

COMPARATIVE HISTOLOGICAL STUDIES OF ILEUM IN CATTLE SHEEP AND GOAT

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Abstract: Ileum in cattle, sheep and goat comprised four types of layers tunica mucosa, tunica submucosa, tunica muscularis and tunica serosa. Tunica mucosa was innermost layer, which comprised lamina propria with number of glands. Intestinal glands were lined by number of goblet cells tall columnar cells and enterochromaffin cells. Lamina muscularis was with circular and longitudinal layers of smooth muscle fiber. Tunica muscularis was comprised of circular and longitudinal muscle fiber. Outermost layer was tunica serosa which was a loose connective tissue with blood vessels.

Keywords: Histology, ileum cattle Sheep Goat.

The Structure of Ileum is specialized in both its digestive and absorptive functions very short information is available.

Materials and Methods: - for the present study the organ Ileum of cattle sheep and goat of non –discript breed were collected from eighteen animals. Each group comprised six animals. The Ileum was brought into the laboratory in the ice pack. The tissue samples approximately 5 mm thickness were collected and fixed into the following fixative 10% formaline, 10% neutral buffer formalinecorneys fluid and bouins fluid.

The tissue samples were processed through the graded alcohol for dehydration cleared in the xylene and embedded in the paraffin of 50° to 60° melting point the tissue comprising paraffin blocks were prepared with the help of the brass 'L' molds. The tissue sections were cut at 3 to 4 μ thickness with the help of manually operated rotary microtome machine. the sections were mounted on the glass slides by applying adhesive (Mukharjee 1990) these sections were stained by a Harris Haematoxyline and Eosin for general observations (Mukharjee 1990). Silver impregnation stain for reticulin (Mukhaje 1990), Verhoeffs stain for collagen and elastic fibers (Mukhaje 1990), Crossmans modifications for Mallarys triple stain for collagen elastic and muscle fiber (Singh and Sulochana 1978) masons Trichrome stain for collagen and muscle fiber (Mukhaje 1990).

Micrometrical observations were recorded on ocular micrometer duly calibrating with stage micrometer. The micrometrical values were subjected to statistical analysis as per the standard procedures of Panse and Sukhatme (1967).

Result and Discussion

The wall of the ileum of cattle sheep and goat revealed tunica mucosa, submucosa, tunica muscularis and tunica serosa (Plate 22(1)).

On ileum of cattle tunica mucosa comprised the epithelium lamina propria with glands and lamina muscularis and villi (Plate 27/2). Villi was lined by simple tall columnar absorbing cells with round or oval nuclei the goblet cells were less numerous at the tip of the villi the intestinal glands opens into the pits between the base of the villi in cattle. In goat the villi were uniform in size in between the two tall villi short pyramidal shaped villi were presented. The border of villi was zigzag like appearance. The villi were small, less in height, microvilli were well developed. Widths of villi were more in goat, in sheep villi were broad and other structure were same as goat. The present observations were in collaboration with the Dellmann and Brown (1987), Bacha and Bacha (1990) in ruminants and Morales and Peroyra (1979).

The mucosa of ileum of cattle was lined by simple columnar epithelium with goblet cells interposed among the tall columnar cells. In ileum of cattle absorbing cells consisted of oval nuclei situated near the cell base.

Epithelial lining of the villi of ileum in cattle, sheep and goat consisted single layer of cells. Epithelial cells were tall simple columnar. Their apical border possesses a well marked striations composed of numerous microvilli. Nucleus was oval and placed close to the basement membrane.

The Goblet cells were found in small number and interposed among the lining of the columnar cells on the side of villi. They were found in different stages of activities from great disk swollen appearance all over the ileum in cattle sheep and goat.

The enterchromaffin cells were found in small number at the base of the crypts rather in frequently on the villi. They were pyramidal in shape being broadly upon the basement more and narrow to the apex. The nuclei was somewhat smaller and spherical in shape in cattle, Sheep and goat. These observations were in close collaborations with the previous observations of Dellmann and Brown (1979) and Bacha and Bacha (1990) in ruminants and Mishra and Das (1990)

Lamina propria of ileum in cattle was formed by loose connective tissue. These tissue forms the core of the villi which surrounds the intestinal glands. Lateral duct was seen in the lamina propria. Lamina propria revealed collagen fibers within the fibers there were presence of leukocytes, fibrocytes and smoothmuscle cells.

