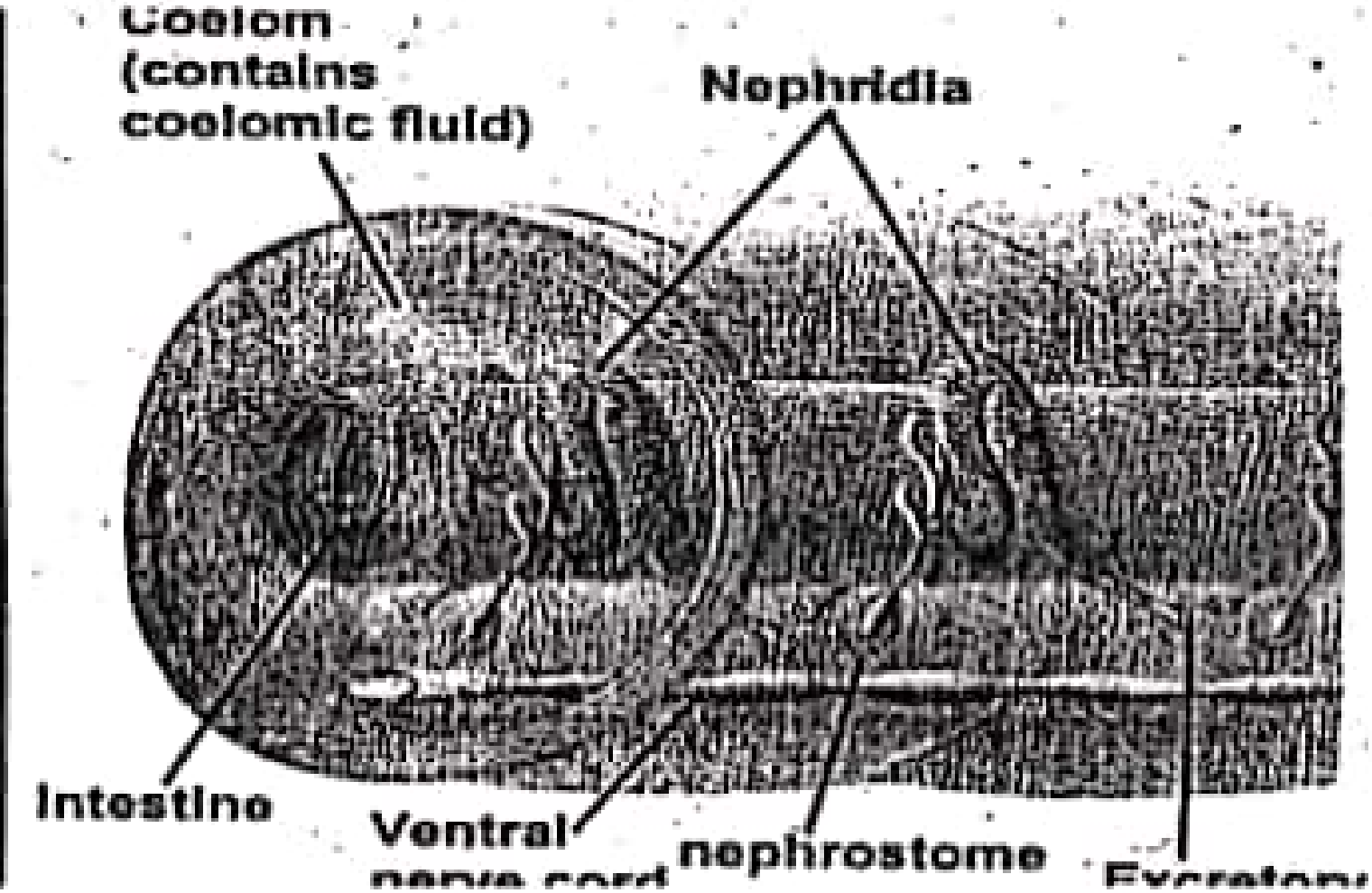
