

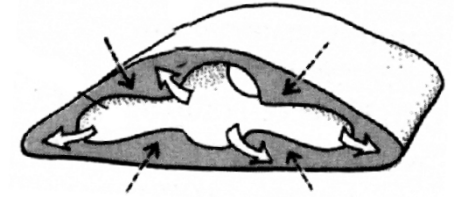
# TRADITIONAL DIVISIONS BASED ON BODY CAVITIES

## Embryonic tissue layers

## Diffusion/circulation

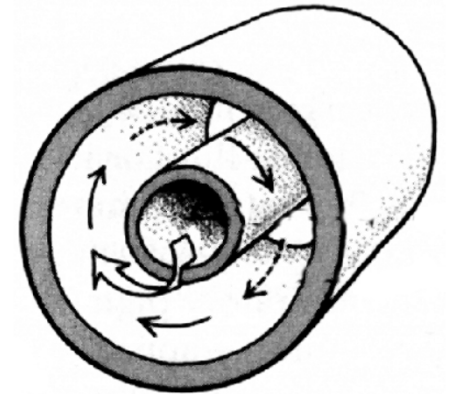
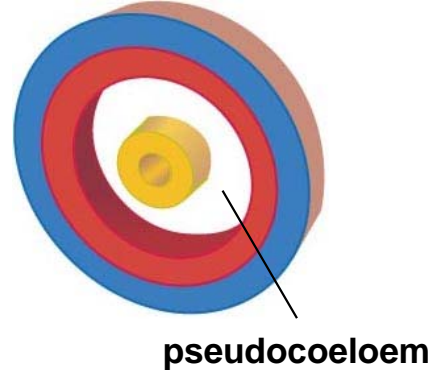
### “Acoelomate”

- Platyhelminthes
- Nemerteans



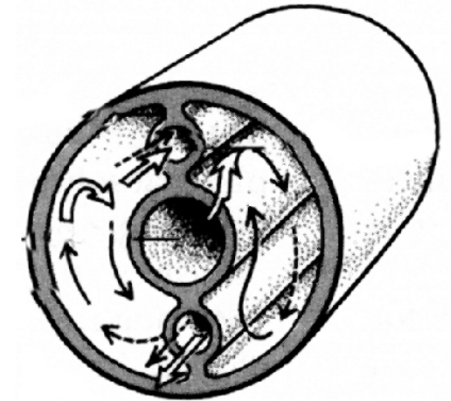
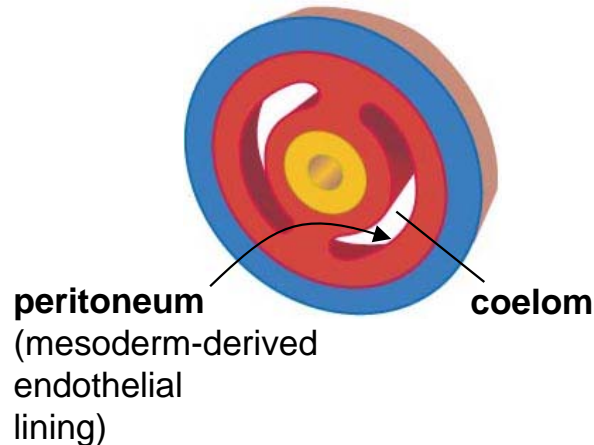
### “Pseudo-coelomate”

- Nematoda
- Nematomorpha
- Kinorhyncha
- Loricifera
- Priapula
- Tardigrada
- Gastrotricha
- Acanthocephala
- Cycliophora
- Gnathostomulida
- Rotifera



