STUDIES ON THE APPENDIX IN ALBINO RAT

THESIS

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(ANATOMY)

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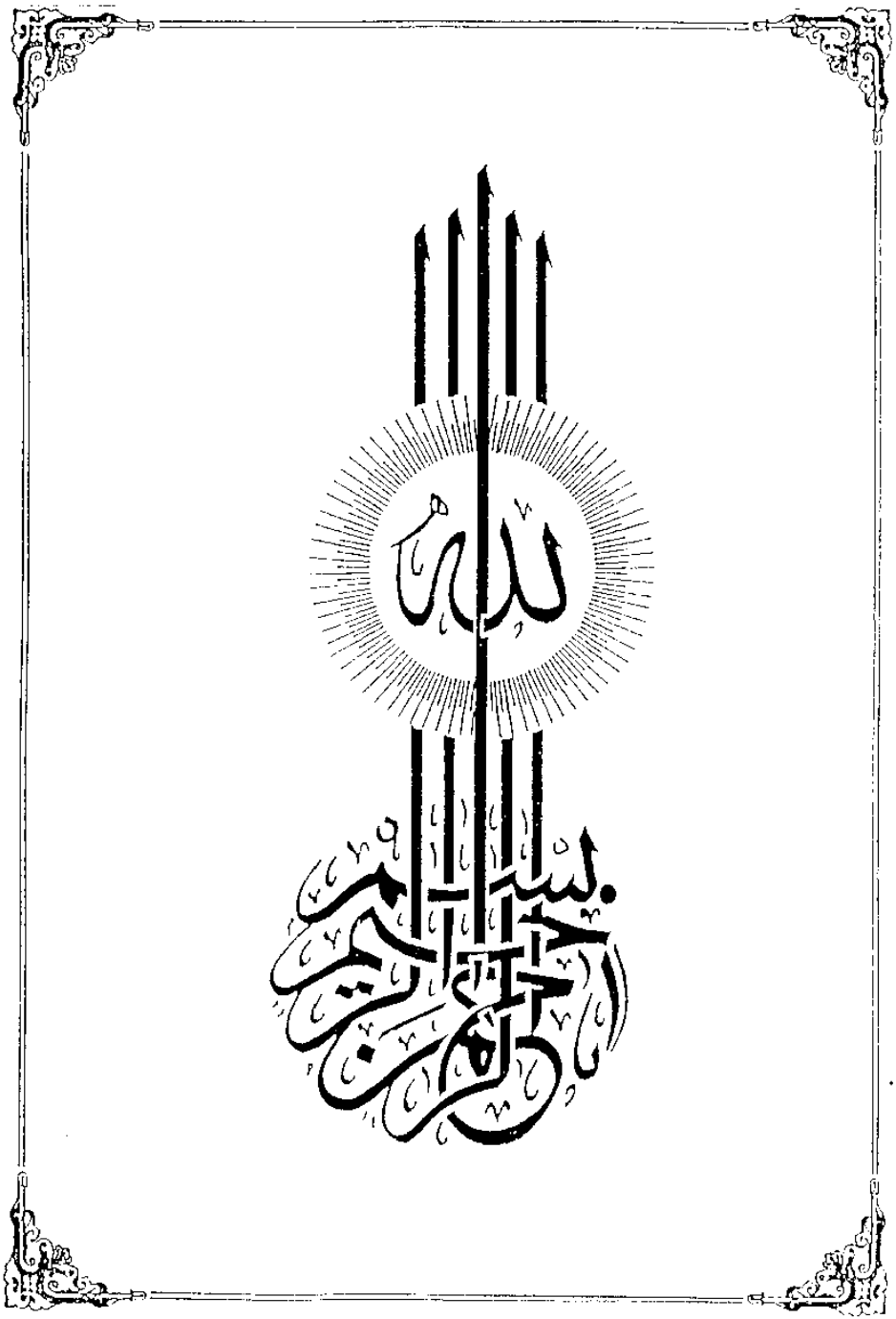

C O N T E N T S

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INTRODUCTION

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Reviewing the literature had shown that the post-natal development of the small intestine had received the attention of many authors as O'Connor 1966, Herbst & Sunshine 1969 and Clarke 1977. However fewer studies were dealing with the develo-ment of the large intestine as the work given by Brackett and Townsend 1980 in the organogenesis of the distal colon. The lack of reference in the sub-ject had stimulated the present investigation.

The aim of this study was to investigate the postnatal macroscopic and microscopic changes and the histochemical activities in the vermiform appendix of the albino rat.

REVIEW OF LITERATURE

MACROSCOPIC STRUCTURE OF THE VERMIFORM APPENDIX

In spite of the fact that the vermiform appendix had been a subject of many researches concerning its lymphoid structure and its role in the immune system, however few reports were available on its post-natal development.

The vermiform appendix in man had been represented by the apex of the caecum. However, only few vertebrates posses a vermiform appendix.

This fact has been submitted to research work to see if any analogy would exist between the true apex of the caecum in lower animals and its representative in man.

In Aves:

Berry (1901) found that the pigeon had two short caeca while the domestic fowel had two long ones which opened at the junction of the small intestine with the large intestine. Berry (1901) also noticed diffuse distribution of the lymphoid tissue in the caecum with slight special prediliction to the apex. Therefore, he concluded that the vermiform appendix was missing. On the other hand, Getty (1975) divided the caecum of domestic fowels into three parts, abase, a body and an apex.

