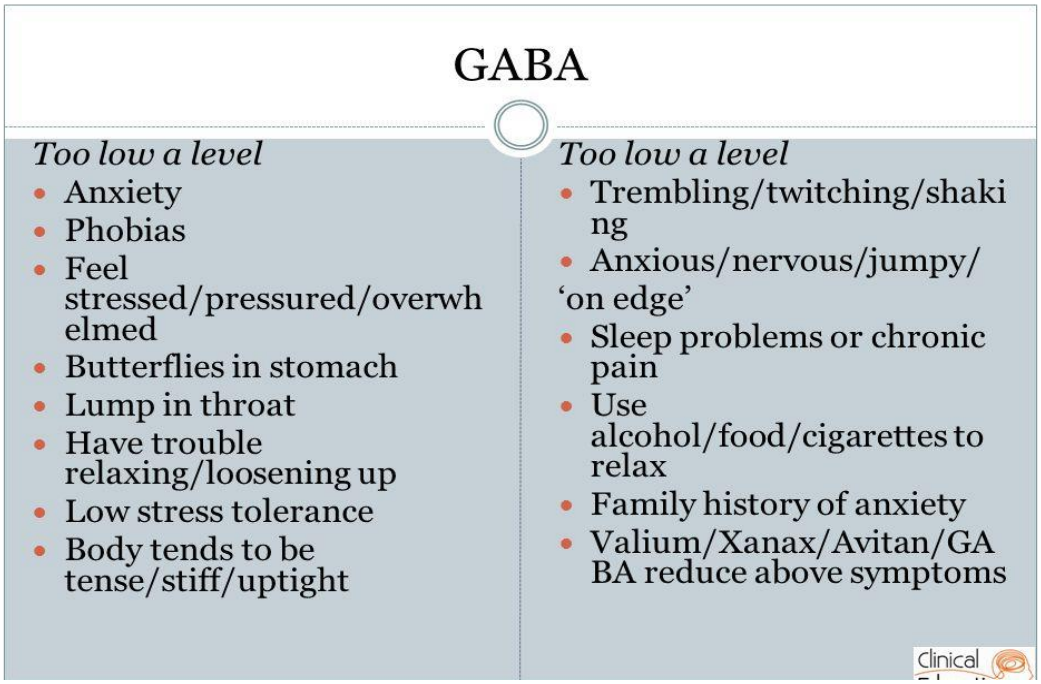
BLOCK D OSPE

BY FATIMA HAIDER

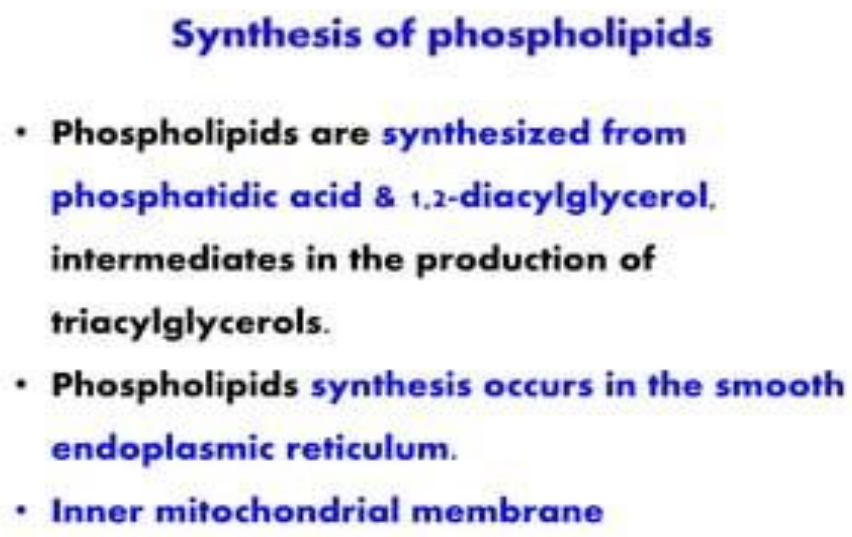
- **Neurotransmitters definition**
  A neurotransmitter is a signaling molecule secreted by a neuron to affect another cell across a synapse.

- **Synapse definition**
  Synapse is a functional junction between two neurons

- **GABA deficiency symptoms**



- **Phospholipids synthesis**
  Mostly phospholipids are the smooth ER and then transported to golgi apparatus and then to organelles or plasma membrane and secreted from cell by exocytosis.



- **phospholipids composition**
  In general, phospholipids are composed of **a phosphate group, two alcohols, and one or two fatty acids**. On one end of the molecule are the phosphate group and one alcohol; this end is polar, i.e., has an electric charge, and is attracted to water (hydrophilic).

- **Phospholipids examples**

The most common phospholipids are **phosphatidylserine, phosphatidylcholine, phosphatidylethanolamine, and sphingomyelin**.

- **Cardiolipin synthesis**
  Two molecules of phosphatidic acid esterified through their phosphate groups to an additional molecule of glycerol form cardiolipin, or diphosphatidylglycerol.
  Cardiolipin found only in mitochondria where it is synthesized from two molecules of CDP-diacylglycerol and one molecule of glycerol-3-phosphate
  Cardiolipin is found in membranes in bacteria and eukaryotes

- **Histamine location**
  Histamine is present in many human tissues, including **skin, intestinal mucosa, heart, lung, and nerve endings in the brain**. The usual body storage sites for histamine include mast cells and basophils

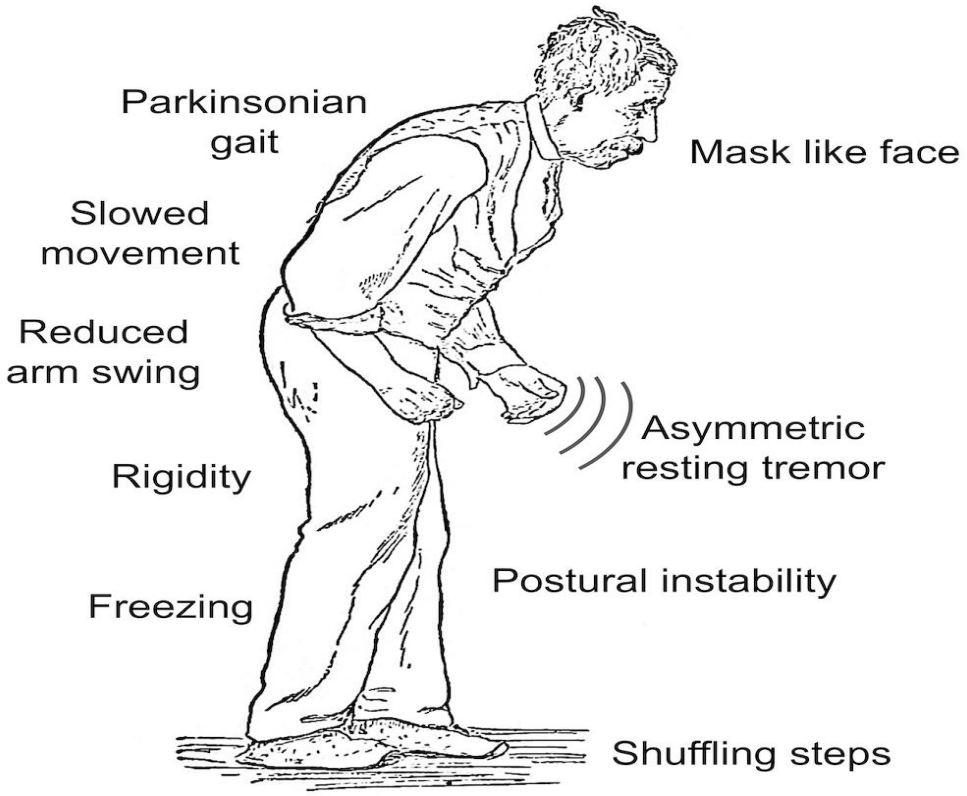
- **Functions of neurons**
  Neurons (also called neurones or nerve cells) are the fundamental units of the brain and nervous system, the cells responsible for receiving sensory input from the external world, for sending motor commands to our muscles, and for transforming and relaying the electrical signals at every step in between.

- **Excitatory neurotransmitter and inhibitory neurotransmitters....how they work**
  Neurotransmitters that open cation channels are called excitatory neurotransmitters
  Neurotransmitters that open anion channels are called inhibitory neurotransmitters

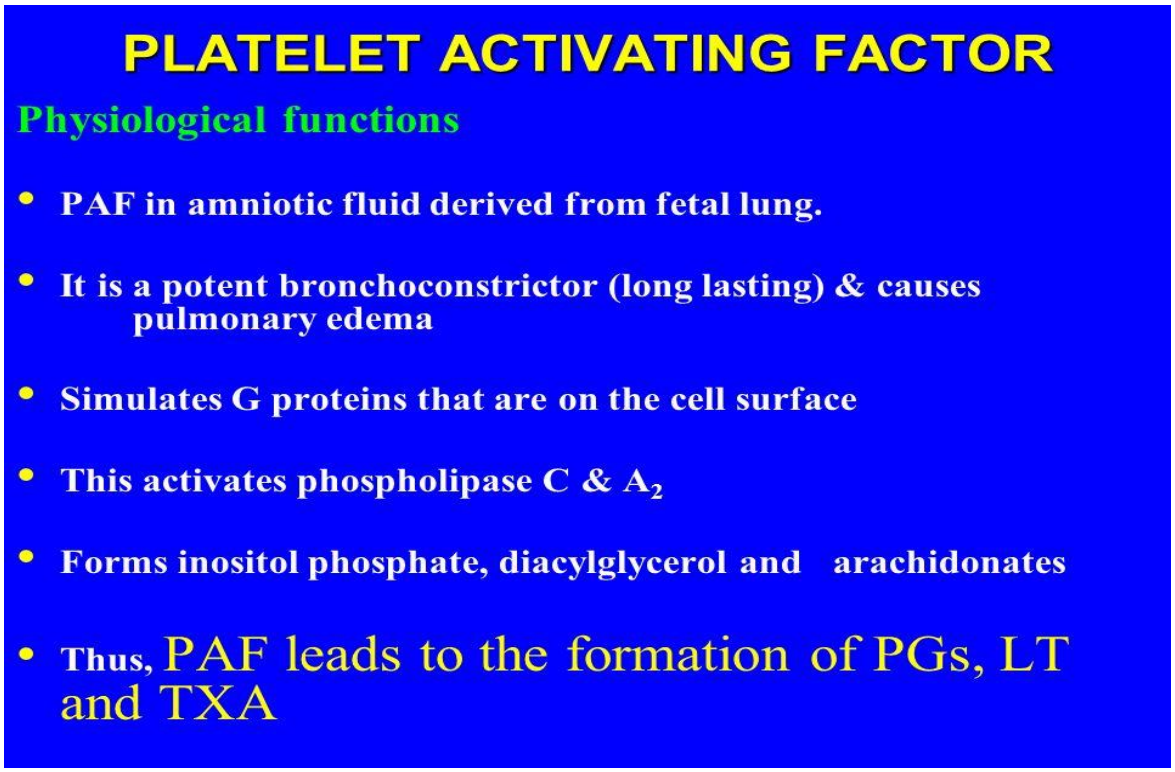
- **Acetylcholinesterase**
  Used for cleavage of acetylcholine into acetate and choline.

