

# Phyla of the Animal Kingdom



[http://www.art.com/asp/sp-asp/\\_/ui--9F63025C7D9144F79D1199082B3E4112/PD--10054920/sOrig--CAT/sOrigID--7444/Yosemite\\_Valley.htm#](http://www.art.com/asp/sp-asp/_/ui--9F63025C7D9144F79D1199082B3E4112/PD--10054920/sOrig--CAT/sOrigID--7444/Yosemite_Valley.htm#)

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Modification by Alie Koroma

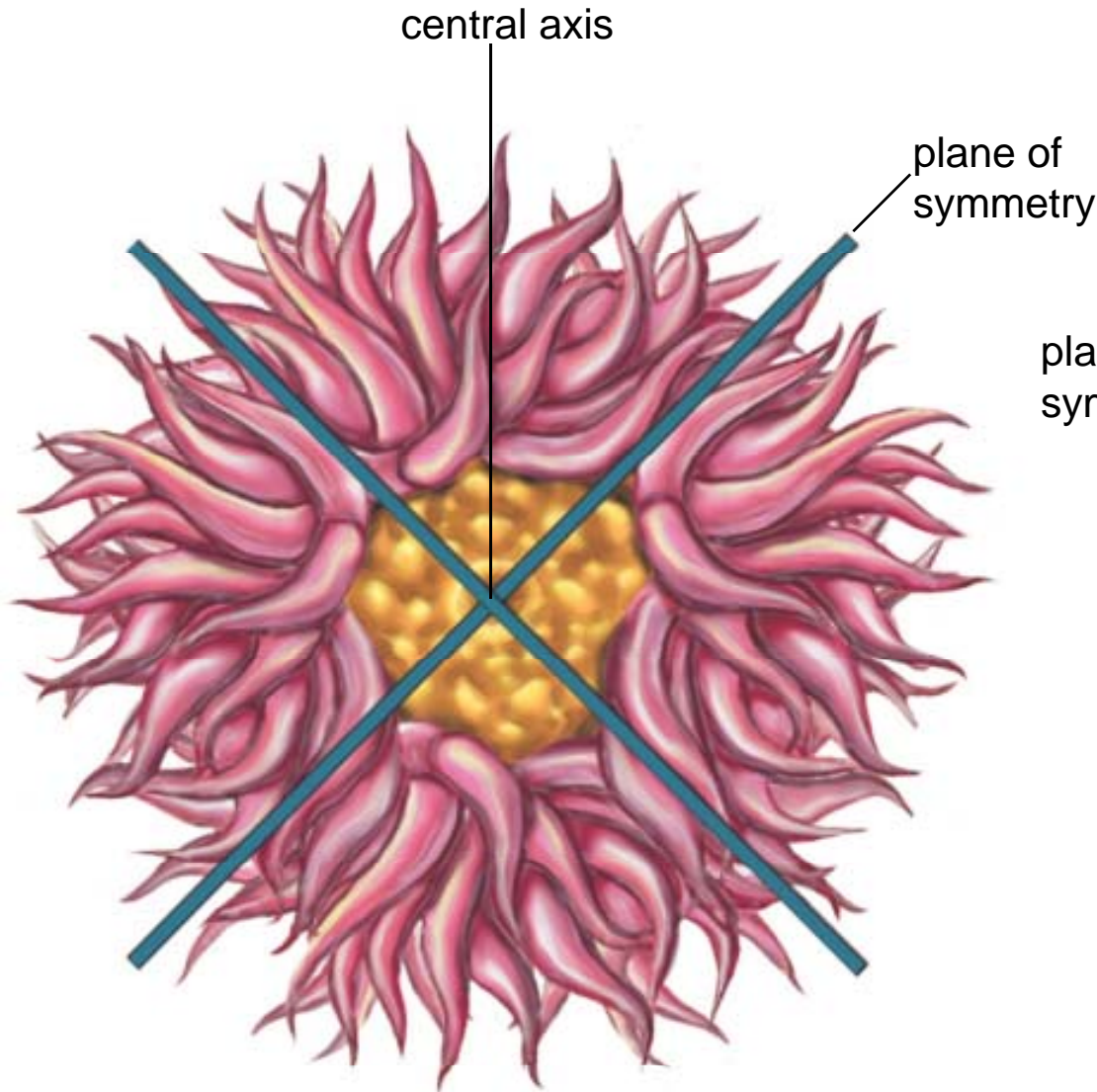
# TODAYS MENU

- Mid-Term Quiz
- Animal Diversity
- Summary 3 and Assignment 5 due
- Next Week No Labs (Spring Break)

