Unit - IV

(i)

Peripheral Nervous System

Nervous System:- The network of nerve cells & fibers which transmits nerve impulses between parts of the body.

The nervous system is very important in helping to maintain the homeostasis (balance) of human body.

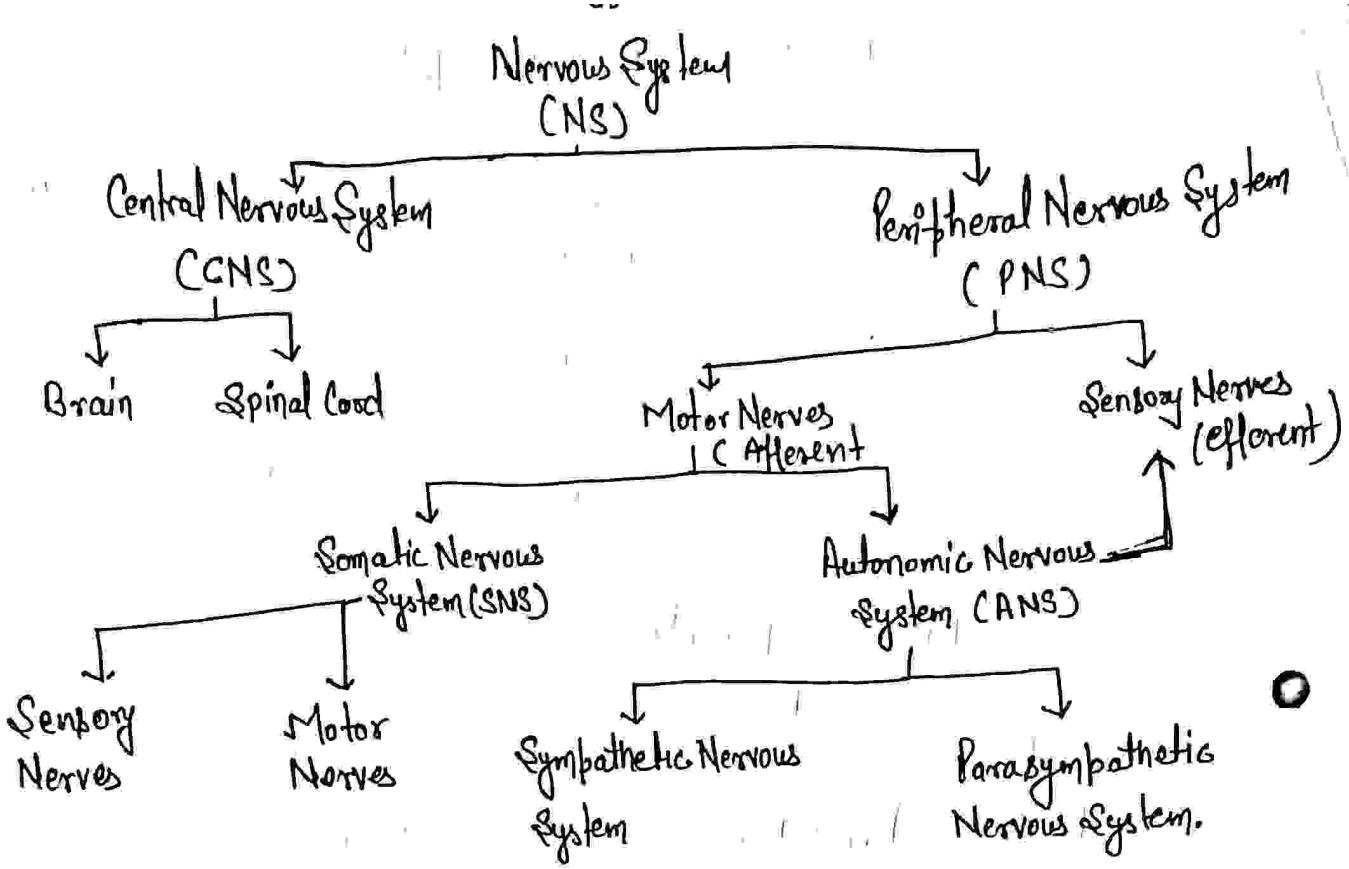
All body activities, volentary & involuntary are controlled by the nervous system.

Two Major Components

- Central Nervous System (CNS)
  - Made up of the brain & spinal Cord.
- Peripheral Nervous System (PNS)
  - Made up of all nerve that leads into & out of the CNS

Peripheral Nervous System :-

- The PNS Consists of the nerves and ganglia outside the brain & Spinal cord. The main function of PNS is to connect the CNS to the limbs & organs, essentially serving as a relay between the brain & spinal Cord & the rest to the body
- These nerves extend from the central nervous system to the outermost area of the body.
- The nervous system is divided into the two type i.e CNS & PNS
- PNS further divided into different parts.



1) Somatic Nervous System :- (SNS) : Greek words — Soma — which means "body"

- The somatic nervous system is voluntary.
- The somatic nervous system consists of sensory neurons & motor neurons.

Sensory Neurons :- The convey information from somatic receptors in the head body wall, limbs and from receptors of special senses of vision, hearing taste & smell to the CNS.

Motor Neurons :- They conduct impulses from the CNS to skeletal muscles

② Autonomic Nervous System (ANS)

- ANS is involuntary. The ANS consists of Sympathetic & Parasympathetic

Sensory Neurons :- They convey information from autonomic sensory receptors located primarily in visceral organs such as stomach & lungs to the CNS.

Motor Neurons :- They conduct nerve impulses from the CNS to smooth muscles Cardiac muscles and glands.

(ii)

Somatic Nervous System:- (8)

✓ It is the part of PNS system responsible for carrying sensory & motor information to & from the CNS.

- SNS name derived from greek word SOMA which mean 'body'.
- It is responsible for transmitting sensory information aswellas for voluntary movement.
- SNS contains two major types of Neurons:-
  1. Sensory Neurons (Afferent Neurons)
  2. Motor Neurons (Efferent Neurons)

- 1. Sensory Neurons (Afferent Neurons): It carry information from the neurons to CNS.
  2. Motor Neurons (Efferent Neurons). It carry information from the brain & spinal cord to muscle fibers throughout the body.
  - It carry information from CNS to other organs.

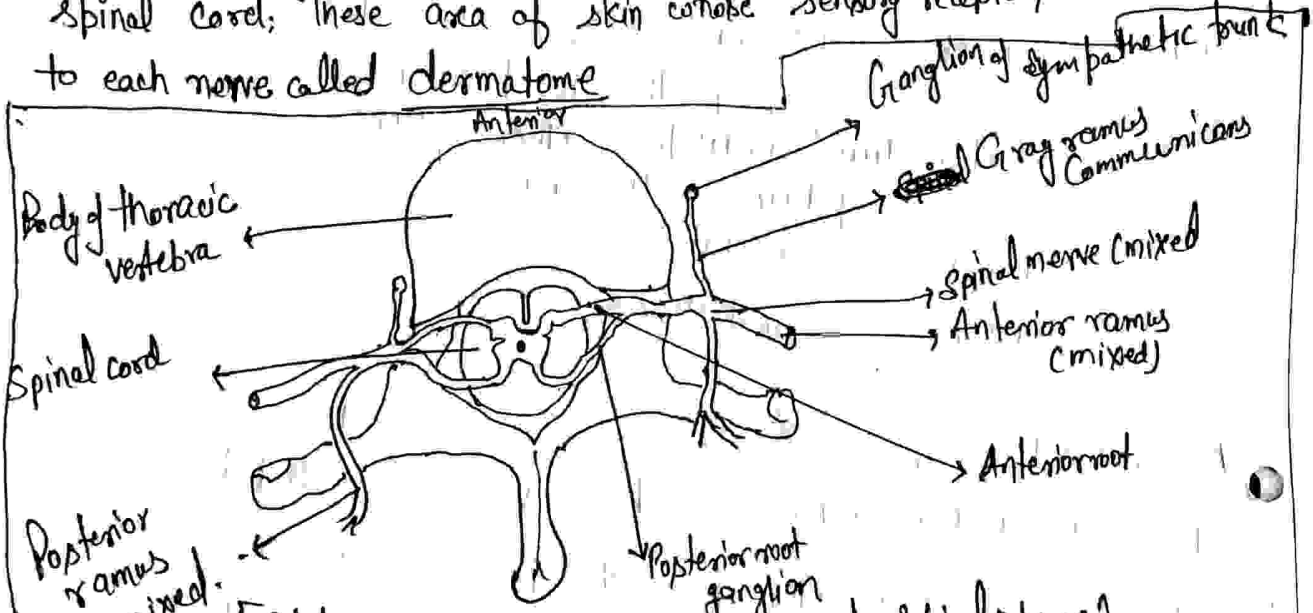
Sensory-Somatic Nervous Systems:- S-SNS Consists of
- 12 pairs of Cranial Nerves
- 31 pairs of Spinal Nerves.

- (A) Spinal Nerves:- Spinal nerves or nerve roots, branch off the spinal & pass out through a hole in each of vertebrae called the Foramen. These nerve carry information from the spinal cord to the rest of the body & from the body back up to the brain. There are 31 pairs of spinal nerves:-
  - 8 Cervical
  - 12 Thoracic
  - 5. lumbar
  - 5 Sacral
  - 1 Coccygeal

Atypical spinal nerves has two (IV) connections to the cords:—
- Posterior
- Anterior.

Anterior Nerve Root:- It consists of nerve fibres which the axons of the nerve cells in the anterior column of grey matter of spinal cord. & In the thoracic & lumbar regions sympathetic nerve fibres which are the axons of cells in the lateral columns of grey matter.

Posterior Nerve Root:- It consists of sensory nerve fibres. Just outside the spinal cord there is spinal ganglion, consisting of a little cluster of cell bodies.
- Sensory nerve fibres pass through these ganglia before entering the spinal cord; These area of skin whose sensory receptors contribute to each nerve called dermatome



[Relationship b/w sympathetic & mixed Spinal Nerve]

Nerve Plexuses: At certain regions of the spinal cord some individual nerve trunks unit to form Plexuses.

There are five large Plexuses of mixed nerves formed on each side of vertebral column.
- Cervical plexuses
- Brachial plexuses
- Lumber plexuses
- Sacral plexuses
- Coccygeal plexuses.

Scanned by CamScanner

(v) (9)

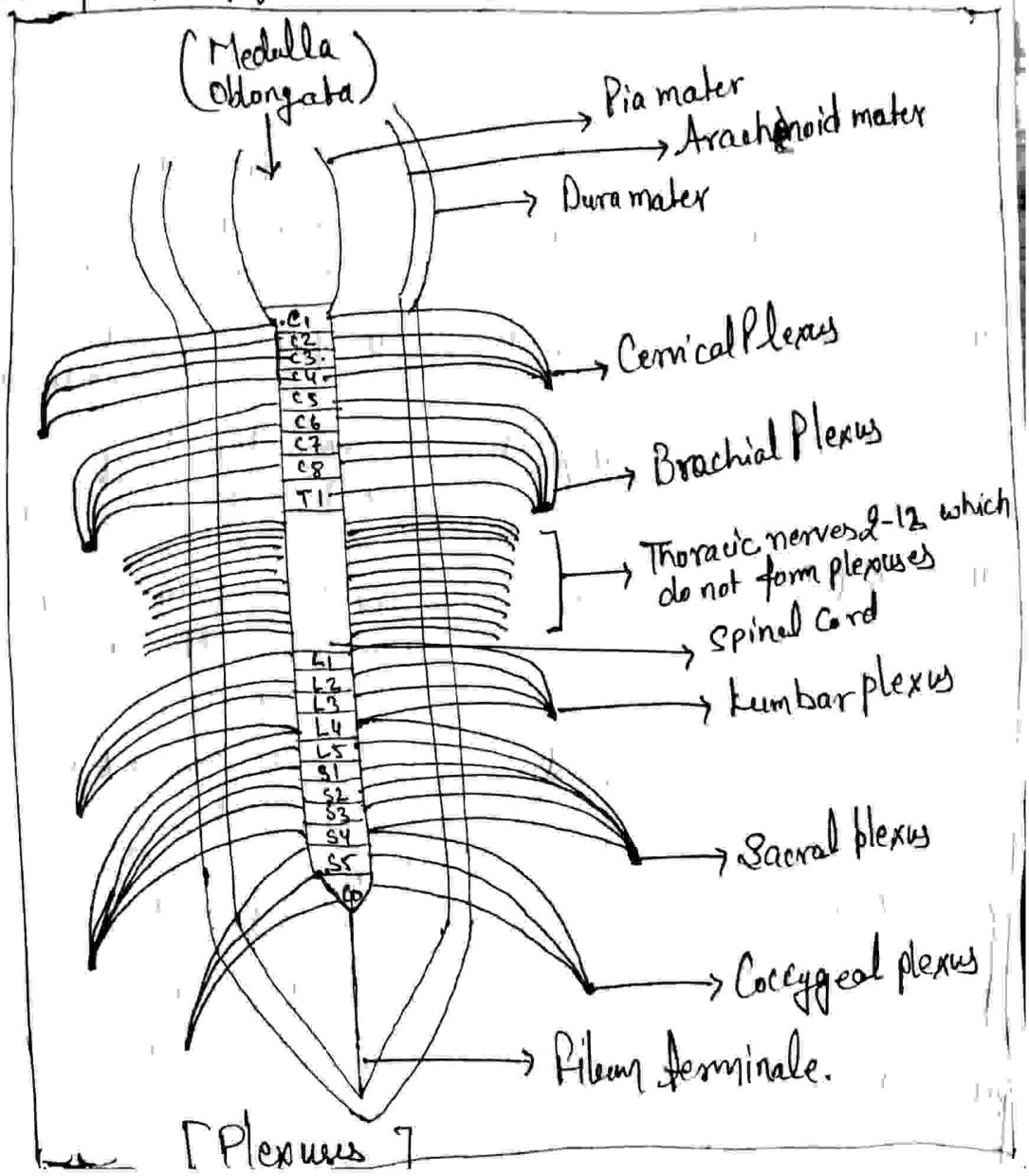
i) Cervical Plexuses:- It is formed by the anterior rami of the first four nerves.

ii) Brachial Plexuses:- The anterior rami of the lower four cervical nerves & a large part of the first thoracic nerve from the brachial plexus.

iii) Sacral plexuses:- It is formed by the anterior rami of the lumbosacral trunk & the 1st, 2nd & 3rd sacral nerves.

iv) Lumbar plexuses:- It is formed by the anterior rami of the first three & part of four lumbar nerves.

v) Coccygeal plexuses:- The coccygeal plexus is a very small plexus formed by part of the fourth & fifth & the coccygeal nerves.



