Blastocoelomates, Continued

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

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

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.

e. Muscular pharynx, complete gut.
f. Excretion, osmoregulation via protonephridia

g. No circulation, respiratory structures - small in size.
**Phylum Gastrotricha**

4. Reproduction:
   a. Mostly hermaphroditic.
   1. Males are rare (may be produced only intermittently).

2. Sexuality via mutual hypodermic insemination.

**Phylum Gastrotricha**

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**

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

**Phylum Rotifera**

**Sensory Structures:**
1. Antennae, eye.
2. Brain, retrocerebral organ.
**Trunk**
1. Usually encased in thickened cuticle – *lorica*.
2. Well-developed musculature.
   a. Circular, longitudinal muscles
   b. capable of rapid retractions - characteristic movements.
3. Salivary, digestive glands along gut.
4. Stomach, occasionally intestine and cloaca.
   a. Some species lack complete gut.
5. Excretory structures:
   a. Protonephridia, occasionally a bladder.
   b. Most waste diffuses as NH$_4^+$.

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**Phylum Rotifera**
6. Possess pseudocoelom proper.
7. No special circulatory, respiratory structures.
   d. Foot - already described.

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**Rotifera Reproduction**
a. Most species gonochoristic, highly sexually dimorphic.
1. females > males
2. males possess degenerate digestive tracts - "swimming testicles."

**Male Structures:**
1. Testis, gonopore, excretory structures.
   2. Hypodermic insemination, occasionally with dimorphic sperm.
   a. Some suggest two sperm types evolves in context of competition.

**Rotifera Reproduction**
b. Female structures:
1. germinovitellarium - produces eggs and yolk
2. oviducts lead to cloaca.
Amictic Cycle:
1. Mostly parthenogenetic – in constant conditions.
   a. amictic eggs (2n) -> females (2n) -> amictic eggs (2n).
2. Changed environmental conditions causes sexuality.

Mictic Cycle:
1. Female (2n) -> mictic egg (n).
   a. unfertilized -> male (n).
   2. Fertilized -> resting egg (2n) -> amictic female (2n).

Rotifer Sex:
3. Often used as a model to demonstrate evolutionary significance of sex.
   a. Rapid population growth assists in exploitation of temporary environments.

Development:
4. Direct development; spiral, determinate cleavage (Protostomous).
   1. Sessile forms may have motile "larval" stage
   2. Really just small, unattached adults.

Phylum Kinorhyncha
General Characteristics:
1. Small, relatively poorly known despite discovery in mid-1800s.
   1. 150 spp.
2. In marine, interstitial habitats, commensal w/sponges, hydroids.
Phylum Kinorhyncha

General Characteristics:
2. Triploblastic, bilaterally symmetrical, segmented pseudocoelom.
1. Suggests affinity w/ annelids.
2. Appears convergent - (movement).

Body Form:
1. Divided into 13 segments (zonites).
   a. Reflected in internal musculature.
   1. Dorsolateral, ventrolateral muscles - top and bottom.
   2. Diagonal muscles - between segments.

Body Form:
b. Nervous system also segmented.
c. Segmentation appears to permit movement through substrate.
d. cuticle is shed with growth.

Body Form:
2. Head is cone-shaped (coneheads), oral stylets on "snout."
   a. Zonites possess spines, dorsal, ventral plates.
   b. Nervous system also segmented.
   c. Segmentation appears to permit movement through substrate.
   d. cuticle is shed with growth.

Body Form:
4. Like other phyla, no circulatory, respiratory structures.
   a. Protonephridia - solenocytes (2) for osmoregulation.

Body Form:
1. Poorly known, but separate sexes exist.
   a. Possess sperm storage organ.
   b. Suggests multiple mating, possible sperm competition.
**Reproduction:**
What can we say about mating systems based on evidence that multiple mating can occur?
1. Mate guarding.
2. Sperm allocation.

**Development:**
2. Appears direct, with egg shell around zygotes.
3. Determinate growth; like humans.