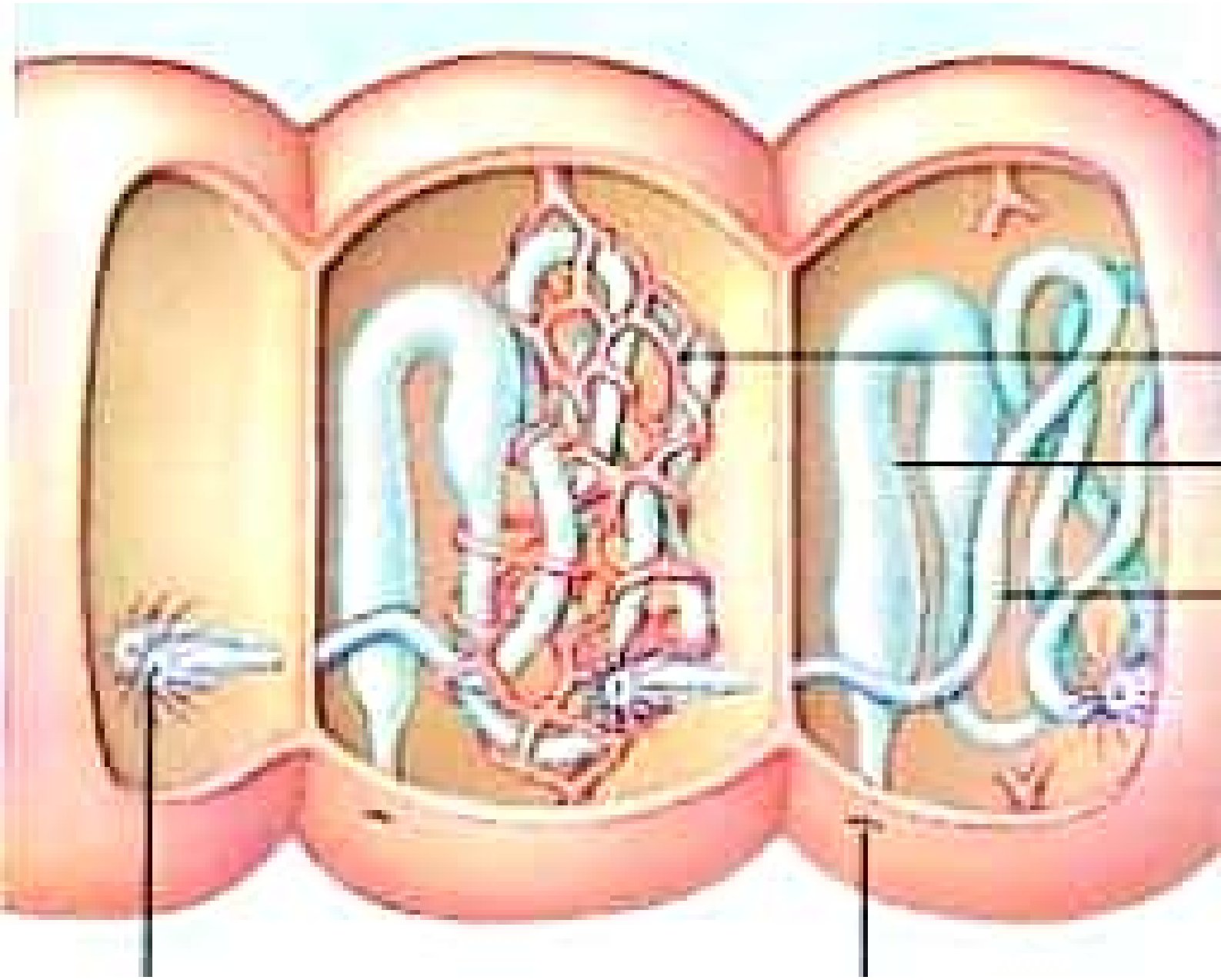


