

## KINGDOM ANIMALIA FOUR KEY EVOLUTIONARY BRANCHES

### BRANCH #1

Parazoa  
No true tissues  
Porifera (sponges)

Eumetazoa  
True tissues  
Rest of the animal phyla

### BRANCH #2

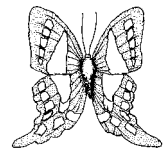
#### Radiata

- Radial symmetry
  - o Top and bottom
  - o No front & back
  - o No left and Right
- Cnidaria & Ctenophora
- Diploblastic (2 germ layers)
  - o Ectoderm
    - Covers surface of embryo
    - Becomes outer covering
  - o Endoderm
    - Innermost
    - Becomes lining of digestive tract



#### Bilateria

- Bilateral symmetry
  - o Top & bottom
  - o Right & left
  - o Front & back
- Rest of animal phyla
- Triploblastic
  - o Ectoderm becomes outer covering & part of nervous system
  - o Endoderm becomes lining of digestive tract & some organs (lungs & liver)
  - o Mesoderm
    - B/w ectoderm & endoderm
    - Becomes muscle & most organs b/w ecto & endo



Red = derived from endoderm  
Blue = derived from ectoderm  
Green = derived from mesoderm

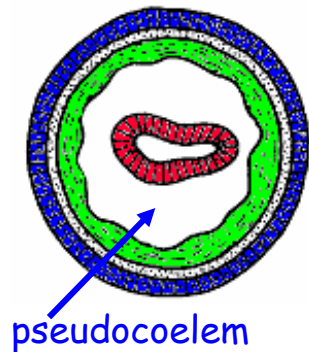
### BRANCH #3 Body cavities (coelom)

#### Acoelomates



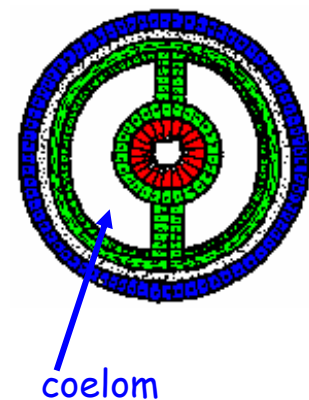
- No body cavity b/w digestive tract & outer body wall
- Solid body
- Platyhelminthes (flatworms)

#### Pseudocoelomates



- False coelom
- Body cavity not completely lined with mesoderm
- Rotifera (rotifers) & Nematoda (round worms)

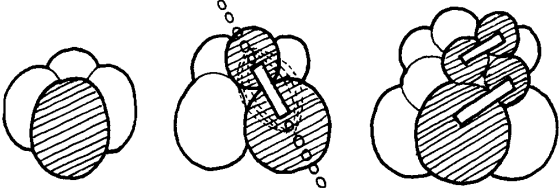

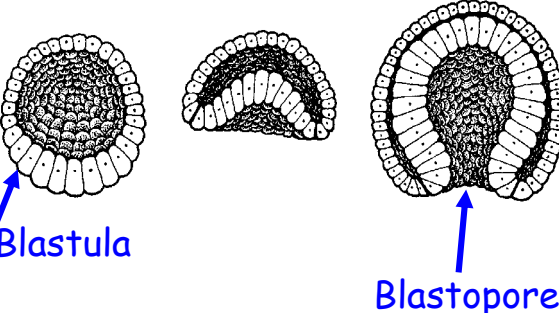
#### Coelomates

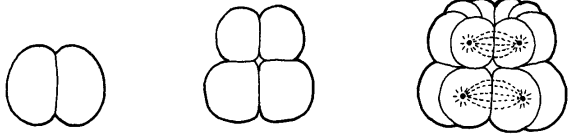
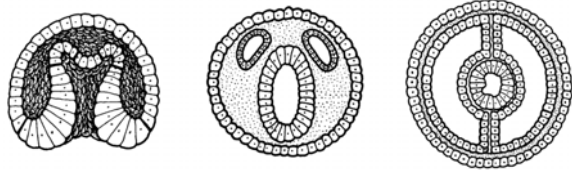
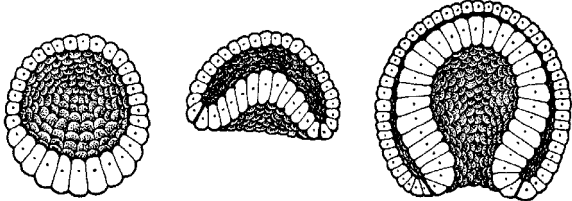


