Anatomy Team 433

MED 433 Teams

OSPE REVISION

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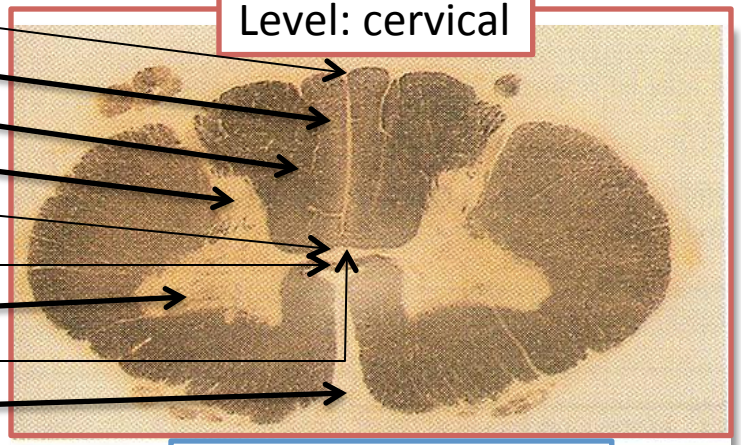
N.B.

- The exam is composed of 8 questions:
  - 5 Anatomy
  - 1 Histology
  - 2 Radiology: 1 CT and 1 MRI
- With the exception of Histology Questions all other questions are in the form of small scenarios.
- Please read the question before answering because not all the questions are just identification.
- There is a difference between the name of gyrus (e.g. precentral gyrus) and the name of the functional of area (e.g. primary motor area)
- The illustrations in these slides are not necessarily those will be present in the exam.
- The information you have obtained for MCQ exam are more than enough for OSPE.

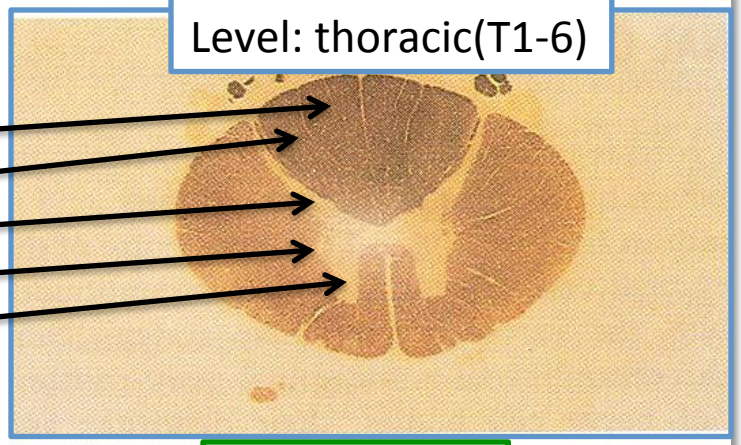
Level: cervical



Posterior median sulcus
Fascicules gracilis
Fascicules cuneatus
Dorsal horn of grey matter
Grey commissure
White commissure
Ventral horn of grey matter
Central canal
Anterior median fissure

Note: no lateral horn

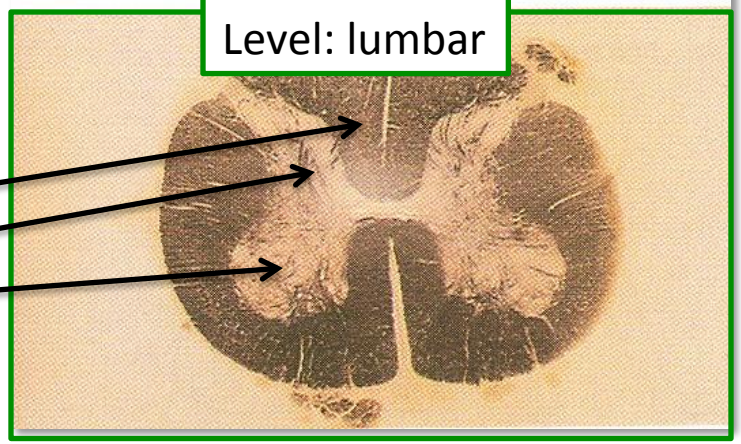
Level: thoracic(T1-6)



Fascicules gracilis
Fascicules cuneatus
Dorsal horn of grey matter
Lateral horn of grey matter
Ventral horn of grey matter

Note: there is both fascicules gracilis (lower limb) and cuneatus(upper limb) in this section so it must be above T6

Level: lumbar



Fascicules gracilis
Dorsal horn of grey matter
Ventral horn of grey matter

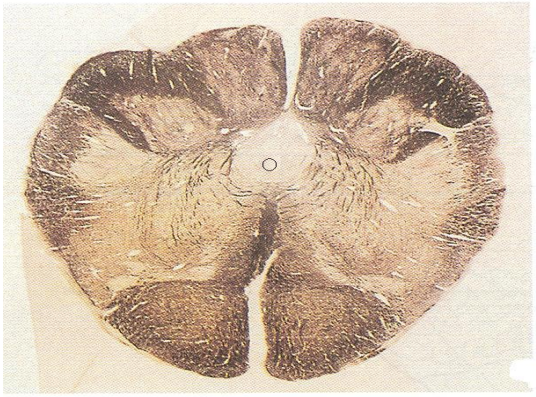
Note: no fascicules cuneatus

-Identify the level
-Identify all structures seen in the slides

Brain stem levels

Caudal medulla:
Level of pyramidal decussation

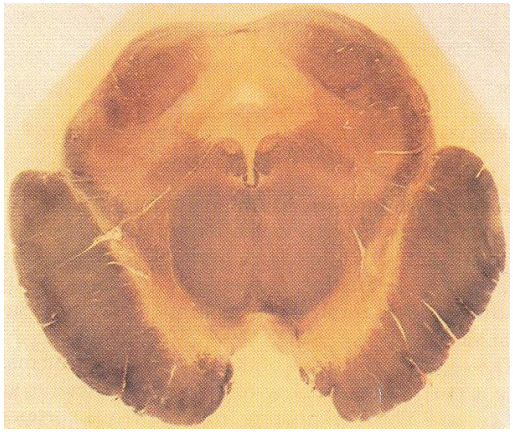
Mid medulla:
Level of sensory decussation