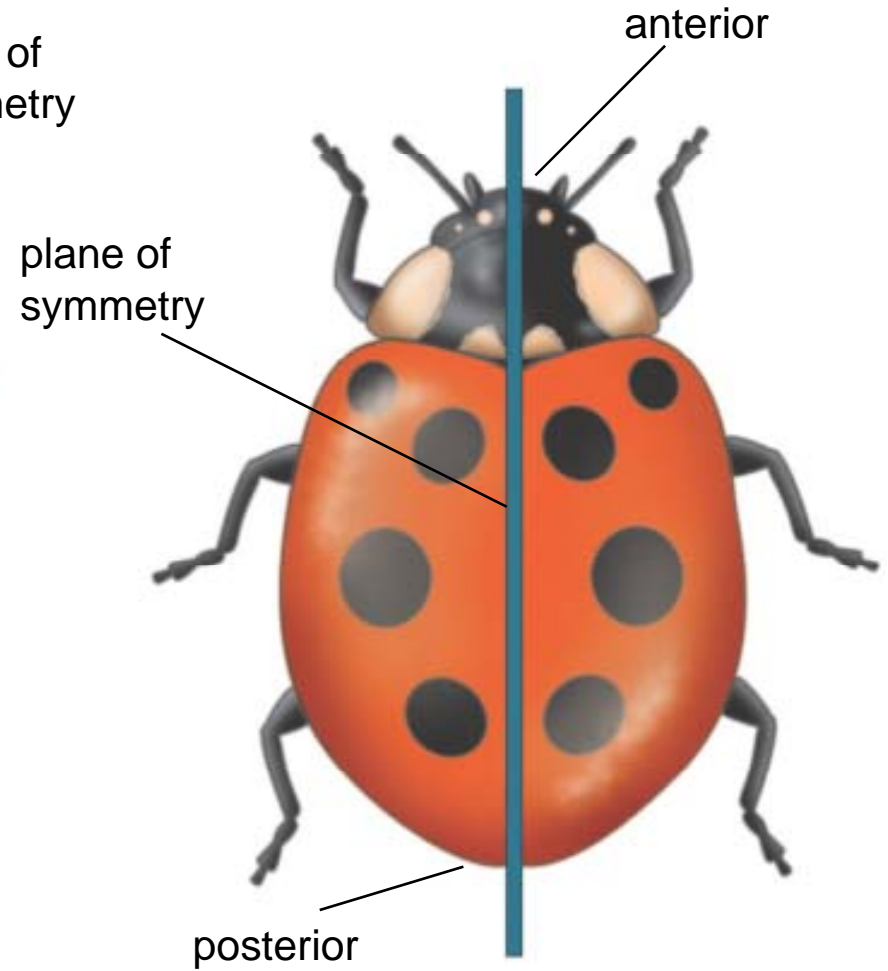
# Which Anatomical Features Mark Branch Points on the Animal Evolutionary Tree?

- Lack of Tissues Separates Sponges from All Other Animals
- Animals with Tissues Exhibit Either Radial or Bilateral Symmetry
  - Radially Symmetrical Animals Have Two Embryonic Tissue Layers; Bilaterally Symmetrical Animals Have Three
  - Bilateral Animals Have Heads

