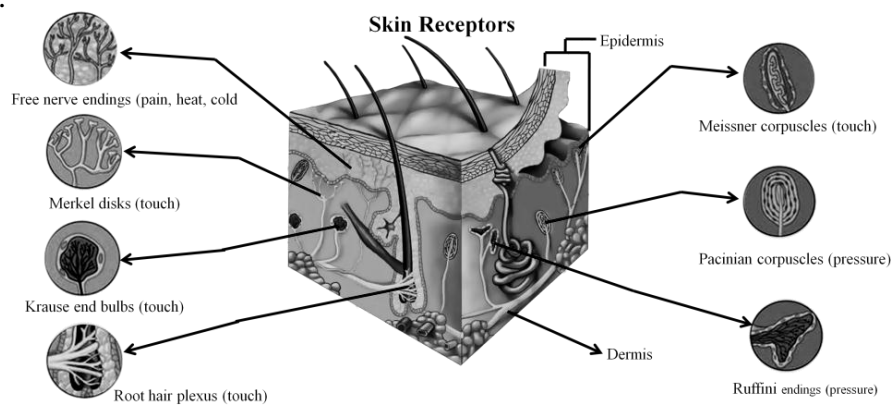


Sensory organs

Types of Receptors:-

- **Exteroreceptors:** These respond to changes in the external environment. These lie near or at the external surface of body. These include:
 - Photoreceptors for light in eyes
 - Phonoreceptors for sound waves in the organ of Corti of internal ear.
 - Olfactoreceptors for smell in nasal chambers.
 - Gustatoreceptors for taste in taste buds.
 - Tangoreceptors for touch, pressure, pain etc in skin.
 - Rheoreceptors for currents of water or air
 - Thermoreceptors for temperature in skin.
 - Georeceptors for gravity
 - Teleroreceptors for distance.
 - Galvanoreceptors are stimulated by electric current in water and are found in the skin of certain fishes.
- **Proprioreceptors:** These are located in the muscles, tendons and joints. These note the changes in muscle position and length. These are not in contact with external environment but are affected by environmental factors.
- **Interoceptors:** These are located within the body and detect the changes in the internal environment of body e.g., body temperature, osmotic and pH changes.
 - Statoreceptors for equilibrium in cristae and maculae of internal ear
 - Visceroreceptors for changes in visceral organs and stimuli like pain, sex desire, hunger, thirst etc.
 - Baroreceptors to note changes in blood pressure. These are present in the carotid bodies in carotid sinus.



Skin Receptors:

NEURAL CONTROL AND CORRDIATION

Are terminal branches of dendrons of sensory neurons. These may be in the form of free nerve endings or corpuscles or bulbs (when covered by a C.T. sheath and lie in the dermis). These are sensitive to five of stimuli like touch, pain, pressure, heat or cold.

Type of skin receptors:-

1.	Tangoreceptors		(a) Basket nerve endings around the hair bulbs. (b) Meissner's corpuscles in the dermis. (c) Merkel's discs in the epidermis. (d) Mazzoni corpuscles in sub-cutaneous zone of fingers.
2.	Theremoreceptors (A) Caloreceptors (B)Frigidoreceptors	Stimulated by touch. Warmth (25-45 C) Cold (10-20 C)	e.g. Ruffini's endings. e.g. End bulb of Krause.
3.	Algesi-receptors (or Nociceptors)	Pain.	e.g. Free nerve endings in deeper layers of epidermis.
4.	Pressure-receptors	Deep pressure.	e.g. Pacinian corpuscles in the dermis.

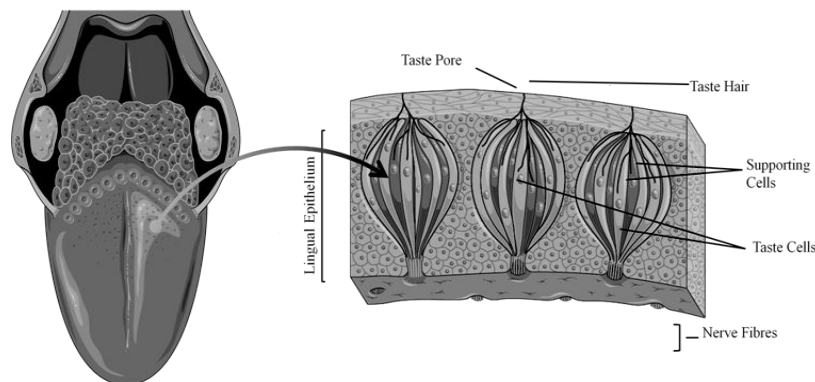
15.3. Olfactory part of nasal chamber and nasoturbinial are lined by a sensory and glandular Pseudostratified epithelium called olfactory epithelium (Schneiderian membrane). So nose is sense organ of olfaction formed of three types of cells: Olfactory cells, supporting cells and basal cells.

