LIFE SCIENCES 11
CHARACTERISTICS & BODY PLANS

Domain Eukarya
Kingdom Animalia

Five general characteristics of animals

1. Feeding
   - heterotrophic; ingest and digest food

2. Support
   - many have an exoskeleton or endoskeleton

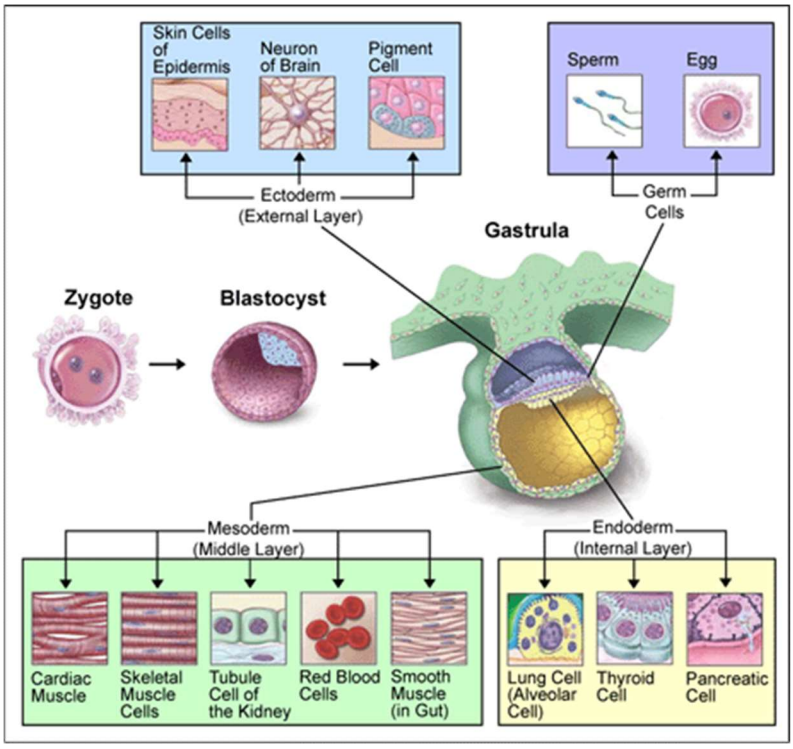
3. Movement
   - muscle fibers allow for motion or locomotion

4. Cell Structure
   - multicellular
   - no cell wall
   - most have tissues and organs

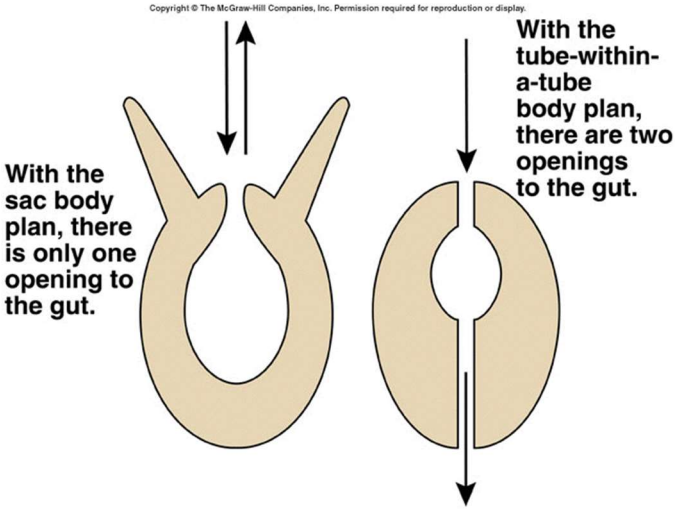
5. Reproduction
   - diploid adult in life cycle
   - sexual reproduction (embryo has developmental stages)
   - some can reproduce asexually – budding, fragmentation, regeneration or parthenogesis

Animal Body Plans

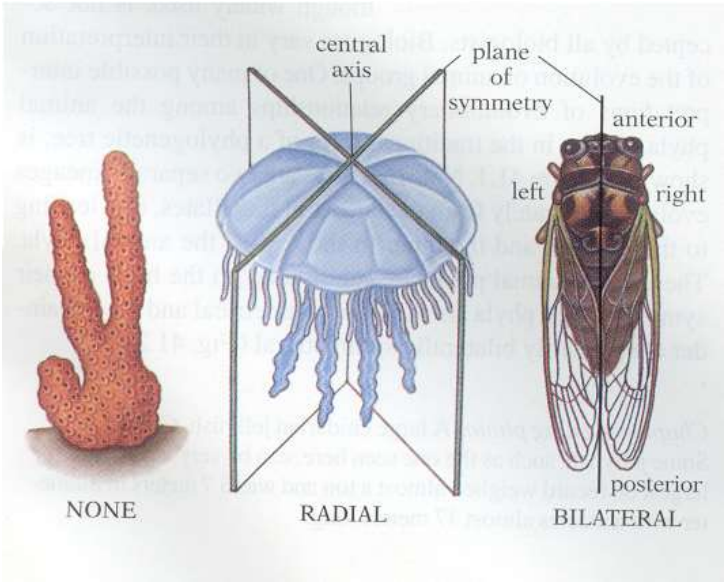
1. Level of Organization
   - cell level, tissue level or organ level of organization
   - based on the number of germ layers (layers from which other structures are derived) present
     - no tissues → cell level of organization
     - only two germ layers (ectoderm and endoderm) → tissue level of organization
     - three germ layers (ecto-, endo- and mesoderm) → organ level of organization



