

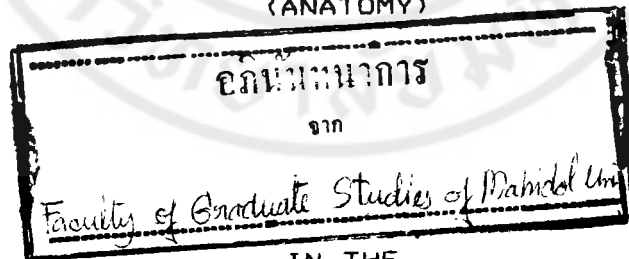


STRUCTURAL CHANGES  
IN  
RAT TESTIS, EPIDIDYMIS AND SPERMATOZOA FOLLOWING  
THE TREATMENT WITH GOSSYPOL

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## Summary

The effects of gossypol on the morphology of the testis spermatozoa and epididymis of adult Wistar albino rats were studied by light and electron microscopy. Following the treatment of gossypol acetic acid in the rats, at dosage 25 mg/kg/day for 5 to 14 weeks the changes in morphology were apparent. At LM level there is an uneven destruction of seminiferous tubules, and the most severely affected are tubules in stages VII and VIII of spermatogenesis. The changes consist sequentially of the desquamation of immature spermatids into the lumen, the asynchrony of cellular association, the formation of multinucleated giant cells from the immature spermatids, the swelling of spermatocytes and vacuolization in cytoplasm of late spermatids. Eventually the most affected tubules are depleted of all germ cells, except spermatogonia and Sertoli cells. The Sertoli cells, themselves are also exhibit considerable changes in morphology that include : (1) extensive development of intracytoplasmic and extracellular vacuoles, the former may be derived mostly from dilated ER and the latter tends to disrupt junctional complexes between Sertoli cells themselves and between Sertoli cells and germ cells ; (2) the swelling of mitochondria and fragmentation of their cristae, some of which may turn into small intracytoplasmic vacuoles ; (3) the clumping and increased granularity of chromatin ; and (4) the disorganization of cytoskeletal system which leads to the

impairment of sperm release and the orderly organization and movement of sperm cells within the germinal epithelium. Spermatocytes and spermatids exhibit the following morphological alterations : (1) the extensive vacuolization in the cytoplasm, most of which may arise from the dilation of endoplasmic reticulum and vacuolated mitochondria ; (2) disrupted nuclear and plasma membranes ; (3) hypercondensation of chromatin in their nuclei. However, acrosomes, head caps and manchette in spermatids appear to be less affected. In spermatozoa, the following changes were observed : (1) the disruption of plasma, nuclear and acrosome membranes ; (2) the decapitation of heads from tails ; (3) the swelling of mitochondria and the disruption of their cristae, as well as the absence of some mitochondrial segments ; (4) the characteristic bending, splitting, fraying and retraction of the core complexes at the midpiece region ; (5) the disappearance of parts of the axoneme complexes, including half of microtubules and outer dense fibers in the middle and principal pieces ; and (6) the retention of large cytoplasmic droplets in most caput and cauda spermatozoa. In contrast to middle and late stages germ cells, spermatogonia and Leydig cells remain relatively normal.

In caput and cauda epididymidis, the drug causes : (1) hypercondensation of nuclei and cytoplasm of some epithelial cells, which lead to the degeneration of some cells at 14th week of treatment ; (2) the extensive vacuolization in the

cytoplasm of principal and clear cells which may be derived from extremely dilated ER or fully - digested autolysosomal complex ; (3) the accumulation of lysosomes in the forms of dense-bodies, multivesicular bodies and vesicles containing myelin-like figures that could be the residual forms phagocytosis of abnormal sperm ; and (4) the dilation of rough endoplasmic reticulum, Golgi complex and intercellular spaces, these defects are most prominent at the longest duration of treatment, and may lead to the disruption of epididymis-blood barrier.

In contrast to the highly sensitive reactions shown by reproductive organs, the tissues of liver and kidney do not exhibit any morphological alteration after gossypol treatment at these dosages and duration..