EXCRETORY SYSTEM

OF ANNELIDS



SEGMENTAL ORGANS

- There are certain tubes called SEGMENTAL organs, as they are repeated in successive segments.
- Severe to convey the excretory/reproductive products from coelom to the exterior
- They are divided into: NEPHRIDIA(derived from ectoderm) & COELOMODUCTS(from mesoderm)
- Goodrich after careful embryological study revealed that neph and coel were 2 morphologically diffrnt structures.

COELOMODUCTS

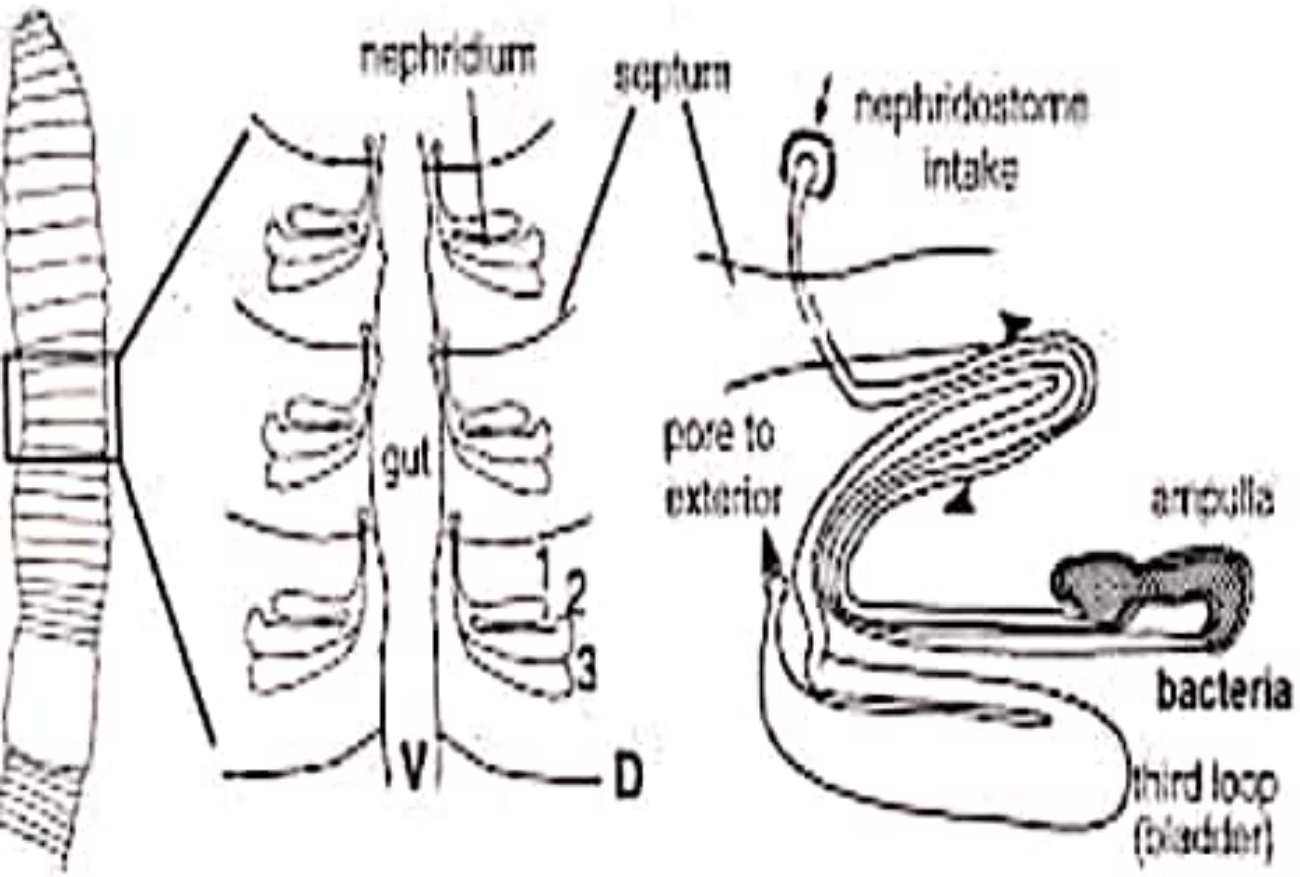
- Segmentally arranged wide tubes of mesodermal origin
- Opens on one hand to the exterior by a genital pore & on the other into the coelom by relatively large ciliated funnel, the COELOMOSTOME.