2. Digestive System
   - Sac Plan
     - incomplete digestive system → only one opening that the animal both brings food in and removes waste through
   - Tube-Within-A-Tube Plan
     - complete digestive system → one opening for ingestion and one opening for removal of wastes
     - allows for specialization of parts along the length of the digestive tract (ie: stomach, intestines, etc)



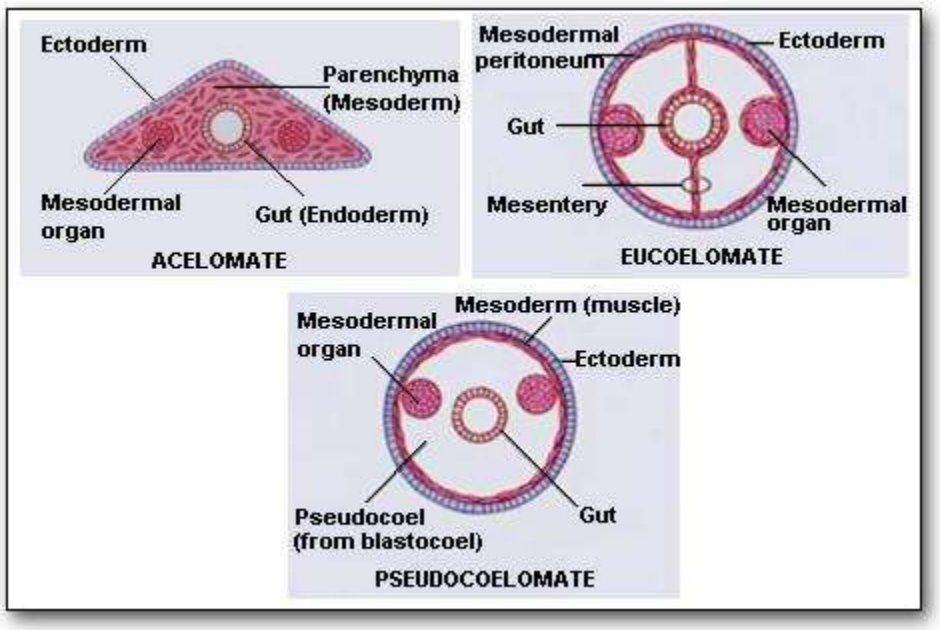
3. Type of Symmetry
    - Asymmetry
        - no symmetry (no balanced distribution of duplicate body parts or shapes)
    - Radial Symmetry
        - circular symmetry (like a wheel)
        - get two identical halves whenever the animal is cut longitudinally
        - sometimes sessile (attached to substrate/ground)
    - Bilateral Symmetry
        - defined left and right sides
        - only get identical halves when the animal is cut down the center
        - animals tend to be active and move forward
        - associated with cephalization → localization of a brain and specialized sensory organs at anterior (head) end of animal

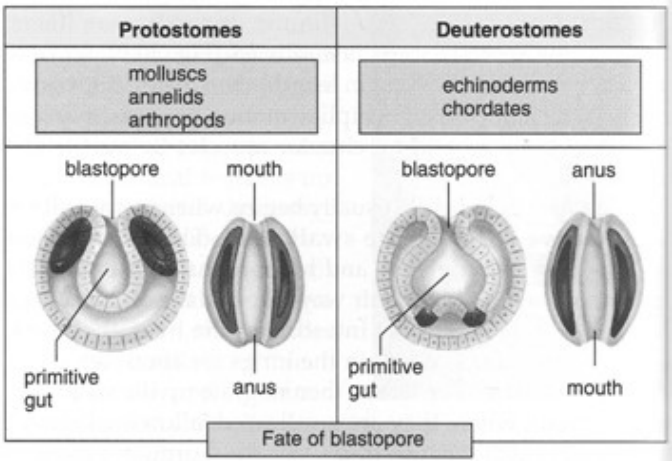


4. Type of Coelom
    - presence of all 3 germ layers allows for the formation of organs
    - Acoelomates
        - no body cavity → solid body between digestive tract and body wall
        - nutrients and wastes diffuse from one cell to the next
        - allows for simple organ development
    - Pseudocoelomates
        - body cavity incompletely lined by mesoderm
        - fluid filled cavity develops between the mesoderm and endoderm → limits organ and organ system development

