

Earthworm Dissection



Pictures: Modern Biology, Holt

The following is a classification of a species in the earthworm family Lumbricidae. This common species is Lumbricus terrestris also known as the night crawler or dew worm.

Phylum -	Annelida
Class -	Oligochaeta
Family -	Lumbricidae
Genus -	<i>Lumbricus</i>
Species -	<i>terrestris</i>

Objectives:

- Describe the appearance of various organs found in the earthworm.
- Name the organs that make up various systems of the earthworm.

Materials:

Safety goggles, dissecting pins, gloves, forceps, lab apron, scissors, paper towel, scalpel, water, dissecting probe, preserved earthworm, hand lens, dissection tray.

Purpose:

In this lab, you will dissect an earthworm in order to observe the external and internal structures of earthworm anatomy.

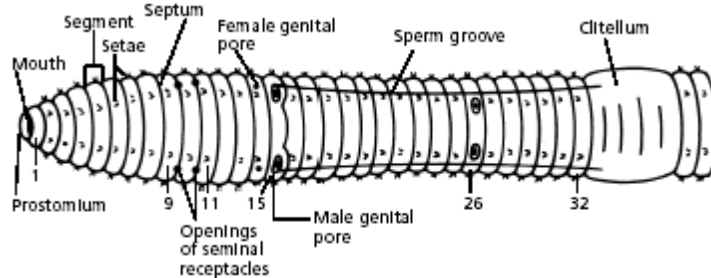
Background:

Among the most familiar invertebrate animals are the earthworms, members of the phylum **Annelida**. The word annelida means "ringed" and refers to a series of rings or segments that make up the bodies of the members of this phylum. Internally, **septa**, or dividing walls, are located between the segments. There may be more than 100 segments in an adult worm. The **clitellum** is a swelling of the body found in sexually mature worms and is active in the formation of an egg capsule, or **cocoon**. **Eggs** are produced in the **ovaries** and pass out of the body through **female genital pores**. **Sperm** are produced in the **testes** and pass out through tiny **male genital pores**. During mating, sperm from one worm travel along the sperm grooves to the **seminal receptacles** of another worm. Fertilization of the eggs takes place outside the body as the cocoon moves forward over the body, picking up the eggs of one worm and the sperm of its mate. The pumping organs of the circulatory system are five **aortic arches**. Circulatory fluids travel from the arches through the **ventral blood vessel** to capillary beds in the body. The fluids then collect in the **dorsal blood vessel** and reenter the aortic arches. The earthworm takes in a mixture of soil and organic matter through its mouth, which is the beginning of the digestive tract. The mixture enters the **pharynx**, which is located in segments 1–6. The **esophagus**, in segments 6–13, acts as a passageway between the pharynx and the crop. The **crop** stores food temporarily. The mixture that the earthworm ingests is ground up in the **gizzard**. In the **intestine**, which extends over two-thirds of the body length, digestion and absorption take place. Soil particles and undigested organic matter pass out of the worm through the **rectum** and **anus**. The nervous system consists of the **ventral nerve cord**, which travels the length of the worm on the ventral side, and a series of **ganglia**, which are masses of tissue containing many nerve cells. The **nerve collar** surrounds the pharynx and consists of ganglia above and below the pharynx. Nervous impulses are responsible for movement and responses to stimuli. Each segment contains an

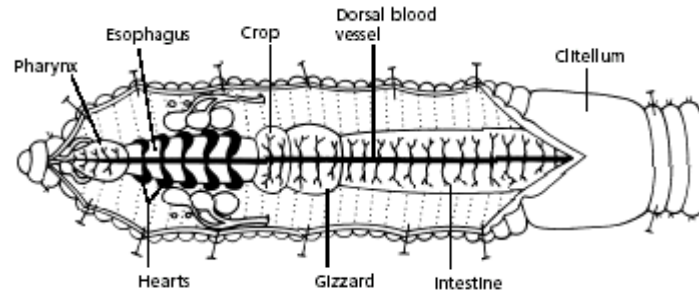
enlargement, or **ganglion**, along the ventral nerve cord. Excretory functions are carried on by **nephridia**, which are found in pairs in each body segment. They appear as tiny white fibers on the dorsal body wall. The earthworm has no gills or lungs. Gases are exchanged between the circulatory system and the environment through the **moist skin**.

