

HISTOLOGY AND HISTOCHEMISTRY OF THE DUCTULAR AND STROMAL COMPONENTS OF THE POST HATCH EXOCRINE PANCREAS OF JAPANESE QUAIL (*Coturnix coturnix japonica*)

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The avian pancreas like that of other vertebrates combine both exocrine and endocrine portions. The exocrine component is of the tubulo-acinar type with ducts of varying orders in the interspaces of the lobes and lobules. Perusal of the available literature revealed that not much work has been done on the microarchitecture and histochemistry of the ductular and stromal components of the exocrine pancreas of the Japanese quail. Hence an attempt has been made to bring to light the histological components and histochemical features of the ductular and stromal components of the post hatch pancreas of the Japanese quail.

Materials and Methods

Sixty post hatch Japanese quails of day old to twenty eight weeks of age, procured from Poultry Research Station, Teynampet, Chennai were used for this study. Pancreas from the splenic, dorsal, ventral and third lobe were collected in 10% Neutral buffered formalin, Bouin's fluid and Chilled formal calcium (4°C). Sections of 5-6 mm thickness were obtained after routine paraffin embedding for histological and histochemical studies.

Harri's haematoxylin, Masson's trichrome, Mallory's PTAH and Alcian blue-PAS methods

were followed to record the following observations and inferences.

Results and Discussion

The post hatch pancreas of Japanese quail revealed a very thin connective tissue capsule constituted mainly of collagenous fibres which extended into the parenchyma to form lobes and lobules. Fine strands of connective tissue were seen to extend from the stroma to get associated with the acinar units and the smaller ducts as in mammals. The supporting frame work of the ductular system made up of fibroelastic and reticular tissue were found to traverse the parenchyma to encapsulate the acini and some of the islets in all the age groups of the Japanese quail studied as reported in vertebrates (Banks, 1993).

The ducts found within the lobules were small, lined by a single layer of cubical cells and had a limiting collagenous layer outside (Fig. 1), as in chicken (Hodges, 1974), duck (Das and Biswal, 1967) and birds (Stinson and Calhoun, 1993). In some of the lobules, these ducts contained a homogenous material (Fig.1)



Fig. 1 Photomicrograph of the ventral lobe of a day old Japanese quail showing intralobular duct. (H & E x 500) Ct-Connective tissue; Id-Intralobular duct.

as in duck (Das and Biswal, 1967), indicating the functional status of the particular region of the pancreas.

The interlobular ducts, the ducts of the next order, were lined by a low columnar epithelium. Their thicker wall contained reticular fibres in addition to the collagenous fibres. The ducts of the interlobar spaces were the largest among the collecting ducts and the epithelium was formed by columnar and goblet cells. Presence of mucosal folds was a regular feature in the ducts of this order. In addition to connective tissue components their wall revealed the presence of smooth muscle fibres also. The above findings agree in toto with the findings of Hodges (1974) in chicken, Das and Biswal (1967) in duck and King and McLelland (1979) in fowl and eagle.

The main excretory ducts were lined by tall columnar cells and their thickest wall revealed an inner circular and outer longitudinal layer of smooth muscle fibres. A thick layer of adventitia limited their outline similar to fowl (Hodges, 1974), eagle (King and McLelland, 1979), and other mammals of higher order (Banks, 1993).

The lining epithelium of all the ducts, immaterial of their size, calibre and position was PAS-positive indicating the presence of glycogen as reported in human (Conklin, 1974). Positiveness for Alcian blue as described by Bancroft and Stevens (1996) in mammals could not be observed in the present study (Fig 2).