**(a) Radial symmetry**



**(b) Bilateral symmetry**

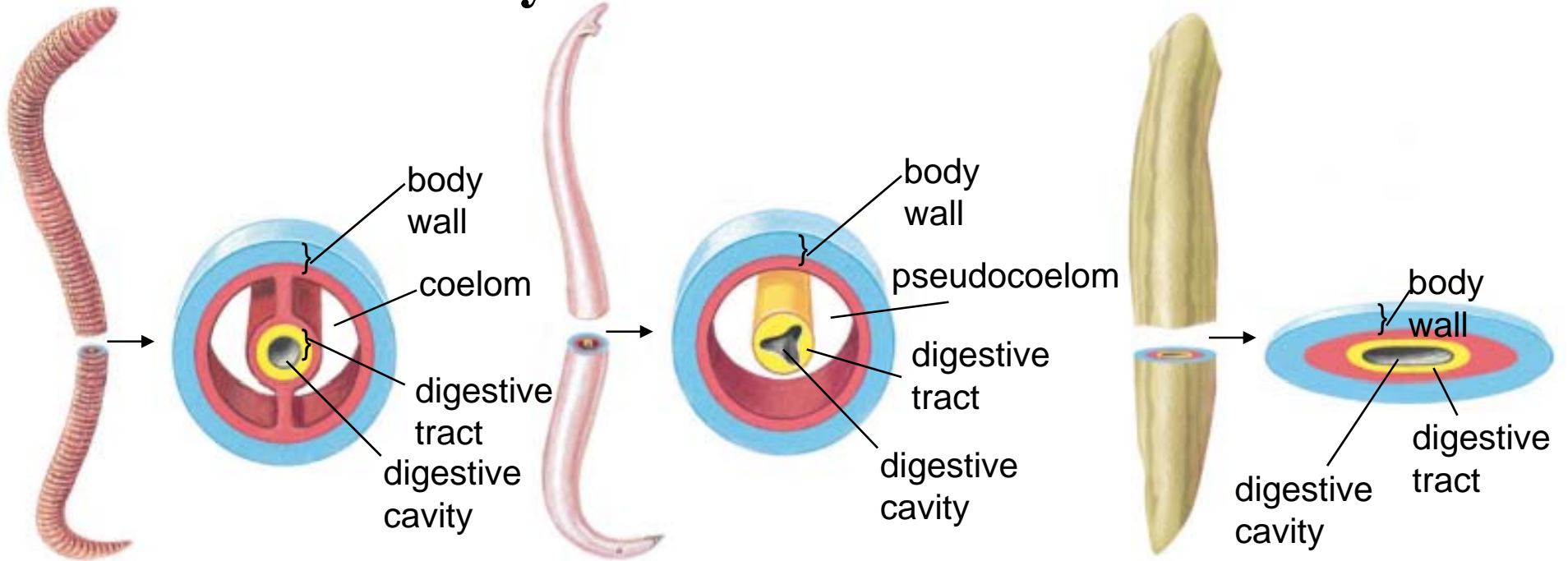


## Body symmetry and cephalization

## Which Anatomical Features Mark Branch Points on the Animal Evolutionary Tree?

- Most Bilateral Animals Have Body Cavities
  - Body Cavity Structure Varies Among Phyla
- Protostomes Include Two Distinct Evolutionary Lines

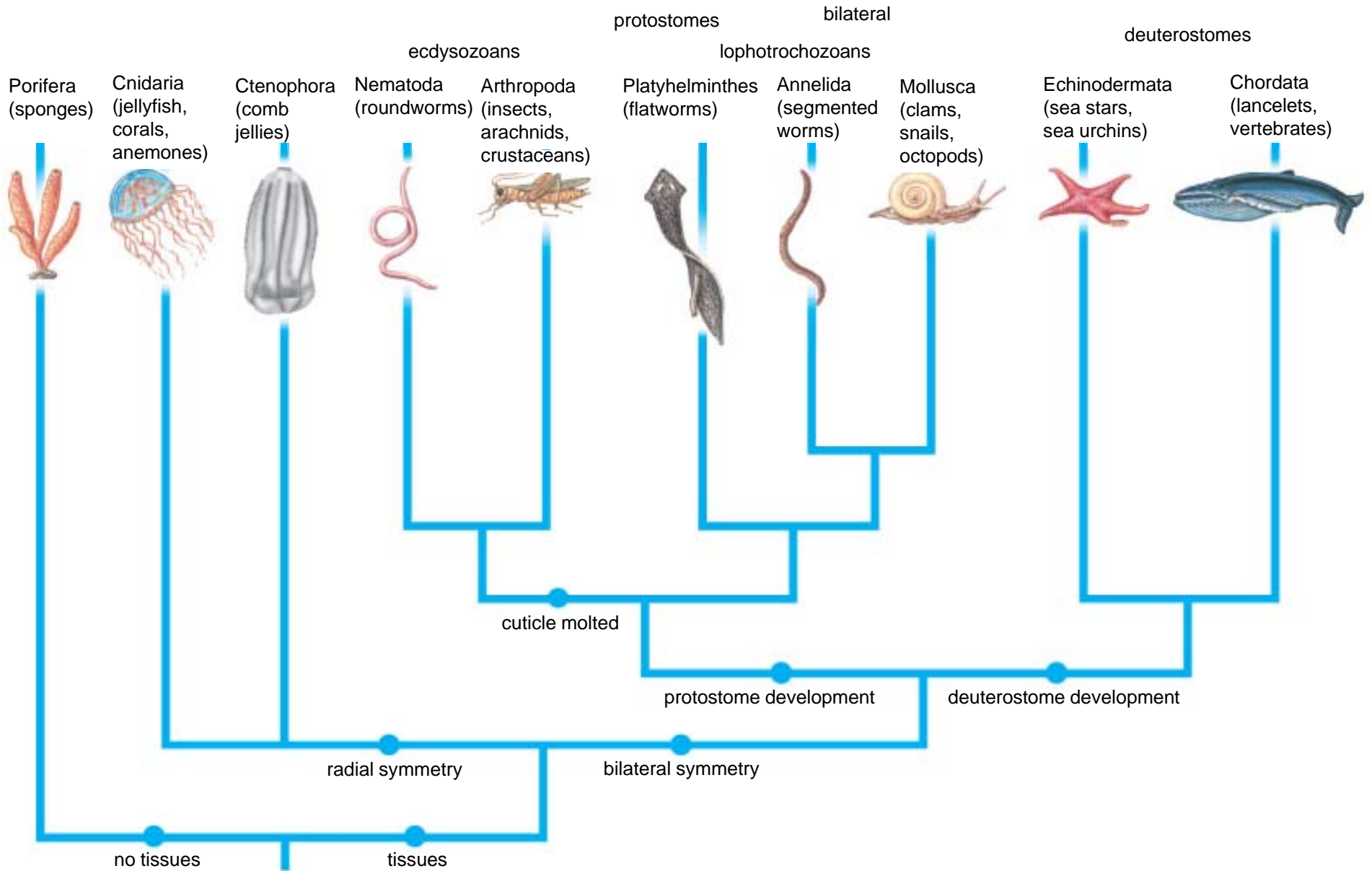
# Body cavities



(a) **"True" coelom**  
(annelids, chordates)

(b) **"False" or pseudocoelom**  
(roundworms)

(c) **No coelom**  
(cnidarians, flatworms)



An evolutionary tree of some major animal phyla

# Phylum Porifera

- Sessile-stays in one place
- Most simple multicellular organism
- No tissues or organs
- Central body cavity
- Osculum- large opening(s) at top
- Pores for incurrent water



