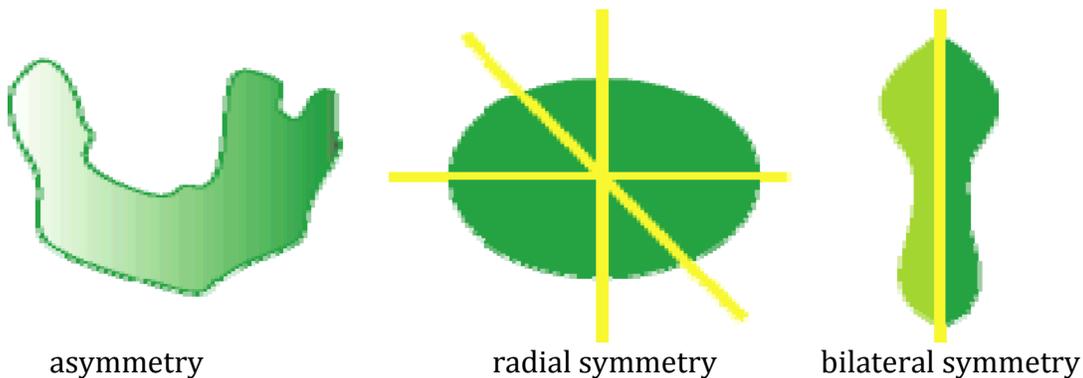


What is an animal?

Animals are characteristically multicellular heterotrophs whose cells lack cell walls. At some point during their lives, animals are capable of movement. In the most commonly encountered animals, this stage is the adult, although some animals (corals) have sessile (nonmobile) adult phases and mobile juvenile forms. Animal and plant evolutionary history both show the development of multicellularity and the move from water to land (as well as secondary adaptation back to water).

Animals developed external or internal skeletons to provide support, skin to prevent or lessen water loss, muscles that allowed them to move in search of food, brains and nervous systems for integration of stimuli, and internal digestive systems.

Animal body plans



(A) Symmetry

Animals show different patterns of body symmetry. Some groups show no particular pattern of symmetry (**asymmetry**). That is, no line of bisection exists that could divide the organism into similar-looking halves. Other groups show **radial symmetry**, where more than one hypothetical bisection can be visualized (lines A, B, and C can each bisect the organism). A third pattern, seen in most phyla of animals, is **bilateral symmetry**, where only one hypothetical bisection can be visualized (only line A can bisect the organism into two halves).

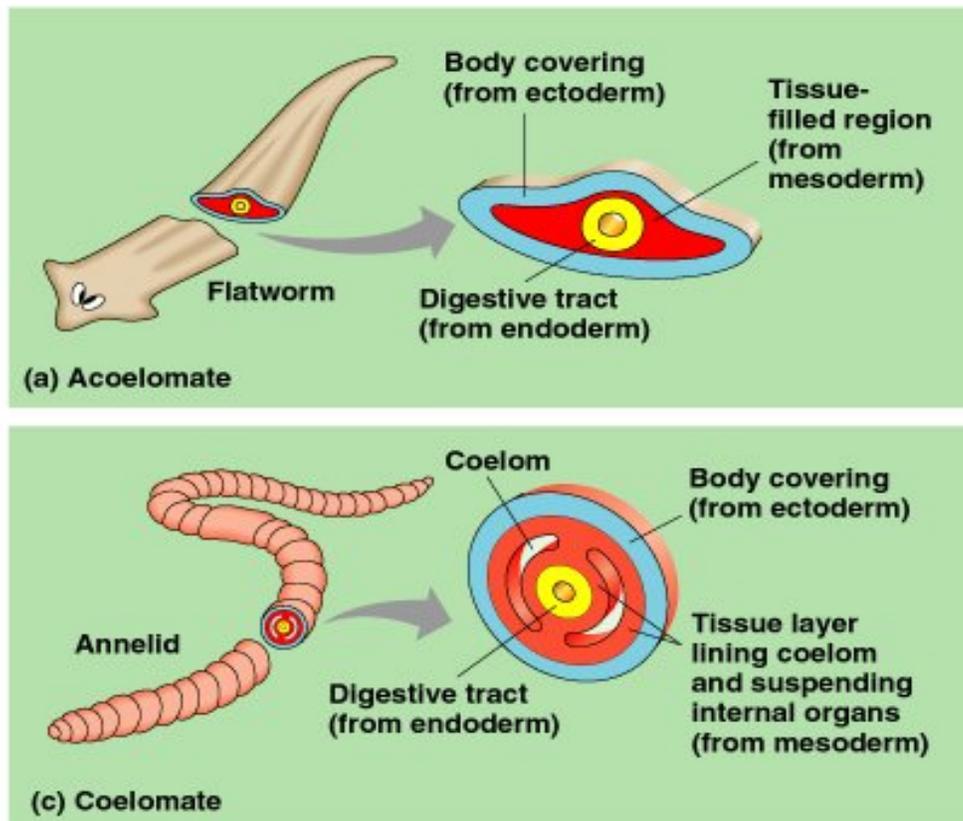
(B) Segmentation, Cephalization & Tagmosis

Segmentation is the structural grouping of parts of an animal body into discrete segments. **Cephalization** means that there is a head, and therefore a concentration of sensory organs, feeding organs, and centers of neural integration near the anterior end of the animal. While at first seeming a bit simplistic, cephalization has tremendous implications for animals. Can you think of any advantages of cephalization? Is cephalization dependent on any particular type of symmetry? **Tagmosis** occurs in segmented animals where groups of segments are organized into functional units. A good example is in arthropods, where segments are grouped into body regions like the head, thorax, and abdomen, each having its own suite of functions.

(C) Body Cavities

One of the primary ways zoologists group animals has to do with the presence or absence of a coelom, and how the coelom is formed. A **coelom** (Greek: *coel* = hollow; pronounced “see-lome”) is a fluid-filled cavity between the alimentary canal and the body wall. There are 3 types of body plans related to the coelom:

1. **Acoelomate**, in which no coelomic cavity exists. Find an animal in your textbook or in the lab that is an example of this body plan.
2. **Pseudocoelomate**, in which a coelom exists, but it is lined by mesoderm only on the body wall, not around the gut. What is an example of a pseudocoelomate animal?
3. **Coelomate** in which the coelom is lined both on the inside of the body wall and around the gut by mesoderm. Animals with a true coelom also have **mesenteries**, which suspend the body organs within the coelom.



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(D) Formation of Coelom - Protostomes vs Deuterostomes

In some animals the anus forms first, and then the mouth. These are called **deuterostomes** (Greek: *deutero* = the second; *stoma* = mouth) In animals belonging to several other important phyla, the mouth forms first, followed by the anus. These are referred to as **protostomes** (Greek: *proto* = the first; *stoma* = mouth).