4. Ph. PLATYHELMINTHES ("flat worm") and Ph. NEMERTEA ("unerring")

"Everybody wants prosthetic foreheads on their real heads." --They Might Be Giants

MAJOR TAXA	Cephalization
Ph. Platyhelminthes (~18500 described spp.)	Organ grade of construction
Cl. Turbellaria (free-living)	Tissue layers: mesoderm, triploblasty
O. Rhabdocoela, Tricladida,	Fundamentals of muscular locomotion
Polycladida, etc.	Body size and gut complexity
Cl. Cestoda, Trematoda (parasitic)	Excretion and water balance
Ph. Acoela	Nervous system: ventral nerve cords/ganglia
Ph. Nemertea (= "Rynchocoela" ~100 spp.)	Reproductive system: sperm transfer/storage
	Duo-gland adhesive system
MAJOR THEMES	The nemertean proboscis and rhynchocoel
Bilateral symmetry	Evolutionary reduction of the coelom

Recap Cnidarian body plan (diploblasty, cnidocyte, life cycles, colonial growth, polymorphism)

TOP TEN concepts to understand and appreciate about flatworms and ribbon worms

10. How circulatory systems solve problems of supply and elimination
9. Flatworm bodies: size and the complexity of gastrovascular cavities
8. The evolution of enodmesoderm: internal musculature and organ systems
7. Bilateral symmetry and cephalization: concentration of sensory structures and processing
6. Protonephridia and their function as simple kidneys
5. Internal fertilization and complex reproductive systems
4. Evolution of parasitic lifestyles (next week)
3. Nemertean complete gut: efficiency but no specialization?
2. Relationships among the complete gut, circulatory system, and excretory system
1. Rhyncocoel and proboscis: a unique, coelomic(?!) apparatus used for predation and defense

GOALS

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

- Explain why triploblastic animals face problems with the distribution of nutrients and the elimination of wastes, and how diploblastic animals and sponges avoid these problems
- Describe general features of flatworms and nemerteans that are used to solve such problems
- Speculate on why elongation and cephalization are common among animal phyla
- Deduce from the size of a flatworm the likely form of its digestive system
- Explain the work that muscles can and cannot do, the basic operation of a musculoskeletal system, and the concept of muscle antagonism
- Explain how circumferential and longitudinal muscles can be used in different ways for changes in body shape that aid locomotion
- Describe general characteristics of the flatworm reproductive system and sexuality
- Describe how nemerteans differ from flatworms in food capture, digestive system, and circulatory system
- Explain at least two potential advantages of a complete (one-way) digestive system
- Explain why excretory systems of the two phyla work with other aspects of body design