

## GROSS AND MICROSCOPIC ANATOMY OF THYROID GLAND OF ONE-HUMPED CAMEL (*CAMELUS DROMEDARIUS*)

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### ABSTRACT

Tissue samples of thyroid glands of 16 healthy camels (*Camelus dromedarius*) were investigated under two age groups i.e. group A (3-5 years) and group B (6-10 years) with equal number of animals, for their gross and microscopic anatomy. Gross studies revealed that thyroid glands were located near the first ring of trachea and had two lobes, connected by an isthmus. They were of reddish brown in colour. The values of weight, length and width of thyroid glands were  $45.7 \pm 0.35$  and  $50.65 \pm 0.26$  g,  $36 \pm 0.46$  and  $6.36 \pm 0.33$  cm, and  $3.35 \pm 0.29$  and  $3.53 \pm 0.21$  cm in groups A and B, respectively. The diameter of the glands averaged  $0.97 \pm 0.13$  and  $1.05 \pm 0.14$  cm in groups A and B, respectively. Histologically, thyroid gland consisted of a connective tissue capsule and trabeculae were found extending from the capsule into the substance of the gland, which divided it into lobules. Each lobule consisted of two sized follicles in variable numbers, the large and small. The large follicles were lined by low cuboidal epithelium, while the small follicles were lined by high cuboidal to columnar epithelium. The follicles had colloid material in their lumen, probably an apocrine secretion from the lining epithelial cells. The para follicular or C-cells were absent in thyroid glands of camel.

**Key words:** Anatomy, thyroid gland, camel.

### INTRODUCTION

The thyroid is an endocrine gland which secretes thyroglobulin, triiodothyronine and thyroxin hormones (Banks, 1993). Thyroxin plays an important role in metabolism of the animal body. Thyroid gland consists of follicles lined by follicular cells. The interfollicular space has been reported to be filled with connective tissue (Leeson and Leeson, 1970). The most outstanding feature of the vertebrate thyroid gland is its ability to concentrate large amount of iodine for the synthesis of thyroxin (Turner, 1966).

The present study was conducted to investigate the gross and microscopic anatomy of thyroid gland of one humped camel (*Camelus dromedarius*) with the objective to understand the anatomy and physiology of the gland of the native dromedaries of Pakistan.

### MATERIALS AND METHODS

Thyroid glands of 16 healthy camels were collected from the local slaughter house. These organs were divided into two equal groups according to age of the animal i.e. group A (3-5 years) and group B (6-10 years). The gross anatomical features including, weight, width, length and diameter of the glands were taken before preservation. About 4-5mm thick tissue specimens for histology were collected from each organ immediately after gross examination. Specimens were preserved in 10% neutral buffered formalin and processed for light microscopy (Bancroft and Stevens, 1990). Paraffin sections were stained with haematoxyline and eosin and examined under

microscope. The data thus obtained from groups A and B were analyzed by using SAS statistical computer package (Anonymous, 1996).

### RESULTS

#### Gross observations

Gross studies of thyroid gland of camel revealed that the gland was located near the first ring of trachea and consisted of two lobes. An isthmus connected these lobes to each other. The colour of the gland was reddish brown. The values of weight, length, width and diameter in camels of two age groups viz 3-5 and 6-10 years old are presented in Table 1. The statistical analysis revealed non-significant difference in various parameters between the two age groups. However, the values of all the parameters were relatively higher in 6-10 years old camels compared with 3-5 years age group.

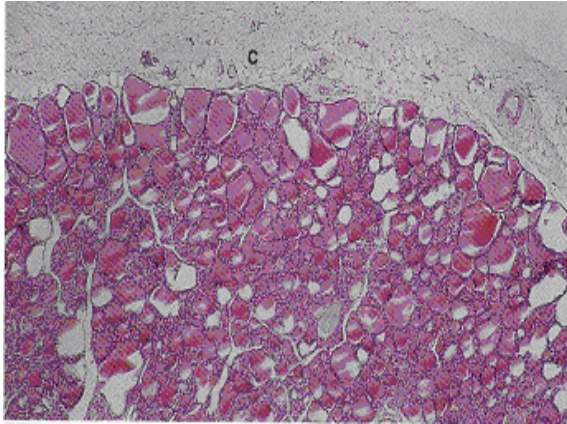
**Table 1: Mean values ( $\pm$  SD) of different parameters in camels of two age groups**

Parameters	Group A	Group B
Weight (g)	$45.70 \pm 0.35$	$50.55 \pm 0.26$
Length (cm)	$5.36 \pm 0.46$	$6.36 \pm 0.33$
Width (cm)	$3.35 \pm 0.29$	$3.53 \pm 0.21$
Diameter (cm)	$0.97 \pm 0.13$	$1.05 \pm 0.14$

Values of all parameters between two groups differ non-significantly.

