

Sensory System

Sensory system is divided into two divisions:

- x

 - x

 - x

 - x

 - x

- x

 - x

 - x

 - x

 - x

 - x

Sensory System

- x General Senses – not specific, found everywhere, fairly simple

 - x Touch

 - x Temperature

 - x Pressure

 - x Pain

- x Special Senses – more complicated, very specific

 - x hearing

 - x balance

 - x sight

 - x smell

 - x taste

Anatomy of the Eye

Sclera –

Cornea –

Choroid –

Lens –

Ciliary Muscle/body –

Aqueous Humor –

Iris –

Vitrious Humor –

Retina –

Fovea Centralis –

Rods –

Uvea –

Uveitis –

Anterior uveitis –

Posterior uveitis –

Anatomy of the Eye

Sclera – the skeleton of the eye.

Cornea – clear portion in front of the lens.

Choroid – the middle layer. All the active parts of the eye are part of the choroid.

Lens – enclosed in a sac and attached to the ciliary muscle.

Ciliary Muscle/body – moves to change the shape of the lens. Creates aqueous humor.

Aqueous Humor – made by the choroid. Found in front of the lense.

Iris – when the iris closes down, the pupil gets smaller, when the iris opens up, the pupil gets larger.

Vitrious Humor - what you got is hwat you got. This is the fluid in the large part of the eye.

Retina- the area of nerve endings to pick up light/color, tissue paper thin

Fovea Centralis – lots of cones in this portion of the eye.

Rods – toward the periphery

Uvea – the combination of the iris, the ciliary body, and the choroid. The entire tunic of the eye. All three of the structures are colored, not just the iris.

Uveitis – refers to inflammation of part or all of the middle tunic.

Anterior uveitis -inflammation of the iris or ciliary body.

Posterior uveitis – inflammation of the choroid.

Light Refraction

Light refraction –

Refractive index –

Air RI =

Glass RI =

Water RI =

Concave lenses –

Convex lenses –

Visual Acuity –

Focal Point –

Focal Length –

Diopter –

Light Refraction

Light refraction – the bending of light rays as a beam passes thru a curved lens or passes from a medium of one density to a medium of a second density.

Refractive index – it's simply density

Air RI = 1

Glass RI = 1.44

Water RI = 1.33

Nothing is under 1 on this planet.

Concave lenses – cause light rays to diverge

Convex lenses – cause light rays to converge

Visual Acuity – The ability to distinguish between forms. Visual acuity is measured grossly at 20 feet by the Snellen chart.

Focal Point – Parallel rays from 20 feet or more away, when passing through a convex lens will come to a point. We call this point the focal point.

Focal Length – The distance from the lens to the point is the focal length.

Diopter – the amount of converging power of a convex lens is expressed in diopters. The meter is the reference length used for expressing diopters. A convex lens with a strength of 1 diopter, has a focal length of one meter. A focal length of 2 meters gives you a diopter of .5 A focal length of .5 meters gives you a diopter of 2

More Light Refraction

Concave lens strength

The human eye has a strength of about:

Most of the refraction is done by the:

The cornea

The len's job is accomodation –

More light refraction

Concave lens strength is measured by the strength of the convex lens that they counteract. (but the value is negative diopter. A concave lens of a -1 diopter will negate a 1 diopter convex lens.)

The human eye has a strength of about: 60 diopters

Most of the refraction is done by the: cornea

The cornea is very curved and has an RI of: 1.33 (The same as water)

The len's job is accomodation – it can change its focal length to bring objects into sharper image. This is fine tuning.

Vision

Rods:

light _____ color _____
found _____

Cones:

color _____
found _____
Cones detect _____

Color blindness -

Near vision – viewing something closer than 20 feet.

Accommodation – adjustment of the refractory power of the lens. The ciliary body alters the shape of the lens allowing it to become more convex which changes its strength.

Pupillary constriction – the smaller the opening, the sharper the image.

Convergence – The two eyeballs have to turn inward on the object. A lack of convergence leads to double vision.

Binocular vision – means we're looking at an object with two separate sense organs. It can help to give us depth. The brain also uses surrounding visual cues as points of reference.

Vision

Rods:

light sensitive but color insensitive
found on the periphery

Cones:

color sensitive
found more toward the center (except for the optic disc, the blind spot)
Cones detect the colors:
Red, green, blue

Color blindness -

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Problems of the eye

Aqueous humor –

Abnormally high pressure in aqueous humor -

Emmetropia –

Hypertropia –

Myopia –

Astigmatism –

Presbyopia –

Problems of the eye

Aqueous humor – (canal of Schlemm – where the extra aqueous humor is gotten rid of). The normal pressure is 20-25 mm of mercury.