Loose connective tissue forms the core of the villi. It was composed of loose connective tissue a enmeshed in a reticular fiber frame. Blood vessels were present in fiber network.

Intestinal glands were simple branched tubular tortuous glands present in lamina propria of ileum in cattle mostly at the base region of mucosa (Plate 21/3). These glands were lined by a tall columnar cells, goblet cells and enterochromaffin cells.

Lamina muscularis in cattle sheep and goat was composed of circular layer of smooth muscle.

Tunica submucosa of ileum in cattle was formed by connective tissue layer that revealed collage and elstic fibers bounded in cattle sheep and goat (Plate 23/4).

The solitary lymphtic nodule was observed throughout the length of submucosa of ileum in cattle. These large masses of aggregated lymphatic nodules forms peyers patches in cattle, sheep and goat. They usually have narrow bands in cattle. These lymphoid tissues was present in scattered form and covered with columnar epithelium in cattle sheep and goat.

In sheep lymphgahtic nodules were elongated and oval and were arranged in line, then transverse fistula was observed in each lymphatic nodules in goat it was oval in sheep at the base of it connective tissue fibers were present in between the peyers patches. In goat lymphatic nodules was arranged at apical region of the villi. The present observation of tunica mucosa was in collaboration with Dellmon and Brown (1987) and Raghvan (1964) in ruminants.

Regarding the observations of peyers patches in sheep and goat were in agreement with Bacha and Bacha (1990) in ruminants Rumyntsev (1975) in cattle and Niku (2002) in small ruminants.

Tunica muscularis of ileum in cattle was composed of inner circular outer longitudinal arrange muscle fibers. In between these two layers the coonective tissue and myenteric plexus were seen. In goat these similar structures were present but in sheep only circular muscle fibers were present.

Tunica serosa was vascular membrane with loose felt work of connective tissue fibers and mesothelia of ileum in cattle. Tunica serosa was an outermost layer consisting of collagen and elastic fibers with blood vessels.

Table 1: Observations of ileum (μm)

Group		Thickness of Tunica Muscularis	Height of Villi	Thickness of Tunica submucosa	Diametre of intestinal glands
Cattle -I	Range	48.721-51.87	23.932-29.73	24.94-28073	5.26-6.07
	Mean	50.078 \pm 1.73	28.382 \pm 027	26.99 \pm 0.78	5.67 \pm 039
Sheep-II	Range	9.923-13.823	34.937-37.90	10.608-14.392	3.78-4.35
	Mean	11.662 \pm 0.54	36512 \pm 1.17	12.124 \pm 0.29	4.05 \pm 0.53
Goat-III	Range	7.83-10.723	52.82-56.092	7.963-9.213	5.41-6.13
	Mean	9.1 \pm 0.39	54.65 \pm 1.37	8.4 \pm 0.35	5.92 \pm 0.63