Rostral medulla

Midbrain:
Level of superior colliculus

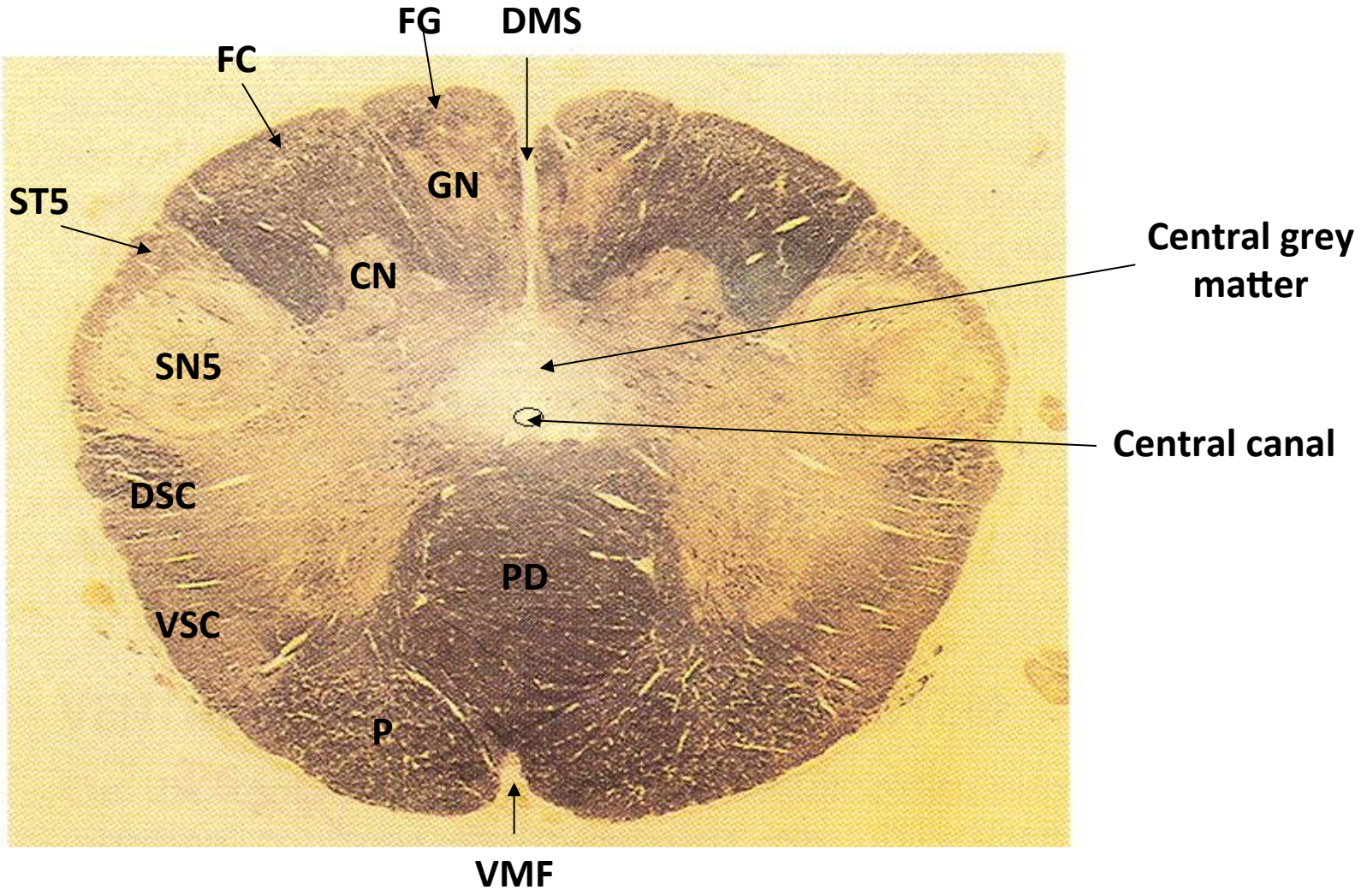
Midbrain:
Level of inferior colliculus



What is the level?
Identification for each section?
Internal structure?

CAUDAL MEDULLA

(LEVEL OF PYRAMIDAL DECUSSATION)



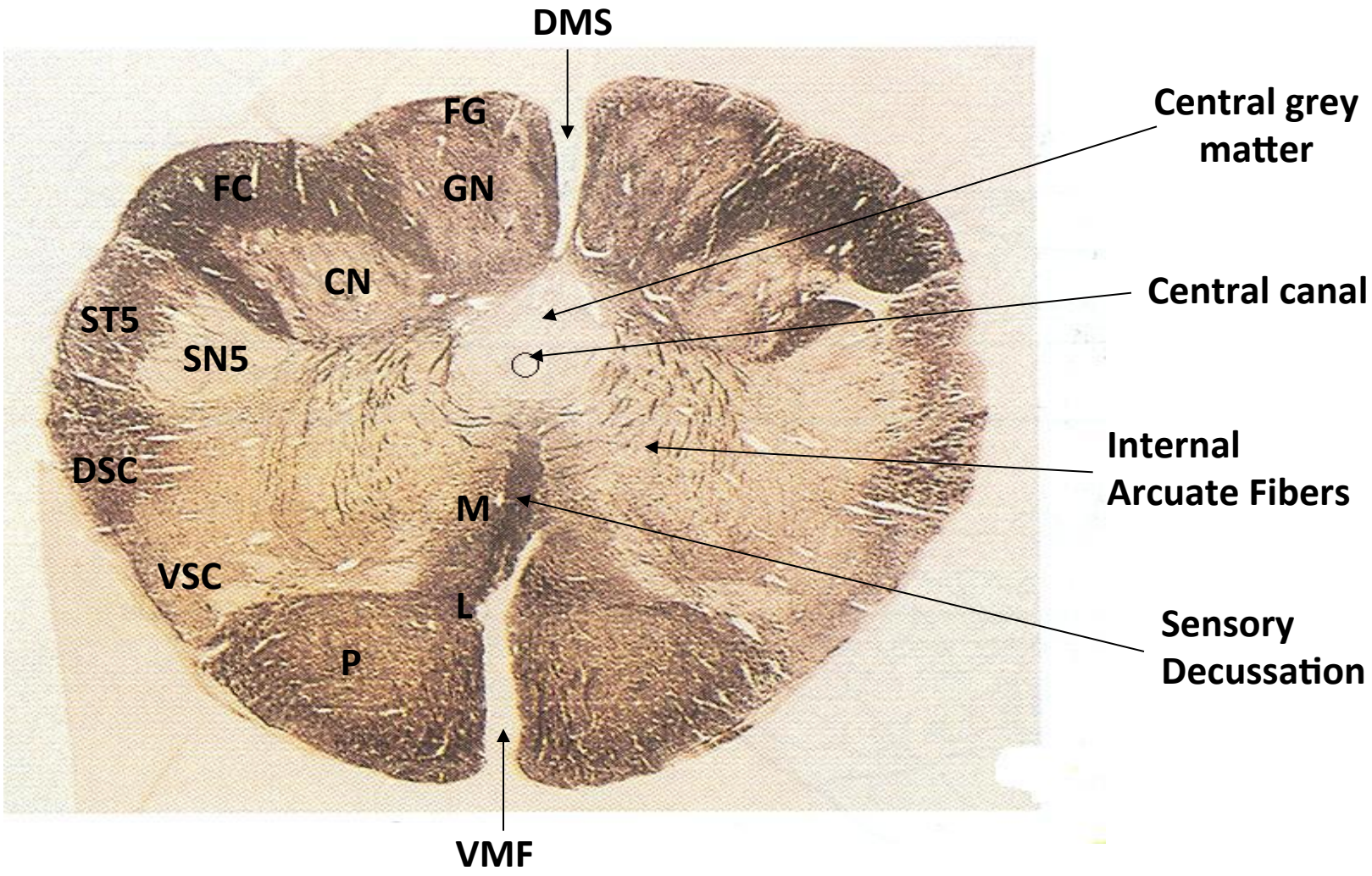
CAUDAL MEDULLA

(LEVEL OF PYRAMIDAL DECUSSATION)

