

MORPHOHISTOCHEMICAL STUDIES OF THE BOWEL SEGMENTS IN THE NUTRIA

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Abstract: A number of 10 nutria (*Myocastor coypus*) cadavers from private farms of Cluj; sacrificed as a necessity; were studied. Besides the morphological observations were also performed some histochemical; and histoenzymological observations at duodenum; jejunum - ileum and colon level; in order to emphasize some indices concerning the cytoplasmatic basophily of enterocytes; RNA presence; absorption process; and also secretion product of caliciform cells.

INTRODUCTION

Morphohistochemical investigations show that in this specie; small intestine lays from pylorus to colon; missing the caecum (Georoceanu; Lisovschi; Miclea; Popovici). Small intestine is flexuous on its length; and it has a relatively uniform lumen. Its delimitation on known segments – duodenum; jejunum; ileum is impossible to be performed; thus it was made considering only duodenum. Jejunum and ileum; representing 2/3 of small intestine total length; represent one segment called jejunum – ileum (Damian; Lisovschi).

Structurally; duodenum presents a wall of 1400 – 1600 microns thickness; where mucous has a 600 – 800 microns thickness. Brunner gland are present in high number; in the initial part of duodenum; continuing pyloric glands. Duodenum epithelium is simple prismatic with striated plateau (Lisovschi; Damian).

Jejunum-ileum has a structure similar to duodenum. In the initial part its wall has a 2600 microns thickness; where mucous has 2000 microns; and submucous 200 microns. Villousities are dense; long; and filliforme; with a 1600 microns length; and 160 microns thickness. The glands are rectilineal and dense. The jejunum-ileum terminal part has a more reduced wall thickness - 1000 microns; from which 680 microns mucous thickness; 80 microns submucous; and 240 microns muscular. At this level the villousities are short - 480 microns and thick - 200 microns (Lisovschi; Damian).

Large intestine is similar to the other mammals large intestine. Colon is similar to small intestine; being structurally identical. The only segment with a larger lumen is the rect. Its wall has a 2200 microns thickness; from which mucous 800 microns; and submucous 320 microns. Mucous epithelium has caliciform cells and enterocytes with striated plateau; in equal proportion (Lisovschi; Damian).

MATERIAL AND METHOD

Experiences were carried out on 10 nutria cadavers - 7 males and 3 females clinically in good health; and sacrificed as a necessity. The cadavers were processed in order to realize morphostructural observations. Samples for histological; histoenzymological; and histo-

chemical processing were harvested. Histological and histochemical samples were fixed in 10% formol; followed by inclusion and 7 microns thickness sectioning.

Staining techniques were applied on sections in order to emphasize the structural elements of the intestinal segment. Some specific reactions also were performed for histochemical reactions: reaction with galloccianine; green - methyl pyronine reaction; PAS reaction; Müller reaction; reaction with blue - alcian; and Danielli reaction.

RESULTS AND DISCUSSION

Pieces from different levels were harvested from duodenum; knowing that in this specie duodenum has a typical histological structure on a very restraint area – 0.5 cm; just near pylorus. In the other parts of the duodenum; it is delimited after anatomical criteria; and it has a structure totally similar to jejunum.

The reaction with galloccianine shows a moderate cytoplasmatic basiphilie; both in cytoplasm of eritrocites situated on villousities; but especially in secretor cells cytoplasm from Lieberkühn glands.

The reaction with green - methyl pyronine indicates the same growing process of cytoplasmatic RNA; as consequence of secretion and absorption product stimulation; in connection with digestion act.

The PAS reaction for neutral mucous substances; appears intensely positive both at basal membrane level; and striated plateau. The PAS positive character of secretion product from caliciform mucous cells is very clear emphasized. It is also very clear observed that these cells are relatively rare compared to those from other carnivore species; towards the villousities edge; more at the villousities base and much dense in Lieberkühn glands. It is clearly observed the expression manner of these cells and glandular lumen full of PAS positive secretion product. In a glandular acyna not all secretor cells are in the same stage of secretor cycle; some of them being loaded with secretion products; thus being in excretion sage. This shows a continuous secretion at Brünner glands level. The excretion in these glands is realized through dialyze – it cannot be observed the aspect of head removing from apical pole with the consecutive nucleolus expulsion; as for caliciform mucous cells from the surface of the intestinal mucous.

The Müller reaction shows the same localization as PAS reaction; meaning the maximum of intensity at striated plateau and caliciform mucous cells level.

The reaction with blue-alcian at pH = 1 is positive as for the other studied segments (at conjunctive tissue level); but here supplementary appears a positive reaction for caliciform mucous cells. We remark that the secretion product of caliciform cells from Lieberkühn glands are very low blue stained; demonstrating that the sulphatate substances quantity is more reduced at this level; but the caliciform cells situated on villousities and especially on their edge appear very rich in sulphatate mucosubstances.

