Animalia

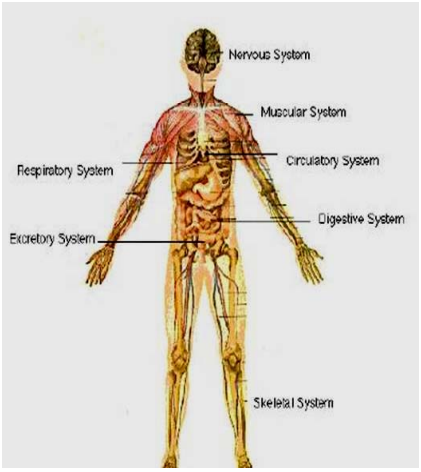
A Brief Survey of Animals

The study of animals is referred to as ***zoology.***

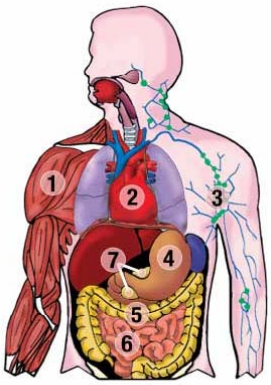
Animals are the largest of the 6 kingdoms, and exhibit a great diversity in form and function.

Major Animal Characteristics

- 1. Multicellular, eukaryotic organisms, with a division of labour amongst cells that are specialized.



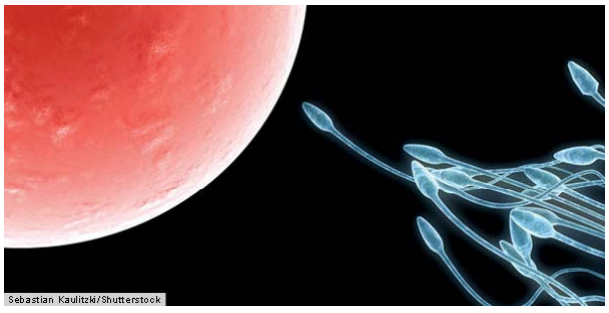
- 2. A variety of systems have evo
and are specialized for specific fu
These systems include:
  - Circulatory
  - Lymphatic
  - Integumentary (skin)
  - Digestive
  - Respiratory
  - Muscular
  - Reproductive
  - Skeletal
  - Excretory
  - Endocrine
  - Nervous



3. Heterotrophic: Animals have more complex systems than plants. These systems are based upon the animal's nutrient requirements.

4. Locomotion: Most are mobile at some point in their lifetime.

5. Reproduction: This may be through sexual or asexual means. Asexual occurs in some lower forms, sexual occurs in all higher forms.



Five Major Areas Used to Describe Animals

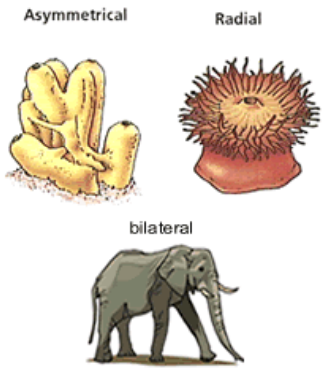
- 1. Systems: When moving from simpler to more complex animal forms, the number and complexity of systems increases.
- 2. Symmetry: This is a term used to describe the body plan of an animal. To find the symmetry of an animal, an imaginary line is drawn to divide the animal in half.

There are three forms of symmetry:

(A) Asymmetric - An organism cannot be cut into two matching halves. (e.g. sponges)

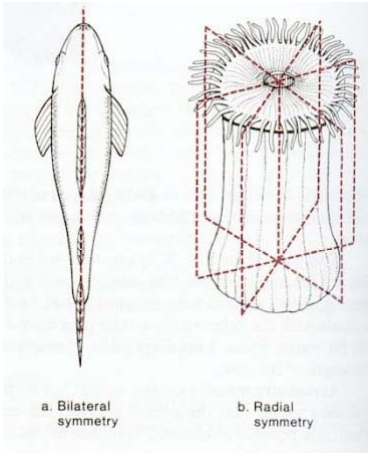
(B) Radial - Any line passing through the central axis of an organism divides it in half. These organisms are rounded. (e.g jellyfish)

(C) Bilateral: An elongated body plan. There is only one line that divides the animal in half. This line runs down the middle of the longitudinal section. This is the most common form of symmetry. (e.g. humans, frogs, etc.)



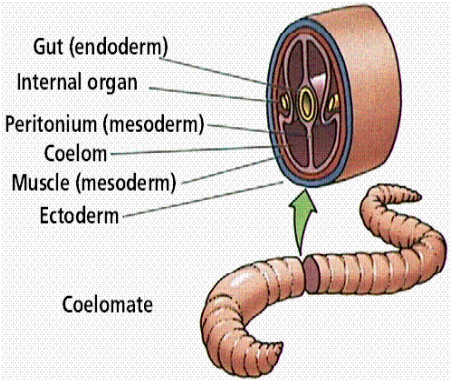
When an animal has bilateral symmetry, the body can be divided into 5 regions:

- *Anterior*: head region
- *Posterior*: rear region
- *Dorsal*: back region
- *Ventral*: bottom region
- *Lateral*: side region



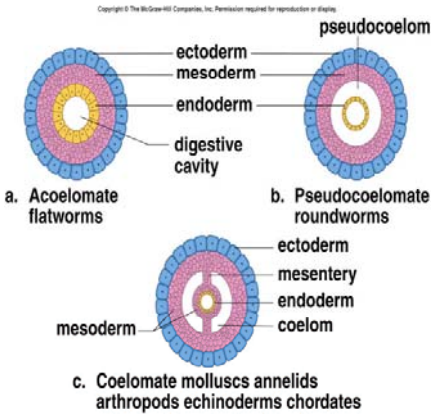
3. Coelom

- A coelom is a body cavity. The presence or absence of a fluid-filled cavity is one of the most significant features of animal body plans used in classification. The coelom is located between the digestive tract and the body wall.



