



Udai Pratap (Autonomous) College, Varanasi

E-learning Material

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Topic	Fish Anatomy
Sub-topic	Weberian Ossicles in Fishes
Key-Words	
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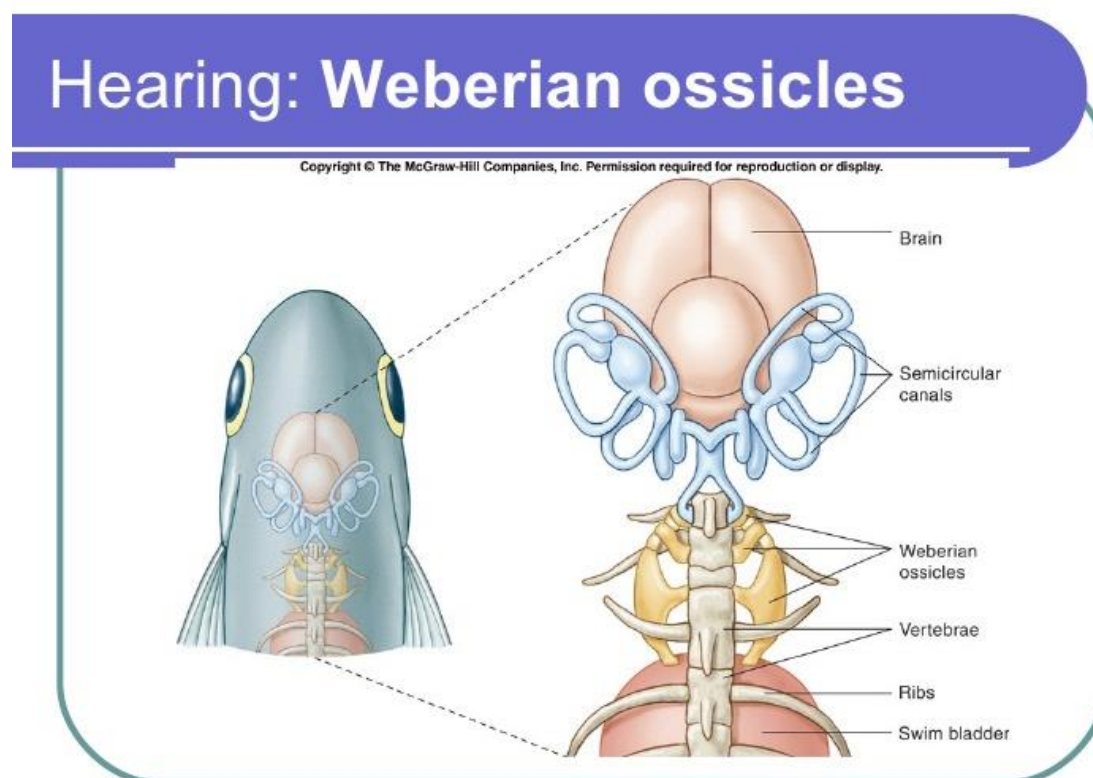
WEBERIAN OSSICLES IN FISHES :

In 1820 Weber described its presence in fishes. The Weberian ossicles are a chain of bony pieces on each side of number of teleostes. The weberian ossicle are placed on each side of anterior vertebrae and extend between the membranous labyrinth and the air bladder of their side of the four ossicles. The Tripus, Intercalarium and Scaphium form the chain while the clastrum lies dorsal to scaphium at the anterior most position of four bony pieces that form the weberian ossicle. Clastrum is the smallest and anterior most in the chain, it either articulate with or forms a part of the neural arch of the first vertebra and may be lost, secondarily in some species as *Wallago attu* and *Gymnotids*.

The Second piece, Scaphium is slightly larger, broad and compressed in structure. A ventral peg-like process is usually present

through which the Scaphium articulate with a depression in the centrum of the first vertebra. The Scaphium is connected with the intercalarium by means of an interossicular ligament. The intercalarium may be just like a small nodule of bones as in *Siluroids* (*Wallago attu*, *Mystus senghala*) in which it is not connected with the vertebral column.

