26-1 Introduction to the Animal Kingdom

Which of these is an “animal?”

End Show

Answer: They are all animals!




Characteristics of Animals:

- heterotrophic
- Eukaryotic
- multicellular
- lack cell walls.

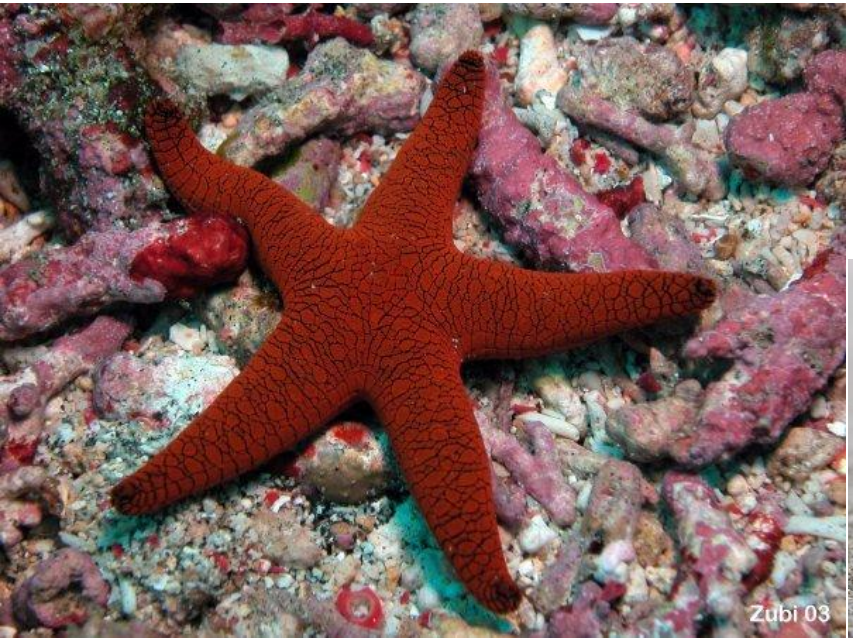
Animals have the following types of tissues:

- epithelial
- muscular
- connective
- nervous

Invertebrates make up 95% of all animal species.

Invertebrates do not have a backbone, or vertebral column.

They include sea stars, worms, jellyfishes, and insects.



End Show

The other 5% of animals are vertebrates.

Vertebrates have a backbone.

Vertebrates include fishes, amphibians, reptiles, birds, and mammals.

Animals carry out the following essential functions:

- feeding
- respiration
- circulation
- excretion
- response
- movement
- reproduction

Feeding

Herbivores eat plants.

Carnivores eat other animals.

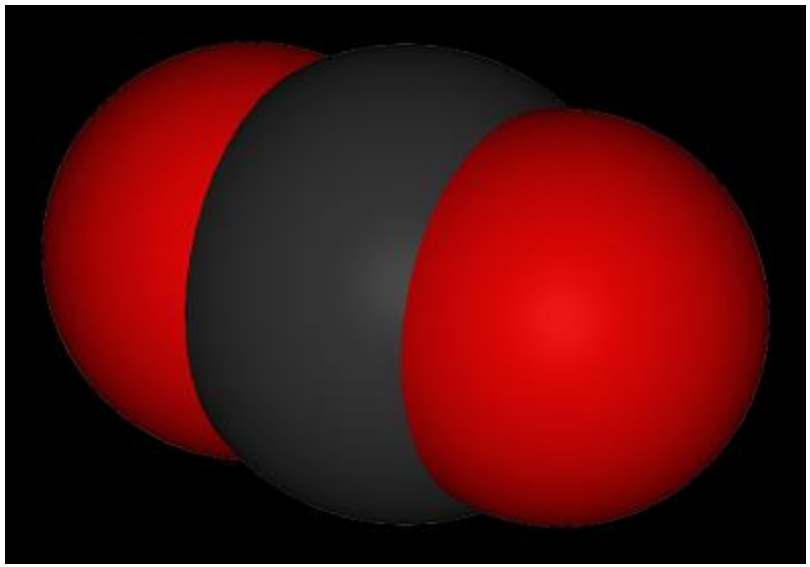
Omnivores feed on both plants and animals.

Detritivores feed on decaying plant and animal material.

Filter feeders are aquatic animals that strain tiny floating organisms from water.

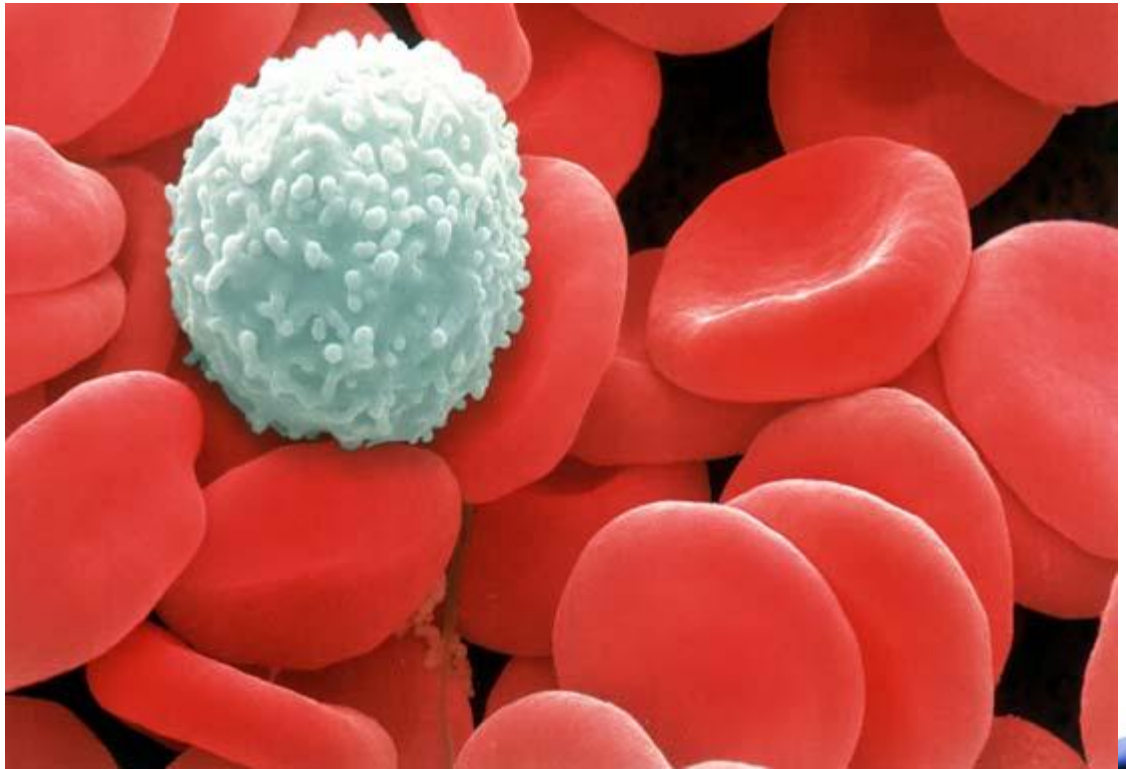
Respiration

Whether they live in water or on land, all animals respire—they take in oxygen and give off carbon dioxide.



