

Histological and Morphological Study of the Uropygial Gland in Gull**(*Larus canus*)****Khalid Ibrahim Abd Al-Khazraji****Histological and Morphological Study of the Uropygial Gland in Gull****(*Larus canus*)****Khalid Ibrahim Abd Al-Khazraji**

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This study has been done in order to investigate the anatomical and histological structures of the uropygial gland in gulls (*Larus canus*). The gland of birds in the present study was examined macroscopically and microscopically. The study revealed that the gland has heart-shaped like, consisted of two lobes joined together at caudal end by isthmus, and one short papillae. The weight of gland was recorded mean of (0.81 ± 0.12 gram), while the means of the length and diameter of right and left lobe were (1.19 ± 0.06 cm, 0.35 ± 0.04 cm and 1.18 ± 0.03 cm, 0.34 ± 0.02 cm) respectively. The gland showed dense connective tissue capsule surrounded the two lobes and the papillae, and each lobe has parenchyma and central cavity. The parenchyma consists of a straight and convoluted secretory tubules separated by tiny trabeculae that increased in thickness toward the lobe center. The epithelial lining of secretory tubules showed four cellular layers; includes the basal, intermediate, secretory and degenerative cells. Three zones in the parenchyma were detected based on the trabecular development, widening of the tubule lumen and the height of epithelial lining. To conclude, the uropygial gland could be classified as exocrine and holocrine type in gull.

Keywords: - Parenchyma, Lobe, tubules, Gull.

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(Larus canus)

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دراسة نسيجية وشكلية للغدة الزمكية في النورس (Larus canus)

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الخلاصة

أجريت هذه الدراسة لغرض الكشف عن التراكيب النسيجية والتشريحية للغدة الزمكية في النورس. وتم خلال الدراسة الحالية فحص الغدة عياناً ومجهرياً. حيث أوضحت الدراسة ان شكل الغدة الزمكية كان يشبه القلب ومكونة من فصين يتحدان مع بعضهما البعض في الطرف الخلفي بواسطة البرزخ، وحلقة قصيرة واحدة. وسجلت الغدة معدل وزن بلغ (0.12 ± 0.81 غرام)، بينما كان معدل طول وقطر الفصين اليمين والأيسر (0.06 ± 1.19 سم، 0.04 ± 0.35 سم و 0.03 ± 1.18 سم، 0.02 ± 0.34 سم) على التوالي. وتبين ان للغدة محفظة مكونة من نسيج ضام كثيف تحيط بكلا الفصين والحلقة، وكل فص يحتوي على متن وتجويف مركزي. واتضح ان المتن يتكون من نبيبات افرازية مستقيمة وملفوفة وهي مفصولة عن بعضها بواسطة طبقة رقيقة من الحويجزات التي تزداد سمكا كلما اقتربنا من مركز الفص. اما الظهارة المبطنة للنبيبات الافرازية فانها تتكون من اربع طبقات من الخلايا وهي طبقات الخلايا القاعدية، والخلايا المتوسطة، الخلايا الافرازية ثم الخلايا المتكسفة. ومن الممكن تقسيم المتن الى ثلاثة مناطق وفقا لتطور الحويجزات وارتفاع الظهارة وسعة تجويف النبيب. الاستنتاج، ان الغدة الزمكية في النورس يمكن تصنيفها ضمن غدد الافراز الخارجي والكلي.

الكلمات المفتاحية - : متن , فص , نبيبات , نورس.

Introduction

Uropygial gland in birds has another names as preen gland, oil gland or oil sack, rump gland, and tail gland. ^[1,2] Its specialized sebaceous gland and may be considered as the only organized integumentary structure of external secretion in most of birds. ^[3] Its thought to be the uropygial gland is analogous to the mammalian sebaceous gland which functions in oil production. ^[4] Secretion of this gland play an important role in a feather maintenance, waterproofing feather, and may be associated with intraspecific communication and defense against the microbial, parasitic agent and predators. ^[5,6,7,8,9] However, in few birds like

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bustard, cassowary and ostrich, this gland may be missing or vestigial.^[10,11] The uropygial gland in various species of birds taken different shape and sizes. In general, it is consist of two lobes and one papillae.^[5] The internal structure of each lobe comprising a central gap to store the secretion of the gland and peripherally tubular section that work on the synthesis of the secretion.^[12,13] The secretion is finally flow through ducts that opens at the top of uropygial papillae.^[14,15] Because of the lack of information on the morphological and histological structures of uropygial gland in *Larus canus* the study was conducted.

