PB-32

Testicular Toxicity and Reduced Sertoli Cell Population in Neonatal Male Rats Receiving Endocrine-Disrupting Chemicals

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(Introduction) To investigate effects of endocrine disrupting chemicals on developing testes in suckling rats, weight and histological changes of testes were examined after three or five consecutive administrations of anti-androgenic flutamide (Flu), anti-estrogenic tamoxifen (Tam) and estrogenic diethystilbestrol (Des). (Methods) Flu (200mcg), Tam (20mcg) and Des (20mcg) were administered subcutaneously into neonatal male rats (5rats/group) on age day-1 to day-3 or to day-5. Testes were removed, weighed, fixed in Bouin solution, processed, and HE-stained for histological examination on age day-4 and day-6. The cell population in 50 seminiferous tubules/rat was examined with respect to gonocytes and sertoli cells in round tubular cross section of seminiferous tubules on day-4 and day-6, respectively and the ratio of sertoli cell/gonocyte was calculated for the comparison. (Results) On day-4 and day-6, testicular wet weight of Flu-, Tam- and Des-groups decreased to some extent, while testicular wet weight per 100 g b.w. was not significantly influenced by the drugs administration even at the toxic dose of Des, although Tam- group exhibited significant testicular toxicity on day-22 (data not shown). However, the ratio of sertoli cell/gonocyte for Flu-, Tan- and Des-groups decreased to 56 %(Flu 200mcg), 45 %(Tan 20mcg) and 52 %(Des 20 mcg) on day-4 and 49 % (Flu 200mcg), 53 % (Tan 20mcg) and 56 % (Des 20 meg) on day-6 of the control group, respectively. (Discussion) In neonatal rats, sertoli cell division occurs until age 14-16 days, whereas spermatogonial proliferation reaches adult levels by 4-days postpartum. The results show that Flu, Tam and Des caused significant Changes in developing testes in rats when administered neonatally. Interestingly, the weight of testes seems to be influenced to some extent during early stage of neonate, whereas the weights in the Tam-group were adversely exaggerated at later stage. Meanwhile, all the drugs caused significant changes in cell population of developing rat testes when administered neonatally. Particularly, sertoli cell population significantly changed by the drags. These results demonstrate that the cell population in seminiferous tubules of neonatal rats can be significantly influenced by the exposure to endocrine disrupting chemicals and such changes may lead to altered reproductive activity at later stage of the growh. (Conclusion) The present study indicates that suckling rats will be useful to evaluate testicular toxicity of endocrine disrupting chemicals in short-term assays and sertoli cell population in the neonatal rat testes would be possible measure to compare endocrine disrupting activities of chemicals quantitatively.