

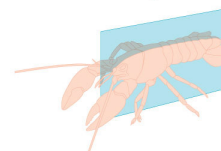
# Animal Development & Organization

## ~Biology AP~

A Meridian® AP Biology Study Guide by Tim Qi

### ❖ Body Symmetry

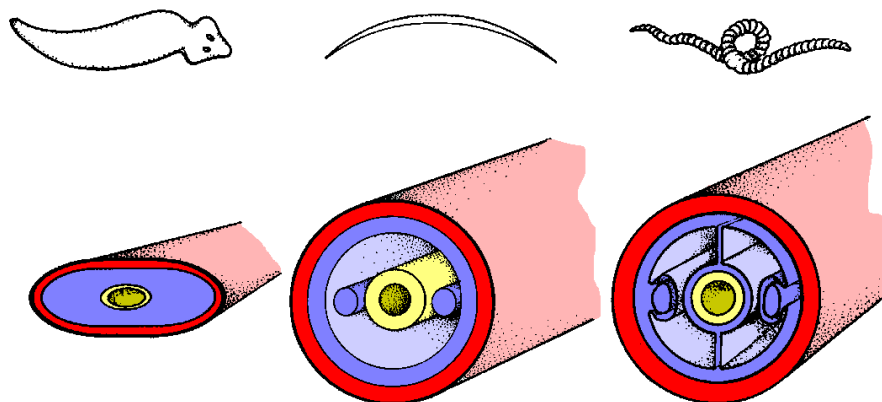
- **Radial Symmetry:** If the body of the animal is cut along a plane that passes through the central axis, the two halves are symmetrical. (e.g. hydra, starfish)
  
- **Bilateral Symmetry:** The body of the animal is cut in the middle and the two halves produce a mirror image left and right. Animals with bilateral symmetry always have 3 germ layers. (e.g. human, lobster)



### ❖ Development of Coelom

- **Definition:** A kind of body cavity that is between the central digestive tract and the outer lining of the body.

The Three kinds of Coeloms	
Coelom	Description
Acoelomate	Animals that completely lack body cavities. There are only 3 existing layers: the digestive tract, internal organs fully embedded in solid connective tissue (mesoderm), and outer body covering. (e.g flatworms)
Pseudocoelomate	Animals that have a fluid filled body cavity partly lined with mesoderm. Internal Organs form loosely in the body cavity fluids. (e.g. roundworms)
Coelomate	Animals that have a body cavity lined on all sides by the mesoderm. Most internal organs are suspended by a double layer mesoderm. Most of the space between the organs are open. (e.g. segmented worms)



❖ **Protostomes & Deuterostomes**

Protostomes	Deuterostomes
<ul style="list-style-type: none"> <li>Mouth forms at blastopore (anus form from second opening).</li> <li><u>Spiral cleavage</u>: Determinate - cell fate are decided when they form.</li> <li><u>Schizocoelous</u>: Solid masses of mesoderm split to form coelomic cavities.</li> </ul>	<ul style="list-style-type: none"> <li>Anus forms at blastopore (mouth forms from second opening).</li> <li><u>Radial cleavage</u>: Indeterminate - cell's fate are not determined early on.</li> <li><u>Enterocoelous</u>: Mesoderm arises as lateral outpocketings of the archenteron which forms the coelom.</li> </ul>

❖ **Animal Classification**

- Developmental morphology compares the developmental processes of different animals in an attempt to determine the ancestral relationship between organisms and how developmental processes evolved.
- Animals are all metazoan, mostly bilateral, and formed from colonial protists.

*\*The following information probably will not appear in-depth on exams in MV. However, they are very likely to appear in SAT II Biology and AP Biology exams.*

Animal Phyla					
Name	Cell Layers	Symmetry	Blood circulation	Body cavity	Descriptions
Porifera	Two	None	None	None	Lack tissue, and ingest bacteria/tiny particles.
Cnidaria	Two	Radial	None	None	One body opening and gastrovascular cavity.
Platyhelminthes	Three	Bilateral	none	Acoelomate	Flattened and unsegmented with a head.
Nematoda	Three	Bilateral	none	Pseudocoelomate	Most are microscopic with cylindrical bodies.
Annelida	Three	Bilateral	Open circulation	Coelomate	All internal organs are segmented in individual units except for digestive tract.
Mollusca	Three	Bilateral	Open circulation	Coelomate	3 body sections: Foot (movement), Visceral mass (organs), Mantle (shell)
Arthropoda	Three	Bilateral	Open circulation	Coelomate	Exoskeleton made of chitin, segmented body, and joint appendages.
Echinodermata	Three	Radial	Water Vascular	Coelomate	Have tube feet used for feeding, gas exchange, excretion, and movement.
Chordata	Three	Bilateral	Closed Circulation	Coelomate	Have notochord, hollow nerve chord and gill slits. And tail (at some point in life).