Sense organs in prawn

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Specialized organs, which receive physical and chemical stimuli from the environment called sense or sensory organ.

The sense organs are associated with the nervous system and transmit the environmental stimuli to the central nervous system.

Sense organ of prawn consists of the following organs-

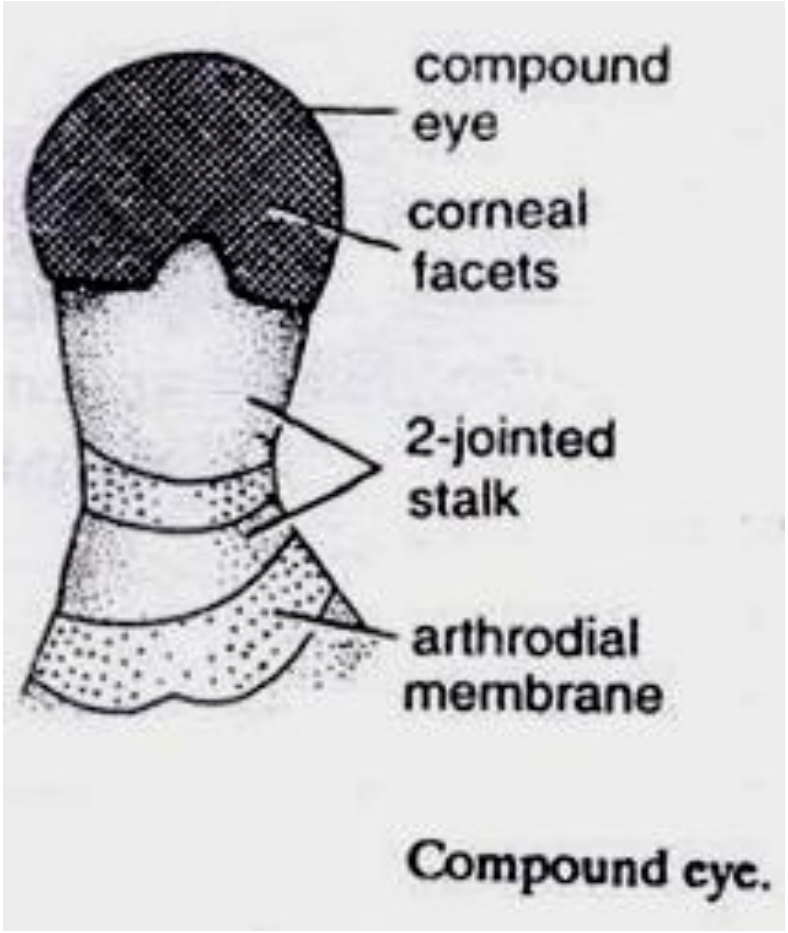
1. **Compound Eye**

2. **Statocysts**

3. **Other sense organ**
    - **a) Tangoreceptors**
    - **b) Chemoreceptors**
    - **c) Proprioreceptors**

Compound eye

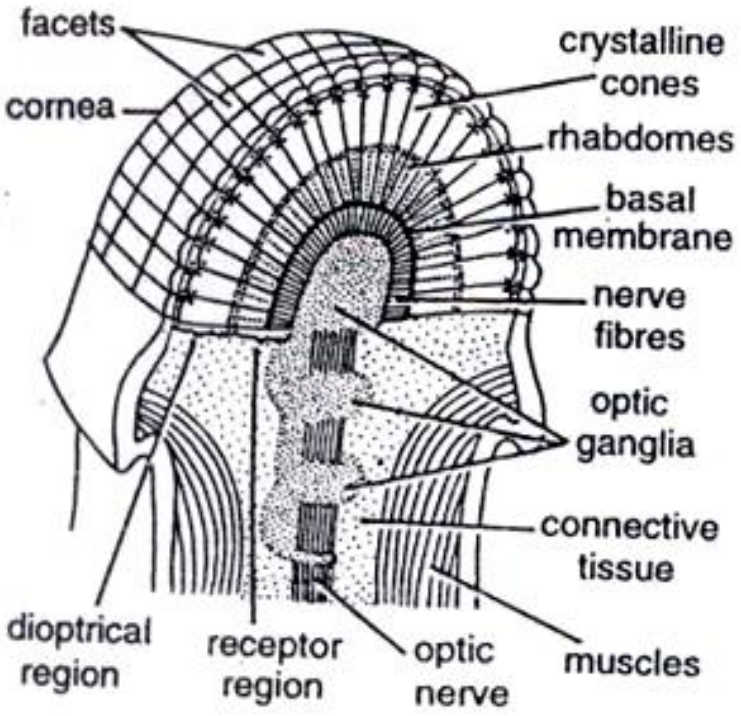
- Prawn having a pair of black and hemispherical eyes.
- Eye is located at base of rostrum and connected by two jointed, short movable stalk.
- Each eye is composed by large number (about 2500 no.) of independent visual elements or units called ommatidia and that's why eye is called compound eye.
- Each of the ommatidia is arranged radially and similar in structure.