- **Types of receptors on post synaptic membrane**
  Five basic types of sensory receptors:
  1. Mechanoreceptors – detect mechanical compression or stretching
  2. Thermoreceptors – detect changes in temperature
  3. Nociceptors – pain receptors
  4. Electromagnetic receptors – detect light on retina of eye
  5. Chemoreceptors – detect taste in mouth, smell in nose, oxygen level in arterial blood, osmolality of body fluids, CO_2 concentration etc.

- **Parkinson disease... neurotransmitter involved**
  Parkinson's disease (PD) is a progressive neurodegenerative disorder caused mainly by lack of **dopamine** in the brain.



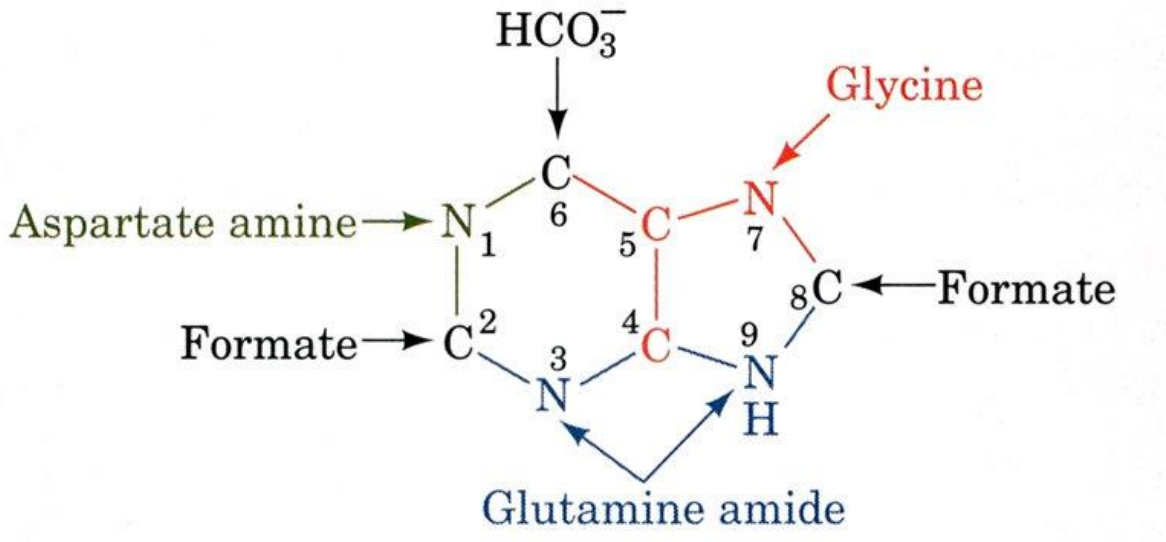
- **Platelet activating factor's functions**



- **Purine's carbon, nitrogen sources**

  To synthesize purine, ring atoms are obtained form:

  1. Amino acids – Aspartate, Glycine, Glutamine
  2. CO_2
  3. N-formyl tetra hydro folate – donate formyl group



- **Purine catabolism end product**
  The end product of complete catabolism of purines is **uric acid**.

- **Genetic code properties**
  Genetic code may be defined as exact sequence of DNA nucleotides read as three letter words or codons, that determines the sequence of amino acids in protein synthesis

Properties of genetic code

1) Each genetic code is composed of nucleotide triplets
- Three nucleotides in mRNA specify one amino acid in the polypeptide products

2) The genetic code is non overlapping
- Each nucleotide in mRNA belongs to just one codon

3) The genetic code is degenerate (degeneracy)
- All but two of the amino acids are specified by more than one codon

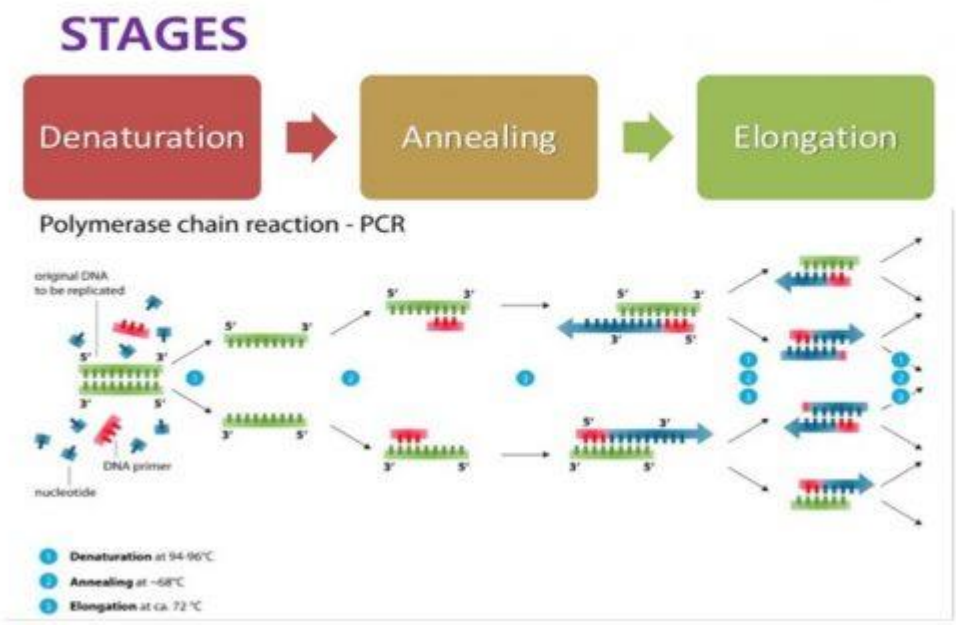
4) The genetic code contains start and stop codons
- Specific codons are used to initiate and to terminate polypeptide chains

5) The genetic code is nearly universal
- With minor exceptions, the codons have the same meaning in all living organisms, from viruses to human

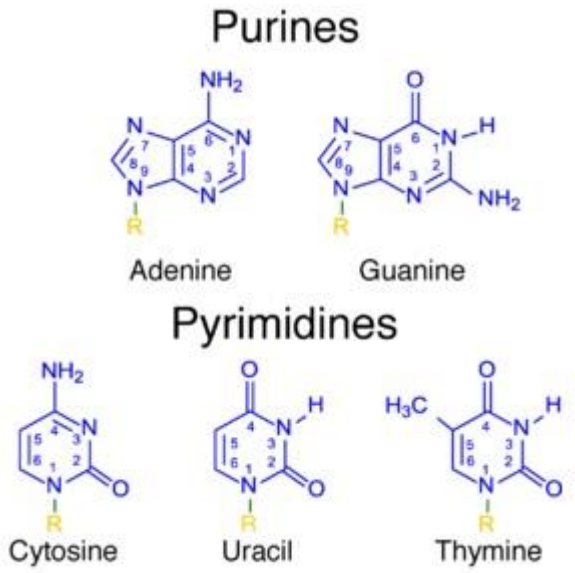
- **Pcr types**
  PCR is a molecular technology aim to amplify a single or few copies of DNA to multiple or millions of copies.
  PCR Types:
  1. Conventional PCR
  2. Nested PCR
  3. Multiplex PCR
  4. Reverse transcriptase PCR
  5. Real-time PCR
  6. Asymmetric PCR
  7. Quantitative competitive PCR

- **PCR procedure**

Polymerase Chain Reaction (PCR)



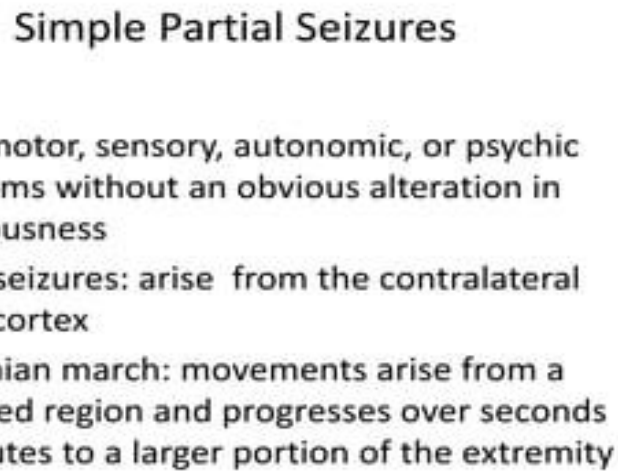
- **Pyrimidine synthesis...**
  Pyrimidine atoms come from two sources—carbamoyl phosphate and aspartate. **The first reaction is catalyzed by CPS II in cytoplasm and the second reaction by aspartate transcarbamoylase**. Aspartate combines with carbamoyl phosphate in the presence of aspartate transcarbamoylase.



- **Causes of extra carnial and intra cranial headaches**

Table 5.3 Extracranial and intracranial causes of headache[12]	
Extracranial	**Intra-cranial**
Cervical zygapophyseal joints	Brain tumours
Cervical spine arteries (including the vertebral artery)	Space occupying lesions (haematoma, abscess)
Trigger points	Subarachnoid haemorrhage
Third occipital neuralgia	Meningitis
Suboccipital muscles	Aneurysm
Cervical spondylosis	Posterior fossa lesions
Occipital neuralgia	Cerebral artery haemorrhage
Accessory nerve neuroma	Raised intra-cranial pressure
	Encephalitis
	Angioma

- **Jacksonion epilepsy**



- **Relationship of pupil size with depth of focus**
  Inverse relation

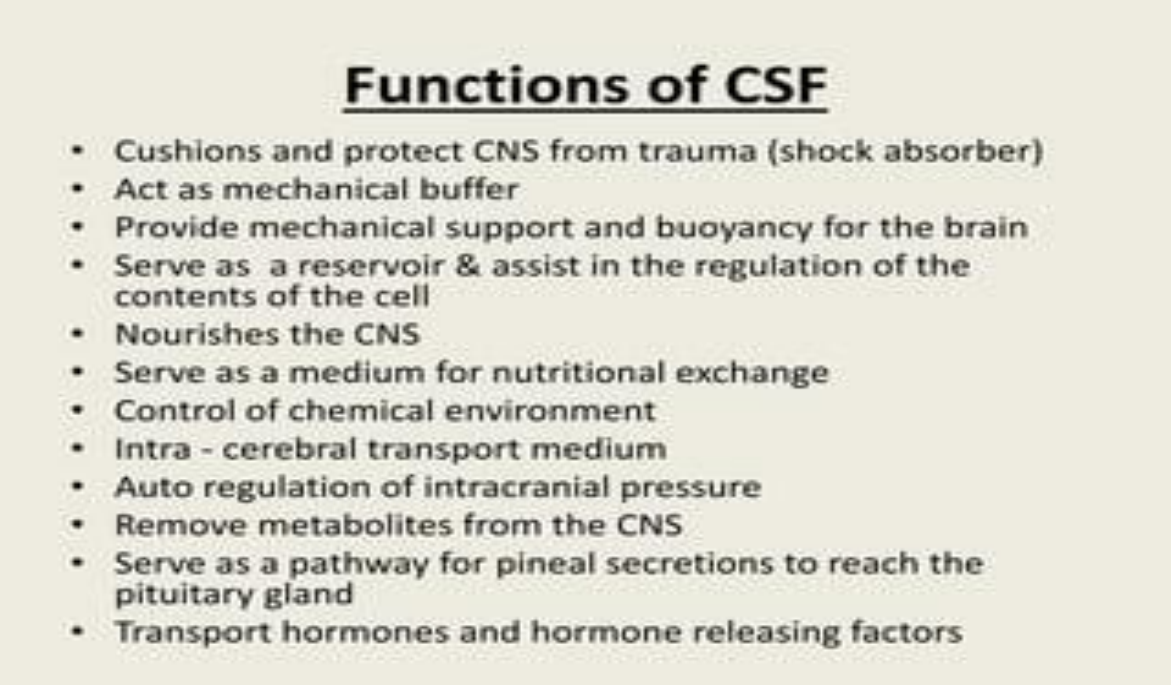
- **In case of bacterial meningitis, what is the effect on CSF glucose level?**
  Levels of glucose in the cerebrospinal fluid (CSF) are used to discriminate bacterial meningitis from viral meningitis. Children with bacterial meningitis typically have **low levels of CSF glucose** because of glycolysis by both white cells and the pathogen and impaired CSF glucose transport.

