NAME: HAMID ULLAH

ID : 14603

VIVA: ANATOMY

Q1.Write a note on the structure of Human Ear.

Ans: **STRUCTURE OF HUMAN EAR**

The ear is the organ of hearing and, in mammals, balance. In mammals, the ear is usually described as having three parts—the outer ear, the middle ear and the inner ear. The outer ear consists of the pinna and the ear canal. Since the outer ear is the only visible portion of the ear in most animals, the word "ear" often refers to the external part alone. The middle ear includes the tympanic cavity and the three ossicles. The inner ear sits in the bony labyrinth, and contains structures which are key to several senses: the semicircular canals, which enable balance and eye tracking when moving; the utricle and saccule, which enable balance when stationary; and the cochlea, which enables hearing. The ears of vertebrates are placed somewhat symmetrically on either side of the head an arrangement that aids sound localisation.

The ear develops from the first pharyngeal pouch and six small swellings that develop in the early embryo called otic placodes which are derived from ectoderm.

STRUCTURE

The human ear consists of three parts the **outer ear**, **middle ear** and **inner ear**. The ear canal of the outer ear is separated from the air filled

tympanic cavity of the middle ear by the eardrum. The middle ear contains the three small bones the ossicles-involved in the transmission of sound, and is connected to the throat at the nasopharynx, via the pharyngeal opening of the Eustachian tube. The inner ear contains the otolith organs the utricle and saccule and the semicircular canals belonging to the vestibular system, as well as the cochlea of the auditory system.

OUTER EAR

The outer ear is the external portion of the ear and includes the fleshy visible pinna (also called the auricle), the ear canal, and the outer layer of the eardrum (also called the tympanic membrane).

The pinna consists of the curving outer rim called the helix, the inner curved rim called the antihelix, and opens into the ear canal. The tragus protrudes and partially obscures the ear canal, as does the facing antitragus. The hollow region in front of the ear canal is called the concha. The ear canal stretches for about 1 inch (2.5 cm). The first part of the canal is surrounded by cartilage, while the second part near the eardrum is surrounded by bone. This bony part is known as the auditory bulla and is formed by the tympanic part of the temporal bone. The skin surrounding the ear canal contains ceruminous and sebaceous glands that produce protective ear wax. The ear canal ends at the external surface of the eardrum.

Two sets of muscles are associated with the outer ear: the intrinsic and extrinsic muscles. In some mammals, these muscles can adjust the direction of the pinna. In humans, these muscles have little or no effect. The ear muscles are supplied by the facial nerve, which also supplies sensation to the skin of the ear itself, as well as to the external ear cavity. The great auricular nerve, auricular nerve, auriculotemporal nerve, and

lesser and greater occipital nerves of the cervical plexus all supply sensation to parts of the outer ear and the surrounding skin.

MIDDLE EAR

The middle ear lies between the outer ear and the inner ear. It consists of an air-filled cavity called the tympanic cavity and includes the three ossicles and their attaching ligaments; the auditory tube; and the round and oval windows. The ossicles are three small bones that function together to receive amplify, and transmit the sound from the eardrum to the inner ear. The ossicles are the malleus (hammer) incus (anvil), and the stapes (stirrup). The stapes is the smallest named bone in the body. The middle ear also connects to the upper throat at the nasopharynx via the pharyngeal opening of the Eustachian tube.

The three ossicles transmit sound from the outer ear to the inner ear. The malleus receives vibrations from sound pressure on the eardrum, where it is connected at its longest part (the manubrium or handle) by a ligament. It transmits vibrations to the incus, which in turn transmits the vibrations to the small stapes bone. The wide base of the stapes rests on the oval window. As the stapes vibrates, vibrations are transmitted through the oval window, causing movement of fluid within the cochlea.

INNER EAR

The inner ear sits within the temporal bone in a complex cavity called the bony labyrinth. A central area known as the vestibule contains two small fluid-filled recesses, the utricle and saccule. These connect to the semicircular canals and the cochlea. There are three semicircular canals angled at right angles to each other which are responsible for dynamic balance. The cochlea is a spiral shell-shaped organ responsible for the sense of hearing. These structures together create the membranous labyrinth.