[Plexuses]

Scanned by CamScanner

(VI)

(B) Cranial Nerves:-

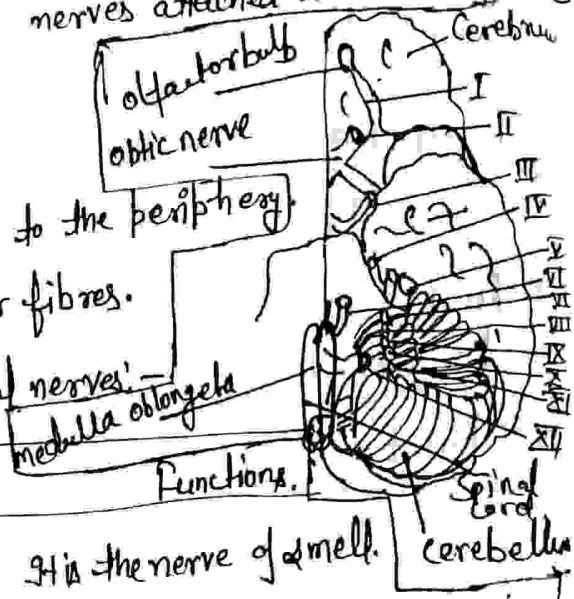
They are 12 pairs of nerves attached to the brain.

These may be sensory, motor or mixed.

Sensory:- Carrying impulse to the brain.

Motor :- Carrying impulses from the brain to the periphery.

Mixed :- Containing both sensory and motor fibres.



The following are the 12 pairs of Cranial nerves:-

S.N.	Name of Nerve	Nature	Functions.
I	Olfactory	Sensory	It is the nerve of smell.
II	Optic	Sensory	It is nerve of vision.
III	Oculomotor	Motor	Supplies the muscles of eyeball or eye movements.
IV	Trochlear	Motor	Supplies the muscles of eye ball.
V	Trigeminal	Mixed.	Sensory fibres to face & forehead. Motor fibres to muscles of mastication.
VI	Abducense	Motor	It supplies the muscles of eye ball or muscle conditioning.
VII	Facial	Sensory/Motor	Sensory for taste. Motor for facial muscles & salivary gland.
VIII	Auditory	Sensory	Consists of two parts i.e Cochleare nerve- the nerve of hearing. Vastibular: Nerve of equilibrium & balance.
IX	Glossopharyngeal	mixed.	Sensory to tongue & motor to pharyngeal muscles.
X	Vagus	mixed.	Main nerves of PNS, speech, heart muscles S.M & two gland.
XI	Accessory	motor	Swallowing, moving head, shoulder
XII	Hypoglossal	Motor	It supplies the muscles tounge

Scanned by CamScanner

Reflex Action — at last page (VII)

(2) Autonomic Nervous System: It is the part of peripheral nervous system responsible for regulating involuntary body functions such as blood flow, heart beat digestion & breathing. It controls tissues which are not under voluntary control. (1)

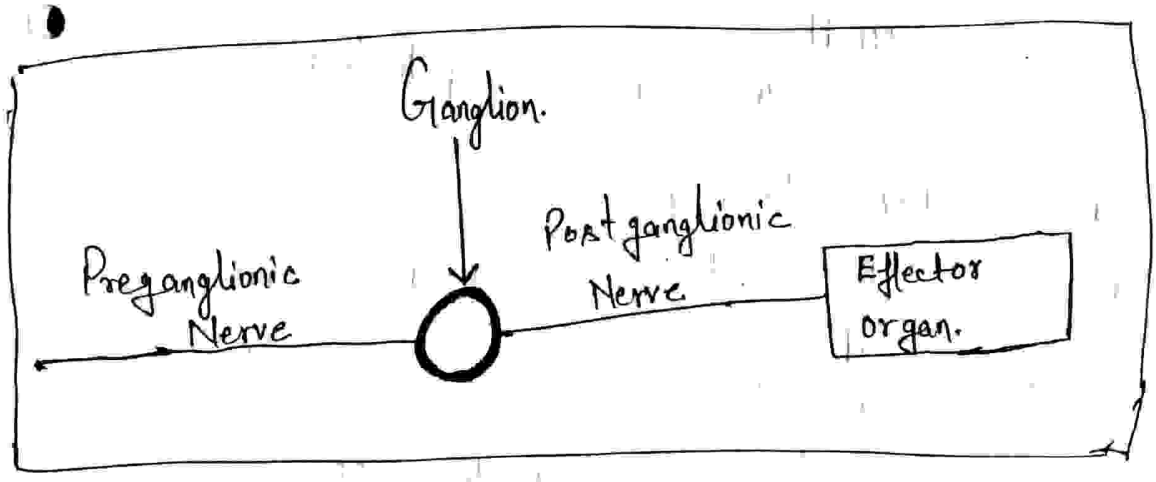
Autonomic Nervous System.

Sympathetic
(Thoracolumbar out flow)
- Regulates the flight-or-fight responses.

Parasympathetic
(Craniosacral out flow)
- Helps to maintain normal body functions & conserves physical resources.

Both the sympathetic & parasympathetic essentially consist of:—

i) A Preganglionic Nerve
ii) A Ganglion.
iii) A postganglionic Nerve.
iv) An effector organ which the nerve supplies.



Scanned by CamScanner

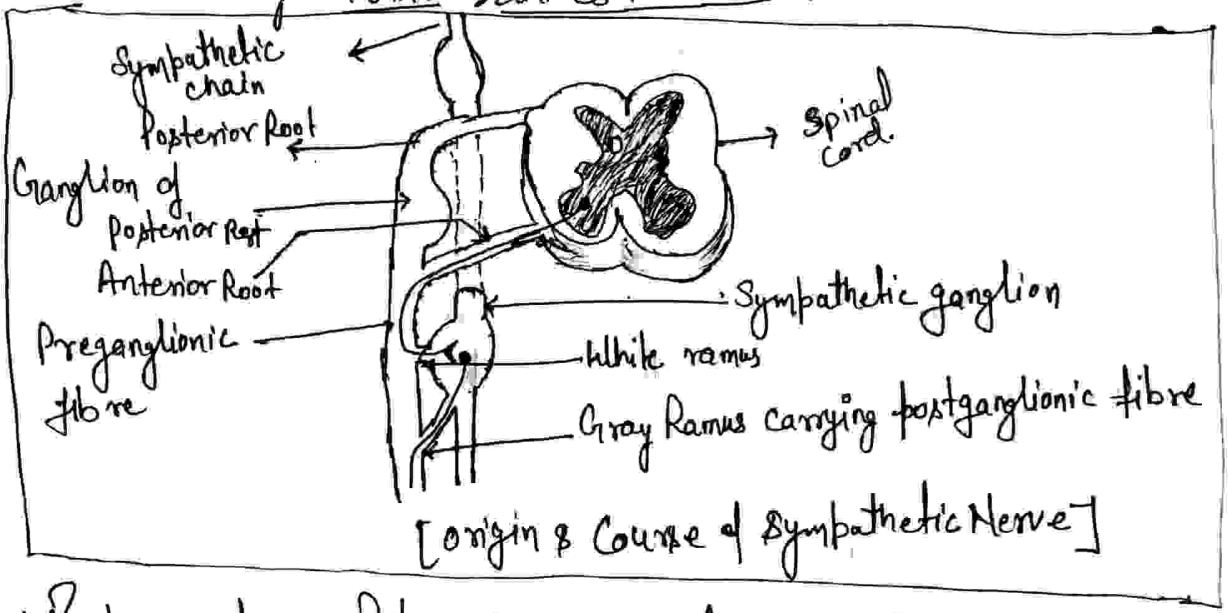
(VIII)

(A) Sympathetic Nervous System :-

- The sympathetic nervous system is located to the sympathetic chain, which connects to skin, blood vessels & organ in the body cavity
- The sympathetic chain is located on both sides of the spine & consists of ganglias.

⇒ Preganglionic Fibres :- The preganglioni fibres of sympathetic nervous system arise from the lateral horn cells of the spinal cord.

- They pass through anterior nerve roots of spinal nerves & Run for a short distance in the spinal nerve and from the spinal nerves, they are communicated to ganglia of sympathetic chain through White rami communicates.



[origin & Course of Sympathetic Nerve]

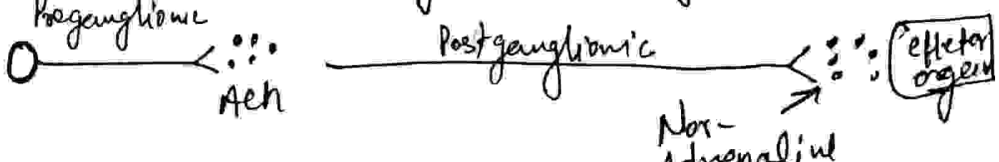
⇒ Post ganglionic Fiberes :- They are form gray Rami communicates which aries from the ganglionic of sympatheic chain.

↓

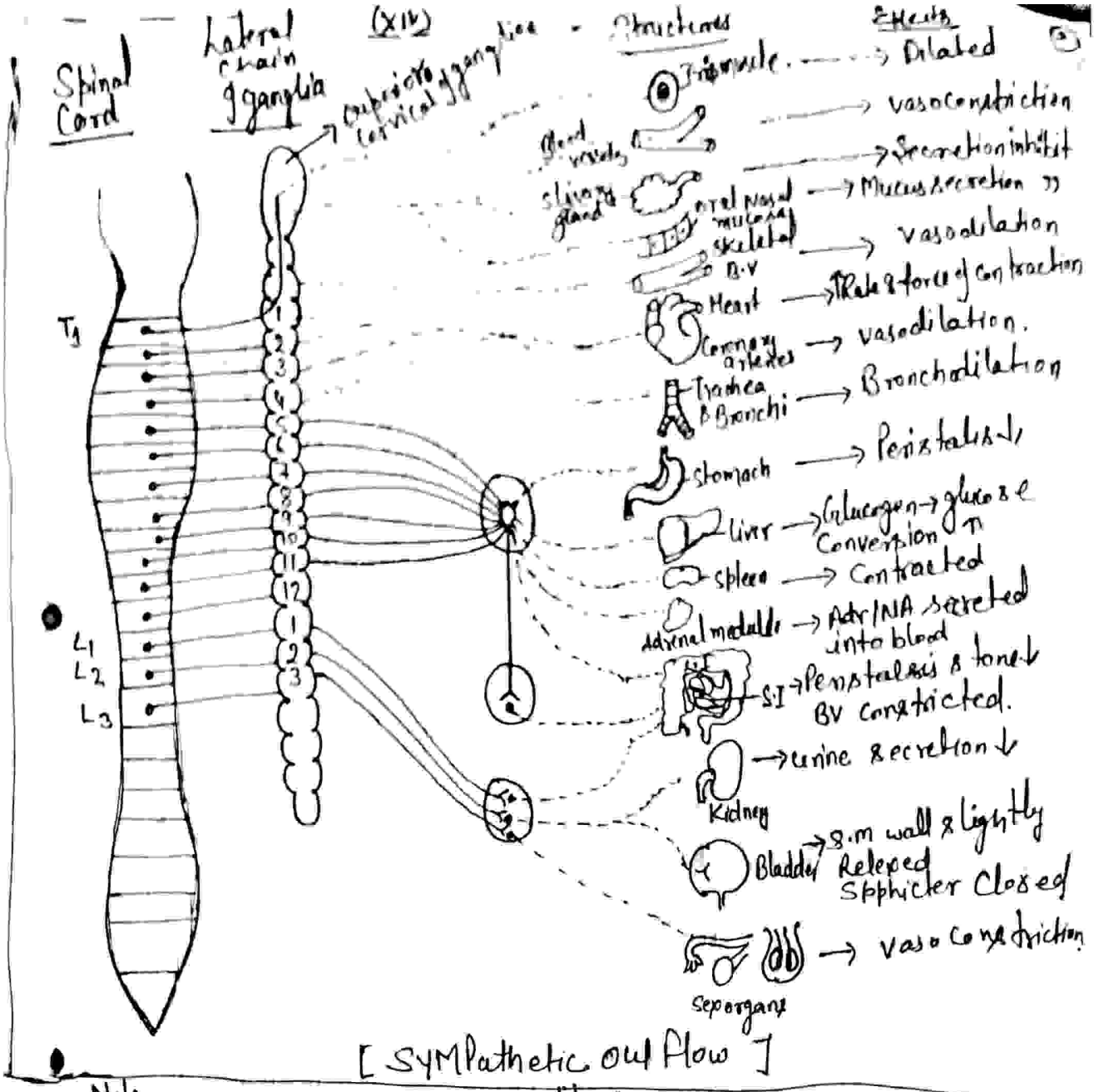
Enter into spinal Nerve of the same level

↓

Reach the organ which they supply



Scanned by CamScanner



Note

i) Solid lines — Preganglionic fibres
ii) Broken lines Postganglionic fibres.

