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Microscopic and histological study of Brunner's gland

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Abstract
This study was done in the department of Anatomy, Patna Medical College & Hospital, Patna. The main aim is to study the Brunner's gland is to make a comparative study of different types of mucin secreted by Brunner's gland of few mammals by applying various histochemical techniques. These histological and histochemical observations on Brunner's gland was done in guinea pig, albino rat, rabbit and goat, which belongs to different order and have different food habits. Hematoxylin and eosin staining the secretory cells of Brunner's gland in case of guinea pig, albino rat and goat to be typically mucous in nature whereas in rabbit the glands were of mucous serous type in guinea pig Brunner's gland secreted mixture of acid and neutral mucin. In albino rat mucous acini secrete moderate amount of acid mucin. In goat Brunner's gland secreted negligible amount of acid mucin. Common finding in the secretion of Brunner's gland of the above mammals was the absence of glycogen. Dietary habits and order of these animals have no impact on the type of secretion. The present study provides a base line for further histological studies on the mucin.

Keywords: microscopic and histological, Brunner's gland

Introduction

Observation

For histological observation of the mucosa Harris's haematoxylin with eosin as counter stain was used for histochemical studies. Alcian blue Ph 1, Alcian blue Ph 2.5, PAS, PAS after Diastase digestion, PAS-Phenyl hadrazine, Alcian blue Ph2.5, PAS procedure and Alcian blue Ph2.5 saffranin method were used. In guinea pig mucous coat was seen having leaf like villi lined by simple columnar epithelium. Goblet cells were found scattered between villi and crypts. In higher magnification it was found that Brunner's gland were compound tubule alveolar composed only of mucous acini densely packed within sub mucosa, which were lined by columnar cells. In low power observation the mucous coat of albino rat was seen having simple columnar epithelium lined villi with goblet cells. Crypts of liverkuhn simple tubular glands were seen in lamina propria. Some mucosae composed of Brunner's gland were specific in this coat. In high power magnification the sub mucosal branched tubuloalveolar Brunner's gland were found. The ducts of few glands were seen piercing the muscularis mucosa and ending in intestinal glands. In goat mucus coat was seen having numerous villi of different shape lined by simple columnar epithelium having few goblet cells, but in high power microscope compound tubuloalveolar Brunner's gland composed only of mucous acini were seen densely packed within sub-mucosa. In guinea pig in low power observation the Brunner's gland of sub-mucosa and goblet cells of villi were found bright blue stained indicating the presence of high amount of sulfated acid mucin, but in high power observation Brunner's gland showed alcinophilia indicating the presence of highly sulphated mucin in substantial amount. In rabbit Brunner's gland were variably stained with PAS. Serous acini were stained light magenta were as mucous acini were unstained indicating the presence of neutral mucin in scanty amount. In albino rat by PAS staining Brunner's gland were stained magenta with PAS and this staining remained unaffected diastase which assured the presence of neutral mucin and absence of glycogen. In goat in PAS staining after diastase Brunner's gland showed no effect on PAS staining after diastase digestion and the glands were highly stained magenta indicating the presence of neutral mucin and diastase resistance indicating the absence of glycogen. In guinea pig by PAS- Phenyl Hydrazine staining it was found that magenta staining Brunner's gland with PAS got abolished after treatment with phenyl hydrazine which confirmed the presence of neutral mucin in substantial amount. In albino rat PAS- Phenyl hydrazine staining Brunner's gland is mild to variably magenta stained with PAS confirms the presence of scanty amount of neutral mucin. In albino rat by PAS- Phenyl hydrazine moderately magenta stained Brunner's gland with PAS with PAS becomes weak which assured the presence of neutral mucin in moderate amount. In goat by PAS phenyl hydrazine magenta stain Brunner's gland with PAS got abolished after treatment with phenyl hydrazine which confirms the presence of neutral mucin in substantial amount.

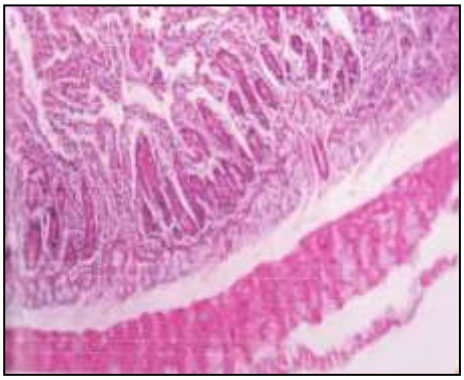

Fig 1: Gunea pig duodenum in H&E stain, 10x

Fig 2: Albino rat duodenum in H&E stain, 10x

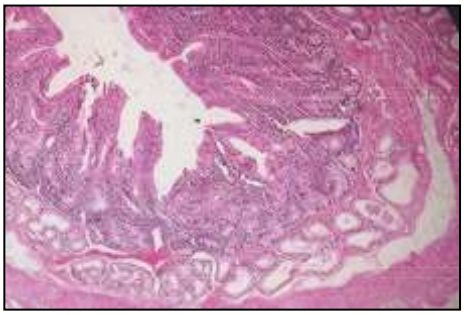

Fig 3: Goat duodenum in H&E stain, 10x

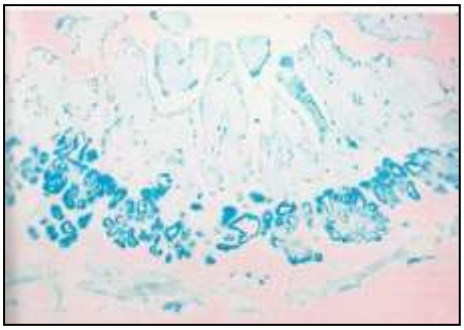

Fig 4: rabbit Brunner's gland with alcian blue, ph1

Materials and Methods

In this present work the guinea pig, albino rat, goat and rabbit were selected for the study. The samples of above mentioned animals were taken from proximal part of duodenum. For the staining procedure hematoxylin and eocin staining as counter stain was used. For histochemical study the staining procedure were applied in which alcian blue ph1, alcian blue ph2, PAS, PAS after diastase, PAS phenyl hydrazine and alcian blue ph 2.5 were used. The sections of all these animals were stained by the above staining procedure.

Summery and Conclusion

The present comparative and histological study on Brunner's gland was conducted in the mammals. In the present work it was found that in H&E preparation the selective cells of Brunner's glad in guinea pig, albino rat and goat to be typically mucous to mucin, but in rabbit the glands were of mucous and serous type. The Brunner's gland of guinea pig secreted mixture of acid and neutral mucin. In rabbit the mucous acini secreted moderate amount of acid mucin, which was mixture of both sulpho and sialomucin with predominance of sialo mucin. Acid mucin was absent in serous acini whereas serous acini secreted scanty amount of neutral mucin. The Brunner's gland of albino rat secreted scanty amount of acid mucin. The Brunner's gland in goat secreted negligible amount of acid mucin, which gwas found to be mixture of both sulpho and sialomucin. Common finding in the secretion of Brunner's gland in these mammals was the absence of glycogen. The dietary habit and order of these animals seem to have no impact on the type of secretion by Brunner's gland. Guinea pig and albino rat are both rodents but gave different picture of secretion. Guinea pig had both types of acid mucin were as sialomucin was absent in albino rat but neutral mucin was found in both. The kingdom of mucin is very vast, however its gate has been unlocked and needed to be explored more. The present work provides a baseline for further histochemical study on mucin. The combination of available histochemical and biochemical information should make it possible to relate changes at the cellular level.

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