The bony labyrinth refers to the bony compartment which contains the membranous labyrinth, contained within the temporal bone. The inner ear structurally begins at the oval window, which receives vibrations from the incus of the middle ear. Vibrations are transmitted into the inner ear into a fluid called endolymph, which fills the membranous labyrinth. The endolymph is situated in two vestibules, the utricle and saccule, and eventually transmits to the cochlea, a spiral shaped structure. The cochlea consists of three fluid-filled spaces: the vestibular duct, the cochlear duct, and the tympanic duct. Hair cells responsible for transduction changing mechanical changes into electrical stimuli are present in the organ of Corti in the cochlea.

Q2.What do u know about Sub mandibular and Sub lingual glands?

Ans: **SUBMANDIBULAR GLAND**

The paired submandibular glands (historically known as sub maxillary glands) are major salivary glands located beneath the floor of the mouth. They each weigh about 15 grams and contribute some 60–67% of unstimulated saliva secretion; on stimulation their contribution decreases in proportion as the parotid secretion rises to 50%

STRUCTURE

Lying superior to the digastric muscles, each submandibular gland is divided into superficial and deep lobes, which are separated by the mylohyoid muscle.

- The superficial lobe comprises most of the gland, with the mylohyoid muscle runs under it
- The deep lobe is the smaller part

Secretions are delivered into the submandibular duct on the deep portion after which they hook around the posterior edge of the mylohyoid muscle and proceed on the superior surface laterally.

Blood supply

The gland receives its blood supply from the facial and lingual arteries. The gland is supplied by sublingual and submental arteries and drained by common facial and lingual veins.

Lymphatic drainage

The lymphatics from submandibular gland first drain into submandibular lymph nodes and subsequently into jugulo digastric lymph nodes.

Nerve supply

Their secretions, like the secretions of other salivary glands, are regulated directly by the parasympathetic nervous system and indirectly by the sympathetic nervous system.

- Parasympathetic innervation to the submandibular glands is provided by the superior salivatory nucleus via the chorda tympani, a branch of the facial nerve that becomes part of the trigeminal nerve's lingual nerve prior to synapsing on the submandibular ganglion. Increased parasympathetic activity promotes the secretion of saliva.
- The sympathetic nervous system regulates submandibular secretions through vasoconstriction of the arteries that supply it. Increased sympathetic activity reduces glandular blood flow, thereby decreasing the volume of fluid in salivary secretions, producing an enzyme rich mucous saliva.

SUBLINGUAL GLAND

The paired sublingual glands are major salivary glands in the mouth. They are the smallest, most diffuse, and the only unencapsulated major salivary glands. They provide only 3-5% of the total salivary volume. There are also two other types of salivary glands; they are submandibular and parotid glands.

STRUCTURE

They lie anterior and superior to the submandibular gland and inferior and lateral to the tongue, as well as beneath the mucous membrane of the floor of the mouth. They are bounded laterally by the bone of the mandible and infer laterally by the mylohyoid muscle. The glands can be felt behind each mandibular canine. Placing one index finger within the mouth and the fingertips of the opposite hand outside it, the compressed gland is manually palpated between the inner and outer fingers.

Blood supply

The gland receives its blood supply from the sublingual and submental arteries. Lymph from the sublingual salivary gland drains into the submandibular lymph nodes.

Nerve supply

The chorda tympani nerve (from the facial nerve via the submandibular ganglion) is secret motor and provides parasympathetic supply to the sublingual glands. The path of the nerve is as follows: junction between pons and medulla, through internal acoustic meatus and facial canal to chorda tympani, through middle ear cavity, out petro tympanic fissure to join the lingual nerve, travels with lingual nerve to synapse at the submandibular ganglion then postganglionic fibers travels to the sublingual gland.

Q3.Why stone formation is more common in the sub mandibular gland than other salivary glands?