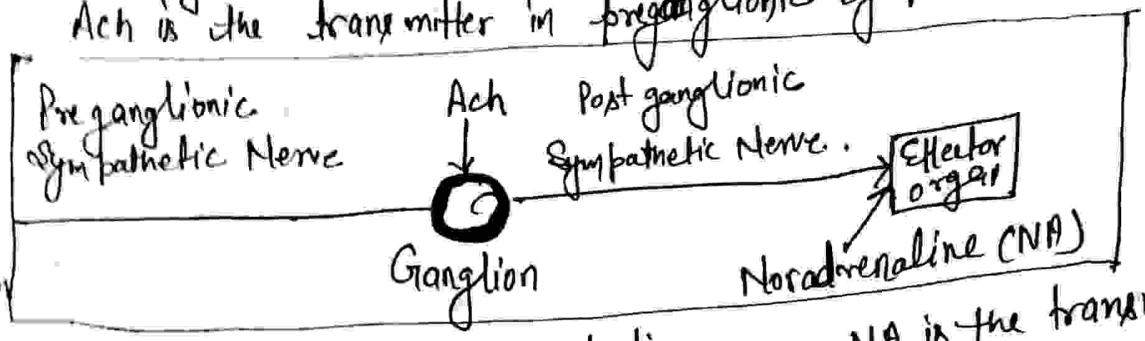
- Stimulated the heart beat
- Raises Blood pressure
- Dilates the pupils
- Dilates the bronchi
- Stimulates glycogenolysis - the conversion of liver glycogen-glucose.
- Inhibit peristalasis in the GI tract
- Inhibit contraction of the bladder & rectum.
- Urine secretion will increase
- Blood vessels constricted.

Scanned by CamScanner

(x)

Chemical Transmitters

- The transmitter in preganglionic Sympathetic nerve is Acetylcholine (Ach) which librated at the ganglion. Ach is the transmitter in preganglionic sympathetic nerve also.



- But in post ganglionic sympathetic nerves, NA is the transmitter It is liberated at the postganglionic sympathetic nerve ending.

(B) Parasympathetic Nervous System.

— The parasympathetic nervous system is the branch of the autonomic nervous system (ANS) responsible for the body's ability to recuperate & return to a balanced state after experiencing pain or stress.

⇒ Preganglionic fibers :— The preganglionic fibres of parasympathetic nerves arise from cells present in — Midbrain, Medulla, & Sacral portion of Spinal cord.

- From midbrain the fibres emerge through occulomotor nerve
- From the medulla, they emerge through facial glassopharyngeal & vagus nerve.
- From the sacral portion of spinal cord, they arise from anterior column of 2nd, 3rd & 4th lumber segments

↓

Then pass through anterior roots of the Corresponding spinal nerves.

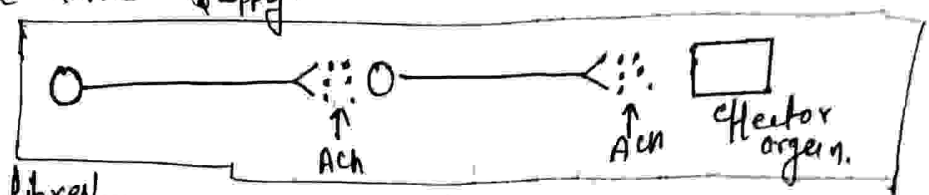
↓

All these nerves end in a ganglion

Scanned by CamScanner

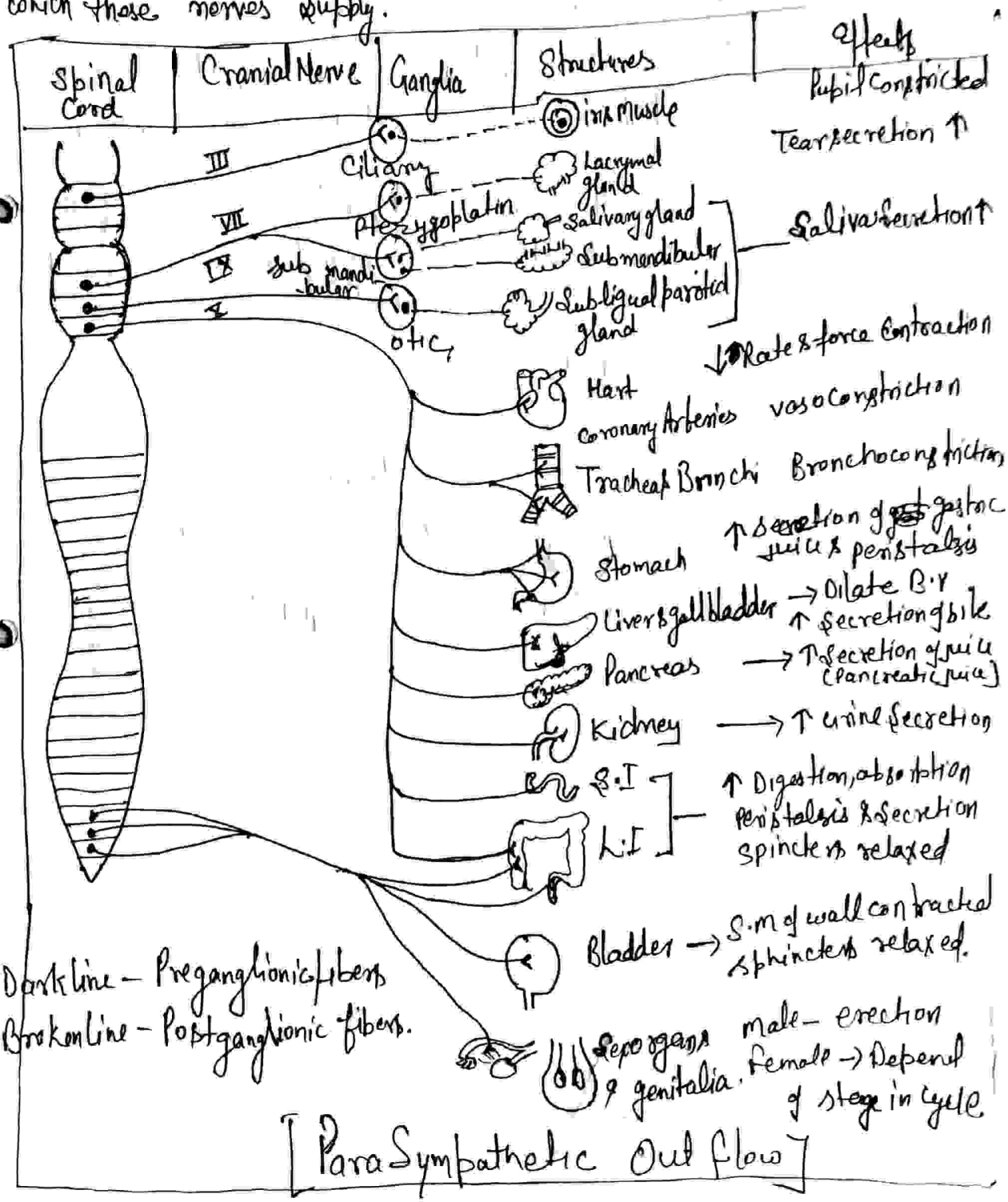
(XI)

These parasympathetic ganglia are very near to the structure which these nerves supply.



Postganglionic fibres!-

They arise from the ganglia & then reach the structures which these nerves supply.



* Dark line - Preganglionic fibers
Broken line - Postganglionic fibers.

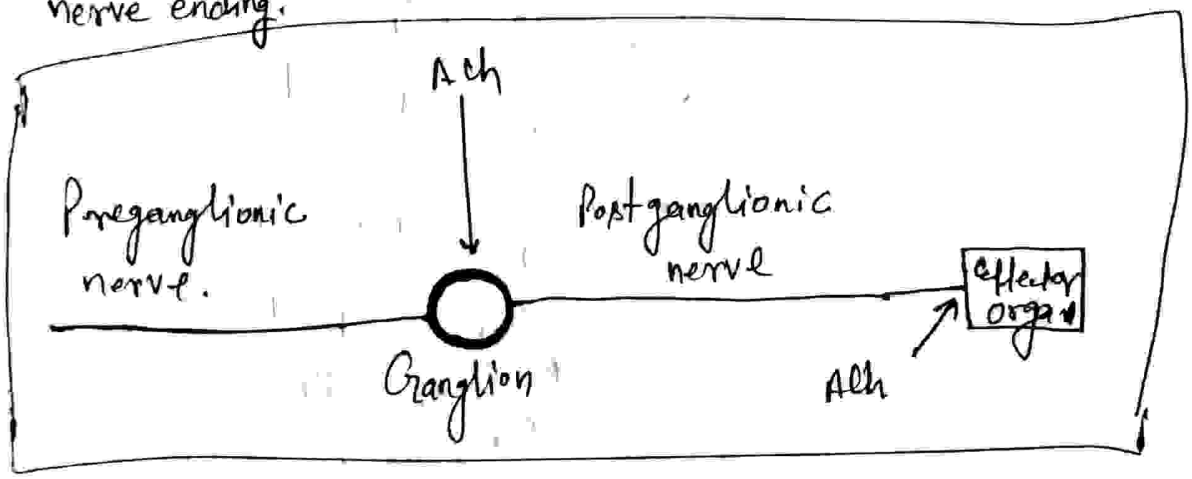
[Para Sympathetic Out flow]

Scanned by CamScanner

- Slowing down of the heart beat
- lowering of blood pressure
- Constriction of the pupiles
- ↑ blood flow to the skin & viscera
- Paristalsis of the GI tract.

Chemical Transmitters:-

- The transmitter in preganglionic parasympathetic nerve is acetyl choline (ACh) which liberated at the ganglion.
- Ach is the transmitter in postganglionic parasympathetic nerve. It liberated at the postganglionic parasympathetic nerve ending.