❖ FUNCTIONS OF COELOMODUCTS

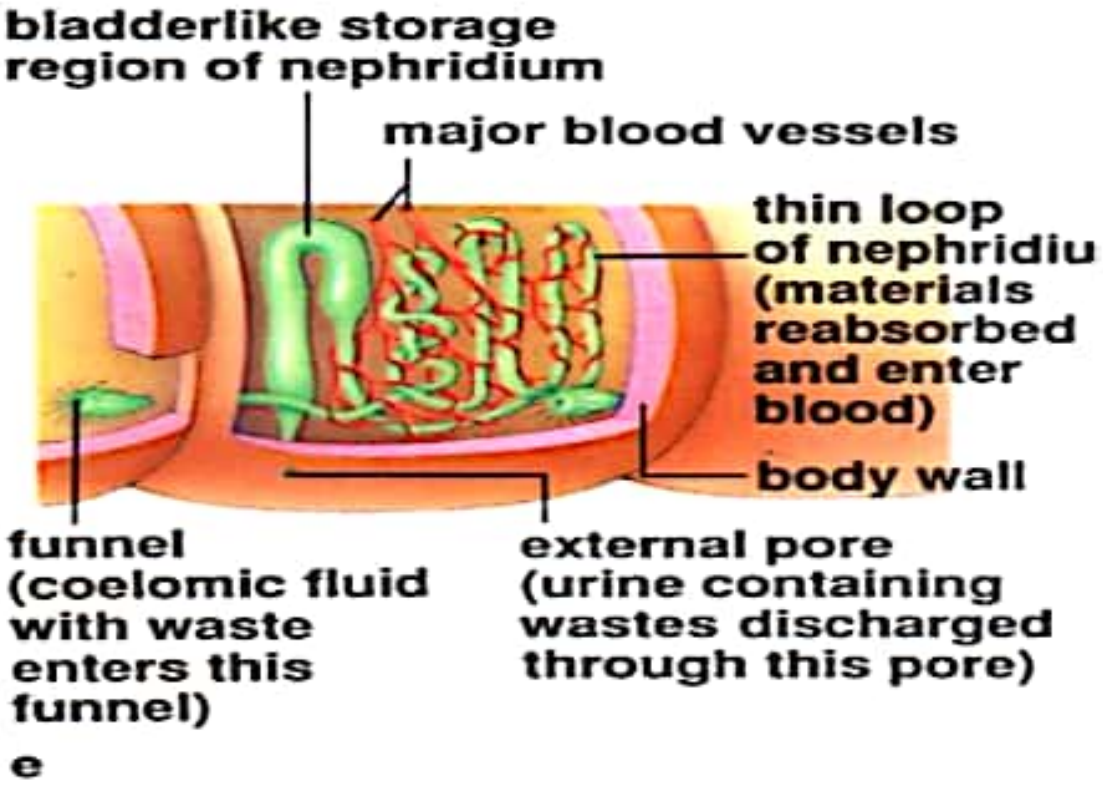
I. Primarily as gonoducts
II. Secondarily as excretory organs
III. As reproductive funnels & ducts in oligochaeta (earthworms)
IV. As the uriniferous tubules forming the vertebrate kidney.

NEPHRIDIA

- Segmentally arranged coiled tubules of ectodermal origin
- Ciliated internally & develped as inpushings/invaginations from the ectoderm so that they project into the coelom.
- Communicate on one hand with exterior through laterally placed small apertures called NEPHRIDIOPORES.