# Phylum Porifera



## Sponges

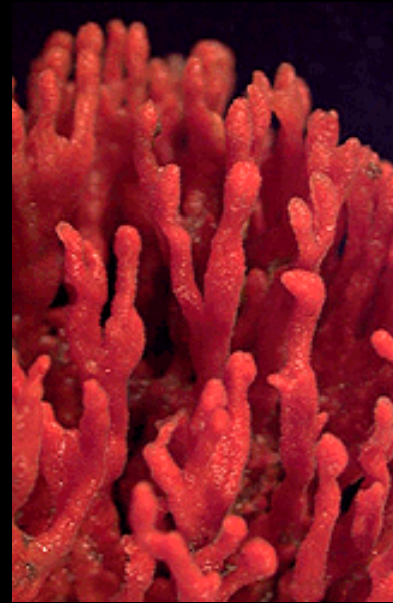
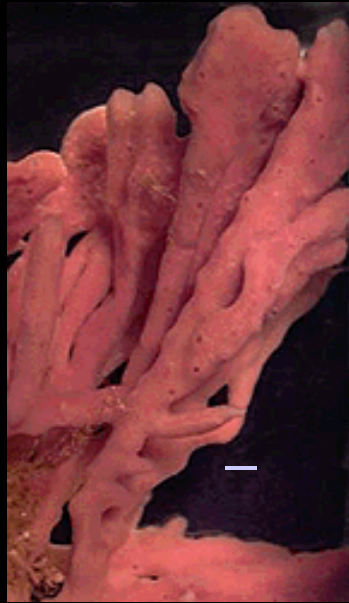
<http://facstaff.uww.edu/wentzl/porifera.html>

# Fun Fact: Sponges



If a sponge were shredded into many tiny pieces, each piece would grow into a full grown functional adult in a process called **Somatic Embryogenesis**.

# Phylum Porifera



## Sponges

<http://tolweb.org/tree?group=Porifera&contgroup=Animals>

# Phylum Cnidaria

- Two forms: Polyp and Medusae
- Polyps mostly sessile
- Medusae free swimming
- Cnidocytes- stinging cells on tentacles
- Gastrovascular cavity- central body cavity

# Phylum Cnidaria



## Anemone

<http://www.earthlife.net/inverts/cnidaria.html>

# Phylum Cnidaria



## Anemone

<http://www.tgrsolution.net/zoo/marine1/marine0013.shtml>

# Phylum Cnidaria



## Jellyfish

[http://www.ucmp.berkeley.edu/cnidaria/C\\_sivickisi.html](http://www.ucmp.berkeley.edu/cnidaria/C_sivickisi.html)

# Phylum Cnidaria



## Coral

<http://www.ucmp.berkeley.edu/cnidaria/images/braincoral.jpg>



# Phylum Platyhelminthes

- Diffusion is used in place of important body systems.
- No real vision only senses light with eyespots
- Examples: Flukes and Tapeworms
- Reproduce asexually by fission
- Reproduce sexually by cross fertilization