Scanned by CamScanner

(XIII) Difference Between SNS & PsNS

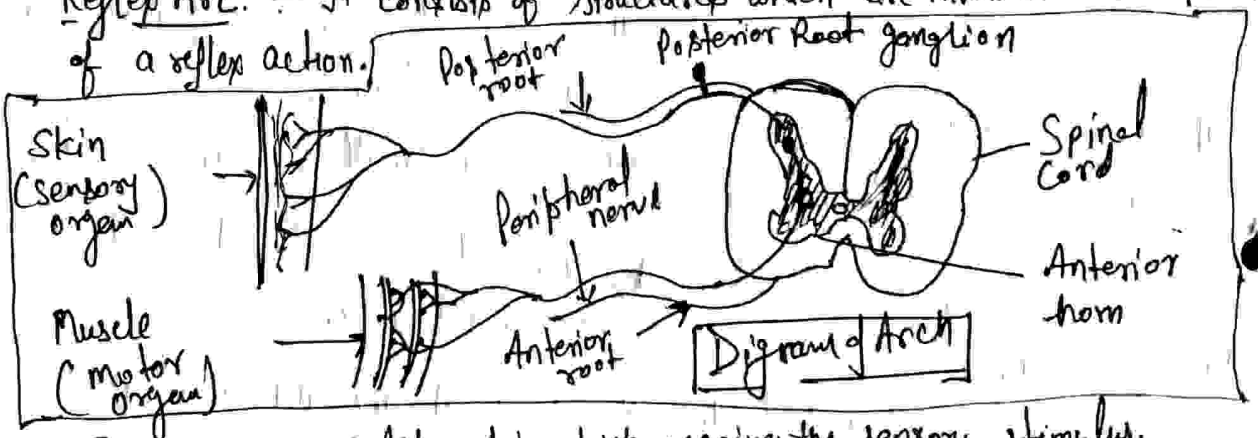
Sympathetic NS	Parasympathetic NS
i) Sympathetic nervous system is part of ANS. that serves to accelerate the heart rate, constrict blood vessels and raise blood pressure.	i) Parasympathetic nervous system is part of ANS that slow the heart rate, increase intestinal & glandular activity, & relax the sphincter muscles
ii) Originates from cranial, thoracic & lumbar regions of the CNS.	ii) Originates from cranial & sacral regions of CNS
iii) Prepares the body for an intense physiological activity.	iii) Relaxes the body by inhibiting high energy functions.
iv) Action is a quick response.	iv) Action is slow response.
v) Ganglion are found close to CNS but away from effector.	v) Ganglion found close to effector but away from CNS.
vi) Pre-ganglionic fibers are short & Post-ganglionic fibers are long	vi) Pre-ganglionic fibers are long and post ganglionic fibers short.
vii) A large number of post-ganglionic fibers are found.	vii) A small number of pos-ganglionic fibers are found.
viii) Covers a large area in the body.	viii) Covers small area in the body.
ix) Generates a diffused effect at its target area.	ix) Generates a localized effect at its target area.
x) Noradrenaline is released at the effector.	x) Acetylcholine (Ach) is released at the effector.
xi) Generates an excitatory homeostatic effect.	xi) Generates an inhibitory homeostatic effect.
xii) Increases Heart beat, Blood level & metabolic Rate.	xii) Decreases heartbeat, blood level & metabolic Rate.
xiii) Dilates the pupil of the eye.	xiii) Stimulates the pupil of the eye.
xiv) Inhibits the saliva secretion.	xiv) Stimulate the secretion of saliva
xv) Dilates the bronchial tubules.	xv) Constricts the bronchial tubules

Scanned by CamScanner

xvi) Release Adrenaline from the adrenaline glands.	xvi) No action on adrenalin gland.
xvii) Increase the activity of the digestive system.	xvii) Decrease the activity of the digestive system.
xviii) Increase the rate of glycogen breakdown	xviii) Decrease/No effect on the glycogen breakdown.
xix) Decrease the urinary out put	xix) Increases the urinary output.
xx) Contracts the rectum.	xx) Relex the rectum

Reflex Action :- Reflex Action occurs independent of it is concerened with involuntary movements. It is a defence mechanism manifesting as a quick & automatic motor response for sensory stimulus.

Reflex Arc. :- It consists of structures which are involved in the production of a reflex action.



→ Sensory Organ :- like skin which receives the sensory stimulus.

→ Sensory nerve - which arises from the sensory organ, through a peripheral nerve, it terminates at the posterior nerve root of spinal cord.

→ Motor nerve which Commences from the anterior horn cell of spinal cord The nerve transmits the impulses to the motor organ such as muscles.

Importance :- Impulse of reflex action are carried only to the spinal cord & not to the motor cortex of brain. The impulses from the spinal Cord are conveyed to the motor organ. So the response is quick & immediate.

Special Senses ①

• Special sense organs are characterised by large & complex organs each with a unique function.
• Sensory organs have special receptors that allow us to smell, taste, see hear and maintain equilibrium or balance. Information conveyed from these receptors to the CNS is used to help to maintain homeostasis.

Organ of Special Senses are:-

- Eye
- Ear
- Nose
- Tongue.

① Eye

Eye is a sensory organ of vision which is situated in the orbital cavity of skull. It contains the eye ball which is surrounded & supported by a number of accessory structures.

Accessory Structure of Eye:-

(A) Eye brows:- These are hairy & arches of thick skin over the eyes They protect eyes from sweat, dust, & rain drop etc.

(B) Eyelids:- They are the upper & lower eyelids which protect eye. The upper eyelids is larger & more mobile. It is raised by levator palpebrae muscle.

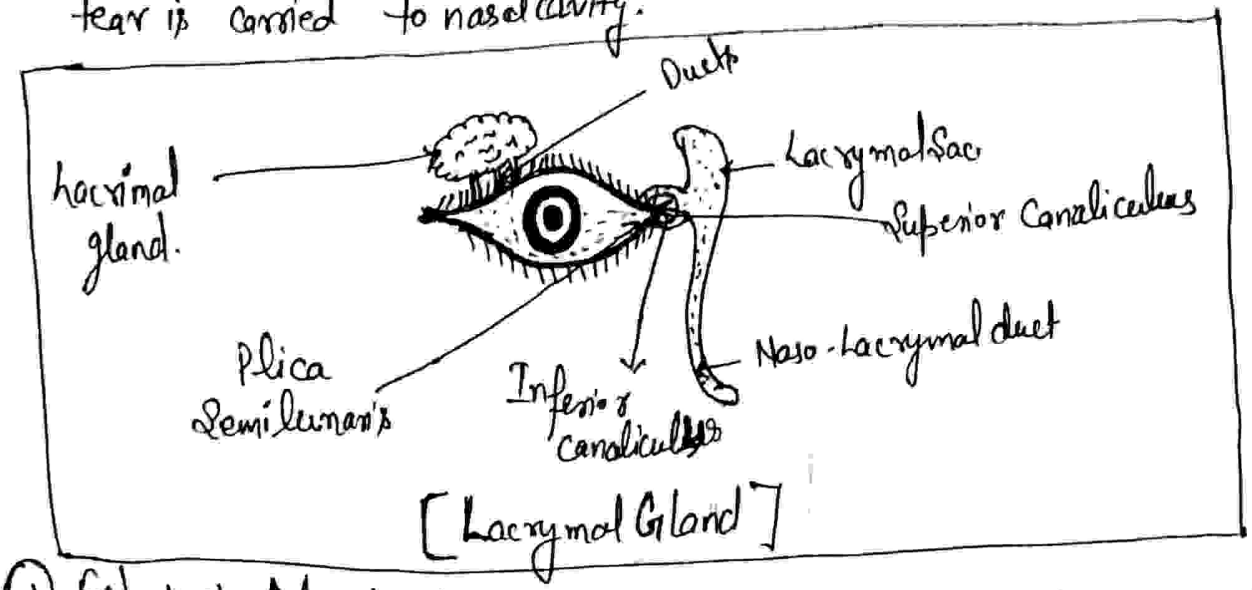
• Both upper & lower eyelids protect the eyes from excessive sunlight & foreign objects & spread lubricating secretions around the eye ball.

Scanned by CamScanner

(c)

(c) Lacrimal apparatus / glands :-

It is concerned with the production of tear & it consists of
- Lacrimal gland - Situated in the lateral & upper eyelid
- 1 Lacrimal Duct, 1 Lacrimal sac & 1 nasolacrimal duct through which tear is carried to nasal cavity.



[Lacrymal Gland]

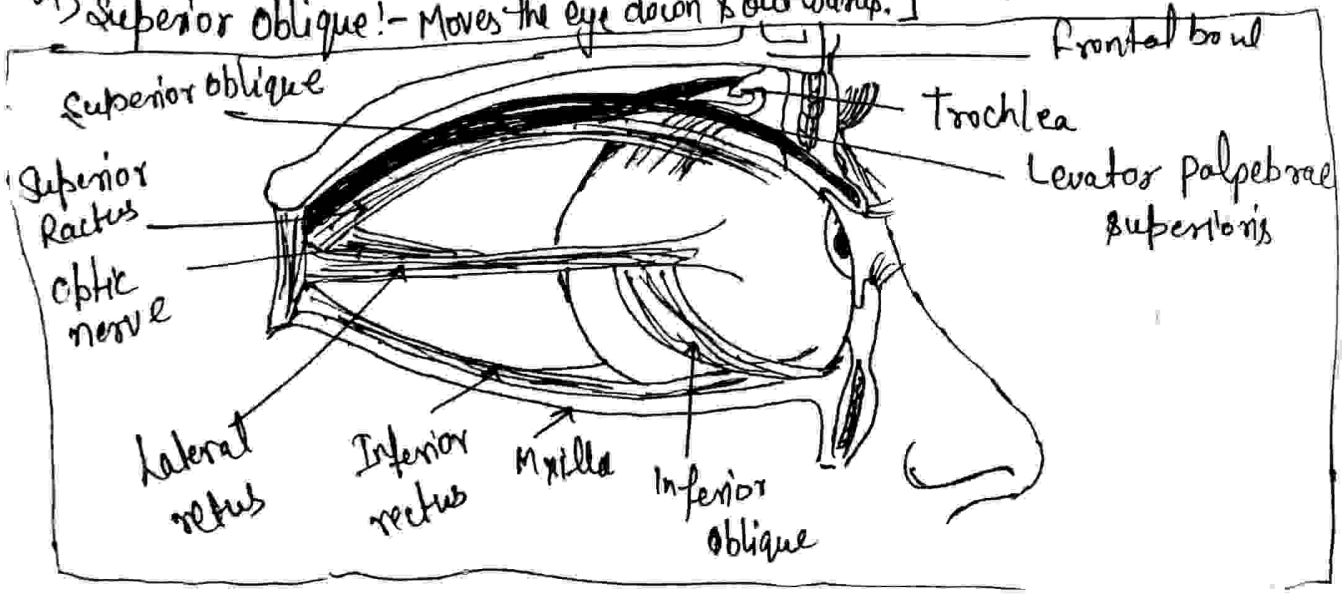
(d) Extrinsic Muscles of Eye :- The eye ball is moved by six muscles These muscles are arise from the posterior bony wall of orbit inserted in to the sclera.

i) Superior rectus :- Moves the eye upwards.
ii) Inferior rectus :- Moves the eye downwards,
iii) Medial rectus : Moves the eye Inwards.

} These are Straight muscles.

iv) Lateral rectus :- Moves the eye out wards.
v) Inferior oblique :- Moves the eye up & outwards.
vi) Superior Oblique :- Moves the eye down & outwards.

} These are Oblique muscles.



Scanned by CamScanner

(2) Eye Ball:- Almost spherical in shape & it is situated in the anterior part of orbital cavity. Eye ball contains 3 coats & three light-transmitting structures. The three coats of eye ball are:-

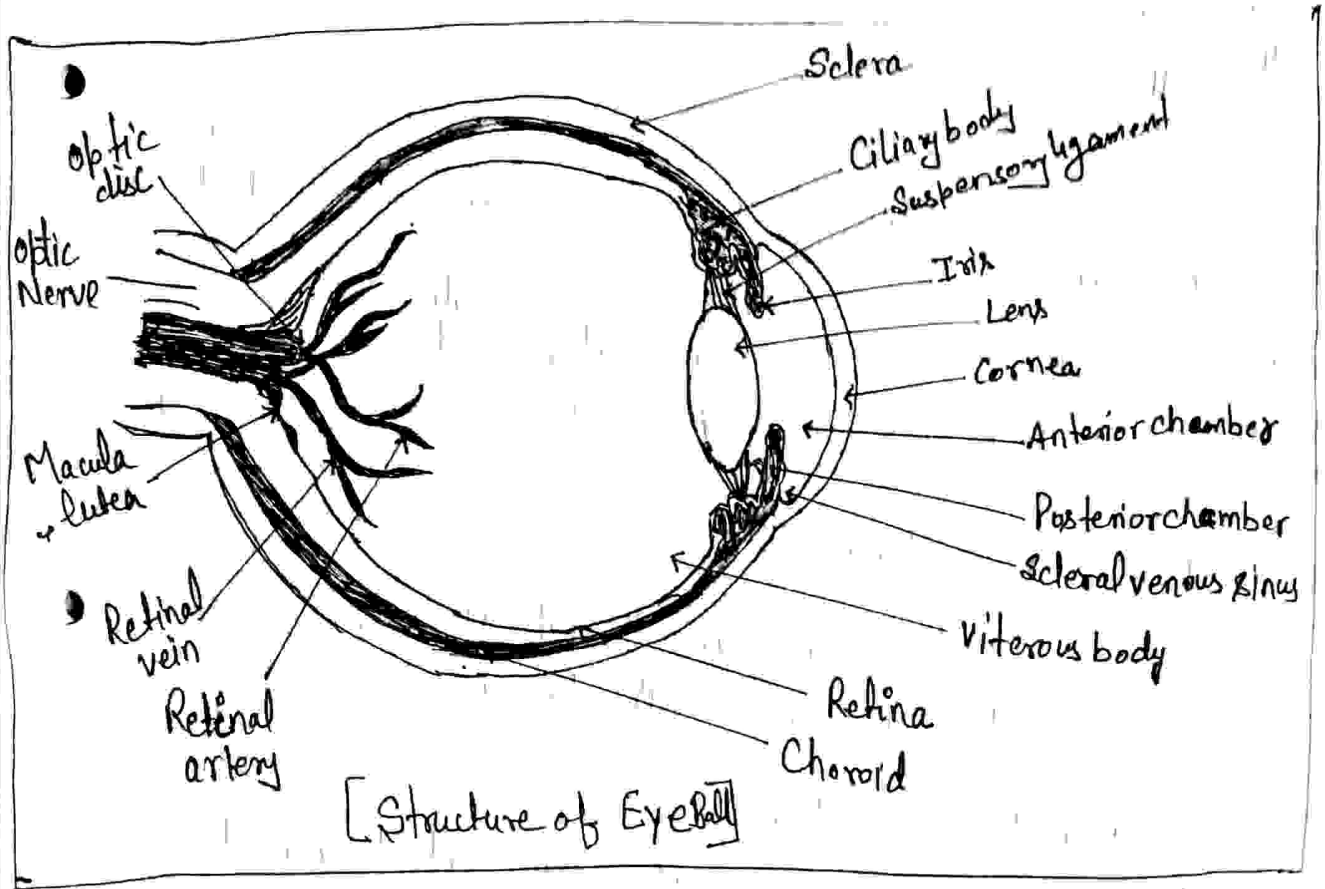
(1) Outer fibrous coat:- It contains sclera & cornea.