Nephridium



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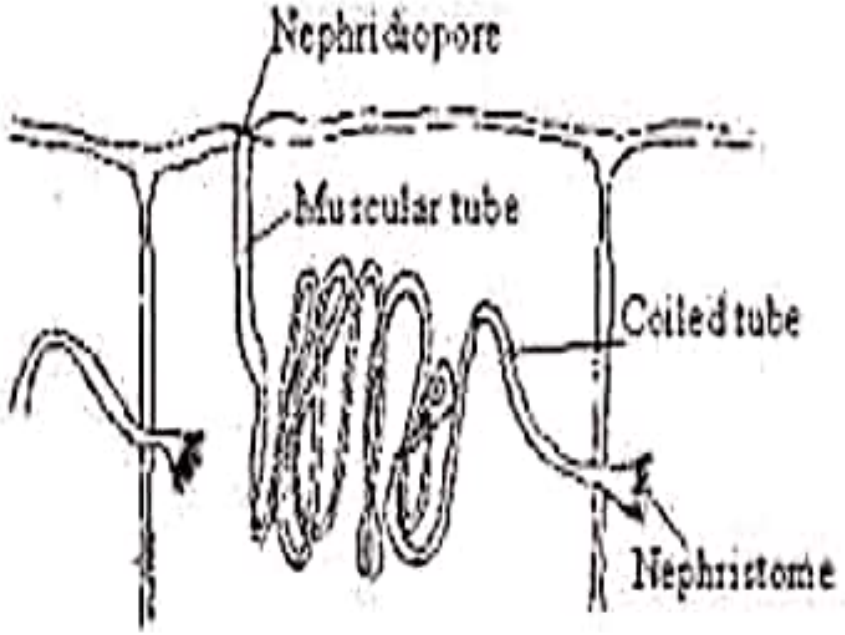
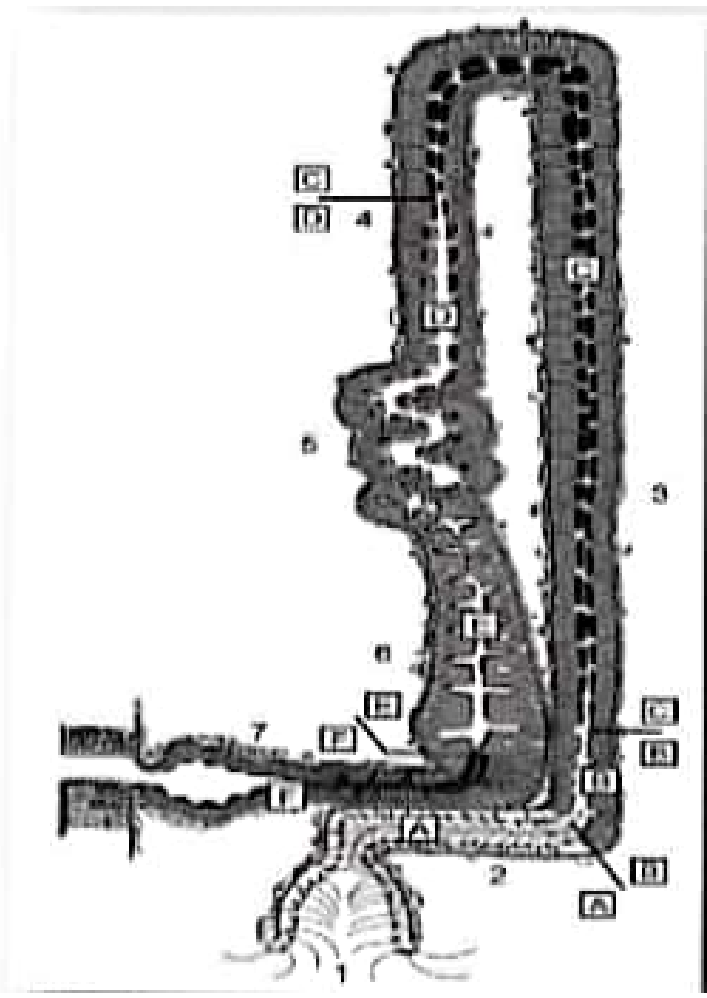


❖FUNCTIONS OF NEPHRIDIA

1. Primarily function as excretory.
2. Secondarily to convey the genital products to the exterior
3. May as well play some role in maintaining salt & water balance.



