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CLASS 11 & 12th



Learning Inquiry
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CLASS 11th

**Structural Organisation
in Animals**

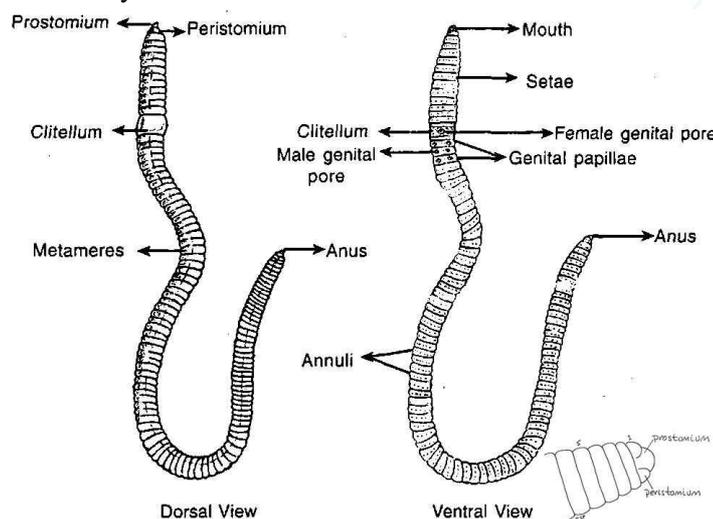
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01. Earthworm

There are several species of earthworms known today. Out of which 13 species of earthworm (*Pheretima*) are found in Indian soil. Out of these *Pheretima posthuma* is the common Indian earthworm. Other genera include *Drawida* and *Megascolex* occurring in Southern Indian and *Eutyphaeus* which is found in the Gangetic plain of North India. Common genus of Europe and North America is *Lumbricus*.

Pheretima posthuma is fossorial animal, i.e. it lives in burrows made up of moist soil. It is nocturnal in habit. *Pheretima* is a clod-blooded animal, with natural lifespan that varies from three and a half year to 10 years.



02. External Morphology

The animal has a glistening dark brown body, due to pigment porphyrin. It protects the earthworm from UV radiation. Body of earthworm is divided into 100-120 segments or metameres or somites. The first segment is buccal segment or peristomium which bears a slit-like mouth. It is dorsally covered with a fleshy process called **prostomium**. It helps in digging burrows and is also sensory in nature. Earthworm lacks distinct head and sense organs like eyes, cirri and tentacles. In a mature worm, a thick band of glandular tissue called **clitellum** is found around 14-16 segments. Due to its presence the body of earthworm is divided into preclitellar, clitellar and postclitellar regions, Out of this, clitellar region has glands whose secretions help in the formation of cocoon or egg capsule. It is protective structure in which eggs are fertilised.

03. Body Wall

The body wall of *Pheretima* has four layers from outside to inside as follows

- (i) **Cuticle layer** is the outermost thin elastic and non-cellular layer made up of collagenous protein forming fibres and a polysaccharide with small amount of gelatin. it a protective layers secreted by underlying epidermis.

- (ii) **Epidermis layer** is single layered of columnar cells resting on basement membrane. It contains supporting cells, gland cells (mucous and albumin), basal cell and sensory cells.
- (iii) The **muscle layer** having an outer thin, circular muscle fibre layer and an inner thick longitudinal muscle fibre layer. All muscle fibres are smooth type.
- (iv) **Parietal peritoneum** or **Parietal layer** or **Coelomic epithelium** lies below the longitudinal muscle layer. It secretes coelomic fluid. Along with all these layers the locomotory organs, i.e. setae are also present. These are S-shaped structures and present in specialised pouches called **saetal sacs**. The body wall protects internal organs and prevents excessive evaporation. It also aids in sensory functions and excretion through the nephridiopores present in it.

04. Digestive System

The alimentary canal of *Pheretima* is complete and well-differentiated. It comprises of buccal chamber, pharynx, oesophagus, gizzard, stomach and intestine. Gizzard is the main grinding organ of alimentary canal. Its wall has hard and thick circular muscle layer. Stomach contains calciferous glands to neutralise the humic acid of soil. The longest and widest part of alimentary canal is intestine.

05. Coelom

The body of earthworm is schizocoelic type, i.e. the formed by splitting of mesodermal band. It is divided into small segments with the help of intersegmental septa. The coelomic fluid is alkaline and colourless. It serves as the hydraulic or hydrostatic skeleton in initial segments. Thus, helps in locomotion. It contains following four types of coelomic corpuscles besides water, salts, proteins.

These are as follows

- (i) **Phagocytes** or **Eleocytes** are the largest and most numerous cells. These are amoeboid in nature and engulf harmful germs.
- (ii) **Mucocytes** are elongated cells with fan-like processes. Their function is unknown.
- (iii) **Circular cells** which are nucleated and make up about 10% of total corpuscles. These may also be called leucocytes.
- (iv) **Chloragogen cells** are yellow, star-shaped cells. These are related to storage and synthesis of glycogen, fat, deamination of amino acids and urea formation. Hence, they are comparable to vertebrate liver.