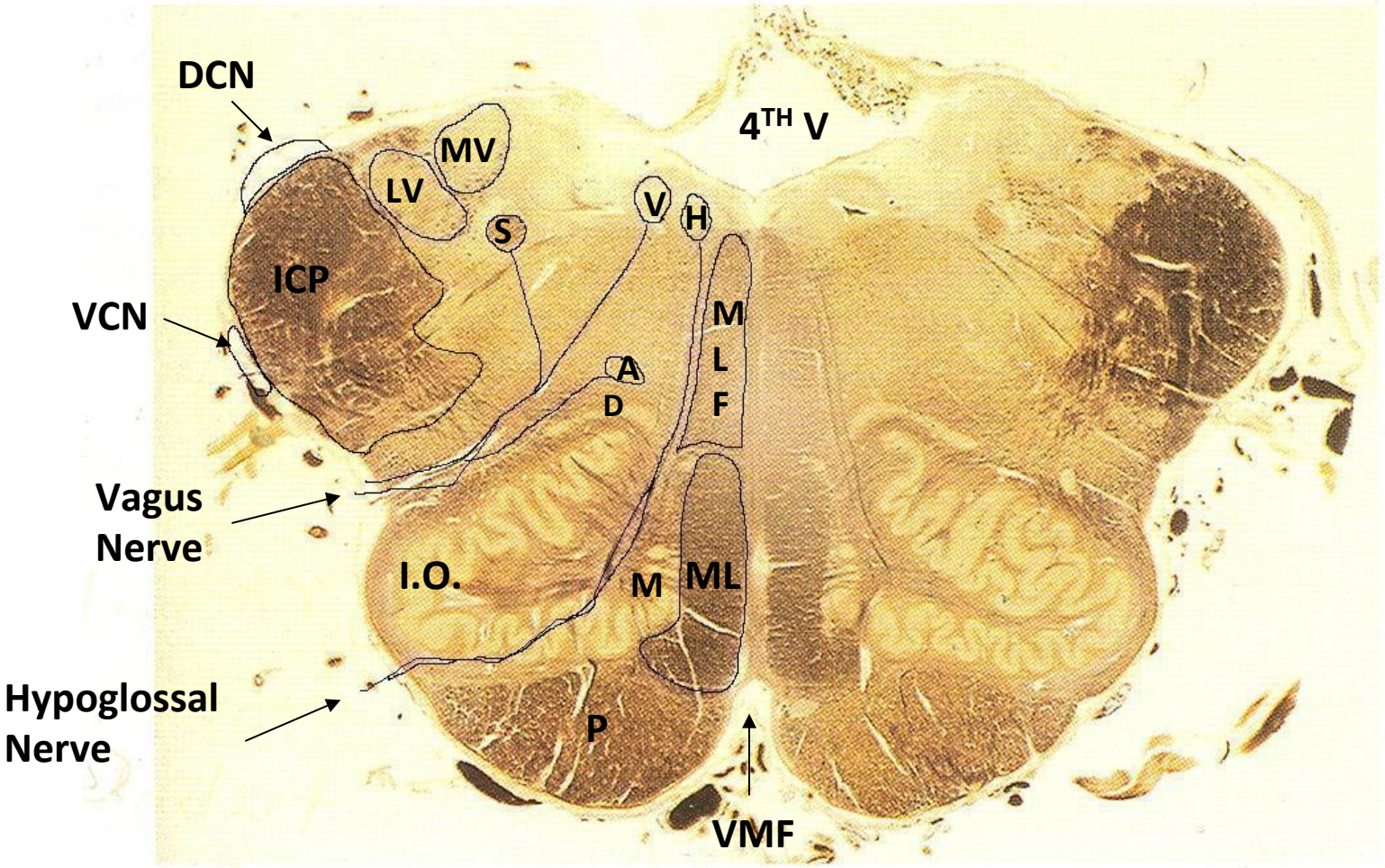
- DMS: Dorsal median sulcus
- FG: fasciculus gracilis
- GN: Gracile nucleus
- FC: Fasciculus cuneatus
- CN: Cuneate nucleus
- SN5: Spinal nucleus of trigeminal nerve
- ST5: Spinal tract of trigeminal nerve
- P: Pyramid
- PD: Pyramidal decussation
- DSC: Dorsal spinocerebellar tract
- VSC: Ventral spinocerebellar tract
- VMF: Ventral median fissure

MID MEDULLA

(LEVEL OF SENSORY DECUSSATION)