- **What are the effects of right and left optic tract lesions**
  Right optic tract lesion – Left homonymous hemianopia
  Left optic tract lesion – Right homonymous hemianopia
  EYE LESIONS:
  1. Optic chiasm – bitemporal hemianopia
  2. Optic tract – contralateral homonymous hemianopia
  3. Optic Radiation – contralateral homonymous hemianopia
  4. Lateral geniculate body – contralateral homonymous hemianopia

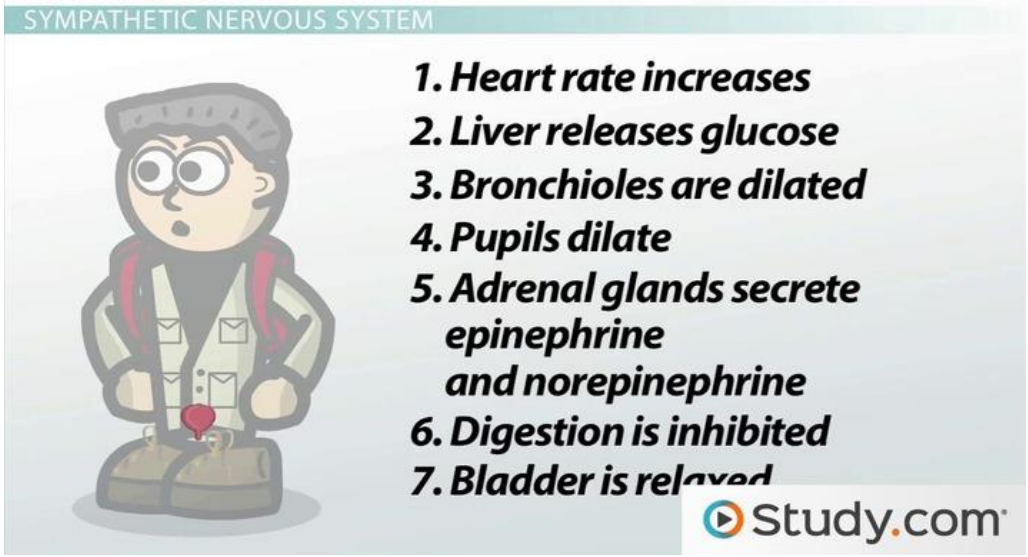
- **Examine the motor component of facial nerve**
  1. Raise eyebrows
  2. Ask subject to shut eyes tightly. Now examiner tries to open upper eyelids

3. Whistle
4. Blow out cheeks
5. Show teeth

- **functions of csf**



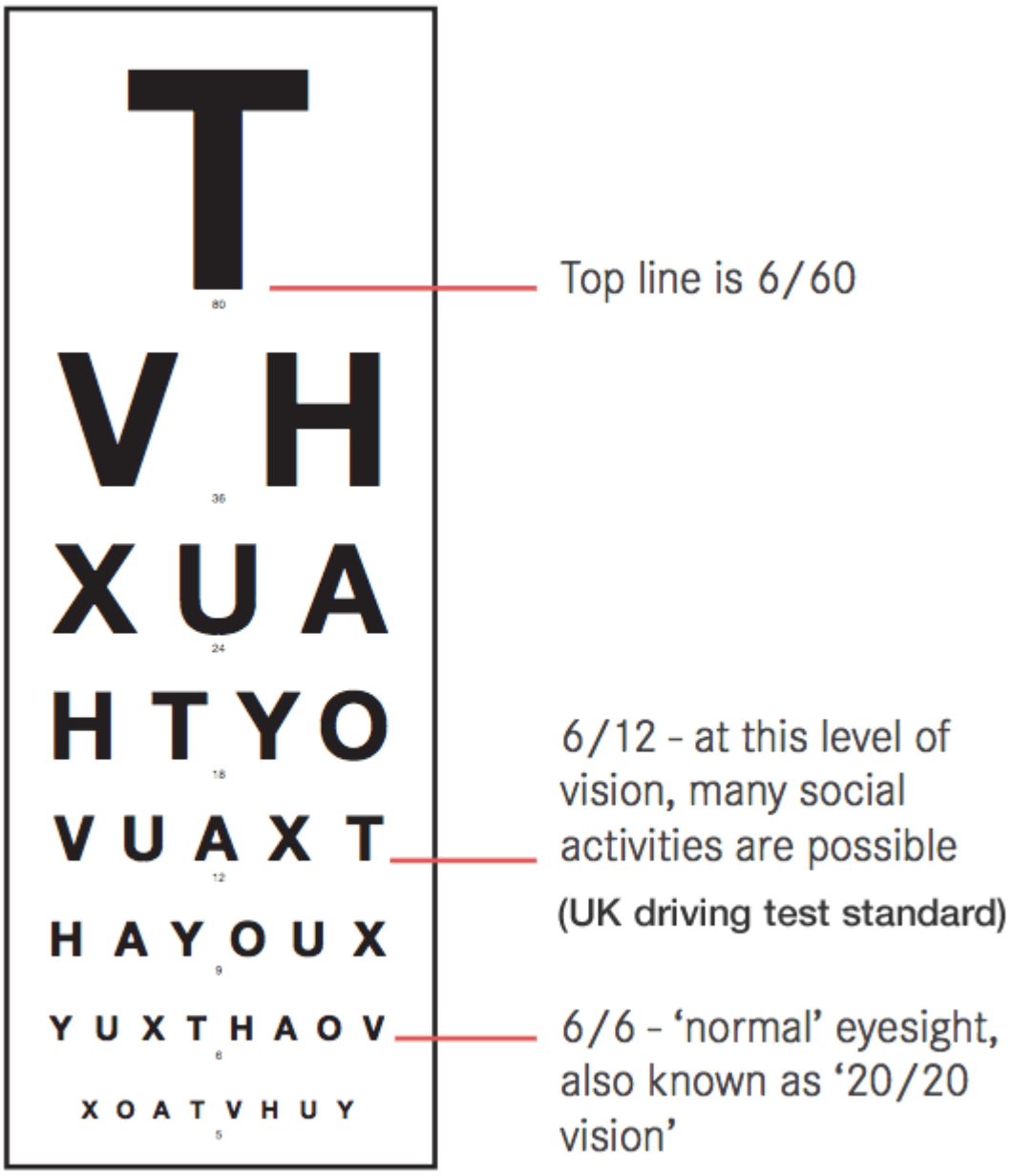
- **2 ways in which sympathetic increases body activity to perform**



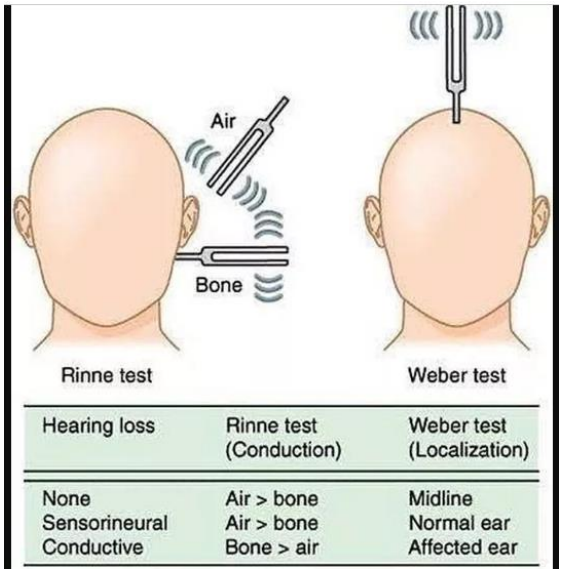
- **Flocculonodular lobe**
  The flocculonodular lobe receives input from the primary vestibular afferents and projects back to the vestibular nuclei. This portion of the cerebellum **governs eye movements and body** equilibrium during stance and gait.

- **What is place principle**
  Place theory is a theory of hearing that states that our perception of sound depends on where each component frequency produces vibrations along the basilar membrane.

- **Visual acuity**
  Visual acuity (VA) is **a measure of the ability of the eye to distinguish shapes and the details of objects at a given distance**.
  Subject is asked to stand at 6 meter/ 20 feet distance from the Snellen chart.



- **Myopia**
  - Also known as nearsightedness
  - Defect in far vision
  - Corrected with concave lens
- **Hypermetropia**
  - Also known as shortsightedness
  - Defect in near vision
  - Corrected with convex lens
- **Rennie's test**
- **Weber test**



Hearing loss	Rinne test (Conduction)	Weber test (Localization)
None	Air > bone	Midline
Sensorineural	Air > bone	Normal ear
Conductive	Bone > air	Affected ear

- **2nd pharyngeal pouch derivatives**

TABLE 17.2 *Derivatives of the Pharyngeal Pouches*

Pharyngeal Pouch	Derivatives
1	Tympanic (middle ear) cavity
	Auditory (eustachian) tube
2	Palatine tonsils
	Tonsillar fossa
3	Inferior parathyroid gland
	Thymus
4	Superior parathyroid gland ultimobranchial body (parafollicular [C] cells of the thyroid gland)

- **Anencephaly , cause** - Failure to close cranial neuropore

- Skull foramina
- Brain ...**corpus callosum and type of fibres present in it**
  The corpus callosum is a large bundle of more than 200 million **myelinated nerve fibers** that connect the two brain hemispheres, permitting communication between the right and left sides of the brain.

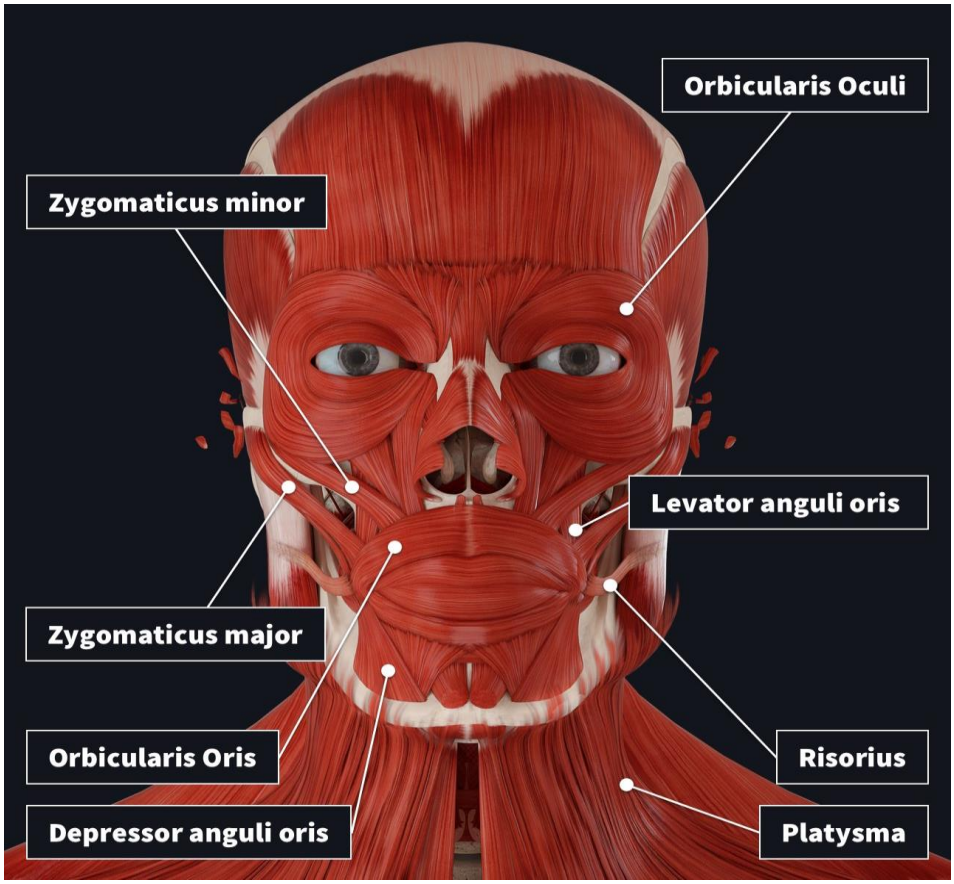
- **Interthalamic adhesion**
  The interthalamic adhesion (ITA) is **an understudied neuroanatomical structure that forms a bridge of tissue connecting the thalamus of each hemisphere across the midline** whose functional significance remains largely unknown.

