

Histological Studies on Pancreas of Goose (*Anser Albifrons*)

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Received: 25 October 2010, Accepted: 4 January 2011

Abstract

Histological and histochemical studies on the pancreas of goose (*Anser albifrons*) were carried out using special staining and light microscope. The pancreas in goose is serous tubuloacinar gland having exocrine and endocrine part. Smooth muscle fibres were absent in capsule of pancreas. Acinar cells have bizonal shape. Intralobular ducts, Interlobular and main excretory ducts were present within parenchyma. The intralobular ducts were lined with a simple cuboidal epithelium reach interlobular ducts lined with low columnar epithelium. The main excretory ducts were lined by simple to stratified columnar epithelium. The glands inside the connective tissue of the ducts and basophilic staining on the apical surface of pancreatic duct system were found from the interlobular ducts to the main excretory ducts. The endocrine part was consisted of various shapes and sizes of alpha and beta islets. Mixed islets were not observed in the goose pancreas. Parasympathetic ganglia were observed in the exocrine pancreas. No significant differences were noted between males and females.

Key words: Histology, Pancreas, Goose

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Introduction

The avian pancreas is located on the right side of the abdominal cavity in all birds. It is tightly bound by mesentery and blood vessels positioned between the descending and the ascending duodenal loops.¹ It is a vital glandular organ in the digestive system. The secretion of exocrine part contains many essential enzymes and many electrolytes.² The endocrine part is responsible for the control of blood sugar concentration and consist of isolated groups of pale staining cells that are called islets of Langerhans.³ In spite of scattered histological investigations on duct system of pancreas by Gulmez⁴ and distribution of endocrine cells by Gulmez *et al.*, in goose,⁵ no information is yet available on histomorphological details of goose pancreas. Therefore, the present study was undertaken.

Materials and Methods

The experiment was conducted on six pairs of geese (*Anser albifrons*) of both sexes (3 sexes each) with an age ranging from 26-30 weeks. Tissue pieces of 1 cm thickness were fixed in 10 % buffered formalin solution and Bouin's fluid. The pancreas segments were embedded in paraffin and the sections were stained with H&E, Gomori's method for reticulum, Verhoeff method for elastin, Masson's trichrome and Maldonado's method for pancreatic islet cells.⁶

Results

The pancreas of goose was covered with a thin connective tissue which consisted of collagenous, elastic and reticular fibres (Fig. 1) and was lined by mesothelium. Reticular and collagen fibres were seen in the interlobular, as well as interacinar connective tissue. A few elastic fibres were encountered in interlobular connective tissue and fibrous components

of duct system. Moreover, a few reticular fibres were seen within pancreatic islets. Smooth muscle fibres were absent in capsule. Parasympathetic ganglia with nerve bundles were observed in the exocrine pancreas (Fig. 2).

The parenchyma consisted of exocrine and endocrine parts and was located in the meshwork of reticular fibres. The exocrine part was arranged in form of serous tubuloacinar glands and occupied a larger area of pancreas (Fig. 3). Contractile myoepithelial cells were absent.

The secretory acini consisted of a variable number of pyramidal cells having basophilic base and numerous apical acidophilic zymogen granules (Fig. 3). Their shape varied from triangular to tall columnar basing on the plane of section. Moreover, small centroacinar cells without granules (Fig. 3) were observed in the central lumen as the beginning cells of the intercalated ducts. The intralobular ducts (Fig. 4) were lined with a simple cuboidal epithelium reach interlobular ducts lined with low columnar epithelium. The connective tissue layers surrounding the epithelium in intralobular ducts were thinner than interlobular ducts. The main excretory ducts were lined by simple to stratified columnar epithelium. These ducts have inner longitudinal and outer circular muscle layers surrounded by the externally connective tissue (Fig. 5). Furthermore, the glands inside the connective tissue of the ducts and basophilic staining on the apical surface of pancreatic duct system were seen from the interlobular to the main excretory ducts (Fig. 5).

Lymphoid aggregations were encountered adjacent to the islets, ducts and blood vessels in parenchyma (Fig. 6).

The endocrine part, which was consisted of various shapes and sizes of alpha and beta islets, scattered in the exocrine part. Mixed islets were not observed in the goose pancreas. The alpha islets were larger than the beta and had no distinct

borders with the exocrine part. The beta islets were delineated from surrounding secretory acini by delicate collagenous fibres, also there were few fibres within islets tissue (Fig. 6). There was no significant difference in parenchymal and stromal structures of pancreas between males and females.