Circulation

Animals transport oxygen, nutrient molecules, and waste products among all their cells through either simple diffusion or some kind of circulatory system



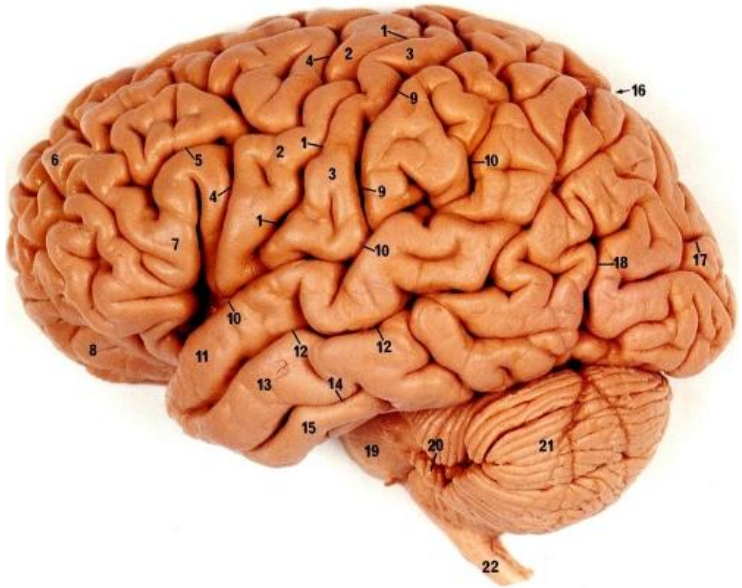
Excretion

Ammonia is a waste product of cells and a poisonous substance.

Most animals have an excretory system that eliminates ammonia quickly or converts it into a less toxic substance that is removed from the body.

Response

Animals respond to events in their environment using specialized cells, called **nerve cells**. In most animals, nerve cells form a nervous system.



Movement

Some animals stay at a single spot, but most can move. Most animals have **muscles or musclelike tissues**.

Muscle contraction enables motile animals to move around by working in combination with a support structure called a skeleton.

Muscles also help even sedentary animals feed and pump water and fluids through their bodies.

Reproduction

Most animals reproduce sexually. This helps to create and maintain genetic diversity in populations and improve species' abilities to evolve when the environment changes.

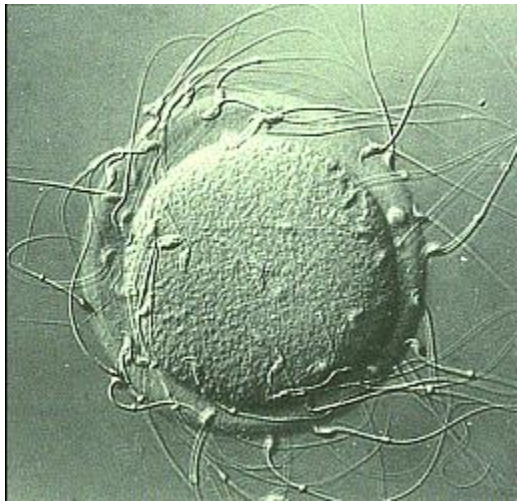
Many invertebrates can also reproduce asexually. This produces offspring that are genetically identical to the parent. It allows animals to increase their numbers rapidly.

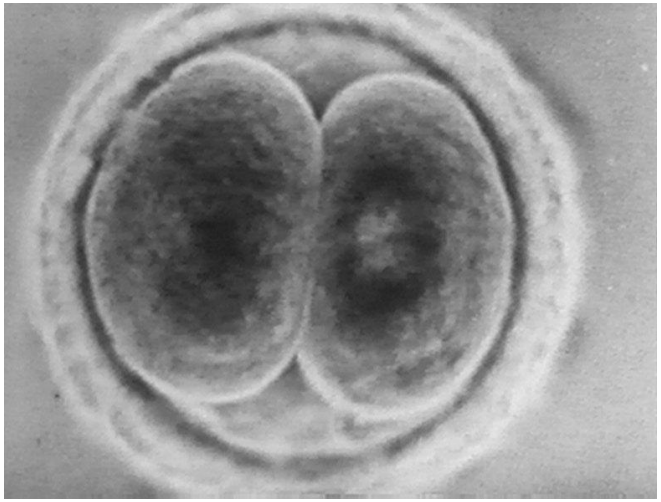
Complex animals tend to have:

- high levels of cell specialization and internal body organization
- bilateral body symmetry
- a front end or head with sense organs
- a body cavity

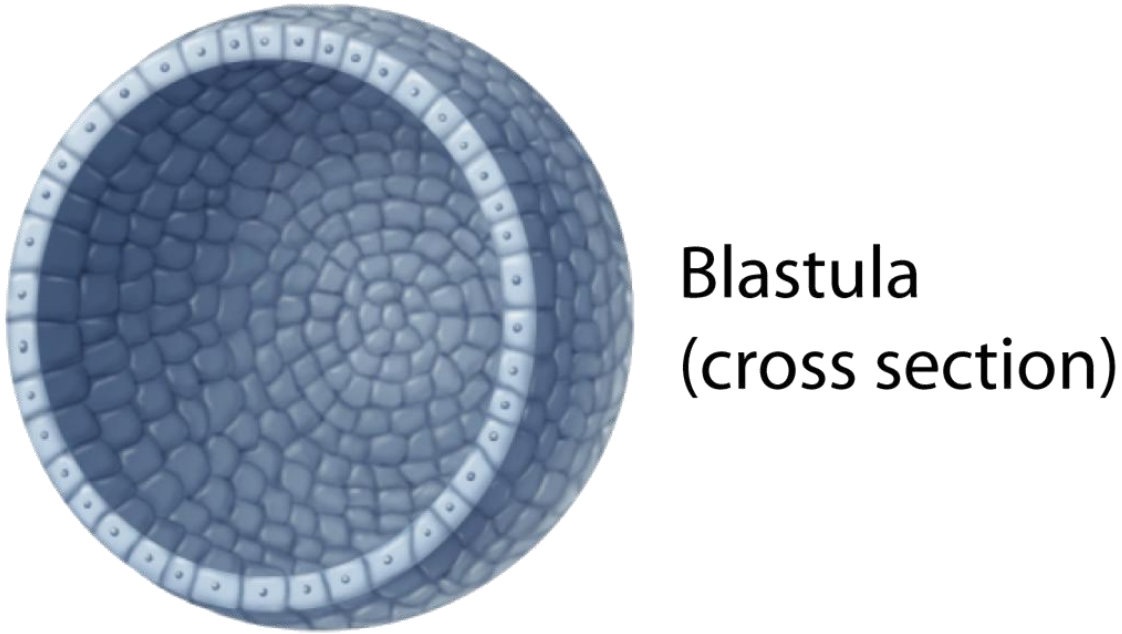
Early Development

Animals that reproduce sexually begin life as a zygote, or fertilized egg.



