CHEMICALLY INDUCED SPERM GRANULOMA IN RAT

RECENTLY Cooper and Jackson[1] reported that ethylenedimethane sulphonate (EDS), an alkylating agent, caused sperm retention cysts in the rat epididymis. α-chlorohydrin an active alkylating chemical possessing the specific biological property of "functionally" inactivating epididymal sperm frequently induces pathological changes in the epididymis.

The present investigation is concerned to study the pathological changes involved in the α-chlorohydrin induced sperm retention cysts or granuloma in rat and to discuss the biologic significance of the phenomena observed.

α-chlorohydrin (3-chloro-1, 2-propanediol) (sp. gr. 1·326) was supplied by the Upjohn Company, Kalamazoo, Michigan, in 0·25% aqueous (1·3 g/ml) methyl cellulose. A working solution was made by diluting the stock solution with distilled water. Ten adult male Wistar rats from the randomly mated colony were giiven α-chlorohydrin orally (25 mg/kg/day for 24 days). The controls received distilled water only. The animals were given rat food (Purina chow : Hindustan Lever Private Ltd.), wet gram and water *ad libitum*.

Twenty-four hours after the administration of the final dose of α-chlorohydrin, the rats were killed by rapid decapitation. Final body weight, and the weights of testis, epididymis, seminal vesicle, ventral prostate and levator ani muscles were recorded. The epididymis were examined with naked eye for cysts formations.

Grossly sperm retention cysts were evident as yellow nodular masses varying in size from 1·25 mm to 3·5 mm in the greatest dimension. The most frequent site was the lower pole of the epididymis.

In histologic preparations, the cyst consisted of a central pool of sperm surrounded by macrophages and histocytes (Fig. 1). The epididymis contained mononuclear cells, spermatocytes and multinucleated spermatic elements. Distension of the coils of ductus-epididymis and atrophy of the liningo-epithelium were conspicuous. Fibrosis and hyalinization of the epididymal tubules were common.

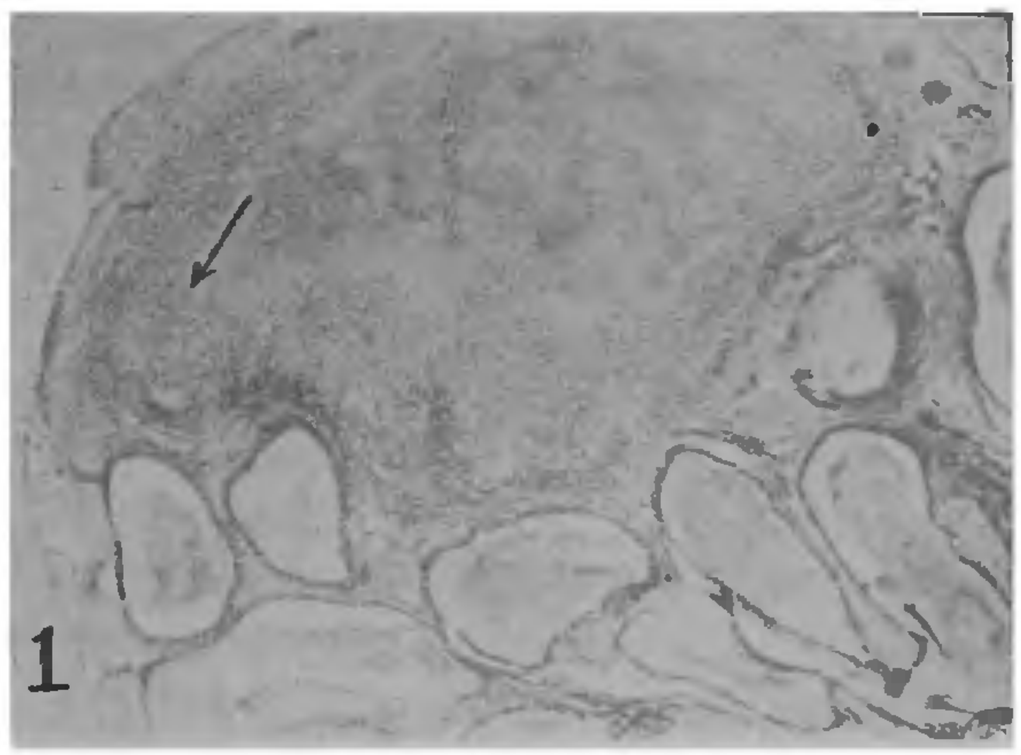

FIG. 1. Showing the sperm retention cyst in the cauda epididymis of rat after *a*-chlorohydrin treatment (Total dose 24 mg). Note the central pool of sperms surrounded by macrophages (→) × 24 HE.

