

Special Senses

MED 164

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Objectives

- Structure and function of eye
- Structure and function of ear

Functions of Sensory Organs

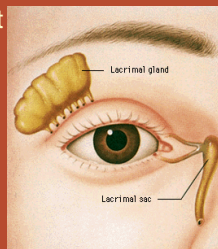
- Sensory organs are specially designed to sense the environment around us
- Touch
- Vision
- Hearing
- Smell
- Taste

Receptors

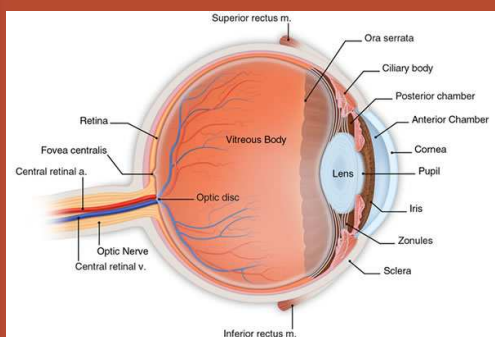
- Sensory organs contain specialized receptors that sense specific environmental stimuli
- Transmit signals to the CNS system for integration and interpretation

Eye

- Eye is about 1" in diameter and protected by skull, eyelids, and eyelashes
- Eyes are lubricated and protected by tears formed in the lacrimal gland and released through the lacrimal duct



Cross Sectional Anatomy



Sclera

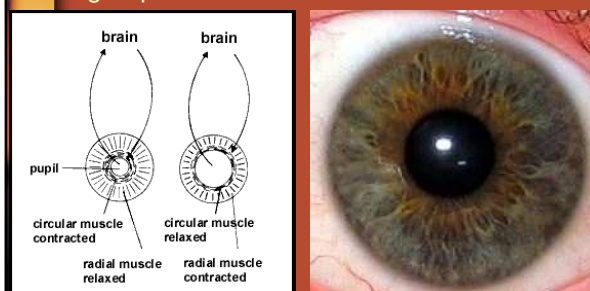
- Sclera is tough, fibrous capsule that holds the eye in its characteristic shape
- Sclera is white in color
- Muscles that control eye movement attach to the sclera

Cornea

- Transparent region of sclera that functions as a window for light waves to enter the eye

Iris

- Colored region of eye that contains two groups of intrinsic muscles

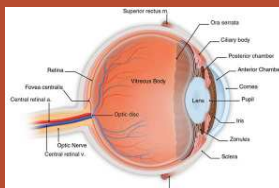


Pupil

- In middle of iris, hole that allows light through
- Size of pupil is controlled by iris muscles
- In the presence of light, pupil constricts
- In the absence of light, pupil dilates

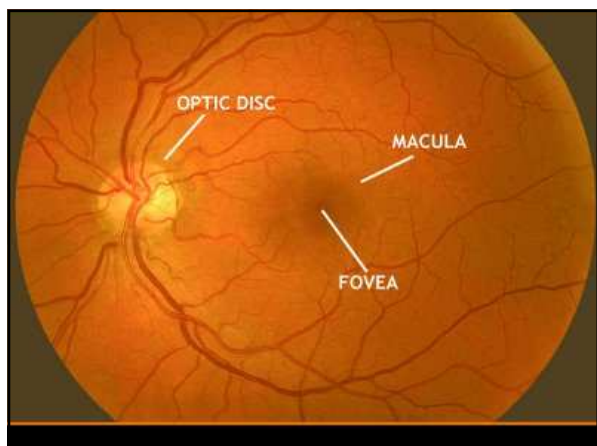
Lens

- Adjusts rays of light and allow us to see things at different distances
- Held in place by suspensory ligaments
- Separates the eye into two separate chambers
 - Anterior chamber
 - Filled with aqueous humor
 - Posterior chamber
 - Filled with vitreous humor



