TOPIC: AND GENERAL CHARATERISTICS AND CLASSIFICATION OF CYCLOSTOMATA,PETROMYZON

LECTURE NO:09

BSC PART 1-PAPER II-GROUP A

DATE: 4TH APRIL 2020

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STRUCTURAL FEATURES

External Gill Slits - openings that lead to the internal gills that are used to extract oxygen from the water. Lampreys have seven distinctive gill slits (fig.).

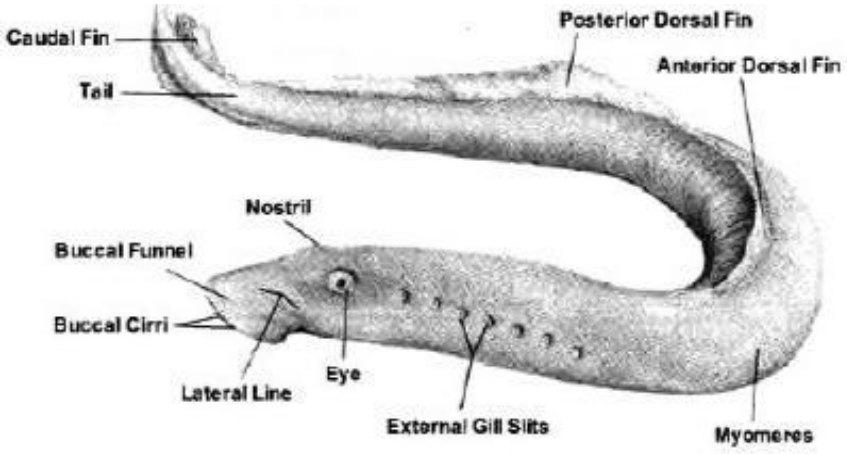

Fig Adult Lamprey

Buccal Funnel - is the beginning of the mouth cavity. It contains numerous teeth in the adult lamprey. It is surrounded and supported by the oral disc.

Buccal Papillae - finger-like projections that surround the buccal funnel.

Lateral Line System - a system consisting of lines of pores that sense water currents, water pressure changes, and movements and vibrations in the water. The visible external pores of the lateral line system lead to an internal canal, which connect with specialized sensory cells. This system is believed to be related to the sense of hearing in other vertebrates.

Median Nostril - The median nostril is a primitive feature unique to the lamprey. Other vertebrate animals have paired nostrils. The nostril is responsible for detecting scents and leads to a nasal tube in the dorsal region of the head. A lamprey can "smell" by perceiving chemicals in the water. These scent particles can be detected from great distances. Chemical scents enter the medial nostril, pass through the nasal tube triggering the olfactory nerve cells along the way, and send electrical signals to the brain via the olfactory nerve.

6. Pineal Organ - The pineal organ is located under the skin immediately posterior to the medial nostril. Evidence of its presence is shown by a generalized round bump on the dorsal

side of the head. In the lamprey, the pineal organ is sometimes referred to as a “third eye” due to its role in perceiving light and dark. The pineal organ contains a light sensitive retina that does not interpret visual images.

Eye - The eye is a sensory organ responsible for receiving visual input. It leads to the optic nerve, which sends visual impulses to the brain. In the brain the images are deciphered. The adult lamprey eye is structurally very similar to the eyes of other vertebrates consisting of a cornea, iris, lens and retina. There are no eyelids present in the lamprey.

Anterior Dorsal Fin - A fin used to maintain an upright orientation in the water while moving about.

Posterior Dorsal Fin - This fin has the same function as the anterior dorsal fin.

Caudal Fin - A powerful fin used to thrust the lamprey’s body through the water.

Cloaca - The common opening of the urinary and reproductive systems. It receives waste from the kidneys and fluids from the reproductive organs and transfers them to the external environment via the opening of the cloaca. The urogenital papilla is a protrusion that may be extending from the cloaca.

Anus - The anus is located immediately anterior to the cloaca. It is an extension of the intestine through which solid waste is expelled from the body.