### Coelomate

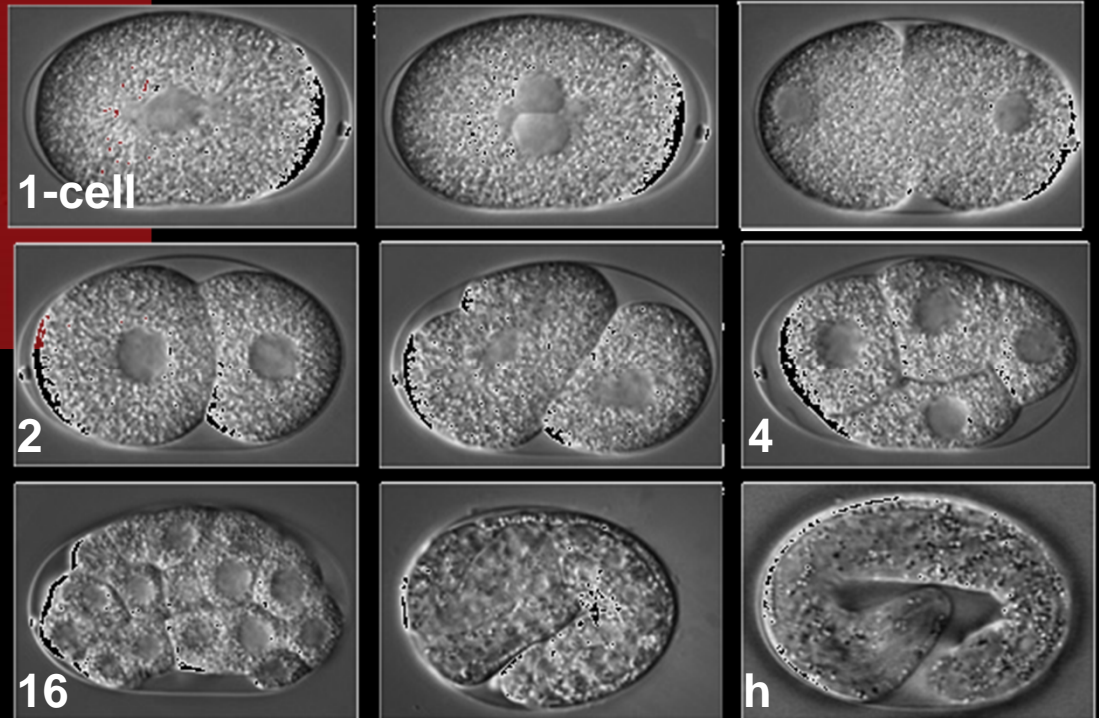
- |               |                 |
|---------------|-----------------|
| - Mollusca    | - Arthropoda    |
| - Annelida    | - Onychophora   |
| - Sipuncula   | - Tardigrada    |
| - Phoronida   | - Echinodermata |
| - Brachiopoda | - Hemichordata  |
| - Bryozoa     | - Chordata      |



