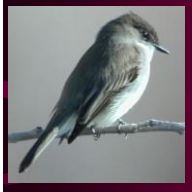
What Is an Animal?



Biology II
Mrs. Michaelsen

Section 25.1
Typical Animal Characteristics

I. Characteristics of Animals

A. All animals are eukaryotic, multicellular, have ways of moving to reproduce, obtain food, and protect themselves.
B. Cells form tissues and organs.
C. No cell walls like plants.

D. Methods of Obtaining Food Vary
1. All are heterotrophic.
2. Some move about and others remain stationary.
3. Those in water move less than those on land and therefore animals on land expend more energy.
4. Both invertebrates and vertebrates move.
5. Some only move in a larval stage and remain **sessile** as an adult (sponges).

E. Animals Must Digest Food

1. Must ingest and digest food.
2. Some animals digest in cells, others in digestive tract.

F. Animal Cell Adaptations

1. Most cells carry out different functions. Some are for protection and others are to seek and find food.

II. Development of Animals

A. Most develop from a single fertilized egg cell called a zygote.

1. Most animals reproduce sexually – internal or external fertilization (sperm + egg).

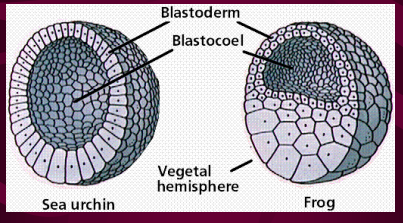
B. Unicellular zygote divides by mitosis – called cleavage.

1. After this cell division occurs it's called an embryo.

C. Cell division continues…

D. Cell division results in a fluid-filled ball of cells called a blastula.

1. Can be a single layer or several layers.
2. In humans this takes 5 days. In a sea urchin 10 hours.



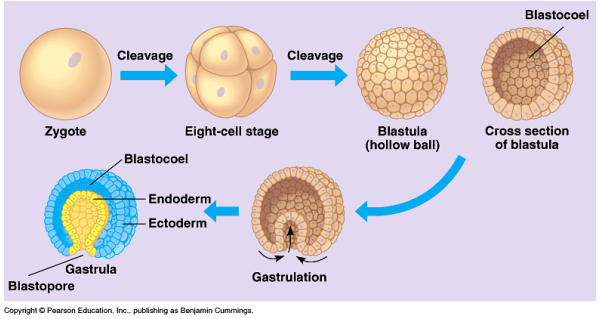
Blastula

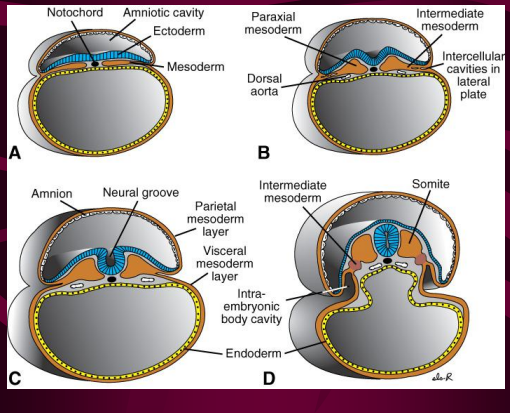
E. As the embryo grows some of the cells of the blastula fold inward forming the gastrula.

1. All animals except sponges pass through this.
2. Ectoderm: The layer of cells on the outer surface. Becomes skin and nervous system.
3. Endoderm: The layer of cells lining the inner surface. Becomes the lining of the digestive tract and organs for digestion.

F. Mesoderm is formed as gastrula continues to develop.

1. Forms between the ectoderm and endoderm.
2. Eventually develops into muscles, circulatory system, excretory system, and respiratory system.





