

Excretory system in Annelida

B. Sc. Part I, Paper- 1, Group- A

Lecture-1

The phylum Annelida includes metameric coelomates having worm like body, which lives in the sea, on land in fresh water and also in burrows in land. They exhibit a high level of structural differentiation and architectural organization. In annelids several tubular segmental organs are present which serve to convey the excretory and reproductive product from coelom to exterior these segmental organs are known as nephridia and coelomoduct respectively. . In Annelida nitrogenous waste products are formed during metabolism and are removed from the body through nephridia. Nephridia also help in the removal of excess water and ions.

The nephridia

Nephridia are segmentally arranged coiled tubes of ectodermal origin. It develops as an invaginations from ectoderm into coelom. The lumen of the tubule constituting the nephridium is formed by the hollowing of the cell and is intracellular. This lumen may be closed internally at coelom end or distal end of the nephridium. The closure is caused by the placement of an apical cell – a flame cell similar to that found in flatworms. This type of nephridium is called **protonephridium**.

In majority the internal end of a nephridium forms a secondary opening into the coelom – a ciliated funnel called nephridiostome or nephrostome and are known as **metanephridium**.

The embryonic nephridia

The nephridia found in the trochophore larva consist of a few syncytial cells with an intracellular blind ending tubule containing a terminal flagellum and draining to the outside. These are solenocytes and typically appear in embryonic stage.

Types of nephridia

On the basis of the size –

- 1. Micronephridia-** These are small in size and occur in large numbers in each segment. These are also called meronephridia because they arise by repeated fragmentation from developing nephridial rudiments.
- 2. Meganephridia-** These are large in size and found in two adjacent segments. The nephrostomes open into the coelom of the segment in which the main body of nephridium is present. Meganephridia are also called holonephridia .

On the basis of their terminal openings, nephridia belongs to two types:

1. Exonephric – are those that open to the outside through their nephridiopores on the surface of the body wall.

2. Enteronephric – are those which do not open outside through nephridiopores. They drain into excretory canals which ultimately lead into the lumen of the gut from where the excretory wastes are eliminated along with the excreta through the anus. Such nephridia help in water conservation as most of the water in the excretory fluid or urine is absorbed by the cells of the gut.

Structure of a typical nephridia

A typical nephridium consists of a nephrostome or a ciliated funnel which hangs into the coelom and leads to the nephridial duct.

The nephridial duct or body of the nephridium may be long, short, convoluted or modified otherwise.

The duct is ciliated internally, situated transversely and is accompanied by blood vessels.

The nephridial duct opens to the exterior by an opening, called nephridiopore

