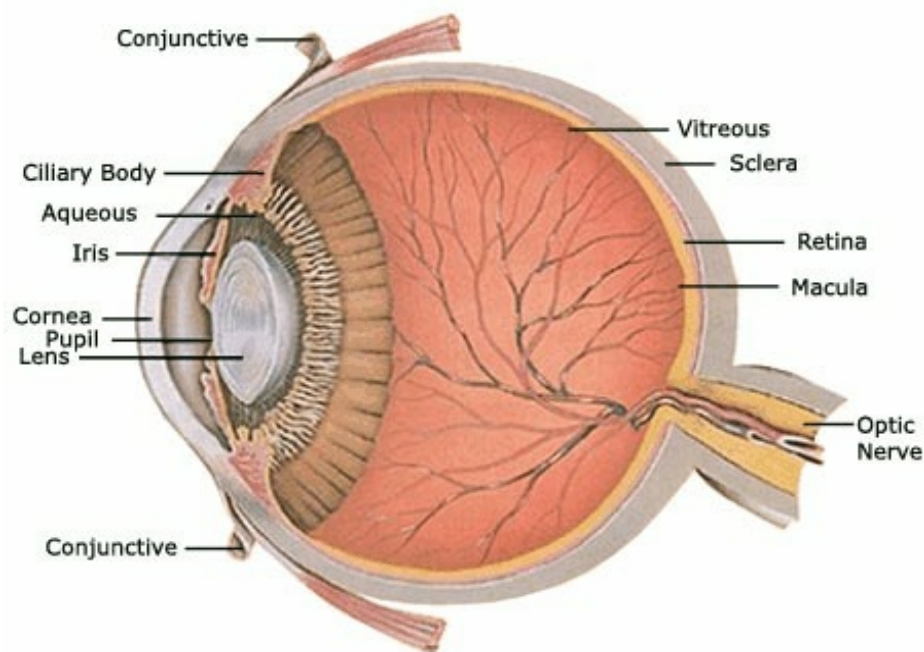


## The Sense Organs...

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Capture stimuli from the external environment and relay them to the brain for processing.

Ex. Eye structure



- protected by bony ridges and socket of the skull, plus eyelashes, eyelids and tears
- two directed forward for chasing prey in a 3D environment, **binocular vision** is the minimum needed for **depth perception**

## Eye Parts :

Eyeball ( globe ) wall has 3 layers...

### Sclera -

“white”, shapes eyeball, thick outermost layer, clear bulge in front is the **cornea**

### Choroid layer -

absorbs light so it doesn't reflect / bounce around inside the eyeball, forms the **iris** in front, **ciliary body** muscles control the shape of the **lens** (“accomodation”)

### Conjunctiva -

a clear membrane over the front of the eye keeping the front moist ( lacrimal glands...lacrimal duct...eye...drain into the sinuses )

Inner rear layer...the retina....a light sensitive layer containing 2 kinds of photoreceptor cells...rod cells and cone cells.

Rods... concentrated around the retina's periphery, for low light black / white / gray vision at night. 150 M

Cones... concentrated at the retina's center, for color brighter light vision...red, green, blue. Daytime vision, neurons have a higher threshold. 6B

Both use a pigment ( rhodopsin ), which light breaks into retinol ( fr vit A ) and opsin, which releases energy to stimulate the receptors. 3 slight changes in opsin gives 3 receptors for red, blue, and green. Neurons bundle together to form the optic nerve leaving from the back of each eye.

## Lens

Lens focus...

Far... ciliary muscles relax,  
ligaments tighten, lens gets  
flatter

Close...opposite

Iris -

Pupil -

## Fovea centralis and macula

the central area of the retina (macula) directly behind the lens centre, where cones are concentrated in a small pit or dent...(fovea)...the best color vision possible.

## Blind spot....

The area on the retina where the optic nerve attaches, no receptors there...no image possible.

The eyeball is divided into 2 compartments...

The front part....anterior chamber

between cornea and lens is the anterior chamber, filled with “aqueous humor”...directs incoming light through the pupil and headed back to the retina.

The back part....posterior chamber

Between lens and retina is filled with vitreous humor, a clear gel that maintains the proper shape of the eye.

Path of Light Through the Eye....

<http://www.youtube.com/watch?v=AsKeu4wm3XI&feature=related>

Cornea, pupil, lens, retina, receptors, impulse, optic nerve, visual cortex at the rear of your cerebrum.

Your ANS is responsible for the pupillary response to light, changing the diameter of the pupil using the iris.

Eye Disorders....(define each)  
(page413)

Glaucoma, cataracts, astigmatism, myopia (nearsightedness), and hyperopia ( farsightedness)

Treatments....(define each)

Corneal transplants, laser surgery ( PRK and LASIK), corrective lenses, and lens replacement.

Ears and Hearing.....

Helps maintain homeostasis by detecting outside air movement, translating that movement into a neural impulse, to be interpreted by the temporal lobe of the cerebrum.

Parts :

pinna, auditory canal, tympanic membrane ( eardrum), ossicles (incus, malleus, and stapes....or hammer, anvil and stirrup), cochlea ( membranes, page 416), auditory nerve, eustachian tubes, and semicircular canals.

(Outer, middle, and inner ear diagram)

(Cochlear membranes)

Disorders....infections and deafness....2 types

Neural deafness...

hair cell damage inside the cochlea. Common with aging, but also exposure to loud sound ( dB scale ). Usually not reversible.

Sound frequencies are unevenly damaged...high and low ranges first.

## Conduction deafness...

Damage to the outer or middle ear that limits the amount of vibration passed (conducted) to the inner ear. Usually not complete, since skull bone still conducts SOME sound. Treated with hearing aids.

### 3 kinds...

Conventional HA -

mic, amp, and receiver, you adjust the volume

Programmable HA -

Electronics custom programmed to your frequency loss. Automatic volume control.

Digital HA -

Digitizes sound, and modifies the different pitches to custom fit to your needs.