Materials and Methods

Thirteen adult Gull (*Larus canus*) of both sexes were collected from various places in Baqubah, Diyala Province, Iraq. The birds were then euthanized after deeply anesthetized using a combination of ketamine and diazepam. The body weight of each bird was estimated by aspiring balance. Eight birds were allocated for anatomical study while five birds used for histological study. Dissection of uropygial glands were begun immediately after the birds were killed. After the gland had been removed from the birds, all anatomical measurements were taken. Sensitive balance used for weight of each gland and the vernier used for measured the external diameter, length of each lobe from the tip of papillae to the cranial end. For histological study uropygial glands were removed and immediately fixed in 10% neutral buffered formalin for 24 hours. The specimens were washed in current water for 6 hours, then dehydrated in ascending graded of alcohol (50%, 60%, 70%, 80%, 90%, 100%), After that cleared in two changes of xylene (2 hours for each change), then soaked in paraffin wax under temperature 56° for infiltration for 3 hours, followed by embedded the specimens in moulds filled with paraffin wax to obtained the blocks. After that, the blocks sectioned at 5 micrometers by rotary microtome, then mounted on glass slide and stained with hematoxylen and eosin.^[16] The anatomical results were analyzed statistically by using Statistical Package for the Social Sciences (SPSS) version 13.00 and all values were represented mean $\pm$ standard error.

Histological and Morphological Study of the Uropygial Gland in Gull**(*Larus canus*)****Khalid Ibrahim Abd Al-Khazraji****Results and Discussion**

The results of the gross examination of uropygial gland of the *Larus canus* proved that the gland lies under the skin dorsally at the base of the tail, above the sacral vertebrae, on the middle line of the trunk and over the levator caudal muscles. These observations were in agreement with ^[17,18] who mentioned that the similar location in other birds as in chickens and osprey. In the present study, the shape of gland appeared heart-shaped like consisted of two lobes, which were dilated at the cranial end and narrowed at the caudal end, and one short papillae (Fig.1). The two lobes were separated from each other cranially and joined at the caudal end by isthmus. In geese, the shape of this gland was V shaped consisted from two large cylindrical lobes ^[19,20], while in owl, the two lobes of uropygial gland were joined for their entire length that gave the gland appearance as one lobe. ^[21] Our results are not in agreement with these reports. The anatomical observations revealed that each lobe of the gland has a large central cavity contain its secretion and the uropygial papillae located dorso-caudally from the gland and the papillae possessed on its top an uropygial tuft of downy feather type that surrounding the two opening of the excretory ducts. Similar finding of the number of opening was observed by ^[19] in geese. In the other hand, ^[21] who found that in the few birds more than two opening at uropygial papillae as in pelecaniformes, and one opening as in hoopoe. Furthermore, ^[22] who referred to that in mask duck, the papillae of gland was free from uropygial tuft. The present study shown that the total body weight was ranged between 381- 553 gram (mean 467.4 ± 13.25 gram), while the weight of the gland recorded mean of (0.81 ± 0.12 gram). The uropygial index (relative percentage the weight of gland to the total body weight) in our study was 0.17%. In other study, ^[21] found that the uropygial index in little grebe was 0.61%, and in fruit pigeons was 0.02%. The results of gland measurements in the present study showed that the means of the length and diameter of right and left lobe were (1.19 ± 0.06 cm, 0.35 ± 0.04 cm and 1.18 ± 0.03 cm, 0.34 ± 0.02 cm) respectively. There was no significant variation appeared at level ($P < 0.05$) between the right and left lobe in their lengths and diameters. The histological examination revealed that the gland bounded by a capsule formed from dense connective tissue and a number of blood

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vessels disseminated throughout (Fig.2). Thin branches of connective tissue capsule extends ventrally down between the secretory tubules forming trabecular septa that increased in thickness toward the lobe center. In study on moorhen, ^[23] who reported that the component of gland capsule was free of muscle fibers. Our study also not detected smooth muscle in capsule of gland. The present study showed that the gland parenchyma in each lobe composed of secretory tubules which were straight at periphery and convoluted near the lobe center and somewhat branched and joined again (Fig.3). These results are not in agreement with Al-Mehdawi ^[24] who mentioned that the uropygial gland in broiler was divided into secretory lobules and the secretory tubule ends by alveoli. The epithelium that lining the secretory tubules showed four cellular layers, a germinative or basal layer composed of one row of flat or cuboidal cells with nucleus dark, an intermediate layer consisted of 1-3 rows of spherical cells, secretory layer formed of 2-5 rows of polygonal cells with eccentric nuclei and cytoplasm contain secretory oil granules, and degenerative cell layer of cells that are a close to the tubule lumen with pyknotic or disappear nuclei (Fig.4). Three zones of secretory tubules were identified in the gland parenchyma from the outside to the near of lobe center based on height of epithelial lining, widening of the tubule lumen, amount of secretion and the develop of trabecular between them (Fig.4). In zone 1, the epithelium was thick, not clear lumen and thin trabeculae (Fig.4). In zone 2, the epithelium was thinner than in first zone, the lumen of secretory tubules was small and sometime filled with degenerative cells or little of fat droplets, and the trabecular was thicker in compare with first zone (Fig.5). In zone 3, the epithelial lining was very thin, wider lumen that filled with sebaceous secretion mixed with degenerative cells and the trabeculae that separated the secretory tubules from each other appeared well developed and thicken (Fig.6). In other study by ^[25] who divided the gland parenchyma into 2 zones, sebaceous zone and glycogen zone, according to the type of secretory product. We conclude that the type of uropygial gland in gull could be exocrine and holocrine gland.