- Blastula development
  - youtube video

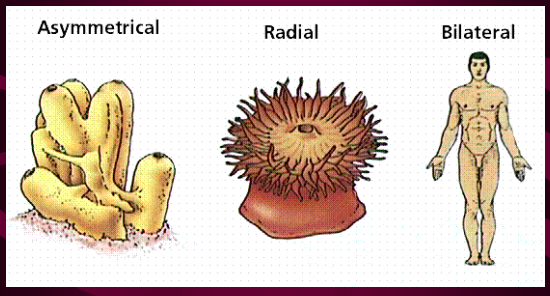
3. Protostome: Animals whose opening of the indented space in the gastrula becomes the mouth.
   1. Includes earthworms and insects.
4. Deuterostome: Animal in which the mouth develops from cells elsewhere on the blastula.
   1. Includes fishes, birds, and humans.

Section 25.2
Body Plans and Adaptations

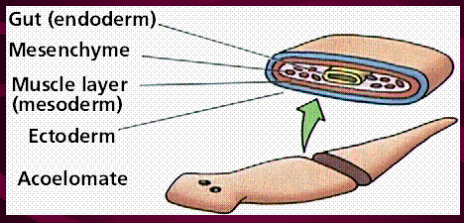
1. Symmetry: All animals have some kind.
   A. It's a balance in proportions of an object or organism.
2. Asymmetry: Ex. Sponge
   A. Has no symmetry. An irregular shaped body.
   B. 2 – layer body plan. No endoderm, mesoderm or gastrula.
   C. Oldest fossils on earth – 700 million yrs old.

3. Radial Symmetry: Ex. Hydra, jellyfish. Tentacles radiate out from around its mouth.
   A. Able to capture prey in any direction.
4. Bilateral Symmetry: Ex. Butterfly. Can be separated into right and left halves that are mirror images of each other.
   A. Anterior, Posterior, Dorsal, Ventral
5. Bilaterally symmetrical: Develop from three embryonic layers – Ectoderm, endoderm, mesoderm.
   A. Have fluid filled cavities where internal organs are found.

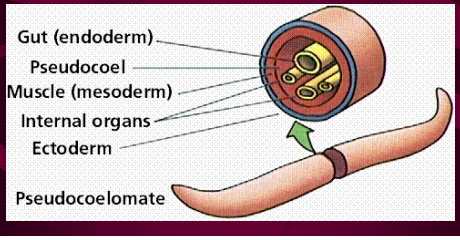
Symmetry in Animals



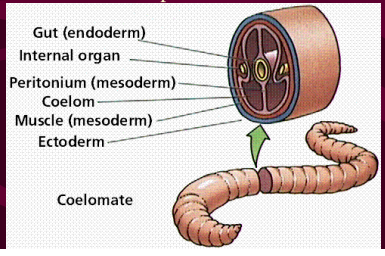
6. Acoelomate: Flatworms. All have three cell layers. Ectoderm, endoderm, and mesoderm, but no body cavities.
   A. They do have a digestive tract.



7. Pseudocoelomates: Roundworms. Have a body cavity. Fluid filled partly lined with mesoderm.
   A. Allows animals to move quickly. Muscles are attached to the mesoderm and brace against the pseudocoelom in movement.



8. Coelom: Earthworm. Also includes humans, insects, fishes, and many others.
   A. Coelom provides space for the development of specialized organs and organ systems.
   B. Digestive tract attached by double layers of mesoderm and suspended in coelom.



9. Animal Protection and Support
   A. Exoskeleton: Hard, waxy covering on the outside of the body that provides a framework for support.
      1. Secreted by the epidermis and provide attachment for muscles.
      2. Often found in **invertebrates (animals without a backbone)** such as grasshoppers, beetles, and spiders.

Molted Exoskeleton of a Tarantula

   B. Endoskeleton: Internal skeleton that provides support inside an animal's body.
      1. Can be made of calcium carbonate, cartilage, or bone.
      2. Protects internal organs and brace for muscles to pull against.
      3. Usually found in **vertebrates** (**animal with a backbone**) such as fishes, birds, reptiles and mammals.
         a. Echinoderms are invertebrates with an endoskeleton.
      4. All vertebrates are bilaterally symmetrical.

10. Origins of Animals
   A. Most biologists agree that animals evolved from colonial protists.
   B. Traced to Cambrian Period 545 million years ago.