B.Sc. Part One (I), Paper I A

Balanoglossus : Coelom & digestive system (Part II)

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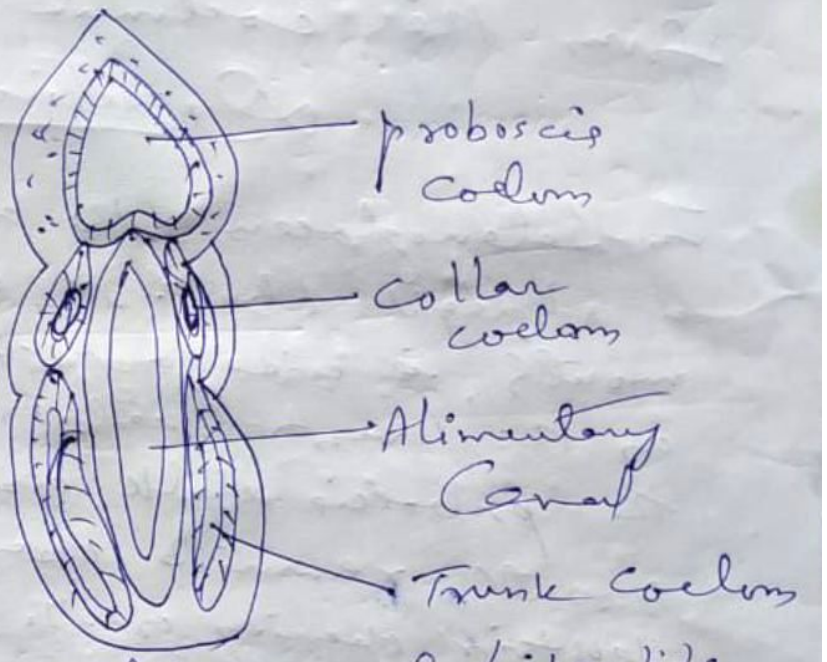
Coelom in Balanoglossus:- It is Enterocoelous having been formed as outgrowths of the enteron. Corresponding with the three body regions the coelom is divided into three portions which are completely separated from each other by septa. The coelom is lined with coelomic epithelium or peritoneum. But entero-pneusts are peculiar in that their coelomic epithelium has connective tissue and muscle fibres which fill much of the original coelomic cavity and a distinct peritoneal lining has disappeared. Moreover the coelomic musculature largely replaces the body wall muscles. The three part coelom or Protocoel, Mesocoelom, a pair of collar

Coelom and a pair of trunk coelom.

1. Proboscis Coelom - The proboscis coelom or protocoel is a single space in the proboscis which is largely occupied by muscle and connective tissue and a few structures like buccal diverticulum, glomerulus and central sinus or heart. Dorsally, towards the posterior side, the proboscis coelom is divided by a dorsal mesentery into right and left dorsolateral compartments which extend into the proboscis stalk. The left compartment is larger than the right and communicate the exterior through the proboscis pore situated mid-dorsally at the base of the posterior stalk. Ventrally, the proboscis coelom is divided by a ventral mesentery into a right and left ventro-lateral compartments which are continuous behind the mesentery.

2. Collar Coelom :- The collar coelom or mesocoel has two cavities lying side by side in the collar, one on each side between the collar wall and buccal cavity. The two cavities are partitioned by incomplete mid-dorsal and mid-ventral mesenteries. The collar coelom does not communicate with the proboscis

coelom but posteriorly, the coelom cavity opens into the first gill sac of its side by a canal called collar canal. Each collar coelom opens to the exterior through a collar pore. The collar coelom is greatly obliterated by the collar musculature and connective tissue.



Balanoglossus : diagram of tripartite Embryo showing Coelomic Cavities

3 Trunk Coelom :- The trunk coelom or metacoel has two cloacal cavities lying between the body wall and alimentary canal. The two cavities are separated by an incomplete dorsal and a complete ventral mesentery. In the branchiogenital region, each cavity is further divided by a lateral septum into a dorso-lateral and ventro-lateral compartment. The trunk coelom is separated from the collar coelom by the trunk septum. The trunk coelom is obliterated by the trunk

musculature.

Coelomic fluid :- The proboscis, the collar and coelom communicate with the exterior and get filled with water through their pores, which keeps them turgid. The trunk coelom is filled with a watery coelomic fluid having amoeboid coelomocytes. The coelomocytes originate from the coelomic epithelium.

Digestive System in Balanoglossus

In Balanoglossus, the alimentary canal is a straight tube. Its anterior opening, the mouth, is wide and circular and situated on the ventral side is a groove between the proboscis stalk and collarette. The mouth remains open constantly. The posterior opening or the anus is a circular aperture at the extreme posterior end of the trunk. Between the mouth and anus, the alimentary canal can be distinguished into four regions - buccal tube, pharynx, oesophagus and intestine. Their walls, composed of ciliated epithelium lined externally by basement membrane and

devoid of muscle fibres.

1. Buccal tube :- The mouth leads into a buccal tube or cavity in the collar region. Its epithelial wall contains glandular goblet cells. The dorsal wall of buccal tube forms a short stiff and hollow buccal diverticulum that projects into the proboscis coelom. It extends upto the collar trunk septum behind which it continues into the pharynx.

2. Pharynx :- The wall of the roof of the buccal tube opens into the pharynx lying in the branchial region of the trunk. Its wall bears a longitudinal constriction along each lateral side. These lateral constrictions project into its lumen as ridges, called parabranchial region. These ridges and constriction incompletely divide the pharynx into a dorsal branchial portion and a ventral digestive portion. The dorsal branchial portion of pharynx is perforated dorso-laterally by two-rows of V-shaped gill slits. It is concerned with respiration. The digestive portion of pharynx is concerned with the food concentration, digestion and absorption of food. Its ciliated epithelial wall contains gland cells.

3. Oesophagus :- Behind the last pair of gills slits the pharynx continues into the oesophagus, the dorsal and ventral divisions of the pharynx

for some distance into the oesophagus. In this region the dorsal part of the oesophagus is called post branchial canal which possesses thick, folded and glandular epithelium. The posterior part of the oesophagus reduces its diameter and has deeply furrowed epithelium.

4. Intestine :- Behind the oesophagus is an intestine. It occupies the hepatic and post hepatic regions of the trunk. The hepatic region of the intestine is highly vascular. Its epithelial cells are dark green or dark brown and its dorsal wall forms numerous prominent evaginations called hepatic caecae. which push the body wall outwards and are thus visible externally. The post-hepatic region of the intestine is connected with the ventral body wall by the pygochord. The intestine has the form of a simple tube and bears a pair of dorso-lateral grooves lined by tall epithelial cells bearing long cilia. The intestine opens out through the anus situated at the extreme hinder end of the body. The anus possesses sphincter muscles