

Anatomy and ultrastructure of the marine oligochaete *Tubificoides benedii* (Tubificidae), with emphasis on its epidermis-cuticle-complex

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Abstract

Although *Tubificoides benedii* (d'Udekem, 1855) (= *Pelosclex benedeni*) is a ubiquitous form in eutrophicated or polluted coastal muds and is characterized by an exceptional viability in "sulphide sediments", almost nothing is known about its anatomy and the structure of its conspicuously papillate body surface. As a part of a research project on "sulphide annelids", done by our group, we investigated the body structure of this common and still extraordinary marine tubificid using light, scanning and transmission electron microscopy.

While the internal structures correspond to the general pattern of marine tubificids (Giere, 1983), the epidermis-cuticle-complex is unusual. The epidermis cells, which are much interdigitated, contain numerous extremely long and irregularly shaped mitochondria. At the tip of the body, many sensory cells, embedded in the normal epidermis cell layer, end with ciliary tufts at the body surface. Long epidermal microvilli traverse the thick cuticular layer which only in the anterior- and posteriormost segments is studded by "epicuticular projections". From most parts of the body these surficial rodlets, so far held typical for all Oligochaeta, are absent. Instead, here the cuticle forms numerous high, almost leaf-like papillae between which a viscous mucus layer regularly harbours many bacteria.

This distinct papillate body armature may serve for stabilization of the mucus layer with its associated bacteria. It is well conceivable that the mucus, beside its usual role of reducing friction in the burrowing process, attracts bacteria. That their settlement may be more than an accidental association and involve some regulative interaction is indicated by the specific attachment of gram-negative bacterial threads often populating the posterior end of *T. benedii* (Dubilier, 1986). The significance of possible stress exerted by the "sulfide-environment" on the worm, as evidenced by an unusually high concentration of lysosomal structures and abnormally formed mitochondria in the epidermis, has to be verified in further studies.

Reference

- Dubilier, N., 1986. Association of filamentous epibacteria with *Tubificoides benedii* (Oligochaeta, Annelida). Mar. Biol. 92: 285–288.