The Danielli reaction is intensely positive in the cytoplasm of all intestinal epithelial cells; except supranuclear area of caliciform cells; where the reaction is negative; and for this reason the cells appear clear on the sample stained found. A very intense reaction is observed at the level of the striated plateau of intestinal epithelium in Lieberkühn glands lumen; and in villousities' axe this reaction emphasize the blood vessels trajectory.

Under histochemical aspect jejunum – ileum presents no essential differences compared to the aspects described for duodenum (Fig. 1). In some concern the histochemical reactions emphasized structural differences much more than the usual stains. Thus; the reaction for mucosubstancs clearly emphasized that the number of caliciform mucous cells

gradually increase in cranio-caudal sense; their number on villousities surface is relatively reduced; their maximum density being deep in Lieberkühn glands.

The same reaction clearly emphasize the striated plateau; structure with role in intestinal absorption. It appears much higher in jejunum and ileum compared to duodenum. As in duodenum also in jejunum-ileum the reaction for sulphatate mucosubstances is weak positive for the caliciform cells from Lieberkühn glands; and intense positive in the same cell type; at intestinal villousities level.

The others histochemical reactions; for nucleic acids and proteins; show aspects very similar to those described for duodenum.

Colon and rectum present very similar histochemical aspects; and for this reason they will be described together (Fig. 2). Except the absence of intestinal villousities; the mucous aspect is very similar to that observed at jejunum-ileum level; the epithelium having the same cell and glands type. The reaction for mucosubstances clearly emphasizes that the caliciform cells of mucous have the maximum density here. The histochemical character of the secretion product is the same as for the mucous cells from small intestine.

The others histochemical reactions; for nucleic acids and sulphatate substances show aspects similar to those described for small intestine.



Fig.1. Jejunum-ileum (col.trichrom)

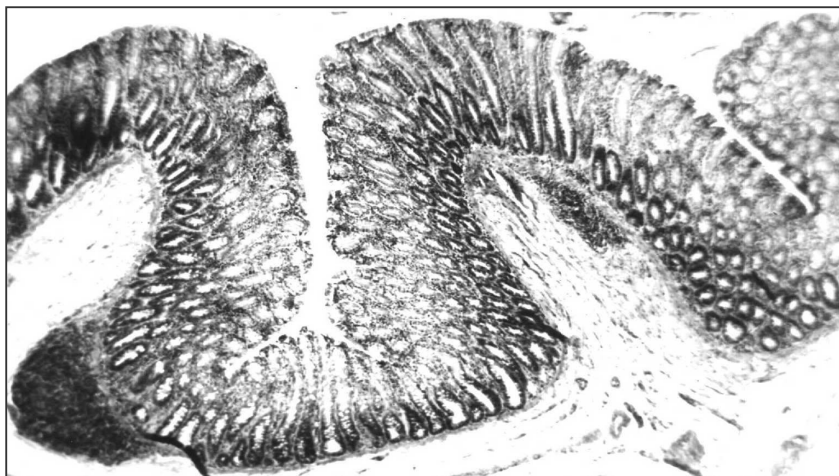


Fig. 2. The colon-ensemble (col. HE)

CONCLUSION

- The histochemical observations are corroborated in the context of morphological investigations on the segment and studied specie
- All histochemical data obtained from these investigations are perfectly corroborated and are correlated to the metabolism of this specie.

BIBLIOGRAPHY

1. Barone; R.; 1988; Anatomie comparés des mammiférés domestiques. Angiologie; Ed. Vigot; 23 rue d'Ecole de Médecine; Paris
2. Botârel; C.; C.Cotea; M.Gaboreanu; Histologie și Embriologie; 1982; Editura Did. și Pedagogică; București.
3. Coțofan; V. și colab.; 1999; Anatomia animalelor domestice; Editura Orizonturi Universitare; Timișoara.
4. Damian; A.; 1999; Morphological and structural researches regarding the intestinal transit in mink of nursery; Bul. USAMV; Cluj-Napoca.
5. Damian; A.; 2000; Estimation of intestinal absorption surface in mink; using micrometry; Bul. USAMV; Cluj-Napoca.
6. Damian; A.; 2001; Anatomie comparată - Sistemul cardiovascular; Editura AcademicPres; Cluj-Napoca.
7. Feider; Z.; 1984; Zoologia vertebratelor; Editura Didactică și Pedagogică; București.
8. Papuc; I. și col.; 2001; Anatomie comparată și Histologie - Aparatul cardiovascular; Ed. Risoprint; Cluj-N.
9. Patea; E. și colab.; 1985; Anatomia comparată a animalelor domestice; Editura Did. și Ped.; București.
10. Sîrbu; V.; V.Nesterov; 1979; Creșterea nutriilor; Editura Ceres; București.