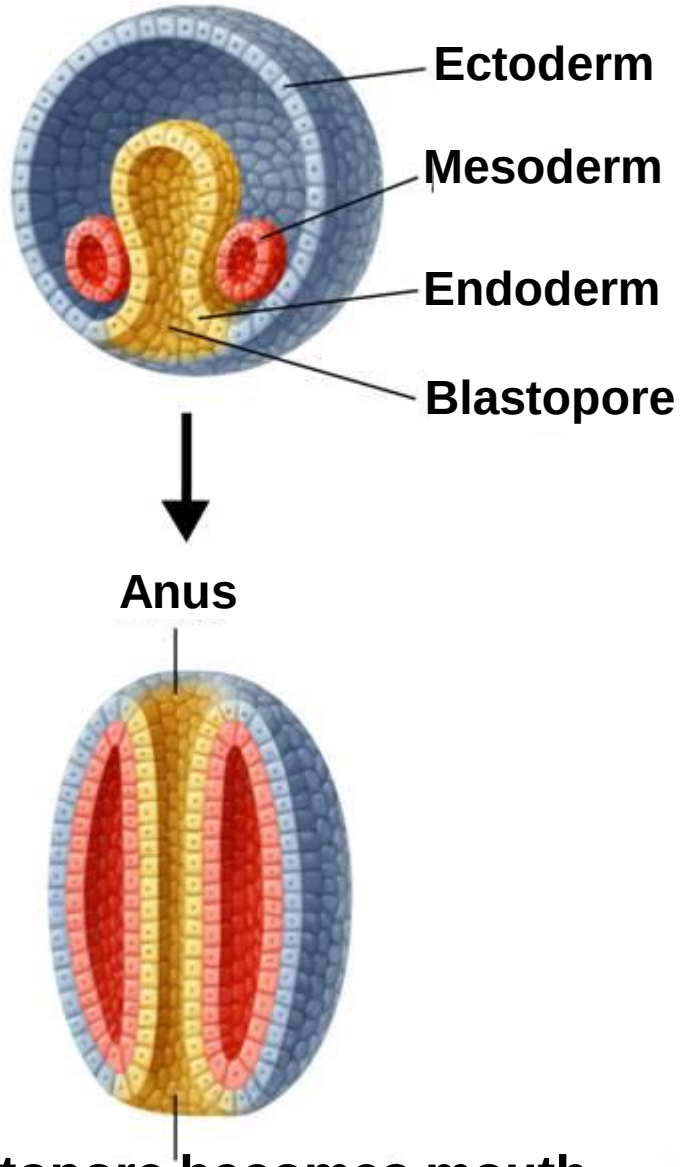


The zygote undergoes a series of divisions to form a **blastula**, a hollow ball of cells.



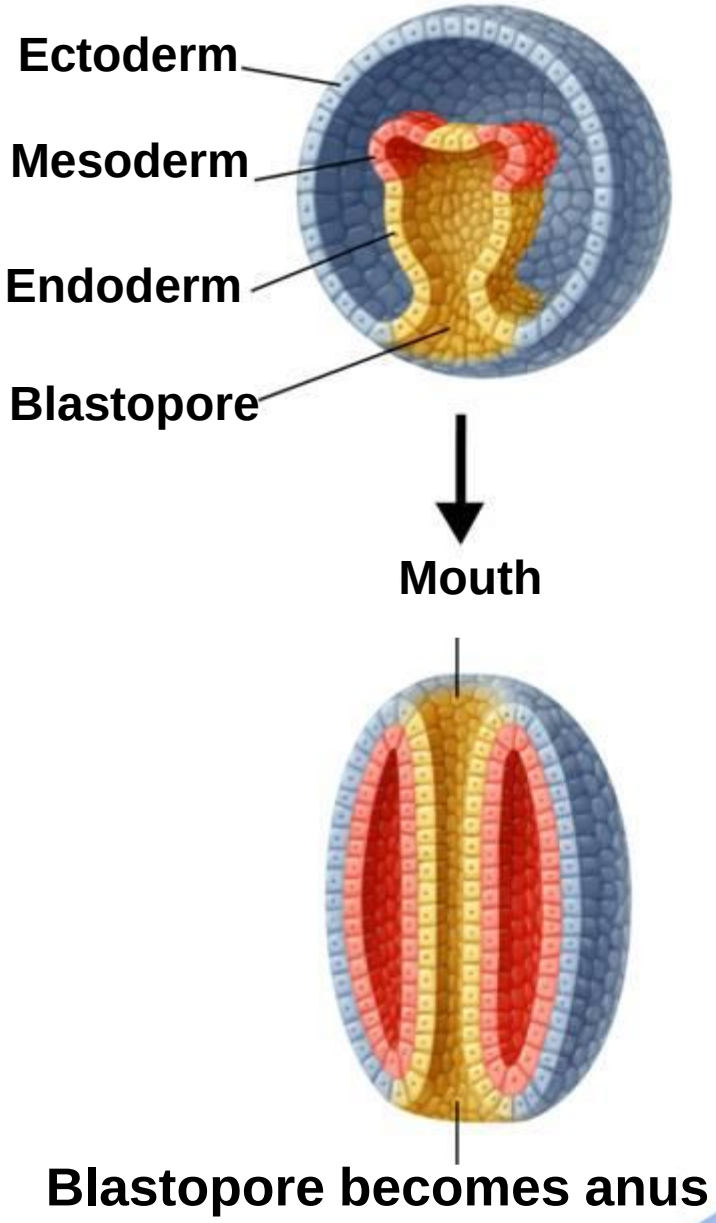
A **protostome** is an animal whose mouth is formed from the blastopore.

Most invertebrate animal are protostomes.