- **Inferior colliculus, function**
  Principal functions of the inferior colliculus involve sound localization, frequency determination, and integration of auditory with nonauditory systems.

- **From Posterior 1/3rd of tongue taste tensations are carried by?**
  Glossopharyngeal nerve

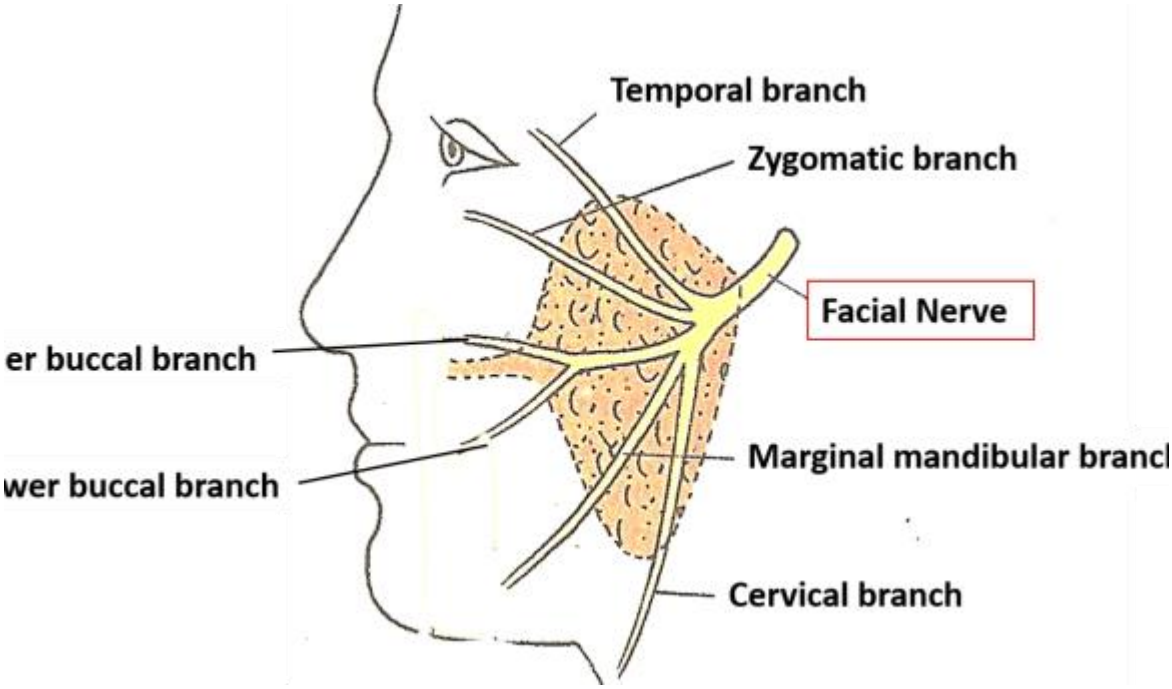
- **Left glossopharyngeal nerve damage...uvula deviated to which side**
  Uvula is deviated **away from the side of the lesion**. i.e. uvula deviates towards unaffected side
- Nerve damaged and which side affected (tongue deviated to right side shown in figure)
  Left vagus nerve lesion
- Larynx model

- **Muscles of fascial expression**



- **Boundaries of posterior triangle**
  - Anterior – Sternocleidomastoid
  - Posterior – Trapezius
  - Base – Clavicle

- **Which nerve pierces parotid gland and its 5 branches**

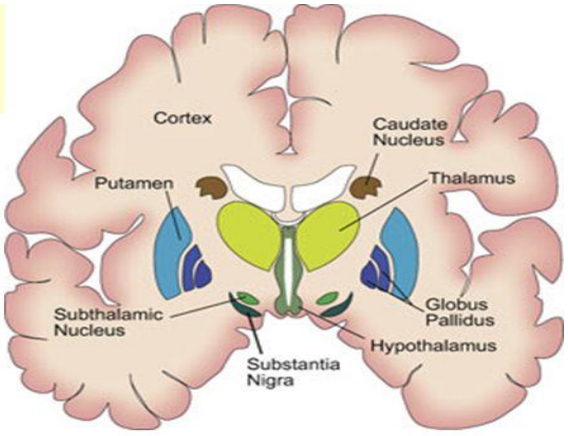


- **Basal ganglia nuclei**

Components

- The basal ganglia include:
- 1-Caudate nucleus
- 2-Putamen
- 3-Globus pallidus:
  - external segment
  - internal segment
- Subthalamic Nucleus
- Substantia nigra

Are functionally related to the basal ganglia



The Amygdala, located within the temporal lobe has a similar embryologic origin but functionally is part of the limbic system.

- **Circle of Willis**

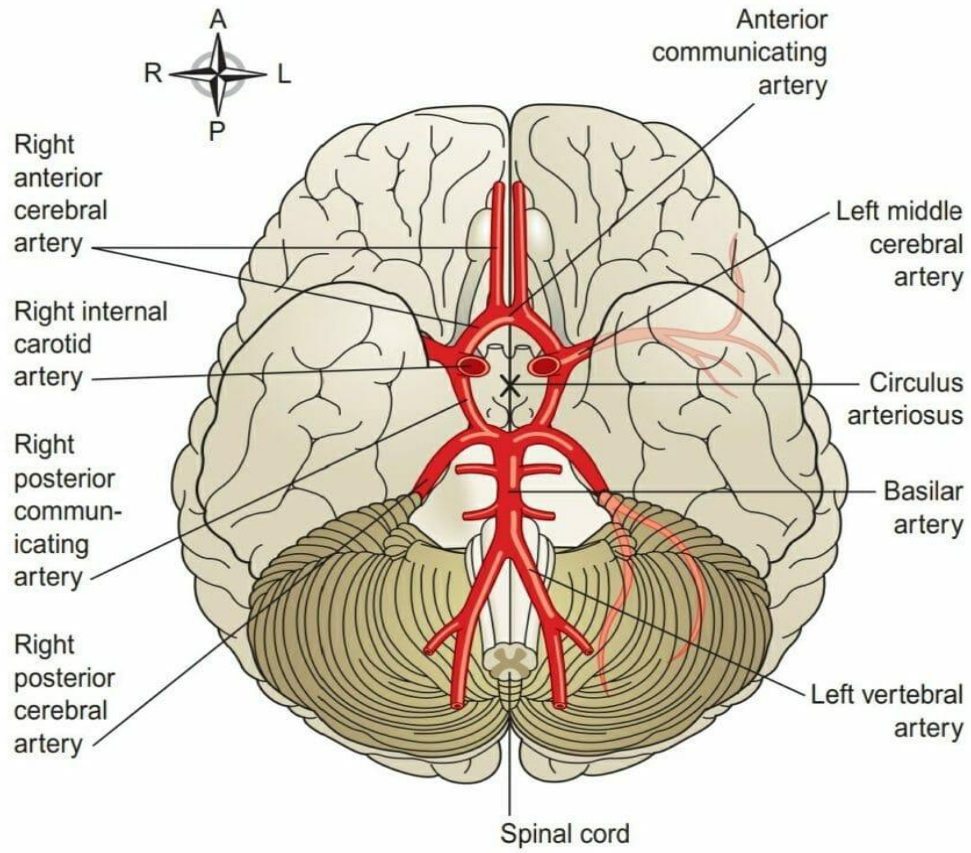


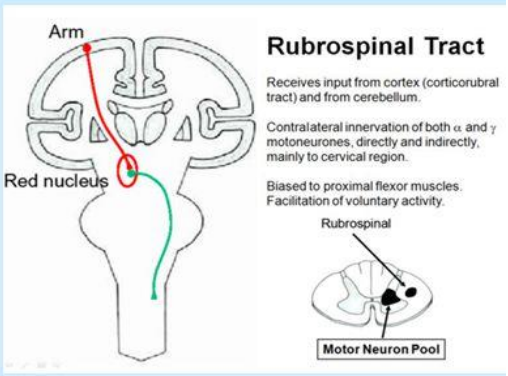
Figure 5.31 Arteries forming the circulus arteriosus (circle of Willis) and its main branches to the brain. Viewed from below.

- Corpus callosum
- Midbrain cross section
- Occulomotor nerve

- **Red nucleus functions**

Red nucleus

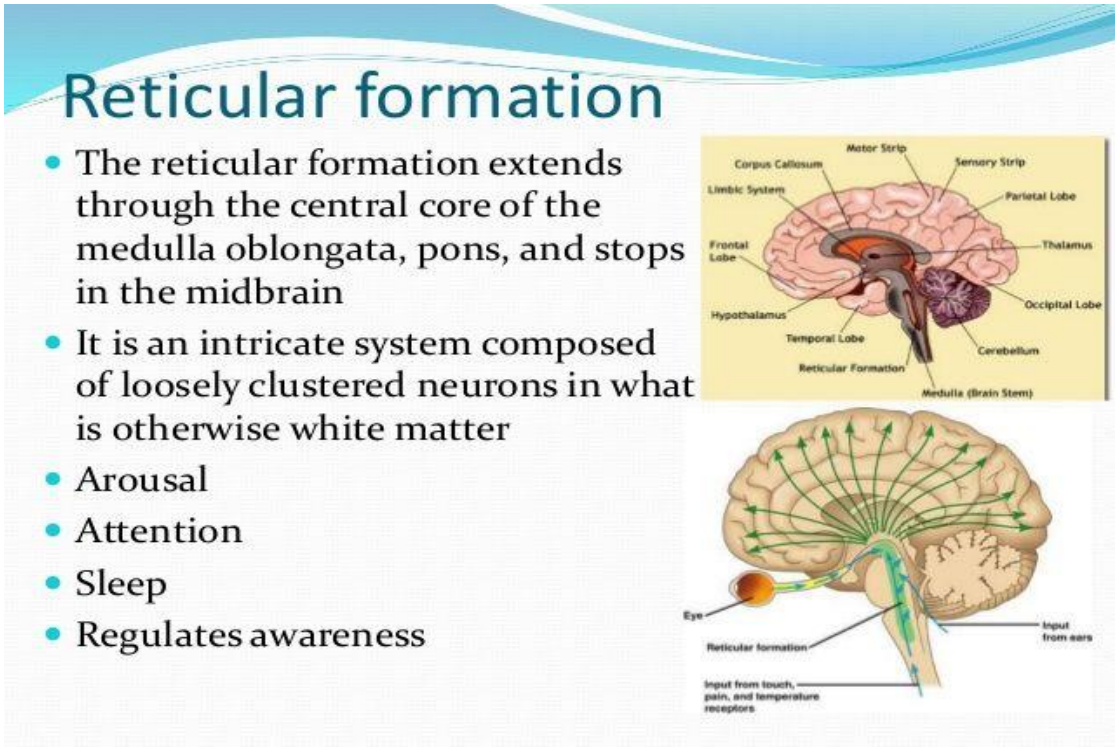
- **Function:**
  - **motor coordination**
    - **Rubrospinal tract** – extrapyramidal pathway *(less important in humans than in many other mammals - **in humans the corticospinal tract is dominant**).*
  - Control of **crawling of babies**
  - Controls the muscles of the shoulder and upper arm (but lower arm and hand as well).
  - Control of **arm-swinging** in normal walking



- **The rubrospinal projection:**
  - receives many inputs from the contralateral cerebellum and an input from the ipsilateral motor cortex
  - sends efferent axons to the contralateral half of the spinal cord

- **Area postemea** – vomiting center in medulla oblongata

- **Reticular formation**
  The reticular formation is **a complex network of brainstem nuclei and neurons that serve as a major integration and relay center for many vital brain systems to coordinate functions necessary for survival**.