Olfactory cells, are chemoreceptors. Chemicals are inhaled along with air. In the olfactory part, these chemicals dissolve in mucus and stimulate the olfactory cells. Olfactory area of temporal lobe of cerebral hemisphere through olfactory nerve and a pair of broad bean-sized olfactory bulbs (extension of limbic system of brain). Olfactory cells are fatigued rapidly.

Organs of taste:-

Position: are taste buds present mainly in the mucosa of taste papillae present also present in the epithelium of soft palate, pharynx and epiglottis.

5-15 in number in a taste bud. Each in long, narrow, crescentic-shaped, bipolar neurosensory cell. Microvilli (stereocillia) on free side while has a nerve fibre on other side

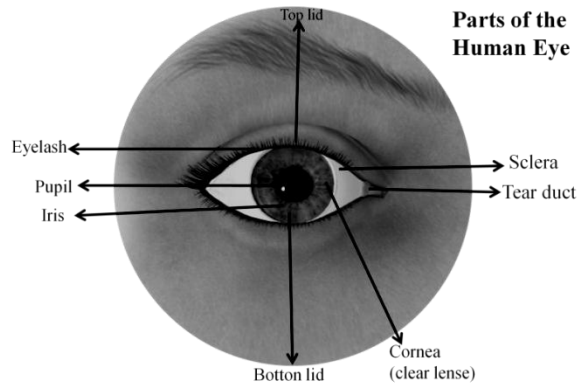


Organs of Sight

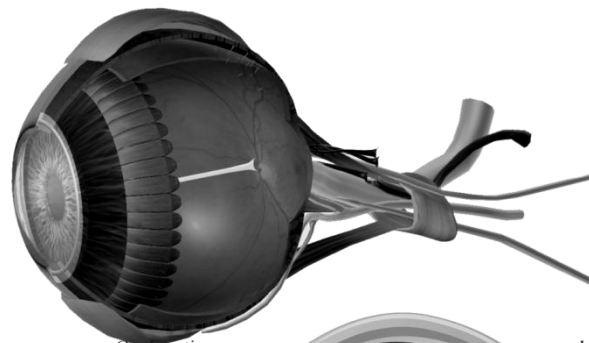
- Protection:-

NEURAL CONTROL AND CORRDIATION

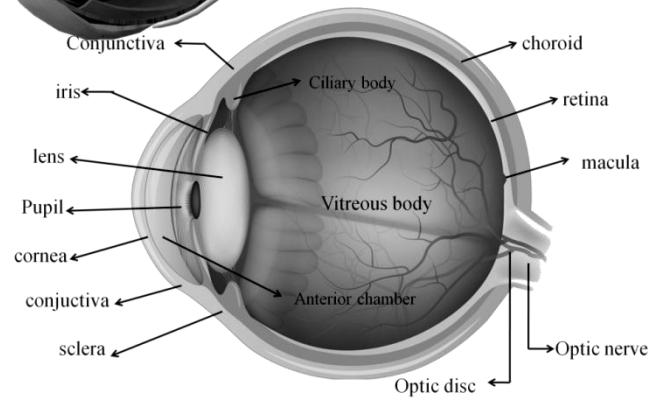
- Eye brows.
- Eye lids.
- Adipose Tissue



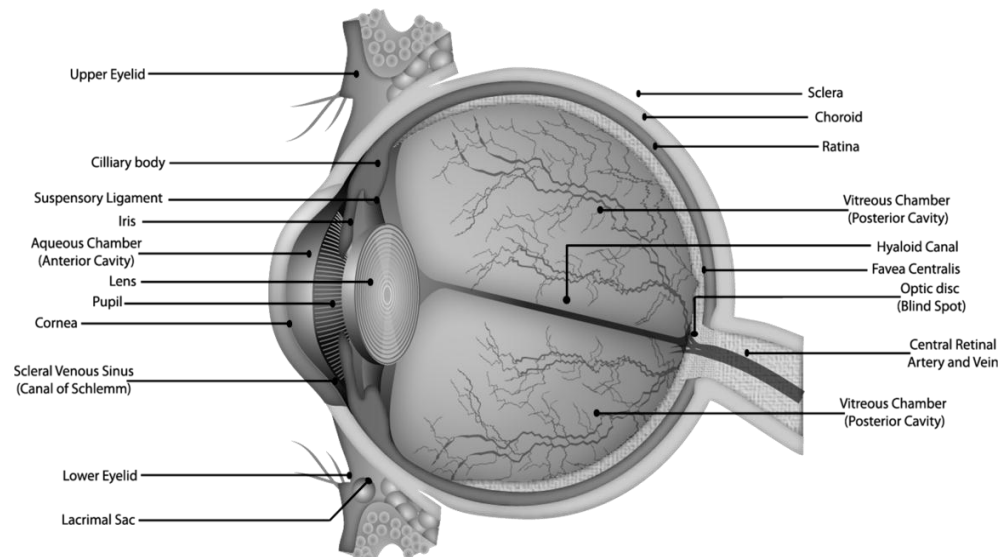
3rd Structure of Eye



2d Structure of Eye



Structure:-



NEURAL CONTROL AND COORDINATION

Structure:-

Fibrous tunic. Only complete layer, and helps in mechanical protection.

