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Effect of gossypol acetate on guinea pig epididymal spermatozoa in vivo and their susceptibility to capacitation in vitro

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To determine the effects of gossypol acetate on guinea pig epididymal and vas deferens sperm maturity and in vivo susceptibility to in vitro capacitation and the acrosome reaction, we examined spermatozoa removed from 37 animals fed gossypol acetate (10-15 mg/kg/day) for 5 to 9 weeks, and 15 vegetable oil-fed, age-paired control animals. In gossypol-treated, reproductively immature guinea pigs, the number of spermatozoa in the epididymis was markedly reduced (P less than 0.01) compared to controls, whereas the presence of spermatids and spermatocytes increased in the epididymis with the duration of gossypol administration. In sexually mature guinea pigs (given 15 mg/kg/day for 5 weeks), the epididymal sperm survival and forward motility were decreased significantly (P less than 0.025 and P less than 0.01, respectively), although the density of mature spermatozoa was the same as in control animals. The percentage of induced acrosome reactions (26.4 \pm 12%) was almost three-fold lower than that of control animals (72.8 \pm 4.6%). Also, in 31.5 \pm 3.8% of spermatozoa from gossypol-treated animals, as compared to only 2.4 \pm 0.7% of controls, the cytoplasmic droplet failed to migrate to its proper position in the midpiece and was retained in the neck region. With a few exceptions, spermatozoa from both experimental and control groups had comparable patterns of freeze-fractured membrane differentiations. Susceptibility to the induced acrosome reactions and the position of the retained cytoplasmic droplet reversed within 3 weeks after the end of gossypol feeding. This study helps establish the suitability of the guinea pig for studies on gossypol-induced infertility.

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