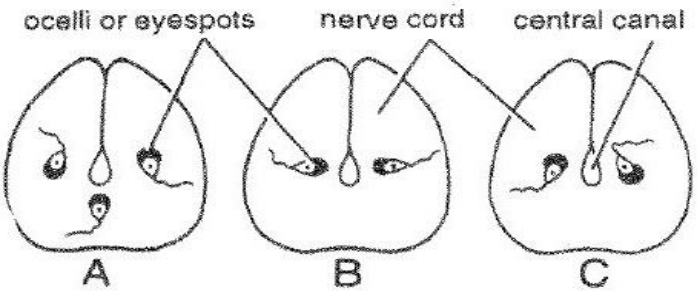
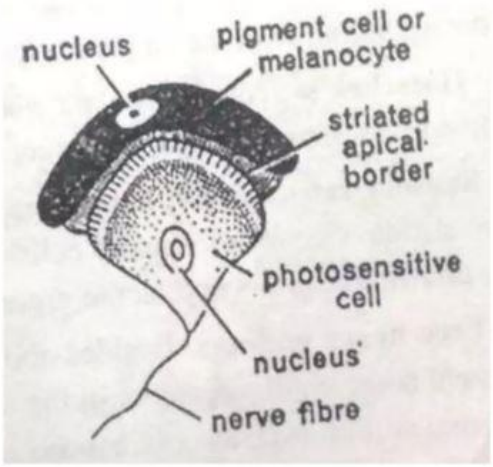
Sense Organs (Receptors) in *Branchiostoma* (=*Amphioxus*)

Branchiostoma, commonly known as *amphioxus* or lancelets, possesses a variety of sense organs that help it perceive its environment. Despite being a primitive chordate, *amphioxus* exhibits a number of sensory structures that are comparable to those found in more complex vertebrates. Here are some of the sense organs and receptors present in *Branchiostoma*:

Eye spots or ocelli. These are photoreceptor or light-sensitive organs distributed on the ventro-lateral sides of nerve cord. They are oriented in different directions and help the animal in burrowing in sand or in swimming spirally to perceive light from all directions. An eyespot or ocellus is made up of two cells, an outer pigment cell or melanocyte and an inner photosensitive cell with a striated apical border which serves as a lens. They are arranged in definite tracts and are sensitive to light. The photosensitive cell receives one nerve fibre from the nerve cord. The light-sensitive eyes are responsible for orientation of the animal as it burrows in sand.



Branchiostoma. Orientation of eyes in different regions of nerve cord.

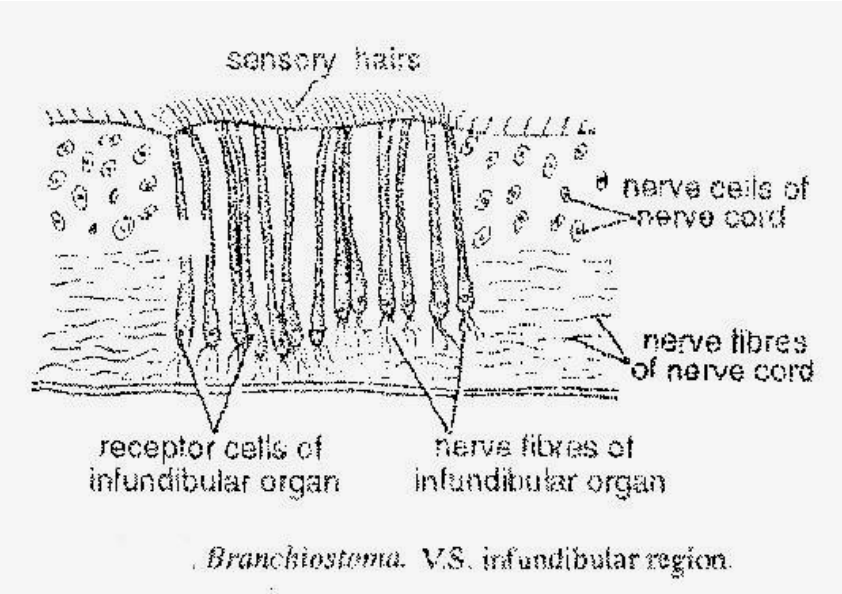


Eye spots or ocelli

2. Pigment Spot:

Pigment spot is a large pigmented spot in the extreme anterior wall of the cerebral vesicle. It lacks the structure of an eye and has no sensory function, But when the animal burrows with its anterior end projecting, then the pigment spot shields the eyes from frontal stimulation by light and probably acts as a thermoreceptor.

3. Infundibular Organ: It is located at the floor of cerebral ventricle and so named because of its homology with the infundibulum of vertebrate brain. It consists of a patch of tall, columnar and strongly ciliated epithelial cells. Internally the organ gives out a fine Reissrier's fibre which enters into the neurocoel. It detects changes in the pressure of the fluid in the neural tube. The various functions assigned are detection of pressure in the cerebra-spinal fluid, perceiving the shadow cast by cephalic pigment spot (photoreception), or neurosecretion.



Branchiostoma. V.S. infundibular region.

4. Kolliker's Pit:

Kolliker's pit or olfactory pit is a pocket of ciliated ectoderm cells above the cerebral vesicle slightly to the left side. It marks the position of neuropore by which the neural tube opens

anteriorly in the larva, but the neuropore closes in the adult. Kolliker's pit is probably not an olfactory organ since it has no specialised sensory cells, nor it has any connection with the brain.

5. Papillae:

Papillae are groups of sensory cells on oral cirri and velar tentacles. They are sensory to touch. The cells of the velar tentacles and oral cirri are also chemoreceptors having gustatory and olfactory functions.

6. Sensory Cells:

Sensory cells are found scattered all over in the epidermis, they are specially abundant on the dorsal side of the body and on oral cirri. Each sensory cells has a nerve fibre at its lower end and at the outer end it has a hair-like sensory process projecting from the cuticle. These cells respond to contact and some of them are concerned with determining the nature of the sand in which the animal will burrow, for the animal avoids sand which is too fine.

The above mentioned receptors in or near the integument are collectively known as exteroceptors or external receptors.

7. Free Nerve Endings:

Besides the above external receptors, there are sensory nerve endings in myotomes which respond to internal stimuli, such as muscular contractions. These are sensitive to internal stimuli such as contractions of muscles (proprioreceptors)