

CYTOBIOLOGICAL INVESTIGATIONS ON THE DIGESTIVE ORGANS OF *NAUTILUS POMPILIUS* L. (CEPHALOPODA, TETRABRANCHIATA)

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Physiological studies on the localization of absorption processes in the digestive tract of coleoid cephalopods substantiated that not only in the midgut gland but also in the caecum food absorption takes place (Boucaud-Camou & Péquinant, 1974; Boucaud-Camou et al., 1976). Autoradiographic tracer experiments with leucine suggest that in octopus the crop too is involved in absorption processes (Wells, 1978).

Histological investigations on the digestive organs of *Nautilus pompilius* showed that in the caecum and crop the tunica mucosa, consisting of a lamina epithelialis mucosae and a lamina propria mucosae, is double-folded. The resulting enlargement of the surface is most distinct in the caecum which is a pouch organ lacking the spiral turning seen in dibranchiate cephalopods (Boucaud-Camou, 1968). Cytological studies of the epithelial cells showed a micro-villi border, endocytotic vesicles, acid phosphatase positive „dense bodies“ in the caecum and crop indicating that absorption occurs in these organs (Westermann & Schipp, 1998a,b).

To investigate in which organs of the digestive tract of *Nautilus pompilius* absorption processes take place the animals were fed with ¹⁴C-labelled shrimps (*Crangon crangon*). 6-8 hours after food ingestion the organs (crop, stomach, caecum, midgut and rectum) of the digestive tract were removed. One half of the organs were fixed and embedded for autoradiography. The other half was burned in an incinerator (Oxynizer, Packard) and the radioactivity was measured with a liquid-scintillation analyser.

The results of the liquid-scintillation analyser showed the highest radioactivity in the midgut gland and caecum. These findings were confirmed through the light microscopic and electron microscopic autoradiography. Silver grains as reaction product could be assigned in the terminal alveoli of the midgut gland. The light microscopic autoradiography also showed silver precipitates in the lamina epithelialis mucosae of the caecum and crop. The present results of the liquid-scintillation analyser and the autoradiography as well as the cytological structural analysis indicate that in the caecum digestive and absorption processes occur. But the largest amount of the nutrient is absorbed by the terminal alveoli of the midgut gland which could also be demonstrated by the liquid-scintillation analyser and the autoradiography. ¹⁴C-labelled glycine and/or leucine localized in the lamina epithelialis mucosae of the crop of *Nautilus pompilius* suggest that already the crop epithelium takes up a small amount of the nutrient. The proof of different enzymes in this segment of the digestive tract (Westermann & Schipp, 1998b) showed that in the crop the food is not only stored but also that digestive processes begin in this organ.

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