STRUCTURE OF PHARYNX AND FEEDING IN *Branchiostoma*

External features

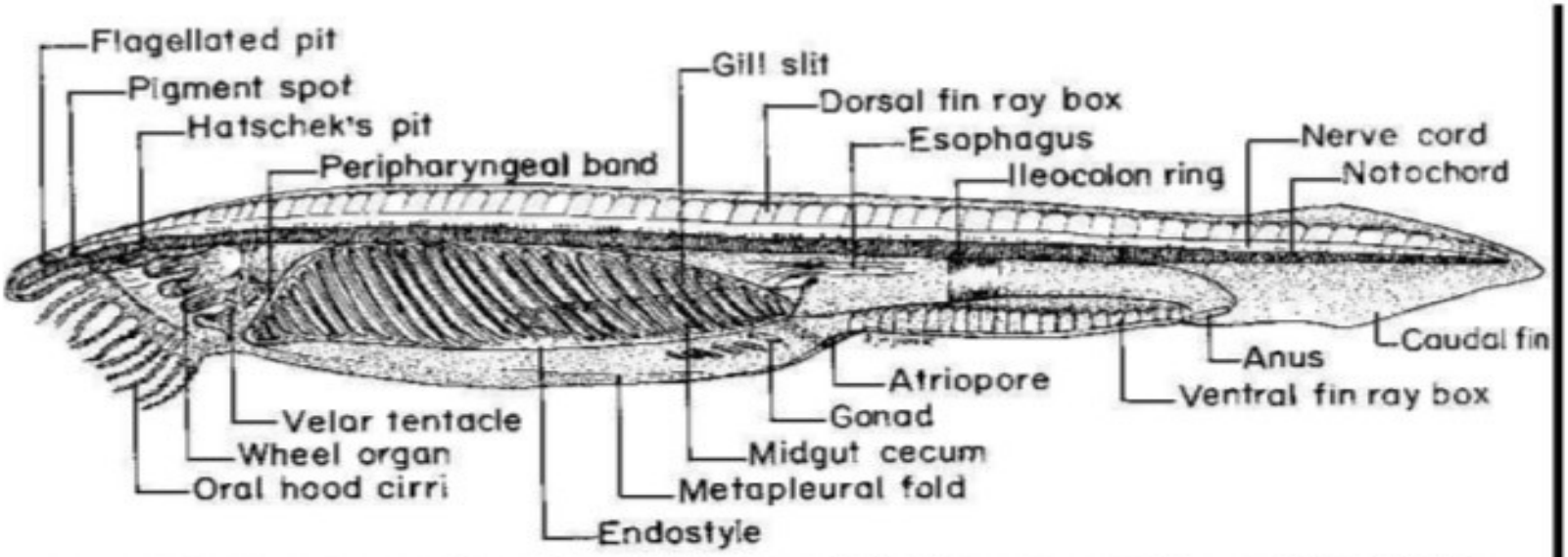


Figure 1–4. A lateral view of a whole mount slide of a young specimen of *Amphioxus*.

SOME SIGNIFICANT FACTS:

The Protochordates reveal a spectacular feeding mechanism which is a very primitive character.

Protochordates exhibit ciliary mode of feeding (filter feeders) .

Protochordates are microphagous and they feed on microscopic organisms like algae, Protozoa, microarthropods , organic detritus etc. suspended in sea water.

Pharynx of Branchiostoma is large , perforated by numerous persistent gill slits opening into atrium.

Pharynx plays dual role :as a **food capturing devise** and **respiration**

CILIARY FEEDING

T IS A MODE OF NUTRITION BY WHICH AQUATIC ANIMALS COLLECT SOLID MICROSCOPIC FOOD PARTICLES BY PASSING WATER OF EXTERNAL ENVIRONMENT WITH THE HELP OF CILIA THROUGH A FILTER OR SHIFTING APPARATUS.

(CARLER,1967)

Digestive system

- Complete type, consist of Alimentary canal and digestive glands
- **Alimentary canal :**
  - Mouth
  - Oral hood
  - Buccal cavity
  - Pharynx
  - Oesophagus
  - Intestine
  - Anus

Digestive glands :

Mid gut diverticulum (Liver)