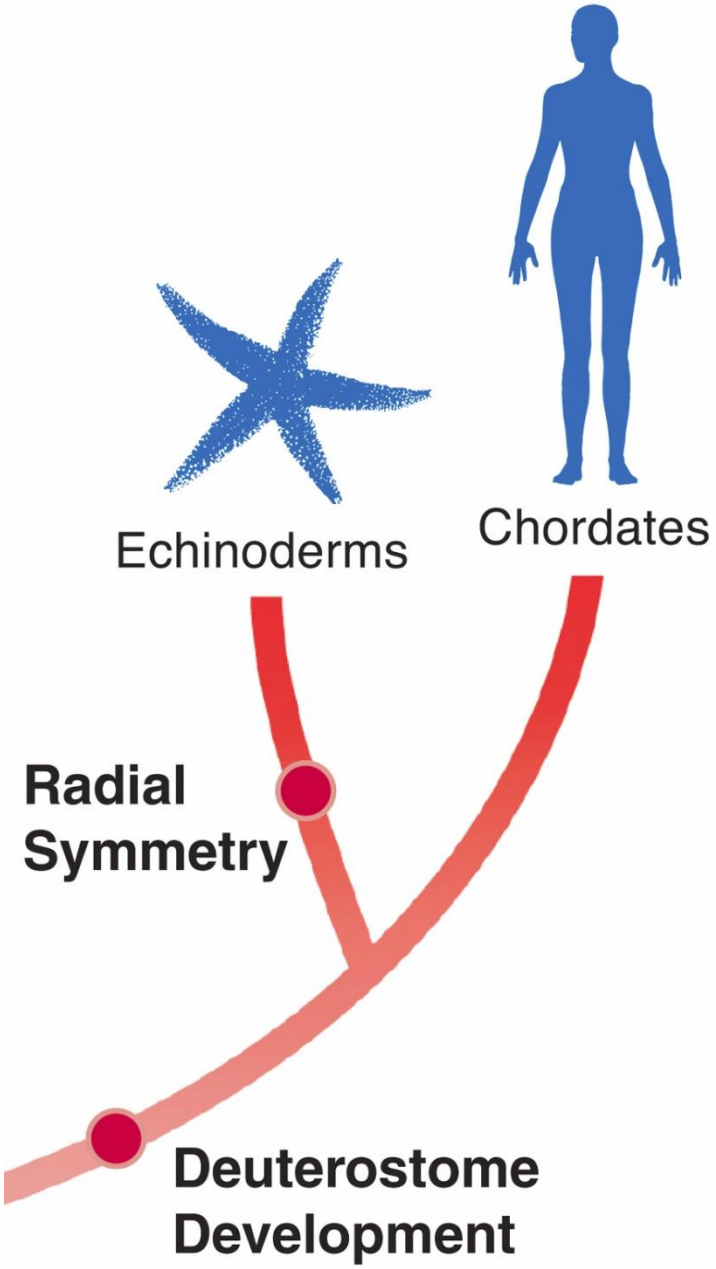


A **deuterostome** is an animal whose anus is formed from the blastopore.

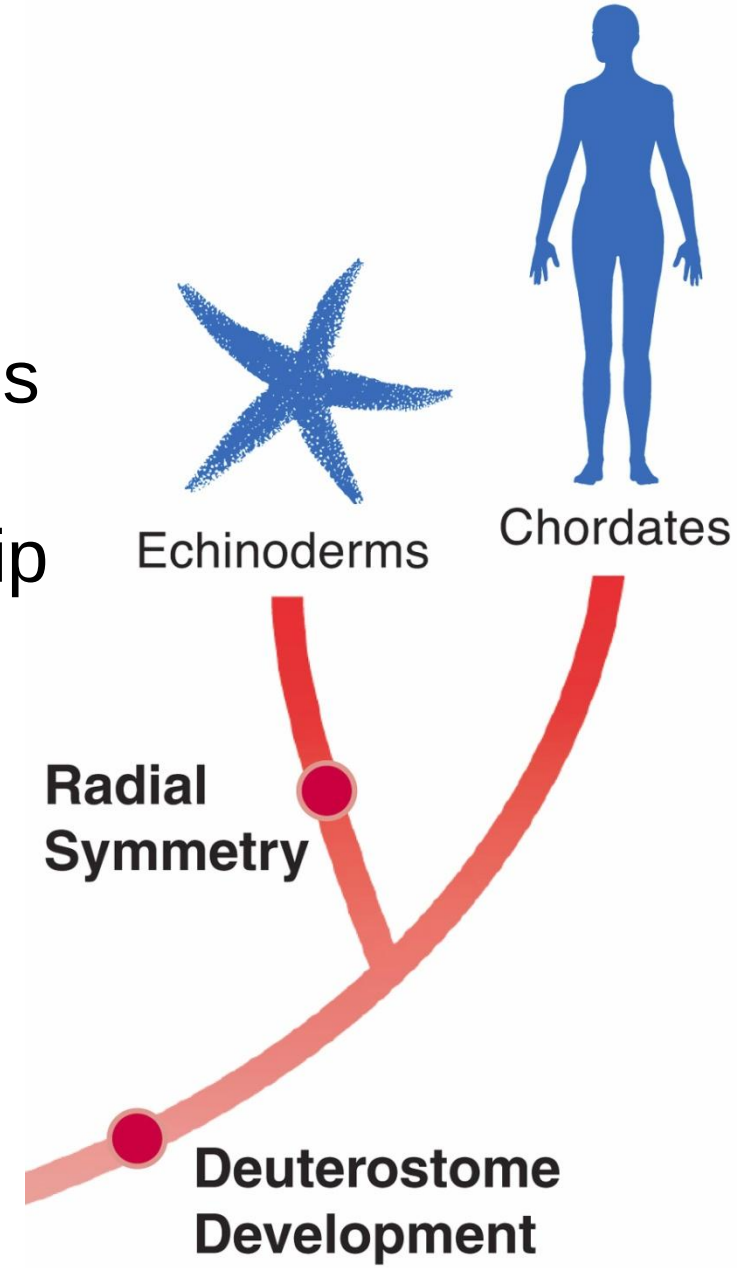
The **anus** is the opening through which wastes leave the digestive tract.



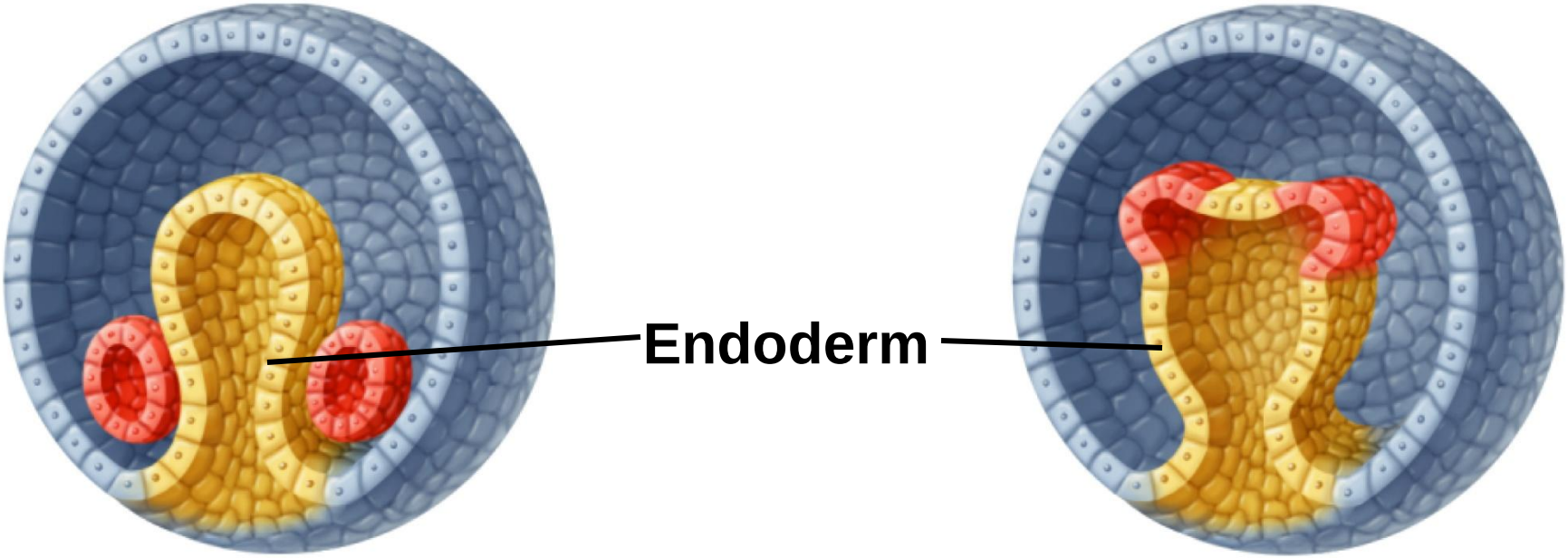
Echinoderms and vertebrates are both deuterostomes.