- **Cauda equine**

  the roots of the lumbar and sacral spinal nerves, which form a bundle within the lowest part of the spinal column.

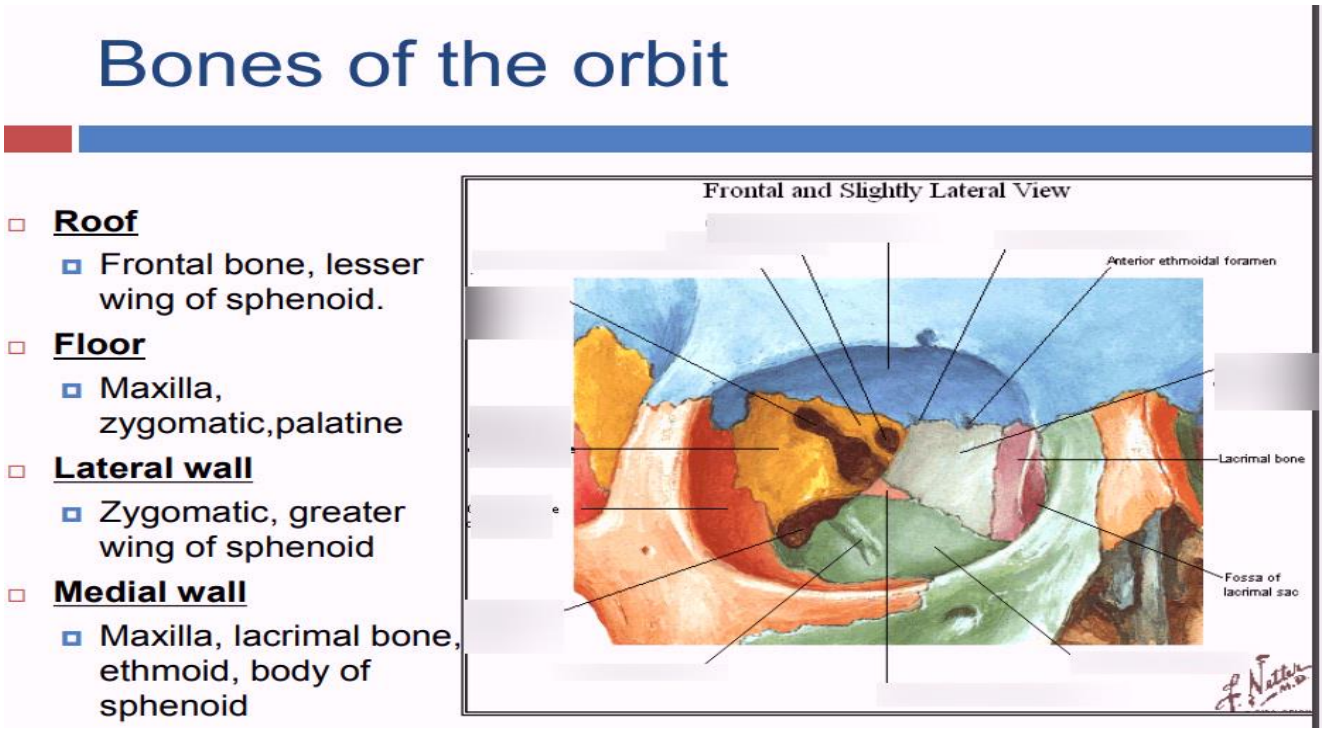
- **Thoracolumbar outflow** – sympathetic nervous system
- **Middle ear present in which bone** – temporal bone

- **Inner layer bony labyrinth**
  inner ear, also called labyrinth of the ear, part of the ear that contains organs of the senses of hearing and equilibrium. The bony labyrinth, **a cavity in the temporal bone**, is divided into three sections: the vestibule, the semicircular canals, and the cochlea.

- **Vestibular apparatus**
  The vestibular system consists of **two structures of the bony labyrinth of the inner ear, the vestibule and the semicircular canals, and the structures of the membranous labyrinth contained within them**.

- **Nassolacrimal duct opens in which meatus** – Inferior meatus

- **Orbit roof and floor**



- **Carotid triangle**
  Contents of carotid sheath: (from lateral to medial)
  1. Internal jugular vein
  2. Common carotid artery
  3. Internal carotid artery
  4. CN 9, 10, 11, 12

- **Intrinsic muscles of eye and nerve supply**

EOM	ORIGIN	NERVE SUPPLY
Superior rectus	Annulus of zinn	Occulomotor nerve
Inferior rectus	Annulus of zinn	Occulomotor nerve
Lateral rectus	Annulus of zinn	Abducent nerve
Medial rectus	Annulus of zinn	Occulomotor nerve
Superior oblique	Annulus of zinn via trochlea	Trochlear nerve
Inferior oblique	Maxillary bone	Occulomotor nerve
Levator palpebral superiosis	Sphenoid bone	Occulomotor nerve

- **Tongue muscles**

TONGUE - MUSCLES

Hyoglossus
Hypoglossal nerve (XII)
Genioglossus
Hypoglossal nerve (XII)
Styloglossus
Hypoglossal nerve (XII)
Palatoglossus
Pharyngeal plexus (IX, X & sympathetic)
Intrinsic muscles
Superior/inferior longitudinal, transverse & vertical
Not attached to bone
Hypoglossal nerve (XII)

Note: All muscles are supplied by hypoglossal nerve except palatoglossus

- **Field of vision**

Field of vision is an extent of an area in space that can be seen at particular moment with an eye fixed at one point.

Normal extent of field of vision with 5mm object in good illumination are:

1. Upward – 60°
2. Outward (Temporal) – 90°
3. Downward – 70°
4. Inward (nasal) - 60°

- **Trochlear nerve lesion**

Trochlear nerve lesion

Isolated trochlear nerve injury is rare.

Lesion results in **diplopia** & inability to rotate the eye infero-laterally due to paralysis of the superior oblique muscle of the same side.

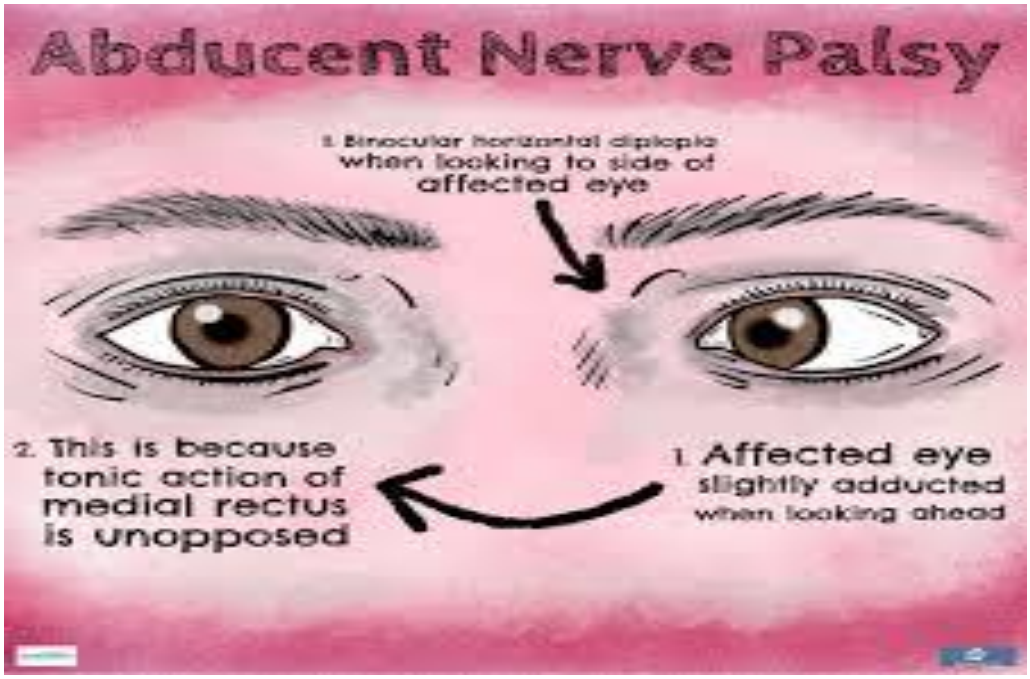
The **eye deviates; upward** and slightly **inward.**

Person has difficulty in walking downstairs.

If you asking the patient to look downwards towards the opposite side of the lesion

Leads to diploplia.

- **<u>Abducent nerve lesion</u>**



- Right eye in down and out position and ptosis.which cranial nerve is involved in this lesion??
- A patient cannot move his left eye to left side.the extraocular muscle involved in this lesion

- **<u>Superior oblique action and nerve supply</u>**
  Superior oblique nerve supply by trochlear nerve.
  Function of Superior Oblique: Depress and abduct
- for physio read the practical notebook and do the cranial nerves plus ophthalmoscope from sir farhan slides because ussai non observed station bohat ata hai
- Aur iss kai ilawa optic nerve lesion ka picture,eye movements ka picture and bells palsy vala joa picture hai voa karlo
- medulla oblongata kai levels are imp as mam mahwish nai kaha tha hamain
- Learn the clinical notes of embryo aur us book mai **<u>pharyngeal arches</u>** ka table hai voa karlo

BRANCHIAL ARCH	SKELETAL DERIVATIVES (neural crest)	MUSCLE DERIVATIVES (mesoderm)	MOTOR INNERVATION
Arch 1	Maxilla, mandible, incus, malleus, zygomatic	Muscles of mastication, ventral mylohyoid, anterior belly of digastric, tensor tympani, tensor veli palatini	Trigeminal (V)
Arch 2	Stapes, upper hyoid	Facial muscles, stapedius, posterior belly of digastric, stylohyoid	Facial (VII)
Arch 3	Lower hyoid	Stylopharyngeus	Glossopharyngeal (IX)
Arches 4-6	Laryngeal cartilages	Soft palate muscles, pharyngeal and laryngeal muscles	Vagus (X)

