

قسم التشريخ والهستولوجيا
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دراسة كمية مورفولوجية على الغده المنوية في الخراف
بعد معاملتها بمادة الزيرانول

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في هذا البحث تم عمل دراسة كمية مورفولوجية وذلك لدراسة تأثير مادة الزيرانول على الغدد المنوية في الخراف غليظة الذيل . قسمت الحيوانات الى ثلاث مجاميع واعتبرت المجموعة الاولى كضابط قياسي ثم زرعت مادة الزيرانول تحت الجلد خلف الأذن في حيوانات المجموعة الثانية والثالثة بثلاث جرعات كل منها ١٢ ملجرام وبين كل جرعة والاخرى أربعون يوما غذيت المجموعتين الاولى والثانية على مخلوط من مواد العلف المركزة الغنية بالبروتين ، بينما غذيت المجموعة الثالثة بمخلوط من مواد العلف منخفض البروتين .

وقد لوحظ من هذه الدراسة أن الغدة المنوية في الخراف غليظة الذيل من النوع الانبوبي الكيس وتبطن هذه الوحدات الافرازية بنوعات من الخلايا خلايا طلائية عمادية وخلايا قاعدية .

وقد اتضح من الدراسة الكمية الوصفية أن مادة الزيرانول أدت الى نقص في ارتفاع الخلايا المبطنة لهذه الغدد وكذلك أدت الى نقص في قطر أنوية هذه الخلايا - مع زيادة كمية النسيج الدعامي .

ومما هو جدير بالذكر أن مادة الزيرانول قد أدت الى نقص في المحتويات البروتينية والكربوهيدراتية والدهنية للخلايا المبطنة لهذه الغدد .

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QUANTITATIVE MORPHOLOGICAL STUDY ON THE SEMINAL GLAND OF LAMBS AFTER ZERANOL IMPLANTATION

(With One Table and 12 Figures)

By

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SUMMARY

The present work was carried out to study the effect of zeranol on the seminal glands of 39 male fat-tailed lambs about 8 months old. The examined animals were classified into three groups. The group I, was considered as control, while group II and III, were implanted subcutaneously in the backside of the ear with 3 doses, each of 12 mg, zeranol at 40-days intervals; Group I and II, were fed on concentrates mixture containing 70.45% starch and 14.42 (high) digestible protein, while that of group III, containing 70.44% starch and 7.92% (low) digestible protein.

The seminal gland of zeranol implanted lambs showed an obvious decrease in weight, and glandular cell height and their nuclear diameter. In addition, zeranol induced a marked morphological signs of decreased cytoplasmic basophilia, lipid content and PAS-positive materials.

INTRODUCTION

Zeranol is a chemically modified derivative of Zearalenone, which was originally isolated from molded corn, (PERRY *et al.*, 1968). Zeranol is a nonsteroid chemical and is classified pharmacologically as a protein anabolic agent (U.S. Food and Drug administration). The name zeranol was adopted in 1968 as the official nonproprietary name by the U.S. Adopted Name Council. In general, the initial work with zeranol indicated that it is a cleaner growth promoter than those exhibiting estrogenic activity (LESPERANCE, 1973). Several investigations have been conducted to ascertain the effect of zeranol upon, the growth and carcass quality of ruminants (SHARP and DYER, 1971; CORAH, 1980 and EL-HOMMOSI, 1982); the growth hormone levels in steers (BORGER *et al.*, 1971); the pituitary gland of lambs (HASSAN *et al.*, 1981); the testicular size and semen quality in bulls (HALL *et al.*, 1977) as well as on the testes of lambs (KAMEL *et al.*, 1983). This study was carried out in the course of an experiment dealing with the performance of fattening fat-tailed lambs implanted with zeranol under various nutritional regimens.

In the present report, a further study on the vesicular glands of zeranol implanted lambs was carried out to establish the effect of zeranol on the reproductive organs in lambs.