Compound eye.

Ommatidia consists different types of cells

1. **Cornea:** It is the outer most transparent convex cuticle layer. In surface view it exhibit large no. of square or facet lines which giving the appearance like graph paper and below the each square lies one ommatidium.
2. **Corneagen cells:** Each of the facet thickens to the center to form biconvex corneal lense and beneath the each lens two corneagen cells are present. It is the modified epidermis and form new cornea after moulting.
3. **Cone cells:** Four elongated, transparent and crystalline cone cells are present beneath the corneagen cells. From the start of the eye to end of the cone cells known as dioptical region which focuses the light to the next receptor region.



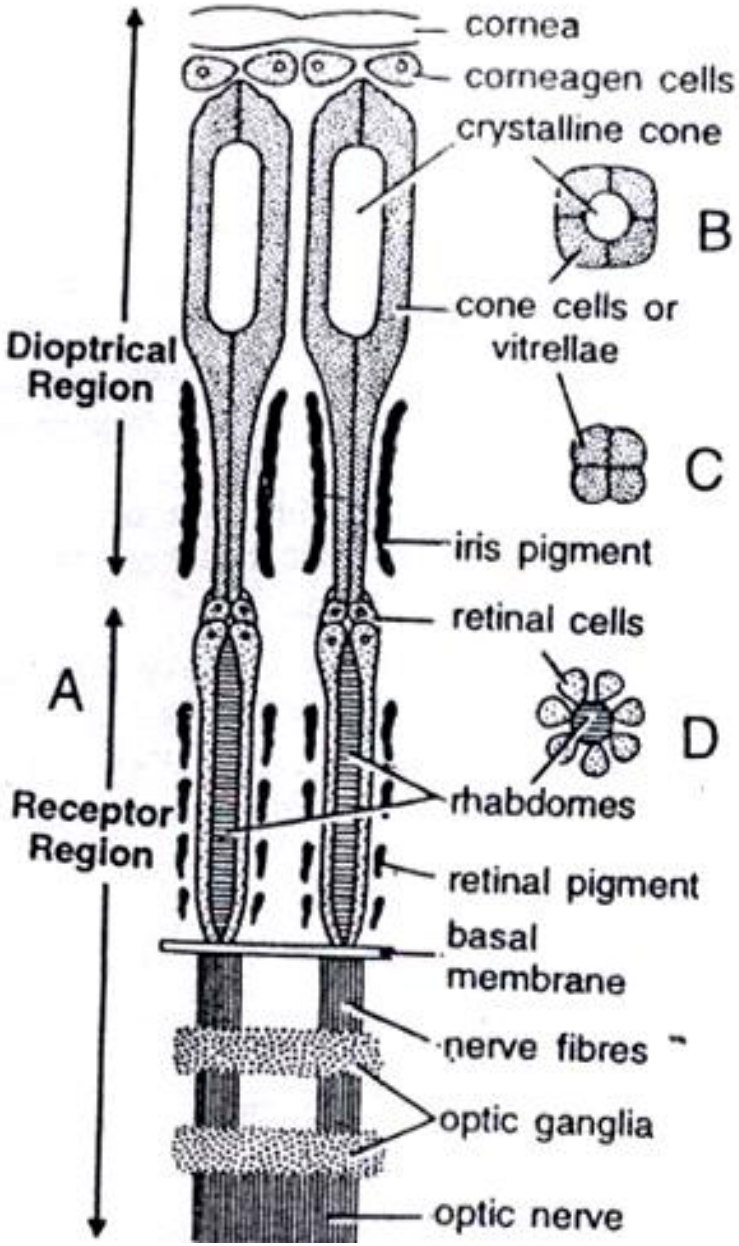
L.s. of compound eye showing arrangement of ommatidia.

4. Rhabdome and retinal cells:

At the inner end of cone cells, elongated spindle shaped rhabdome cells are present and it is surrounded by seven elongated retinal cells. Rhabdome and retinal together form inner receptor region. Inner end of the retinal cells rest on the basal membrane and beyond this region optic ganglia cells are present, which are connected to the brain by optic nerve.

5 .Chromatophores:

- Each ommatidium is separate from others by a sheath of movable, amoeboid, dark pigment cells called chromatophores, which are arranged in two series. Outer series lying along the cone cells called iris pigment and inner series which separating the rhabdomes called retinal pigment.
- Chromatophore cells take different position according to intensity of light.