- learn the foramina plus their contents

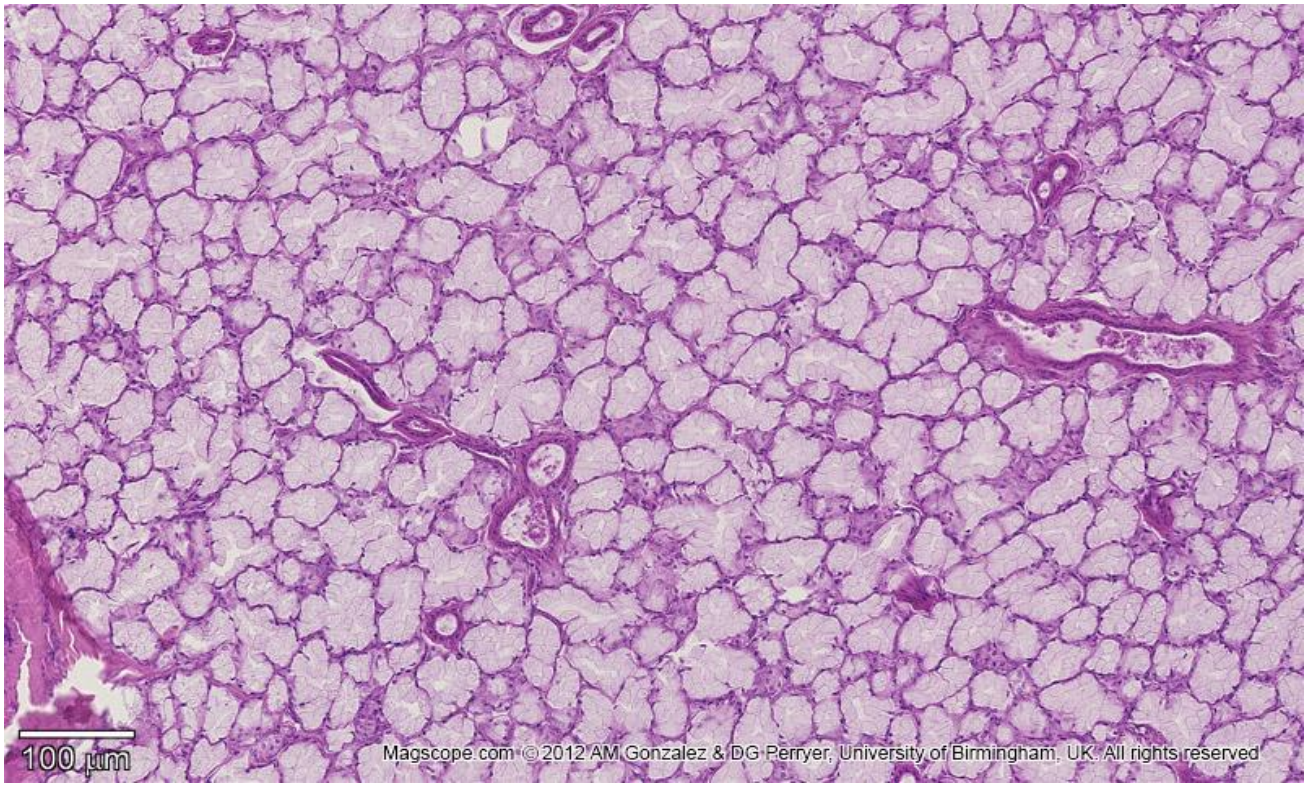
Aperture	Contents
Optic canal	CN II
Superior orbital fissure	CN III, IV, V1, VI; superior ophthalmic vein
Foramen rotundum	CN V2
Foramen ovale	CN V3
Foramen spinosum	Middle meningeal artery
Foramen lacerum	Meningeal branches of the ascending pharyngeal artery
Vidian canal	Vidian artery and nerve
Internal auditory canal	CN VII, VIII
Jugular foramen pars nervosa	CN IX
Jugular foramen pars vascularis	CN X, XI; internal jugular vein
Carotid canal	ICA
Stylomastoid foramen	CN VII
Hypoglossal canal	CN XII
Foramen magnum	Medulla

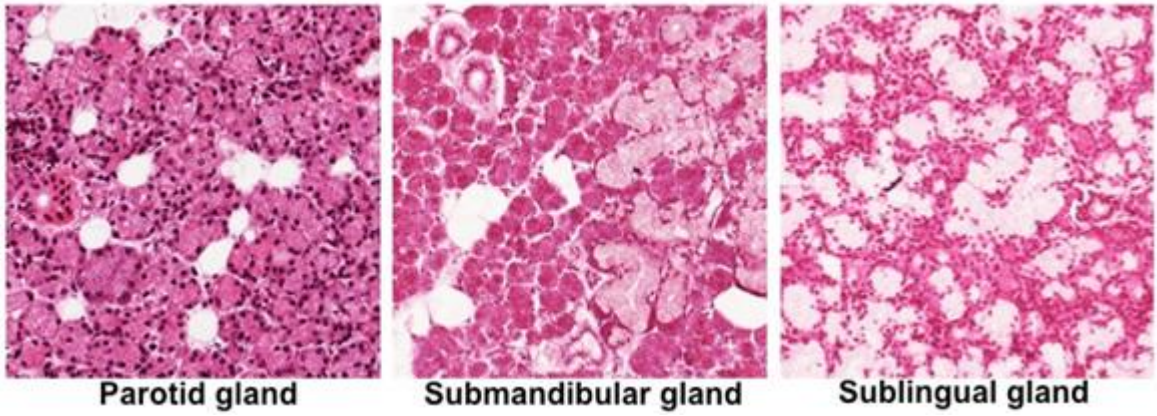
Note.—CN = cranial nerve.

- Aur pyrimidine valai chap sai do the definitions only.

- **<u>Branches of external carotid artery</u>**
  1. Superior thyroid artery
  2. Ascending pharyngeal artery
  3. Lingual artery
  4. Facial artery
  5. Occipital artery
  6. Maxillary artery
  7. Superficial temporal artery

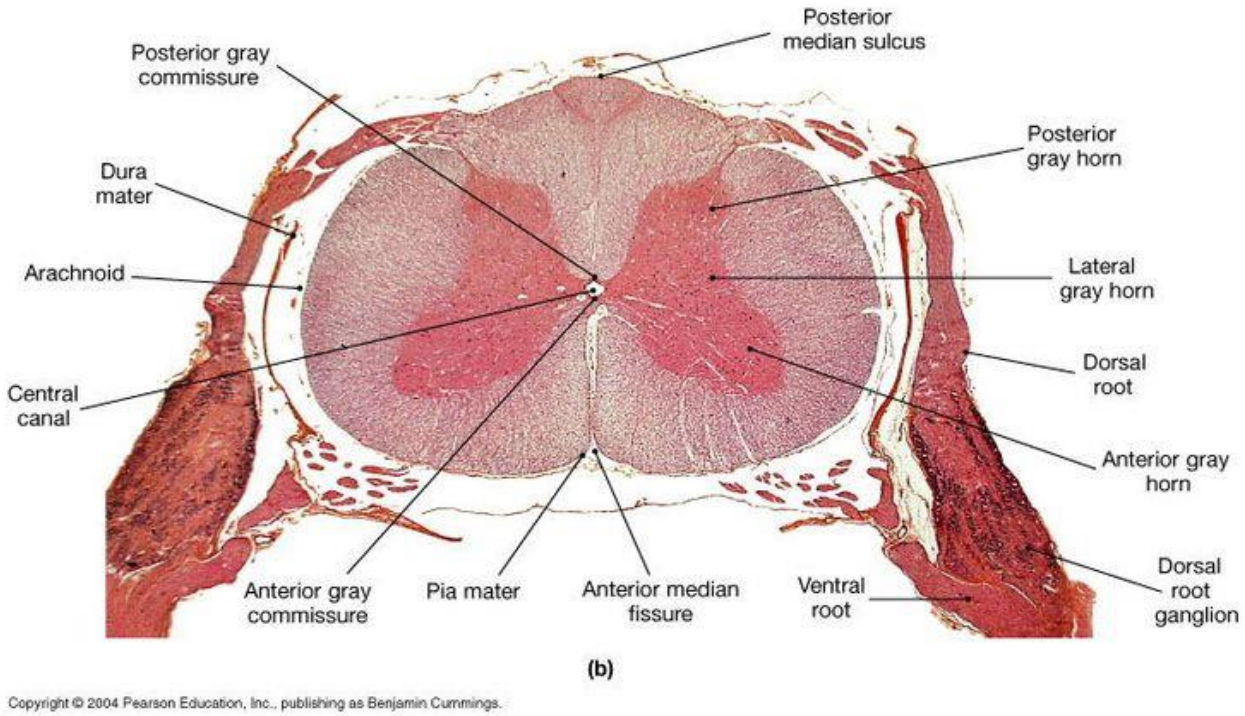
- **<u>Sublinigual gland slide</u>**





Sublingual glands have mainly mucous acini. Parotid glands have mainly serous acini. Submandibular glands have a mixture of mucous and serous acini. Mucous acini stain more weakly than serous acini, because of the techniques used to produce the sections.

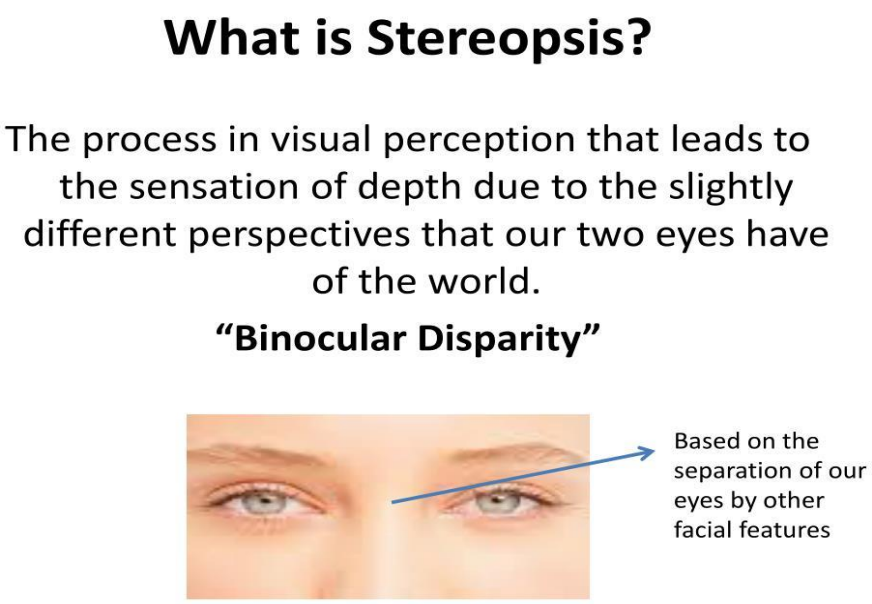
- and **spinal cord slides**



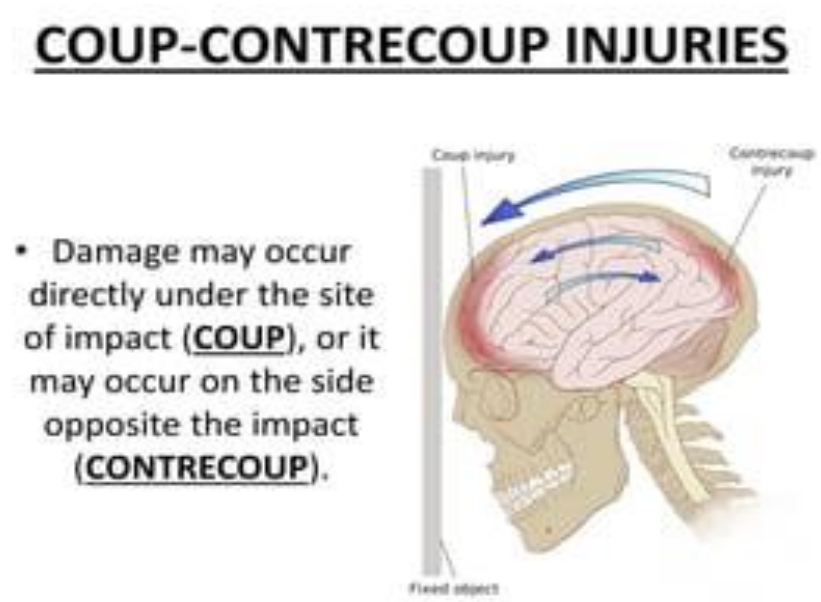
- **Different chemoreceptors present in our body**
  Taste receptors, smell receptors, oxygen level in arterial blood, osmolality of body fluids, CO_2 concentration

- **Mechanism of long-term memory**
  Storage of memory is a function of synapses.
  Each time certain types of sensory signals pass through sequences of synapses, these synapses become more capable of transmitting the same type of signal the next time, a process called **facilitation**. After the sensory signals have passed through the synapses a large number of times, the synapses become so facilitated that signals generated within the brain itself can also cause transmission of impulses through the same sequence of synapses, even when the sensory input is not excited. This process gives the person a perception of experiencing the original sensations, although the perceptions are only memories of sensations.