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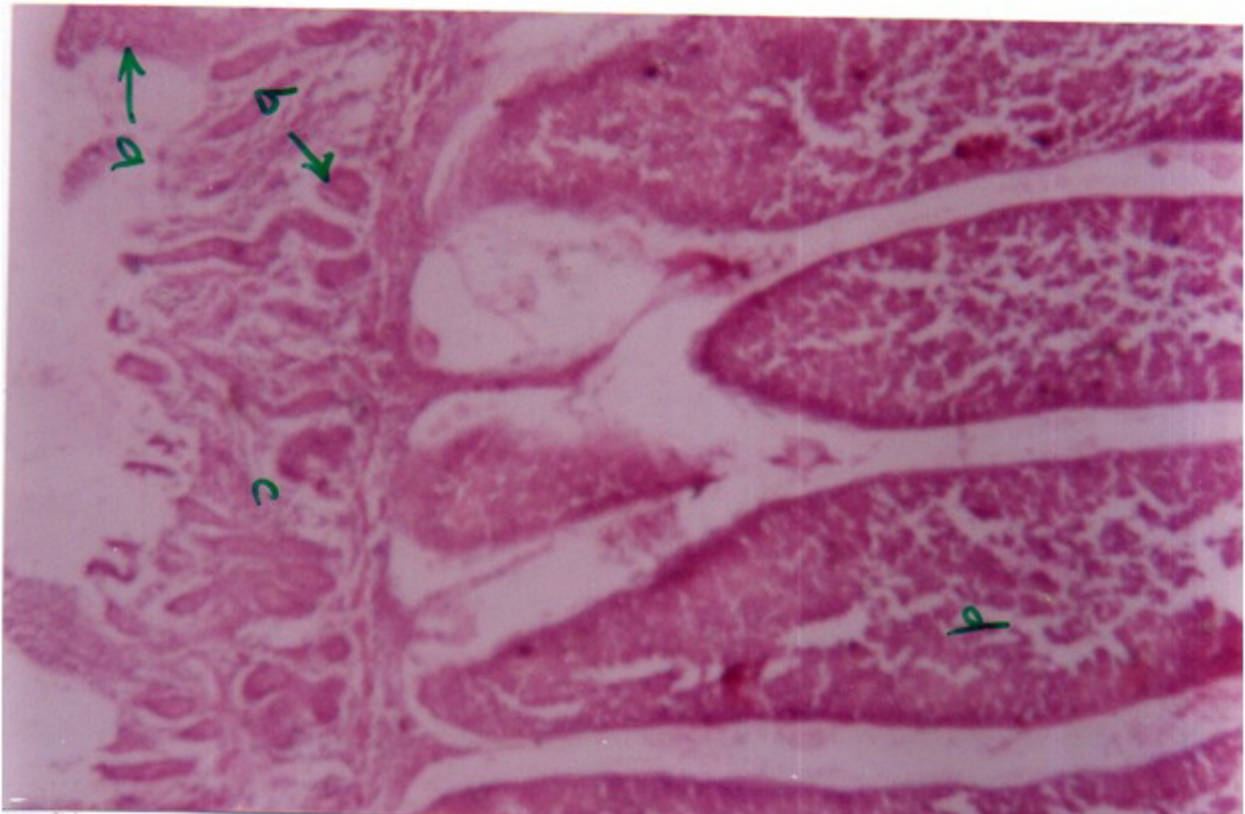


Plate 1. Microphotograph showing histological structure of ileum in Sheep.

- a) Villi
 - (b) Intestinal gland
 - (c) Lamina propria
 - (d) Lymphatic nodules (Peyers patches)
- (Haematoxyline and Eosin stain, 100 X)