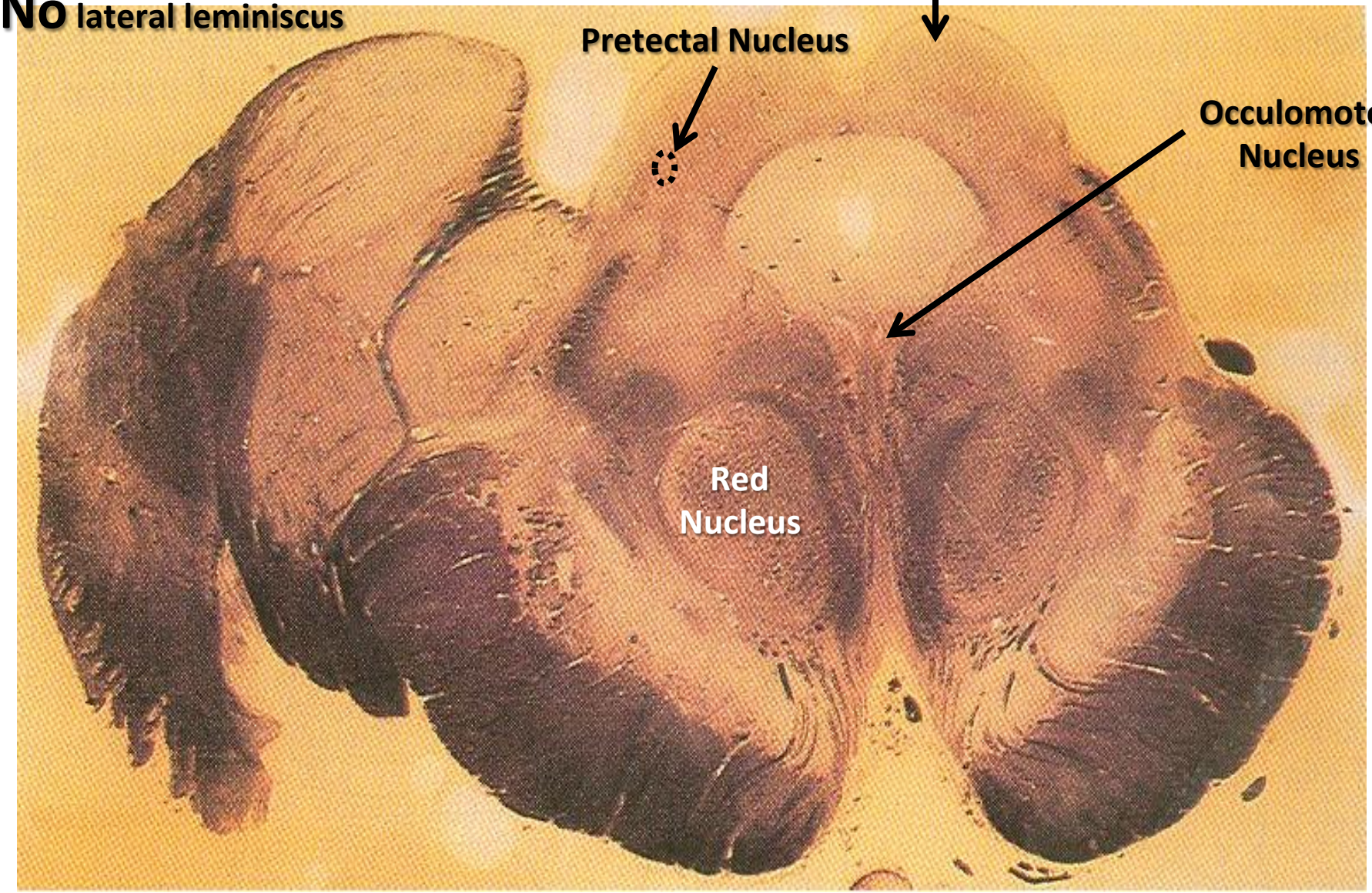
ROSTRAL MEDULLA



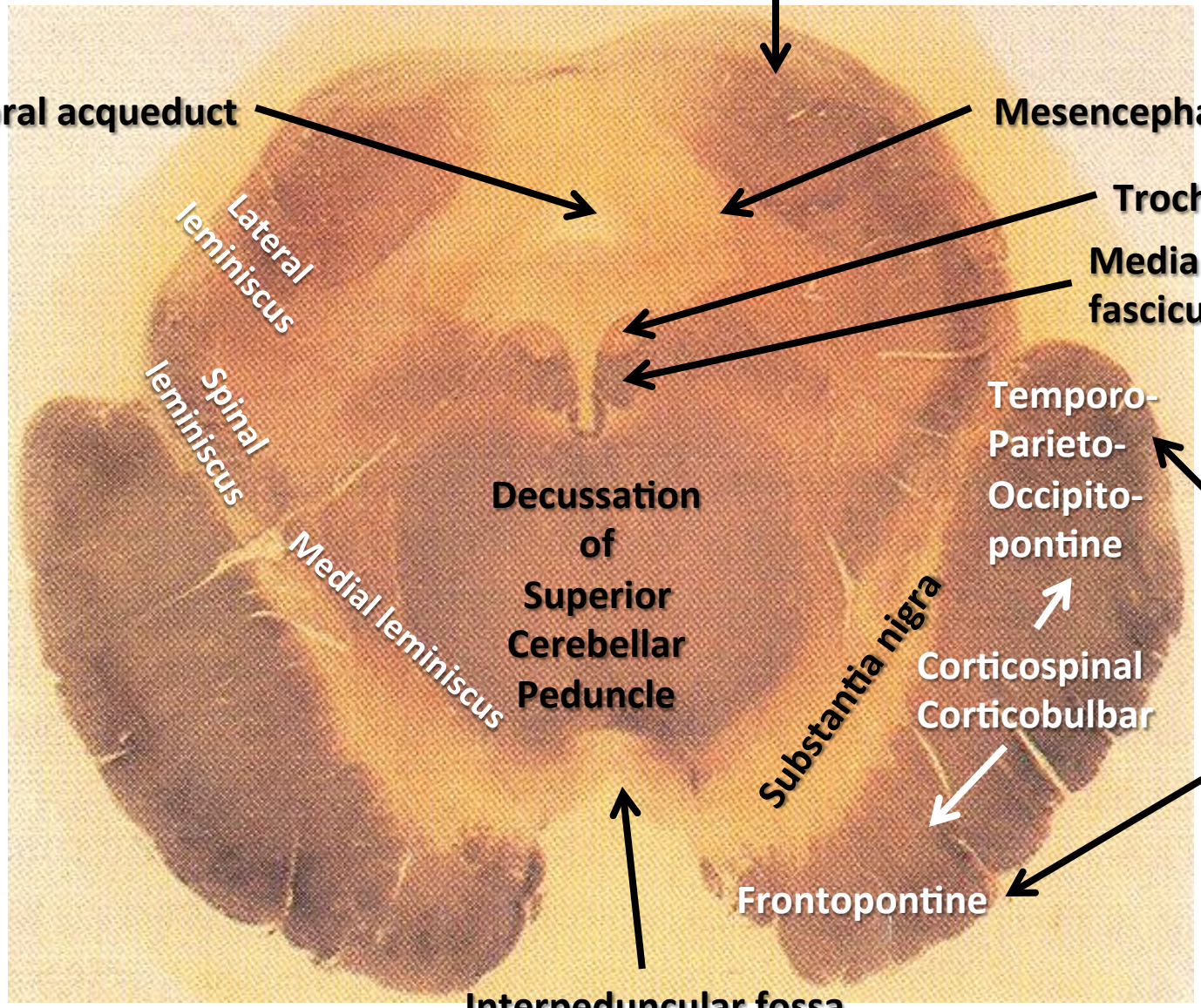
ROSTRAL MEDULLA

- **H: Hypoglossal nucleus** (Type: General somatic efferent)
- **V: Dorsal vagal nucleus**
- **S: Nucleus solitarius**
- **A: nucleus ambiguus**
- **MV: Medial vestibular nucleus**
- **LV: Lateral vestibular nucleus**
- **DCN: Dorsal cochlear nucleus**
- **VCN: Ventral cochlear nucleus**
- **ICP: Inferior cerebellar peduncle**
- **I.O.: Inferior olive** afferent: -As an afferent : spino-olivary -Efferent : olivo-cerebellum, olivo-spinal
- **D: Dorsal accessory olive**
- **M: Medial accessory olive**
- **MLF: Medial longitudinal fascisulus**
- **ML: Medial leminiscus**
- **P: Pyramid** (Supplied by : vertebral artery)
- **VMF: Ventral median fissure**

