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B.Sc Part I Paper I

E. Content for Students of Patliputra University

Topic - Excretory System of Pheretima

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Q. Describe the excretory system of Pheretima.

Ans. Excretory System : Excretory organs are the nephridia. Nephridia occur in all segments excepting the first three and the last segments. The nephridia are small and coiled tubular structures and occur in huge numbers.

In the body of earthworm three kinds of nephridia occur – *septal*, *integumentary* and *pharyngeal*. Structurally, these nephridia show basic similarities, its classification is based on its position in the body. The types of nephridia that occur in earthworm are :

(a) Septal Nephridia : Septal nephridia remain attached to the two faces of the septum. They occur from 15th segment backward. That means in the first fourteen segments they are absent. Each septum bears 40-50 nephridia in average in its anterior and a similar number on its posterior face. Thus in each segment there are about 80-100 nephridia.

Structure of Septal Nephridium : A typical septal nephridium consists of a main body formed by a straight lobe and a long narrow, spirally twisted loop, a funnel like nephrostome connected to the main body by a short neck and a terminal nephridial duct. All the nephridial structures remain restricted to the same segment.

The nephrostome or funnel is a rounded structure. The mouth of the funnel which communicates with the coelom is provided with a large upper lip and a small lower lip. The lips are ciliated. A narrow ciliated tube runs from the funnel into the body of the nephridium and takes several turns inside it.

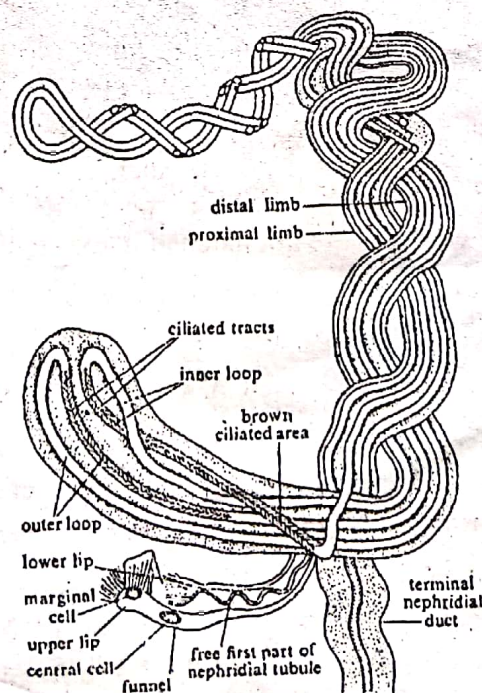


Fig. A septal nephridium of earthworm (after Bhal).

The main body of the nephridium is made up of a main lobe and a spirally twisted loop. The loop is twice as long as the main lobe and consists of a *proximal* limb and a *distal* limb twisted round each other. The straight lobe is continued as the distal limb of the twisted loop and the proximal limb receives the ciliated tubule from the nephrostome and also it gives off the terminal duct which opens at the nephridiopore. The straight lobe bears four parallel tubules, the proximal and distal ones bear three tubules each and in the apical part there are two tubules.

Terminal ducts of the septal nephridium open into a septal excretory canal which runs parallel and internal to commissural vessels.

There are a pair of septal excretory canals one on each side of the septum. The two septal excretory canals open into a pair of supra intestinal excretory ducts which turn on the mid-dorsal line side-by-side from 15th segment to the posterior end. The supra-intestinal excretory ducts open into the lumen of the intestine by single and small ducts at the level of each intersegmental septum.

(b) Integumentary Nephridia : They are smaller in size than the septal nephridia. These 'V' shaped structures occur on the inner surface of the integument in all segments excepting the first two. They occur 200-250 in each segment but in the 14th, 15th and 16th segments the number of nephridia is much more. Structurally they resemble septal nephridia but lack the nephrostome. They open independently to the outside by nephridiopores on the outer surface of the body wall.

(c) Pharyngeal Nephridia : They are as large as the septal nephridia and occur in the forms of three pairs of bunches or tufts in the 4th, 5th and 6th segments and on either side of pharynx and oesophagus. Nephrostomes are also absent in the pharyngeal nephridia. In each bunch the terminal ducts of the nephridia join together to form a slender duct. The slender ducts again unite in each segment and form a thick walled duct which opens into the alimentary tube. Thus there are three pairs of ducts, one pair each in the 4th, 5th and 6th segments. Some workers maintain that the pharyngeal nephridia have digestive function or, in other words, they aid in digestion and hence they are sometimes referred to "peptic nephridia".

The septal and pharyngeal nephridia open into the alimentary canal and are called enteronephric while the integumentary nephridia open to the outside directly and are called exonephric. The enteronephric system helps in the conservation of water in the body because the water present in the excretory product is again reabsorbed in the intestine.

Some of the nitrogenous excretory substances like guanin are excreted from the blood stream by chloragogen cells. These cells collect and store excretory products and on becoming heavily laden with excretory materials, they pinch off into the coelomic fluid from where they are eliminated through dorsal pores or by nephridiopores.