Abnormally high pressure in aqueous humor - doesn't hurt anything in the anterior part of the eye, but it pushes the lens back into the vitreous humor, which pushes back on the retina and can kill the cones/rods/ and optic nerve. (Glaucoma – any time you look at streetlights at night and see a halo) (Cataracts are a thickening of the Cornea)

Emmetropia – the term for a normal refracting eye.

Hypertropia – far sightedness. The light rays are converging behind the retina. (Solve with a positive diopter - Convex)

Myopia – near sightedness. The light rays are converging in front of the retina. (solve with a concave lens, or negative diopter)

Astigmatism – an unequal curvature of the refractive surface and the rays of light cannot be brought to a fixed point but rather over a more diffuse area.

Presbyopia – Elasticity, ability to accommodate to being lost. Everything is stiffening up.

Ear

Bony Labyrinth – the “cave” system within the bones

Semicircular canals – at 90 degrees to one another

Vestibule – where the utricle and saccule are

Cochlea – where the cochlear duct and hearing takes place.

Membranous Labyrinth – the membranous sac within the bony labyrinth

Membranous semicircular canals – for balance, dynamic equilibrium.

utricle & saccule –two membranous sacks located within the vestibule. The utricle is closer to the semicircular canals, the sacule is closer to the cochlea. For balance, detects changes in acceleration.

cochlear duct – organ of hearing

Perilymph – fluid formed by the connective tissue lining the bony labyrinth.

Endolymph –

Oval window –

Round Window –

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cochlear duct – organ of hearing

Perilymph – fluid formed by the connective tissue lining the bony labyrinth.

Endolymph – Fluid found inside the membranous labyrinth

Oval window – attached to the stapes bone

Round Window – the opposite end of the cochlear duct.

More Ears

Pitch –

Pitch & Organ of Corti -

Loudness

Loudness & Organ of Corti -

Semicircular canals sense –

Utricle and saccule sense –

Constant Movement -

More Ears

Pitch – refers to the high or low quality of the sound. And is measured in cycles per second. The human ear can detect the range of 30 to 20,000 cycles per second. But hears most accurately between 500 and 4,000.

Pitch & Organ of Corti - The various pitches are detected by various areas in the organ of Corti. The higher the pitch, the shorter the distance up the organ of Corti the sound will travel. High pitch sounds stimulate the beginning of the organ of Corti. So, pitch is location.

Loudness is measured by the amplitude of the vibrations.

Loudness & Organ of Corti - Loudness is detected by the organ of Corti by the number of hair cells stimulated at one time vs the location of hair cells. Loudness is quantity.

Semicircular canals sense – respond to rotational movement.

Utricle and saccule sense – to acceleration and deceleration. These are also involved with balance that's related to eye movement.

Constant Movement - There's no sensory organ associated with constant movement.

Smell & Taste

hyposmia – decreased ability to smell

anosmia – total lack of ability to smell.

Types of Taste

x

x

x

x

Sweet and salt –

Bitter and sour -

Back of the throat and epiglottis -

Smell & Taste

hyposmia – decreased ability to smell

anosmia – total lack of ability to smell.

Types of Taste

x Sweet

x Sour

x Bitter

x Salty

Sweet and salt – predominate on the anterior 2/3rds of the tongue. This is CN VII. (Facial)

Bitter and sour - The posterior 1/3rd CN IX, glossopharyngeal

Back of the throat and epiglottis – CN X vagus

Cranial Nerves

- I. On Olfactory
 - II. Old Optic
 - III. Olympus' Oculo Motor – eye movement and accomodation
 - IV. Towering Trochlear – eye muscle
 - V. Top Trigeminal – it has three branches for sensation to the face and muscles of mastication.
 - VI. A Abduscence – it goes to the lateral rectus that Abducts the eye
 - VII.Finn Facial – Move the muscles of the face (smile, taste on anterior 2/3rds of the tongue)
 - VIII.And Acustic – Vestibulo Cochlear
 - IX. German Glossophyrengeal – all of the muscles of the tingue except one. Also taste to the posterio
1/3rd of the tongue
 - X. Viewed Vegas – Comes from vagabond. Carries para-symphathetic to the trunk.
 - XI. A Accessory (or spinal accessory) It shrugs the shoulder, SCM, etc. Stuff the spinal nerves
should do.
 - XII.Hop Hypoglossal – musculature we swallow with. One muscle of the tongue and the back of
the throat.
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