

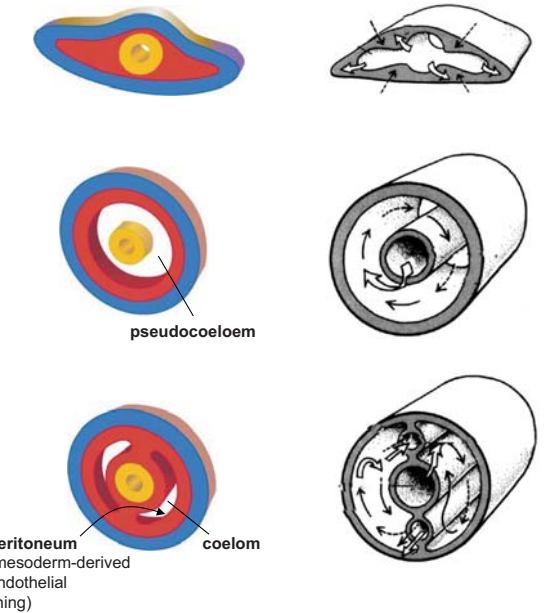
### TRADITIONAL DIVISIONS BASED ON BODY CAVITIES

**"Acoelomate"**  
 - Platyhelminthes  
 - Nemertean

**"Pseudo-coelomate"**  
 - Nematoda  
 - Nematomorpha  
 - Kinorhyncha  
 - Loricifera  
 - Priapula  
 - Tardigrada  
 - Gastrotricha  
 - Acanthocephala  
 - Cyclophora  
 - Gnathostomulida  
 - Rotifera

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

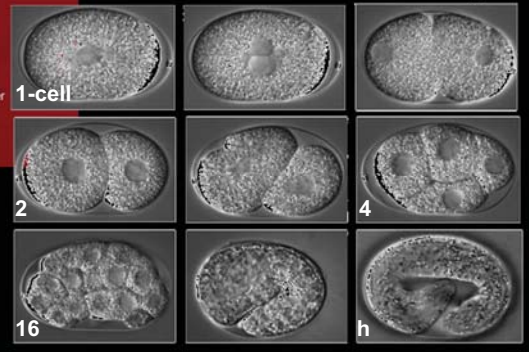
Embryonic tissue layers      Diffusion/circulation