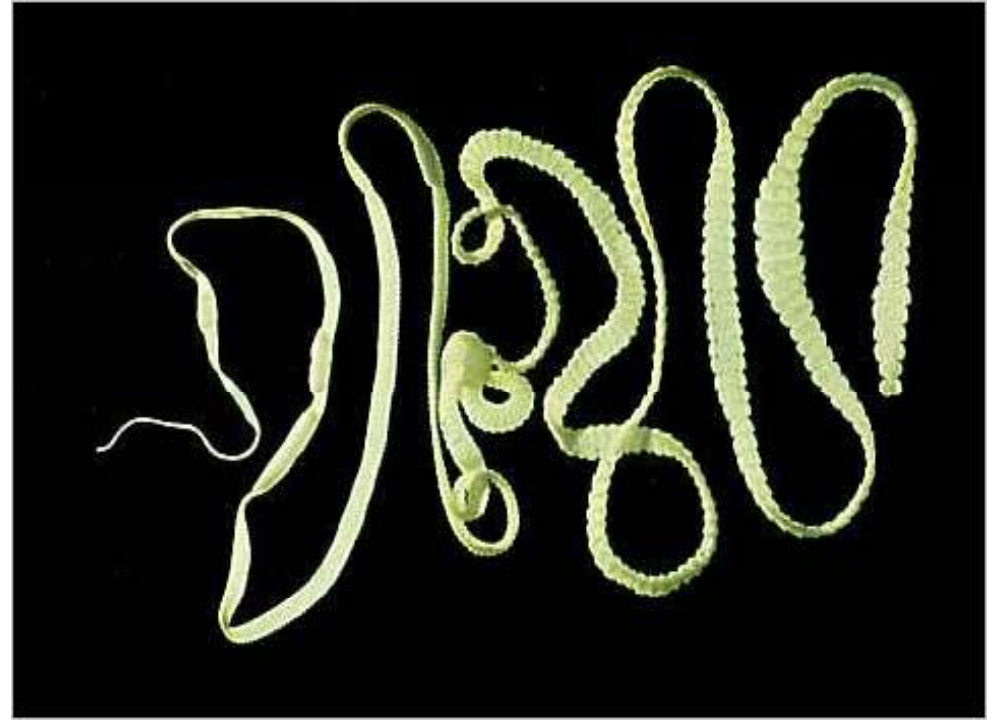
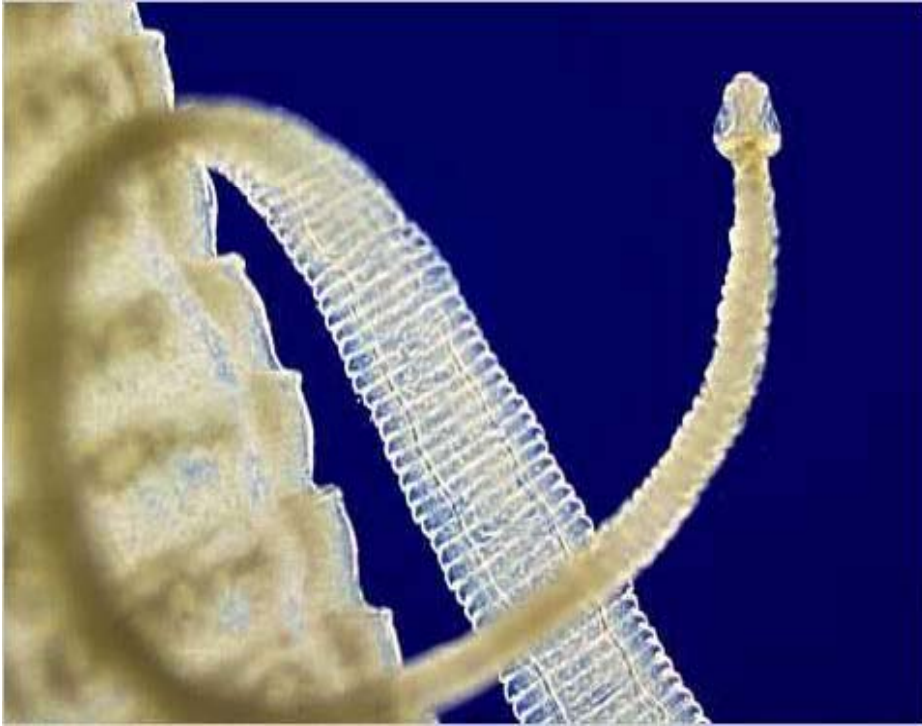
# Phylum Platyhelminthes



## Flatworm

<http://www.ucmp.berkeley.edu/platyhelminthes/platyhelminthes.html>

# Fun Fact: Tapeworms



<http://www.micrographia.com/specbiol/helminth/platyhel/cest0100.htm>

**In the 1920's ingesting tapeworms was a method of weight loss. The more intake of nutrients in the body; the longer the tapeworm becomes in the intestine.**

# Phylum Nematoda

- Roundworms are found everywhere
- In one cubic meter millions can live
- Some Nematodes are parasitic
- Hookworms are intestinal and drink blood of stomach
- Trichinella is a muscle parasite found in pig meat
- Filarial Roundworms infect lymphatic system cause Elephantiasis

# Phylum Nematoda

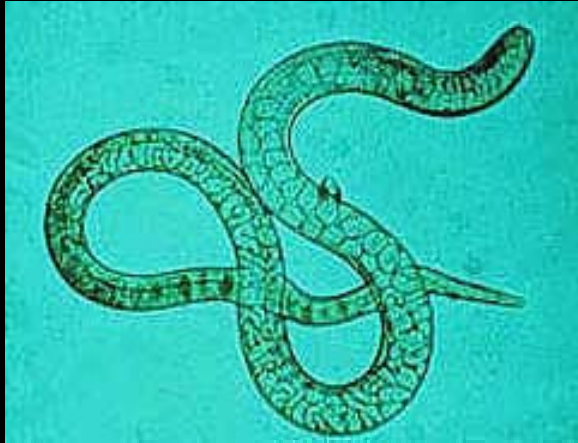


<http://www.cbv.ns.ca/mchs/diversity/adu02.jpg>



## Hookworm

# Phylum Nematoda



<http://www.medicine.mcgill.ca/tropmed/txt/lecture4.htm>

## Trichinella



<http://www.anri.barc.usda.gov/bnpcu/trinat1.asp>

# Phylum Nematoda



## Roundworms

<http://www.biosci.ohio-state.edu/~parasite/dioctophyme.html>



**Elephantiasis**  
caused by  
Roundworms.  
Transmitted  
by a vector  
such as a  
mosquito or  
biting fly.

<http://elephantiasis.freeyellow.com/blackleg.jpg>





(c) University Erlangen,  
Department of Dermatology  
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**Elephantiasis**  
caused by  
Roundworms.  
Transmitted  
by a vector  
such as a  
mosquito or  
biting fly.

<http://elephantiasis.freeyellow.com/legs.jpg>

# Fun Fact: Roundworms

<http://www.medicine.mcgill.ca/tropmed/txt/lecture4.htm>



adult female  
20-35 cm long



Adults taken  
from one child

About 650 million infected worldwide mainly tropics.  
Transmission is fecal-oral; egg very resistant, can survive years.