# Ph. Nematoda

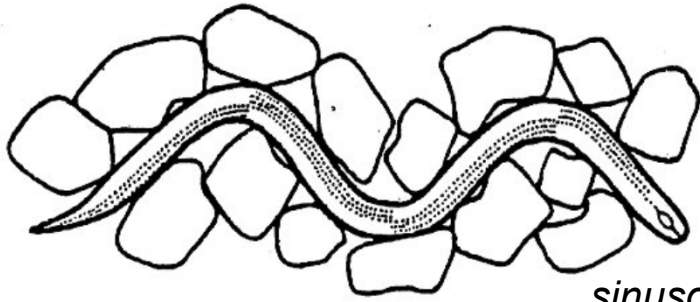


Model research system  
*Caenorhabditis elegans*



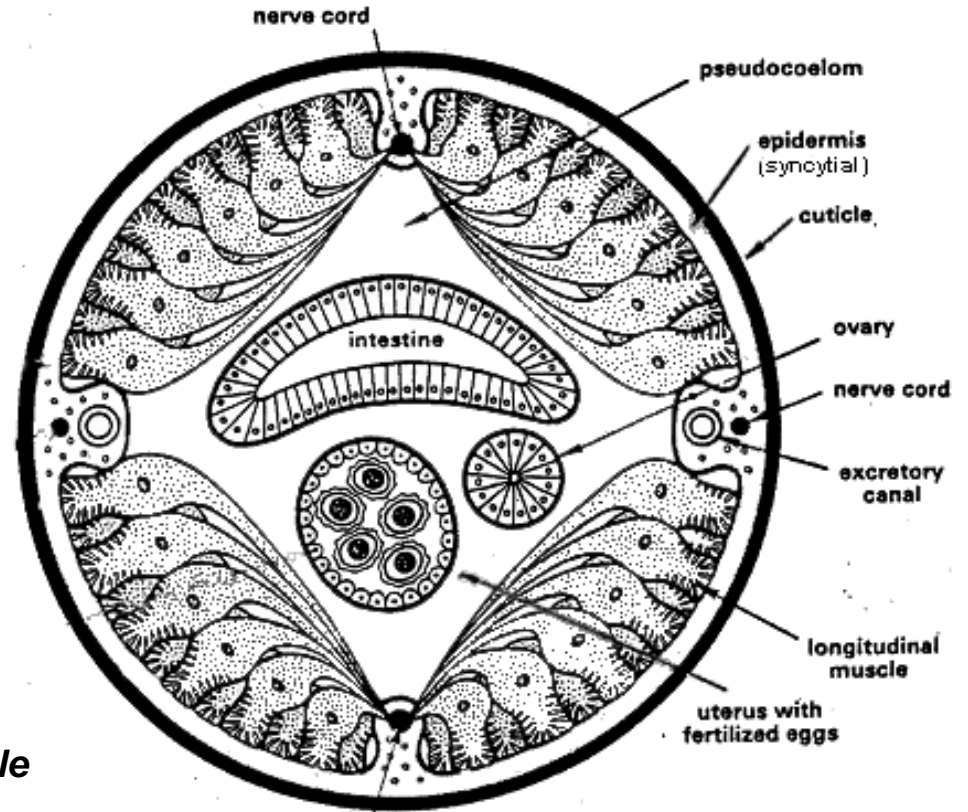
**Theme:** chitinous cuticle;  
evolution of  
pseudocoelomates

# Ph. Nematoda

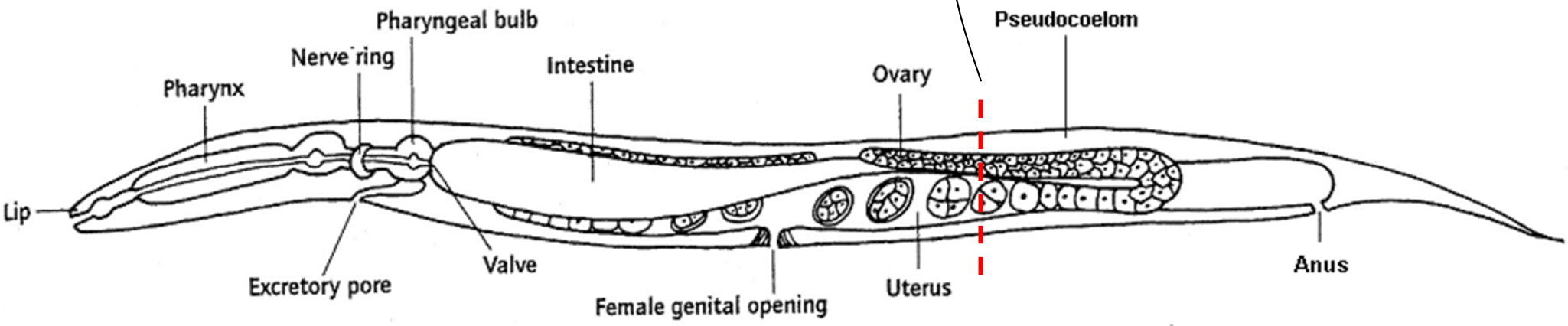


*sinusoidal locomotion*

- *pseudocoelom*
- *high internal pressure*
- *molted chitinous cuticle*
- *syncytial epidermis*
- *longitudinal muscle only*
- *muscle projections to nerves*