## Ph. Nematoda

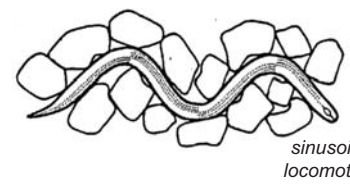


Model research system  
*Caenorhabditis elegans*

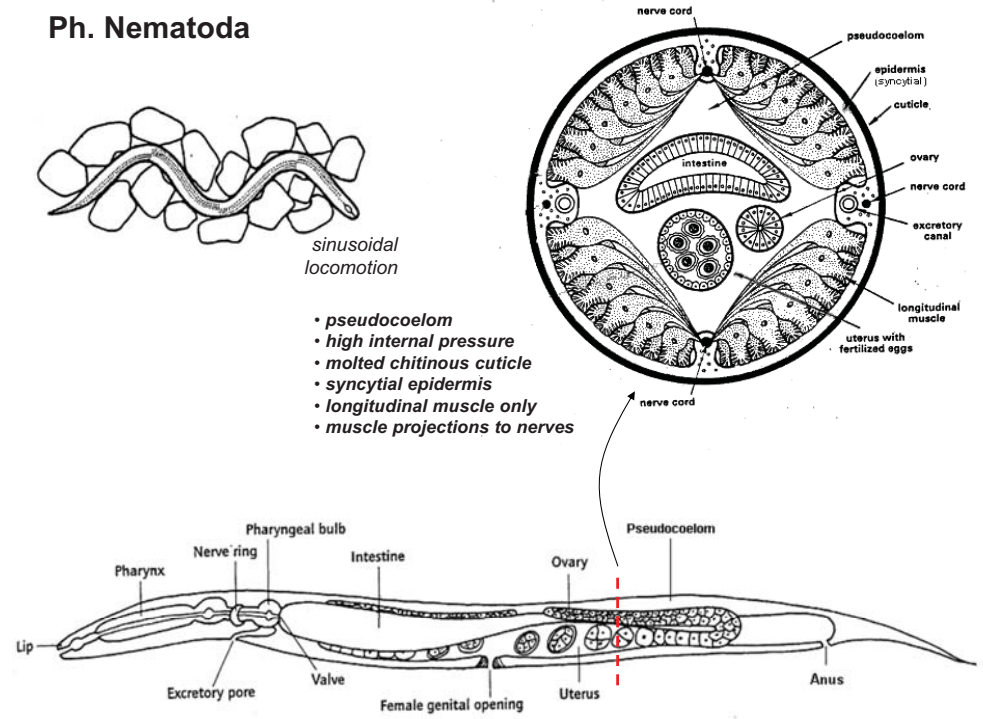


**Theme:** chitinous cuticle;  
 evolution of  
 pseudocoelomates

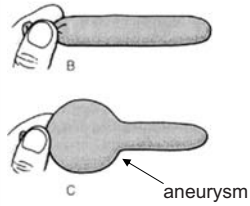
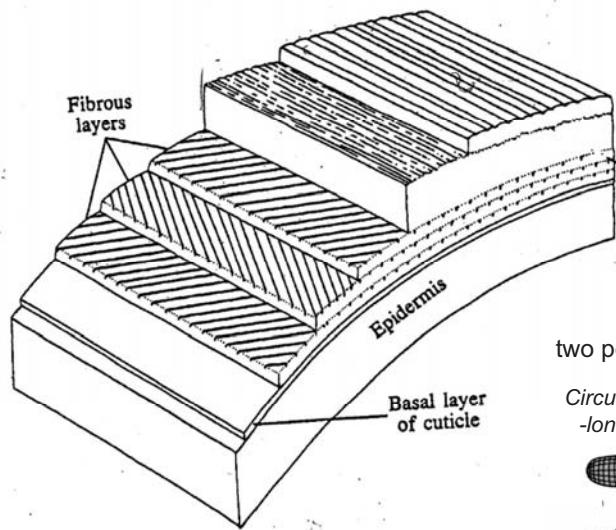
## Ph. Nematoda



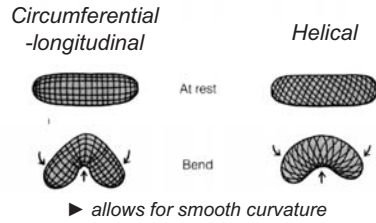
- pseudocoelom
- high internal pressure
- molted chitinous cuticle
- syncytial epidermis
- longitudinal muscle only
- muscle projections to nerves



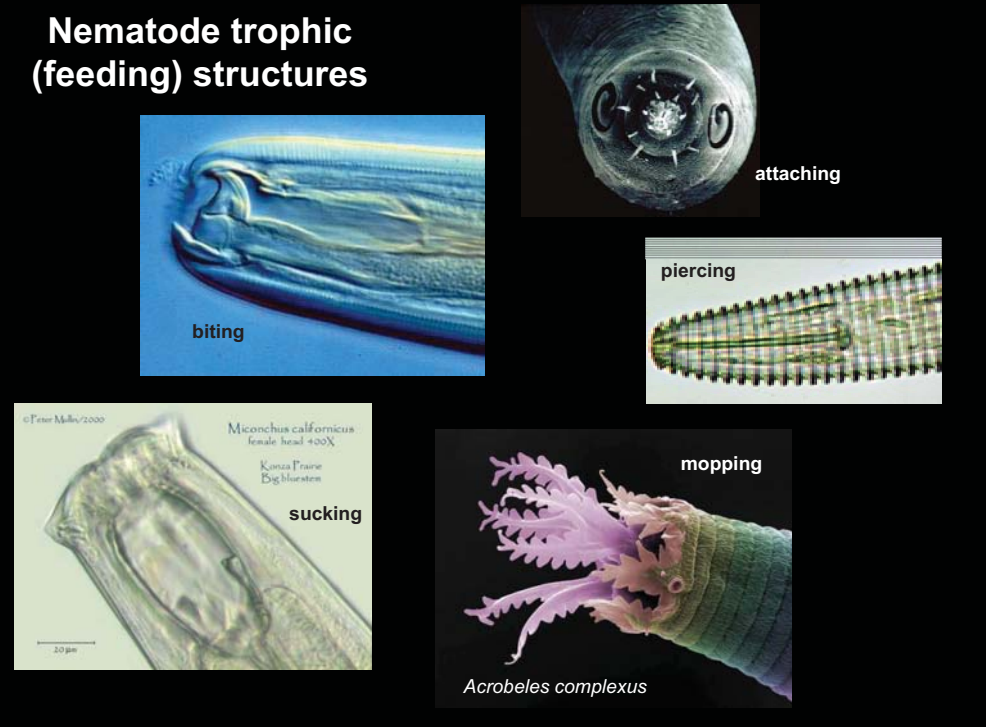
**Cuticle = chitin + reinforcing collagen fibers**