- **Mechanism of depth perception by the eye**
  Depth perception **relies on visual cues**. These cues are the physical signals and the brain's interpretation of them, which are responsible for your vision as the brain and your body work together. In order to have depth perception, you must have binocular vision, also known as stereopsis.



- **What is coup and contra-coup injury**



- **What is strabismus**

Strabismus — also known as hypertropia and crossed eyes — is **misalignment of the eyes, causing one eye to deviate inward (esotropia) toward the nose, or outward (exotropia), while the other eye remains focused**.

-
- **DIFFERENCES BETWEEN UMNL AND LMNL**...

UMNL	LMNL
1. Hypertonia 2. Hyperreflexia 3. Spasticity 4. Babinski sign 5. Clonus (involuntary muscle contractions) 6. No atrophy	1. Hypotonia or Atonia 2. Hyporeflexia or Areflexia 3. Flaccidity 4. Fibrillation/ Fasciculation 5. Atrophy of muscles

- **What is dermatome**

  A dermatome is an area of skin that is mainly supplied by a single spinal nerve.

- **What is meant by amorphosynthesis**

  A medical condition where the patient is unaware of somatic sensations from one side of the body, usually a sign of lesion in the left parietal lobe.

- **Functions of Non-dominant and Dominant cerebral hemispheres**

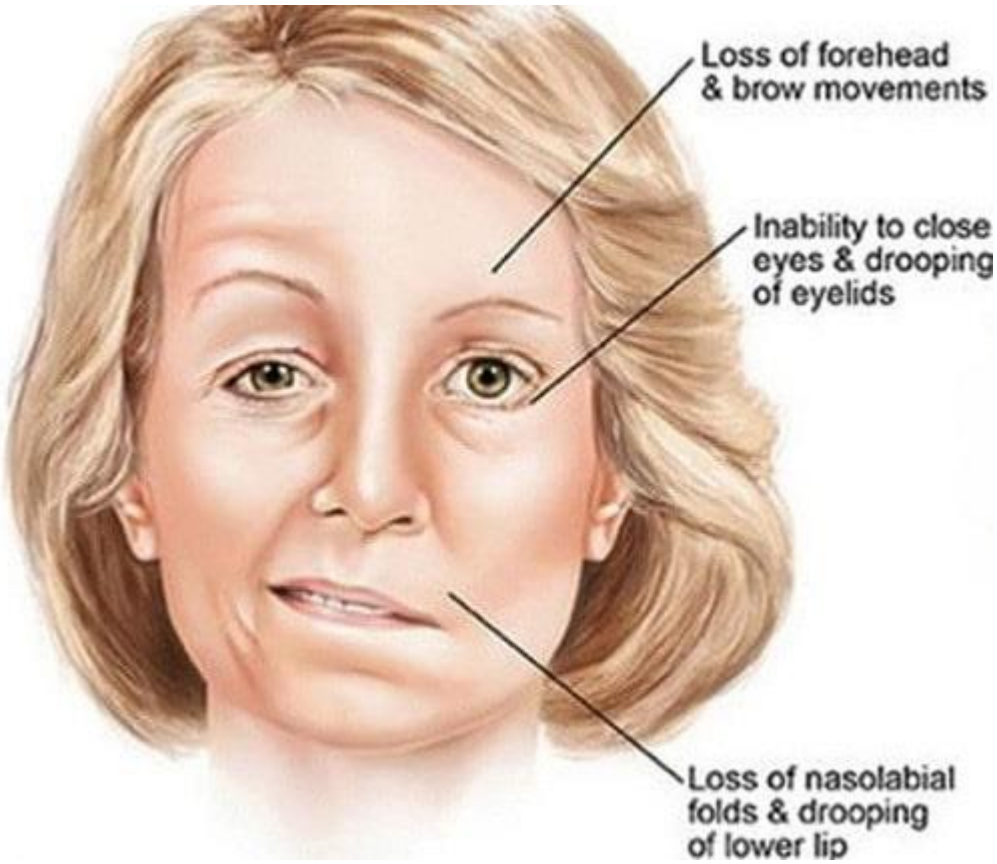
  DOMINANT HEMISPHERE

  1. Angular Gyrus
  2. Broca's area
  3. Motor area for controlling hands

  NON-DOMINANT HEMISPHERE

  1. Understanding and interpreting music
  2. Nonverbal visual experience
  3. Spatial relations between "body language" and intonations of people's voices

- **Picture of facial nerve palsy...**



- Which nerve lesion and side affected

- **A branch of facial nerve called.....carries tatse fibres from.....of tongue**
  Chorda tymani from anterior 2/3 of tongue

- **In LMNL of facial nerve, which side of face is affected?**
  LMNL – paralysis of upper as well as lower face on same side of lesion
  UMNL – paralysis of lower face on opposite side

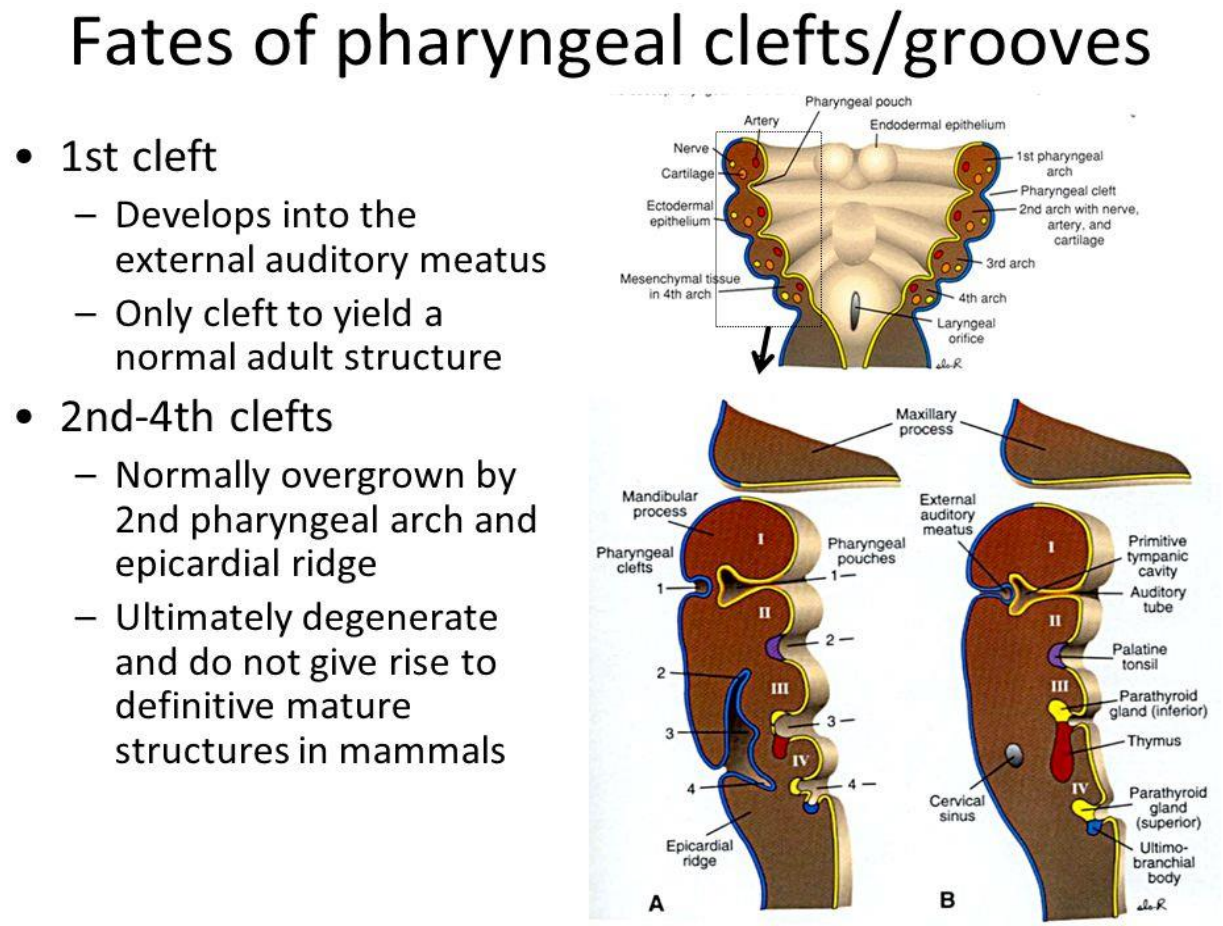
- **What is the reason of physiological blind spot**
  The physiological blind spot refers to a zone of functional blindness all normally sighted people have in each eye, due to an absence of photoreceptors where the optic nerve passes through the surface of the retina.

- Skull model....cribriform plate and what structure passes through it, contents of foramen ovale, infra-orbital foramen and its contents

- **Blood supply of frontal lobe**
  The frontal lobe is supplied by the **anterior and middle cerebral arteries**, which are branches of the internal carotid artery.

