5. Ph. NEMATODA (and other former "pseudocoelomates")

"If all the matter in the universe except the nematodes were swept away, our world would still be dimly recognizable... we would find its mountains, hills, valleys, rivers, lakes and oceans represented by a thin film of nematodes" --N.A. Cobb, 1914

MAJOR TAXA
Ph. Nematoda (≅ 20-100,000 species)

MAJOR THEMES
Bilateria
Ecdysozoa
Taxonomic distribution of "vermiform" bodies
Body cavity variation and functions
Distribution of "pseudocoeloms" among phyla
Syncytial epithelium
Chitinous cuticle
Hydrostatic pressure
Eutely
Helical reinforcing fibers

OUTLINE

Recap: Flatworm body plan: triploblasty and solutions to problems of supply and distribution

- Evolution and phylogenetic retention of worm-shaped bodies
- "Pseudocoelomates": a pseudo-grouping of mostly worm-shaped phyla
- Body cavities: what does an internal cavity allow?
- Nematodes: a psuedocoelomate (outdated), ecdysozoan (current usage) worm

TOP TEN concepts to appreciate about worm-shaped phyla (esp. nematodes)

10. Vermiform shapes have evolved or been maintained throughout evolutionary history
9. Themes of bilaterian body design: symmetry, cephalization, body cavities, locomotion
8. Nematodes: Small size, ubiquitous distribution, diversity of body forms and trophic structures
7. Triploblasty, cephalization, "pseudocoelomate" condition that may be secondarily derived
6. How muscles and hydrostatic skeletons can interact to effect locomotion
5. Role of the cuticle and collagenous reinforcing fibers in body form and locomotion
4. Relationships to arthropods, other ecdysozoa, and other "pseudocoelomates"
3. Syncytial epithelium: greater physiological control than with a typical epithelium?
2. Eutely: strict conservation of cell number
1. Ecological and economic importance of an enormous phylum

GOALS

After studying from lecture notes and the associated reading, you should be able to:

- Describe how a hydrostatic skeleton uses incompressible fluid to antagonize opposing muscles
- Explain how reinforcing fibers can help to determine properties of a hydrostatic skeleton
- Describe how different types of body cavities can aid in internal circulation and distribution
- Speculate on possible advantages of eutely and a syncytial epithelium
- Describe general aspects of the diversity of nematode nutrition and lifestyles
- Describe how nematodes differ in musculature from most other worm-shaped organisms, and how this influences their locomotion
- Describe the relationship between bilateral symmetry, the location of nervous and feeding structures, and the use of muscles for movement