ANS: Stone formation occurs most commonly in the submandibular gland for several reasons. The concentration of calcium in saliva produced by the submandibular gland is twice that of the saliva produced by the parotid gland. The submandibular gland saliva is also relatively alkaline and mucous. The submandibular duct (Wharton's duct) is long meaning that saliva secretions must travel further before being discharged into the mouth. The duct possesses two bends, the first at the posterior border of the mylohyoid muscle and the second near the duct orifice. The flow of saliva from the submandibular gland is often against gravity due to variations in the location of the duct orifice. The orifice itself is smaller than that of the parotid. These factors all promote slowing and stasis of saliva in the submandibular duct, making the formation of an obstruction with subsequent calcification more likely.

Salivary calculi sometimes are associated with other salivary diseases, e.g. sialoliths occur in two thirds of cases of chronic sialadenitis, although obstructive sialadenitis is often a consequence of sialolithiasis. Gout may also cause salivary stones, although in this case they are composed of uric acid crystals rather than the normal composition of salivary stones.

Q4.What do u know about the vertebra's of the human skeleton. Explain in details.

Ans: **VERTEBRAE:**

Vertebrae are the 33 individual bones that interlock with each other to form the spinal column. The vertebrae are numbered and divided into regions: cervical, thoracic, lumbar, sacrum, and coccyx (Fig. 2). Only

the top 24 bones are moveable; the vertebrae of the sacrum and coccyx are fused. The vertebrae in each region have unique features that help them perform their main functions.

Cervical (neck) - the main function of the cervical spine is to support the weight of the head (about 10 pounds). The seven cervical vertebrae are numbered C1 to C7. The neck has the greatest range of motion because of two specialized vertebrae that connect to the skull. The first vertebra (C1) is the ring-shaped atlas that connects directly to the skull. This joint allows for the nodding or "yes" motion of the head. The second vertebra (C2) is the peg-shaped axis, which has a projection called the odontoid, that the atlas pivots around. This joint allows for the side-to-side or "no" motion of the head.

Thoracic (mid back) - the main function of the thoracic spine is to hold the rib cage and protect the heart and lungs. The twelve thoracic vertebrae are numbered T1 to T12. The range of motion in the thoracic spine is limited.

Lumbar (low back) - the main function of the lumbar spine is to bear the weight of the body. The five lumbar vertebrae are numbered L1 to L5. These vertebrae are much larger in size to absorb the stress of lifting and carrying heavy objects.

Sacrum - the main function of the sacrum is to connect the spine to the hip bones (iliac). There are five sacral vertebrae, which are fused together. Together with the iliac bones, they form a ring called the pelvic girdle.

Coccyx region - the four fused bones of the coccyx or tailbone provide attachment for ligaments and muscles of the pelvic floor.

While vertebrae have unique regional features, every vertebra has three functional parts.

- A drum-shaped body designed to bear weight and withstand compression (purple)
- An arch-shaped bone that protects the spinal cord (green)
- Star-shaped processes designed as outriggers for muscle attachment (tan)

Q5. Write about the importance of Radiology in medical field.

Ans: IMPORTANCE OF RADIOLOGY:

Radiology, also called diagnostic imaging, is a series of different tests that take pictures or images of various parts of the body. Many of these tests are unique in that they allow doctors to see inside the body. A number of different imaging exams can be used to provide this view, including X-ray, MRI, ultrasound, CT scan, mammography, nuclear medicine, fluoroscopy, bone mineral densitometry and PET scan.

Radiology's role is central to disease management, with a wide choice of tools and techniques available for the detection, staging and treatment. Diagnostic imaging provides detailed information about structural or disease related changes. Early diagnosis saves lives. Without diagnosis there can be no treatment, there can be no cure.

“Radiologists save lives. Image interpretation is the most visible contribution of radiologists. The population should be informed about the importance of diagnostic imaging.”

In Ontario, every hour of every day, an average of eight people will be diagnosed with some type of cancer and three will die from cancer. Doctors today cannot manage patients without diagnostic imaging. For many diseases, your family doctor and emergency care physicians rely on radiology test results to determine your diagnosis and the course of your treatment.

Radiologists are the physicians who specialize in interpreting the results of these imaging exams. Family physicians and other specialists turn to radiologists for consultation on the safest and most effective exam, and what the results mean for the patient and the treatment options. The radiologist is responsible for interpreting the images acquired through a range of techniques and then communicating their analysis is to the patient’s physician.