# Phylum Annelida

- **Segmented worms are capable of more complex movements**
- **Have a closed circulatory system**
- **Have five pairs of “hearts”**
- **Pharynx draws in food**
- **Crop stores food**
- **Gizzard grinds food up**
- **Then it is passed into the intestine where nutrients is absorbed**
- **And out the anus**

# Phylum Annelida



## Earthworms

<http://www.framingham.k12.ma.us/mccarthy/worms.htm>

# Phylum Annelida



**Segmented worms**

# Fun Fact: Phylum Annelida



<http://www.biopharm-leeches.com/>



[http://www2.hmc.edu/www\\_common/biology/florafauna/leeches.html](http://www2.hmc.edu/www_common/biology/florafauna/leeches.html)

Leeches are used medically to help reattach lost limbs.

# Phylum Arthropoda

- **Most dominant animals on Earth**
- **Exoskeleton “suit of armor” made of chitin**
- **Efficient gas exchange allows rapid supply of oxygen to muscles**
- **Well developed sensory system**
- **Well developed nervous system**
- **Well developed circulatory system**

# Phylum Arthropoda



Scorpion

<http://www.bushveld.co.za/scorpion.htm>



Arachnids



# Phylum Arthropoda



*Hypsosinga rubens*  
(Orbweaver)

# Phylum Arthropoda

[www.ecuadortours.com /](http://www.ecuadortours.com/)  
*michael stiegler*



Rock Crab

**Crustacean**

# Phylum Arthropoda



The Rock Crab's Grandpa  
**Crustacean**

# Phylum Mollusca

- Shell made of Calcium Carbonate
- Mantle lays down the shell
- Open circulatory system except for Cephalopods
- Radula tongue made of chitin used to scrape for food
- Bivalve named for number of shells
- In some the shell is internal

# Phylum Mollusca



**Snails**



**Chiton**

# Phylum Mollusca



## Bivalves

[http://www.manandmollusc.net/beginners\\_intro/pelecypoda.html](http://www.manandmollusc.net/beginners_intro/pelecypoda.html)

# Fun Fact: Phylum Mollusca

**Every pearl is unique.**

Because a pearl is a creation of nature, no two pearls are exactly alike. There are, however, several recognized classifications of pearls.



[http://www.tiffany.com/expertise/pearl\\_kinds.asp?mysid=](http://www.tiffany.com/expertise/pearl_kinds.asp?mysid=)

Bivalves are used for pearl culture by placing an irritant (ex. Sand) into the mantle.

# Phylum Mollusca



**Clam**

<http://www.cabiota.com/cabiota/mollusca.htm>



# Phylum Mollusca



**Octopus**

# Phylum Echinodermata

- **The name echinoderm is Greek for “hedgehog skin”**
- **Use a water-vascular system for locomotion, respiration, and food capture**
- **Lack a circulatory system**
- **Have regenerative capabilities**

# Phylum Echinodermata



## Sea Star

<http://tolweb.org/tree?group=Echinodermata&contgroup=Metazoa>

# Phylum Echinodermata



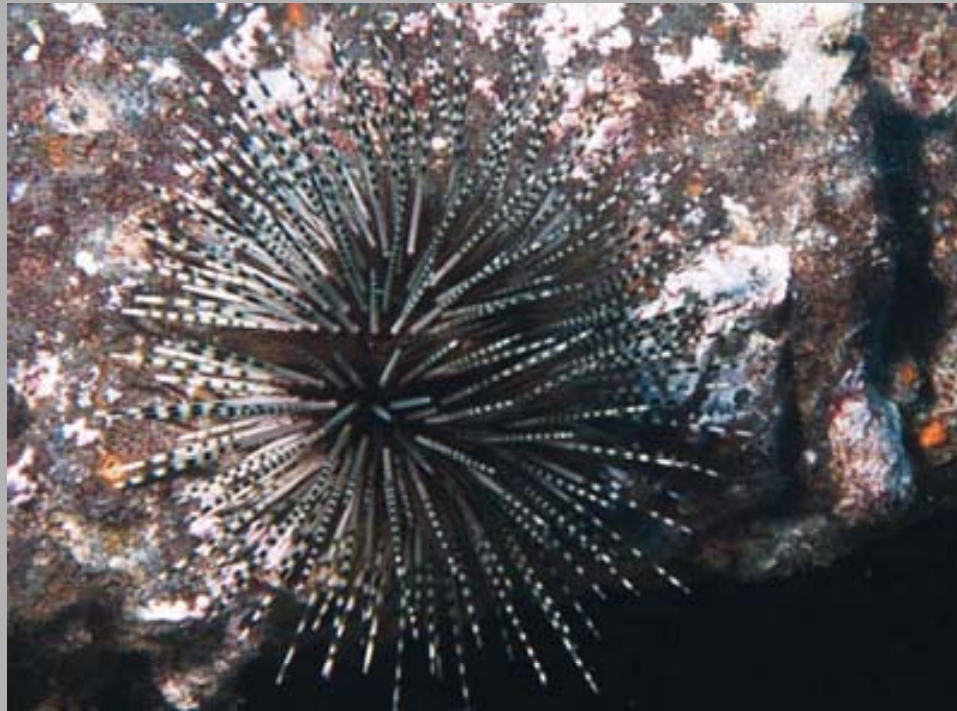
Star fish

# Phylum Echinodermata



## Sea Urchin

# Phylum Echinodermata



**Sea Urchin**

[http://www.inhissaddle.com/Scuba%20Pictures%20Album/pages/BandedSeaUrchin02\\_jpg.htm](http://www.inhissaddle.com/Scuba%20Pictures%20Album/pages/BandedSeaUrchin02_jpg.htm)