Sclerotic of dense white fibrous connective tissue.

Cornea. Anterior, smaller transparent, bulging and exposed part of eye. It is non-vascular.

Covered by a thin transparent stratified epithelium called conjunctiva.

Vascular coat or uvea

Choroid, thin, pigmented (with melanin), bluish coloured and highly vascular part present loose fibrous connective tissue and performs two functions:

Darkens the eye ball for total absorption of light.

It provides nutrition to retina.

Iridial part.

- Thin pigmented and opaque diaphragm which hangs in the eye ball just in front of the lens. Aperture is called pupil whose size can be regulated by two sets of smooth iridial muscles:

- Sphincter muscles. These are circularly arranged and when contract, decrease the size of pupil.

- Dilator muscles. These are radially arranged and when contract, increase the size of pupil.

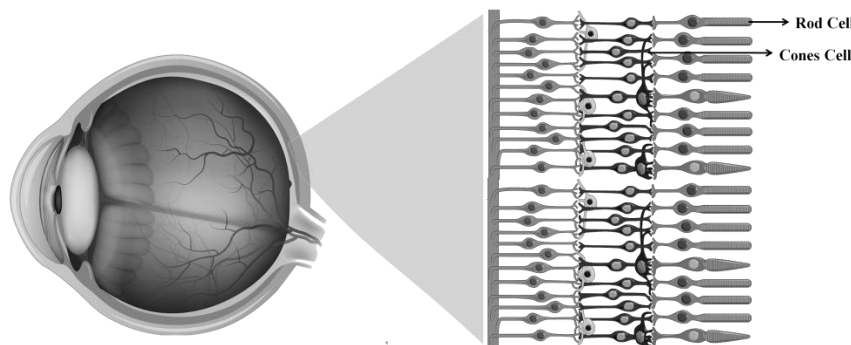
Ciliary part thickened ring-like structure present inner to the junction of sclerotic and cornea produced into radiating folds called ciliary processes having two sets of smooth ciliary muscles Circular muscles these are circularly arranged and when contract, decrease the size of eye ball.

Meridional muscles when these contract, the choroid is pulled forward.

Retina innermost and incomplete layer. It is also formed of three parts:

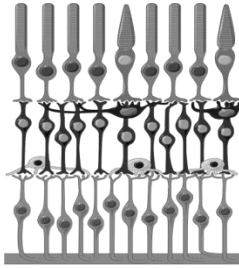
Optical part. Thick, pigmented and photosensitive 4 layers of cells. These layers from outer to inner side are:

- Pigmented epithelium of cuboidal cells having melanin pigment granules. It helps in absorption of light. A layer of two
- types of photoreceptors – Rods and cones – having light sensitive photopigments.
- A layer of bipolar neurons.
- A layer of retinal ganglionic cells.

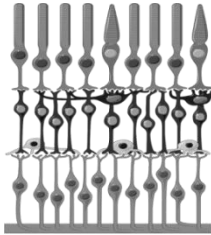


Rods. These have a visual purple pigment called rhodopsin (a derivative of vitamin- A) and are sensitive to dim light (scotopic vision) so these help in twilight vision during night. Rhodopsin is readily bleached by bright light into a protein scotopsin and a pigment retinal which depolarizes the rod cell. Rhodopsin is rapidly regenerated in dim light.

NEURAL CONTROL AND CORRINATION



Cones having their own peculiar photopigments which respond to red (erythropsin), green (chloropsin) and blue light (cyanopsin) radiations. White colours at night.



(i) Blind spot without rods and cones so is insensitive to light, so no image is formed on it site of origin of optic nerve and entry of retinal blood vessels.

(II) Yellow spot called macula lutea or area centralis. It is a small yellow-coloured area on retina which lies opposite to optical axis of the lens and lateral to blind spot. It is with only cones so is most sensitive to day light vision. It is with a depression, fovea centralis, in its middle. Area centralis acts as filter over fovea centralis. It is the area of most distinct day vision. It is the point of maximum visual activity (Resolution).

Aqueous chamber: watery fluid, aqueous humor, which helps in Nutrition to non-vascular lens and cornea; Inflates eye ball and gives shape to the eye; Supporting the lens; and Refracts the light rays to focus on retina.

(b) Vitreous chamber: transparent gelatinous material, vitreous humor or Wharton's jelly, which Helps in shape to the eye;

Ciliary part:- thinner, only pigmented part present inner to the colinary part of uvea and both collectively form ciliary body demarcated from the optical part by a small wavy area, ora serrata.

Iridial part: It also thinner, only pigmented part present inner to the iridial part of uvea and both collectively forms iris. Iris, being pigmented, gives colour to the eye.

Lens:- Lens present just behind the iris and is surrounded by a thin, transparent and elastic membrane, lens capsule. Suspended in the cavity of the eye ball by a ring-like ligamentous (yellow fibrous) frame called suspensory ligment which extends between the ciliary body and the lens capsule. Refracts the light rays.

Practice Question Online