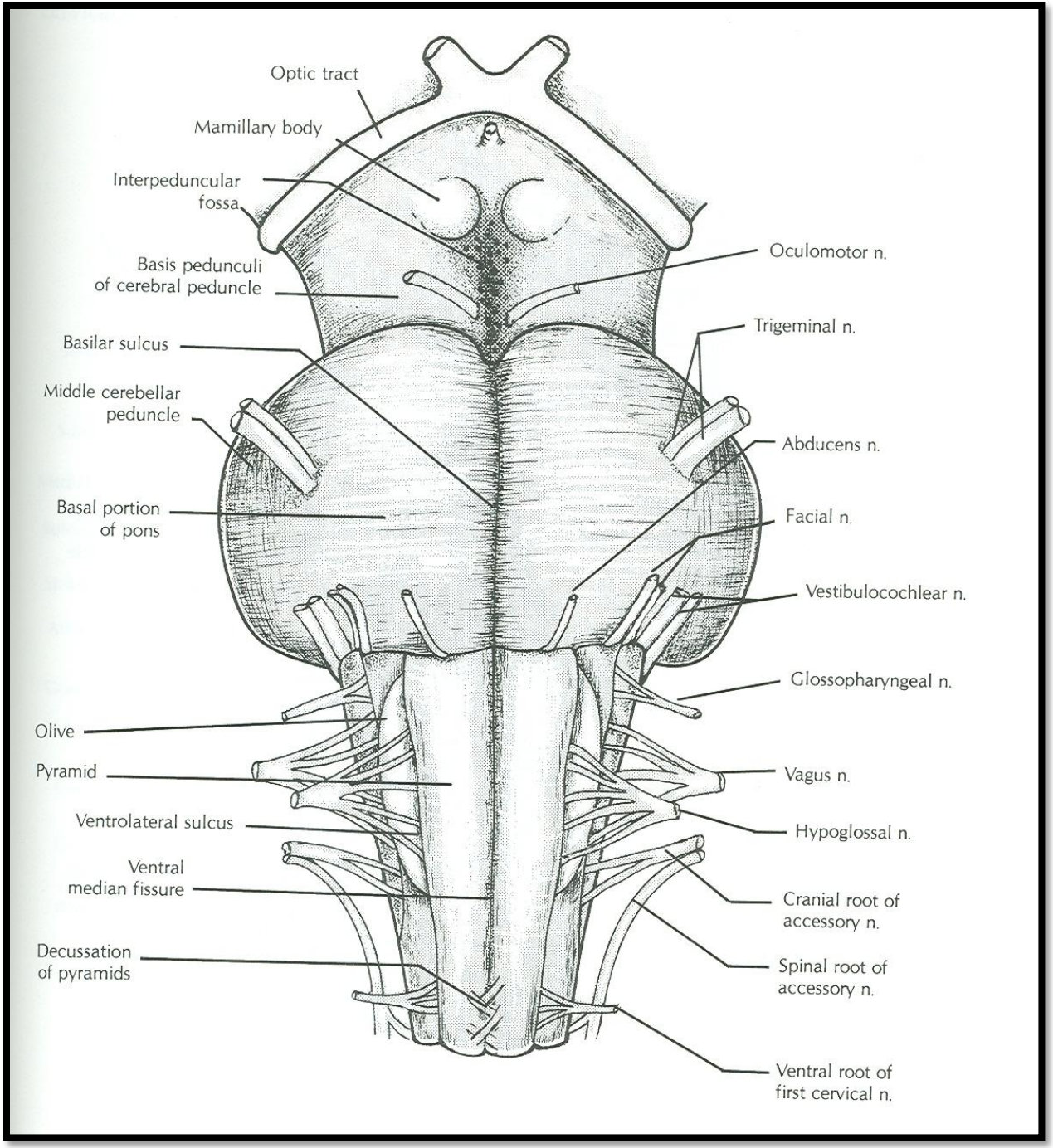
MIDBRAIN – LEVEL OF SUPERIOR COLLICULUS

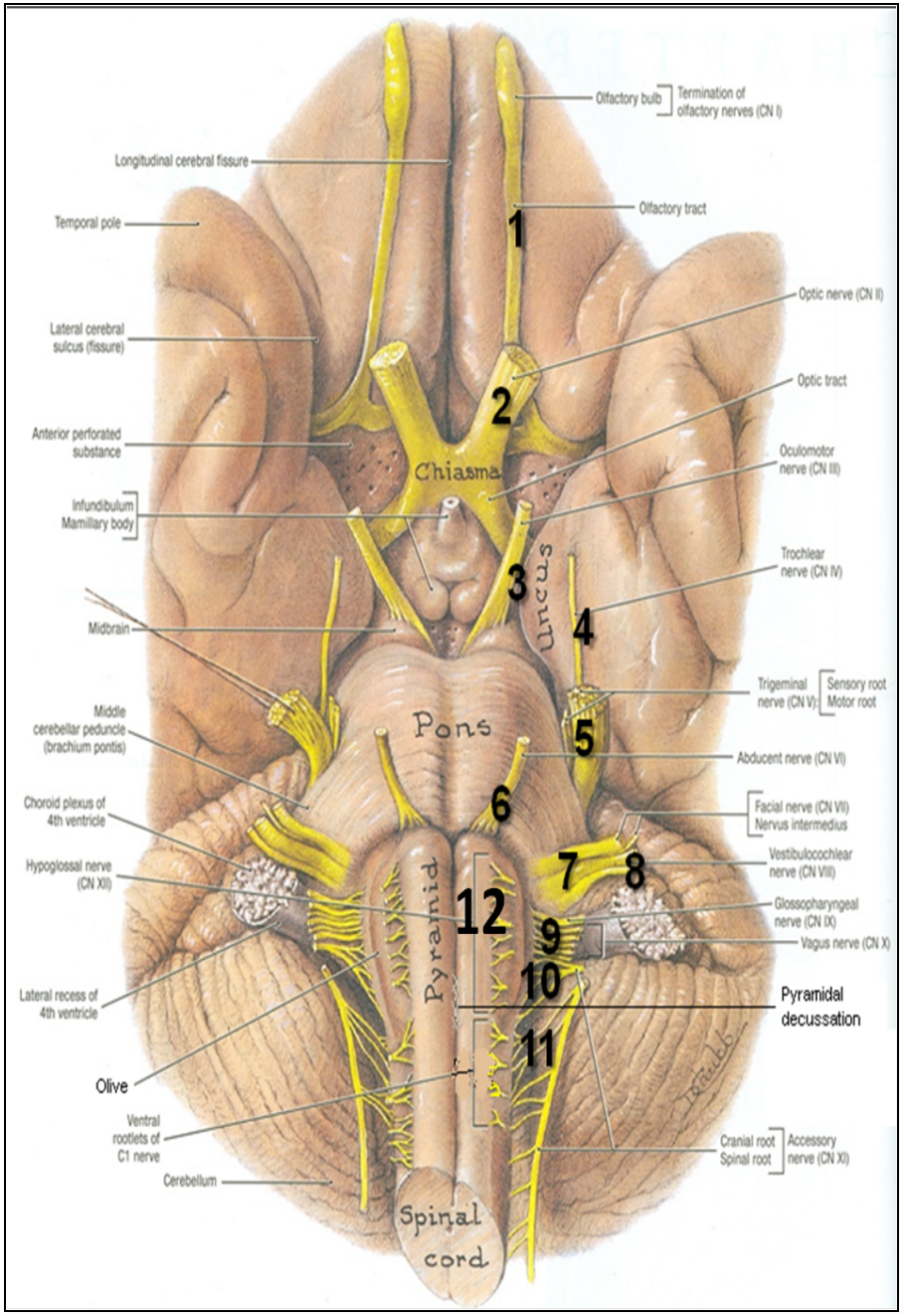


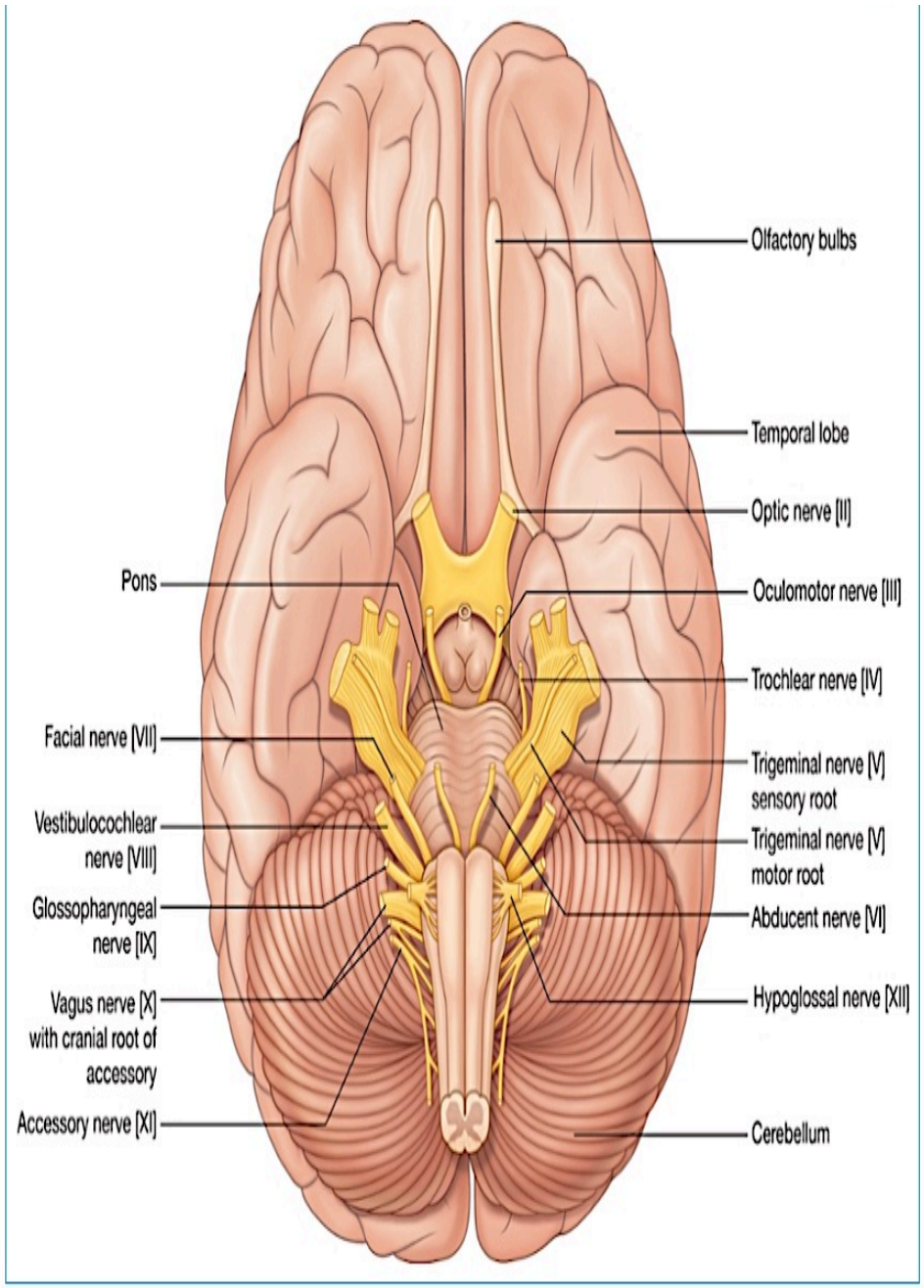
MIDBRAIN – LEVEL OF INFERIOR COLLICULUS



- **Name of cranial nerves**
- **Motor & sensory supply**
- **Effect of injury**




Olfactory bulb
Termination of olfactory nerves (CN I)
Longitudinal cerebral fissure
Temporal pole
Olfactory tract
1
Optic nerve (CN II)
Lateral cerebral sulcus (fissure)
Optic tract
2
Anterior perforated substance
Chiasma
Oculomotor nerve (CN III)
Infundibulum
Mamillary body
Trochlear nerve (CN IV)
3
Uncus
4
Midbrain
Trigeminal nerve (CN V)
Sensory root
Motor root
Middle cerebellar peduncle (brachium pontis)
Pons
5
Abducent nerve (CN VI)
6
Choroid plexus of 4th ventricle
Facial nerve (CN VII)
Nervus intermedius
Hypoglossal nerve (CN XII)
7
8
Vestibulocochlear nerve (CN VIII)
Pyramid
12
Glossopharyngeal nerve (CN IX)
9
Vagus nerve (CN X)
10
Lateral recess of 4th ventricle
Pyramidal decussation
11
Olive
Ventral rootlets of C1 nerve
Cranial root
Spinal root
Accessory nerve (CN XI)
Cerebellum
Spinal cord