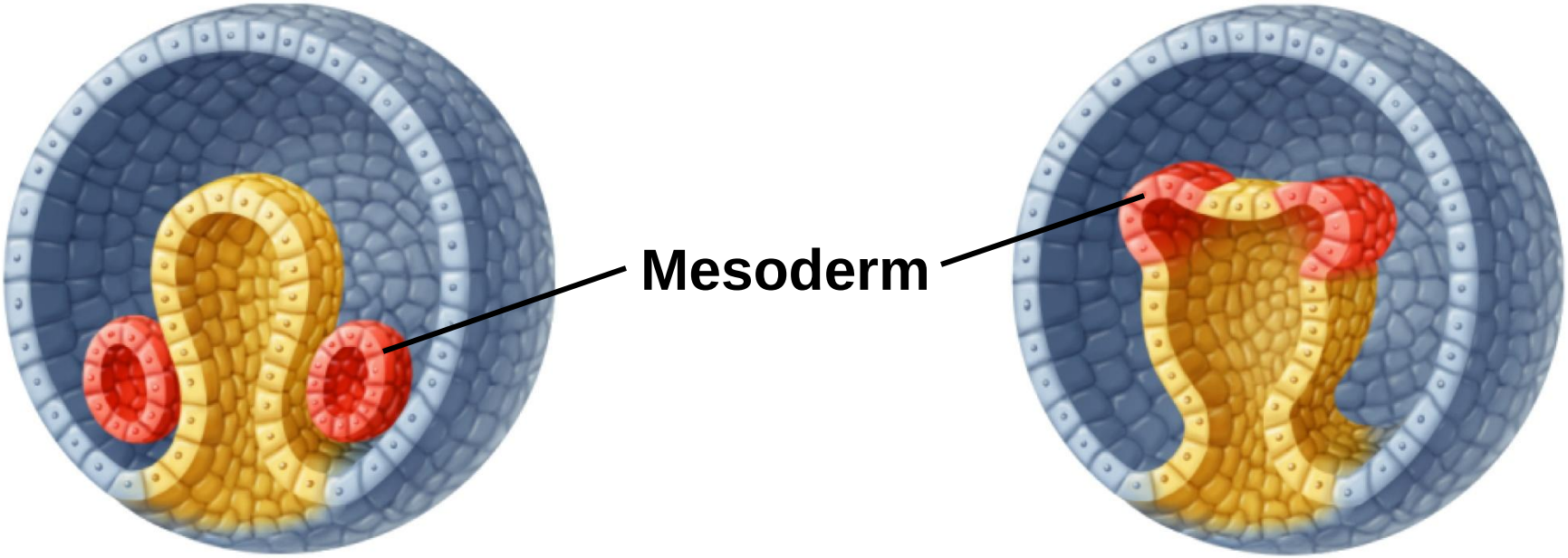
This similarity in embryology may indicate that vertebrates have a closer evolutionary relationship to echinoderms than to other invertebrates.



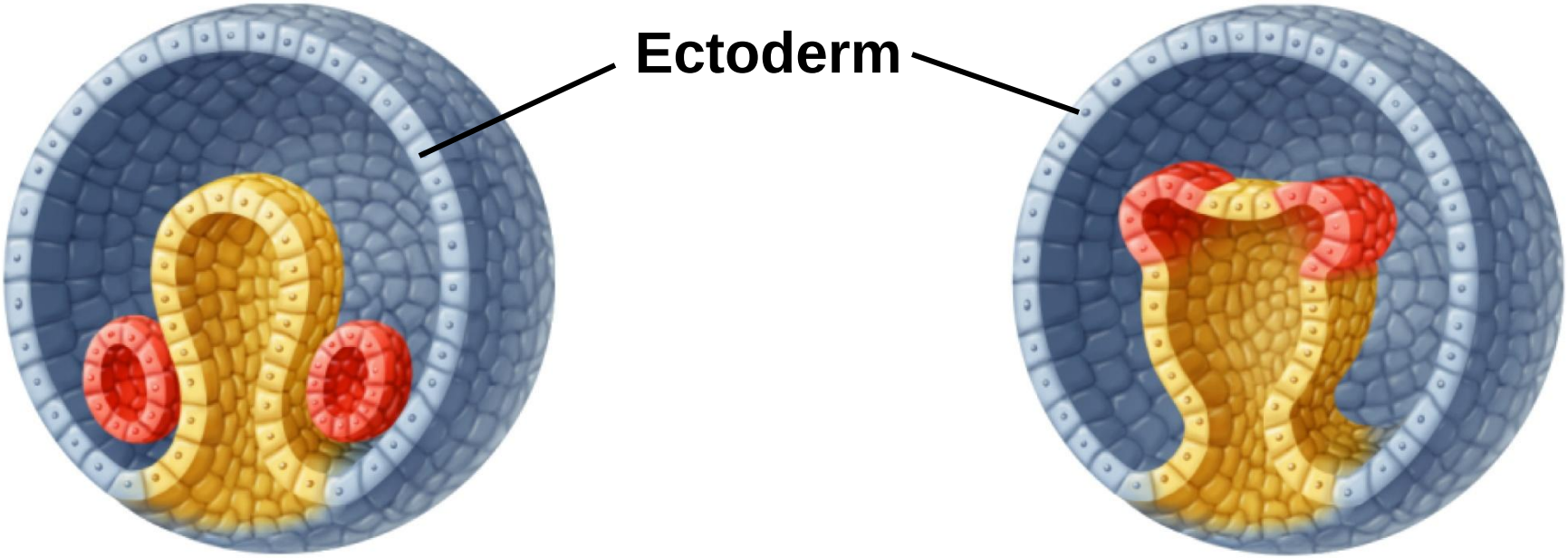
The cells of the **endoderm**, or innermost germ layer, develop into the linings of the digestive tract and much of the respiratory system.



The cells of the **mesoderm**, or middle layer, develop into muscles and much of the circulatory, reproductive, and excretory organ systems.

