

Kingdom Animalia

Chapter 26

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Animals are multicellular, eukaryotic heterotrophs whose cells lack cell walls.

Invertebrates are animals that do **not** have a backbone, or vertebral column.

Over 95% of Animal Species

Vertebrates are animals that **do** have a backbone.

Less than 5% of Animal Species

Animal Phyla

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Phylum Porifera (sponges)

Phylum Cnidaria (jellyfish, sea anemones, corals)

Phylum Platyhelminthes (flatworms)

Phylum Nematoda (roundworms)

Phylum Annelida (segmented worms)

Phylum Mollusca (mollusks - snails, slugs, clams, squid, octopi)

Phylum Arthropoda (insects, crabs, centipedes, spiders)

Phylum Echinodermata (sea stars, sea urchins, sand dollars)

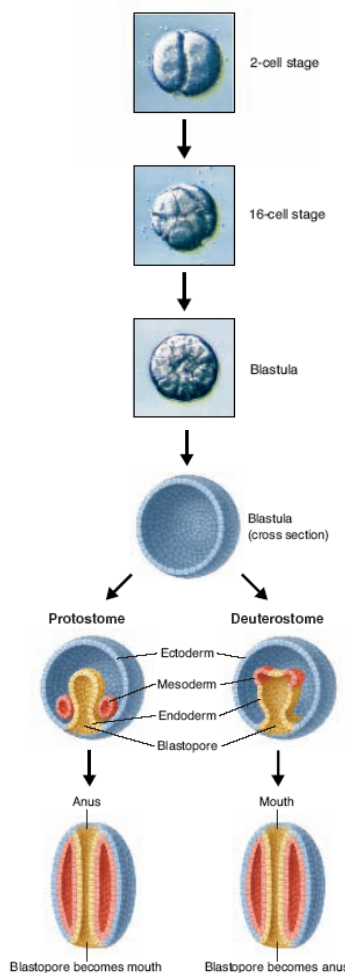
Phylum Chordata (fish, amphibians, reptiles, birds and mammals)



Early Development ✓ (Page 661)

Animals that reproduce sexually begin life as a zygote, or fertilized egg. (egg + sperm → zygote)

Embryology is the study of the formation and growth of embryos.



► **Figure 26-4** During the early development of animal embryos, cells divide to produce a hollow ball of cells called a blastula. An opening called a blastopore forms in this ball. In protostomes, the blastopore develops into the mouth. In deuterostomes, the blastopore forms an anus.

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blastula - a hollow ball of cells
- folds in on itself to form a blastopore

blastopore - leads into a central tube that runs the length of the developing embryo

protostome - an animal whose mouth is formed from the blastopore

deuterostome - an animal whose anus is formed from the blastopore

anus - opening through which wastes leave the digestive tract

Three Germ Layers (Cell Layers) ✓

During early development, the cells of most animal embryos differentiate into three layers called germ layers.

endoderm - innermost layer of cells
- develop into the linings of the digestive tract and much of the respiratory system

mesoderm - middle layer of cells
- gives rise to muscles and much of the circulatory, reproductive, and excretory organ systems

ectoderm - outermost layer of cells
- gives rise to sense organs, nerves and the outer layer of skin

Body Symmetry ✓

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With the exception of sponges, every kind of animal exhibits some type of body symmetry in its anatomy, or body structure.

radial symmetry - body plan in which body parts repeat around the center of the body

- any number of imaginary planes can be drawn through the center
- characteristic of sea anemones and sea stars

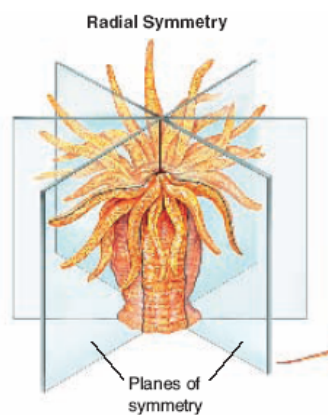


Figure 26-5
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bilateral symmetry - body plan in which only a single, imaginary line can divide the body into two equal halves