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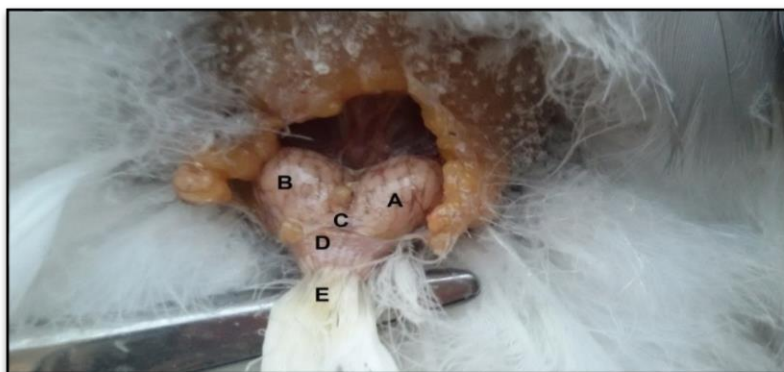


Fig.1: Macroscopically image of the uropygial gland showed: A. right lobe, B. left lobe, C. isthmus, D. papillae, E. uropygial tuft.

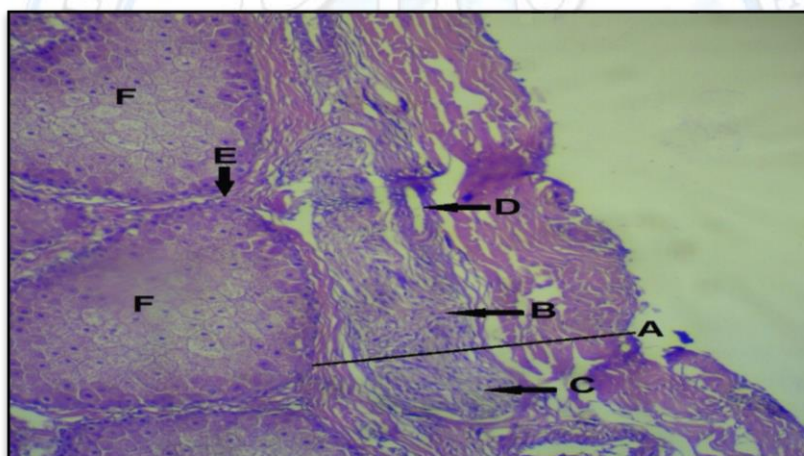


Fig. 2: Microscopically section illustrates the capsule of uropygial gland showed: A. connective tissue, B. collagen fiber bundles, C. fibroblast, D. blood vessel , E. thin trabeculae, F. secretory tubules. (H& E stain, X 400).

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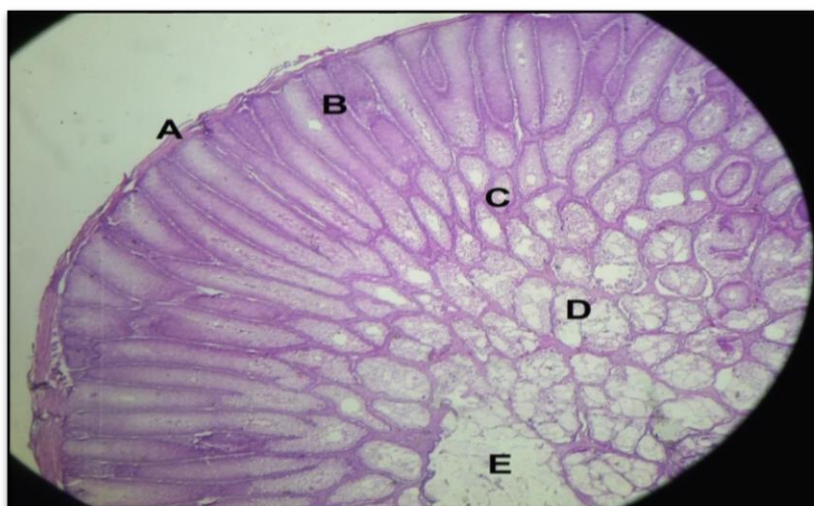


Fig. 3: Microscopically section illustrates the histological structure of uropygial gland and showed: A. capsule, B. secretory tubules in first zone of parenchyma, C. secretory tubules in second zone, D. secretory tubules in third zone, E. central cavity. (H& E stain, X 50).

