

Chapter III. THE INTESTINE.
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Esophagus.

The tick alimentary canal opens anteriorly in the oral aperture inside the preoral cavity and passes into the massive pharynx. The pharynx, characterized by extensively developed muscles, leads into a narrow tubular esophagus. The posterior end of the esophagus opens into the midgut. Both the pharynx and the esophagus are ectodermal in origin and lined with cuticle. The esophagus is subcircular in transverse section. Its wall, in addition to cuticular lining, consists of epithelial cells separated by the basal lamina from layers of muscles. The thin cuticular lining is extensively folded and consists of fibrillar procuticle and a thin dense layer of epicuticle. The epithelial cells, which follow the cuticular foldings in shape, are basically similar in structure to the epidermal cells and show no signs of secretory or transport processes. The esophagus cells have a short microvilli beneath the cuticular lining and a few organelles in the cytoplasm. Their basal plasma membrane forms minor invaginations (figs. 122, 123).

Midgut.

The endodermal midgut is subdivided into a central portion, or stomach, and paired tubelike lateral diverticulae, occupying most of the internal cavity of the tick body. In representatives of the family Ixodidae, the stomach is a short, narrow tube with 7 pairs of long diverticulae forming numerous loops. The midgut is connected to the rectal sac by the small intestine, which is a short tube narrowing toward the rectal sac. It extends medioventrally from the posterior end of the stomach, curves dorsally and enters the anteroventral part of the rectal sac.

Numerous light microscope investigations have shown that, despite considerable morphological subdivisions, all midgut parts are histologically a similar (Hughes, 1954; Balashov, 1957, 1961a, 1967; Tatchell, 1962b, 1964; Chinery, 1964; Sonnenshine and Gregson, 1970; Gurgis, 1971; Khalil, 1971a). The midgut wall is built from a single layer of epithelial cells resting on a thin basal lamina. Outside the basal lamina is a network of muscles (fig. 128, 130). Light and electron microscope studies indicate that the midgut epithelium consists of three cells types: reserve (undifferentiated), secretory, and digestive. Numbers of each cell type vary considerably depending on physiological phase (figs. 124-127). Secretory and digestive cells both undoubtedly originate from reserve cells. But the question remains whether secretory cells and digestive cells are actually successive functional phases of one cell type, or reserve cells are differentiated into two completely