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Effects of Ethanol on Embryonic and Neonatal Rat Testes in Organ Cultures

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Ethanol exposure in adult animals and humans has shown to elicit significant inhibitory effects on the function of male reproduction, but consequences of ethanol exposure on the embryonic and early postnatal testis development are not known. The current study investigated the effect of ethanol on embryonic and neonatal testis development using an organ culture technique. In embryonic day 13 (E13) testis organ cultures, ethanol had no effect on the testicular cord formation, the expression of Müllerian-inhibiting substance (MIS) in Sertoli cells or the number of gonocytes. Similarly, in the ethanol-treated embryonic day 18 (E18) testes, both the number of gonocytes and the expression of GATA-4 and MIS were similar to those from the control testes. In contrast, in postnatal day 3 (P3) testes, ethanol at concentrations of 150 and 200 mM significantly decreased the number of gonocytes without affecting the expression of GATA-4 and MIS in Sertoli cells. This effect was shown to be resulting from the enhanced apoptosis of gonocytes. In addition, ethanol abnormally activated retinoic acid receptor alpha ($RAR\alpha$), as indicated by increased nuclear localization of $RAR\alpha$ with increasing doses of ethanol treatment. These observations suggest that the effect of ethanol on testis varies at different stages during embryonic and neonatal testis development. Furthermore, germ cells may be the main target for the action of ethanol on the early postnatal testis.

Key words: Gonocytes, Sertoli cells, testis, seminiferous cords, apoptosis

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