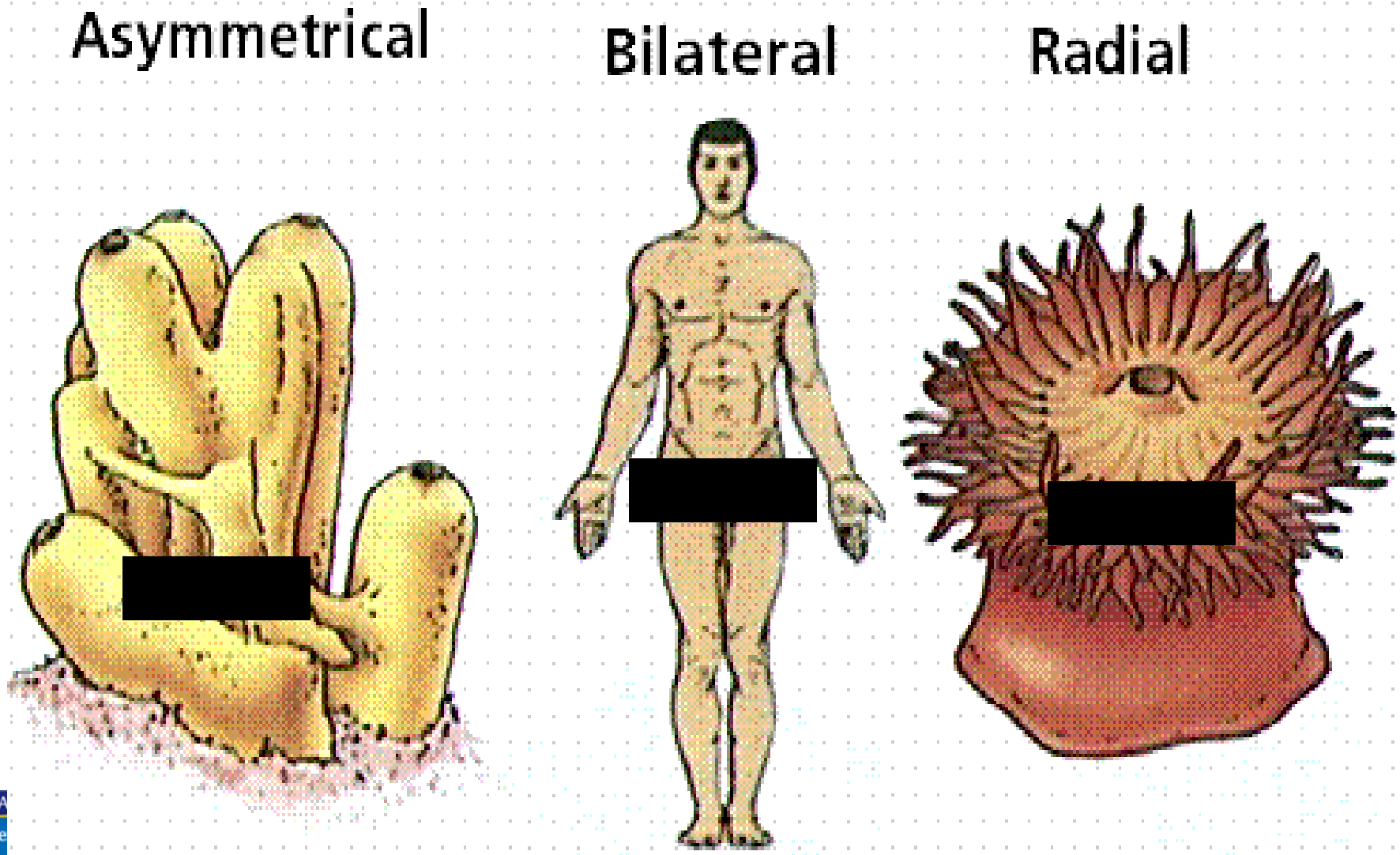


The **ectoderm**, or outermost layer, develops into the sense organs, nerves, and the outer layer of the skin.



Body Symmetry

Except for sponges, every animal exhibits some body symmetry in its structure.