- **Identify orbicularis occuli. Nerve supplying it**
  All muscles of facial expression supplied by facial nerve
- Cross section of medulla oblongata.... At the level of decussation of medial leminisci..... Identification of pyramids, spinal nucleus of trigeminal nerve, internal arcuate fibres and their function, bilateral cleft lip and its cause

- **Structure derived from 1st Pharyngeal cleft**

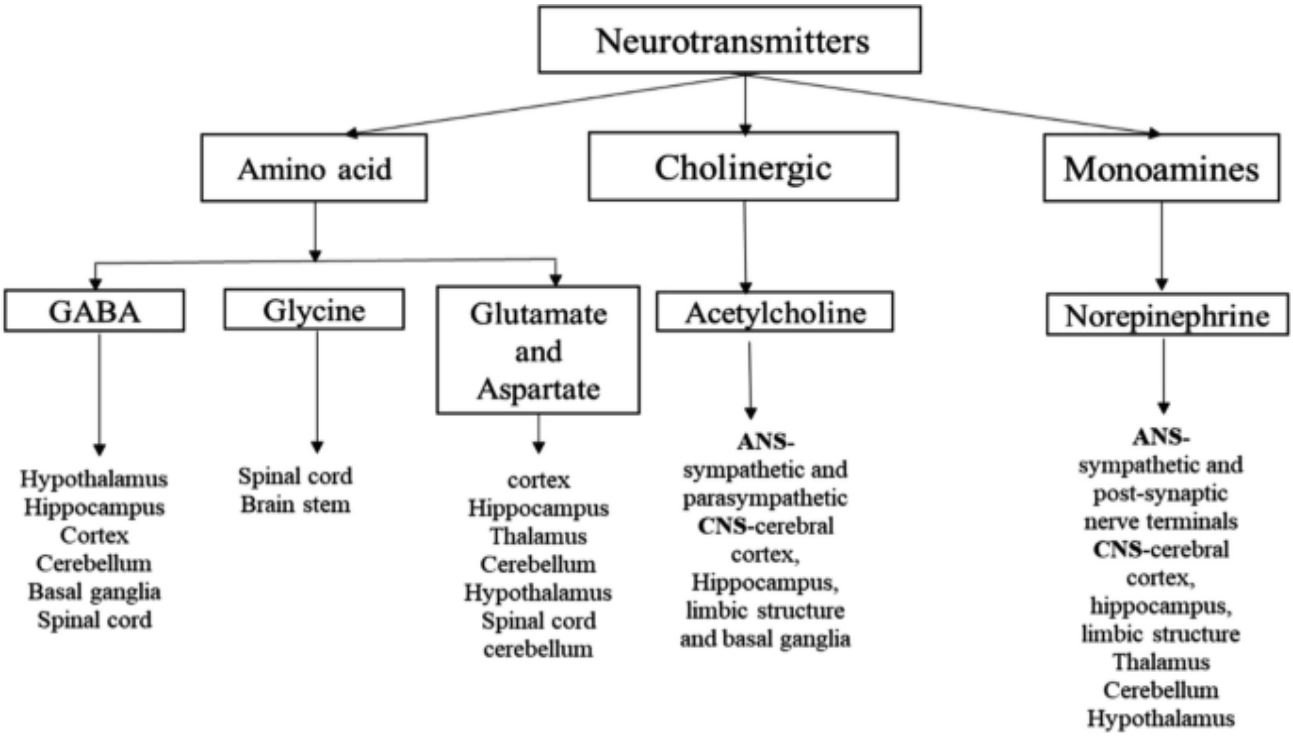


- Nerve derived from 3rd pharyngeal arch
- Boundaries of posterior triangle of the neck

- Right eye in down and out position and ptosis. Which cranial nerve is affected
- A person cannot move his left eye to left side. Which extraocular muscle is damaged

- **Neimann-Pick disease**
    1. Type A: There is progressive mental retardation, hepatosplenomegaly because of progressive accumulation of sphingomyelin. Children die within 2 years of life.
    2. Type B: There is no involvement of brain but sphingomyelin is present in excessive amount in liver, spleen and bone marrow. Death occurs within 20 years of life.

- **Classification of neurotransmitters on basis of structure**



- **Transcription definition**
  Transcription is the process in which RNA is synthesized from DNA. For this purpose, one of the two strands of DNA serve as template to produce working copies of RNA molecules.
  9
- **Inhibitors of Transcription i.e. inhibitors of RNA synthesis**
    1. Actinomycin D
    2. Rifamycin
    3. Amantin
    4. Heparin

- Inhibitors of DNA and RNA synthesis

- **Gout**
  The disorder is characterized by hyperuricemia with recurrent attacks of acute arthritic joint inflammation, caused by deposition of mono-sodium urate crystals.

- **Mutation**
  A mutation is **a change in the DNA sequence of an organism**. Mutations can result from errors in DNA replication during cell division, exposure to mutagens or a viral infection.

- **Types of mutations**
    1. Point Mutations (transitions or transversions)
        a) Silent mutation – the codon containing the changed base may code for same amino acid, so no detectable effect
        b) Mis-sense mutation – codon containing changed base may code for different amino acid

c) Non-sense mutation – codon containing changed base may become a termination codon e.g. UGA, UAA, UAG

2. Frameshift mutations (Deletion or insertion)

- Sources of C and N of Purine

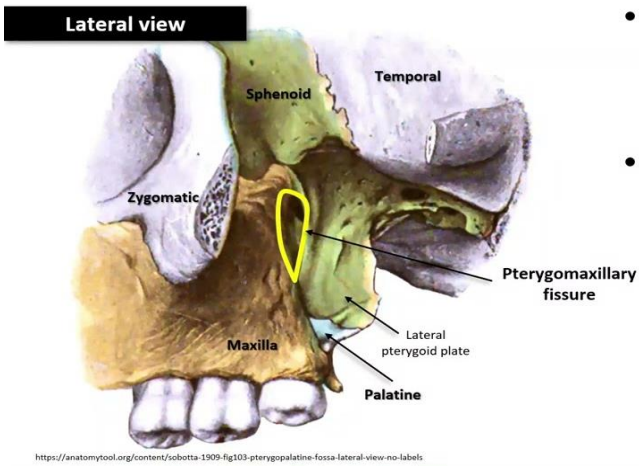
- **Endproduct of Purine catabolism =** Uric acid

- In contrast to purines, **pyrimidines** undergo ring cleavage and the usual end products of catabolism are **beta-amino acids plus ammonia and carbon dioxide**.

- Nucleoside = Sugar + base
- Nucleotide = Sugar + Base + Phosphate
- Slides.... Cerebrum, Sub-lingual gland
-
- ANATOMY VIVA
- **Fascial layers of neck**
  1. Investing fascia
  2. Pretracheal fascia
  3. Prevertebral fascia

- Facial vein
- **Internal juglar vein... Formation and drainage**
  It is formed by the union of inferior petrosal and sigmoid dural venous sinuses in or just distal to the jugular foramen (forming the jugular bulb). It descends in the carotid sheath with the internal carotid artery.
  The tributaries of the internal jugular include the **inferior petrosal sinus, facial, lingual, pharyngeal, superior and middle thyroid, and, occasionally, the occipital vein**.
  The blood collected from these vessels then drains to **the brachiocephalic vein and into the right atrium**.

- **Pterygopalatine fossa**



- **Pterygopalatine fossa:** depression medial to pterygomaxillary fissure
- **Boundaries:**
  - **Lateral:** pterygomaxillary fissure
  - **Medial:** Palatine
  - **Anterior:** Maxilla
  - **Posterior:** Sphenoid (greater wing)
  - **Roof:** Sphenoid (body)

- Nerves arising from medulla

-
- Posterior surface of medulla ko
- Cranial nerves.... Sensory/motor/mixed

- **Temporomandibular joint... Ligaments**
  The two extrinsic ligaments of the TMJ are the **stylomandibular and sphenomandibular ligaments**.

- **CSF movement**
  CSF **flows from the lateral ventricles to the third ventricle via the foramen of Monro**. From here, it flows across the cerebral aqueduct of Sylvius to the fourth ventricle and onto the subarachnoid space through the apertures of Magendie and Luschka
- Tracts

- **Depth perception through:**
  1. Size
  2. Moving parallex
  3. Stereopsis (Binocular vision)
- **Branches of External Carotid Artery**
  1. Superior thyroid artery
  2. Ascending pharyngeal artery
  3. Lingual artery
  4. Facial artery
  5. Occipital artery
  6. Maxillary artery
  7. Superficial temporal artery

- **Branches of Basilar artery**
  1. Pontine branches
  2. Anterior inferior cerebellar artery (AICA)
  3. Labyrinthine artery
  4. Superior cerebellar artery
  5. Two terminal branches: Posterior cerebral arteries

- **Branches of internal carotid artery**
  1. Ophthalmic artery
  2. Hypophyseal arteries
  3. Anterior choroidal artery

4. Posterior communicating artery
5. Two terminal branches: Anterior and middle cerebral arteries

- **SCALP LAYERS**
  - Skin
  - Dense connective tissue
  - Aponeurotic layer
  - Loose connective tissue
  - Pericranium

- **5 layers of deep cervical fascia**
1. Investing layer
2. Pretracheal fascia
3. Carotid sheath
4. Prevertebral fascia
5. Pharyngeal fascia

- **Infratemporal fossa contains**
  - Muscles of mastication
  - Mandibular nerve and its branches
  - Maxillary artery and its branches
  - Pterygoid venous plexus
  - Otic ganglion

- **Lesions of**
1. Globus pallidus → Athetosis
2. Subthalamus → Hemiballismus
3. Putamen → Chorea
4. Substantia Nigra → Parkinson's disease

- **Dominant Hemisphere**
  - Angular gyrus
  - Broca's area
  - Motor area for controlling hands
- **Non-Dominant Hemisphere**
  - Understanding and interpreting music
  - Nonverbal visual experiences
  - Special relations between "body language" and intonations in people's voices

- **EXAMINATION OF CN-3, 4, 6**
  - Look for ptosis
  - Test for ocular movements (H)
  - Examination of pupil
  - Light reflex
  - Accomodation reflex

- **Examination of Trigeminal Nerve**
  - Touch sensation (sharp or blunt object)
  - Temperature sensation (test tubes filled with warm and cold water)
  - Corneal Reflex (light wisp of cotton, eye blinking)
  - Clench teeth (Masseter and temporalis stand out)
  - Open mouth against resistance to check pterygoids

- **Examination of facial nerve**
  - Facial expression

- Raise eyebrows
- Subject asked to Shut eyes tightly. Examiner try to open upper eyelids
- Whistle
- Blow out cheeks
- Show teeth

- **Examination of Vagus nerve**
  - Patient say “Aah”
  - Uvula deviates ipsilaterally in defect
  - Normal: centralized uvula

- **Examination of Accessory nerve**
  - Shoulder shrug Trapezius
  - Sternocleidomastoid
- **Examination of Hypoglossal nerve**
  - Protrude tongue (look for fasciculation or atrophy)
  - Normal centralized
  - Abnormal deviate towards lesion
  - Bilateral paralysis – unable to protrude tongue

- **Rinne’s Test**
  - Normal: Air Conduction > Bone Conduction
  - Rinne’s Positive: Normal i.e. Air Conduction > Bone Conduction
  - Rinne’s Negative: Conductive Deafness - Bone Conduction > Air Conduction
  - Rinne’s Reduced Positive: Both air conduction and bone conduction are reduced but the normal ratio between air and bone conduction is still maintained (Nerve Deafness)
  - Rinne’s False Negative: Both air conduction and bone conduction are absent in the ear being tested. The subject perceives the vibrations of tuning fork through bones of skull in other normal ear.

- **Intortion of eye** → Superior oblique + Superior Rectus
- **Extorsion of eye** → Inferior oblique + Inferior Rectus

- **Extracranial Headaches:**
  - Tension headaches
  - Migraine
  - Sinusitis
  - Otitis media
  - Mastoiditis
  - Tooth abscess
  - Neuralgia

- **Intracranial Headaches:**
  - Cerebral abscess
  - Intracranial hematoma
  - Severe hypertension
  - Meningitis
  - Subarachoid hemorrhage

- **Place principle**: Pitch of sound is determined by location of vibration across basilar membrane

- **Depth Perception:** The ability to determine distance is called depth perception
  A person normally perceives distance by three main means:
  1. The size of images of known objects on the retina
  2. The phenomenon of moving parallax
  3. Phenomenon of stereopsis – binocular vision

- **Derivatives of pharyngeal pouches**

TABLE 17.2 *Derivatives of the Pharyngeal Pouches*

Pharyngeal Pouch	Derivatives
1	Tympanic (middle ear) cavity
	Auditory (eustachian) tube
2	Palatine tonsils
	Tonsillar fossa
3	Inferior parathyroid gland
	Thymus
4	Superior parathyroid gland ultimobranchial body (parafollicular [C] cells of the thyroid gland)