The present investigation points out the possible cause for chemically induced spermatic granuloma formation is, the damage to the epididymal epithelium for the leakage of sperm. The sperm may then become involved with the inflammatory process in the stroma, resulting in the formation of the sperm granuloma. From a practical point of view, spermatic granulomas are important because they stimulate other lesions, particularly tuberculous epididymitis[2].

In the rat, the epididymis is androgen dependent. α-chlorohydrin produces marked inhibition of the accessory sexual structures (seminal vesicle, ventral prostate and levator ani muscles ; Table I) indicating pharmacological action on the androgenic

TABLE I

*Changes in body weight, the weights of testes and accessory sex-organs of adult male rats after oral treatment with α-chlorohydrin**

Group	Treatment	Initial body wt. g	Final body wt. g	Testes wt. (mg)	Seminal vesicle wt. (mg)	Ventral prostate wt. (mg)	Epididymis wt. (mg)	Levator ani muscle wt. (mg)
1.	Control (10)	245 ± 19	252 ± 11	2297 ± 200	735 ± 95	286 ± 20	788 ± 30	128 ± 13
2.	*α-Chlorohydrin* (Total dose 120 mg 24 days) (10)	237 ± 18	215 ± 9	981 ± 78†	309 ± 47†	80 ± 13†	462 ± 14†	64 ± 9†

* 5 mg/day for 24 days.
† P<0·01 compared with controls.

Figures in parentheses represent the number of animals examined, All figures ± S.E.M.

function of the leydig cells. Chronic administration of α-chlorohydrin produce spermatocoe!e[3], which may be important in relation to antifertility of this compound.

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A NOTE ON THE COMPARATIVE STUDY OF FREE AMINO-ACIDS CONTENT BETWEEN WILD SALT TOLERANT RICE AND CULTIVATED RICE VARIETIES

WILD rice (*Orzyza coarctata*) grows profusely on saline marshy area (electrical conductivity above 25 m.mhos/cm) near the institute farm. An attempt has been made to study the physiology of salt tolerance of this wild rice. This note reports free amino-acid content of wild and cultivated rice varieties.

For a comparative study along with the wild rice, a local salt-tolerant rice variety Damodar, and a high yieding rice variety Jaya was selected. Plant samples were collected from young seedlings (33 days old). Free amino-acids were analysed from fresh samples by paper chromatographic method as suggested by Plaisted[1]. Leaf and stem were analysed separately. Free amino-acid content of the rice varieties are given in Table I.

The results show that alanine, serine and glycine, histidine and arginine, and proline content of wild salt-tolerant rice—*Oryza coarctata*—is more as compared to cultivated rice varieties. It is interesting to note that proline content of *Oryza coarctata* is quite high compared tt the other varieties. From comparative rates of proline accumulation in various plant organs Singh *et al.* (1973) postulated that a water deficit or osmotic stress induces proline accumulation in the leaves from where it is translocated to the roots and other plant organs. Stewart *et al.* (1966) suggested that proline may be the major source of energy and nitrogen during immediate post-stress metabolism. From this it can be concluded that possibly proline which accumulates under osmotic stress condition is

TABLE I

A comparative study of free amino-acids content between wild salt-tolerant rice and cultivated rice varieties (in microgram/gram of dry matter)

Name of the Amino-acids	*Oryza coarctata* (wild rice)		Damodar		Jaya	
	Stem	Leaf	Stem	Leaf	Stem	Leaf
Alanine	1,754·20	52·17	983·00	1,855·52	1,426·55	142·47
β-Alanine	156·60	90·33	255·30	109·52	713·24	..
γ-Amino butyric acid	350·80	99·51	105·00	130·00	271·32	..
Aspartic acid	701·40	105·79	367·62	288·92	545·43	36·93
Asperazine	467·60	48·30	192·33	53·27	265·73	..
Glutamic acid	327·40	115·45	784·60	775·63	727·24	50·62
Histidine and arginine	1,204·40	40·09	149·23	60·00	153·88	..
Leucine	134·40	140·09	190·70	139·12	167·83	86·65
Lysine	140·20	55·55	..	35·72	..	..
Methionine and valine	327·40	64·73	184·62	139·10	135·60	67·83
Phenylalanine	32·60	24·63	72·30	32·65	173·42	..
Proline	1,590·60	1,468·59	384·62	76·00	307·65	..
Serine and glycine	1,263·00	169·08	969·24	501·98	951·00	83·28
Threonine	249·00	62·80	184·66	94·23	116·00	..
TOTAL	8,844·60	2,537·31	4,823·22	4,291·66	5,954·89	467·78