

**CILIATED CELLS ON THE DIGITAL TENTACLES OF *NAUTILUS POMPILIUS* L. INDICATE THEIR FUNCTION AS SENSE ORGANS (CEPHALOPODA, TETRABRANCHIATA)**

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In resting posture the hood of Nautilus is almost closed, only the post- and preocular tentacles, the central part of the eyes, and the tentacular sheathes of the digital tentacles are visible. As Nautilus is neutrally bouyant, only a light attachment with a single tentacle is enough to fasten the animal to the substrate. When food is put into the aquarium the animals start to travel with quick pendulum-like motions which correspond to the respiratory motion of the body. We presume that these motions are useful in building up an olfactory gradient for the localization of the food, which is possibly received by the ocular tentacles<sup>1</sup> or the rhinophores<sup>2</sup>. After the direction of the food is located the digital tentacles form a "cone of search"<sup>3</sup>. The animals swim forward while searching for food. One or two pairs of digital tentacles hang downward with the tips touching the bottom giving the impression of a tactile searching. The digital tentacles discern and grasp the food and they bring it close to the mouth. Following the meal the animals return to the resting posture. Scanning electron microscopical studies on the oral surface possesses closely packed transverse ridges which tend to be more widely spaced towards the distal end. A median groove extends from the distal to the proximal part of the tentacle on the aboral surface. In contrast to the situation in *N. macromphalus*<sup>2,4</sup> sensory ciliated cells extend on the epidermis of digital tentacles of *N. pompilius*. They can be divided into three different cell types according to the number and length of the cilia and their distribution on the tentacle surface. Ciliated cells of Type I are restricted to the anterior surface area of the transverse ridges. They stand close together in "cilia-fields". Cells of Type II spread out frequently all over the epidermis of the lateral surface of the digital tentacle. Type III cells are regularly but less frequently distributed in the aboral groove. Histological studies show that the digital tentacles of Nautilus are substantially different from those of coleoids, although their musculature is organized in a similar manner<sup>5,6</sup>. A distinct network of muscle fibers guarantees their high degree of movability. Transmitted light micrographs of longitudinal sections show that a conspicuous nonmyelinated axial nerve bundle parallels the long axis of the tentacle and terminates directly on a thin and flat epithelium at its tip. Using an indocarbocyanine dye the labeled nerve fibers could be studied under the fluorescence microscope. The tracer stains from the axial nerve bundle over a small nervous plexus to the muscle fibers and to the high columnar epithelium of the transverse ridges, where ciliated cells are located<sup>7</sup>. These findings lead to the conclusion that the digital tentacles of *N. pompilius* are important sense organs for sensitive and tactile reception.

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