Procedure:

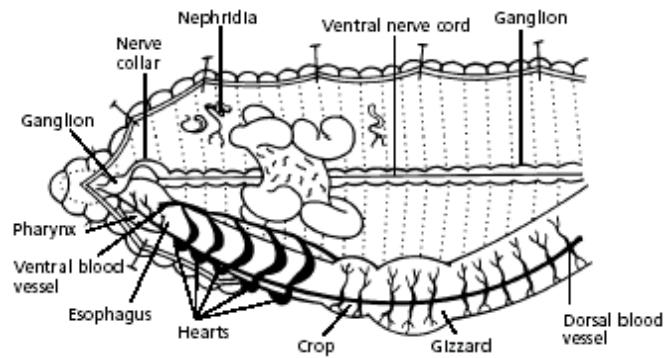
1. Put on safety goggles, gloves, and a lab apron.
2. Place earthworm in the dissecting tray & rinse off the excess preservative. Identify the **dorsal side**, which is the worm's rounded top, and the **ventral side**, which is its flattened bottom. Turn the worm ventral side up, as shown in the diagram below.



3. Use a hand lens as you observe all parts of the worm, externally and internally. Find the **anterior end** by locating the **prostomium**, which is a fleshy lobe that extends over the mouth. The other end of the worm's body is the **posterior end**, where the **anus** is located.
4. Locate the **clitellum**, which extends from segment 33 to segment 37. Look for the worm's **setae**, which are the minute bristle-like spines located on every segment except the first and last one.
5. Refer again to the diagram of the ventral view of the worm to locate and identify the external parts of its reproductive system. Find the pair of **sperm grooves** that extend from the clitellum to about segment 15, where one pair of **male genital pores** is located. Look also for one pair of **female genital pores** on segment 14. There is another pair of male genital pores on about segment 26. Try to find the two pairs of openings of the seminal receptacles on segment 10. **Note: These openings are not easy to see.**
6. Turn the worm dorsal side up. Using a scalpel and scissors, make a shallow incision in the dorsal side of the clitellum at segment 33. **CAUTION: Scalpels and scissors are very sharp. Report any cuts to your teacher.** Using the forceps and scalpel, spread the incision open, little by little. Separate each **septum** from the central tube using a dissecting needle, and pin down each loosened bit of skin. Continue the incision forward to segment 1.
7. Use the diagram below to locate and identify the five pairs of **aortic arches**, or hearts. Then find the **dorsal blood vessel**. Look for smaller blood vessels that branch from the dorsal blood vessel.

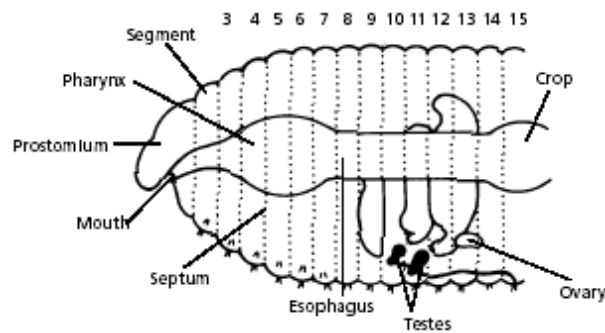


8. Locate the digestive tract, which lies below the dorsal blood vessel. Refer to the diagram above to locate the **pharynx**, **esophagus**, **crop**, **gizzard**, and **intestine**.
9. To find organs of the nervous system, push aside the digestive and circulatory system organs. Use the diagram below to locate the **ventral nerve cord**. Trace the nerve cord forward to the nerve collar, which circles the **pharynx**. Find one pair of **ganglia** under the pharynx and another pair of ganglia above the pharynx. The ganglia above the pharynx serve as the brain of the earthworm.



10. The worm's excretory organs are tiny **nephridia**. There are two in every segment. Use the preceding diagram to locate some nephridia.

11. Use the diagram below to locate and identify a pair of **ovaries** in segment 13. Look for two pairs of tiny testes in segments 10 and 11. To find these organs, you will again have to push aside some parts already dissected.



12. Dispose of your materials according to the directions from your teacher.

13. Clean up your work area and wash your hands before leaving the lab.



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