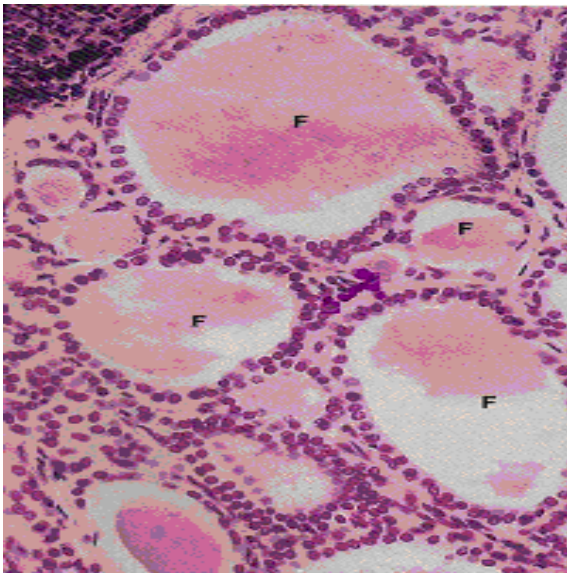
### Histological findings

Histologically, the thyroid gland consisted of a connective tissue capsule composed of coarse and fine collagenous fibers (Fig.1). Fibroblast and small blood vessels were also present in the capsule. The trabeculae were seen extending from the capsule into the substance of the gland and dividing it into lobules. Blood vessels were also present in the connective tissue of the trabeculae.



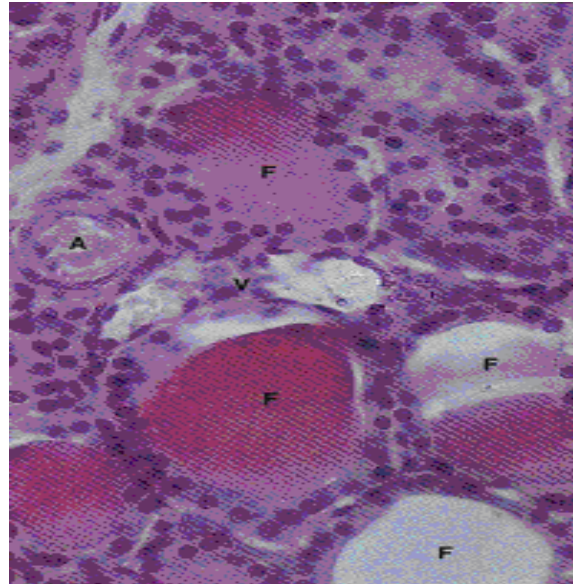
**Fig. 1 :** Photomicrograph of the thyroid gland.  
C: Capsule of the gland

Each lobule consisted of aggregation of follicles. Two types of follicles were identified, large and small (Fig. 2). The large follicles were lined by low cuboidal epithelium having flattened nuclei and were assumed to



**Fig. 2:** Photomicrograph of the thyroid gland.  
Two types of follicles (F) showing colloid within the follicles and the simple cuboidal epithelium that lines the follicles.

be inactive cells. The small follicles were lined by high cuboidal epithelium with rounded nuclei, these were active cells. Each follicle was filled with a gel-like material called colloid (Fig. 3). The colloid is a storage form of follicular epithelial secretion. Para follicular or C-cells were not present in the thyroid gland of camel.



**Fig. 3:** Follicles (F) with colloid of the thyroid gland. A: Arteriole, V: Venule.

### DISCUSSION

Thyroid is an endocrine gland that secretes hormones including thyroglobulin, triiodothyronine and thyroxin. Thyroxin hormone secreted by this gland plays an important role in metabolism of the body (Turner, 1966).

In camels, the location of thyroid gland in the body is similar to other large animals like cattle and buffaloes (Getty *et al.*, 1986) i.e., with the first ring of trachea and consisted of two lobes on both side and an isthmus connecting these lobes. In camel, the gland appeared reddish brown in colour which is in concordance with the findings of Schwartz and Dioli (1992).

The gland was compared between two age groups for parameters like weight, length, width and diameter. Non-significant differences were observed between two age groups i.e., 3-5 and 6-10 years in all these parameters, although there was relevant increase in all parameters with age. The mean mass was 45.7 and 50.55 g in two groups respectively, which was slightly lower than previously reported value of 52.7 gm in camel (Abdel-Wahab and Hamza, 1970). It has been reported that in summer the size of the gland increases (Yagil *et al.*, 1978). The mean diameters recorded in two age groups were 0.97 and 1.05 cm which fell in the range of 0.5 to 1.5 cm in adult camels (Schwartz and Dioli, 1992). The mean length recorded was 5.36 and

6.36 cm, and is in agreement to 3 to 8 cm reported in camel. Similarly, the width of gland recorded was 3.35 and 3.53 cm and is in range between 1 to 4 cm reported earlier in this species (Schwartz and Dioli, 1992).

Histological studies revealed similar results as reported previously in camel (Abdel-Magied *et al.*, 2000; Atoji *et al.*, 1999) i.e. the gland consisted of follicles of variable sizes with smaller lined by low cuboidal to semi squamous epithelium, while the larger ones were lined by high cuboidal to columnar epithelial cells. The parafollicular or C-cells were found missing but has been reported in cattle and buffaloes (Miyandad, 1973). Similar observations have been recorded by Abdel-Magied *et al.* (2000).

Hence, it can be concluded that thyroid gland does not vary considerably in weight, length, width and diameter between 3-5 and 6-10 years old camels.

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