While in Cyprinids as *Labeo rohita*, *Cirrhinus carpio* and *Tortor* the intercalarium is a rod like piece and is attached to the centrum of the second vertebra. One end of the intercalarium is bifurcated the intercalarium is connected to the last piece, tripus by means of another ligament.



Weberian Apparatus

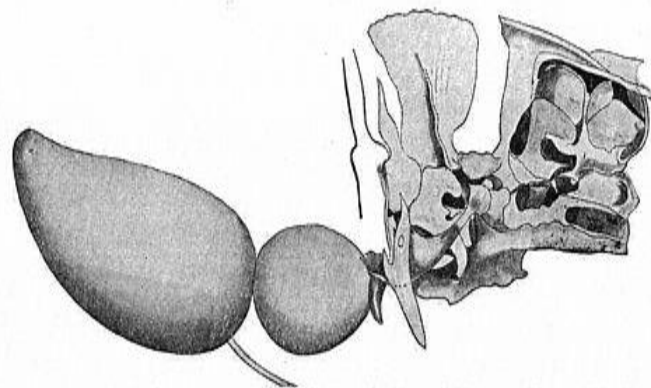
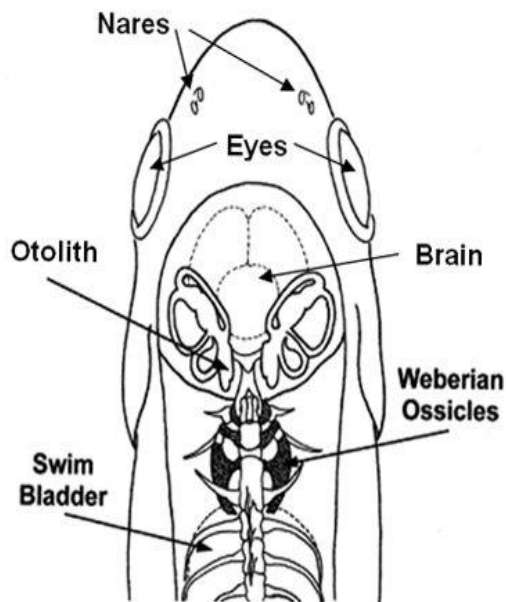
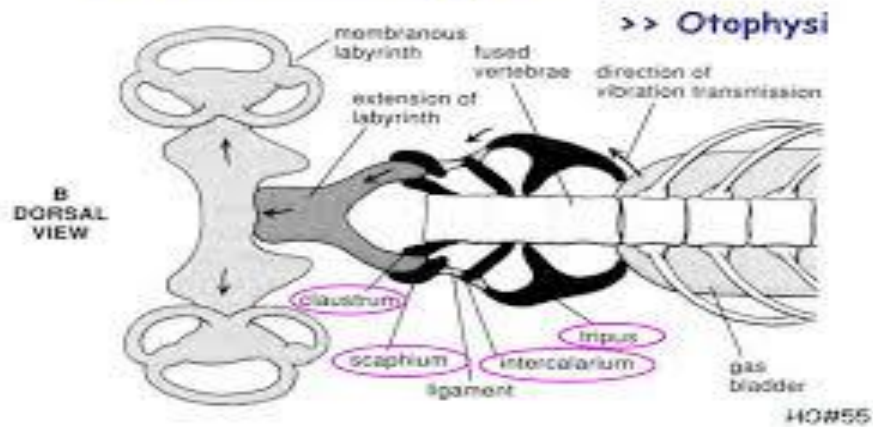


Fig. 289.—Weberian apparatus and air-bladder of Carp. (From Günther, after Weber.)

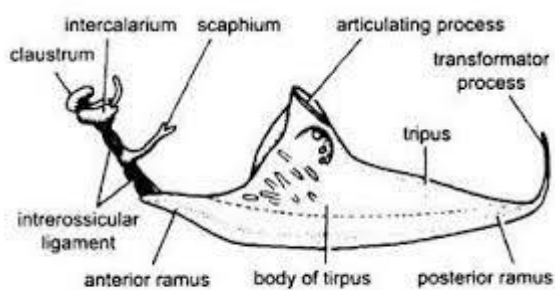


Fig. 15.5. Chain of Weberian ossicles separated.

