

Sensory System

Week 4

Sensory System

- Special Senses

- *Vision* from receptors in eye
- *Hearing* from receptors in inner ear
- *Equilibrium* from receptors in inner ear
- *Taste* from receptors in tongue
- *Smell* from receptors in upper nasal cavity

- General Senses

- Pressure, temperature, pain, & touch from receptors in *skin*
- Sense of position from receptors in muscles, tendons, & joints

Vision

- Layers of the eye wall
 - Sclera and cornea: known as the white of the eye
 - Maintains shape
 - Protection
 - Cornea bends light rays to focus on the retina
 - Uveal tract
 - iris: muscular body that controls pupil
 - ciliary body: muscles suspend and adjust lens
 - Retina: This is where images are focused

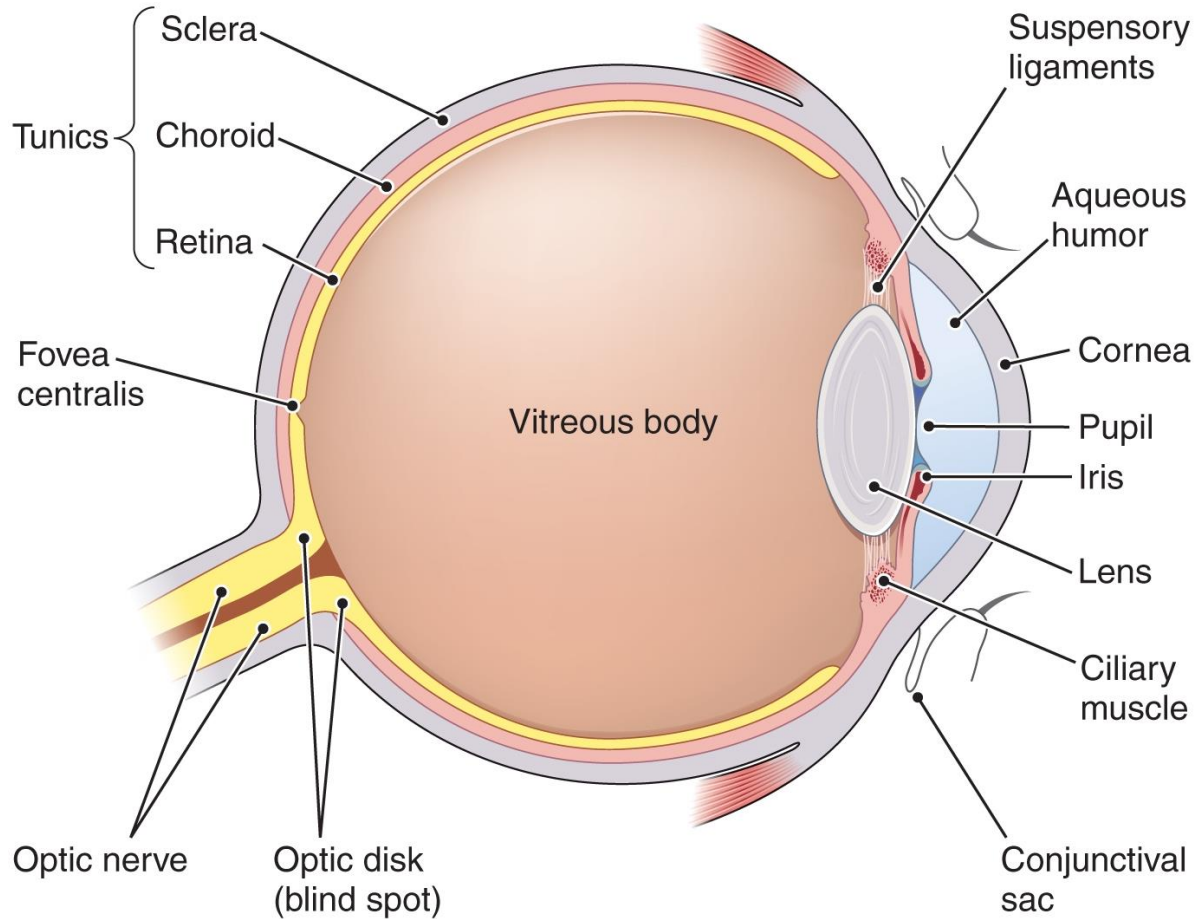
Vision

- **Key Structures of Eye**

- **Iris:** muscular, pigmented ring that controls pupil
- **Pupil:** circular opening in center of eye
- **Lens:** clear structure behind iris that refracts light & focuses
- **Aqueous humor:** fluid that fills eye
- **Vitreous body:** jellylike substance that maintains eye's shape

The Eye

- Eye



Eye Vocabulary

- Ocul: eye
- Lacrim/o: tear
- Blephar/o: eyelid
- -opia: suffix for vision
- Dipl/o: two or double
- Ophthalm/o: eye vision
- Ophthalmologist: person who studies eye diseases.

You should know.....

- The common term for lacrimal fluid is: tears
- Eyelids, eyelashes and eye brows protect the eye from foreign particles, light and impact.
- The retina contains **rods**, receptors that respond to dim light and **cones**, receptors that perceive color and are responsible for high visual acuity.

Disorders and Treatments

- Refractive Errors: corrected with glasses
 - **Refractive surgery**
 - Astigmatism: light coming into the eye does not focus on a single point.
 - Nearsightedness: images fall in front of the retina
 - **myopia**
 - Farsightedness: images fall behind the retina
 - **Hyperopia**
 - **Presbyopia** result of aging

Disorders and Treatment (cont.)

- Infections

- Conjunctivitis: inflammation of the transparent lining of the eyelid
 - Viral, bacterial, allergic (“Pink Eye”)
- Keratitis: Inflammation of the cornea after irritation or injury.

Glaucoma

- Increased intraocular pressure
 - Damages optic nerve
 - Can be treated and controlled but not reversed
 - Tunnel vision
 - Treated with medication to reduce intraocular pressure
 - Reduce production of aqueous fluid
 - Increase fluid drainage