In Rodentia:

Berry (1901) from his studies on the rabbit showed that the small intestine with its expanded lower end named the "sacculus rotundus" joined the blind diverticulum of the caecum which ended in a well marked vermiform appendix.

In other rodents as mice and albino rats, Berry (1901)observed that the caecum showed a slight constriction at its middle which divided the caecum into two parts, a basal portion and an apical portion. This apical portion was proved to be the vermiform appendix.

Borrodaile (1935) reported that in the rodents the caecum was large in diameter as was the case in all herbiverous mammals. Adams and Eddy (1949) showed that the size of the caecum of adult rats was nearly similar to the size of its stomach.

In (1960) Rowett stated that there was no internal septa in the caecum as was in the case of many rodents. Yet, the begining of the caecum was guarded by an ileo-caecal valve at its mouth.

Farris and Griffith (1965) also confirmed that the constriction of the caecum divided it into a basal part and an apical lymphoid part which they suggested to be the vermiform appendix. This lymphoid part varied greatly in length from 10-30 mm. Kent (1965) also showed that the colic caecum in rodents was reduced in diameter near its blind end which terminated in the vermiform appendix, with a greatly restricted or semioccluded lumen.

Hebel & Stromberg (1976) divided the caecum to 3 parts, a base, a body and an apex. The finger tip sized apex was directed cranioventrally, while the curved body extended along the lateral abdominal wall and curved caudal to the stomach as it merged into the caudomedially directed apex. They found that the vermiform appendix had a wide range of mobility which they attributed to a long mesentry. The caecum might be turned medially in such a way that its greater curvature was found to lie cranially and its apex was directed cadually. However, a turn in the opposite direction i.e. the greater curvature lying caudally had been observed.

In Carnivora:

Berry (1901) came to the conclusion that the caecal apex in cats corresponded to the vermiform appendix of

the rabbit. Crouch (1969) had denied the existence of the vermiform appendix in cats.

Mu and Lingam (1974) had noticed (the presence of vermiform appendix) in the form of a rudimentary projection from the tip of the caecum and passed a definite mesentry. Getty (1975) found the Cat's caecum was lying between the right flank and the median plane and ended as a blind pointed end but he did not describe it as a vermiform appendix.

In Humonidae:

a) In anthropidae:

Scott (1980) showed that the majority of cynomalgus and rhesus macaques had a conical caecum which gave a false impression of having a rudumentary appendix. He discovered a continuous longitudinal muscle layer surrounding the tip of the conical caecum. This made him come to the conclusion that the apex of the caecum when covered by an apparant continuous muscle layer should not be regarded as a rudumentary appendix. Scott, (1980) found that the vermiform appendix of the Gorilla was similar to that of the Human in which it arose abruptly from the posteromedial aspect of the caecum.

b) In Huminidae:

Treves (1885) considered that the vermiform appendix was nearly always related to the root of mesentry and directed upwards towards the spleen. However Wakeley (1933) criticized the old Treves teaching and studied the embryological explanation of his results. He stated that the ultimate position was profoundly influenced by the changes in the position and shape of the caecum during development. Regarding the percentage of the different positions he classified them into:

- The anterior or pre-ileal was 1% with a long meso-appendix and oftenly on ileocaecal fold.
- The splenic or post-ileal was 0.4% and an ileocaecal fold might be present.
- The pelvic or descending position was 31.01% and commonly with a genitomesenteric fold which extended from the posterior aspect of ileum or left side of mesentry to the internal abdominal ring.
- The subcaecal was 2.26% and twisted with its mesentry in a clockwise direction with its tip directed cranially.
- The commonest position was the posterior caecal or retrocolic and was 65.28%, and only in 0.05% it was ectopic in position.

Kulik (1957) found that the vermiform appendix was arising from the medial side in 52% of cases and from the post-medial aspect in 36% of cases.

Shersheneva (1960) described the human appendix as an independant part of the alimentary canal rather than a rudimentary structure having a protective function. It appeard at early stages of development and retained its definitive structure throughout life but showed individual changes in its microscopic details.

Maisel (1960) observed that the pelvic position was the commonest, second in order was the retrocaecal and retrocolic each comprising less than one third of all positions with no racial influence.

Pande (1972) reported that the human caecum occupied the subhepatic position throughout foetal life and descended to the right iliac fossa in childhood. It was attached to the medial wall of the caecum just below the terminal ileum and retained this attachment permenantly.

Patten and Carlson (1974) found that by the age of two months prenatally the caecum was developed. One month later and as a result of the lag of growth, the

distal end appeared to have a narrower diameter; the vermiform process.

Valdes and Dapena (1979) interpreted that the two most common positions in man were that caudal to the caecum and the retrocaecal. They also mentioned that rarely did the caecum of the newborn acquire a long mesentry which permitted a considerable mobility. So, in such a situation the caecum and appendix were located in the upper quadrant but this should not be miscontrued as malrotation of the gut.

MICROSCOPIC STRUCTURE OF THE ADULT VERMIFORM APPENDIX

The subject had been submitted to research work mainly for the localization of lymphoid tissue and its role in the immune system of the body.

In Aves:

Berry (1901) revealed the fact that the lymphoid tissue was diffusing throughout the mucosa of the caecum with a slight special prediliction to the apex.

In Rodents:

Berry (1901) found that the lymphoid tissue was accumulating in the lateral wall of its vermiform appendix. This finding had been confirmed later by Farris and Griffith (1965). Detailed studies by Hebel and Strombery (1976) showed that in the rat all the layers of the wall of the caecum including the appendix were thinner than those of other parts of the large intestine.