EARLY DEVELOPMENT OF THE DIGESTIVE TRACT

OF MACROPUS EUGENII (THE TAMMAR WALLABY)

Setiati Dra. (Padjadjaran)

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SUMMARY

This study was initiated with the aim of providing, for the first time, histological and cytological descriptions of early development of the digestive tract in a macropodid marsupial (<u>Macropus eugenii</u>, the tammar wallaby). Light microscopy plus scanning and transmission electron microscopy were used to examine material recovered from individuals in the last week of embryonic development and at various ages up to six weeks of pouch life.

The digestive tract was structurally similar and simplified throughout from 21 to 25 days of gestation. In most regions, the remaining three days of embryonic life led to considerable differentiation.

At birth a large and muscular grooved tongue was present. It grew steadily and remained, in older young, particularly well suited for attachment to and retention on the nipple. Papillar development on the upper surface was far from complete by 40 days. At birth the oesophagus was less well developed than in new born eutherians. Ciliation and intercellular vacuolation were conspicuous features of oesophageal development. Rudiments of oesophageal glands and muscularis mucosae were not observed.

Oesophageal, cardiac, fundic and pyloric regions of the stomach were recognised. The oesophageal region, with an oesophagus-like epithelium, was dominated by the gastric sulcus which was obvious at birth and became more conspicuous in later stages. Cardiac and fundic regions were indistinguishable until 20 days when the latter began development of larger and more complex gastric glands. At the same age, both regions contained mature parietal cells (their precursors much earlier) with characteristic internal canaliculi and apical tubulovesicular systems indicative of active hydrochloric acid production. Parietal cells are not present in the cardiac regions in adult tammars; it would appear that they are lost much later than 40 days post partum. The pyloric region showed increasing mucosal folding and pyloric gland deepening from birth. Pepsinogenic chief cells were not found in any region at any age examined.

Villi were well developed in the newborn small intestine. Villar cell extrusion was observed at all ages examined and was extremely widespread at 20 days. Absorptive, microvillus-covered cells had an increasingly broad layer of tubulovesicles from birth, particularly in the ileum. A variety of macromolecules, including immunoglobins, are probably taken up into the tubulovesicular system by pinocytosis. Secretory glands developed early in the small intestine. Brunner's glands could be distinguished in the proximal duodenum of the newborn and glands of Lieberkühn throughout the small intestine from 5 days. The caecum and colon were histologically similar except for a greater frequency of goblet cells in the latter. During the first 40 days of pouch life, the duodenum, ileum, caecum and colon developed at about the same rate rather than the proximal-distal progression described for the eutherian intestine.

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