Cataracts

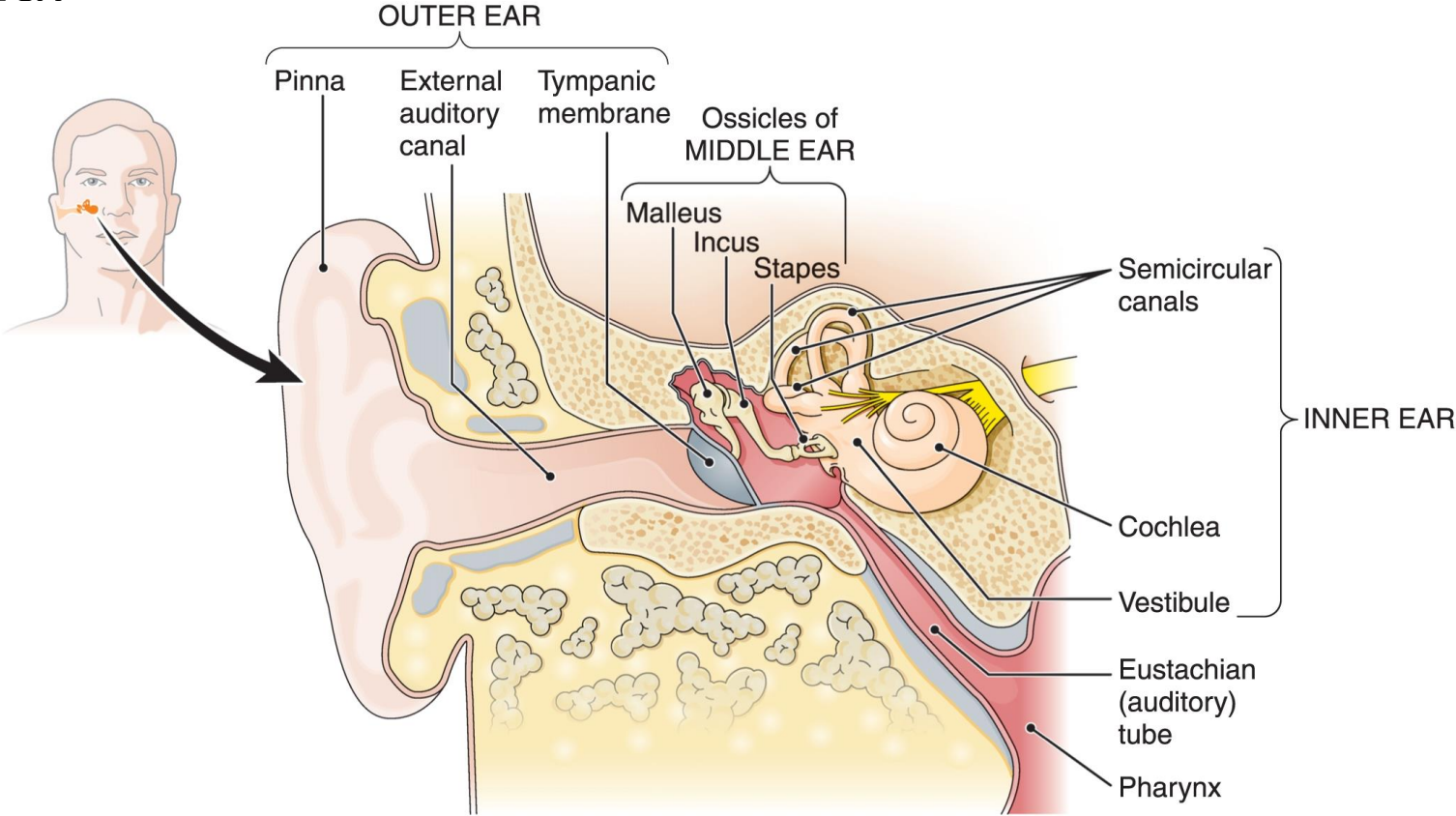
- A cloudiness or opacity of the lens
 - Injury
 - Disease
 - Age
 - Chemicals
- Treatment is surgery when vision is significantly impaired.

Practitioners: Who takes care of you?

- Ophthalmologist: Medical doctor who specializes in care of the eyes.
- Optometrist: College + 4 years training at optometry school. Examines eyes and prescribes corrective lenses
- Optician: one year optician program. Fills eyeglass prescriptions and dispenses eye wear

The Ear

- Ear



Hearing and Equilibrium

- **Sections of Ear**

- **Outer ear:** outer projection & canal. Funnel sound into the ear canal.
 - Cerumen (ear wax) protects middle ear from dust insects and some bacteria
- **Timpanic Membrane:** Sound waves vibrate
- **Middle ear:** 3 small bones & a eustachian tube (malleus, incus, stapes)
 - They transmit sound vibrations to the inner ear
 - Eustachian tube helps equalize pressure

Inner Ear

- **Labyrinth** (maze)
 - Sensory receptors for hearing and balance
- **Cochlea**: changes sound waves into electrical signals processed by the brain.

Disorders of the Ear

- Conductive Hearing Loss
 - Outer or middle ear cannot conduct sound waves to the inner ear
- Sensorineural Hearing Loss: nerve damage
- Presbycusis: hearing loss related to aging
- Anacusis: Total deafness

Earache and Inflammation

- Otalgia
- Otodynia
- Pain may be caused by trauma or infection
- Otitis media is the name of a middle ear inflammation
 - Treatment antibiotics (oral or ear drops)

More....