MATERIAL and METHODS

The present work was performed at the animal production station, Faculty of Agriculture, Assiut University, Egypt. Thirty nine fat-tailed lambs, aged about eight months and weighing about 50 Kg., were divided into three groups. The animals of group (I) were considered as control, while those of groups (II and III) were implanted subcutaneously at the back-side

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of the ear with three doses each of 12 mg zeranol at 40 days intervals. The lambs of groups I and II were fed on concentrate mixture containing 70.45% starch value and 14.42% (high) digestible protein, while that of the group III containing 70.44% starch value and 7.92% (low) digestible protein. Feeding staffs were adjusted once a week according to the average live body weight of each group. The refusals of feeding staffs were weighed every day and, feed intake was estimated. Final body weight and total gain were recorded for each group. Lambs were kept in the semi-open sheds. At the end of the experiment, three animals of each group representing the average weight of the group were selected and slaughtered. The seminal glands (right and left) were dissected out immediately, weighed and small pieces from each gland were cut and fixed in neutral formalin and Bouin's fluid.

The material fixed in formalin were cut by cryostat at 15 μ m thickness and stained with Sudan Black B for demonstration of fat. The Bouin fixed tissue was dehydrated and embedded in paraffin, then sections at 5 μ m were stained with: Haematoxylin and Eosin, Crossman's trichrome, Bromophenol blue and PAS-Haematoxylin (DRURY and WALLINGTON, 1980). Measurement of cell height and nuclear diameter were counted from 50 microscopic fields randomly selected from each gland at a magnification of 400, using an eye-piece micrometer scale which was calibrated with a stage micrometer to the nearest micron. The obtained data was statistically analysed according to SNEDECOR and COCHRAN (1967).

RESULTS

The seminal glands of the control fat tailed lambs were covered by a thick connective tissue capsule rich in smooth muscle fibers. Outside the capsule a layer of loose connective tissue containing fat cells, blood vessels, nerves and ganglia were demonstrated. Septa bearing the same structure of the capsule divided the gland into a number of lobules. This gland was of tubulo-alveolar type. The end-pieces presented columnar and basal cells. The height of the columnar cells was about 15 μ m (Fig. 1,2). The apical portion of these cells contained coarse PAS positive granules (Fig. 3) as well as dust-like sudanophilic material (Figs. 4 & 5). Also a strong cytoplasmic basophilic reaction was observed within these cells (Fig. 6). The apical border of these columnar cells showed bleb-like cytoplasmic protrusions as an indication of their apocrine mode of secretion (Fig. 2). The nuclei appeared vesicular, round or oval in shape and were situated at the middle portion of the cells. They were about 3.75 μ m in diameter. The basal cells were located between the basal lamina and the columnar epithelium in a fashion that they did not abut on the lumen (Fig. 3). Their cytoplasm were faintly stained and vacuolated. It contained few PAS positive granules and large sudanophilic globules (Fig. 4 & 5). The nuclei were darker in stain and smaller in diameter (2.22 μ m) than those of the columnar cells.

Afer zeranol implantation (G II & III) a marked morphological changes in the glandular epithelium and fibro-muscular tissue of the seminal gland of the lamb could be demonstrated (Table 1). The seminal glands were obviously decreased in weight. The height of the columnar and basal cells as well as their nuclear diameter were significantly decreased (Figs. 7,8 and table 1). No significant changes in the epithelial height and their nuclear diameter were demonstrated between the seminal glands of group II and III. The apocrine activity of the columnar cells were greatly reduced after zeranol implantation (Fig. 7 & 8). Most of the basal cells appeared flattened in shape and containing deeply stained flattened nuclei (Fig. 8). The PAS positive granules, sudanophilic materials and the cytoplasmic basophilia in both the columnar and basal cells were markedly diminished. (Fig. 9, 10, 11 & 12). The interstitial fibromuscular tissue became relatively abundant.

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DISCUSSION

The general morphological features of the seminal glands of the control fat-tailed lambs were similar to those obtained in rams (AITKEN, 1959 and BAYOUMI, 1976), bucks (YAO and EATON, 1954 and SELIM, 1974) and boars (AITKEN, 1960).

The results of the present work indicate that the bleb-like cytoplasmic protrusions of the glandular epithelium are probably great evidence of an apocrine type of secretion. However, WROBEL (1968) denied the apocrine type of secretion in the glandular cells of the seminal glands of the boar and considered that these protrusions and projections are devices to increase the area of exchange between the glandular lumen and secretory epithelium.

In the present investigation, the correlation between structure and function of the examined seminal glands were undertaken tentatively due to the lack of biochemical data.

