Histomorphology of Pancreas in Goats

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Abstract
The pancreas as whole was collected from the fresh carcass of goat slaughtered in Namakkal. The complete pancreas was separated from the surrounding organs by careful blunt dissection and washed with normal saline and fixed in Neutral buffered formalin (NBF). The exocrine portion consisted of numerous dark-staining acini composed of tubular and spherical masses of cells, which were the subunits of the lobule. The endocrine part of pancreas appeared as lightly stained clusters of cells among the darkly stained acini. All the islets of Langerhans were surrounded by sparse collagen and reticulin fibres.

Keywords: Histomorphology, Pancreas, Goats

Introduction
Pancreas of mammals is a unique gland as it consists of both exocrine and endocrine portions. The exocrine portion of pancreas which contributes 95% of pancreatic mass, secretes digestive enzymes into the duodenum and it includes acinar and duct cells with associated connective tissue, vessels and nerves. The endocrine portion of pancreas contributes 1-2% of pancreatic mass and it synthesize insulin, glucagon, and soma to statin and pancreatic polypeptide. The present study was undertaken to reveal his tom or phology of pancreas in goats.

Materials and Methods
The pancreas as whole was collected from the fresh carcass of goat slaughtered in Namakkal. The complete pancreas was separated from the surrounding organs by careful blunt dissection and washed with normal saline and fixed in Neutral buffered formalin (NBF). Pancreas was collected from 10 numbers of adult goats. The tissue pieces of 2mm^3 was collected and processed for histological and histochemical methods. Sections of 5 micron thickness was made and stained with haematoxylin and eosin for studying the histoachitecture of exocrine and endocrine parts of the goat pancreas. Few other sections were treated with special stains to demonstrate the alpha, beta and delta cells in the islets of Langerhans.

The alpha, beta and delta cells in each Islet were counted. His tom or phology of pancreatic acini (Exocrine part) was studied.

Results and Discussion
The histological structure of the pancreas was first described in 1869 by Langerhans (Motta et al. 1997). Shortly thereafter, Heidenhain characterized the periodic postprandial changes that occurred in the histology of the canine pancreas who concluded that the granules in the pancreatic acinar cells contained the precursors of the digestive enzymes (Hans et al. 2008).

The present micro-anatomical study of pancreas in goats revealed that pancreas was a compound tubule acinar gland containing both exocrine (about 80%) and endocrine (about 20%) units as described by Dell Mann (1993)

In accordance with the observations of Ganguli and Prasad (1995), the goat pancreas was surrounded by fine connective tissue (Figure 1) but does not have a fibrous tissue capsule. The lobules are visible on gross examination and are connected by connective tissue septa that contained the blood vessels, nerves, lymphatics, and excretory ducts.

The endocrine portion consisted of the islets of Langerhans, which were spherical clusters of light-staining cells scattered throughout the pancreas (Banks, 1981).

The Exocrine Part
The exocrine portion consisted of numerous dark-staining acini composed of tubular and spherical masses of cells, which were the subunits of the lobule (Leeson and Leeson, 1976).

The lumen of the acinus was the origin of the secretory duct and contained centroacinar cells (Figure 2) which are unique to the pancreas. These cells were pale staining in histologic
sections and smaller than the acinar cells (Malik and Prakash, 1972).

The lumen of the acinus was continued by intra lobular ducts (Figure 3), which were covered by low columnar epithelial cells. These ducts were none striated and anastomosed to form the interlobular ducts, which were lined by columnar epithelium and few goblet cells (Elizabeth and Fredric, 2001). The interlobular ducts fused to form the main pancreatic duct. The larger ducts had thick wall consisting of connective tissue and elastic fibers (Banks, 1981).

Acinar cells were tall, pyramidal or columnar epithelial cells, with their broad bases on a basal lamina and their apices converged on a central lumen (Malik and Prakash, 1972). In the resting state, numerous eosin ophlic zymogen granules filled the apical portion of the cell (Figure 4). The basal portion of the cells contained one or two centrally located, spherical nuclei and extremely basophilic cytoplasm (Dell Mann and Brown, 1976).

The Golgi complex was located between the nucleus and zymogen granules and was seen as a clear, non-staining region (Leeson and Leeson, 1976). The nucleus was spherical, with one or more nucleoli (Banks, 1981).

There was a thin basal lamina along the basal surface of the acinar cells, below which were collagen fibers and capillary network Meshram et al. (2001).

**The Endocrine Part**

The present study indicated that the islets were distributed along the periphery of pancreatic lobes, adjacent to interlobular connective tissue in the vicinity of blood capillaries. The islets were found abundantly in the caudal portion of the gland. These findings were in line with that of Bloom and Fawcett (1968), Copen haver and Duglus (1975) in human, Vijayaraghavan and Mariappa (1976) in buffaloes and Meshram et al. (2001) in caprines.

Bloom and Fawcett (1968), found that there was about one million islets of Langerhans in the human pancreas and each islet was made of anastomosing cords of polygonal endocrine cells. According to Copen haver and Duglus (1975) each islet in human pancreas was about 0.2 mm in diameter, much larger than an acinus, and separated from the surrounding exocrine tissue by fine connective tissue fibers, which were continuous with those of the exocrine gland.

Spherical or oval shaped islets were found to be intermingled with exocrine pancreatic tissues as reported by Dell Mann and Brown in 1976. The islet cells were arranged in irregular anastomosing cords composed of five different cell types A, B, C, D, and F cells. The alpha cells constituted 25% and beta cells constituted 70%. Of the total islet population. The chrome alum haematoxylin phloxin stain demonstrated the alpha cells as pink and beta cells as blue coloured cells (Figure 5). The alpha cells were smaller than the beta and delta cells. Beta cells were more in number than alpha and delta cells. Beta cells were located at center of the islet while alpha and delta cells were located at periphery as observed by Meshram et al. (2001) in caprine.

The capsule of the Islets was well organized and consisted of collagen, elastic and reticular fibers. It also contained blood vessels and nerves. The similar findings had been reported by Banks (1981) in dogs, Ladukar and Bhamburkar (1994) in layers and broilers and Ganguli and Prasad (1995) in goats. However Ali et al. (1991) did not find such evidences of connective tissue surrounding the isolated islets in ultrathin sections of bovines.
Fig 4: Photomicrograph of A Pancreatic Islet in Goat Showing Alpha Cells (A) And Beta Cells (B) Chrome Alum Hematoxylin Phloxin X 1000

Fig 5: Photomicrograph of Goat Pancreas Showing the Capsule (Arrows) Enclosing a Pancreatic Islet H&E X 1000

References