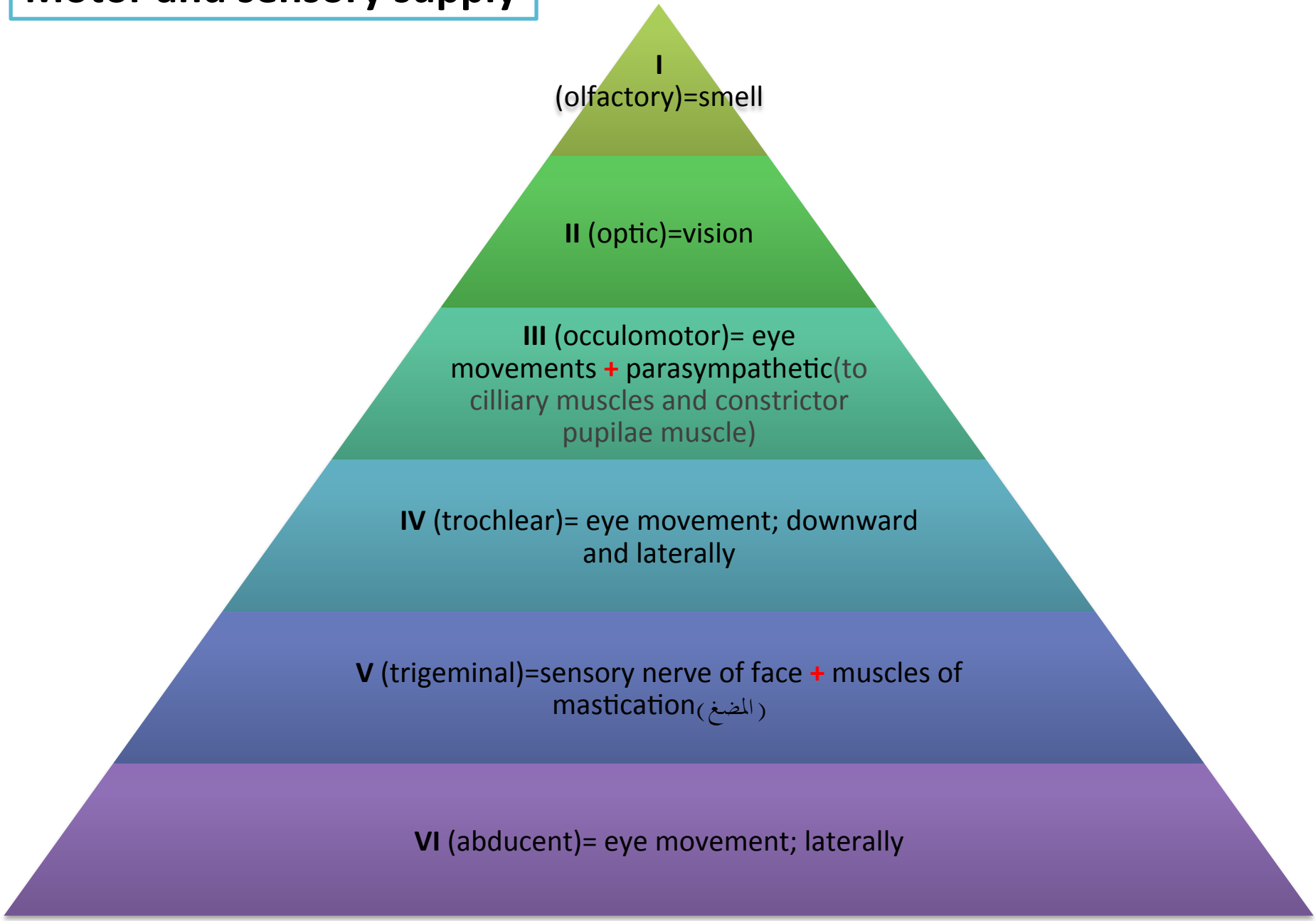

Olfactory bulbs
Temporal lobe
Optic nerve [II]
Pons
Oculomotor nerve [III]
Trochlear nerve [IV]
Facial nerve [VII]
Trigeminal nerve [V] sensory root
Vestibulocochlear nerve [VIII]
Trigeminal nerve [V] motor root
Glossopharyngeal nerve [IX]
Abducent nerve [VI]
Vagus nerve [X] with cranial root of accessory
Hypoglossal nerve [XII]
Accessory nerve [XI]
Cerebellum

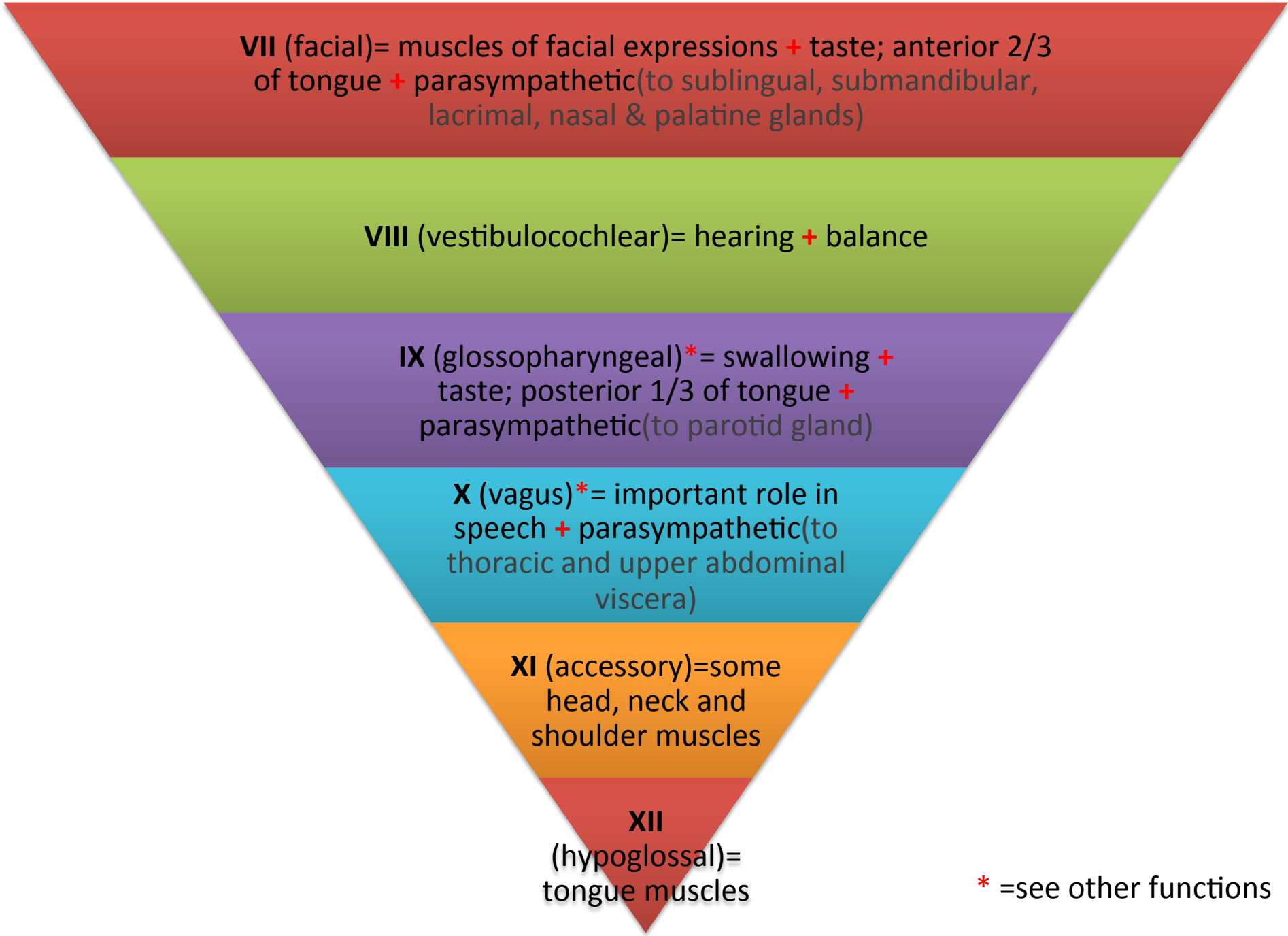
What are the sites of emergence of Cranial nerves?

All cranial nerves emerge from brainstem EXCEPT Olfactory "CN I" and Optic "CN 2"

Nerves	Site of emergence
Medulla oblongata	
Hypoglossal "CN XII"	Anterolateral Sulcus between pyramid and olive.
• Glossophyrengial "CN IX" • Vagus "CN X" • Cranial part of accessory "CN XI"	Sulcus dorsolateral to olive
Pons	
Trigeminal "CN V"	From middle ventrolateral aspect of pons as 2 roots: Small medial motor & large lateral sensory.
Abducent "CN VI"	from sulcus between pons and pyramid
Facial nerve "VII"	from cerebellopontine angle as 2 roots: Sensory and motor roots
Vestibulocochlear nerve "CN VIII"	from cerebellopontine angle as 2 roots: Vestibular root & Cochlear root
Midbrain	
Ventral surface	
Oculomotor nerve "CN III"	Through Red nucleus then medial to crus cerebri.
Dorsal surface	
Trochlear nerve "CN IV"	just caudal to inferior colliculus (The only cranial nerve emerging from dorsal surface of brain stem).

