Chapter 33 – Introduction to Invertebrates

Invertebrates

- No Spine
- They're EVERYWHERE.

Porifera – Sponges

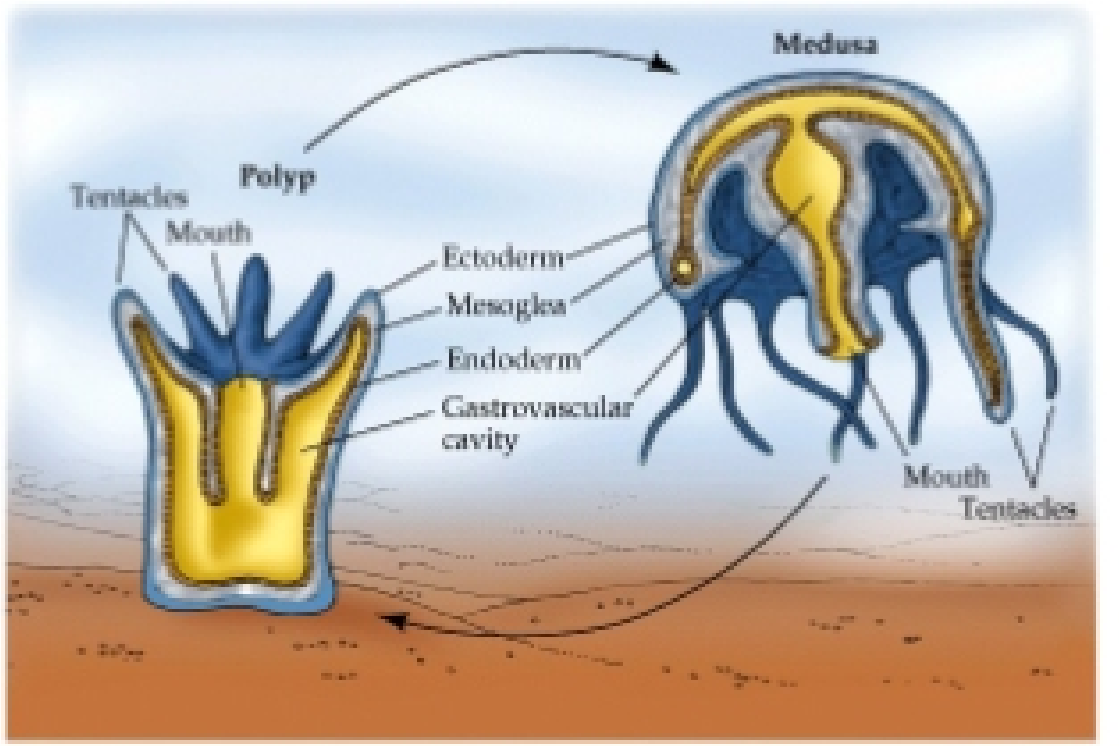
Lophotrochozoans – flatworms, rotifers, lophophorates

Porifera

- Sponges
- Around 9,000 species
- No tissue
- No organs, nerves, etc.
- 2 types of cells: Choanocytes (see previous chapter) and Amobocytes
- Fliter Feeders
- Reproduction: hermaphroditic (both male & female), asexual/budding

Cnidaria

- Corals, Jellyfish, anemones, sea fans
- 10,000+ species
- Polyps & Medusas (see diagram)
- 2-way digestive tract
- Radially symmetric
    - 2 tissue layers
- Man-o-war 'jellyfish' = medusa. It's a colony of Polyps.
- **Cnidocyte** – stinger body
- **Nematocyst** – stinger 'harpoon'
- Reproduction: asexually/budding, hermaphroditic (launches gametes into the water)



Ctenophores

- Comb Jellies
- NO stingers (sticky stuff to catch prey instead)
- 1-way digestive tract
- 2 tissue layers – where the mesoderm would be, there is jelly instead.

