Cycloneuralia Characters

18(2): Ambiguous “spiral” cleavage.
92: Terminal mouth with radial pharynx.
94(4): Brain collar-shaped; with saddle on pharynx.

Pseudo-coelomates (Ecdysozoa):

1. Kinorhyncha
2. Loricifera
3. Priapulida (Priapula)
4. Nematomorpha
5. Nemata
**Pycnophyes greenlandicus**

A larval loriciferan

**Priapulus caudatus**
A horsehair worm

Strongyloides filariform larva

Deuterostome Allies?

Entoprocta
- Resemble Lophophorates.
- But: #9: Unique mushroom-shaped extensions from basal lamina into epidermis

Cycliophora
Most Successful:

1. Rotifera - aquatic, small, adaptable feeding apparatus.
   - Nematoda (Nemata) - parasitic, generalized body shape, feeding apparatus.
Common Characteristic
A pseudocoelom.
a. A fluid filled body cavity without mesenteries.
b. Position of viscera maintained by hydrostatic pressure.

Pseudocoelom
1. Allows room for gut, visera.
2. Allows area for gamete maturation.
3. Is under pressure
a. Implications of this will be seen shortly.

Pseudocoelom
The size of pseudocoel is quite variable:
1. In fact, existence of pseudocoel in some groups was an artifact of certain staining procedures
Phylogenetic Relationships

2. We'll still consider them here but bear in mind that this represents about the best example of a polyphyletic group there is.

Other Characteristics

a. Small size

1. possess reduced circulatory system
   a. internal transport via pseudocoelom.

2. Reduced excretory system:
Other Characteristics
b. Occasionally have protonephridia
c. Also may have solenocytes
1. Specialized cells like flame cells but with only 1 flagellum.

b. Bodies are elongated, unsegmented, with an external cuticle.
1. They must molt to grow.
2. Cuticle assists in locomotion, especially in nematodes.

3. External ciliation:
a. Variously developed depending on the taxon.
Other Characteristics

4. Cephalization.

Other Characteristics

c. Complete gut
1. usually simple.
2. with mouth an anus.

d. Eutely
2. Results in fixed number of cells within a species.
3. Useful in developmental biology in determining fate maps.
Other Characteristics

e. Development:
2. Spiral, determinate cleavage.
3. Persistent blastopore, that becomes mouth.

Phylum Gnathostomulida

General Characters
1. Relatively recently discovered (1956).
a. Interstitial, in anoxic black sand, may attain high densities.

Phylum Gnathostomulida

b. Small, 0.2-3 mm.
c. 100 described species, probably many others that are undescribed.

Gnathostomula armata
Phylum Gnathostomulida
General Characteristics:
1. Sensory organs: have ciliary pits, sensory cilia.

Phylum Gnathostomulida
General Characteristics:
3. Blind-ending gut; temporary anus may form.
4. No circulatory, gas exchange system
5. Protonephridia – excretion.

Phylum Gnathostomulida
General Characteristics:
6. Ciliated epidermis – for locomotion; swim/glide with help of cilia and longitudinal muscle contractions; monociliated cells on epidermis; no cuticle.
**Phylum Gnathostomulida**

**General Characteristics:**
7. Feeds with paired jaws in pharynx.
8. Protandric (male later becomes female) or simultaneous hermaphrodites.

**Phylum Gnathostomulida**

**General Characteristics:**
9. Little known about their reproduction; internal fertilization, zygotes deposited singly into habitat.
10. Spiral cleavage with direct development (no larval stage)

**Phylum Gnathostomulida**

What sets gnathostomulids apart from others?
Muscular pharynx with complex jaw for grazing; scrape food items off sand grains.
**Phylum Gnathostomulida**

3. Other notes
   a. Their lack of cuticle and monociliated cells suggests similarity to turbellarians; cross-striated muscles are like cnidarians.

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**Phylum Gastrotricha**

**General Characteristics**
1. Triploblastic, bilaterally symmetrical, unsegmented animals.
2. Microscopic
   a. 400-500 spp
   b. marine, freshwater, primarily interstitial.

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**Phylum Gastrotricha**

**Body Form:**
   a. Elongate, ventrally flattened, lobelike head w/sensory tufts.
   b. Adhesive tubes on posterior, produce attachment, detachment secretions.
**Phylum Gastrotricha**

c. Reduced coelom, mesenchyme-like material creates nearly acoelomate condition.
d. Cuticle well-developed, often with scales, spines (hence the name).

**Phylum Gastrotricha**

1. Also partly syncitial
2. with ventral, monociliated cells - linked to flatworms.

**Phylum Gastrotricha**
e. Muscular pharynx, complete gut.
f. Excretion, osmoregulation via protonephridia
g. No circulation, respiratory structures - small in size.
4. Reproduction:
   a. Mostly hermaphroditic.
      1. Males are rare (may be produced only intermittently).

2. Sexuality via mutual hypodermic insemination.

b. Few large eggs produced
   1. Direct development, spiral determinate cleavage.
Phylum Rotifera

General Characteristics:
1. Triploblastic, bilaterally symmetrical, unsegmented animals.
   a. Although may appear superficially segmented.

Phylum Rotifera

General Characteristics:
   a. Mostly microscopic.
   b. Identified by van Leeuwenhoek as "wheel animalcules."

Phylum Rotifera

General Characteristics:
c. Solitary, some colonial, parasitic.
Phylum Rotifera

Body form:
a. Three recognizable regions:
   1. Head - feeding apparatus.
   2. Trunk - internal organs.
   3. Foot - attachment, toes with adhesive glands.

Phylum Rotifera

Head:
1. Conspicuous anterior end - ciliated corona.
   a. Also known as **trochus**; trochal disks in derived forms.
   b. generates current of water into mouth.

Phylum Rotifera

2. Other feeding structures:
a. Muscular pharynx – **mastax**.
b. Variable in structure depending on habitat, food.
Phylum Rotifera

*Mastax trophi:*
c. 7 hardened elements – *trophi*.
1. Redundant structures can facilitate adaptive radiation.
2. Structures must be able function, even as intermediates.