

Introduction to the Animal Kingdom



Common Characteristics:

- Multicellular
- Feed on other organisms
- Have means of locomotion at some point in its life.
- Have a means for obtaining food / energy
- All are heterotrophic
- Break down food-digest their food

Body Plans: Symmetry

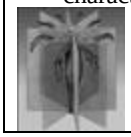
- The balanced distribution of duplicate body parts or shapes.
- The arrangement of body structures in relation to some axis of the body.
- Types of Symmetry:
  - Spherical
  - Radial
  - Bilateral
  - Asymmetrical

Spherical

- sphere-shaped, the body can be divided into two identical parts by any plane passing through the center.

Radial

- the body can be divided into two identical halves by any plane that passes through the longitudinal axis.
- body plan in which body parts repeat in a regular pattern around the center of the body (a central axis);
- characteristic of sea anemones and sea stars

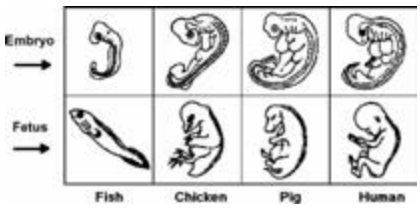



Bilateral

- the body can be divided into two identical or mirror halves by only one specific plane passing through the longitudinal axis.
- body plan in which only a single, imaginary line can divide the body into two equal halves; characteristic of worms, arthropods, and chordates

Asymmetrical

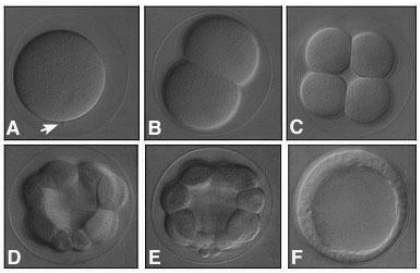
- the body has no definite shape and cannot be divided into any identical halves
- the body has no symmetry



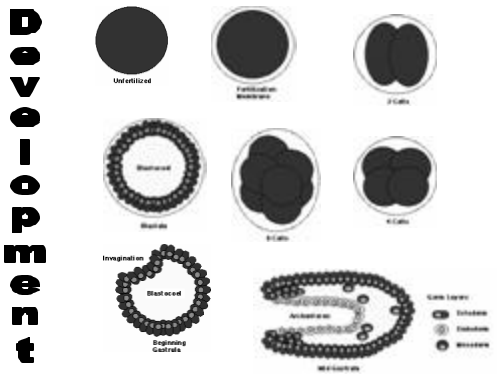
Early Development Process:

- **Zygote**
- 2 cells
- 4 cells
- 8 cells
- 16 cells
- **Morula** (solid ball of cells)
- **Blastula** w/**Blastrocoel chamber**
- **Gastrula** w/**Blastopore** and **Archenteron** (embryonic gut)

Early stages of Development



Single cell to blastula stage in sea urchin.



Morula

- Stage in embryonic development consisting of a solid ball of cells.

Blastula

- Early stage in the development of a fertilized egg, when the egg changes from a solid mass of cells (the morula) to a hollow ball of cells (the blastula), containing a fluid-filled cavity (the blastocoel).
- Single layer of cells forming a hollow ball

Gastrula

- Two cell layers thick
  - One side of the blastula folds inward allowing for the second layer to form.
  - Two layers here are the ectoderm and endoderm
- Gastrulation occurs here:
  - producing the three primary germ layers
  - Gastrula phase continues until the mesoderm forms (the third layer of a developing embryo.)

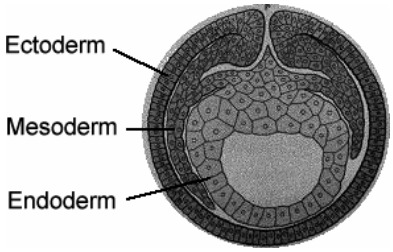
Germs, Germs, Germs

- During the gastrula stage of development, three germ layers form. All other tissues eventually form from these three layers.
- The three germ layers are the:
  - **endoderm** (inside skin)
  - **mesoderm** (middle skin)
  - **ectoderm** (outside skin)

Germ Layers

- **Ectoderm** - cells on the outside of the gastrula that become the body covering.
- **Mesoderm** - a middle layer of cells that forms the muscles and interior organs, internal linings, blood vessels, blood, skeleton .
- **Endoderm** - cells on the inside of the gastrula that become the lining of the gut.

Germ Layers



How many germ layers???

- Animals that produce all three layers are known as **triploblastic**.
- Some animals only produce two layers, endoderm, and ectoderm. These organisms are called **diploblasti**c.

Coelom?

- Fluid-filled body cavity within the body of many animals.
- It is formed by the splitting of the embryonic mesoderm into two layers.

Coelom: Body Cavity

- Animals who do not have a coelom are called acoelomates
  - *a*: meaning without
  - *coelom*: meaning cavity
- Animals that have a coelom:
  - Pseudocoelomates:the coelom is not completely lined with mesoderm ("false coelom")
  - Coelomates: the coelom is completely covered with mesoderm and is a true body cavity or coelom.

Proto what?

- Coelomates can be broken up into two main groupings:
  - Protostomes: blastopore develops into a mouth
    - from Greek meaning "first" and "mouth"
  - Deuterostomes: blastopore does not develop into the mouth, the blastopore develops into the anus later in development
    - from Greek meaning "second" and "mouth"

Cleavage

- Protostomes: Spiral Cleavage
- Deuterostomes: Radial Cleavage