EXCRETORY SYSTEM OF BRANCHIOSTOMA

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PART- IV

By

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Excretory System of Branchiostoma

The excretory system of Branchiostoma lacks a kidney and is most peculiar for the organization of solenocytes which are comparable with those found in platyhelminthes, annelids and molluscs.

The excretory organs of Branchiostoma include the nephridia, brown funnels and cells of the atrial wall. The main excretory organs of the Branchiostoma are so-called nephridia. Goodrich (1902) gave a detailed description of the excretory organs of Branchiostoma.

Nephridia:
There are about 90 pairs segmental nephridia in Branchiostoma. The nephridia, called protonephridia, are situated on the dorsolateral wall of the pharynx. Each nephridium is a bent vesicular sac having one horizontal limb and one vertical limb. The nephridia are segmentally arranged. Each sac corresponds to each primary gill-bar and opens by a nephridiopore to the atrium.
A large number of elongated tubular flame cells or solenocytes derived from mesodermal cells, open into the vesicle. Each solenocyte (Podocyte) measures about 50 µm and has a long tubular stalk with a tiny balloon-like cell-body at the terminal end. The cell-body gives off a flagellum through the hollow stalk which helps in eliminating the waste products.
The solenocytes become associated with nephric glomerular sinus which separates the solenocytes from the coelomic epithelium. Electron microscopy has revealed that the flame cells are the modified coelomic epithelial cells.
The flame cells have similarity with the podocytes that line the renal capsule of vertebrates and the peculiar name of these cells has been given the cyrtopodocytes. The basal part of the cells covering the glomerular blood vessels is joined by a slit
membrane. The basement membrane is absent in between blood and coelomic spaces. Excretion takes place through the wall of solenocytes by diffusion through the thin walls and the products pass down into the cavity of the vesicle through the tubular part. Colour particles which are injected into the blood stream are not excreted by the flame cells.

On the contrary Ruppert and Barnes (1994) say that the physiological significance of the nephridia is not known and the primary urine in the subchordal coelom is formed by the ultrafiltration of blood across the blood vessel and may then be directed into the tubule for the formation of final urine. This urine, finally leaves the body through the atriopore. Kardong (2002) presumes that the exact role of solenocytes is not clear, but their arrangement between blood vessel and atrium helps in removing metabolic wastes from the blood and flushed away by the water stream that passes through the atrium and atriopore.

**Nephridium of Hatschek:**
Besides the nephridia, a tube called the nephridium of Hatschek is regarded to be excretory in function. It arises from the mouth and proceeds forward to the right side of the notochord. It is an ectodermal derivative and gets blood supply from the dorsal aorta. Blood from the nephridium of Hatschek is also returned to the dorsal aorta.

**Miscellaneous excretory organs:**
Besides the nephridia following structures also assist in excretion:

**Brown funnels:**
A pair of brown funnels are also claimed to play excretory role. These are blind sac-like bodies at the anterior end of the atrium and protrude into the epibranchial coelom. Although these are assigned to be excretory structures by many workers, these are possibly receptor organs.

**Atrial wall:**
Groups of cells in the atrial wall sub serve excretory function.

**Gonads:**
Inside the gonads, particularly in the testes, there are yellow masses containing uric acid. These masses are expelled along with the expulsion of gametes.