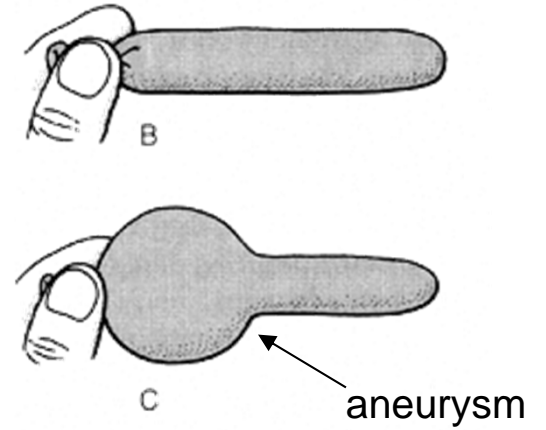
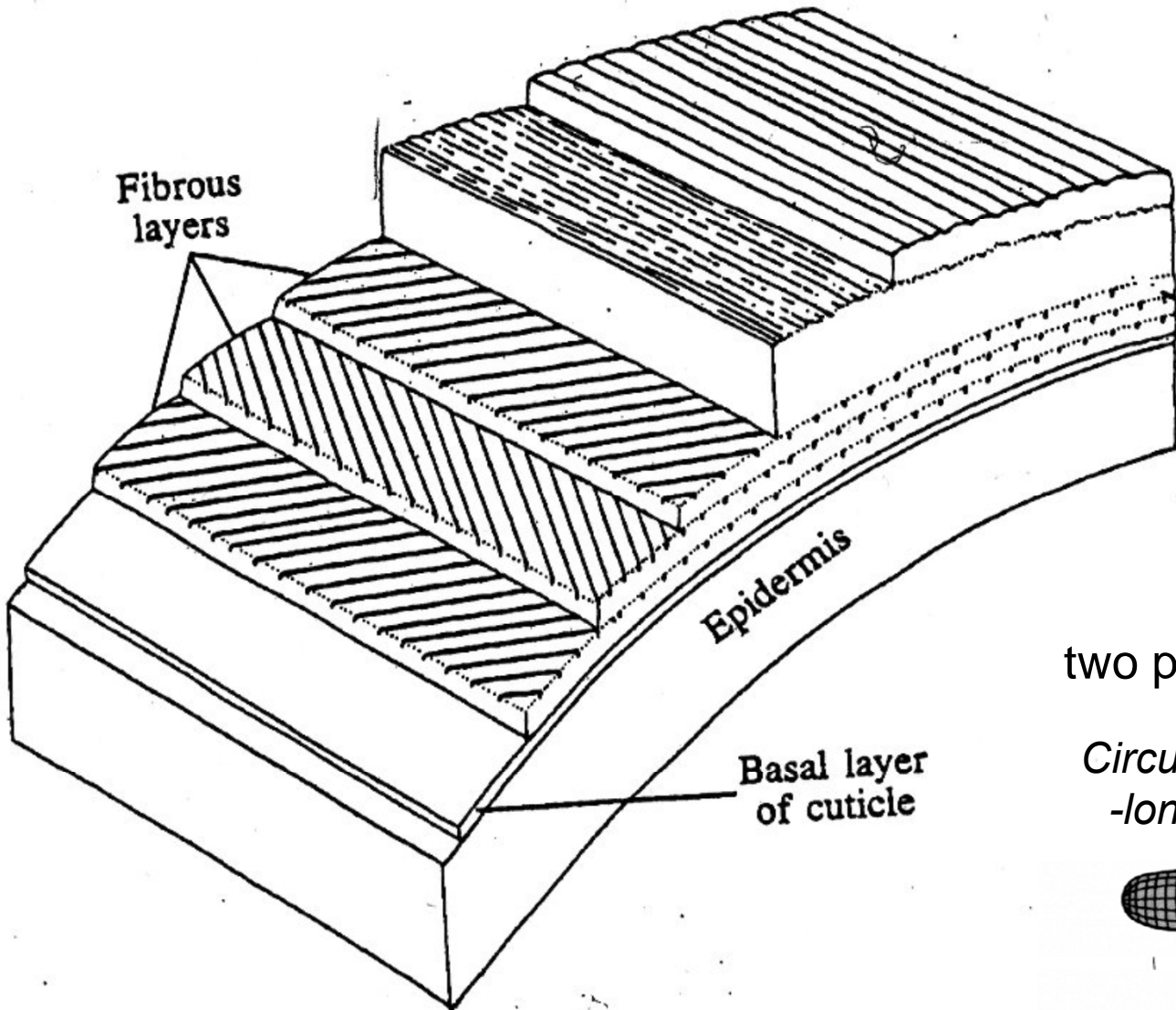


