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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

Histological Study of European Starling Uropygial Gland (*Sturnus vulgaris*)

Alaa H. Sadoon

Department of Anatomy, College of Veterinary Medicine, Basrah University, Basrah, Iraq

Abstract: Thirty healthy starling obtained to describe the histological structures of uropygial glands. The gland lies on base of tail over the pyostyle muscle and surrounded by a thin capsule consist of dense connective tissue and devoid by smooth muscle. The glands parenchyma composed of a large number of secretary tubules that filled with fat droplets, the tubules radiate out from the center and end blindly at the capsule of the glands.

Key words: European starling, uropygial glands, secretary layer

INTRODUCTION

European Starling (*Sturnus vulgaris*) birds is resident in southern and western Europe and south western Asia. Starling birds are characterized by black skinny, glossed purple or green and spangled with white, particularly strongly so in winter. Adult male starling are less spotted below than adult females (Higgins *et al.*, 2006) (Fig. 1).

The uropygial glands of birds otherwise known as the oil gland, preen gland or rump gland has been the subject of much discussion and investigation. It is considered as the only organized tegumentary structure of external secretion typical of birds, it is always found in embryonic stages, while in adult of some species it may be vestigial or absent (Montalti and Salinian 2000). It is a bilobate sebaceous organ variable in shape and size (Lacus and Stettenheim, 1972) located dorsally between the fourth caudal vertebrae and the pygostile (Johnston, 1988). It is holocrine gland enclosed in a connective tissue capsule made up of glandular acini that deposit their oil secretion into a common collector tube ending in a variable number of pores, most usually two. Each lobe has a central cavity that collects the secretion from tubules arranged radially around the cavity. The gland secretion is conveyed to the surface via duct that in most species open at the top of papillae (Salibian and Montlti, 2009). The secretion of gland protect the feathers flexibility and act as antimicrobial agent inhibiting the growth of feather-degrading bacteria (Shawkey *et al.*, 2003).

The histology of the gland has been examined in a reduced number of species. It appears that the histological organization corresponds of a sebaceous glands (Wagner and Brood, 1975). The tubular epithelium is made up of four well defined layers A: a germinative layer were cell division occurs and consisting of one or two strata of flat or cuboidal cells with a basophilic cytoplasm and dark nucleus, B: an intermediate layer consisting of 1-5 strata of polygonal cells with a basophilic cytoplasm, C: a secretary layer

formed by 1-10 layers of voluminous polygonal cells with secretary granules and D: a degenerative layer characterized by cells with pycnotic nuclei and keratohyalin granules in the cytoplasm (Montalti *et al.*, 2001).

The present study was conducted due to the lack of information about the histology of uropygial glands in starling birds.

MATERIALS AND METHODS

Thirty adult Starling (*Sturnus vulgaris*) 200-250 gram weights of both sexes collected from the local market of Basrah city, Iraq, the birds was devoid from clinical disease. The birds then killed and the complete anatomy of birds done, by removing skin and muscle, after that the glands removed from birds and washed in waters and immediately fixed in 10% natural formalin for 24 h.

The specimens then washed in running water and dehydrates by series of alcohol, cleared in xylol and embedded in paraffin wax. After that histological slides worked and staining with hematoxylin and eosin for microscopic examination (Luna, 1968).

RESULTS AND DISCUSSION

The uropygial glands of starling birds have two lobes lies on the base of tails over the pygostyle muscle.

Histological studies of glands reveals that it surrounded by capsule consist of the dense connective tissue composed from irregular collagen fibers (Fig. 2) this differ with (Daaj, 2009) that found capsule of uropygial glands of local turkey consist of the dense collagen fibers and elastic fibers intermingled with it.

Also the starling capsule devoid from muscle fibers. This result is in agreement with Hou, 1928 in goose, Sawad (2006) in moorhen who reported that the uropygial glands capsule don't have muscle, but differ with Daaj (2009) and Getty (1975) were reported that the capsule of uropygial glands have smooth muscle mingled with collagen fibers.



Fig. 1: The European starling *Sturnus vulgaris*

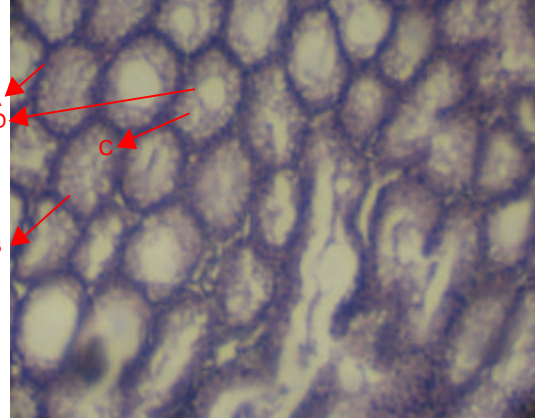


Fig. 4: Tubular epithelial cells layers A - germinative layer, B - Intermediate layer, C - Secretory layer, D - Degenerative layer

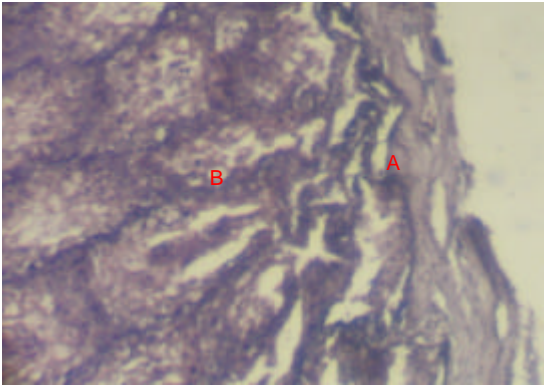


Fig. 2: Capsule of glands (A) surrounding secretory tubules (B)

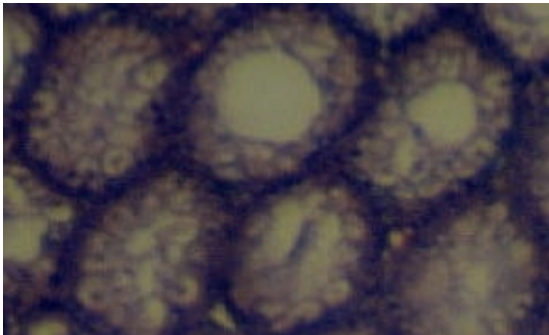


Fig. 3: Secretory tubules of glands filled with fat droplets

The parenchyma of the glands composed from large numbers of secretory tubules that filled with fat droplets and ducts, the secretion passes through the ducts to opening of glands (Fig. 3).

The tubules radiate out from the center and end blindly at the capsule of the gland (Fig. 2). This result is in agreement with Hodeges (1984) in fowl, King and McLelland (1984), Menon *et al.* (1981) in avian, Sawad (2006) in moorhen, Salibian and Montlti (2009) in avian. The secretory tubules consisted of four layers of cells.

Basal layer or germinative layer consisted of one or two strata of flat or cuboidal cells with basophilic cytoplasm and dark nucleus, an intermediate thin layer of polygonal cell with a basophilic cytoplasm, secretory layer composed of (1-4) row of polygonal cell with secretory granules and the degenerative layer characterized by cells with pyknotic nucleus (Fig. 4).

These result were similar with Sawad (2006) but differ it that intermediate layer are thin and secretory layer composed from (1-4) layers. Also this result is in agreement with Harem *et al.* (2010) in osprey birds (*Pandion haliaetus*) that divided the cells into four layers and shows that intermediate cells in Osprey were few in number while secretory layer consisted of 2-4 strata but differ that he determine degenerative cells consisted of 2-3 strata indicating a high level of lipogenesis.

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