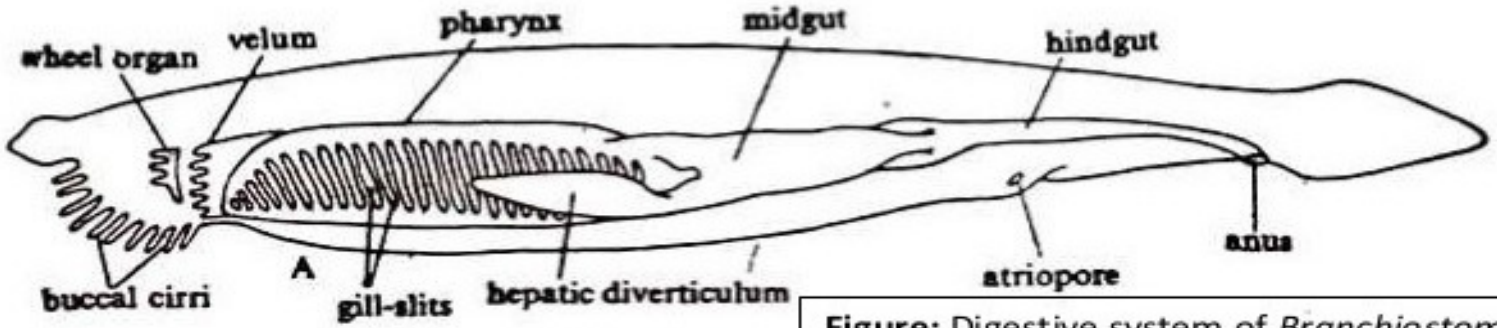


Figure: Digestive system of *Branchiostoma*

Digestive system

- **Physiology of digestive system:**
  - **Food**: Microphagus
  - **Feeding** : Ciliary or filter feeder
  - **Digestion** : Digestion starts in midgut. Midgut diverticulum and midgut epithelium secretes digestive enzymes like amylase, lipase and protease. Digested food is absorbed in midgut and hindgut and undigested food is thrown out of anus.