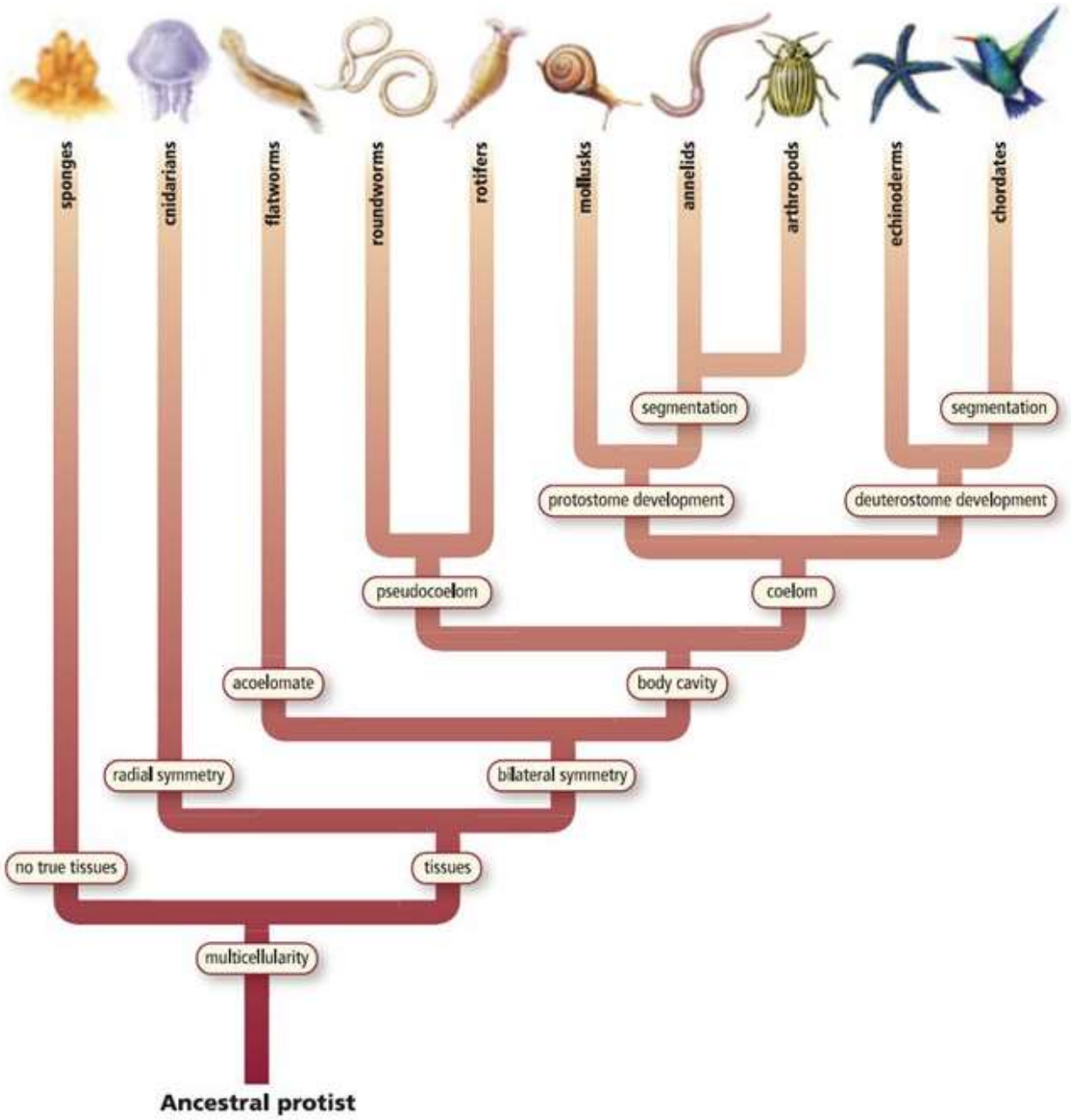
- Coelomates
  - fluid-filled body cavity completely lined by mesoderm
  - allows for specialized organs and organ systems to develop → allows for larger animals with increased levels of activity
  - developing embryo forms a ball with one opening; as the mesoderm layer develops, it creates a second opening opposite the first

	First Embryonic Opening	Second Embryonic Opening
Protostome	Mouth	Anus
Deuterostome	Anus	Mouth

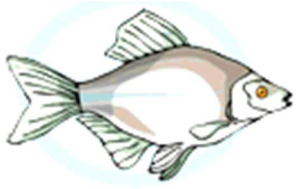




5. Segmentation
    - the formation of an animal from similar body parts
    - segmentation allows for different body parts to develop for specific purposes
    - two advantages
        - increased survivability → if one segment is damaged, another segment may be able to carry out the same function
        - Increased movement → segments can move independently



Animal Symmetry and Phyla



Animal	Phylum	Symmetry
Snail		
Fish		
Earthworm		
Anemone		
Frog		
Jellyfish		
Starfish		
Alligator		
Crayfish		
Ant		
Elephant		
Coral