(2) Middle vascular coat:- It contains choroid, ciliary body and iris

(3) Inner nervous coat:- It contains Retina, optic disc, macula

The three light transmitting structures are:-

(i) Aqueous humour (ii) Lens (iii) Vitreous humour.



[Structure of Eye Ball]

(1) Outer Fibrous Coat

(i) Sclera:- Outer part of the eye ball. It covers the entire eye ball except cornea.

- Sclera protects the internal structures & also maintains the shape of eye ball
- The optic nerve passes through the posterior aspect of sclera & reaches the Retina.

Scanned by CamScanner

Cornea: It is transparent and has a convex anterior surface. It has no blood supply but it is richly supplied by sensory nerve

* At the junction of sclera & cornea is an opening known as Canal of Schlemm

(2) Middle vascular Root:-

i) Choroid:- It is a thin pigmented and highly vascular membran It lies the posterior compartment of the eye & lies blw the inner surface of sclera & retina.

ii) Ciliary body:- It is the anterior continuation of choroid & it is lies between choroid & iris. The ciliary body contains ciliary muscle. The suspensory ligament of lens is attached to Ciliary muscle.

iii) Iris:- It is the anterior continuation of ~~choroid & it lies between~~ Ciliary body

Iris is a pigmented membrane and the colour of eye is dependent on its pigments.

Iris has a central opening called pupil. Two sets of iris muscles control the pupil

- Circular muscles which reduce the pupillary size.
- Radial muscles which increase the pupillary size.

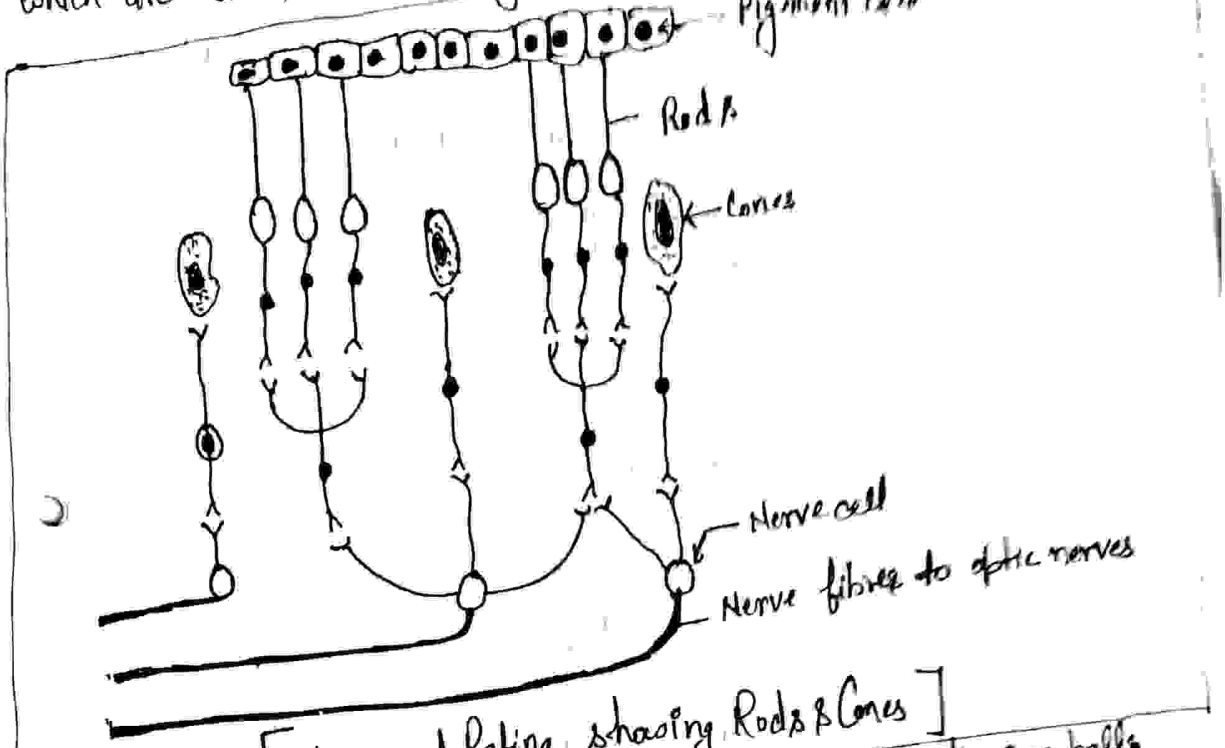
(3) Inner nervous Coat:-

i) Retina:- It is the inner most nervous coat of eyeball and lies immediately deeper to choroid. The retina contains

- Nerve cells & Nerve fibres which are in the inner surface (facing the Chamber of eyes)
- Some special structures called Rod & Cones, which are on the outer or choroidal surface of retina.

Scanned by CamScanner

These rods and cones receive the light & the path of impulses which are transmitted through optic nerve.



[Layers of Retina showing Rods & Cones]

ii) Optic disc :- It is the point where the optic nerve leaves the eye ball. This point does not contain retina & it is insensitive to light so this point called as blind point.

iii) Macula :- It is a small area of retina situated just lateral to the enterence of optic nerve. It is exactly opposite to the centree of pupil. Direct or near vision is focussed on macula.

(b) Light Transmitting Structures :-

- Lens :- Lens is present behind the pupil & iris within the cavity of eyeball. A crystalline protein arranged like the layers of an onion, make up the lense transparent & lacks blood vessels. The lense have to focus images on the retina to facilitate clear vision.

Scanned by CamScanner

ii) Aqueous humour:- It is a fluid present in the both the ant and posterior chambers of eye.
Posterior b/w iris & lens, and anterior b/w cornea in front & iris, Ciliary body back

iii) Vitreous humour:- It is a jelly like fluid which fills the space b/w lens & retina & maintain the shap of eye. It keeps the retina in contact with Sclera & chorold.

Blood Supply to Eye

Carotid Artery
↓
Ophthalmic Artery
↓
Cilliary artery & Central Retinal artery
↓
Eye

Mechanism of Sight (Vision)

Light enter the eye through Cornea
↓
Iris & pupil regulate the amount of light entering the eye.
↓
Image is then focused through the lens on the retina
↓

Scanned by CamScanner

↓

Pigmented choroid darkens the interior of the eye
Reduces scattering & reflection of light

↓

Image stimulates by the receptors present in
the rod & cones of retina

↓

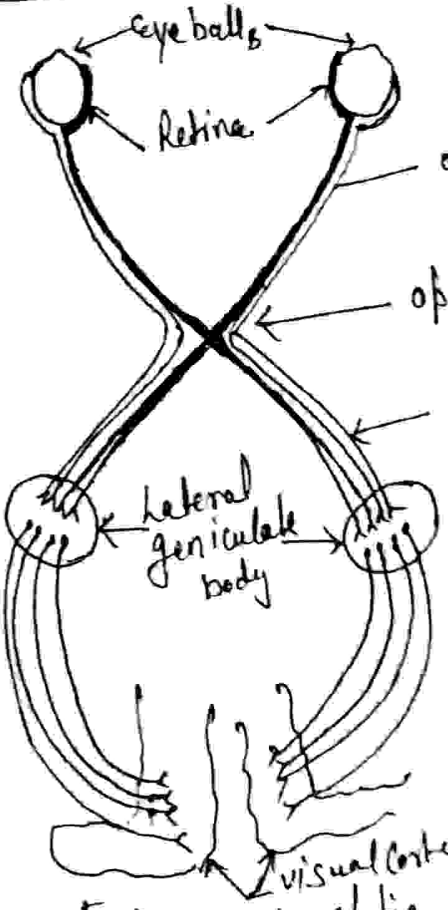
Impulses are carried through optic nerve
The optic nerves of both side cross called optic chiasma

↓

from optic chiasma, the impulses are carried by optic tract
& visual cortex present in the of occipital lobe of brain

↓

Here the image is ~~perceived~~ perceived



[Dig of optic tract]

Scanned by CamScanner

Accomodation:- It is the focussing of the lens for near vision. Ciliary muscles which are attached to the lens control the mechanism of accomodation

⇒ The contraction & relaxation of these muscle alter the focal length of the lens.

⇒ Contraction of these muscles focusses the lens for near vision

⇒ Relaxation of these muscles focuses the lens for distant vision

* Focussing the lens for distant vision is called as **cycloplegia** or Paralysis of accomodation.

Diseases of Eye

i) **Contract**:- Opticity of lens is termed as Contract. It is caused by the degenerative changes in the cells of the lens.

ii) **Glucoma**:- It is an increase in Intraocular tension produced due to excessive collection of aqueous humor. Unless properly treated it may lead to blidness due to retinal damage.

iii) **Presbyopia**:- It is a defect in accomodation, It occurs in old age due to loss of elasticity of the lens.

iv) **Myopia**:- (Short Sight):- Occurs due to an increase in the antero posterior diameter of the eye ball. So the image is formed in front of the retina. The patient can see the near objects without difficulty. But distant objectes cannot seen easly. This is corrected by using **Concave lens**.

v) **Hypermetropia** (Long sight) Occurs due to decrease in antero-posterior diameter of the eye ball. So image falls behind the retina. Near object can not seen easily. This is corrected by using **Convex lens**

Scanned by CamScanner

(5)

Functions of Eye (on the basis of eye parts)

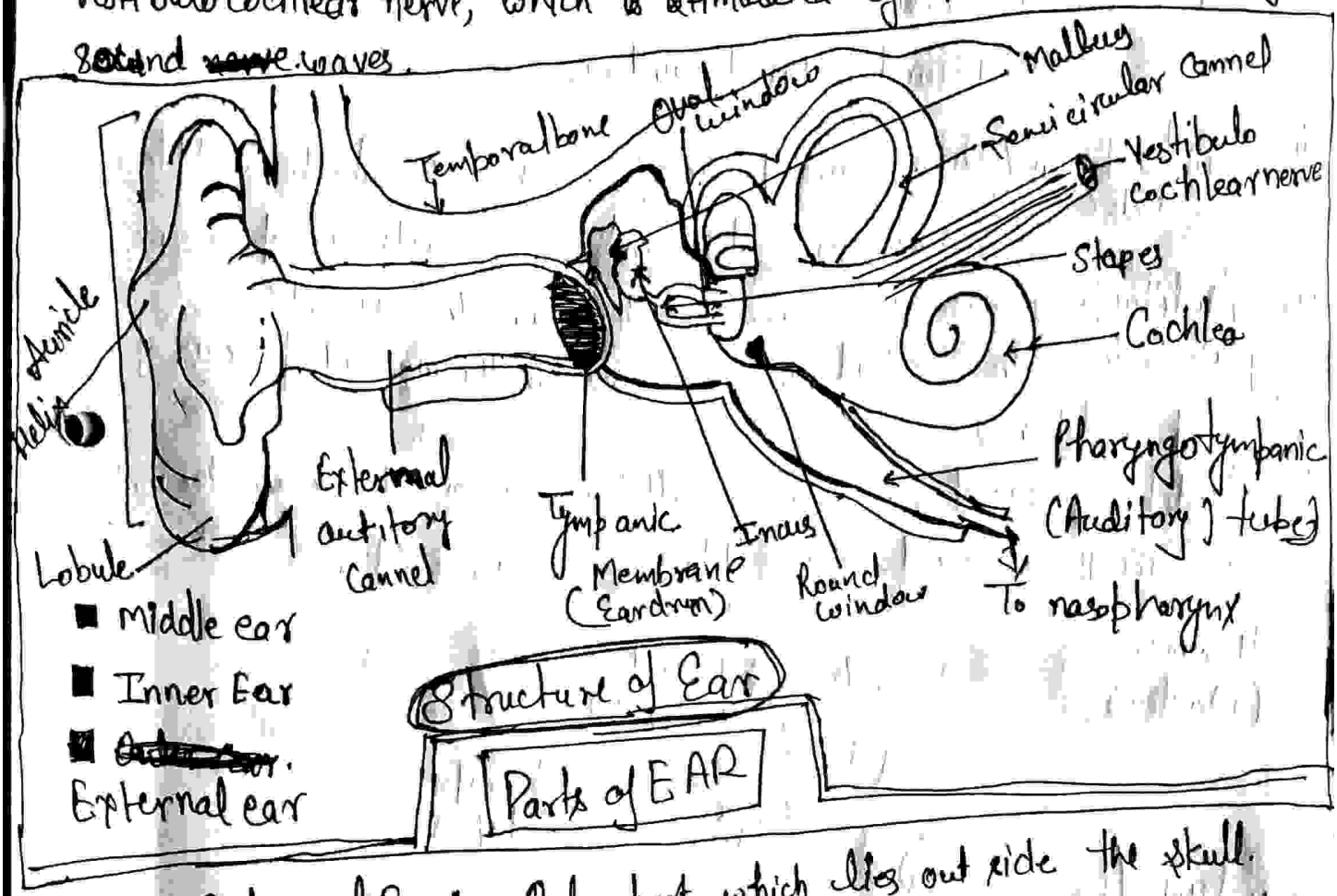
Parts	Functions
Sclera	Tough outer layer of the eye which cover & protect eye ball.
Choroid	Prevents internal reflection of light & Nourish retina.
Retina	Contains rod & Cones which convert light into nerve impulses
Ciliary body	A ring of muscle controlling the shape of curvature of the lens.
Iris	Control the pupil size thus controls entry of light
Pupil	A hole in the iris that lets light into the back of eye
Lens	Accomodation & focusing of light onto the retina.
Cornea	Bends incoming light focusing it on the retina.
Blindspot	Exit point of the optic nerve cutting through the retina so no rods or cones.
optic nerve.	Carries the impulses from the rods & cones to the visual center of the brain.