- Vertigo: dizziness/loss of balance
- Tinnitus: ringing in the ear or ears
- Meniere's Syndrome: chronic disease of inner ear.
 - Nausea
 - Dizziness
 - Temporary hearing loss

Surgical Treatments

- Otoplasty: repair of outer ear
- Mastoidectomy: removal of mastoid process
- Tympanectomy: removal of tympanic membrane
- Tympanoplasty: repair of tympanic membrane
- Stapedectomy: removal of stapes
- Labyrinthotomy: incision into the labyrinth

Taste (gustation)

- Receptors (taste buds):
 - Sweet
 - Salty
 - Sour
 - Bitter
- Designed to respond to chemical stimuli
- Important in stimulating appetite & warning of harmful substances
- Head injuries sometimes interfere with taste and smell.

Smell (Olfaction)

- Receptors located in epithelium of superior region of nasal cavity
- Sniffing required to bring odors upward into nose
- Designed to respond to chemical stimuli
- Head injuries can result in permanent damage to olfactory receptors.

Effects of Aging on Sensory System

- Deterioration of olfactory receptors: food less appealing
- Temperature control & perception of pain & pressure decrease
- Structures of eye change, leading to:
 - Decreased ability to focus on near objects
 - Poor night vision & depth perception
 - Cataracts
- Hearing loss or tinnitus (ringing in the ears)
- Loss of balance, coordination, fine movements, spatial orientation

Matching terms and definitions

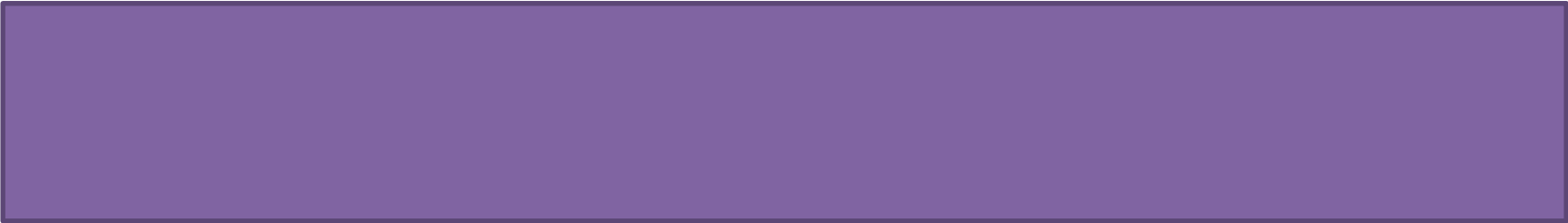
- Ophthalmology _____
 - Vitreous Humor _____
 - Iris _____
 - Cornea _____
 - Conjunctiva _____
- A. Transparent shield of tissue covering the iris
 - B. Lining of the eyelid
 - C. The colored part of the eye
 - D. Gelatinous liquid between lens and retina
 - E. Study of eye


Matching Terms and Definitions


- Audiologist ____
 - Cochlea ____
 - Tympanic Membrane _
 - Otitis Media ____
 - Labyrinth ____
 - Tympanoplasty ____
- A. The eardrum
 - B. Mazelike portion of the inner ear
 - C. Hearing specialist
 - D. Inflammation of the middle ear
 - E. Changes sound waves into electrical impulses
 - F. Repair of tympanic membrane

Test your memory...

- Farsightedness is called
- A. Myopia
- B. Hyperopia
- C. Presbyopia
- D. Both B and C

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- Hearing loss due to nerve damage is called?
 - A. Conductive loss
 - B. Sensorineural loss
 - C. Tympanitis
 - D. Tinnitus

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- The tube that goes from the middle ear to the nasopharynx is _____
 - A. Tympanic membrane
 - B. Eustachian tube
 - C. Cochlea
 - D. Esophagus Tube

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- What is an inflammation of the mastoid process?
 - A. Rhinoplasty
 - B. Mastoiditis
 - C. Conjunctivitis
 - D. Tinnitus