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Stichosomida

Nematodes formerly classified in the Order Stichosomida constitute at least two important groups of animal parasites, the mermithids, parasites of invertebrates, and the trichinellids, parasites of vertebrates. These nematodes are characterized by a pharynx that is narrow and thin-walled anteriorly and which, posteriorly, is surrounded by unicellular, glandular stichocytes, each with a duct into the pharyngeal lumen (Fig 1, Fig. 2). The pharynx extends one-fourth to nine-tenths of the body length in various taxa and is almost devoid of musculature. The region of the pharynx surrounded by stichocytes is known as the stichosome. Recent phylogenetic analysis based on a synthesis of molecular and morphological data suggest that the stichosome may be an example of parallel evolution and that the trichinellids and mermithids are more appropriately separated as two orders: Trichinellida, with at least six families, and Mermithida, with two families (De Ley and Blaxter, 2002). However, debate on the higher classification of nematodes continues and opinion will no doubt refocus as new data emerge and are applied.

Two brief life history examples provide some insight into the biology of these organisms. In *Trichinella spiralis*, encysted larvae are ingested in infected muscle tissue (raw or undercooked pork is the classic example in the case of trichinosis in humans). The cyst surrounding the larva is digested in the new host and the larvae molt to adults, mate, embed in the intestinal epithelium and females produce eggs which hatch (1000 larvae per female in 5 days). The hatched larvae are distributed via the circulatory system and migrate into surrounding cells, which die unless they are striated muscle fibers. Secretory products of the stichocytes induce DNA endoreduplication and transformation of the muscle fiber and into a multinucleate nurse cell which becomes encapsulated by collagen and supplied with capillaries (Despommier, 1998; Lee, 2002). The life cycle continues when the muscle is eaten by another animal. In *Romanomermis culicivorax*, the preparasitic larva is equipped with a stylet which allows penetration through the cuticle of the mosquito larva host. The stylet is lost in subsequent larval stages and the stichosome separates from the intestine, which becomes a trophosome with no anal opening to the exterior. Nutrient uptake from the insect hemolymph is through a very thin cuticle, perhaps enhanced by narrow diameter pores. Interestingly, the epidermal cells adjacent to the cuticle have their absorptive surface area increased by outwardly-directed microvilli (Poinar and Hess, 1977; Munn and Munn, 2002). The continued role of the stichosome is unclear although it appears to be involved in protein synthesis (Poinar, 1983). The larva undergoes one molt in the insect host and then ruptures the body wall as it emerges. After a final molt to the adult stage, the female deposits eggs. The nature and function of stichocyte secretions, particularly of vertebrate parasites, is an area of continued interest in research on host-parasite relationships.

Literature Cited

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General Reading

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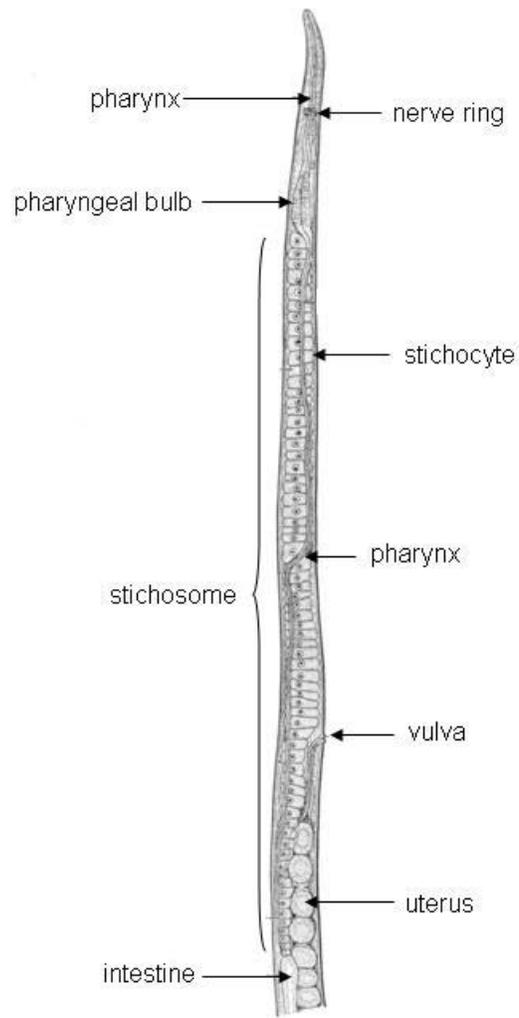


Figure 1. The stichosome of *Trichinella spiralis*. Adapted from Chitwood, 1930.

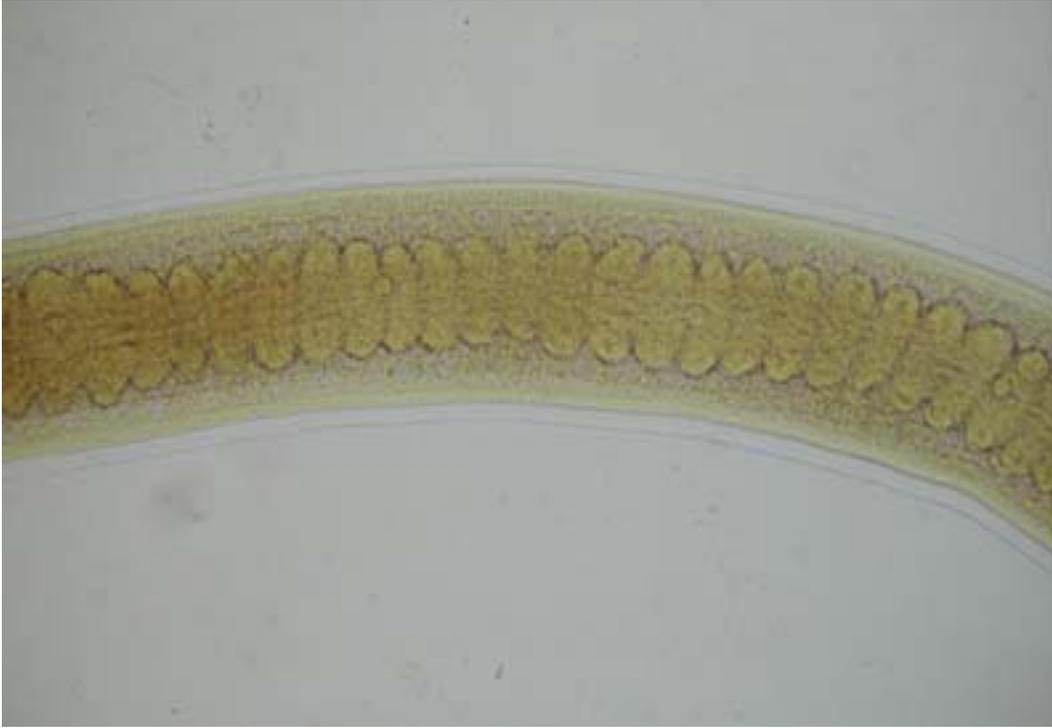


Figure 2. A portion of the stichosome of the whipworm, *Trichuris trichiura*.
Photomicrograph by Sung-Jong Hong (The Korean Society for Parasitology).