

# **TOPIC: AND GENERAL CHARACTERISTICS AND CLASSIFICATION OF CYCLOSTOMATA,PETROMYZON**

LECTURE NO:08

BSC PART 1-PAPER II-GROUP A

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## **OBJECTIVE**

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- To understand the systematic and functional morphology of various groups of Cyclostomata.
- To study their affinities and adaptations to different modes of life.
- To describe and explain the basic biology, evolution and development system of Cyclostomata.
- To impart knowledge in comparative anatomy and development of Cyclostomata.
- To understand the ecological terms.

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## **INTRODUCTION**

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Cyclostomata is a group of chordates that comprises the living jawless fishes: the lampreys and hagfishes. Both groups have round mouths that lack jaws but have retractable horny teeth. The name Cyclostomata means "round mouths". Their mouths cannot close due to the lack of

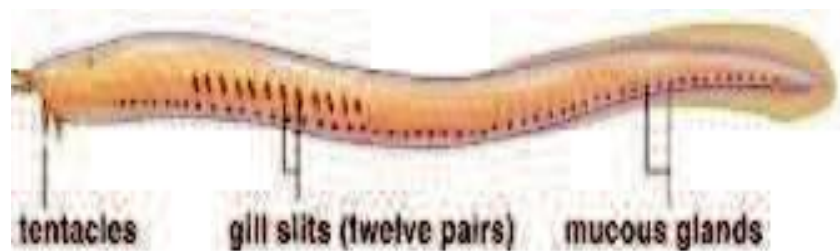
a jaw, so they have to constantly cycle water through the mouth.

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## GENERAL CHARACTERS OF CYCLOSTOMATA

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Cyclostomes are jawless primitive vertebrates. They may be marine or fresh-water. They include hag fishes and lampreys (fig 5.1).



(a)



(b)

Fig 5.1 (a) Hag Fish (b) Lamprey

- The body is long, eel like. It has a trunk and a compressed tail.
- Paired fins are absent. Median fin is supported by cartilaginous fin-rays.
- The skin i.e soft and smooth. It is slimy. It is scale less.
- Z- shaped myomeres are present in the trunk and tail Protractor and retracstor muscles Move the tongue.
  - In this group a true coelome is seen.
  - These vertebrates do not have jaws, hence called Agnatha.
  - The mouth is circular. It works like a sucker and is surrounded by tentacles.
  - Tongue bears teeth.
- Stomach is absent and oesophagus leads into the intestine.
- Endoskeleton is present.
- Skull is simple and primitive.
- Notochord presists throughout life.

- Vertebrae are represented by neural arches, around the notochord.
- Five to sixteen pairs of gills are present in sac like pouches
- The heart is two chambered. Sinus venosus is present, but conus arteriosus is absent.
- Blood contains leucocytes and Irregular nucleated erythrocytes..
- Brain is seen.
- Ten pairs or less number of cranial nerves are present.
- Nasal sac is single and median.
- Lateral line sense organ is present.
- Excretory system includes a pair of mesonephric kidneys.
- Sexes are separate.
- Gonad is single and without a gonoduct.
- Development may be direct or with a long larval stage.

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## **CLASSIFICATION**

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The class Cyclostomata is divided into two orders:

(1) Petromyzontia and

(2) Myxinoidea

## **Order 1 Petromyzontia**

This includes Lampreys.

The buccal funnel is suctorial and shows horny teeth.

The mouth is present in the buccal funnel.

The nasal sac is dorsal. It has no connection with the pharynx.

Eyes are functional.

Seven pairs of gill slits are present.

A well-developed dorsal fin is present.

Branchial basket is complete.

Brain is well developed.

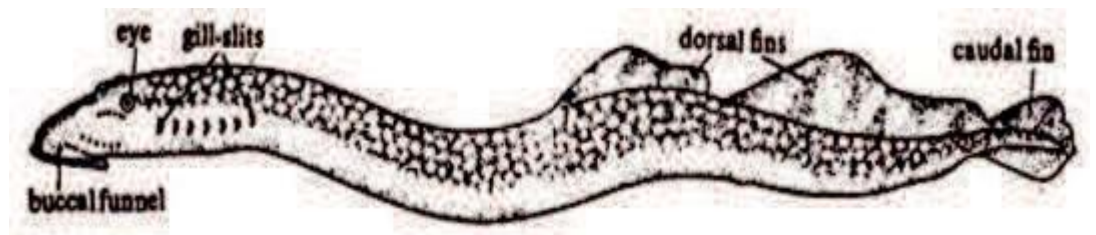
Pineal eye is well developed.

