Chapter 15

Special Senses System

Smell

Functions

Warn animals of enemies

Guides for food

Motivates the sex reflexes

Organs of Smell

Nose- Peripheral organ for smell

Olfactory epithelium- the organ of smell.

Nostrils- two nasal opening.

Just inside the nasal cavities is a layer of skin that has a ring of coarse hairs.

What are these for?

Features

The mucous membrane lining of the nose is connected to other lining. This makes the spread of infection easier. It is connected to the nasopharynx, the eustachian tube, the middle ear cavity, the sphenoid, ethmoid, frontal, and maxillary sinuses, the palatine bones, and the tear ducts.

The stimulation of the olfactory epithelium is transmitted to the olfactory bulb and then to the olfactory centers in the brain.

Human Odors

Flowery

Fruity

Spicy

Resinous

Burned

Putrid

Taste

Organs of taste are the taste buds.

Tastes

Sweet

Sour

Salt

Bitter

Eye

Parts

Conjunctiva- the soft, transparent mucous membrane that covers the inner surface of the eyelid

Transport medias- fill the optic cavity, The vitreous body (between the retina and lens) and the two aqueous humor chambers anterior to the lens.

Sclera- Opaque posterior portion of the fibrous coat of the eye. It is continuous with the cornea. This is the white of the eye. Small superficial blood vessels can been seen.

Cornea- Anterior- transport portion of the fibrous coat of the eyeball through which the light enters the eye. It is dome-like. It is devoid of blood vessels.

Choroid- Between the sclera and the retina. It is thin membrane with a vascular layer. It maintains the nutrition function of the retina.

Ciliary Body- an extension of the choroids, wedge-shaped flattened ring with muscles that attach the lens to it. The ciliary muscles change the shape of the lens.

Suspensory Ligament- 2nd structure of the anterior extension of the choroids.

Lens-Directly behind the iris and is enclosed in a capsule supported by the suspensory ligament. The lens focuses light rays on the retina.

Iris- Doughnut-shaped and is contains the central opening or pupil. The iris is composed of rings of muscles fibers, some which are circularly arranged. They contract and expand to regulate the size of the pupil and the amount of light admitted.

Macula lutea- area in the back of the retina that is the region of clearest vision with no rods, where the optic nerve enters

Retina- innermost of the three coats of the eyeball. It has cells called rods and cones.

Cones- less numerous and are adapted for bright light and color
Rods- are much more sensitive to low light.

Lacrimal Apparatus- tears moisten and clean the surfaces of the eye. They also contain antibacterial substances.

The blinking of the eye spreads the tears and directs them to the nasal corner where tears drain through the nasolactrimal duct. This opens just inside the nasal cavity.

The Mechanism of Vision

Light enters through the pupil and is focused by the lens, cornea, and aqueous humor. Refraction(focusing) is accomplished by four components. Stimulation of the rods and cones are transmitted through the optic nerve to the midbrain and occipital lobe.

Hearing

The ear is the organ for hearing but also for equilibrium.

Structures of the Ear

External Ear

Pinnea

External auditory meatus - a short passageway that leads to and penetrates the temporal bone.

Middle Ear

This is situated between the inner ear and the tympanic membrane.

It is a small air filled cavity lined with mucous membrane.

This communicate using the Eustachian tube with the pharynx.

This tube keep the air pressure on both sides of the tympanic membrane equal.

The pharynx end of the tube is closed unless swallowing or yawning occurs

There are three tiny bones in the middle ear. They are called the auditory ossicles. These bones transmit sound waves by the mechanical action of the bones to the inner ear.

Malleus (hammer)

Incus (anvil)

Stapes (stirrup)

Inner Ear

The inner begins at an oval shaped window in which the stapes presses on the outside.

The tube continues into a cochlea or spiral shape.

The cochlea has three canals.

Two are bony chambers filled with perilymph fluid.

The third canal is situated in the middle of the other two and is filled with endolymph and contains that organ of Corti

Mechanism of Hearing

1. Sounds waves enter the external ear and cause the tympanic membrane to vibrate.
2. This sets the three bones in the middle ear in motion.
3. The staples which is the last to vibrate strikes the oval window setting the fluid in the internal ear into motion.
4. The hair cells of the organ of Corti are stimulated by the endolymph.
5. The final interpretation of sound is made by the brain.

Sense of Equilibrium

In addition to the ear structures there are also three semicircular canals in the ear that lie at right angles to each other. There is also a utricle and saccule.

The utricle and saccule are sacs that are lined with sensitive hairs and contain otoliths. The otolith press on the hairs cells through gravity. The stimulation sends an impulse to the brain.

The semilunar canals are liquid filled that respond to movement. The three canals relate to the three spatial planes.

Touch

Skin is a receptor for the sensation for touch as well as heat, cold, and pain.

Touch is experienced because of free sensory nerve endings (dendrites) that are in the skin.

Pain is an unpleasant sensory experience from actual or potential damage to tissue from mechanical, thermal, or chemical stimuli.