nerve cord



Pseudocoelom

**Cuticle** = chitin + reinforcing collagen fibers



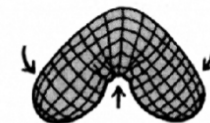
Collagen fibers:  
two possible orthogonal arrangements

*Circumferential  
-longitudinal*

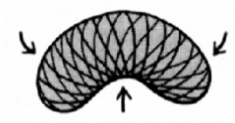
*Helical*



At rest

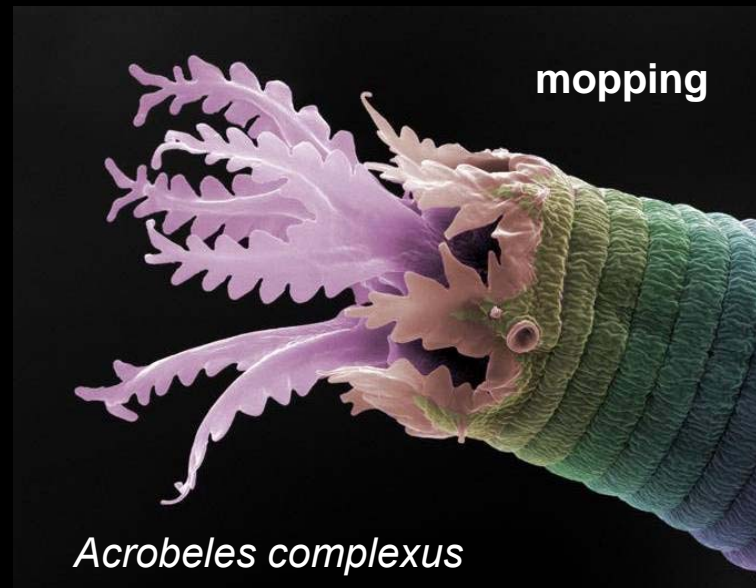
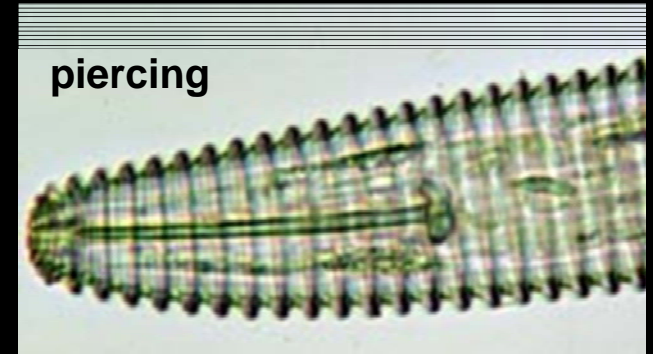
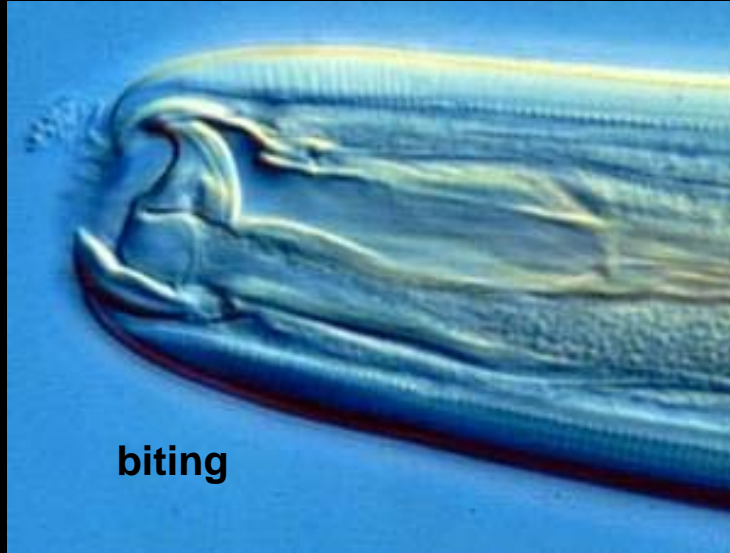