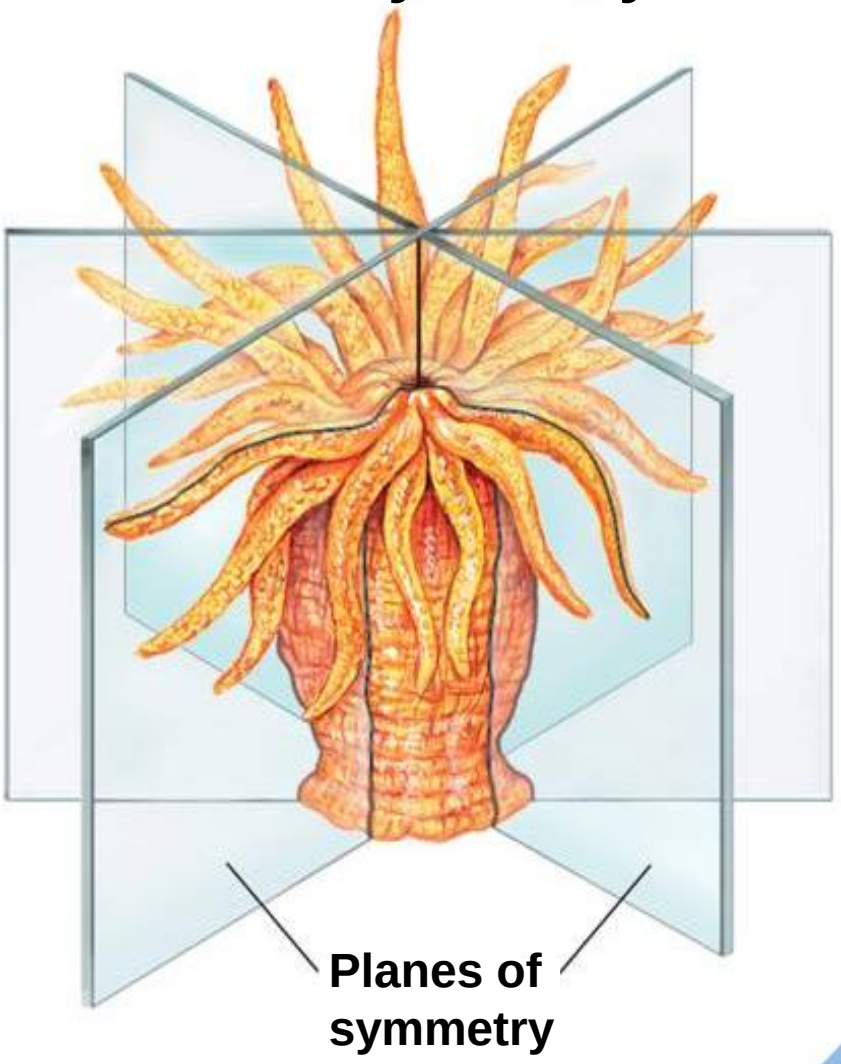


Body Symmetry

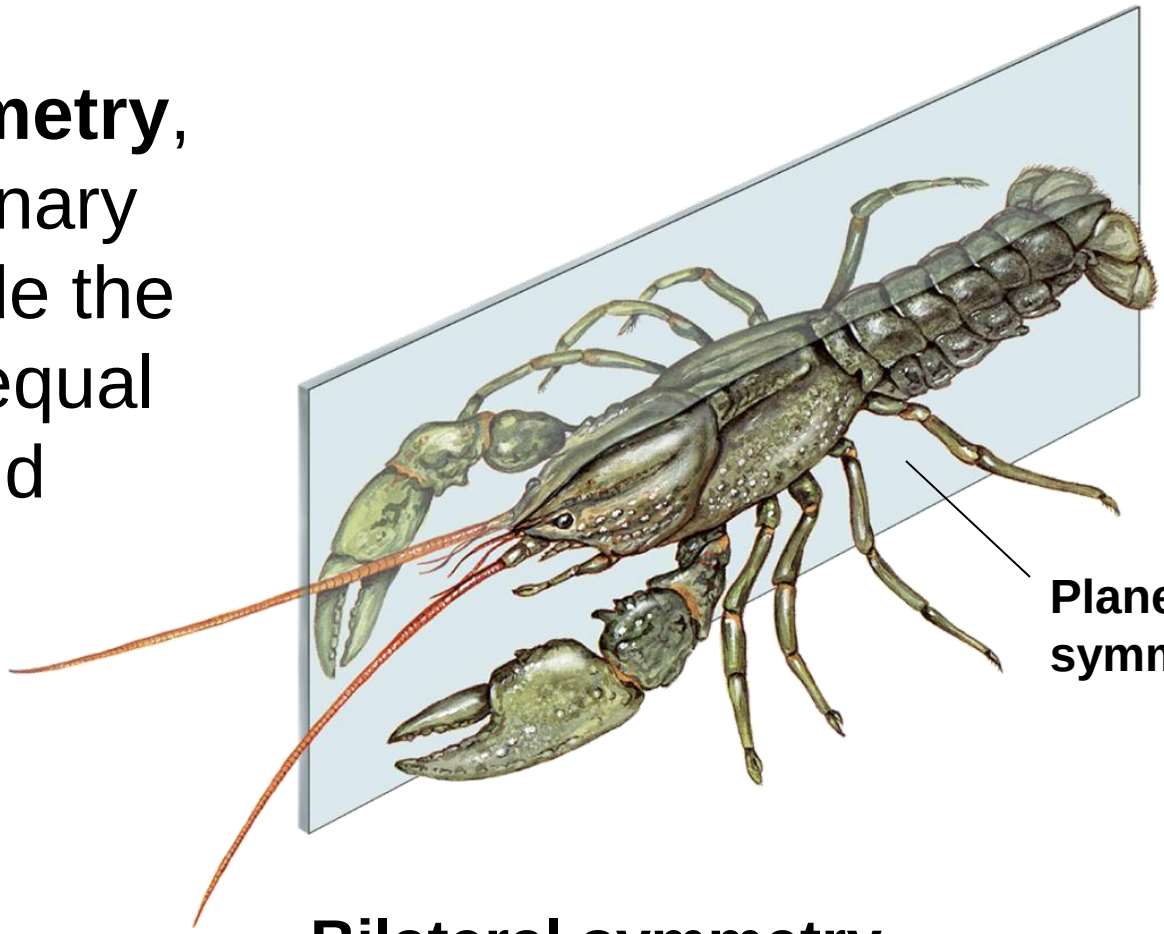
Many simple animals, like the sea anemone, have body parts that repeat around the center of the body.

These animals exhibit **radial symmetry,** in which any number of imaginary planes can be drawn through the center, each dividing the body into equal halves.

Radial symmetry

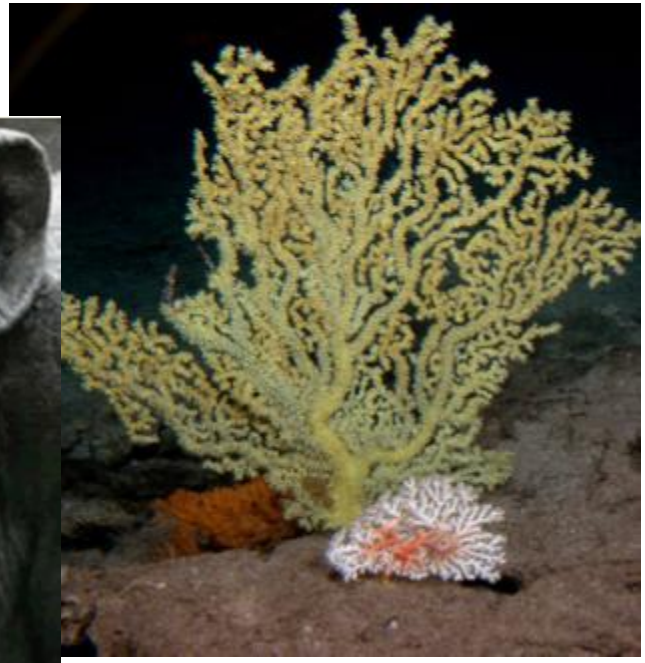


In animals with **bilateral symmetry**, only one imaginary plane can divide the body into two equal halves—left and right.



