findings suggest that GGA-induced activation of HSP 70 significantly alleviate CCl4 inflicting testicular damage by HSP 70 mediated cytoprotection and antioxidant effects.

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