

Phylum Annelida

The annelids are worms with segmented bodies - the body is divided into a linear series of similar parts or **segments** or **metameres**

The pattern of repeated segmentation is called **metamerism**

Annelids do have a head - **prostomium** - and posterior end - **pygidium**

Internally, the coelom is subdivided by partitions - **septa**

This kind of arrangement allows for each metamere of the annelid worm to act as a **hydrostatic skelton**

The muscle system is metameric - each metamere has longitudinal and circular muscles

Each segment usually bears one or more chitinous bristles called **setae**

These anchor segments that are extended after the circular muscles contract

The nervous system, circulatory system and excretory system is also metameric

The nervous system consists of a brain, connected to a pair ventral longitudinal nerve cords, with a ganglion in each segment.

There is an extensive **closed circulatory system**, in which the blood is always enclosed within blood vessels that run the length of the body and branch to every segment.

Several hearts are used to pump blood through the closed circuit

The excretory system consists of paired **metanephridia**.

Most annelids are hermaphroditic, but they are usually cross fertilizers.

Earthworms and leeches forms pairs and reciprocally fertilize one another

However, some e.g. marine sandworms are dioecious and they release eggs and sperm into the marine environment, where gametes unite to form a trochophore larvae

Evolution of Annelids

Annelids probably originated in the Precambrian.

Definite annelids didn't appear until the Cambrian.

Canadia and other Cambrian polychaetes had no jaws, but some later polychaetes developed hard jaws, which are sometimes mineralized with iron oxide.

Such polychaete jaws are fairly common in the fossil record, and are known as scolecodonts.

Body fossils of polychaetes are rarer, being generally restricted to *Lagerstätten* - localities with unusually good preservation of fossils. Mazon Creek, near downtown Chicago, is one of these localities where polychaetes have been found.

Fossil oligochaetes are much rarer, and there are almost no fossil hirudineans (leeches) known.

Annelid Diversity

Class Polychaeta ("many bristled")

Each segment is equipped with a pair of fleshy paddle-like structures - **parapodia**
 And the parapodia contain a large number of chitinous bristles - **setae**
 The head or **prostomium** usually is well equipped with sensory structures
 The mouth is located just below the prostomium, but in front of the modified segments collectively called the - **peristomium**
 The digestive system includes a muscular pharynx that can be everted through the mouth
 The pharynx is equipped with pincer like jaws for prey capture

Smaller polychaetes lack respiratory structures; larger ones possess gills
 Gills are usually modifications of the parapodia

Some polychaetes are sedentary and burrow into mud or live in protective tubes in the mud
 And in several of these species filter feeding has evolved
 e.g., the fan worm (*Sabella*) with their feather-like head structures called **radioles**

Chaetopterus is a U-shaped tube dweller
 The parapodia are highly modified into 3 fan-like structures that bring water into the tube
 An anterior structure called a **notopodium** secretes a mucous bag that traps food from the water flowing through the tube

The worm *Arenicola* lives in a J-shaped burrow
 It employs peristaltic movements to generate a water flow

Class Oligochaeta ("few bristles")

Many of the morphological structures are reduced when compared to the polychaetes

Each segment usually contains one or more pairs of chitinous bristles - setae

Earthworms literally eat their way through the earth, feeding on vast quantities of soil that contains living and decaying organic material.

The digestive tract of the annelids shows specialization along its length.
 They may be a mouth, pharynx, **crop** (food storage), **gizzard** (grinding), **calciferous glands** (accessory glands that excrete excess calcium from the food)
 The remainder of the gut is the intestine - for digestion and absorption
 Its surface area is increased because of a dorsal longitudinal fold called the **typhlosole**

Oligochaetes lack respiratory organs

Oligochaetes are hemaphroditic, but exchange sperm during copulation. During copulation worms join their anterior ends; they are held together due to mucous secretions from a modified group of fused segments called the **clitellum**.

Class Hirudinea

The body is dorso-ventrally flattened

The anterior segments are modified as a small sucker which surrounds the mouth; the posterior segments form a larger sucker

The setae are completely absent

Although there is evidence of segmentation externally, there is no internal septa

Leeches crawl over the surface in a loop like fashion, with the use of 2 suckers.

Leeches are often predatory, feeding on small invertebrates such as worms and arthropods

The most infamous types are the parasitic, bloodsucking forms.

Blood sucking leeches have blade like jaws that they use to penetrate the skin of a host.

The blood of a host is prevented from clotting because they secrete a powerful anticoagulant; anesthetics are also released

They are hermaphroditic but engage in cross fertilization

Some use hypodermic impregnation

Also have the clitellum and generate cocoons