Scanned by CamScanner

Unit - IV

EAR

Ear is the organ of hearing and also involved in balance. It is supplied by the 8th cranial nerve that is the cochlear part of the vestibulocochlear nerve, which is stimulated by vibrations caused by sound waves.



① External Ear:- Only part which lies outside the skull.

i) Pinna/Auricle:- It is a funnel shaped organ made of elastic fibrocartilage. It helps to collect the sound waves.

ii) External Auditory Meatus/Canal:- It is a small channel lined by skin & wax secreting glands. It conveys the vibrations of sound to the tympanin membrane / Ear drum.

Scanned by CamScanner

2) Middle Ear :- It is a small cavity in the temporal bone.

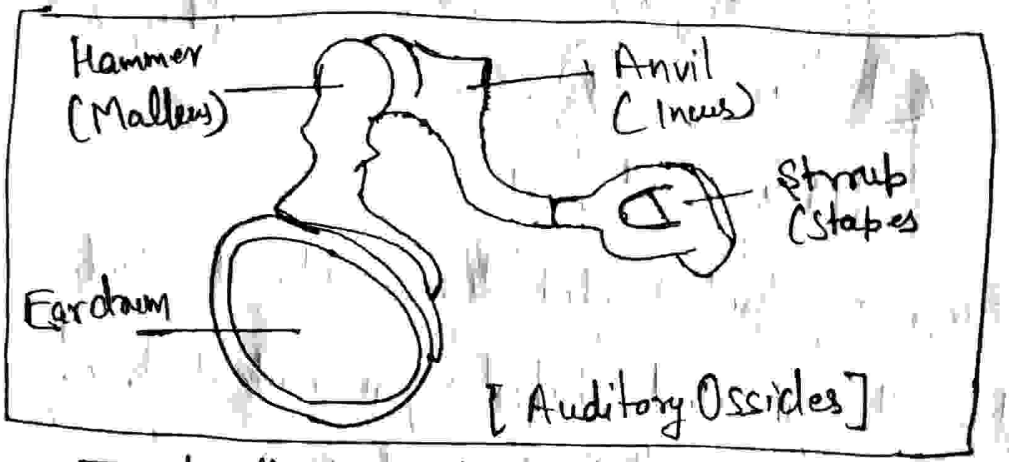
i) Tympanic Membrane :- Also called ear drum which form the lateral wall.

ii) Two Foramina in the inner or medial wall called
- Fenestra ovalis / oval window
- Fenestra Rotundum / Round window.

iii) Eustachian (Pharyngotympanic) Tube :- Through which middle ear communicates anteriorly with nesopharynx.

iv) Auditus :- A narrow channel which connects the middle ear posteriorly with mastoid antrum (Present in the mastoid process of temporal bone)

v) Auditory ossicles :- Three small bones arranged across the middle ear. The three ossicles are :- Malleus, Incus, & Stapes



- The handle of maleus is fixed to the eardrum & other head of malleus is connected to incus which in turn is connected to stap

3) Internal Ear :- The internal ear is also called as labyrinth.

It consist two part
- Bony Labyrinth
- Membranous labyrinth.

Scanned by CamScanner

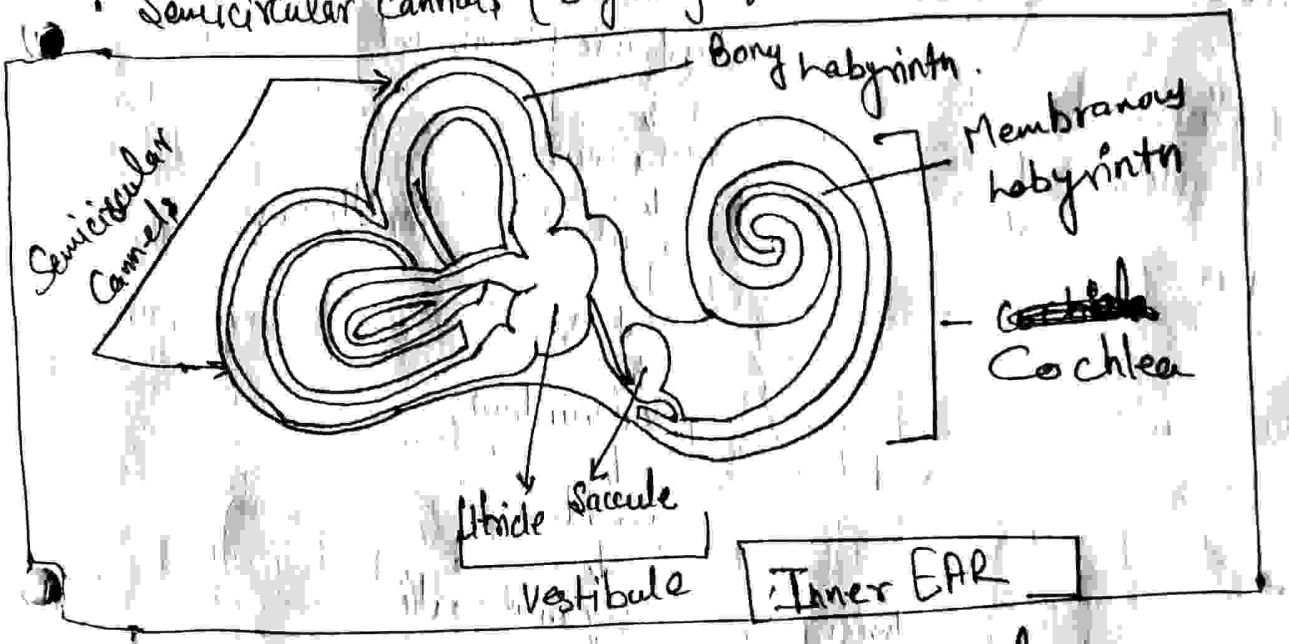
Membranous labyrinth:- which lies in the bony labyrinth. (3)

- The membranous labyrinth is filled with a fluid called endolymph.

ii) Bony labyrinth:- which consists of a series of channels. The bony labyrinth contains fluid called perilymph

Bony labyrinth contains three structures:-

- vestibule
- Cochlea (Organ of Hearing)
- Semicircular Cannals (Organ of equilibrium)



i) Vestibule:- It is the central part, It is b/w Cochlea & Semicircular Cannals. It contains utricle & saccule which are the part of membranous labyrinth

ii) Cochlea:- It is a spiral Cannel which looks like the shell of snail.

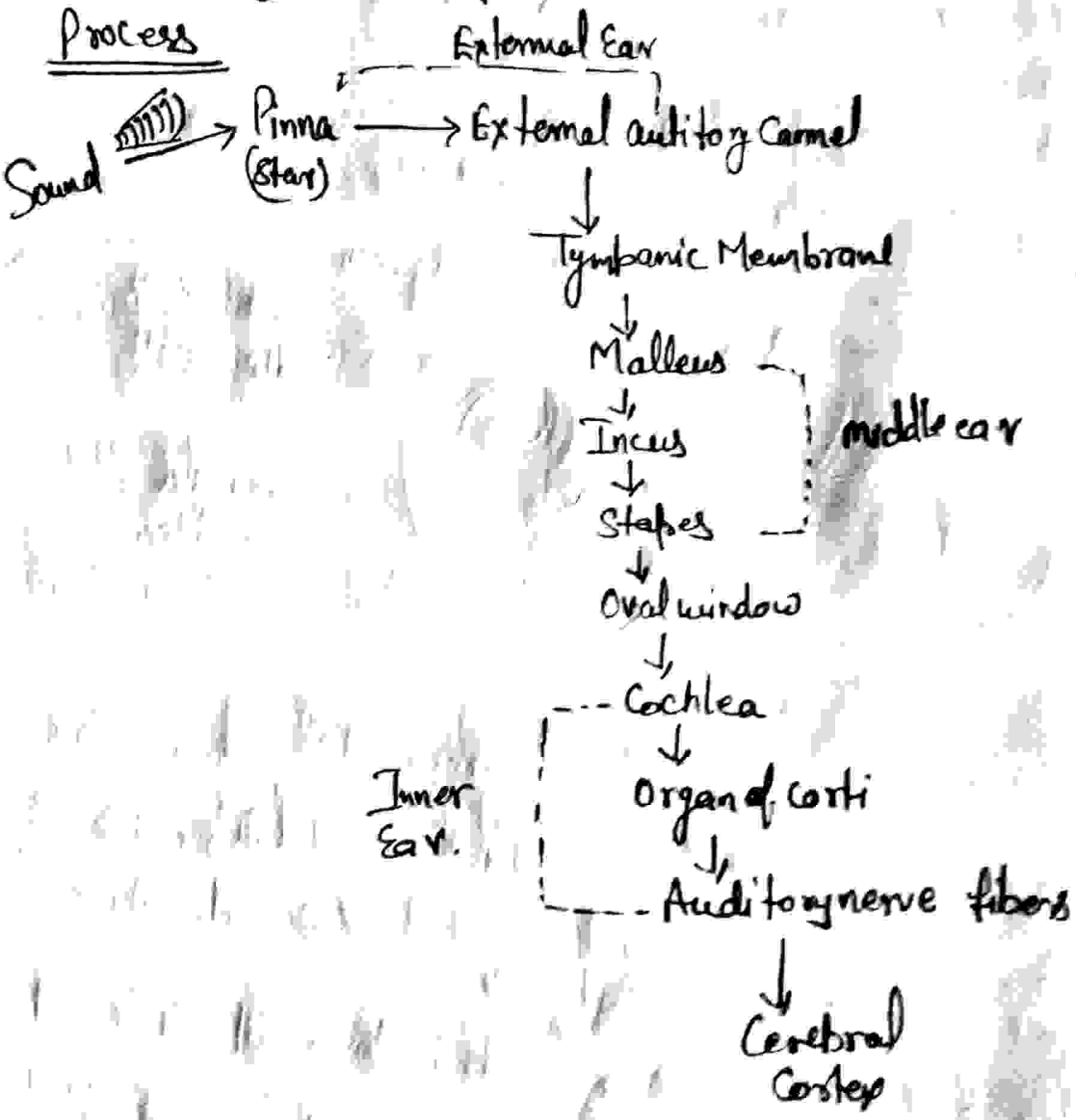
Modiolus is a central column of spongy bone around which the spiral Canel twines.

Scanned by CamScanner

iii) Semicircular Canals :- Each ear has three semicircular canals which are placed at right angles to each other. They are posterior, superior & lateral Semicircular Canals. Each semicircular canal has enlarged end called ampula. It has endings of vestibular nerve & also some hair like projections

Mechanism of Hearing :-

Process



Scanned by CamScanner

Events Involved in Hearing

(i) Sound wave arrive at the tympanic Membrane

↓

(ii) Movement of the tympanic membrane causes displacement of the auditory ossicles

↓

(iii) Movement of the stapes at the oval window establish pressure waves in the perilymph of the vestibular duct.