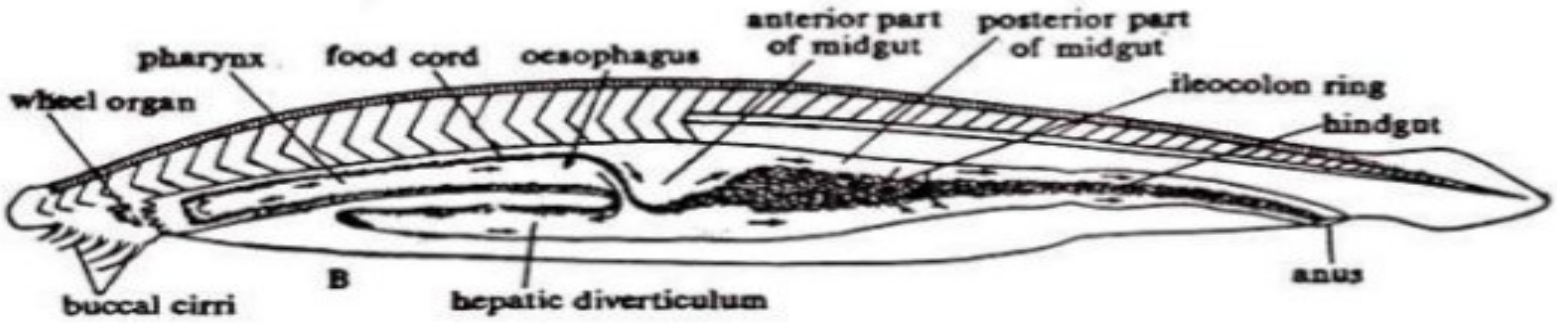


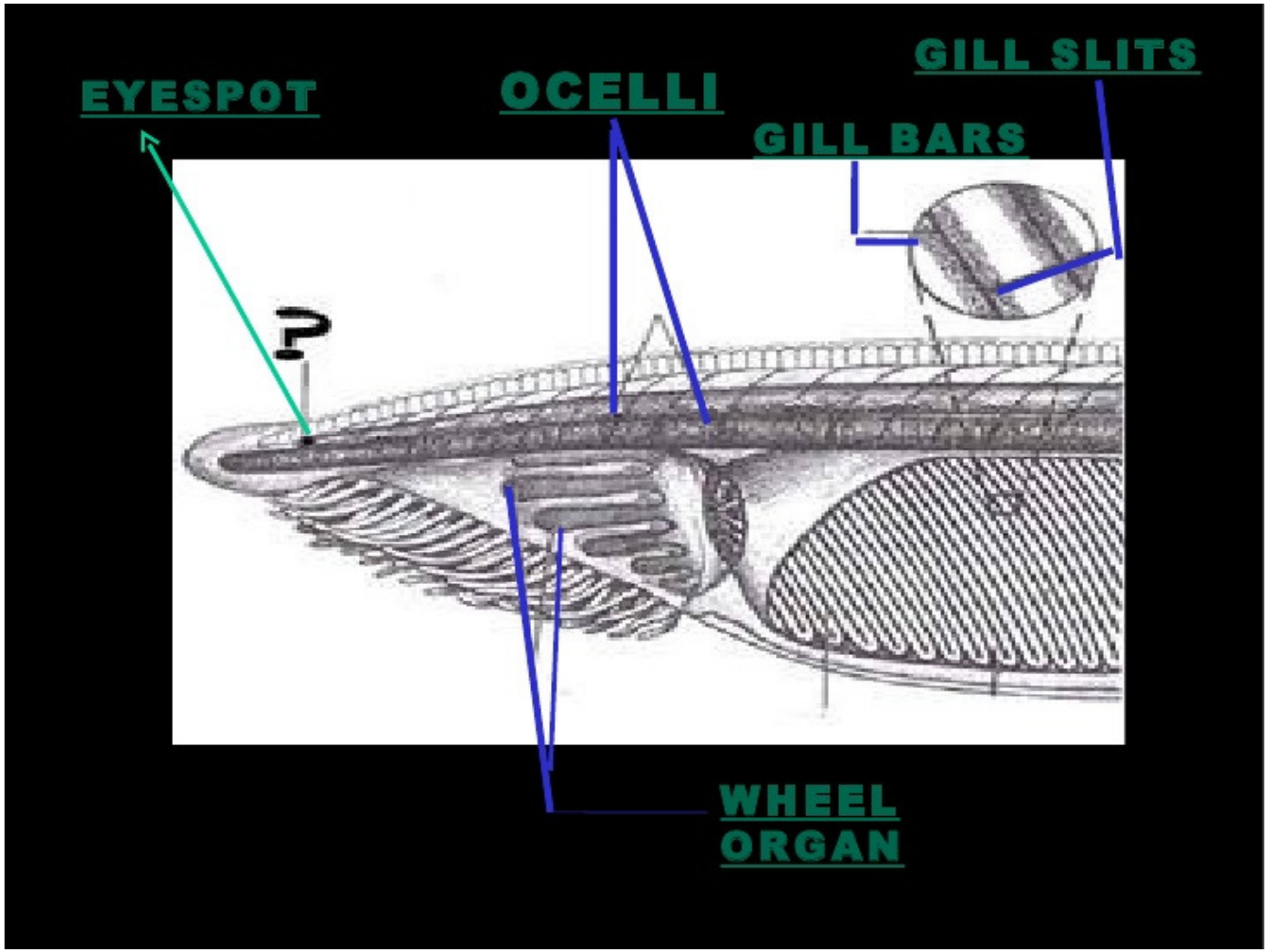
Figure: Schematic representation of feeding current through the gut