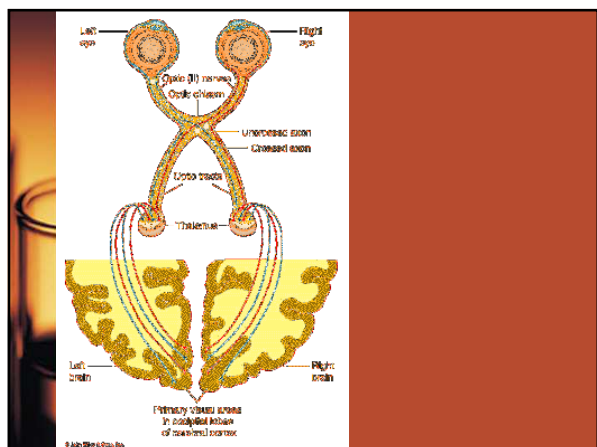
Retina

- Light rays are focused onto the retina
- Retinal contains pigments and specialized cells called rods and cones
- Rods sense in dim condition
- Cones sense in bright conditions and see colors
- Fovea centralis contains cones
- Optic disc (blind spot) contains no rods or cones and is where nerve fibers leave eye



Pathway of Vision

- Light waves enter the cornea and enter the pupil
- They are bent and refracted by the lens and focused onto the retina
- In the retina, the rods and cones pick up the stimulus and send a signal to the optic nerve and it travels to the optic chiasma

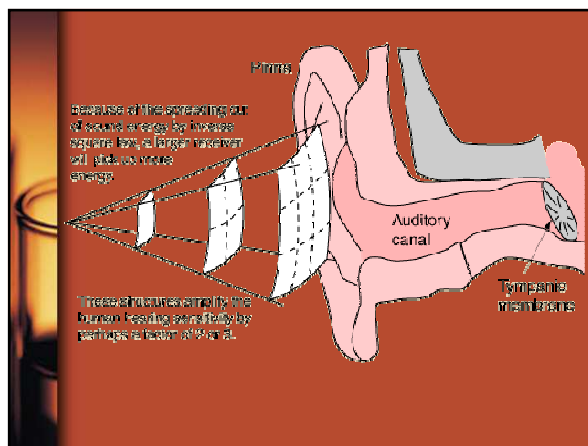


Ear

- Designed to pick up sound waves and convert them to mechanical stimuli and mechanical stimuli is converted into electrical stimuli
- Additionally, the ear is involved in equilibrium and balance
- Three regions
 - Outer
 - Middle
 - Inner

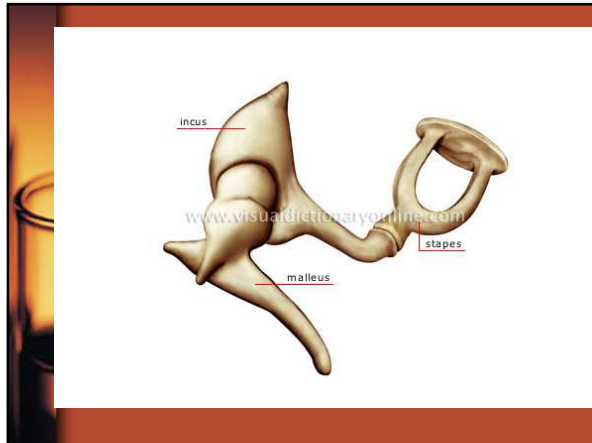
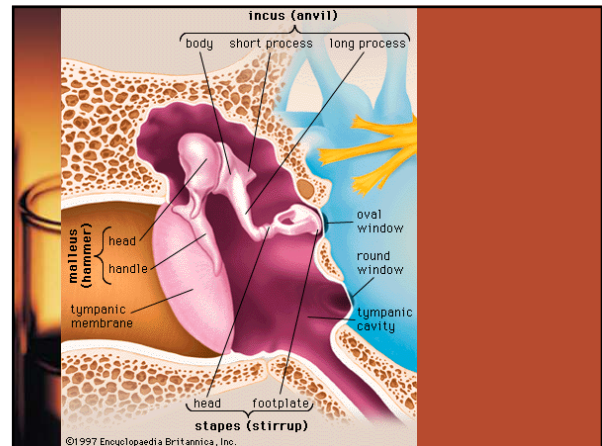
Outer Ear

- Pinna- Collects waves and focuses them towards the tympanic membrane
- Tympanic membrane- Sound waves bounce off of tympanic membrane and moves bones of middle ears



Middle Ear

- Contains ossicles
 - Malleus (Hammer)
 - Incus (Anvil)
 - Stapes (Stirrup)
- Transmit sound waves from the ear drum to the inner ear
- Eustachian tube connects to pharynx and equalizes pressure in middle ear with outside environment



Inner Ear

- Contains cochlea
- Cochlea is filled with fluid that vibrates when struck by stapes
- Fluid vibrates hair like cells that when stimulated transmit an electrical signal to the auditory nerve