The Digestive System

The digestive system consists of the alimentary canal, which runs from the mouth to the anus. Food enters the food enters the mouth and moves through the pharynx into the esophagus. The adult lamprey is an ectoparasite and its food is in the form of fish blood.A lamprey does not have a stomach. Rather, food passes directly from the esophagus to the intestine, which absorbs the bulk of the nutrients. The intestine becomes the site of the emulsification, digestion, and absorption of nutrients. The latter portionof the intestine digests bacteria, reabsorbs water, and forms feces. The last section of the intestine narrows to form an exit called the anus. The resulting solid wastes leave the body at this point.

Nervous system

Lampreys have a primitive nervous system, the brain structure is fairly simple compared to other vertebrate animals.System consists of the brain and a hollow spinal cord–Situated above the alimentary canal. –Vertebrate nerve cord and brain contain

a cerebrospinal fluid which contains mineral salts and traces of protein and sugar. The fluid helps to support the nervous tissue and probably plays some part in its nutrition.The nerve fibers are not covered by the myelin sheath (a fatty insulating layer) found in all higher vertebrates–Therefore nervous conduction is slow. The complex nervous connections found in higher forms are impossible in these early vertebrates**.**

CirculatorySystem:

Blood flows through a series of vessels to supply oxygen and nutrients to the body and to remove carbon dioxide and other wastes.–Arteries and arterioles carry blood away from the heart–Veins and venules carry blood back towards the heart–Capillaries are the smallest vessels where the gases are exchanged with the cells of the body

RespiratorySystems:

A lamprey "breathes" by extracting the oxygen present in the water in which it lives.Within the respiratory tube are seven gill pouches, each containing the finer feather-like gill lamellae. The gill lamellae increase the surface area of the respiratory structures and contain the small capillary beds that extract

oxygen Problem, when a lamprey is feeding and attached to a fish the mouth serves as an attachment organs, it is no longer available for use in respiration. Under this situation Water can be drawn directly into the respiratory tube through the external gill slits. Muscular contractions change the volume of the respiratory tube and thus control the movement of water over the gill lamellae.

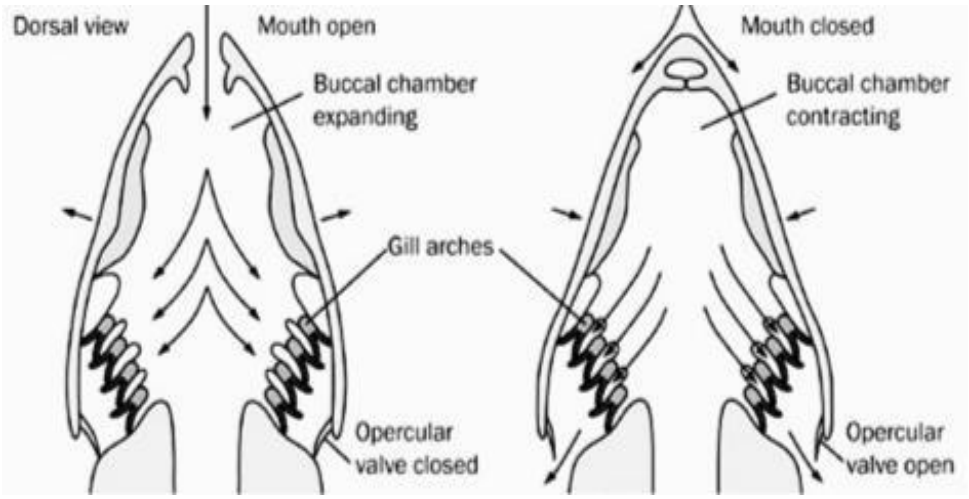

Fig Mechanism of respiration in lamprey

Excretory System

Kidney: filters out waste from the blood–Ions, water and other nitrogenous wastes– Responsible for maintaining osmoregulation.The balance between the salts in the

body and the salts in the environment. Kidneys excrete extremely dilute urine to maintain the ionic balance in the body. Kidneys excrete highly concentrated urine. Lampreys rely on the gills to get rid the body of excess salt.

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