Ear has two semicircular canals.

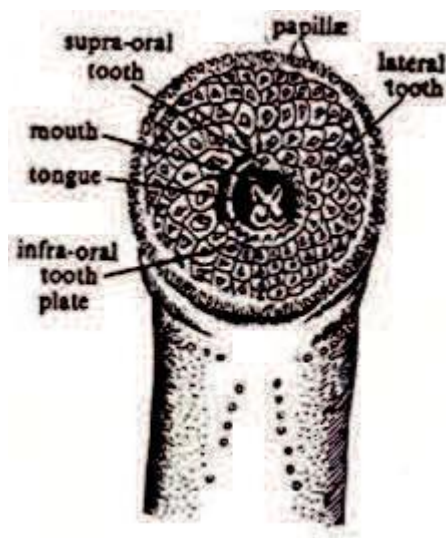
Ex: 1. Petromyzon (Sea-lamprey).



(a)



(b)



(c)

**Fig. (a) Lamprey on lake trout (b) Sea Lamprey (c) Suctorial mouth of Lamprey**

## **Order 2: Myxinoidea**

It includes the hag-fishes or slime eels.

Buccal funnel is absent.

The nasal sac opens into pharynx through a canal.

Eyes are vestigial.

Dorsal fin is absent or very small.

Branchial basket is poorly developed.



Myxine sp. Lateral view

Brain is primitive.

Pineal eye is reduced.

Ear has only one semicircular canal.

The hag-fishes are all marine.

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## GENERAL STUDY OF PETROMYZON

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General study of Petromyzon

## Systematic position

Phylum Chordata

Sub phylum Vertebrata

Group Agnatha

Class Cyclostomata

Order Petromyzontiformes

Family Petromyzontidae

Type Petromyzon (Lamprey)

## External Feature:

Lampreys are eel-like in appearance, but have a soft, cartilaginous skeleton. They lack paired fins but have well developed dorsal and ventral finfolds. In the adult, the jaws are so rudimentary that apparently they are wanting; the mouth is a longitudinal slit when closed, but forms an elliptical disc at the tip of the snout when open, and is armed with many horny, hooked teeth arranged in numerous (11 to 12) rows, the innermost the largest. There are two dorsal finfolds, and seven



open gill slits on each side. The sea lamprey (the only member of its group known from our salt waters) can hardly be mistaken from any other fish its eel-like appearance coupled with two dorsal fins and the jawless mouth locate it at a glance.

**Colour:**

Small specimens (whether on their way downstream or in salt water) are white below and uniformly colored above, usually described as blackish blue, or as lead colored, and more or less silvery. But large specimens usually are olive brown above, or of varying shades of yellow-brown, green, red, or blue, mottled with a darker shade of the same color, or sometimes nearly black if the dark patches are confluent. The lower surface is whitish, gray, or of a pale shade of the same hue as the ground color of the back. During breeding season, the landlocked form takes on more brilliant hues, with the ground tint turning bright yellow.

**Size:**

The length at the time of transformation from the larval stage is about 4 to 8 inches (100-200 mm.). Sexually mature individuals, taken [page 13] in American rivers, average 2 to 2½ feet long, up to a maximum of about 3 feet. One of 33 inches weighed 2¼ pounds.

## **Habit and Habitats:**

It has been known since a longtime that the sea lamprey breeds in freshwater. However, it does not enter all the streams within its range indiscriminately. As an illustration, we may cite outer Nova Scotia and the Bay of Fundy, where lampreys run in the St. Marys, Sackville, Annapolis, Shubenacadie, Petit Codiak, and St. Johns Rivers, but not in the Moser or Apple Rivers, although these last also are "salmon" rivers. Their requirements are a gravelly bottom in rapid water for their spawning beds, with muddy or sandy bottom in quiet water nearby, for the larvae.

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