TYPES OF NEPHRIDIA

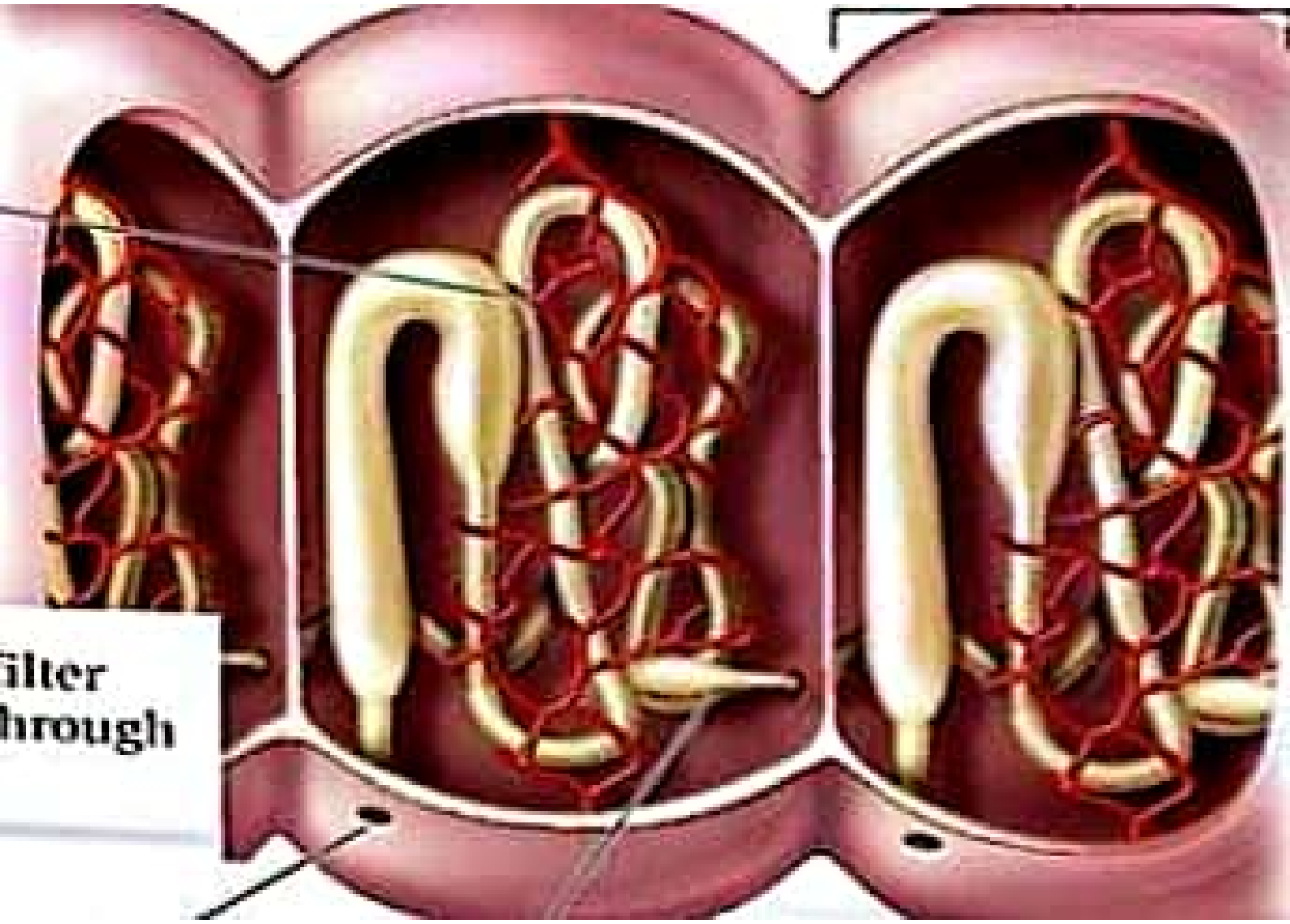
- Protonephridia(closed)
- Metanephridia(opened)
- Mega and micronephridia
- Exo and enteronephridia

Protonephridia

- Closed type- seems to be more primitive type
- Terminates in the coelom as a blind tube
- Closed pre-septal end provided with peculiar specialized excretory TUBE CELLS / SOLENOCYTES.
- Found in Vanadis, Phyllodoce, Tomopteris, etc.