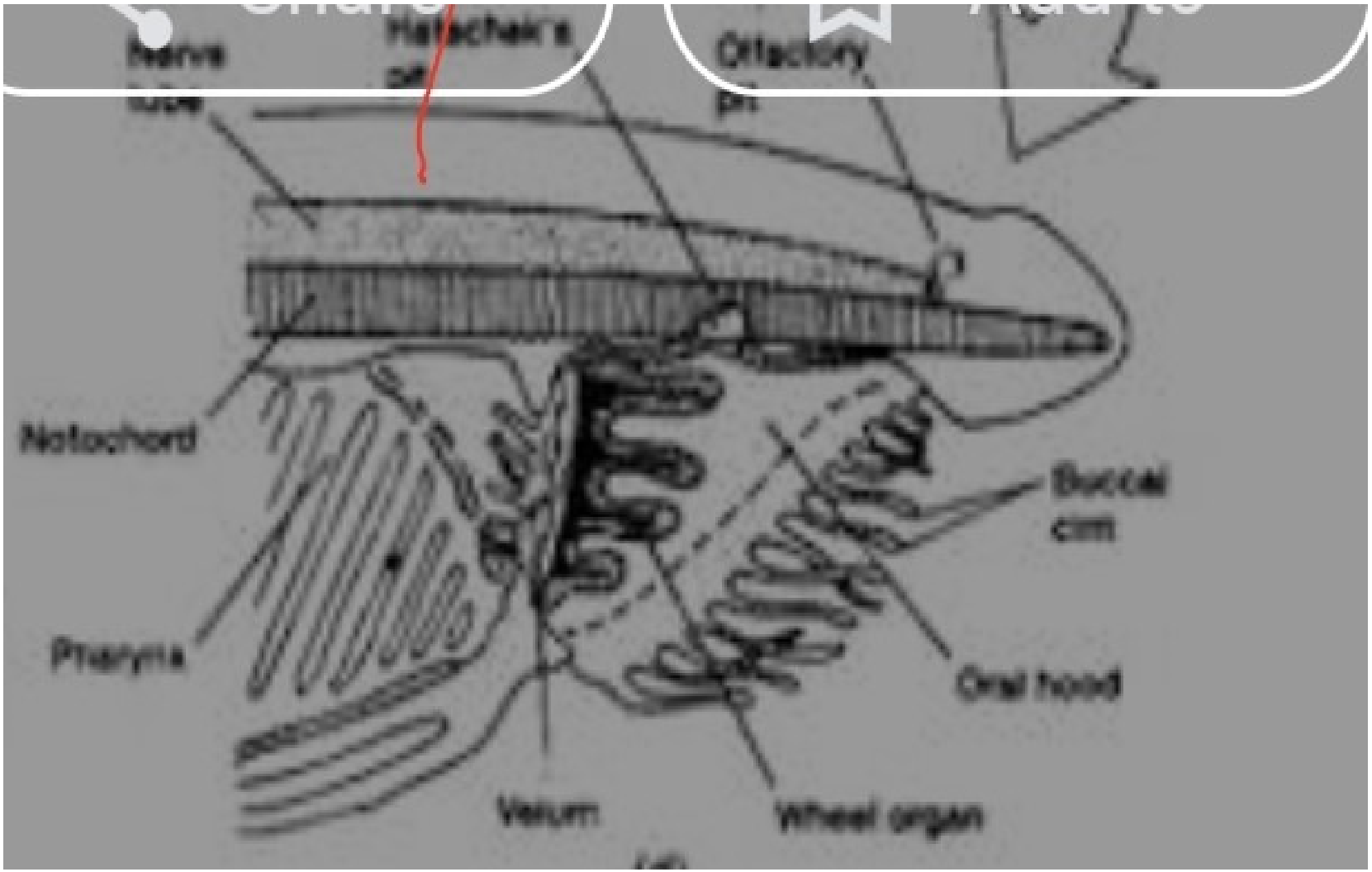
GILL SLITS : where water goes through; where strings of mucus travelling across them trap tiny food particles

GILL BARS : supports between gill slits

OCELLI : light-sensitive organ; it assist in orienting the animal as it burrows in the sand

WHEEL ORGAN : retrieves some of the heavier food particle that miss the mouth, and it directs these through the mouth and into the pharynx along with the water stream


EYESPOT
OCELLI
GILL SLITS
GILL BARS
WHEEL ORGAN


Olfactory
Notochord
Buccal
cirri
Pharynx
Oral hood
Velum
Wheel organ

STRUCTURAL UNIQUENESS

ORAL HOOD- It encloses the anterior end of pharynx and supports the assortment of food processing equipment. The inside walls of the oral hood hold ciliated tracts that sweep food particles into the mouth.

BUCCAL CIRRI- Located at the free edge of oral hood. It prevents the entrance of large particles in pharynx

WHEEL ORGAN- Anterior to velum, the walls of buccal cavity bear a series of thick ciliated groove to form the wheel organ. Cilia in these grooves trap food particles in mucus for digestion further posterior in gut.

HATSCHEK'S PIT OR GROOVE- It is located below the right side of the notochord (i.e. at the roof of oral cavity). Hatschek's pit is a ciliated invagination that secrete mucus to help collect food particles.

VELUM-Posterior wall of the oral hood is defined by velum. Suspended material are tested and sorted in the velum before passing through the central opening in the velum and entering the pharynx.

PHARYNX- It has endostyle. Mucus is secreted by the endostyle and secretory cells of pharyngeal bars. Food particles adhere to mucus and are conveyed to the gut for digestion. Gill slits present help in respiratory gaseous exchange.

Vestibule: collecting chamber for sea water

Oral hood: serves as entrance and storage

Velum: works as valve and filter; surrounds the mouth

Velar tentacles: prevent undesirable objects from entering the digestive cavity

FEEDING MECHANISM

During feeding the lateral cilia of gill bars generate water current that enters pharynx through mouth.

Water then passes laterally through gill slits, passes out of pharynx and into the surrounding atrium.

Mucus secreted by endostyle is carried upward over the inner surface of gill bars by ciliary currents generated by frontal cilia.

Mucus entangles food particles and transports them to epibranchial groove.

Cilia of the groove then move mucus and trapped food posteriorly into esophagus.

Digestion occurs extracellularly in stomach and ileocolon and its products are absorbed by epithelium of coecum.

Feeding:

Once the food is in the pharynx it is processed as follows.