- True coelom
- Body cavity completely lined with mesoderm
- Rest of the animal phyla

stome = mouth  
 proto = first  
 deuterostome = second

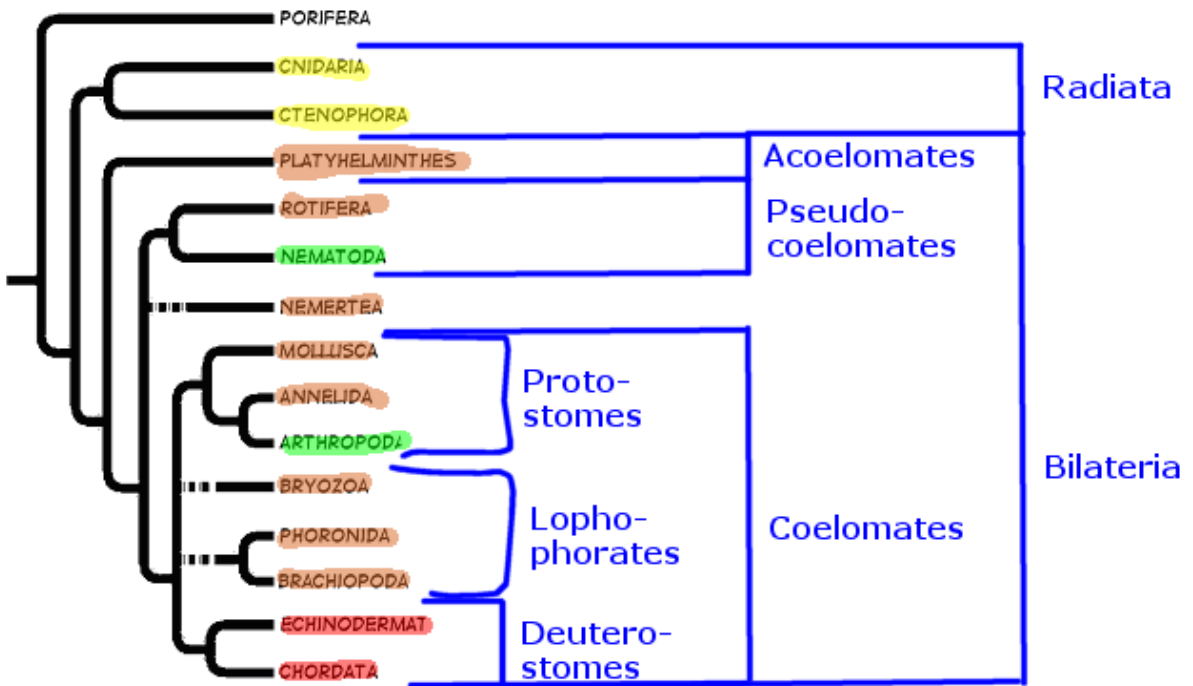
**BRANCH #4**

<p>Protostomes</p> <p>Mollusca</p> <p>Annelida</p> <p>Arthropoda</p>
<p>Spiral cleavage</p> <p>Plane of cell division diagonal</p>  <p>Determinate cleavage</p> <p>Fate of each cell determined very early</p>
<p>Schizocoelous</p>  <p>solid mass of mesoderm splits to form coelom</p>
<p>Blastopore becomes the mouth</p>  <p>Blastula</p> <p>Blastopore</p>

<p>Deuterostomes</p> <p>Echinodermata</p> <p>Chordata</p>
<p>Radial cleavage</p> <p>Cleavage plane parallel or perpendicular to vertical axis</p>  <p>Indeterminate cleavage</p> <p>Each cell in early embryo retains ability to develop into complete embryo</p>
<p>Enterocoelous</p>  <p>Coelom develops from outpocketings of archenteron (primitive gut)</p>
<p>Blastopore becomes the anus</p> 

# ANIMAL PHYLOGENY

## BASED ON BODY- PLAN



## BASED ON MOLECULAR COMPARISONS