METANEPHRIDIA

- Opened type- far advanced
- Absence of solenocytes, its inner pre-septal end opens into coelom by a ciliated funnel called NEPHROSTOME.
- Thus open at both ends
- Exc. Wastes diffuse from coelomic fluid/ blood into the lumen of the nephridial tubule & discharged to the outside through NEPHRIDIOPORE.
- Found in- polychaeta(Neanthes), oligochatea (Lumbricus) & leeches



- Its said a pair of originally meganephridia has broken up to form a large no. of micronephridia.
- In Megascolex, micro & mega neph. Exist even in same segment of worm.
- Serpula & other tubicolous worms- division of labour exists

Anterior region- mega neph.- excretory in function.

Posterior region- micro neph.- serve as gonoduct.

EXO & ENTERO NEPHRIDIA

Exo/ecto nephridia

- Directly open to the exterior
- Nephridiopores present
- Such as-

Meganephridia of Nereis, Hirudinaria & Lumbricus

Integumentary micronephridia of Pheretima.

Entero nephridia

- Open into the excretory canals / alimentary canals
- Nephridiopores absent
- Such as-

Septal & pharyngeal nephridia of Pheretima.

NEPHROMIXIA

- Compound segmental organs.
- Coelomoducts become fused partially / wholly with nephridia to form nephromixia.
- Consist of ectoderm & mesoderm- serve for both excretion & exit of gametes.

DEGREE OF COMBINATION

1. Protonephromixium-

- coelomoduct +protonephridium
- Convey both reproductive & excretory products to the ext.
- Found in- Phyllodoce

2. Metanephromixium-

- Coelomoduct + metanephridium
- Found in- Hesione.

3. Mixonephridium-

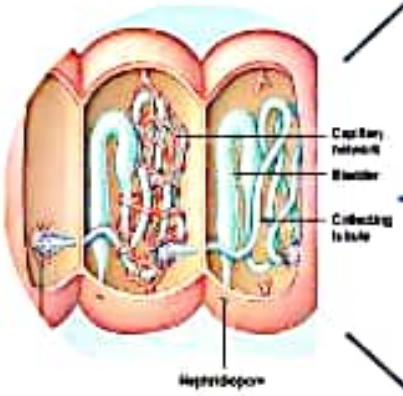
- Coelomoduct + nephridium
- Funnel is formed by coelomoduct
- Duct formed by nephridium
- Occur in Arenicola.

4. Ciliated organs-

- Coelomoducts reduced to ciliated organs
- In Nereis, they are attached to the dorso-lateral longitudinal muscles & known to open externally.

EXCRETORY SYS IN PHERETIMA

acc to the position of neph In the body is distinguished into:



