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Effects of Thyroid Hormones on Di(N-Butyl) Phthalate (DBP)-Induced Oxidative Damages in Adult Rats Testis

Mee Young Ahn[1], Ena Lee[2], Hee Jin Kim[1], In Young Kim[2], Tae Sung Kim[2], Ho Yun Ki[2], Tae Seok Kang[2] and Hyung Sik Kim[1]

[1]*Laboratory of Molecular Toxicology, College of Pharmacy, Pusan National University and*
[2]*National Institute of Toxicological Research, Korea Food and Drug Administration*

Hypometabolitic state induced by hypothyroidism is associated with a decrease in free radical production and in oxidative damage levels. However, it is not clear whether hypothyroidism is associated with decrease in oxidative damage in the testis. This study examined the effects of di(n-butyl) phthalate (DBP) on oxidative damages and antioxidant enzymes activities in the testes of normal and hypothyroid rats. Hypothyroidism was induced in Sprague-Dawley pubertal male rats (4 weeks of age) by administering 0.1% propylthiouracil (PTU) in their drinking water for 30 days. DBP was administered to the hypothyroid (250, 500 or 750mg/kg) and normal (750mg/kg) rats by oral gavages for 30 days. The body weight of the PTU-treated hypothyroid rats was significantly lower than the control group. No significant changes in the testis, epididymides and adrenal weight were observed in the hypothyroid rats. However, DBP (750mg/kg) significantly reduced the weights of the testis in both the normal and hypothyroid rats. The total T3 and T4 serum level decreased, but the TSH level increased in the hypothyroid rats. In contrast, the serum thyroid hormone levels (T3, T4, and TSH) did not change following DBP treatment. Although the histomorphological examination showed a severe diffused Leydig cells hyperplasias in the DBP (750mg/kg)-treated groups, these effect was mild in the DBP-treated hypothyroid rats. In order to investigate the oxidative DNA and lipid damages, 8-hydroxydeoxyguanosine (8-OHdG) and malondialdehyde (MDA) levels were measured in the testis. The levels of 8-OHdG and MDA were slightly increased in hypothyroid rats, but there was no significant differences were observed in DBP-treated hypothyroid and normal rats. In contrast, glutathione peroxidase (GPx) and catalase (CAT) activities decreased in the testes of hypothyroid rats. Although reactive oxygen species (ROS) has been suspected of producing the induction of testicular atrophy in DBP-exposed

rats, no apparent sign of oxidative damages were found after DBP exposure. It is, therefore, appears that hypothyroidism may cause changes in metabolism of DBP and it may cause the protection of testes damages against mono-butyl phthalate (MBP), a primary metabolite of DBP.

Keyword : Hypothyroidism, DBP, 8-OHdG, MDA, GPx