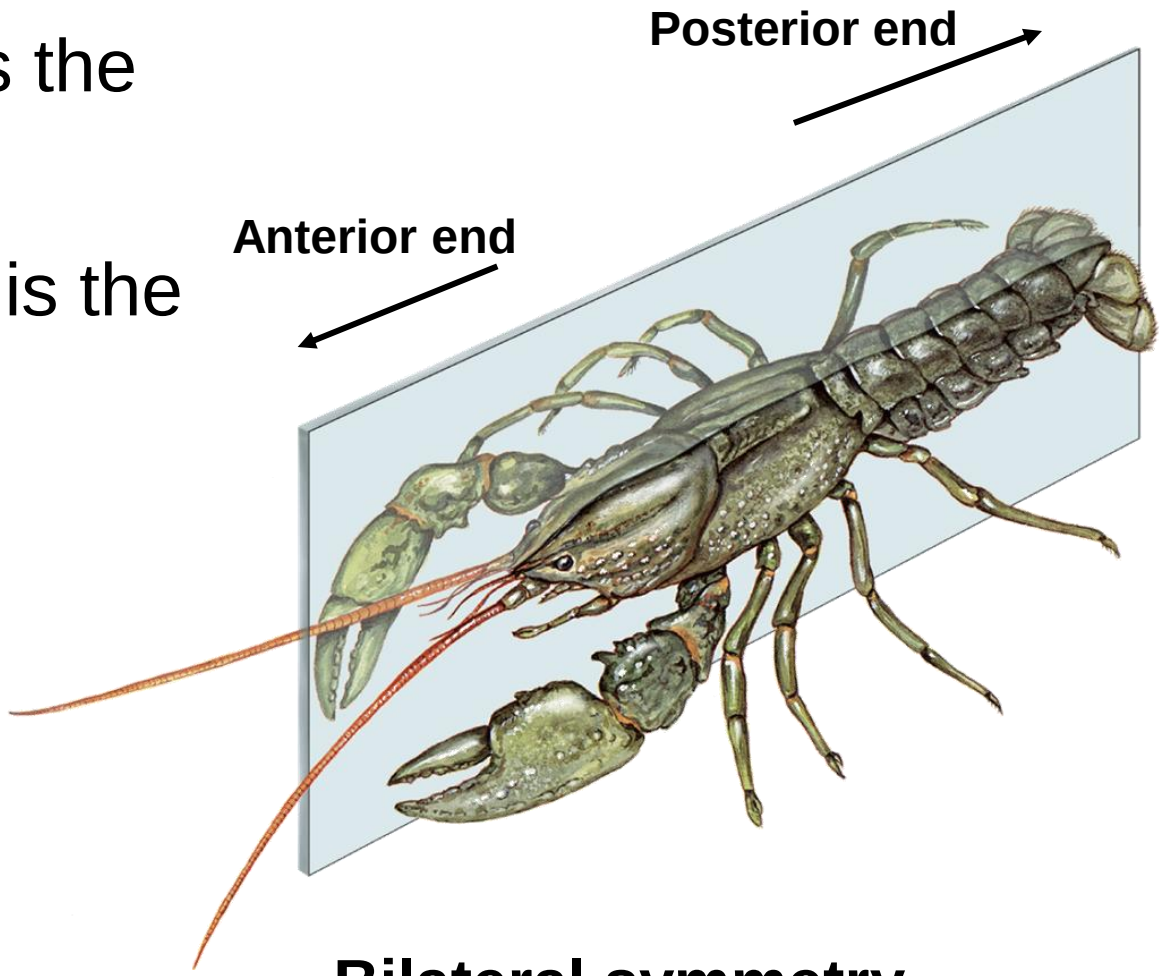
Bilateral symmetry

Identify the Symmetry



The **anterior** is the front end.

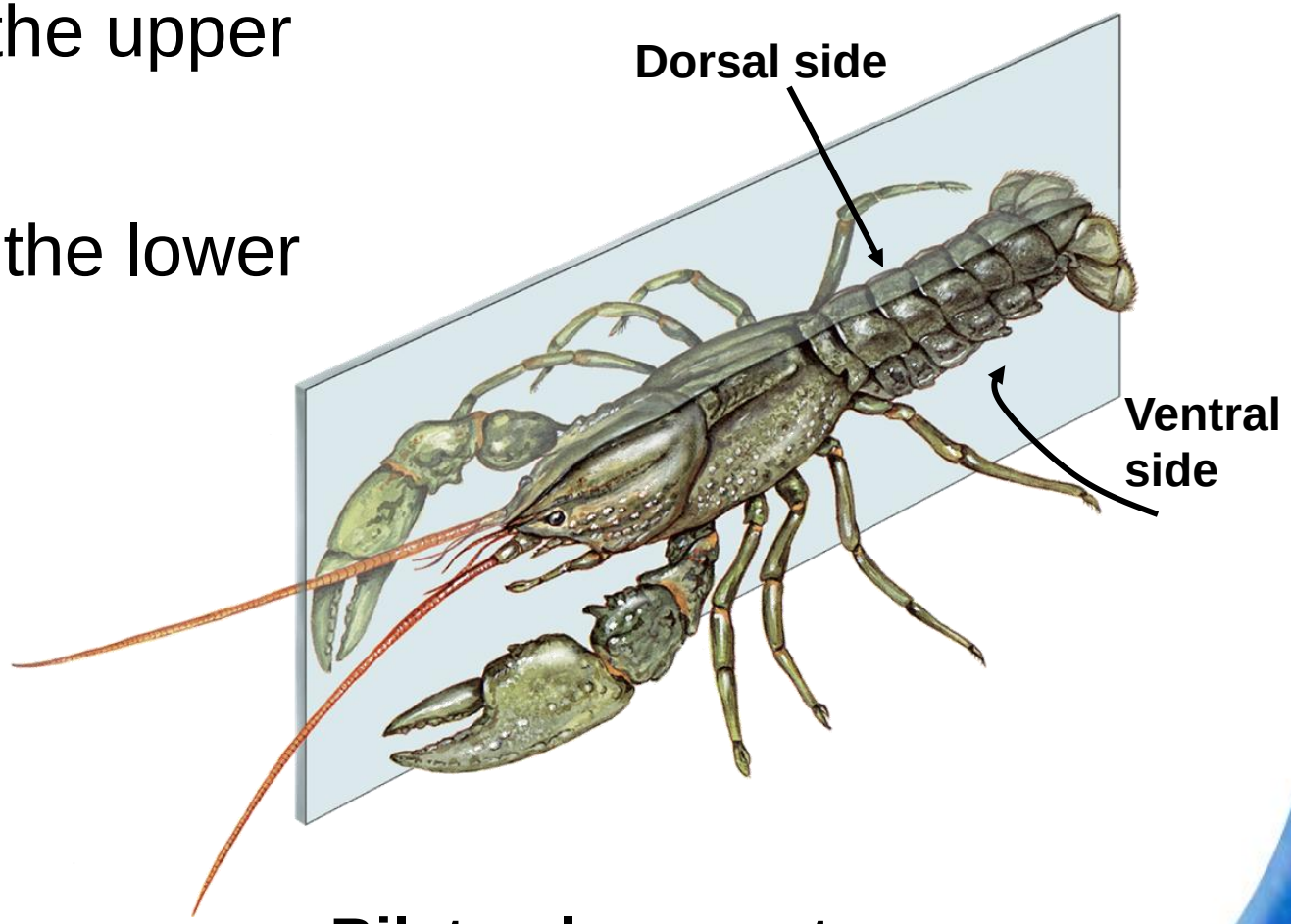
The **posterior** is the back end.



Bilateral symmetry

The **dorsal** is the upper side.

The **ventral** is the lower side.



Bilateral symmetry

Cephalization

Animals with bilateral symmetry exhibit **cephalization,** which is the concentration of sense organs and nerve cells at the front end of the body.

Body Cavity Formation

Most animals have a **body cavity**, a fluid-filled space between the digestive tract and body wall.

A body cavity provides a space in which internal organs can be suspended so that they are not pressed on by muscles or twisted out of shape by body movements.

Animal Kingdom Phyla

Phylum Porifera – sponges

Phylum Cnidaria – sea anemones, jellyfish, hydra

Phylum Platyhelminthes - flatworms

Free-living Planarian

Parasitic Tapeworm

Phylum Nematoda – roundworms

Phylum Annelida – segmented worms

Phylum Mollusca – clams, squid, snails

Phylum Arthropoda – crustaceans, insects, spiders

This is the largest phylum in the animal kingdom and contains the most number of species

Phylum Echinodermata - starfish

Phylum Chordata – includes all vertebrates

26-1 Section QUIZ

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Section QUIZ

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End Show

2 Animals respond to events in their environments using specialized cells called

a. muscle cells.

b. nerve cells.

c. gametes.

d. blood cells.

3 A characteristic that all animals share is being

a. heterotrophic.

b. autotrophic.

c. prokaryotic.

d. anaerobic.

4 Excretion is a function of all animals that involves

a. exchange of oxygen and carbon dioxide.

b. transport of material from one part of the body to another.

c. digestion and absorption of food molecules.

d. removal of metabolic wastes.

5 One major trend in animal evolution has been

a. the simplification of body organ systems.

b. an increase in the degree of cephalization.

c. a shift from bilateral symmetry to radial symmetry.

d. disappearance of the blastula stage in early development.