

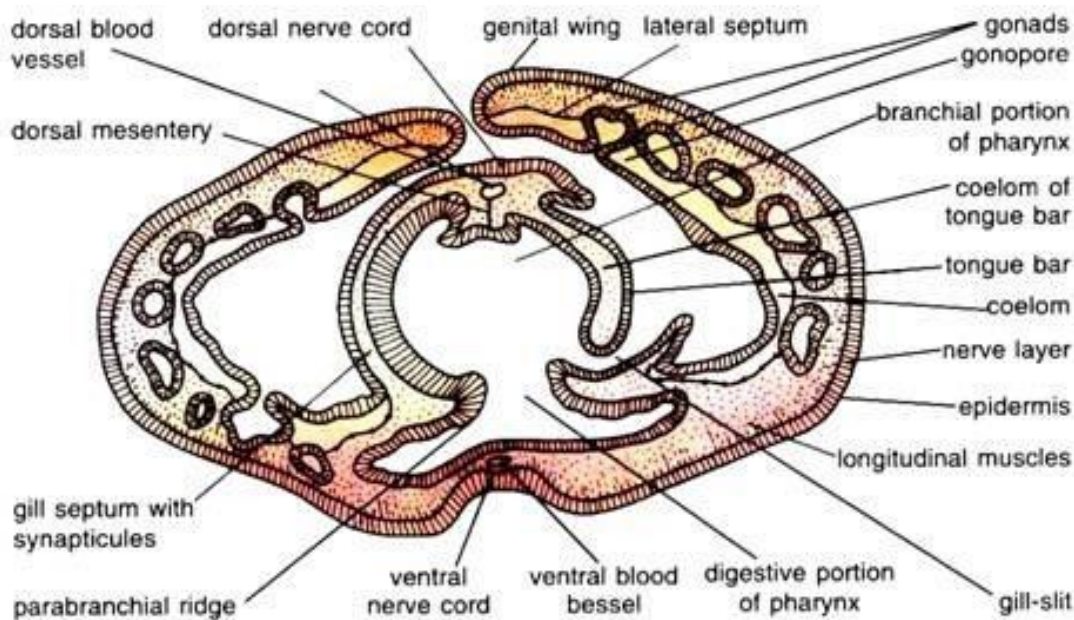
Digestive system of Belanoglossus

BSc. Part I Zoology (Subsidiary)

Alimentary Canal of Balangolossus:

In Balanoglossus, the alimentary canal is a straight tube. Its anterior opening, the mouth, is wide and circular and situated on the ventral side in a groove between the proboscis stalk and collarete. 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 are 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 up to 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 ridges consisting of tall columnar cells. These ridges and constrictions incompletely divide the pharynx into a dorsal branchial portion (pore pharynx) and a ventral digestive portion (digestive pharynx).

(i) Branchial Portion of Pharynx:

The dorsal branchial portion of pharynx is perforated dorsolaterally by two rows of U-shaped gill-slits. It is concerned with respiration.

(ii) Digestive Portion of Pharynx:

The digestive portion of pharynx is concerned with the food concentration, digestion and absorption of food. Its ciliated epithelial wall contains gland cells.

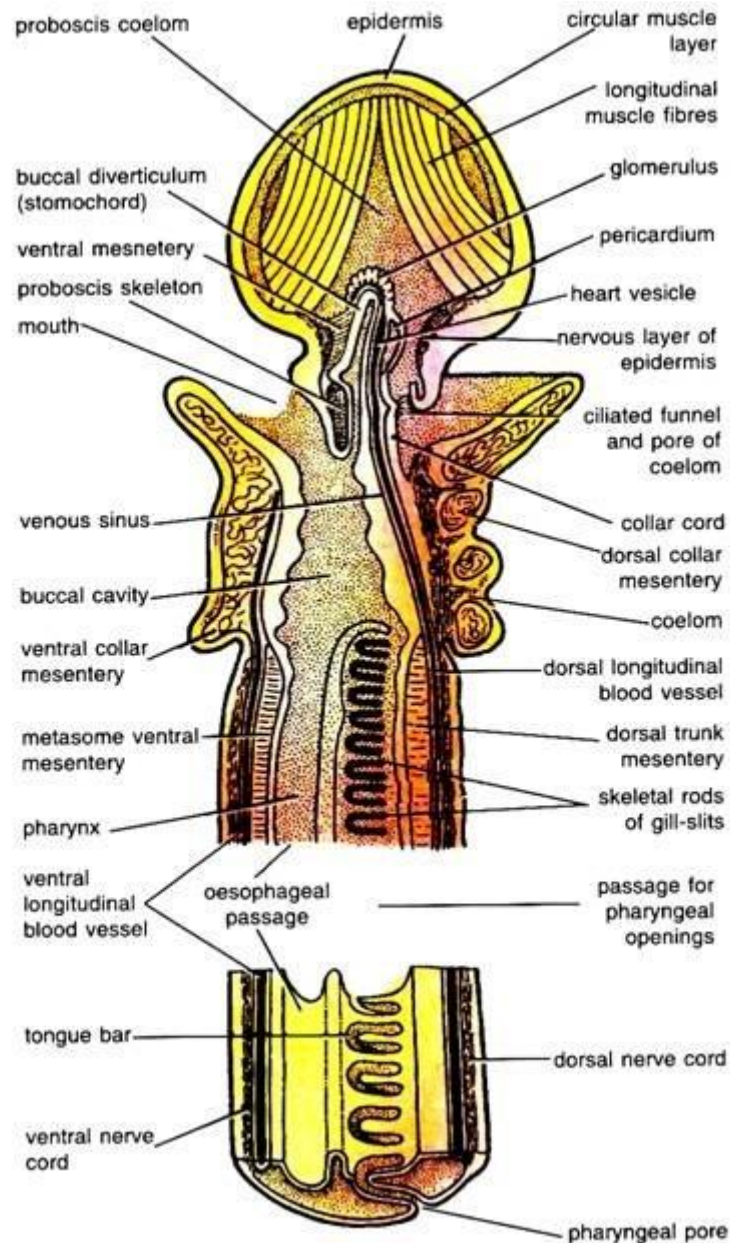
3. Oesophagus:

Behind the last pair of gill-slits the pharynx continues into the oesophagus. The dorsal and ventral divisions of the pharynx continue 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 reduce in 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 sacculations called hepatic caeca 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 dorsolateral grooves lined by tall epithelial cells bearing long cilia. The intestine opens out through the anus situated at the extreme hind end of the body. The anus often possesses sphincter muscles.



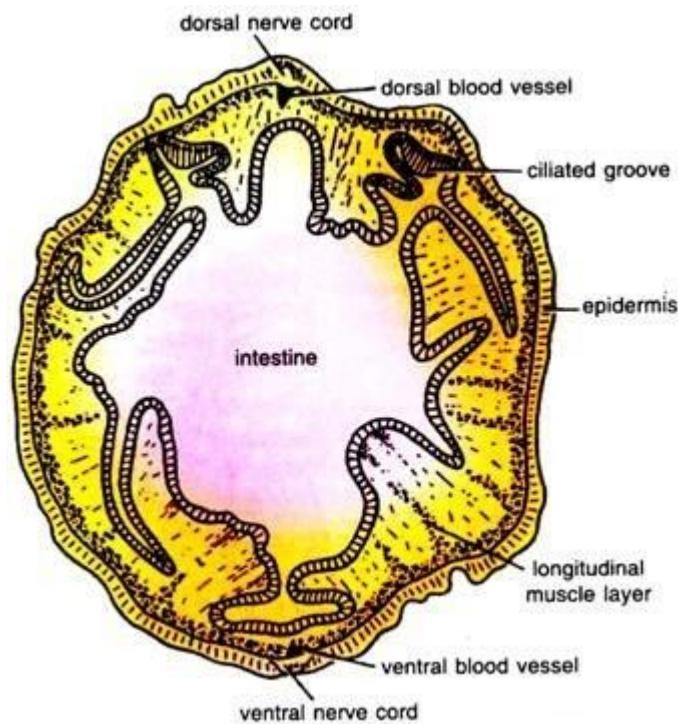
Food, Feeding and Digestion of Balanoglossus:

Balanoglossus is a **“ciliary feeder”**. Its food comprises microscopic organisms and minute organic particles present in water and mud or bottom sand in which it makes its burrows. The lateral cilia lining the gill-slits set up a current of water directed backward which enters through the mouth, takes its course through the buccal tube, pharynx, gill-slits and branchial sacs, and leaves through gill-pores.

This is called respiratory-cum-food current. Some food particles directly enter the mouth with this current, while some come in contact with the proboscis and are entangled in the mucus that covers it.

The mucus is secreted by the gland cells of the proboscis epithelium. Cilia covering the proboscis direct the mucous string, containing food particles towards the preoral ciliary organ at the base of the proboscis.

From here the mucous string is passed back into the mouth by the action of the proboscis cilia, assisted by the main water current entering the mouth. Organic particles present in the mud or sand are ingested directly along with mud or sand at the time of burrowing.



At the base of the proboscis, on the ventral side, there is a U-shaped depression bordered by long epidermal cells bearing long cilia. This structure is called the pre-oral ciliary organ.

It tests the quality of food and the water entering the mouth. Undesirable substances are prevented from entering the mouth by the ventral part of the collarette which does so by covering the mouth. Thus, the rejected particles, instead of entering the mouth, pass back over the collar.

Backward movement of food through the alimentary canal is maintained by the cilia lining its walls. In the pharynx, the food passes through the ventral digestive portion.

The exact process of digestion in *Balanoglossus* is not known with certainty; however, the digestion of food is brought about by the enzymes secreted by proboscis, gland cells of the pharynx, oesophagus and hepatic region of the intestine. Proboscis secretes mucus, which contains amylase, is ingested with the food.

The gland cells of pharynx and oesophagus also secrete enzymes. It is also claimed that hepatic caeca secrete amylase, maltase, lipase and weak protease. The enzymes digest the organic particles in the mud or sand. Undigested substances, along with mud or sand, pass out through the anus in large quantities which forms piles of “**castings**” at the posterior opening of the burrow.