**Collagen fibers:**  
two possible orthogonal arrangements



**Nematode trophic (feeding) structures**



**Hypotheses for the evolution of body cavities**

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

**“Acoelomate”**

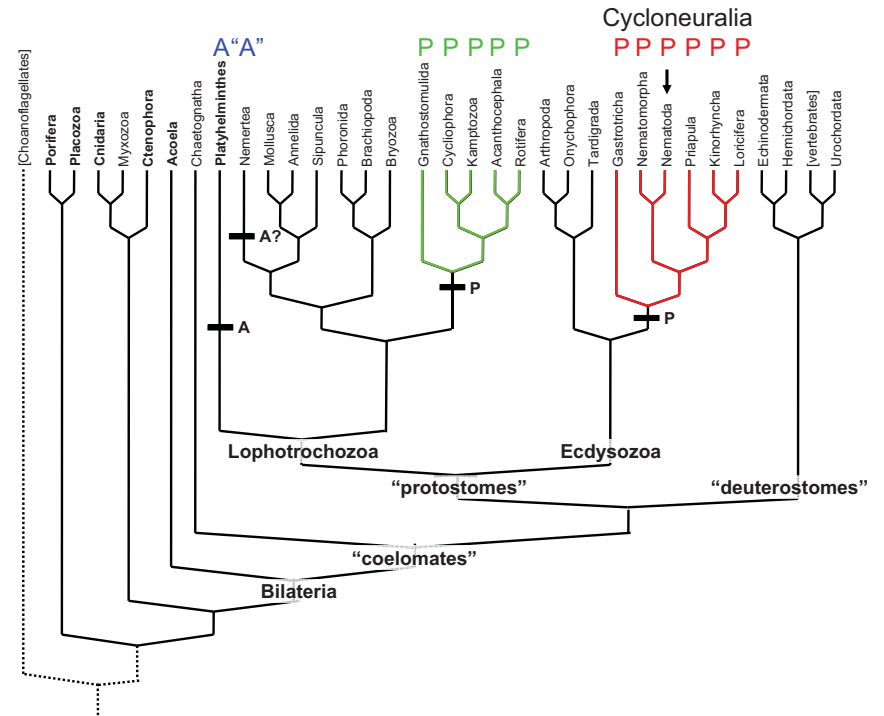
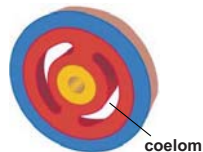
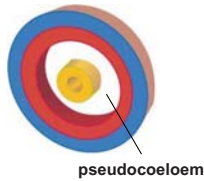
- Platyhelminthes
- Nemertean

**“Pseudo-coelomate”**

- **Nematoda**
- Nematomorpha
- Kinorhyncha
- Loricifera
- Priapulida
- Tardigrada
- Gastrotricha
- Acanthocephala
- Cyclophora
- Gnathostomulida
- Rotifera

**Coelomate**

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



# Hypotheses for the evolution of body cavities

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

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

## “Acoelomate”

- Platyhelminthes
- Nemertean

## “Pseudo-coelomate”

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

## Coelomate

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

