

Protective Effect of Ginger Root Extract on Dioxin-Induced Testicular Damage in Rats

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Abstract : Background: Dioxins are one of the most widely distributed environmental pollutants. Dioxins consist of feedstock during the preparation of some industries, such as the paper industry as they can be produced in the atmosphere during the process of burning garbage and waste, especially medical waste. Dioxins can be found in the adipose tissues of animals in the food chain as well as in human breast milk. 2,3,7,8-Tetrachlorodibenzo-pdioxin (TCDD) is the most toxic component of a large group of dioxins. Humans are exposed to TCDD through contaminated food items like meat, fish, milk products, eggs etc. Recently, natural formulations relating to reducing or eliminating TCDD toxicity have been in focus. Ginger rhizome (*Zingiber officinale* R., family: Zingiberaceae), is used worldwide as a spice. Both antioxidative and androgenic activity of *Z. officinale* was reported in animal models. Researchers showed that ginger oil has dominative protective effect on DNA damage and might act as a scavenger of oxygen radical and might be used as an antioxidant. Aim of the work: The present study was undertaken to evaluate the toxic effect of TCDD on the structure and histoarchitecture of the testis and the protective role of co-administration of ginger root extract to prevent this toxicity. Materials & Methods: Male adult rats of Sprague-Dawley strain were assigned to four groups, eight rats in each; control group, dioxin treated group (given TCDD at the dose of 100 ng/kg Bwt/day by gavage), ginger treated group (given 50 mg/kg Bwt/day of ginger root extract by gavage), dioxin and ginger treated group (given TCDD at the dose of 100 ng/kg Bwt/day and 50 mg/kg Bwt/day of ginger root extract by gavages). After three weeks, rats were weighed and sacrificed where testis were removed and weighted. The testes were processed for routine paraffin embedding and staining. Tissue sections were examined for different morphometric and histopathological changes. Results: Dioxin administration showed a harmful effects in the body, testis weight and other morphometric parameters of the testis. In addition, it produced varying degrees of damage to the seminiferous tubules, which were shrunken and devoid of mature spermatids. The basement membrane was disorganized with vacuolization and loss of germinal cells. The co-administration of ginger root extract showed obvious improvement in the above changes and showed reversible morphometric and histopathological changes of the seminiferous tubules. Conclusion: Ginger root extract treatment in this study was successful in reversing all morphometric and histological changes of dioxin testicular damage. Therefore, it showed a protective effect on testis against dioxin toxicity.

Keywords : dioxin, ginger, rat, testis

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