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Postnatal Changes in Epithelial Lining of Follicles in Thyroid Gland of Pati Ducks (Anas Platyrhynchos Domesticus) Of Assam at Different Age Groups

[1]Snehangsu Sinha, [2]Munmun Sarma and [3]K.B.Dev Choudhury
Department of Veterinary Anatomy & Histology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781022, India

Abstract: *The study was conducted on 42 number of Assam Pati ducks divided into 7 groups to study the histomorphological characteristics of thyroid glands from day-old to 40 weeks of age. The thyroid glands were collected from 6 birds in each group. The material was fixed and processed for histological studies. The microscopic structure of thyroid glands of Pati ducks revealed primarily the capsule enclosing the follicles that contained colloid. The capsule was made up of collagen and reticular fibers with scanty elastic fibers. The interfollicular space was narrow and consisted of fine collagen and reticular fibers that extended from the capsule. The interfollicular space was relatively devoid of elastic fibers. The nerves fibers were present in all age groups. Parenchyma of thyroid gland was composed of follicles. A homogenous translucent colloidal mass filled the thyroid follicles in all age groups. Follicles were lined by single layer of epithelial cells. Therefore, based on the type of epithelium and nature of colloid, the follicles were categorized as active follicles and inactive follicles. The active follicles were lined by simple cuboidal epithelium, while the inactive follicles were lined by simple squamous epithelium. The epithelial height of the active follicles increased up to eighth week. The epithelial height of inactive follicles showed a decreasing trend.*

Key Words: *Epithelium, Thyroid, Follicles, Pati ducks.*

I. Introduction

The 'Pati' duck population constitutes a major indigenous non-descript duck variety in Assam. Pati ducks have been playing vital role in rural economy of Assam. The thyroid gland is a unique endocrine gland which plays an important role in maintaining general metabolic rate and controlling pre and post natal growth and differentiation of many organ systems. Epithelial lining indicates the activity of the thyroid gland. As the work on epithelial lining is lacking in Pati ducks of Assam, a comprehensive study was taken up to document the changes in epithelial lining height of follicles in thyroid gland at various age groups.

II. Materials And Methods

For histological and micrometrical study thyroid gland samples were collected from different age group of Pati ducks. The tissue samples were fixed in 10% neutral buffered formalin and standard procedures were adopted for histomorphological studies. Different micrometrical parameters were recorded on Hematoxylin and eosin stained sections by means of standard method of micrometry using Nikon E 200 camera mounted microscope and Image Pro Express Ver-2.0 Software.

III. Results And Discussion

The paired thyroid glands in the Pati ducks were located on either side of the trachea close to the vascular angle formed by the subclavian artery and common carotid artery. The microscopic structure of thyroid glands of Pati ducks revealed primarily the capsule enclosing the follicles that contained colloid. The capsule was made up of collagen and reticular fibers with scanty elastic fibers. Parenchyma of thyroid gland was composed of follicles. The follicles were closely packed together and their shape varied from oval to polyhedral in all the age groups. Follicles were lined by single layer of epithelial cells and type of epithelium depends upon their functional status. Therefore, based on the type of epithelium and nature of colloid, the follicles were categorized as active follicles and inactive follicles (Fig1.). The active follicles increased upto 8 weeks of age and then a gradual decrease was seen until the end of the study. The inactive follicles increased with the advancement of age. This might be related with the activity of the thyroid gland with advancement of age. The active follicles were lined by simple cuboidal epithelium, while the inactive follicles were lined by simple squamous epithelium (Fig: 2) which was similar to the findings of Hodges (1974) in fowl, Enura et al. (1977), Wight and Shannon (1985) in quail). Mean epithelial height of active follicle was 9.3316 ± 0.0054 µm and that of inactive follicle was 1.5100 ± 0.0051 µm in day old ducklings. Micrometrical values of lining epithelium of active and inactive follicles are given in table 1. The epithelial height of the active follicles increased up to

eighth week. From eighth week onwards, there was a gradual decrease in the mean epithelial height up to 40 weeks. The epithelial height of inactive follicles showed a decreasing trend from day old ducklings to 40 weeks adult ducks but the epithelial height in 2 weeks and 4 weeks old ducks were similar. Increase in the height of the epithelium in the thyroid follicles in Pati ducks indicated the higher secretory activity and low epithelial height might be due to poor activity of the thyroid gland in accordance to George and Naik (1964) in Starling. The diversity in the type of epithelium as well as the shape and size of the follicles observed in the present study might be related to the functional activities of the thyroid follicles. The change in the follicular epithelium due to aging might be attributed to two factors as reported by Balasundaram (1995) in domestic fowl. Firstly, the mechanical pressure caused the distension of follicles and secondly, the altered density of basement membrane and increased collagen fibers acted as a barrier in the way of exchange between the plasma and epithelium.

Table 1: Height Of Lining Epithelium Of Active And Inactive Follicles At Different Ages In Pati Ducks

Age groups	Epithelial height of active follicles (µm)	Epithelial height of inactive follicles (µm)
Day old	9.331 ± 0.005^{d}	1.510 ± 0.005^{a}
2 weeks	9.341 ± 0.009^{d}	1.480 ± 0.002^{b}
4 weeks	16.001 ± 0.001^{a}	1.480 ± 0.002^{b}
8 weeks	16.003 ± 0.002^{a}	1.478 ± 0.004^{b}
20 weeks	15.315 ± 0.003^{b}	1.406 ± 0.002^{c}
30 weeks	15.003 ± 0.002^{c}	1.385 ± 0.002^{d}
40 weeks	15.000 ± 0.000^{c}	1.355 ± 0.002^{e}

Means with different superscripts are significantly different from each other ($P<0.0001$).

IV. Conclusion

The present study confirmed that the state of thyroid gland activity will change the epithelial lining of the follicles. The epithelium was cuboidal during high activity and squamous type when the gland was inactive.

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Fig 1: Photomicrograph showing thyroid in 20 weeks old Pati duck with active follicles (AF) and inactive follicles (IF). H&E, X10.

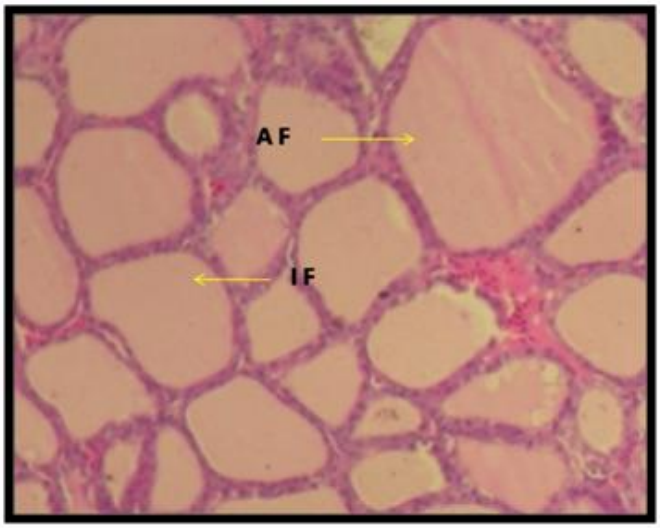

Fig 2: Photomicrograph showing active follicles (AF) lined by cuboidal epithelium and inactive follicles (IF) lined by simple squamous epithelium (SQ) in 30 weeks old Pati duck. H&E, X40.