↓

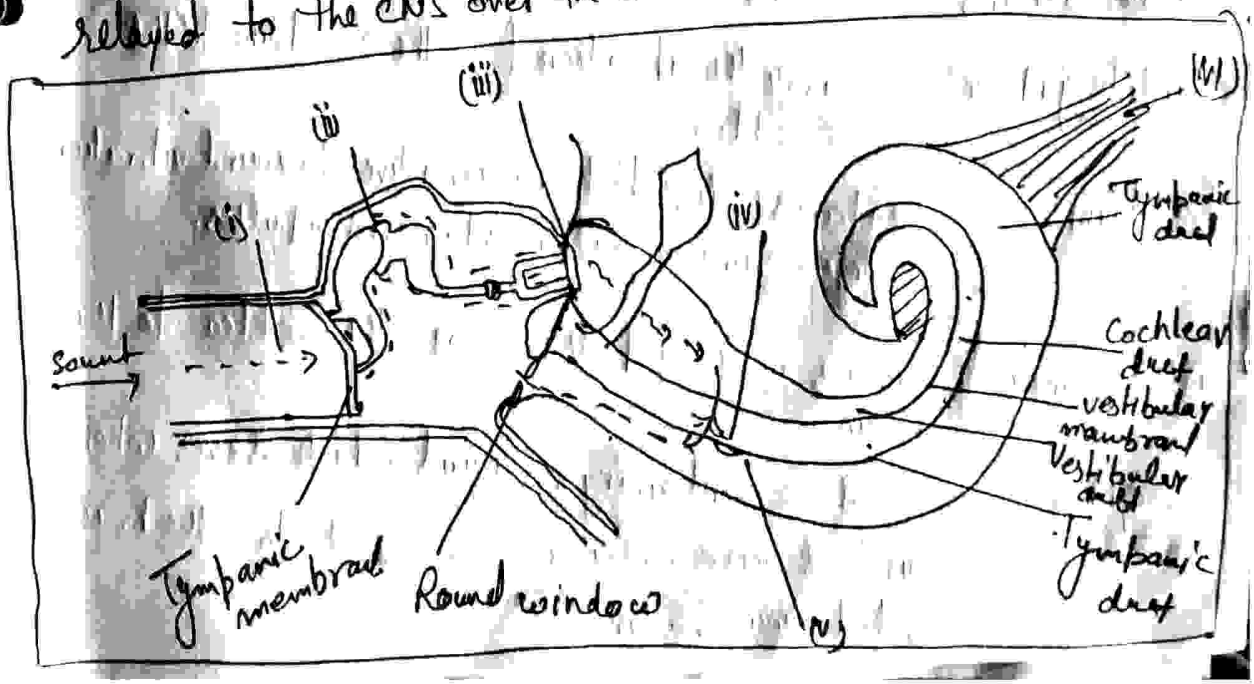
(iv) The pressure wave distort the basilar membrane on their way to round window of tympanic duct

↓

(v) Vibration of the basilar membrane causes vibration of hair cells against the tectorial membrane.

↓

(vi) Information about the region & the intensity of stimulation is relayed to the CNS over the cochlear branch of cranial nerve VIII



Scanned by CamScanner

Disease of EAR

i) **Deafness!-** It is the damage of a part of Conduction system or pathway, ear drum, bones, middle ear & inner ear lead to conduction deafness while damage to ~~external~~ nerve fibres of Cochlear nerve, cause nerve ~~deform~~ deafness.

ii) **Otitis Externa!-** The otitis externa refer to the inflamation of external auditory Cannel

iii) **Impacted Cerumen!-** It is a condition in which ear wax accumulates in ear cannal leadings to blockage and pressure on ear Cannel.

iv) **Furunculosis!-** It is infections disorder characterized by formation of boils in the hair follicles

v) **Otitis Media!-** It is the inflammation of the mucous membrane of middle ear eustachian tube & mastoid process.

Function of ear

Parts	Function.
Middle earbones	Vibrate when sound wave reach to it
Auditory Nerve	Carry the vibration from the ear drum to the Cochlea
Ear drum	Contains cells, which are sensitive to sound vibrations change, sound vibrations into nerve impulses.
Circular Canals	Carries nerve impulses from the cochlea to the brain
Cochlea	3 tubes containing a liquid, which moves when the your head move, Messages are sent to the brain to control your balance

Scanned by CamScanner

NOSE

Nose is the most protruding part of the face. It bears the nostrils and is the first organ of the respiratory system. It is also the principal organ in the olfactory system. The shape of the nose is determined by the nasal bones and cartilage including the nasal septum which separates the nostrils & divides the nasal cavity into two. On an average the nose of a male is larger than that of a female.

STRUCTURE

Several bones and nasal cartil-

Scanned by CamScanner

-ages makes up the bony-cartila-
-ginous framework of the nose,
and the internal structure.
The nose is also made up of
types of soft tissue such as
skin, epithelia, mucous membra-
-ne, muscles, nerves & blood. In
the skin there are sebaceous
glands & in the mucous membr-
-rane there are nasal glands.

The framework of the
nose is made up of bone and
cartilage which provides strong
protection for the internal stru-
-ctures of the nose. The arrange-
-ment of the cartilages allows
flexibility through muscle cont-
-rol to enable airflow to be
modified.

Bones that are possessed by a
human nose are nasal
bones, lacrimal bones, maxilla

Scanned by CamScanner

Vomer bone & palatine bones. These bones provide structure & framework to the nose.

Cartilages The nasal cartilages are the septal, lateral, major alar and minor alar cartilages. It provides structure and support to the nose.

External Nose It includes nasal ridge that border between the root and tip of the nose which in profile can be variously shaped. It also includes ala of the nose is the lower lateral surface of the external nose, and it covers in the dense connective tissue. It forms a rounded eminence around the nostril.

Scanned by CamScanner

Internal Nose It includes the cavities, lateral walls, roof of cavity, Choanae, Nasal valves, Nasal vestibule, muscles

- **Nasal Cavity**: It is the large internal space of the nose. It is lined with hair and mucus membrane. It warms or moistu-rize & filter the air entering the lungs.

- **Lateral wall**: It is a region of the nasopharynx essential for humidifying & filtering the air we breathe in nasally.

- **Roof of cavity**: is formed in its upper third to one half by the nasal bone & more inferiorly by the junctions of the upper lateral cartilage & nasal septum

Scanned by CamScanner

- **Choanae**: These are the two openings, one from each fossa called choanae. It gives entrance to the nasopharynx and rest of the respiratory tract.

- **Nasal Valves**: Valve area in the cavity responsible for producing resistance to the flow of air. This enables an increased time for warming & moistening the air.

- **Nasal Vestibule**: It is the frontmost part of the nasal cavity & is enclosed by cartilages. It holds the unwanted particles entering the nose / lungs.

- **Muscles**: Facial & neck muscles provides movement of nose.

Scanned by CamScanner

Mechanism Of Smelling

Olfactory nerves originate as chemoreceptors in the mucous membrane of the roof of the nasal cavity above the superior nasal conchae. one each side of the nasal septum nerve fibres pass through the cribriform plate of the ethmoid bone to the olfactory bulb where inter-connections & synapses occur. From the bulb, bundles of nerve fibres form the olfactory tract, which passes backwards to the olfactory area in the temporal lobe of the cerebral cortex in each hemisphere where the

Scanned by CamScanner

impulses are interpreted & odour perceived.

FUNCTION

- **Breathing** : Nose traps the unwanted dust particles at the opening & hence, helps in the normal breathing.

- **Cleansing** : Sneezing & nose blowing helps in the cleansing of dust particles or foreign agents of the body.

- **Smell** : It is the main function of the nose i.e smell. It helps us to recognise the smell around us, whether it is good or not.

Scanned by CamScanner

- **Taste** - Although taste is a completely separate sense than smell, the nose plays a role in the way the tongue perceives taste. Individuals with a congested nose report a decreased sense of taste.

- **Voice** - Air resonating in your nose affects the sound of your voice

DISORDERS OF NOSE

Scanned by CamScanner

NASAL POLYPS

Nasal polyps are those soft abnormal growths from the sinuses cavities or the surface of the nasal mucosa.

Symptoms -

Headaches, Snoring, Running Nose, Distorted sense of Smell, etc.

Treatment -

- Avoid all medication that contain aspirin.
- Avoid over-the-counter nasal sprays.
- FESS, which is a surgical method.

Scanned by CamScanner

RHINITIS MEDICAMENTOSA

It is a condition of rebound nasal congestion brought on by extended use of topical decongestants and that work together constricting blood vessels in the lining of the nose.

Causes -

Pregnancy, Chronic rhinosinusitis & overuse of drugs, etc.

Treatment -

Treatment of Rhinitis medicamentosa involves withdrawal of the offending nasal spray by the surgery.

Scanned by CamScanner

CHRONIC SINUSITIS

It is the inflammation and infection of the air-filled spaces that are located within the bones in & around the nose.

Cause -

Pregnancy, Nasal tumors, Low humidity, etc.

Symptom -

Sneezing, Tiredness, Running Nose, Severe headache, etc.

Treatment -

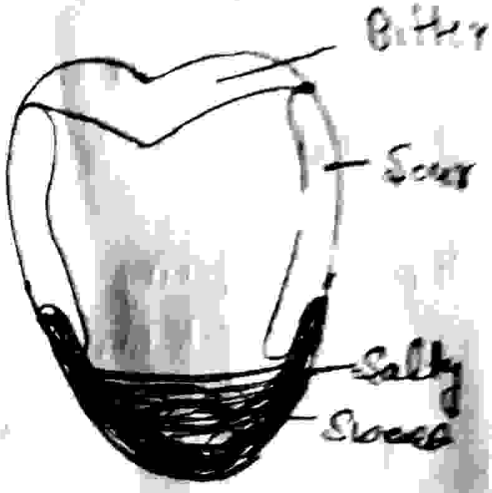
- Humidifier medications
- Possible surgery

Scanned by CamScanner

Unit - 4 Organ of Taste (Tongue)

The word taste comes from franch word "taster" which means to touch. Taste is the detection & recognition of substances in solution

The receptors for the sensation of taste are taste buds. The taste buds are present at the sides and base of the tongue.



Types of Taste buds

i) Sweet — At the tip
ii) Sour — At the back edge
iii) Salty — At the front edge
iv) Bitter — At the back

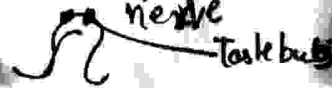
Location :- Mucous of tongue, Soft palate pharynx, epiglottis & esophagus

* Young adult — Approx. 9000 taste buds

Papillae :- A small rounded protuberance on a part or organ of the body.

Filliform (thread)
- Tapered thread like structure
- Lined by stratified Squamous Keratinized epithelium.

Fungiform (fungi like)
- 18% of taste buds
- Nerve supply Taste buds (non) ↓ Chorda tympani Branch of facial nerve



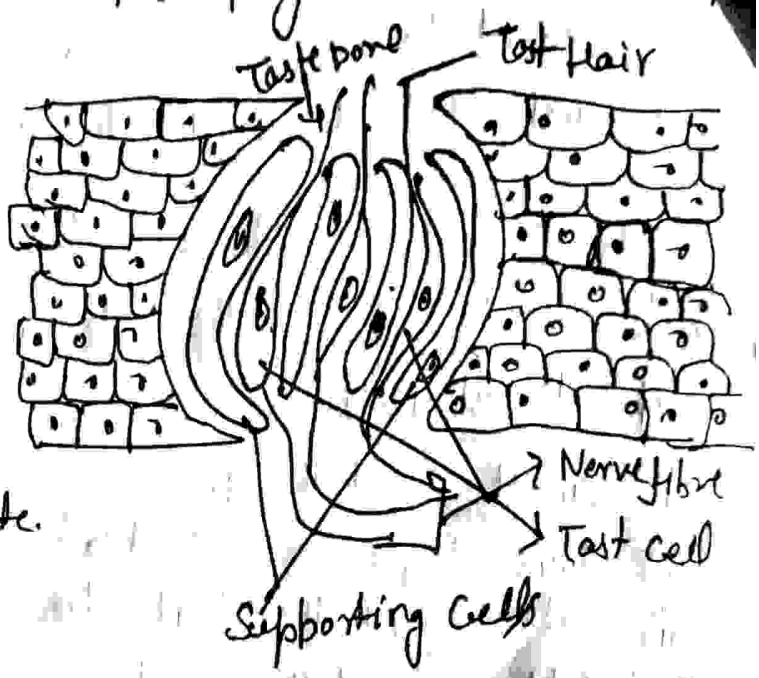
Foliate (leaf like)
- 2- Post erolateral sides of tongue
- 34% of total taste buds — rabbit

Circumvallate
- largest & 12 no.
- 45% total buds
- Dorsal surface Keratinized :- lateral wall not Keratinized

Scanned by CamScanner

Taste buds — Barrel shaped 70 µm high & 40 µm diameter

Components :- • Cell
• Taste chamber
• Taste pore



Taste chamber :-

Gel like material.
• Vit C & enzyme like acid phosphatase, esterase, ATPase etc.

Taste pore :- • Opening
• 2-10 µm

Cells of the Taste buds

- Supporting Cell (Dark cells) / Sustentacular
  - Columnar cells - darkly stained Oval nuclei & granular cytoplasm - out Capsule
- Gustatory / Receptor (Light cells)
  - → ~~Septe~~ Single long microvillus
  - → Opening of taste buds
  - — life span - 10 days.
- Basal cells
  - Stem cell found at periphery of the tastebud near the Connective tissue layer, producing supporting cells

Scanned by CamScanner

Mechanism of stimulation of taste buds:- ⑨

Tastant (in sol. form) enters in pores of taste buds

↓

Reacts with receptor molecule on microvilli

↓

opening / closure of ion channels (diff. for diff. taste modalities)

↓

Partial loss of -ve potential (Receptor potential)

↓

Increase in Ca^{++} within taste cell

↓

Neurotransmitter release

↓

Action potential in sensory nerve.

