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Effect of Transient Embryonic In Vivo Exposure to the Endocrine Disruptor Methoxychlor on Embryonic and Postnatal Testis Development

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The current study was designed to examine the effects of a transient embryonic exposure to the pesticide methoxychlor, an endocrine disruptor, on in vivo rat testis development and function. Gestating female rats were transiently administered methoxychlor (MXC) from embryonic day 7 (E7; EO = plug date) through E15. Embryonic testes were collected at E16 and postnatal (PO = day of birth) testes at P4, P10, P17-20, and P60. Seminiferous cords formed in testes from MXC exposed males. However, at E16, there was a decrease in the area of cords and an increase in interstitial area in MXC exposed testes when compared with controls. At all postnatal ages collected, there did not appear to be differences in seminiferous cord/tubule area, interstitial area, or number of seminiferous cords/tubules between untreated controls and males exposed to MXC. Exposure to the endocrine disruptor also had no effect on the postnatal organ weights of a variety of different organs, nor were testosterone levels altered. Interestingly, there were reductions in the number of germ cells in testes from MXC-exposed males at P17-P20 when compared with untreated controls. Furthermore, there was a twofold increase in apoptotic cells in tubules from pubertal P17-P20-MXC exposed males when compared with untreated controls. Testes were collected from adult P60 males to determine if early embryonic and postnatal alterations in germ cell numbers or testis cellular composition had compromised spermatogenesis. In adult P60 MXC exposed testes there were no gross morphological changes in testis structure or cellular composition over that of controls. However, there was an increase in apoptotic cell number in elongating spermatids in MXC exposed testes. Four P60 males that were exposed to MXC during gestation and 4 control males were bred with unexposed females to determine their ability to produce offspring. All MXC exposed males were capable of impregnating females and had normal litter size and pup weights. Combined observations demonstrated that exposure to MXC during gestation at a critical stage of testis development (ie, sex determination) affects embryonic testis cellular composition, germ cell numbers, and germ cell survival. While alterations in these parameters does not affect the ability of males to produce offspring,

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there appears to be a reduced spermatogenic capacity associated with MXC treatment. Therefore, transient embryonic exposure to an endocrine disruptor (methoxychlor) during gestation can influence the germline and fertility in adult males.

Key words: Sertoli, mesenchymal-epithelial, growth, gametogenesis

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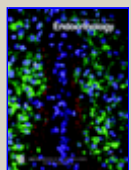


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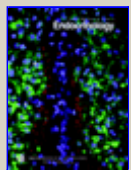


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