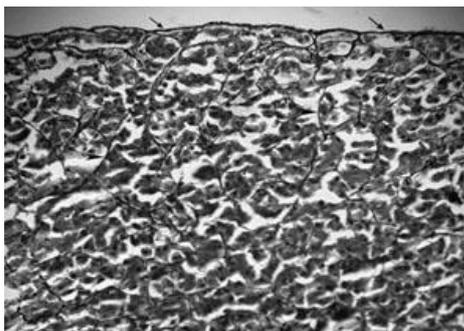


Fig 1. Reticular fibres in capsule (arrows) and interacinar connective tissue (arrow heads). Gomori's method for reticulum, 400×

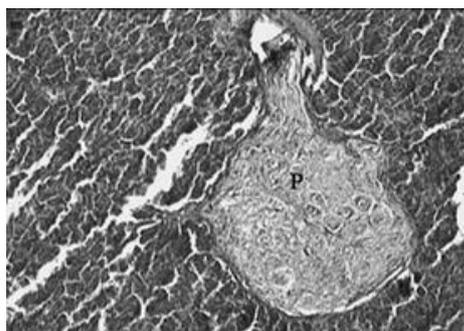


Fig 2. Parasympathetic ganglia (P) in the exocrine pancreas. Maldonado's method for pancreatic islet cells, 163×

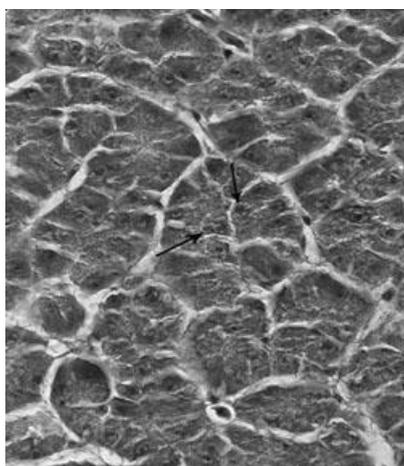


Fig 3. Centro-acinar cells (arrows) and bizonal character of acinar cells. H & E, 1000×



Fig 4. Intralobular duct (D). Masson's trichrome, 400×

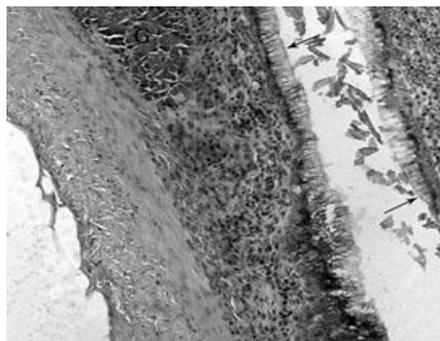


Fig 5. Basophil staining on the apical surface of epithelium (arrows) and glands (G) in the main excretory duct. H & E, 400×

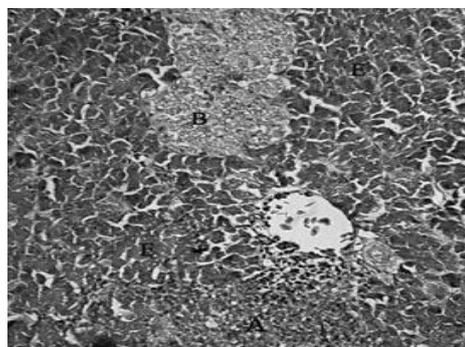


Fig 6. Exocrine (E) and endocrine pancreas (alpha (A) and beta islet (B)). H & E, 400×

Discussion

The capsule of pancreas was made up of collagen, elastic and reticular fibres which correlate to the findings of Das *et al.*, in duck.⁷ Furthermore, it has not any role in secretion of pancreatic juice in goose. Parasympathetic ganglia with nerve bundles observed in the exocrine pancreas were similar to those of duck.⁷

Lymphoid aggregations were encountered adjacent to the islets, ducts and blood vessels in parenchyma which

was similar to the findings of Das *et al.*, in duck.⁷

The structure of the goose exocrine glands found in the current study agrees with the results of previous studies.^{4, 7-11} In fact, the avian pancreas was mainly composed of exocrine glands (about 99 %).^{4, 7, 10, 11} Shape of secretory acini varied from triangular to tall columnar basing on the plane of section as reported in duck,⁷ and columnar in fowl¹² and goose⁴ and polygonal in duck.¹³

The bizonal character of acinar cells could be attributed to the presence of mitochondria and zymogen granules in basal and apical portion, respectively.^{7, 13} The centroacinar cells were observed in the central lumen of the acinus. This finding is in agreement with the results of previous studies.^{4, 7} The structure of the ducts in the goose pancreas was found to be similar to that described in previous studies.^{4, 9, 14} The basophilic staining on the apical surface of the interlobular ducts to the main excretory ducts indicates possible secreting functions of those tissues.⁴

In the present study, we found that the main excretory ducts were lined by simple to stratified columnar epithelium. Thus, with the exception of this finding, our results on the goose pancreas were in agreement with those of previous studies.⁴

The exact border between the endocrine part and endocrine part was not always distinguished in the goose pancreas which was similar to the findings of Hellerstrom in duck,¹⁵ and Gulmez *et al.*, in goose.⁵

The avian pancreas is divided into light, dark and mixed islets.^{7, 15, 16} However, in the present study, mixed islets were not noticed in the goose pancreas. This finding is in agreement with the results of Gulmez *et al.*,⁵ The beta islets were delineated from surrounding secretory acini by delicate collagenous fibres which was similar to the findings of Gulmez *et al.*,⁵

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