Mosaic vision

Each ommatidium is capable of producing a separate image of a small part of a object seen.

Therefore the object viewed consist of several dark and light tinny spot, so that total image formed as mosaic. Because of its similarity to mosaic art work, this type of vision is called mosaic vision.

Prawns can adjust their eyes to form both types of images according to the prevailing intensity of light.

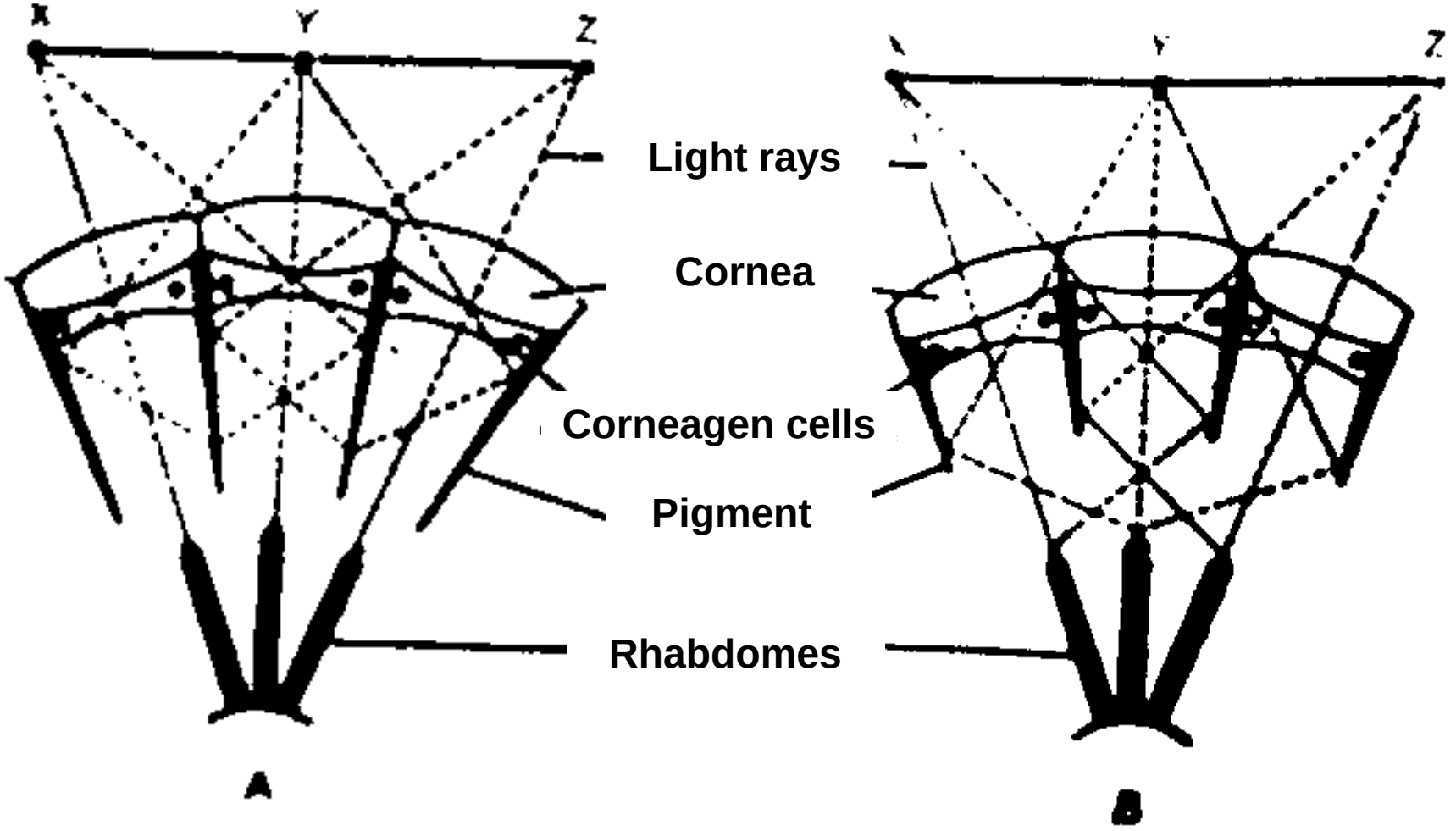
The optic nerve carries impulse to the brain where the interpretation and registration of image occurs.

Apposition image

In bright or day light, the pigment cells spread in such a way that they completely isolate the adjacent ommatidium. Only those light rays which fall perpendicularly upon the cornea can passes through the ommatidium and form a point of image. As a result the complete image formed in mosaic of several component. This called as mosaic or apposition image.