In zeranol implanted lambs the seminal gland exhibited morphological signs of decreased activities compared with those in the non-implanted animals. It showed an obvious decrease in weight, glandular cell high, nuclear diameter, cytoplasmic basophilia, lipid content and PAS- positive materials. In spite of the growth promoting effect of zeranol implantation (ROSS and BROWN, 1970, SHARP and Dyer, 1970, 1971; LESPERENCE, 1973 and IBRAHIM *et al.*, 1976), some evidences were given by HALL *et al.* (1977), who stated that zeranol implantation delay sexual maturity in immature lambs. In addition, HASSAN *et al.* (1981) concluded that zeranol inhibits both FSH and LH-cellular activities. Furthermore, KAMEL *et al.* (1983) stated that the spermatogenesis and interstitial cells of Leydig were greatly affected and exhibited signs of decreased activity in zeranol implanted lambs. Consequently, it can be suggested that, zeranol implantation may reduce the androgen level which affect the growth and secretory activities of the seminal glands in fat-tailed lambs (NALBANDOVE, 1970 and SALEH *et al.*, 1986).

In conclusion it becomes very obvious from the available data that there is no place for the use of zeranol implants with lambs intended to be employed for breeding purposes.

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Legend Of Figures

- Fig. 1. Section into the seminal glands of the control fat-tailed lamb. (Hx & E. X 160).
- Fig. 2. Higher magnification of the glandular epithelium, showing the bleb-like cytoplasmic protrusions. (Hx. & E. X 400).
- Fig. 3. PAS-positive granules in the columnar and basal cells of the control seminal gland. (PAS & Hx. X 400).
- Fig. 4. Sudanophilic reaction in the control seminal glands. (Frozen section, Sudan B. X 400).
- Fig. 5. Sudanophilic material within the columnar and basal cells. (Frozen section, Sudan B. X 1000).
- Fig. 6. The control seminal glands, showing the Bromophenol blue reaction in the columnar and basal cells. (Bromophenol blue, X 400).
- Fig. 7. Section into the seminal glands of zeranol treated lambs. (Hx. & E. X 160).
- Fig. 8. Section into the seminal glands of zeranol treated lamb, showing the low columnar epithelium without cytoplasmic protrusions and flattened basal cells. (Hx. & E. X 400).

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- Fig. 9. PAS-positive materials in the columnar and basal cells of zeranol treated seminal glands. (PAS & Hx. X 400).
- Fig. 10. The Sudanophilic materials in the columnar and basal cells of zeranol treated seminal glands. (Frozen section, Sudan B. X400).
- Fig. 11. Section into the seminal glands showing the Sudanophilic materials in the columnar and basal cells. (Frozen section. Sudan B. X1000).
- Fig. 12. Section into the seminal glands after zeranol implantation, showing the protein content in the columnar and basal cells. (Bromophenol blue, X 400).

Table (1): Effect of zeranol implantation on the seminal gland of lambs

Group	No. Anim.	Initial b.wt. (Kg)	Final b.wt. (Kg)	Total gain (Kg)	Seminal gl.wt. (gm)	Cytometric and staining properties of the columnar (C) and basal (b) cells		PAS	Sudan	B.	Basophila	Fibro-muscular tissue					
						Cell height Um.	Nucl-diameter Um.										
I	13	28.50 [±] 1.33	52.92 [±] 1.76	24.42	8.31 [±] 0.082	16.01 [±] 0.77	5.312 [±] 0.086	3.75 [±] 0.167	2.22 [±] 0.022	+++	+	+++	+++	+++	+	Thin	
Control																	
II	13	28.58 [±]	54.75 [±]	26.17	5.44 ^b 0.041	8.51 ^b 0.092	4.15 [±] 0.038	3.32 [±] 0.032	2.32 [±] 0.020	++	+	++	+	++	+	Moderate	
High-protein																	
III	13	28.50 [±] 1.03	55.36 [±] 1.29	27.54	5.11 ^b 0.038	7.64 [±] 0.167	3.81 [±] 0.011	3.11 [±] 0.009	1.96 [±] 0.016	+	-	+	+	+	-	Thick	
Low-protein																	

± = S.E.

+++ = abundant

++ = moderate

+ = few

- = trace

b = P < 0.01



