

Ultrastructure of the rhyncheal system and rhynchocoel in the *Trypanorhynch scolex* (Plathelmintes, Cestoda)

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The trypanorhynch scolex is unique among cestodes in having a rhyncheal apparatus (Dollfus, 1942; Campbell, Beveridge, 1994; Beveridge *et al.,* 2017). The histology of the rhyncheal system has been studied in a number of species (Dollfus, 1942; Rees, 1950). In spite of the taxonomic importance of the rhyncheal system and its possible phylogenetic significance, few ultrastructural observations on it have been made (McKerr, 1978; Biserova, 1986; Ward *et al.,* 1986; Beveridge, Smith, 1988; Jones, Beveridge, 1998; Jones, 2000; Korneva, Biserova, 2005).

In *Grillotia erinaceus*, rhyncheal system comprises four armed, invaginable tentacles, tentacle sheaths, retractor muscles and hydroprotractor muscular bulbs. Tentacles, sheaths and muscular bulbs possess a closed cavity – rhynchocoel*). The cavity is filled with fluid, which produced by specialized glandular cells. Vesicles of these cells contain a homogeneous substance, which is probably mucin. The hollow tentacles, sheaths and muscular bulbs are united by the common rhynchocoel.The wall of tentacle is syncytial consisting of anuclear apical cytoplasm filled with secretory granules, extracellular fibrous multi-laminar support plate, and the basal cytoplasm containing the nuclei, myofibrils and secretory granules. Thick and thin myofilaments form the muscular fibres oriented in two different directions, like two spirals, which help to revert and evert the tentacle. The plasma membrane of the basal cytoplasm is in contact with fluid of the rhynchocoel. The tentacle retractor muscle extends through the lumen of the rhynchocoel from the tentacle tip to the muscular bulb. The tentacle retractor is presented by the smooth-muscular symplast (myosymplast) with nuclei in the central part of the fibre. Perinuclear cytoplasm contains numerous secretory granules. Hollow tentacle hooks originate from the extracellular matrix of the fibrous support plate. Tentacle sheaths consist of two layers of the extracellular fibrous support plate. In addition, the inner layer of the support plate is lined by the rhynchothelial cells, and to the outer layer the circular muscles are attached. The circular muscles contraction helps for evagination of the tentacle. In pars botrialis the sheaths are stabilized by the rich muscular frame of the scolex musculature. The rhynchothelial cells have elongated shape; each cell contains a round nucleus, numerous mitochondria, and large quantities of rough endoplasmatic reticulum cisterns with mucin-filled reservoirs. In the pars vaginalis the rhynchothelium consist of an unicellular layer. Agglomeration of the rhynchothelial cells is histochemically evidenced in the anterior portion of the tentacle sheath. We identified thin neurites penetrating the fibrous plate of the tentacle sheaths and entering in the rhynchocoel. The tentacular bulbs consist of numerous layers of striated muscles surrounding the bulb lumen. Individual tentacular bulbs

form the proximal terminal for a closed hydraulic system, rhynchocoel. The lumen of each bulb is approximately circular in cross-section and contains a fine granular fluid. The fluid is produced by the rhynchothelial cells lining the rhynchocoel. Adjacent myofibres are separated by approximately 0.5 μm, possess abundant mitochondria and have shallow T-tubules and associated sarcoplasmic reticulum at each Z line (Biserova,1986; Korneva, Biserova, 2005; Ward *et al.,* 1986). Nuclei are found exclusively over muscle fibres and extended as a longitudinal band close to the medullary line. The neuronal control of the bulb muscles is suggested by the presence of obvious motor nerve terminals with synaptic vesicles. Phylogenetic significance is discussed.

*) The term " Rhynchoel" was used by V.N. Beklemishev for description of the rhyncheal cavity in kalyptorhynchean turbellaria, trypanorhyncha tapeworms, acantocephala and nemertina (Beklemishev, 1964; Beklemishev, 1969)