# Phylum Chordata

- **Deuterostome development-anus formed first**

- **Characteristics of Chordates:**

- 1. Notochord**

- 2. Dorsal, hollow nerve cord**

- 3. Pharyngeal gill slits / Respiratory Openings**

- 4. Post-anal tail**

# Phylum Chordata



## Fishes

<http://www.tgrsolution.net/zoo/marine1/marine0030.shtml>



# Phylum Chordata



[http://www-astro.physics.ox.ac.uk/~erik/toad/toad\\_gallery.html](http://www-astro.physics.ox.ac.uk/~erik/toad/toad_gallery.html)

Toad

Amphibians

# Phylum Chordata



<http://members.tripod.com/~elliottdragon/>

## Reptiles

# Phylum Chordata



<http://www.northrup.org/photos/Animals/nl-7.htm>

**Toucan  
Birds**

# Phylum Chordata



## Mammals

<http://www.uta.edu/biology/westmoreland/>

# Comparison of the Major Animal Phyla

Table 22-1 Comparison of the Major Animal Phyla

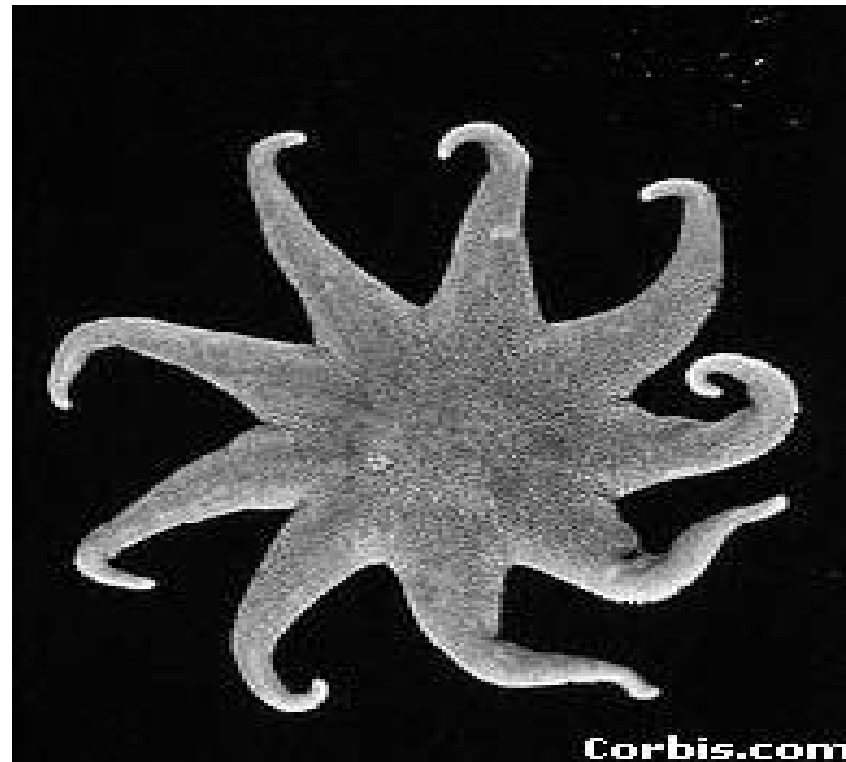
Common name (Phylum)	Sponges (Porifera)	Hydra, Amoebas, Jellyfish (Cnidaria)	Flatworms (Platyhelminthes)	Segmented Worms (Annelida)	Snails, Clams, Squid (Mollusca)	Insects, Arachnids, Crustaceans (Arthropoda)	Roundworms (Nematoda)	Sea Stars, Sea Urchins (Echinodermata)	
Body Plan	Level of organization	Cells—lack tissues and organs	Tissue—lack organs	Organ system	Organ system	Organ system	Organ system	Organ system	
	Germ layers	Absent	Two	Three	Three	Three	Three	Three	
	Symmetry	Absent	Radial	Bilateral	Bilateral	Bilateral	Bilateral	Bilateral larvae, radial adults	
Internal Systems	Cephalization	Absent	Absent	Present	Present	Present	Present	Absent	
	Body cavity	Absent	Absent	Absent	Celom	Celom	Pseudocoel	Celom	
	Segmentation	Absent	Absent	Absent	Present	Absent	Absent	Absent	
	Digestive system	Intracellular	Gastrovascular cavity, some intracellular	Gastrovascular cavity	Separate mouth and anus	Separate mouth and anus	Separate mouth and anus	Separate mouth and anus	Separate mouth and anus (normally)
	Circulatory system	Absent	Absent	Absent	Closed	Open	Open	Absent	
	Respiratory system	Absent	Absent	Absent	Absent	Gills, lungs	Tracheae, gills, or book lungs	Absent	Tube feet, skin gills, respiratory tree
	Excretory system (fluid regulation)	Absent	Absent	Contract with ciliated cells	Nephridia	Nephridia	Excretory glands resembling nephridia	Excretory gland	Absent
	Nervous system	Absent	Nerve net	Head ganglia with longitudinal nerve cords	Head ganglia with paired ventral cords, ganglia in each segment	Well-developed brain in some cephalopods; several paired ganglia, most in the head; nerve network in body wall	Head ganglia with paired ventral nerve cords; ganglia in segments, some fused	Head ganglia with dorsal and ventral nerve cords	Head ganglia absent; nerve ring and radial nerves; nerve network in skin
	Reproduction	Sexual; asexual (budding)	Sexual; asexual (budding)	Sexual (some hermaphroditic); asexual (body splits)	Sexual (some hermaphroditic)	Sexual (some hermaphroditic)	Normally sexual	Sexual (some hermaphroditic)	Sexual (some hermaphroditic); asexual by regeneration (rare)
	Support	Endoskeleton of spicules	Hydrostatic skeleton	Absent	Hydrostatic skeleton	Hydrostatic skeleton	Exoskeleton	Hydrostatic skeleton	Endoskeleton of plates beneath outer skin
Number of known species	5000	9000	12,000	9000	50,000	1,000,000	12,000	6500	