Lophotrochozoans

- Annelids, rotifers, flatworms, mollusks
- Bilaterally symmetrical
    - 3 tissue layers
- **Lophophore** – fan of ciliated tentacles surrounding the mouth
- **Trochophore** - _____
- Flatworms:
    - Tapeworms, flukes, planarians
    - Flat

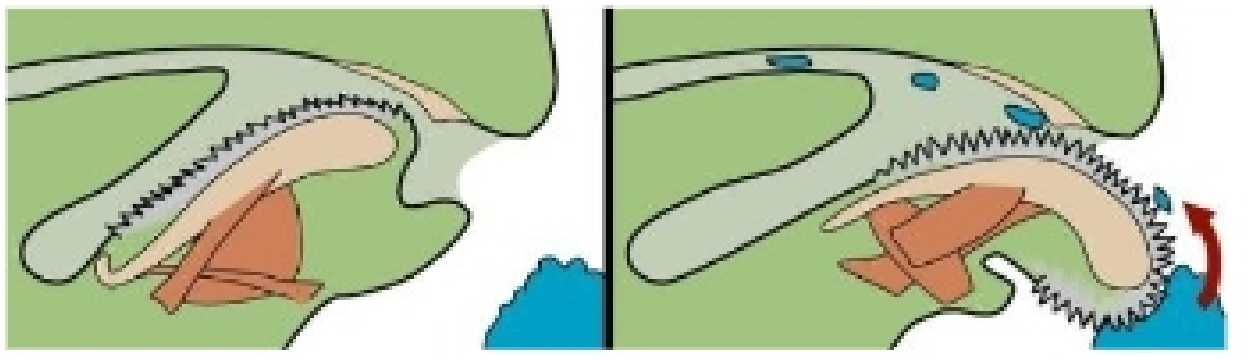
- Some marine, some freshwater, some in moist soil
- Many are parasitic
- 2-way digestive tract
- Barely beginning of a brain
- Regeneration
- Brain matter throughout their body
- Can be microscopic or up to 60 feet long
- Most are hermaphordidic
- *EXAMPLE: Blood Flukes*
  - Produce schistosomiasis.
  - 20 thousand fatalities/year.

- Rotifers:
  - Psudocoelomates
  - 1-way digestive tract
  - 1st development of exoskeleton (along with Lophophorates)
  - Reproduction: **Parthenogenesis**
    - "Virgin Birth"
    - Only Females
    - Diploids produce diploid eggs through mitosis, which produce female rotifers.
    - When the environment changes (pH, temperature, etc.) males show up as haploids.
    - They sexually reproduce from then on,
- Lophophorates:
  - 1st development of exoskeleton (along with Rotifers)
  - Uncertain Phylogeny
  - Filter Feeders
  - Three Types: Bryozoans, Phoronids, & Brachiopods
  - *Bryozoans*:
    - Moss animals
    - Colonial
    - Grow on outside of boats
    - Produces the cancer-fighting drug **Bryostatin**
  - *Brachiopods:*
    - Big in fossil history
- Nemertia:
  - Pseudocoelomates
  - 1-way digestive tract
  - Long snout – expelled for feeding
  - Make "feeding piles"
  - **Closed Circulatory System**
    - Blood is always contained, not just circulating around

- In capillaries
- Humans have a Closed Circulatory System

Mollusks

- Snails, clams, oysters, mussels, slugs, chitons, scallops, octopuses (octopi?), squids, cuttlefish, nautiluses (nautili?)
- Can be marine, freshwater & terrestrial
- Have lungs/gills – don't respire through skin
- Have exoskeleton (besides slugs & octopi)
- 1-way digestive tract
- Open circulatory system (sans cephalopods)
- Most are omnivores
- Not a 'super developed circulatory system
  - Besides octopi. They have a highly developed nervous system.
- Gastropods
  - Gastro = stomach; pod = feet
  - Snails, slugs, cowries.
  - Shells = snails & cowries
  - No Shells = slugs
  - **Visceral mass** – soft-bodied part
  - **Mantle** – covers visceral mass; makes shell
  - Respiration by gills or lungs
  - **Radula** – system of 'backhoes' in mouth to graze food off of a surface (see picture)



- Chiton:
  - See diagram 33.16 in the book
- Clams & Mussels:
  - *EXAMPLE: Zebra Mussels*
    - Striped
    - Invasive species in the Great Lakes
    - Attach to solid stuff
      - Even other mussels, suffocating them.
- Cephalopods:
  - Octopi, Nautili, Squid, Cuttlefish
  - Closed circulatory system
  - Some of the largest invertebrates
  - Rapid swimmers (sometimes even backwards)
  - Shells are internal (squid), external (nautilus) or nonexistent (octopus)
  - Hunters
  - Foot modified to be tentacles