Bend



▶ *allows for smooth curvature*

# Nematode trophic (feeding) structures



# Hypotheses for the evolution of body cavities

## H<sub>1</sub>: Evolution in sequence

### “Acoelomate”

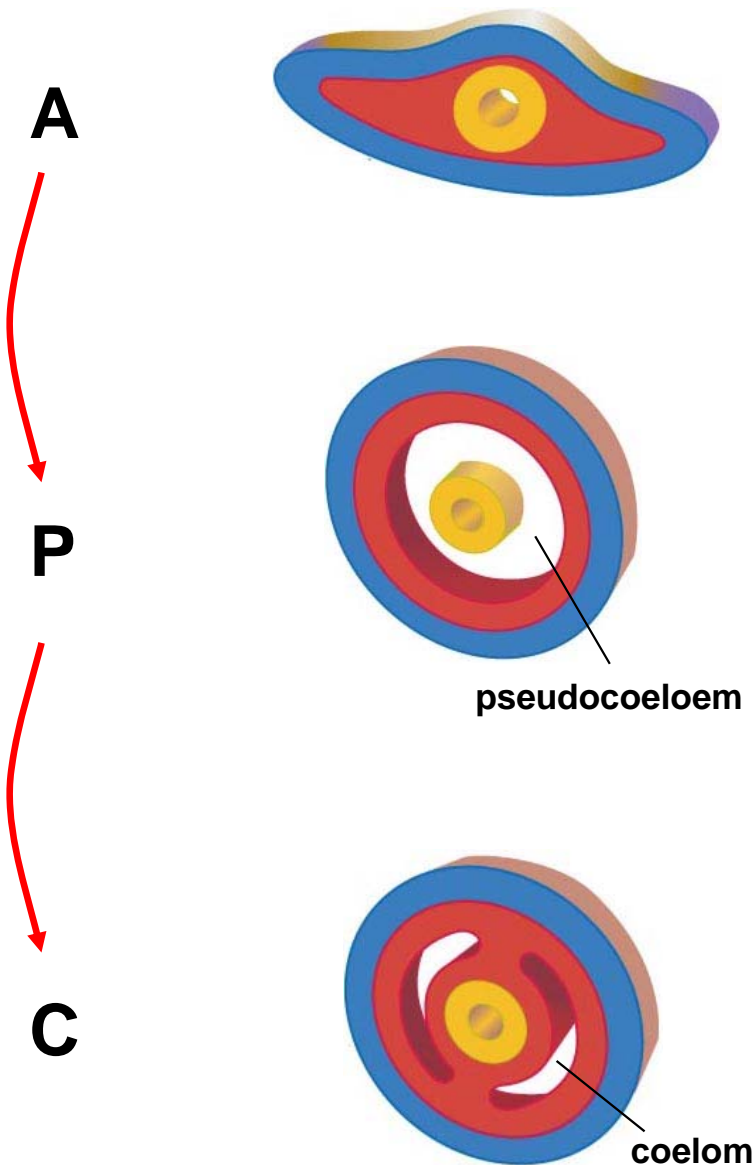
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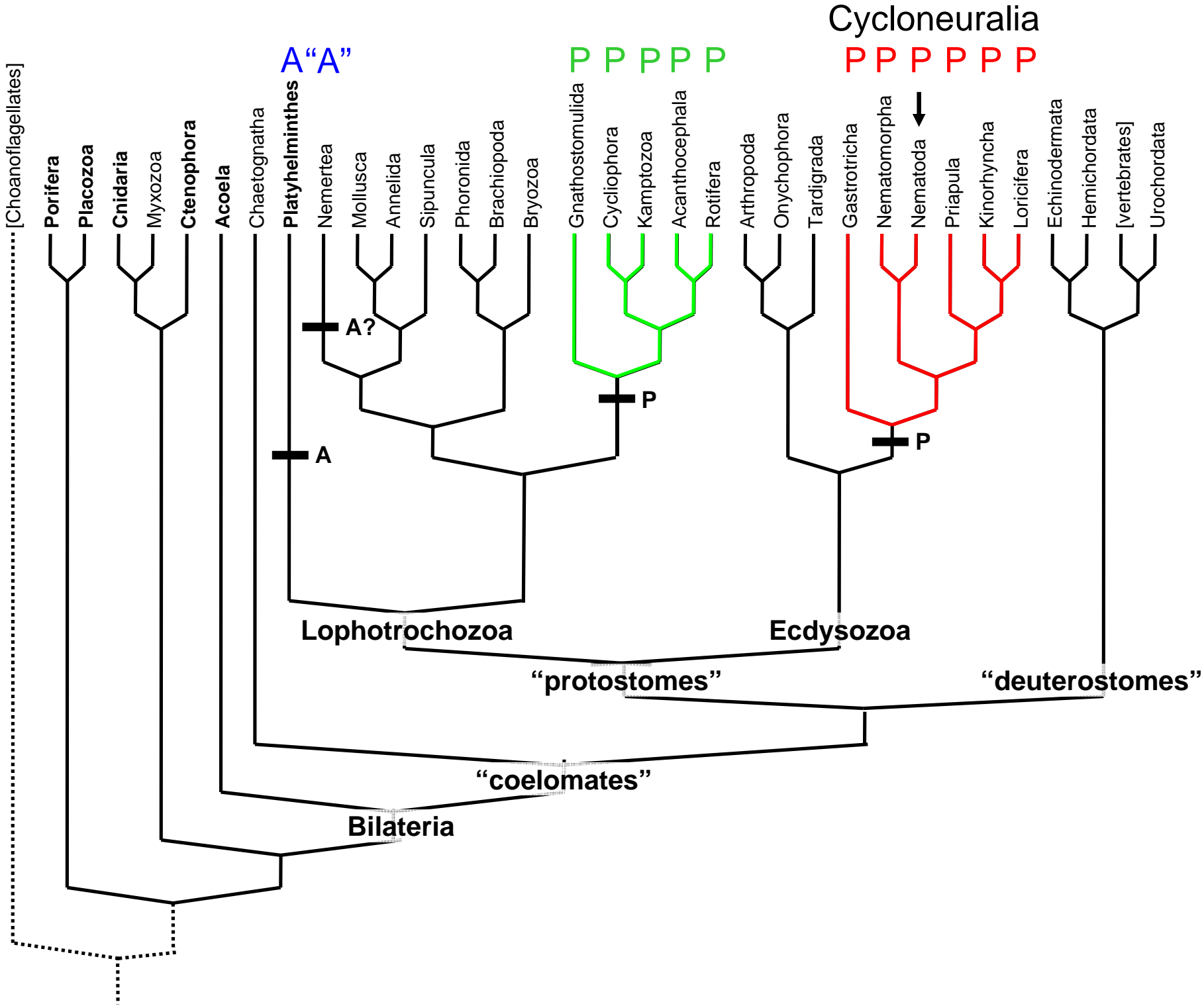
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### Coelomate

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| - Brachiopoda | - Hemichordata  |
| - Bryozoa     | - Chordata      |







# Hypotheses for the evolution of body cavities

**H<sub>1</sub>: Evolution in sequence**

**H<sub>2</sub>: Secondary loss**  
(small body size?)

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- Nemertean

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