# What Phylum?



Phylum Arthropoda

What Phylum do starfish belong to?



**Phylum Echinodermata**

# What Phyla do these belong to?



African  
Bullfrog  
eating an  
earthworm

**Chordata**

(Bullfrog)

&

**Annelida**

(Earthworm)



What Phylum do jellyfish belong to?



**Phylum Cnidaria**

**What Phylum do we belong to?**



**Phylum Chordata**

What Phylum do clams belong in?



**Phylum Mollusca**

What Phylum do Flatworms belong in?



**Phylum Platyhelminthes**

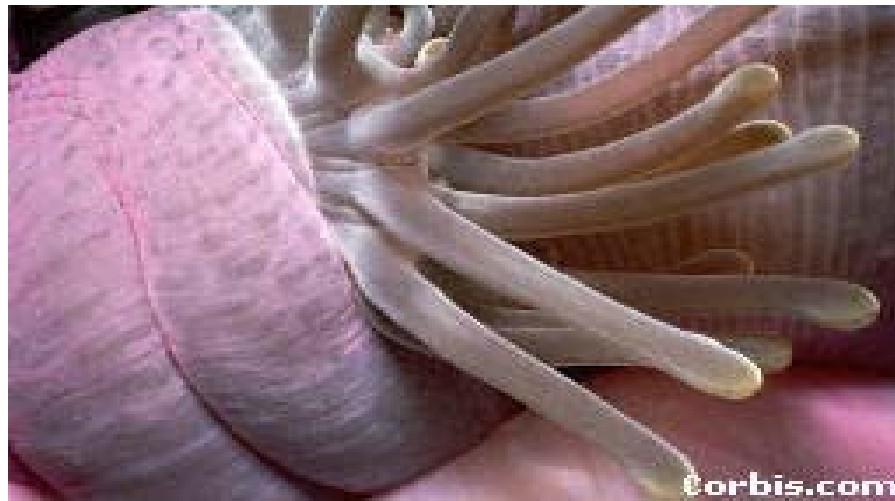
# What Phylum?



Copperband Butterflyfish

**Phylum Chordata**

# What Phylum?



Sea Anemone

**Phylum Cnidaria**

What Phylum do Segmented worms belong to?



**Phylum Annelida**

# What Phylum?



**Alcyonarian Soft Coral**

**Phylum Cnidaria**



# What Phylum?



**Phylum Mollusca**

# *What Phylum?*



California Spiny Lobster

**Phylum Arthropoda**

# What Phylum?



Brilliant Red Finger Sponge

**Phylum Porifera**

# Name and Phylum?



Hookworm



Trichinella



Roundworm

All belong to Phylum Nematoda

# Review:

**Porifera**

- Sponges

# Review:

## Cnidaria

- Jellyfish
- Coral
- Anemones

# Review:

## Mollusca

- Bivalves
- Cephalopods
- Gastropods

# Review:

## Echinodermata

- Starfish
- Sea Urchin
- Sea Cucumbers



# Review of Worms:

## Platyhelminthes

- Flatworms
- Tapeworms

# Review of Worms:

## Nematoda

- Hookworms
- Trichinella
- Roundworms

# Review of Worms:

## Annelida

- Segmented worms
- Earthworms

# Review:

## Arthropoda

- Crustaceans
- Arachnids

# Review:

## Chordates

- Mammals
- Amphibians
- Reptiles
- Birds
- Fish

# KEY WORDS

- Anatomical features distinguishing phyla
- Features of each phyla
- Symmetry
- Phylum Chordata
- Specimens represented in lab.

## Next Lab

- Meiosis and Genetics (pg to read 203-235)