Motor and sensory supply



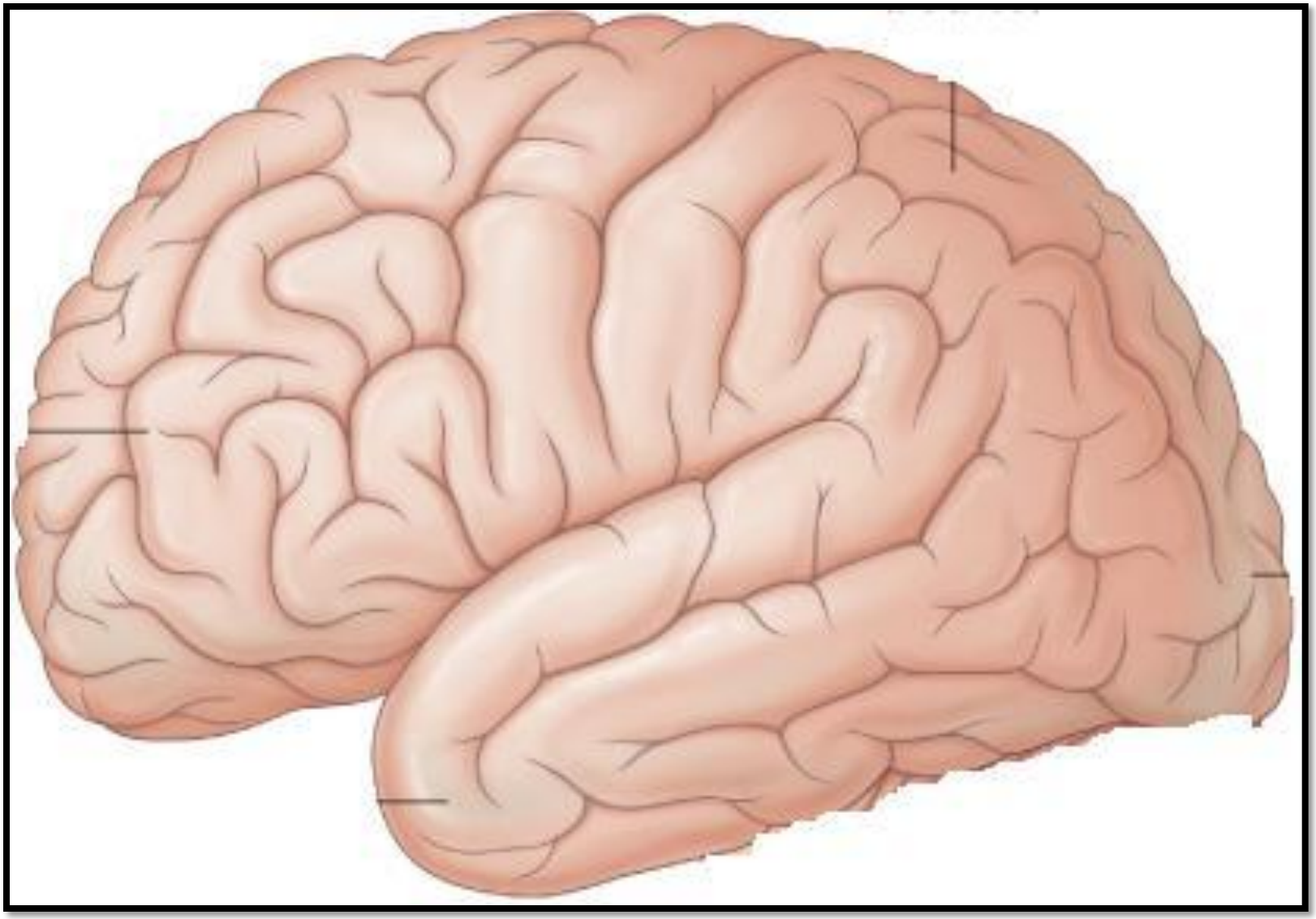

VII (facial)= muscles of facial expressions + taste; anterior 2/3 of tongue + parasympathetic(to sublingual, submandibular, lacrimal, nasal & palatine glands)
VIII (vestibulocochlear)= hearing + balance
IX (glossopharyngeal)*= swallowing + taste; posterior 1/3 of tongue + parasympathetic(to parotid gland)
X (vagus)*= important role in speech + parasympathetic(to thoracic and upper abdominal viscera)
XI (accessory)=some head, neck and shoulder muscles
XII (hypoglossal)= tongue muscles
* =see other functions

Effect of lesion

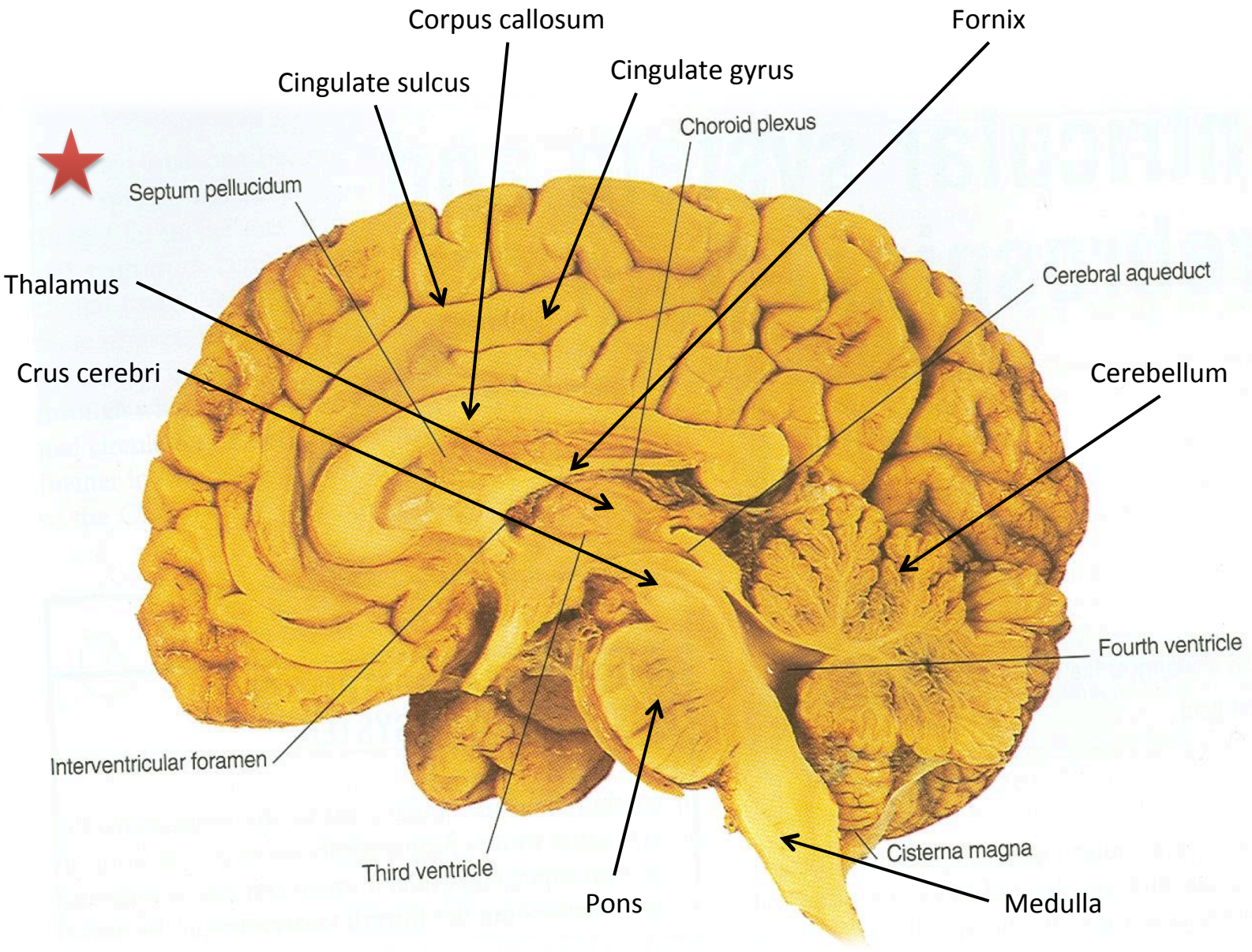
Nerve	Effect of lesion
I (olfactory)	**Loss of smell sensation (anosmia)**
II (optic)	1. disease of the optic nerve lead to loss of vision in the affected eye **(monocular blindness).** 2. Compression of the optic chiasm leads to **bitemporal hemianopia.** 3. Damage to the optic tract, and optic radiation produce a **contralateral homonymous hemianopia.**
III (occulomotor)	Lesion results in: **Lateral squint.-Ptosis.-Diplopia.-Pupillary dilatation.-Loss of accommodation.** The eye is fully abducted and depressed(down and out) because of the unopposed activity of the lateral rectus and superior oblique.
IV (trochlear)	Lesion results in **diplopia & Inability to rotate the eye infero-laterally.** So, **the eye deviates; upward and slightly inward**. This person has difficulty in walking downstairs
V (trigeminal)	Compression, degeneration or inflammation of the 5th cranial nerve may result in a condition called **trigeminal neuralgia** or tic douloureux. This condition is characterized by recurring episodes of intense stabbing , sever, excoriating pain radiating from the angle of the jaw along a branches of the trigeminal nerve. Usually involves maxillary & mandibular branches, rarely in the ophthalmic division.
VI (abducent)	Lesion results in: Inability to direct the affected eye laterally, so it result in (**medial squint**). May involve the facial n (facial colliculus) and cause paralysis of all ipsilateral facial muscle