Taste buds

- Taste is interpreted
- Impulse move to the parietal lobe of cerebrum
  - Send an impulse through the sensory nerve fibers

- Function (Tongue)
  - ✓ Suckling in infants
  - ✓ Mastication.
  - ✓ Mixing of food with saliva.
  - ✓ Position food b/w teeth
  - ✓ formation of food bolus

Scanned by CamScanner

Disease of Tongue

1) Ulcers of tongue:- Infective ulcers like herpes simplex infection

- Lichen planus
- Carcinoma

Glossitis Nutritional deficiencies & pernicious anemia & Candidosis cause inflammation & soreness of tongue. due to deficiencies of iron, folic acid, Vit B_{12} & V_B

Geographic:- (Erythema migrans)
It is an idiopathic benign lesion characterized by formation of Red depapillated areas on tongue in "map" like configuration

Median Rhomboid Glossitis
It is defined as red depapillated rhomboid shaped area on dorsum of tongue caused by Candida albicans infection

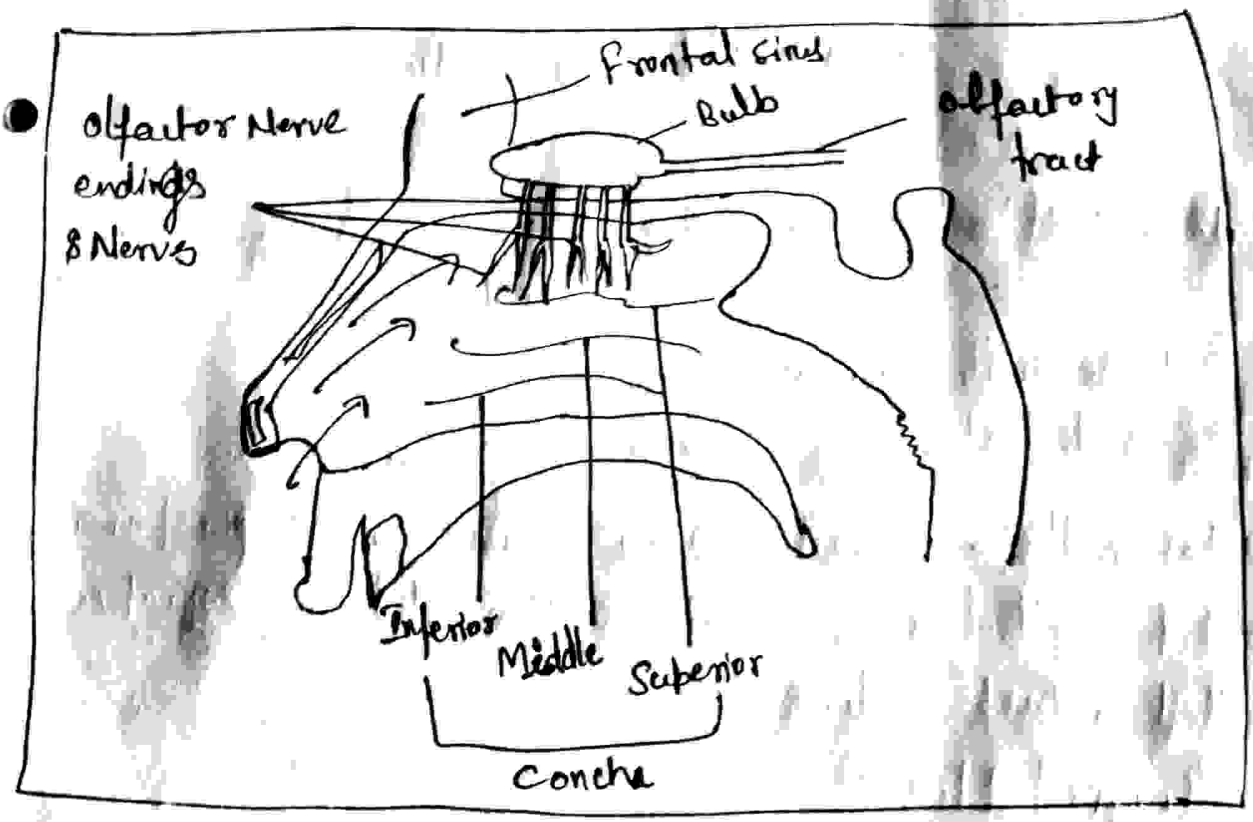
Black Hairy tongue:-
Hyperplasia of filiform papillae & overgrowth of pigment producing bacteria (as spergillus strain), Cause by smoking Antibiotic therapy, & Also excessive use of antiseptic mouth wash.

Scanned by CamScanner

NOSE

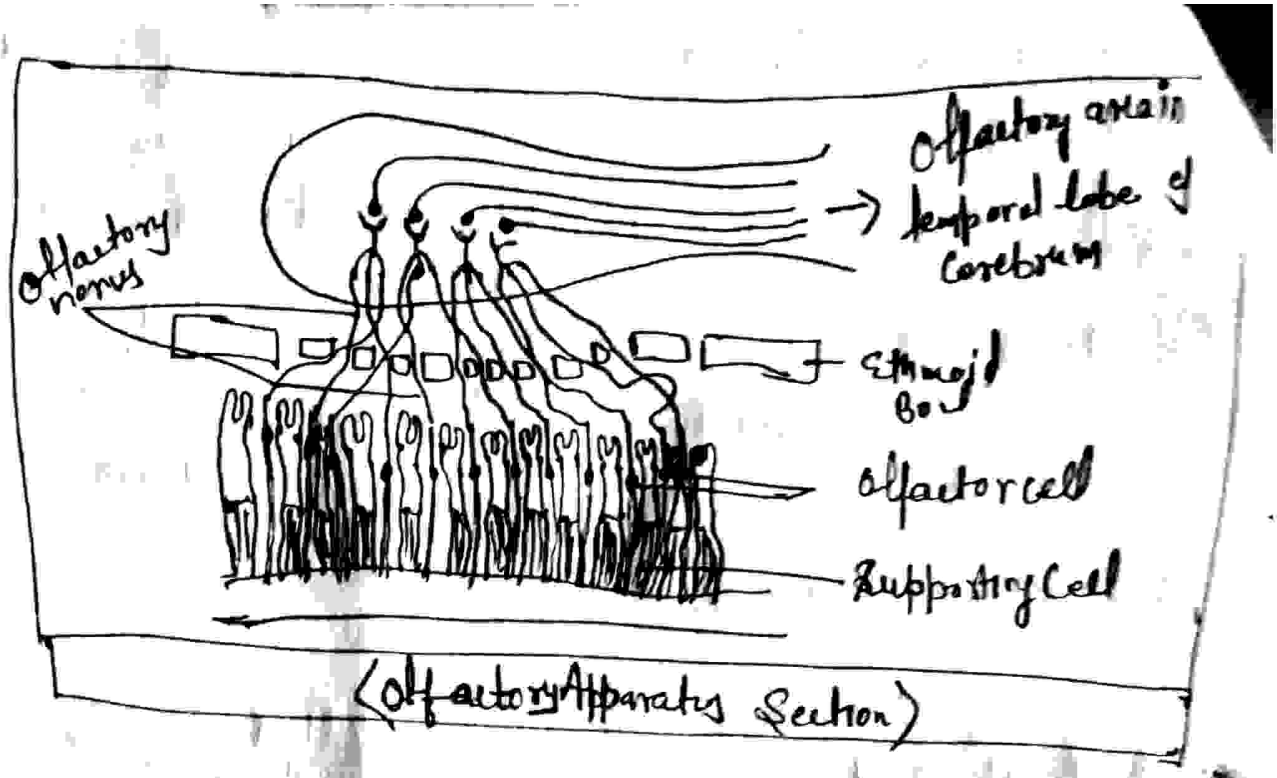
Nose is the organ of the sense of smell. The sensory nerves of smell are the olfactory nerves (first cranial nerve).

Olfactory Nerves:- These are the sensory nerves of smell. They originate as specialized olfactory nerve endings (chemoreceptors) in the mucous membrane of the roof of the nasal cavity above the superior & nasal conchae.



Each side of nasal septum nerve fibres pass through the cribriform plate of the ethmoid bone to the olfactor bulb. where interconnections of synapse occur

Scanned by CamScanner



〈Olfactory Apparatus Section〉

Olfactory Cell:- These are the cells for smell sensation —
— bipolar nerve cells derived originally from the CNS
— 10 to 20 million Receptorscell
— Each olfactory receptor is a neuron

Olfactory bulbs:- Axons of receptors ~~bulbs~~ Contact the primary dendrites of mitral cells. forming Complex globular Synapse called olfactory glomeruli

Function of Nose

- Breathing
- Smell
- Air Conditioning of inspired air
- Protection of lower airway
- Ventilation & drainage of P.NS (Paranasal Sinuses)
- Olfaction
- Nasal resistance.

Scanned by CamScanner

Mechanism of olfactory cell stimulation

Odourant + Receptor protein

↓

Activation of G-protein

↓

Activation of adenyl cyclase (AC)

↓

ATP ⟶ cAMP

↓

Opening of Na^+ channels

↓

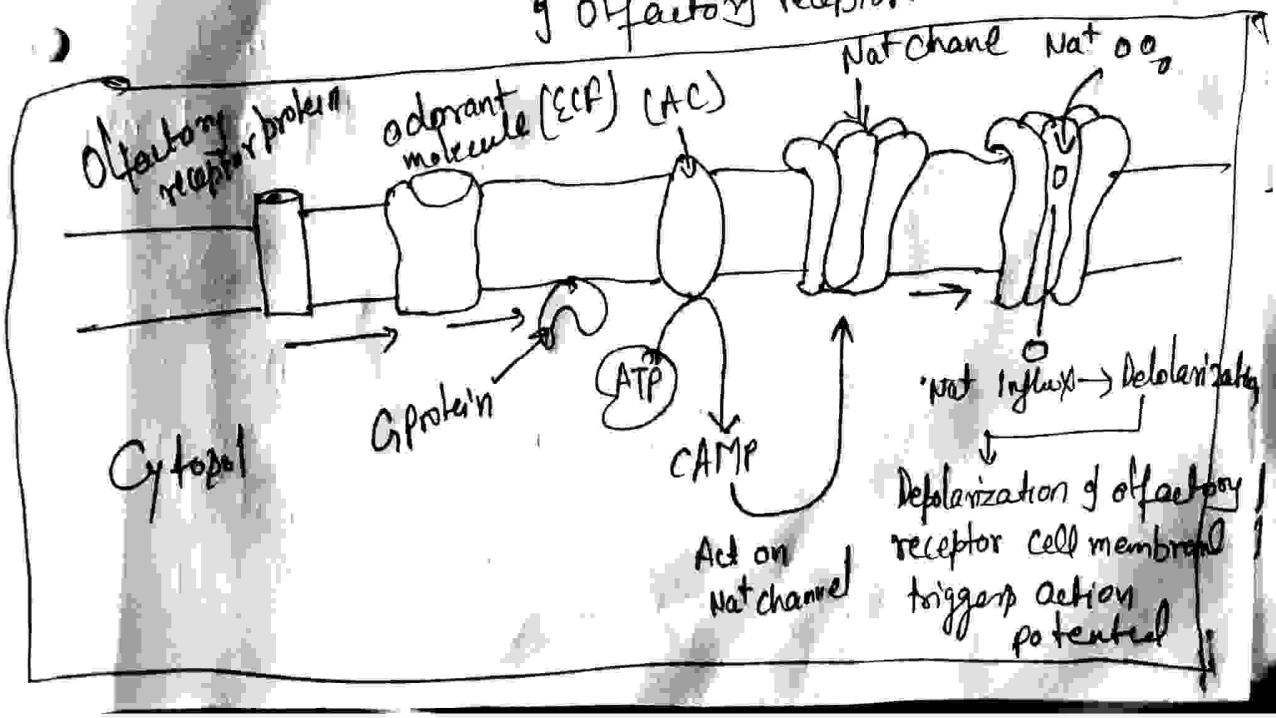
Na^+ influx

↓

depolarization.

↓

Nerve impulse is propagation along axon of olfactory receptor.



Scanned by CamScanner

Diseases of Nose

- **Nasal Vestibulitis** :- Diffuse dermatitis of the nasal vestibule caused by staphlococcus aureus. Cause by frequent picking of the nose.
- **Rhinophyma**:- Thickening & heated raised lesions of the tip of the nose due to hypertophy of sebaceous gland.
  - Typically afflicts white male b/w 40 & 60 yrs. of age.
- **Basal Cell Carcinoma**:-
  - Most common malignancy of the skin commonly affecting the nose, long term exposure to sunlight.

Scanned by CamScanner