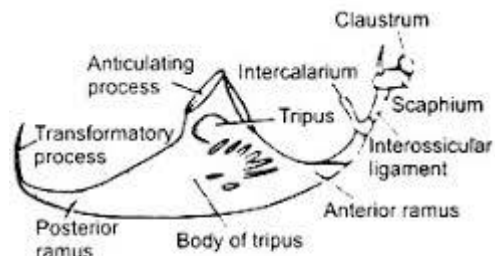
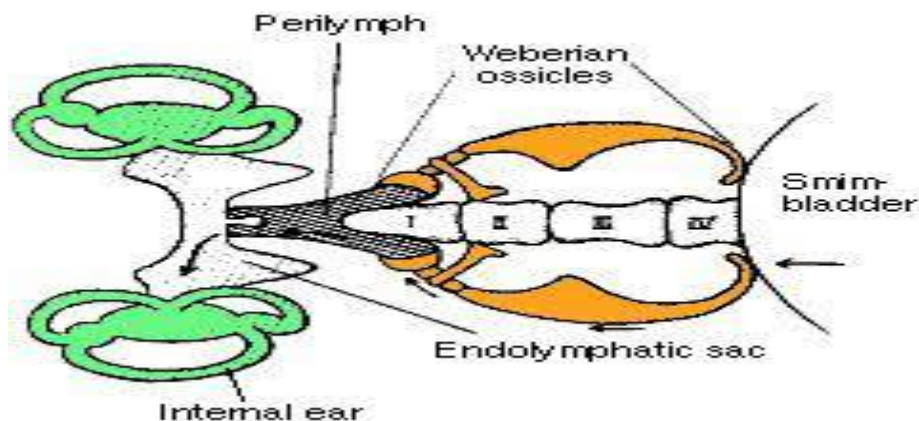


Fig. 18.7. Wallago : Weberian ossicles



The tripus is the largest piece in the chain and may be triangular in shape having three process. The anterior process is connected to the intercalarium by interossicular ligament. The middle process of the tripus articulate with the vertebral column between the second and third vertebra. The posterior process is larger slightly curved and is called the transformator. It is connected with anterior surface of the wall of gas bladder by ligaments.

MECHANISM OF WORKING OF WEBERIAN OSSICLE :

Weberian ossicle are work on the basis of direct and indirect methods.

In indirect methods weberian ossicles is connected to the well developed large gas bladder

While in the direct method swim bladder protrudes through an opening in the bony capsule for attachment with the tripus. In such cases a change in the volume of bladder causes its wall to bulge out of the opening and moves the ossicle forward, thus transmitting the vibrations to the ear.

A change in water pressure causes the bladder to expand or contract when it expands the tripus is moved forward which transmitted to the scaphium and to the perilymph in sinus impar, which then conveyed to the sacculus.

Similarly, when swim bladder is compressed, the tripus is moved back and scaphium is drawn out decreasing its pressure on the perilymph. During all these actions the connection of the ossicles with the vertebral column acts as a spring or fulcrum.

FUNCTION OF WEBERIAN OSSICLE :

It has following functions-

- (1) Weberian ossicles have an auditory functions and provide an efficient mechanism of transmitting sound waves from the bladder wall to ear.
- (2) **Dijkgraaf (1950) Jones and Marshall (1956)** suggested that Weberian ossicle have hydrostatic functions and help the fish in sensing changes in the volume of the swim bladder at different depth.

References :

1. Anatomy and Physiology of Fishes by Dr Santosh Kumar and Dr Manju Tembhre
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3. A Text Book of Fish Biology and Indian Fisheries By Dr Rahul P. Parihar.
4. Fish and Fisheries of India by V.G. Jhingran
5. Images from www.Google.co.in

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