Phylum Nematoda (Roundworms)

[Exercise 10A; p160]

Identifying Characteristics of Phylum:

- freeliving and parasitic worms with elongated cylindrical body tapered at both ends
- three true tissue layers
- has a body cavity that is a pseudocoelom (cavity incompletely lined with mesodermal tissues) that serves as hydroskeleton
- external nonliving cuticle secreted by epidermis
- complete digestive tract with mouth and anus
- exhibits eutely (the number of cells is constant in each species)

Cell Types and Characteristic Structures:

- epidermis (=hypodermis) usually syncytial and secreting a flexible cuticle
- three true tissue layers; mesoderm forms longitudinal muscle layer lining the body wall
- no muscle tissue associated with intestine
- gastrodermal cells line intestine

Body Organization:

- round, nonsegmented, tubular body tapering at both ends
- no distinct head apparent
- characteristic "S"-like movements as longitudinal muscles in body wall work against hydrostatic skeleton
- presence of a body cavity and a complete digestive tract creates "tube within a tube" body design
- strong muscular pharynx (tripartite in cross section) is not eversible

Classification:

(A very large yet poorly known phylum in which the taxonomy has not been clearly worked out)

Lab Activities:

1. Read description and discussion of roundworms in the lab manual beginning on page 159

2. Ascaris, the intestinal roundworm (p 160) preserved: Ascaris lumbricoides
   a. general features
      • know: spicules, mouth, lips, anus, vulva
      cuticle, lateral line

   b. internal structure
      • know: both: pseudocoel, excretory canals, pharynx
      intestine,
      female: vagina, uteri, oviducts, ovaries
      male: ejaculatory duct, seminal vesicle
      vas deferens, testis

3. Transverse Sections of Ascaris (p162) slides: Ascaris lumbricoides male, cs
   Ascaris lumbricoides, female, cs or Ascaris male & female
   • know: both: cuticle, epidermis, longitudinal muscles, pseudocoel, excretory
canals, intestine
female: uteri, oviducts, ovaries
male: testis, vas deferens, seminal vesicle

4. Vinegar Eels: *Turbatrix aceti* (p162) live: vinegar eels
   • Note characteristic thrashing movement with and without sand
   • Be able to recognize them as nematodes
   • Know: mouth, pharynx, intestine, anus,
   distinguish between male and female
   (To study their anatomy you may need to add a drop of *detain* to a slide)

5. Trichina worm: *Trichinella spiralis* (p165) slide: *Trichinella spiralis* encysted larva, wm
   • Be able to recognize the encysted larva
   • Know what disease this organism causes

6. Pinworm *Enterobius vermicularis* (p166) slide: *Enterobius vermicularis*, wm
   • Be able to recognize it as a nematode
   • Know what disease this organism causes

Demonstrations:

• Body Cavities: be able to distinguish between the acoelomate, pseudocoelomate and eucoelomate condition

• General Nematode Anatomy: may help you to identify some of the assigned structures in your specimens

• Observe other roundworms that are on display and be able to recognize the phylum and the diseases each is associated with if any

Notebook Suggestions:

→ Make observations on the movement of the vinegar eels both with and without the sand grains

→ Compare the various roundworms in terms of size and anatomy; what are their similarities and what are their differences

→ Make some drawings and observations of nematodes that you have collected from soil/root samples