- characteristic of worms, arthropods and chordates

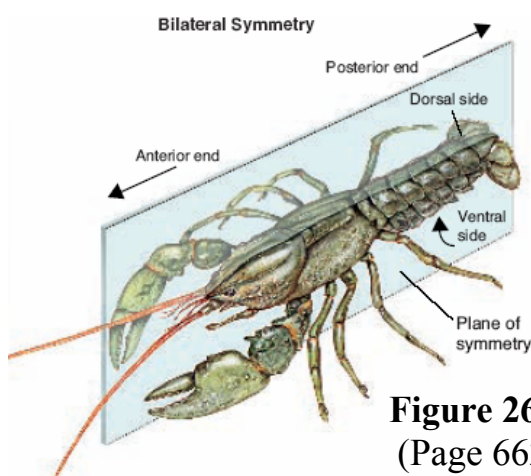


Figure 26-5
(Page 662)

right side/left side

anterior - front end

posterior - back end

dorsal - upper side

ventral - lower side

An anatomy with bilateral symmetry allows for segmentation, in which the body is constructed of many repeated and similar parts or segments.

Cephalization

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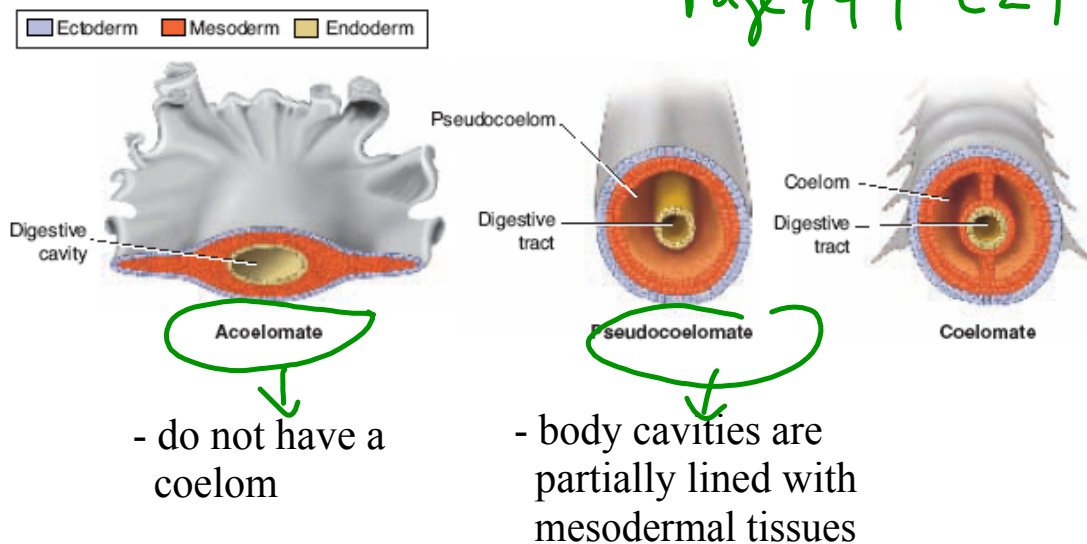
Animals with bilateral symmetry usually exhibit the anatomical characteristic called cephalization. Cephalization is the concentration of sensory organs and nerve cells at the front end of the body.

Invertebrates with cephalization can respond to the environment in more sophisticated ways than can simpler invertebrates.

In general, the more complex an animal becomes, the more pronounced their cephalization. The anterior end is often different enough from the rest of the body that is called a head.

Most complex animal phyla are coelomates (SEE-luh-mayts) meaning that they have a true coelom (See-lum), or body cavity between their body wall and digestive cavity that is lined completely with tissues from the mesoderm.

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Comparing Invertebrates

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Figure 29-5

Comparing Invertebrates			
	Sponges 	Cnidarians 	Flatworms 
Germ Layers	Absent	Two	Three
Body Symmetry	Absent	Radial	Bilateral
Cephalization	Absent	Absent	Present
Coelom	Absent	Absent	Absent
Early Development	—	—	Protostome

	Roundworms 	Annelids 	Mollusks 	Arthropods 	Echinoderms 
Germ Layers	Three	Three	Three	Three	Three
Body Symmetry	Bilateral	Bilateral	Bilateral	Bilateral	Radial (adults)
Cephalization	Present	Present	Present	Present	Absent (adults)
Coelom	Pseudocoelom	True coelom	True coelom	True coelom	True coelom
Early Development	Protostome	Protostome	Protostome	Protostome	Deuterostome