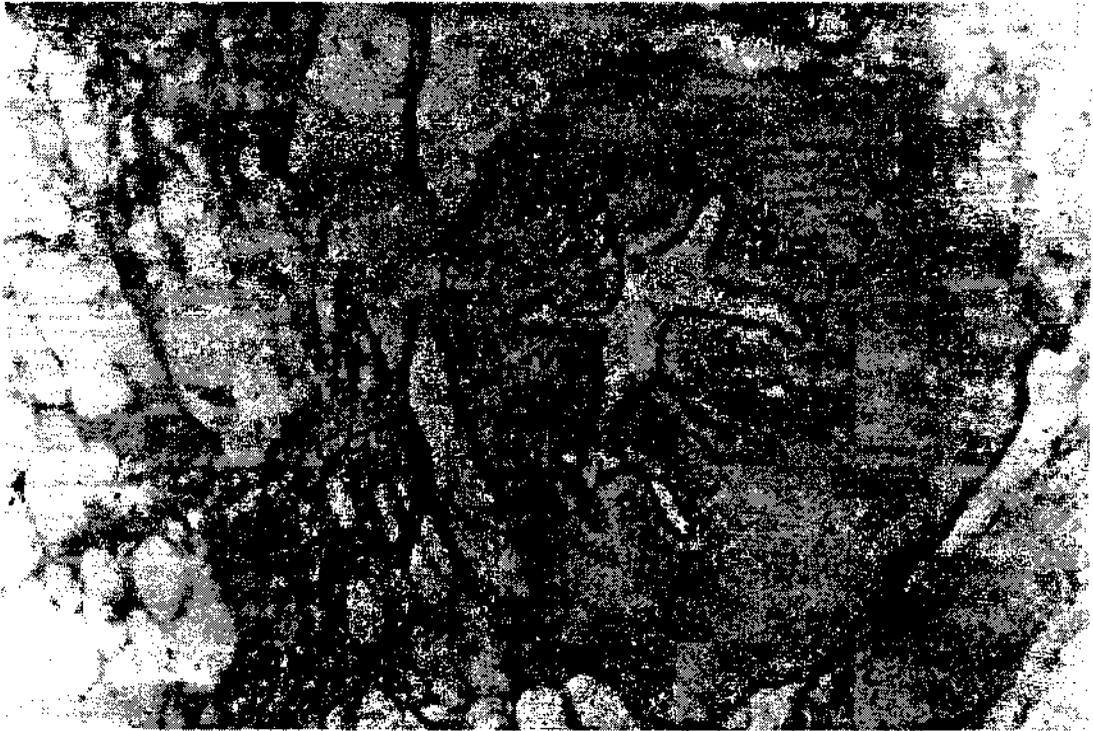


Fig. 2 Photomicrograph of the interlobular duct of a twelve week old Japanese quail showing PAS-positive columnar epithelium (arrow) (Alcian blue-PAS x 250) Ct-Connective tissue.

Summary

The interspaces of the lobes and lobules of the exocrine pancreas of the Japanese quail harboured different orders of ducts covered by varied amounts of connective tissue. The lining epithelium of the ducts ranged from cubical to columnar type and was positive to PAS.

References

- Bancroft, J.D. and Stevens, A. 1996. *Theory and Practice of Histological techniques*. 4th Ed., Churchill Livingstone, Edinburgh, London
- Banks, W.J. 1993. *Applied Veterinary Histology*, 3rd Ed. Williams and Wilkins Company, Baltimore. pp: 195-197.
- Conklin, J.M. 1974. Cytogenesis of the Human Fetal Pancreas. *Am. J. of Anat.*, 111(2): 181-196
- Das, L.N. and Biswal, G. 1967. Microanatomy of Intestine, Pancreas and Liver of the Domestic duck (*Anas boscas*). *Indian Vet. J.* 44(9): 763-766
- Hodges, R.D. 1974. *The Histology of the Fowl*. Academic Press, London. pp:101-108
- King, A.S. and Mc Lelland, J. 1979. *Form and Function in birds vol. I*. Academic Press, London. pp:151-155,
- Stinson, A.W. and Lois Calhoun, M.1993. "Digestive System" in *Text Book of Veterinary Histology*. 4th Ed. H. Dieter Dellmann. Lea and Febiger, Philadelphia. pp:191-193.