

Topic 14: Ecdysozoans: Nematodes, Arthropods, & some minor groups (Ch. 33)

I. Ecdysozoa (clade)

A. defined primary by molecular evidence

B. synapomorphy is **ecdysis**, or molting, of **cuticle**

1. cuticle is a (relatively) tough external coat that is often chitinous and often serves as an exoskeleton
2. growth requires partial dissolving and then shedding of the cuticle (ecdysis) and depositions of a new cuticle
3. process of molting (ecdysis) usually controlled by **molting hormone**, or **ecdysone**
4. new cuticle is relatively soft and expandable for a while
 - animal usually “puffs up” to expand new cuticle, then grows into it
 - animal is vulnerable while the new cuticle hardens

C. clade includes the following phyla and organizational taxons that we will cover:

1. Scalidophora

- Phylum Priapulida (clade)
- Phylum Loricifera (clade)
- Phylum Kinorhyncha (clade)

2. Nematoida

- Phylum Nematoda (clade)
- Phylum Nematomopha (clade)

3. Panarthropoda

- Phylum Onychophora (clade)
- Phylum Tardigrada (clade)
- Phylum Arthropoda (clade)

II. Scalidophora

- A. clade of three phyla: Priapulida, Loricifera, and Kinorhyncha
- B. basal branch within Ecdysozoa
- C. all are pseudocoelomate or acoelomate
- D. have spiny, eversible proboscis that is used for feeding

III. Phylum Priapulida (clade) – penis worms

- A. marine; 16 living species, all with phallic appearance
- B. range from near microscopic to about 20 cm in length
- C. fossil record back to the Cambrian period, were likely major predators during Cambrian
- D. named for Greek fertility god Priapos

IV. Phylum Loricifera (clade)

- A. ~100 living species
- B. live in marine sediment
- C. tiny (less than 3 mm long)
- D. can telescope most of body into **lorica**, a protective 6-plate pocket

V. Phylum Kinorhyncha (clade)

- A. ~150 living species
- B. live in marine sediment
- C. tiny (less than 1 mm long)
- D. segmented body, with head, neck, and trunk with 11 segments

VI. Nematoida

- A. clade containing two phyla: Nematoda and Nematomorpha
- B. sister group to Panarthropoda

C. pseudocoelomate

VII. Phylum Nematoda – roundworms or nematodes

- A. "If all the matter in the universe except the nematodes were swept away, our world would still be dimly recognizable...we should find its mountains, hills, vales, rivers, lakes, and oceans represented by a thin film of nematodes." -N.A. Cobb, 1914, Yearbook of the United States Department of Agriculture
- B. ~25,000 living species (maybe as many as 500,000)
- C. most soil-dwelling and microscopic (< 1 mm)
- D. covered with flexible, thick cuticle
- E. muscles extend along length (longitudinal), not around
- F. feeding:
 - 1. many are parasites
 - 2. mouth often has **stylets** for piercing
 - 3. muscular chamber in throat (**pharynx**) used for sucking up food
- G. many are important plant parasites
- H. about 50 species parasitize humans
- I. *Trichinella* - causes **trichinosis**, females in digestive tract of pigs produce young which make their way to muscle tissue where they form cysts - cook well and you are fine, but 2.4% of people in U.S. carry the worm (don't eat raw pork!)
- J. *Caenorhabditis elegans* – important lab animal; adult has exactly 959 cells; complete developmental cellular anatomy known
- K. no cilia or flagellae, even on sperm
- L. reproduction – sexual, with separate sexes (**dioecious**)

VIII. Phylum Nematomorpha – horsehair worms or nematomorphs

- A. ~320 living species
- B. similar to nematodes in physiology