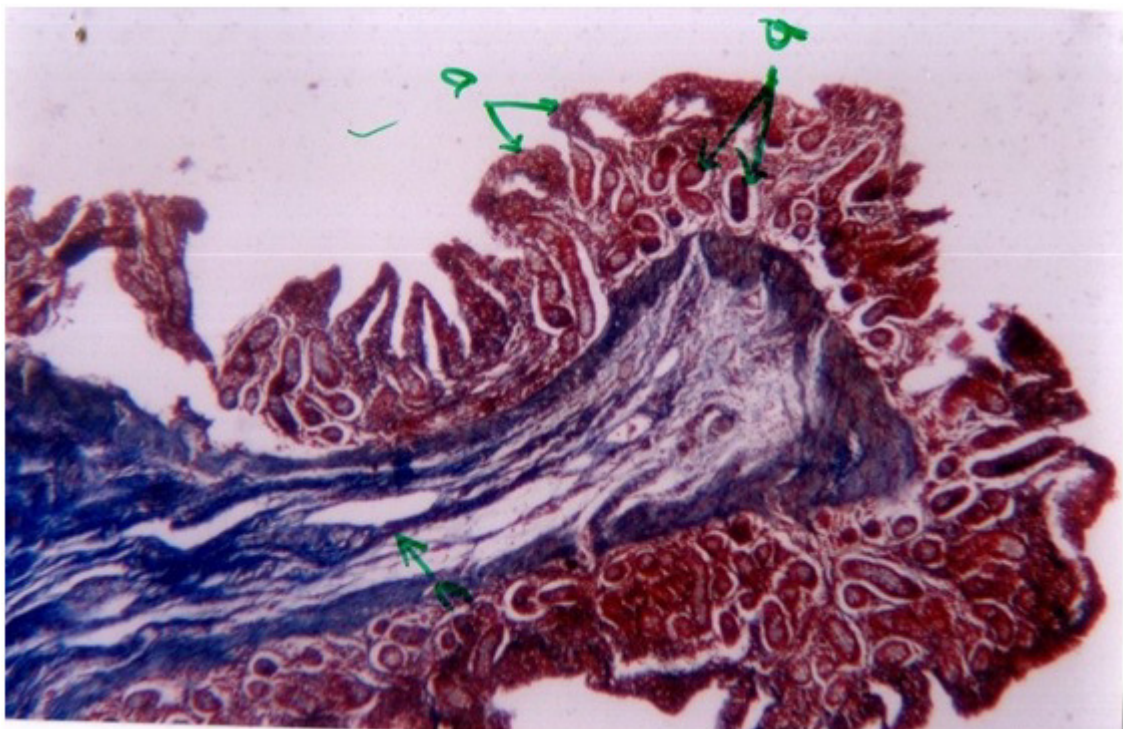
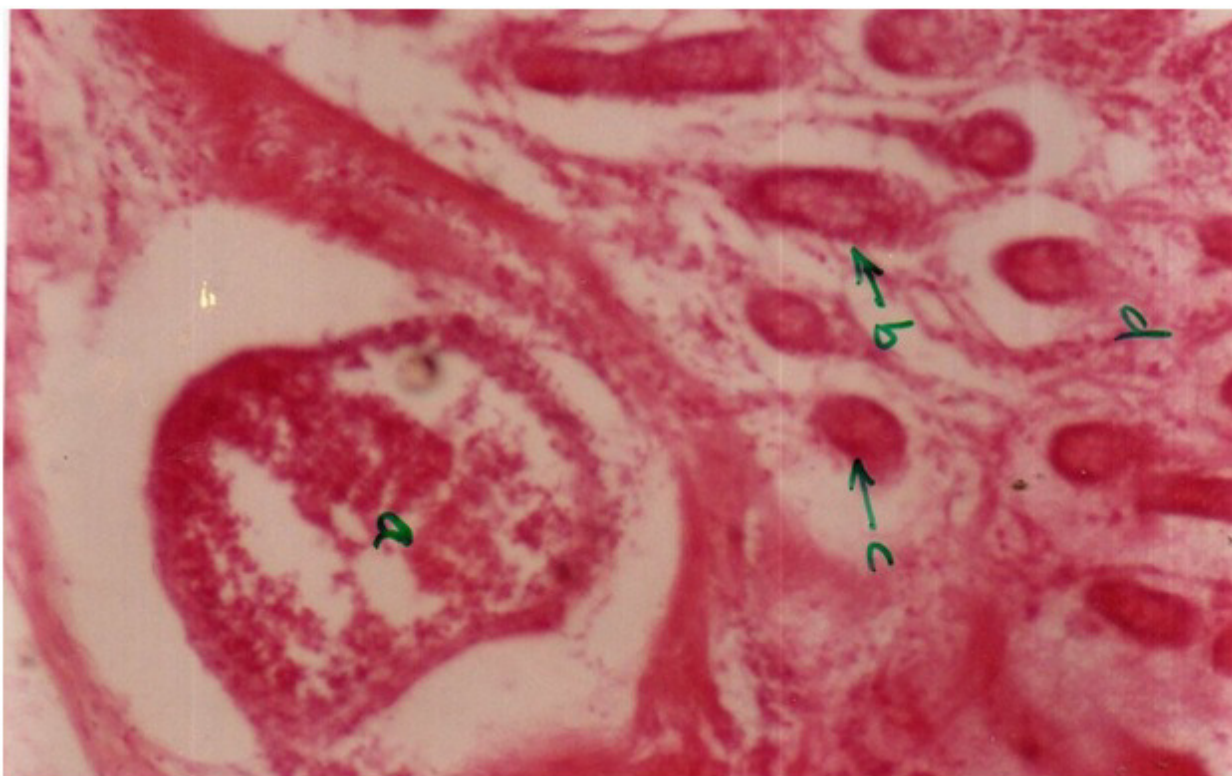