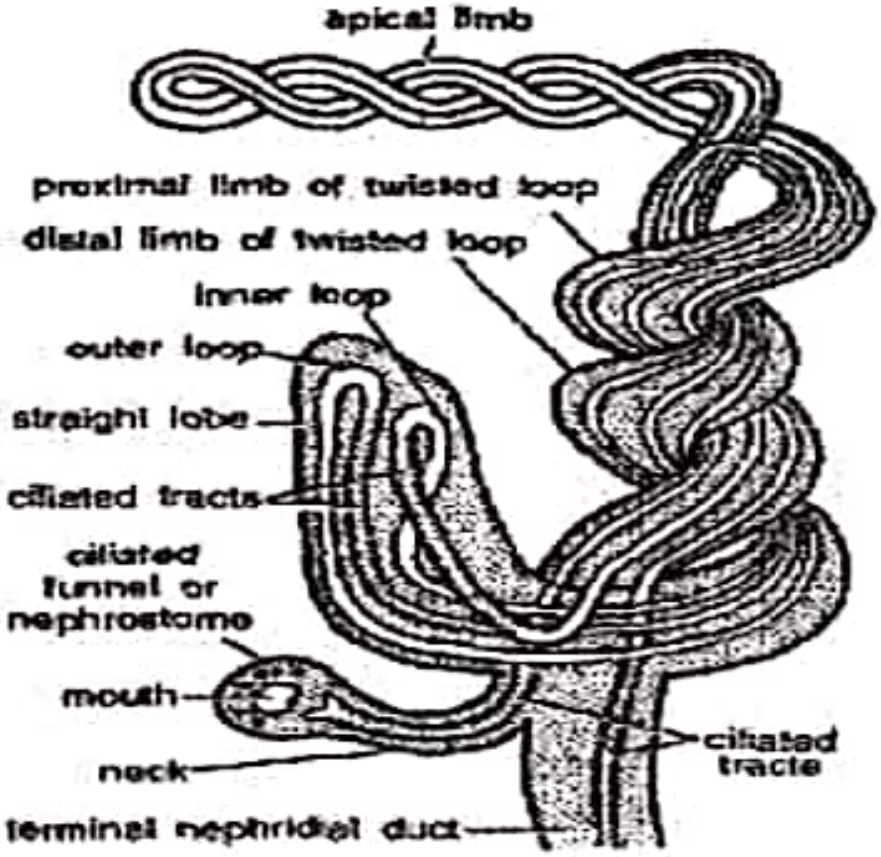
SEPTAL

- Nephrostome
- Body of nephridium
- Terminal duct
- Nephridial duct

PHARYNGEAL

INTEGUMENTARY

- 10 times the usual no.
- Called FORESTS of nephridia.



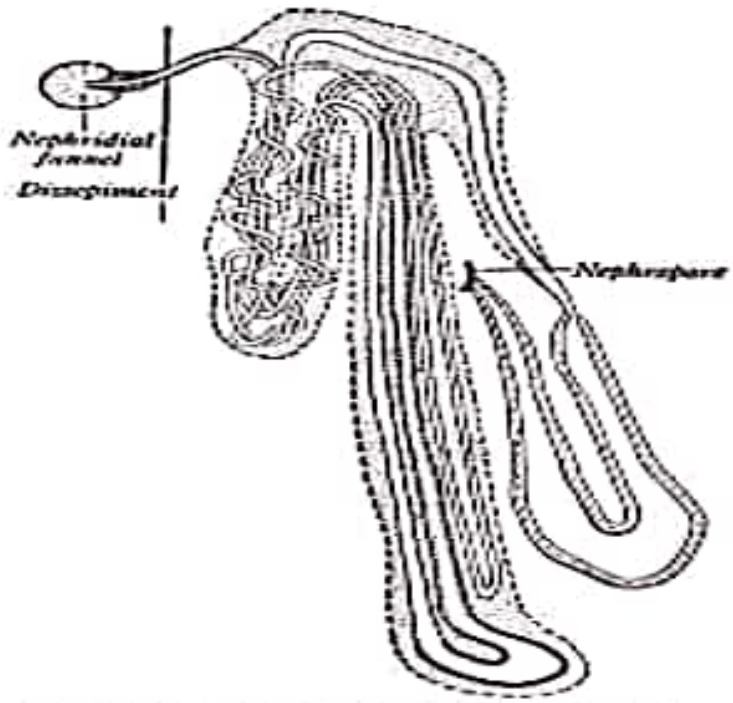


FIG. 158. *Nephridium of Earthworm*

PHYSIOLOGY

- Gland cells extract- excess water + urea + ammonia + creatinine –from blood.
- Septal nephridia eliminate solid part. From coelomic fluid through nephrostomes.

➢ Integumentary neph(exonephric)- discharge wastes directly to the exterior.

➢ Septal & pharyngeal neph- forms entero-nephric nephridial sys- discharge into the lumen of the gut

- Special enteronephric nephridial arrangement also serves for conservation of water / osmo-regulation.
- SELECTIVE RESORPTION- excretory fluid discharged into pharynx moisten the food, as the faeces become compacted water is reabsorbed by intestine to be re-used by the body. Reabsorption of salts also occurs during fluid through the nephridia, this process is called S.R.

Another means of excr.: CHLORAGOGEN CELLS

- Yellow cells called chloragogen cells.
- Found in intestine & the dorsal blood vessel in large no.
- Derived from the peritoneum/coelomic epithelium of the alimentary canal.
- Take up nitrogenous waste products from the blood capillaries of the gut & deposited as yellow granules(guanin) in their cytoplasm.

- These cells are also concerned with

-deamination of proteins

-formation of ammonia

-synthesis of urea

Therefore, they are as the vital intermediary in metabolism of earthworms as the liver in vertebrates.