Importance of a Coelom

- (i) They provide space in which internal organs can be suspended so they are not negatively affected by muscle pressure and body movement.
- (ii) They provide space for internal organs to develop and expand.
- (iii) They contain fluids which may assist in internal transportation and nutrient and gas exchange.

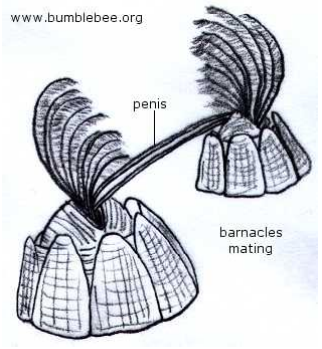


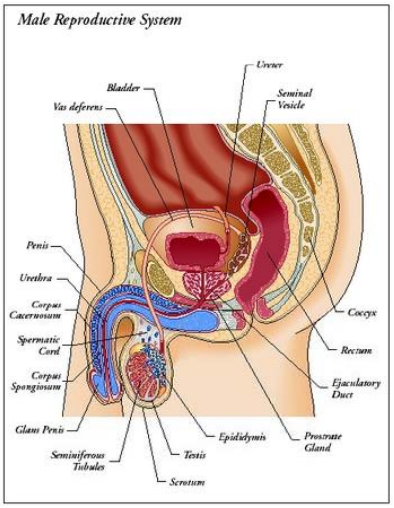
Lower animal forms have no or partial coeloms (also called a **pseudocoelom**). They are at a disadvantage in light of the efficient functioning of a true coelom.

4. **Cell Layers**: Animals contain either two or three embryonic cell layers. Simpler animals contain only two; all others have three. Each layer is responsible for producing various tissues and structures in the adult animal. These layers include:

- *Ectoderm* - forms the outer body (skin, nerves)
- *Mesoderm* - forms the middle organs (kidney, heart)
- *Endoderm* - form lining of gut or digestive tract
- *simple animals have no mesoderm.*

5. Reproduction: Moving from simpler to more complex animal forms, the reproductive system becomes more complex.



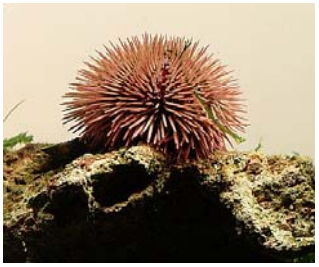


Classification

- There are two major groups of animals. They are classified according to the presence or absence of a backbone.

Invertebrates

- 1. These organisms lack a backbone, and include the following phyla:
- (a) Porifera (sponge)
- (b) Coelenterata (jellyfish)
- (c) Platyhelminthes (tapeworm)
- (d) Nematoda (ringworm)
- (e) Annelida (earthworm)
- (f) Mollusca (shellfish)
- (g) Arthropoda (insects)
- (h) Echinodermata (starfish)



2. Make up 97% of the animal kingdom.

3. Higher forms are characterized by *cephalization.* This is an evolutionary tendency towards specialization of the body with concentration of sensory and neural organs in the anterior end.

4. They possess body plans which have been enormously successful both ecologically and evolutionarily.

Key Terms / Definitions Used in Animal Classification

- Pseudocoelom - partial, not a true body cavity
- 2-way Digestive System - only one opening through which food enters and undigested food exits
- 1-way Digestive System - two openings. Food enters through the mouth and undigested food exits the anus.
- *One way system is better because it allows the animal to eat continuously.*
- Diffusion - a substance goes from an area of high to low concentration without any expenditure of energy
- Open Circulatory System - blood is not always inside blood vessels, and is not under pressure. It is slow and inefficient, and does not transport oxygen.

Key Terms / Definitions (continued)

- Closed Circulatory System - blood is always inside blood vessels, and is under pressure. It is fast, efficient and transports oxygen.
- Ganglia - a mass of nerve cells that give rise to a nerve center.
- Eye Spot - sensory organ capable of detecting light from dark, does not see images
- Flame Cell - cells that contain cilia that push waste from an organism.
- Nephridia - a unit that filters body fluids to remove waste so that the fluid may be recycled.

Key Terms / Definitions (continued)

- Malpighian Tubules - tubules that collect liquid wastes within an organism and dump them into the hind gut of the organism
- Green Glands - structures in which wastes are collected and become concentrated within an organism
- Tracheals - tubes leading into the body of the organism for the purpose of gas exchange
- Hermaphroditic - possessing both ovaries and testes