Plate 2. Microphotograph showing histological structure of ileum in Cattle

- a) Villi
 - b) Intestinal gland
 - c) Connective tissue
 - d) Lamina propria
- (Masson's Trichrome stain, 100 X)

**Plate 3.** Microphotograph showing histological structure of ileum in Cattle.

- a) Lymphatic nodules (Peyers patches)
 - b) Intestinal gland
 - c) Crypts of Lieberkuhn
 - d) Lamina Propria
- (Haematoxyline and Eosin stain, 100 X)

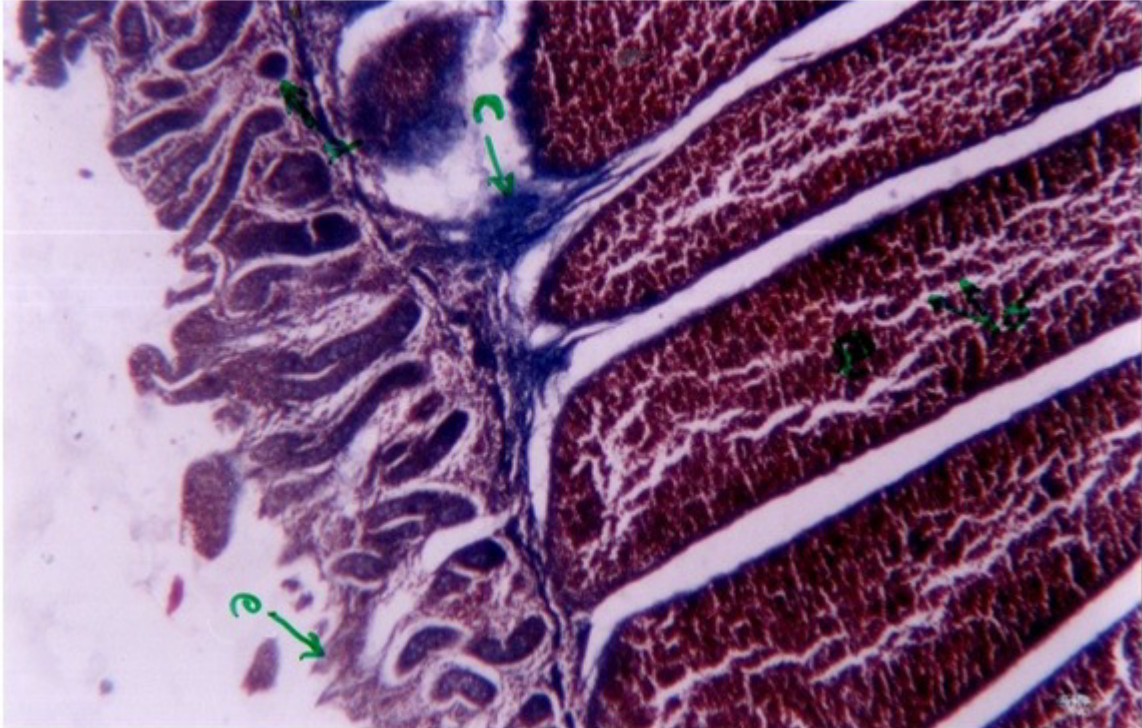


Plate 4. Microphotograph showing histological structure of Plate ileum in Sheep

- a) Lymphatic nodules
- b) Fistula
- c) Collagen fiber
- d) Intestinal gland
- e) Villi

(Masson's Trichrome stain, 100 X)