Super position image

In dim light or night, the pigment cells separated into distal and proximal pigment, so the adjacent ommatidium are optically connected and work in union. The light rays passes through number of ommatidium and capable of forming overlapping adjacent point of image. This continuous image is called superposition image.



Apposition image

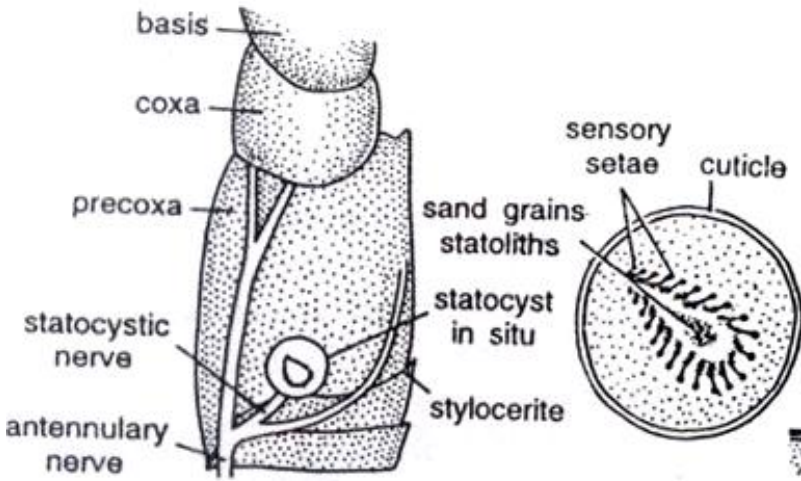
Super-position image

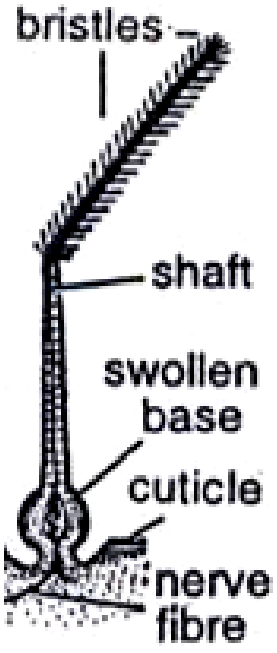
Statocysts

Statocysts are a pair of small, white bead like sacs lies inside the basal segment or precoxa of each antennule, to its dorsal wall.

It opens through a minute concave depression of precoxa called statocystic aperture. A small statocystic branch of antinnular nerve suplies to the statocyst. Oval shaped statocystic cavity is filled with minute sand particles and lined by number of elongated sensory hair of receptor setae. Each receptor setae connected by statocystic nerve. Each receptor setae consists of a swollen base and a long tappering shaft, which is pointed towards the centre.

It act as organ of orientation and equilibrium.



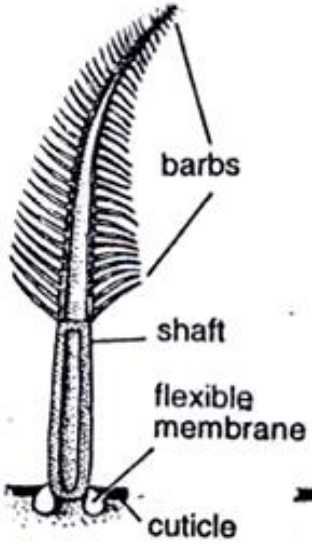


Other sense organ

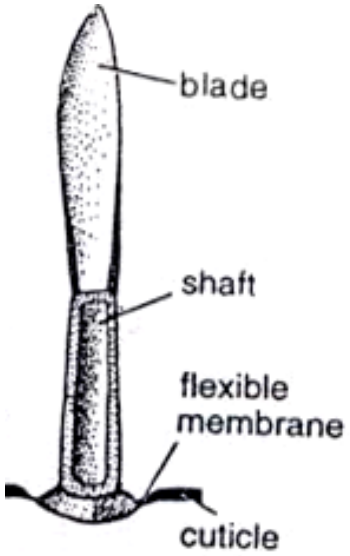
1. **Tango-receptor:** prawn having sensitivity to touch by means of tactile organ or tango-receptor. Elongated feelers of both the antennae said to be tactile in function.

2. **Chemoreceptor:** Chemo-receptors or olfactory organs respond to chemical stimuli. They present on mouthparts, flagella of antennules and inner wall of gill chamber. Nerve fiber from the olfactory branch of antennulary nerve connected to each seta.

3. **Proprio-receptor:** These occur internally throughout the body. They receive internal stimuli such as relate to posture and mascular function.



Tactile receptor (Tango-receptor)



Olfactory receptor (chemo-receptor)