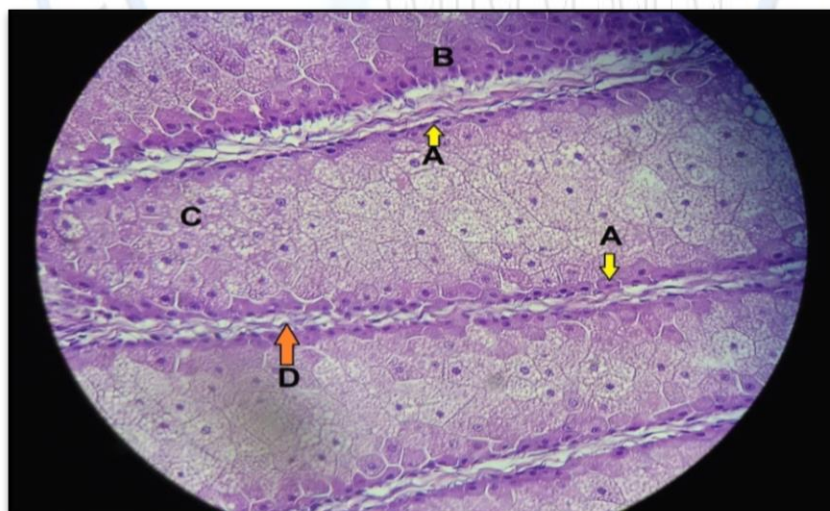


Fig. 4: Microscopically section illustrates the secretory tubules in first zone. A. basal cells, B. intermediate cells, C. secretory cells, D. trabeculae between the secretory tubules. (H& E stain, X 400).

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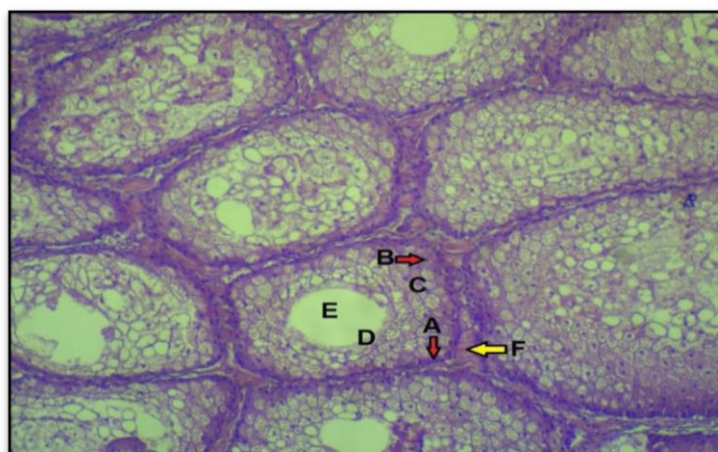


Fig. 5: Microscopically section illustrates the secretory tubules in second zone. A . basal cells, B. intermediate cells, C. secretory cells, D. degenerative cells, E. small lumen of tubule, F. thick trabeculae. (H& E stain, X 400).

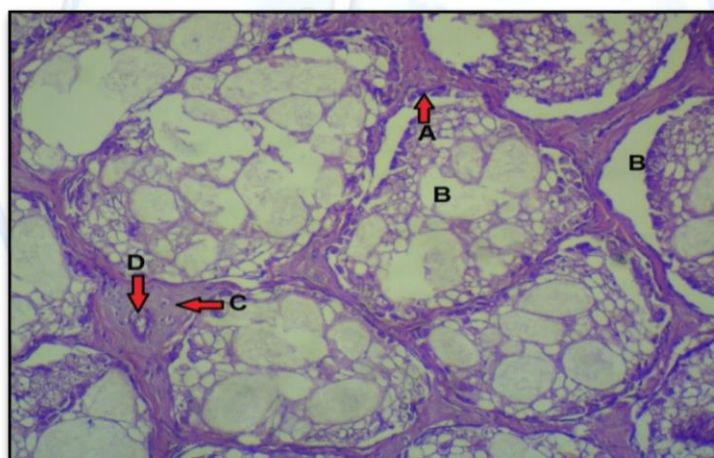


Fig. 6: Microscopically section illustrates the secretory tubules in third zone. A. thin epithelial lining, B. large lumen filled with sebaceous secretion with degenerative cells, C. well-developed trabeculae, D. blood vessel. (H& E stain, X 400).

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