

LECTURES 23, 24: THE SPECIAL SENSES

A. Explain the structures (in appropriate order) involved in the pathway that leads to sight and sound.

CLASSIFICATION:

1) Define the four special senses (taste, smell, sight, hearing).

STRUCTURE/FUNCTION OF EYE

2) Identify and describe the anatomical and functional features of the three tunics of the eye, the lens, and the humors of the eye.

3) Describe the structure and function of the retina (pigmented and neural layers), photoreceptors (rods and cones), and bipolar and ganglion cells. Emphasize that photoreceptors are the only cells that detect light

INFORMATION FLOW FOR VISION:

4) Trace the pathway of light as it passes through the cornea, aqueous humor, lens, vitreous humor, ganglion cells, bipolar cells, and then is detected by the photoreceptors

5) Explain how light is focused for close vision in the context of hyperopia, myopia

6) Trace the pathway nerve impulses use to travel from the retina to the optic nerve

STRUCTURE/FUNCTION OF HEARING

7) Describe the features of the external ear (auricle, external acoustic meatus, and tympanic membrane) that accommodate the gathering of sound waves and transmission of sound waves to the middle ear

8) Describe the bony location of the middle ear; explain the function of the associated structures: the pharyngotympanic tube and the ossicles (malleus, incus, stapes), round window, and oval window

9) Explain the events occurring in the cochlea that participate in the mechanism of hearing

10) Describe the three chambers of the cochlea (scala vestibuli, scala media, scala tympani), and the fluids within these chambers (perilymph, endolymph)

11) Describe the structures and functions of the spiral organ of Corti (tectorial membrane, hair cell/stereocilia, basilar membrane, supporting cells)

INFORMATION FLOW FOR SOUND:

12) Trace the pathway of a sound wave, starting from the tympanic membrane, auditory ossicles (malleus, incus, stapes), oval window, perilymph (scala vestibuli, scala tympani), endolymph (scala media), until it dissipates at the round window

STRUCTURE/FUNCTION OF BALANCE:

13) Differentiate between the bony and membranous labyrinths of the inner ear

14) Categorize the structures of the bony labyrinth according to their locations and functions, including semicircular canals, vestibules, and cochlea

15) Categorize the structures of the membranous labyrinth according to their locations and functions, including semicircular ducts, utricles, saccules, and cochlear ducts

Optional:

16) Identify the causes and symptoms of motion sickness, Ménière's syndrome, and deafness

17) Distinguish between static equilibrium and linear acceleration

18) Explain how the maculae and otoliths contribute to the sense of static equilibrium

19) Describe the structures of the maculae (otolithic membrane, hair cells, stereocilia, and supporting cells)

20) Describe the structures of the crista ampullaris (cupula, hair cells, stereocilia, and supporting cells)

21) Define *taste*; describe taste bud histology and explain the gustatory pathway

22) Identify five basic taste sensations

23) Define *smell*; describe olfactory epithelium, explain how smell is relayed to the brain