Nerve	Effect of lesion
VII (facial)	Damage of the facial nerve results in paralysis of muscles of facial expressions : Facial (**Bell's) palsy**; lower motor neuron lesion (whole face affected) Face is distorted: Drooping of lower eyelid, Sagging of mouth angle,Dribbling of saliva,Loss of facial expressions,Loss of chewing, Loss of blowing, Loss of sucking,Unable to show teeth or close the eye on that side. NB. In upper motor neuron lesion (upper face is intact) .
VIII (vestibulo-cochlear)	**Cochlear > hearing loss** **Vestibular >loss of equilibrium**
IX (glossopharyngeal)	**Difficulty of swallowing;** **Impairment of taste sensation over the posterior one-third of the tongue ,palate and pharynx.** **Absent gag reflex.** **Dysfunction of the parotid gland.**
X (vagus)	Vagus nerve lesions produce palatal and pharyngeal and laryngeal paralysis; Abnormalities of esophageal motility, gastric acid secretion, gallbladder emptying, and heart rate; and other autonomic dysfunction.
XI (accessory)	It produces atrophy and weakness of trapezius. Unilateral paralysis of trapezius is evident by inability to elevate & retract the shoulder ,difficulty in elevating the arm & **Winging of scapula** Dropping of the shoulder is an obvious sign of injury of the nerve. The lesion also causes **difficulty in swallowing and speech&** **Inability to turn the head**
XII (hypoglossal)	**Loss of tongue movements** **Difficulty in chewing and speech** The tongue **paralyses, atrophies, becomes shrunken and furrowed on the affected side** (LMN paralysis) On protrusion, tongue **deviates to the affected side** If both nerves are damaged, person can't protrude tongue

Name of gyri, sulci, important functional areas, arterial supply

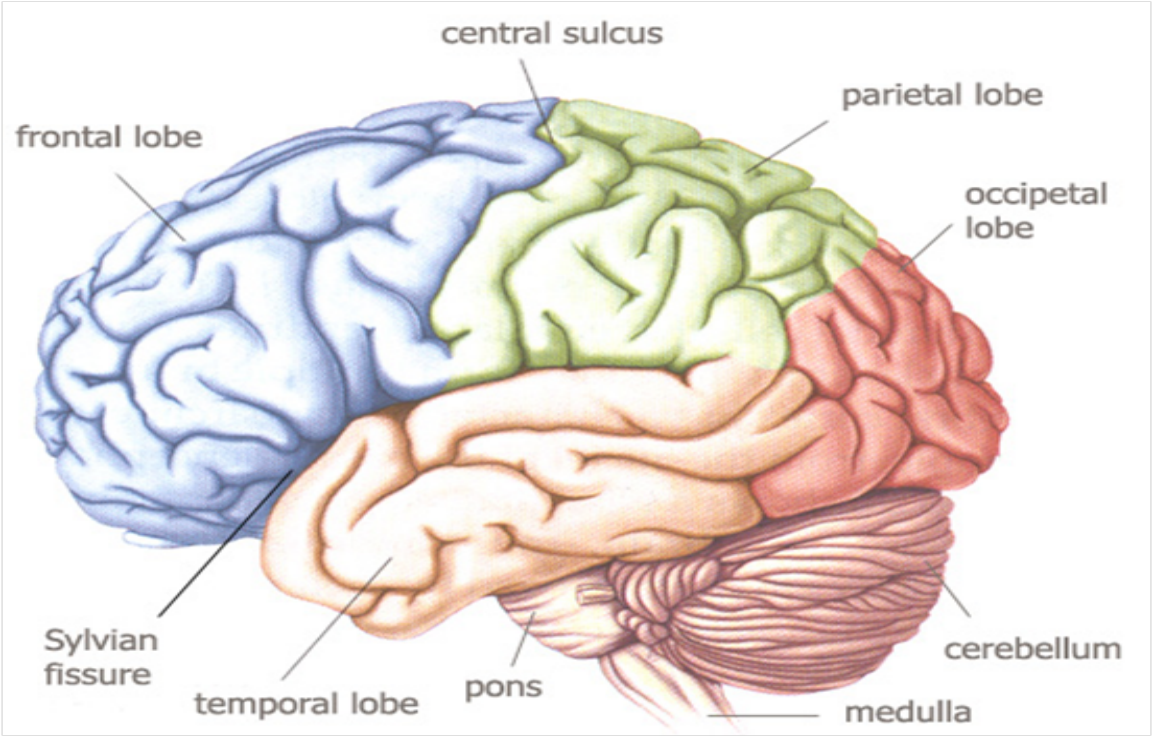


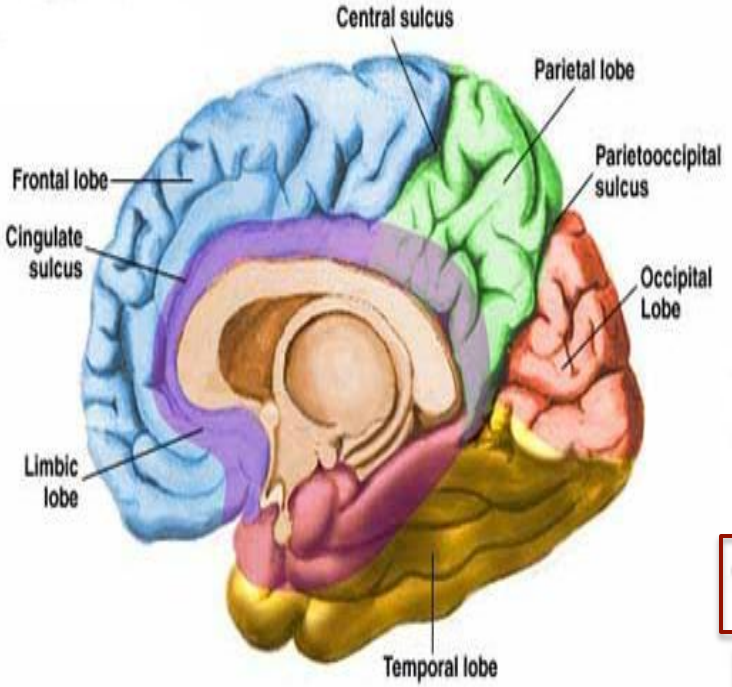
Name of gyri, sulci, important functional areas, arterial supply

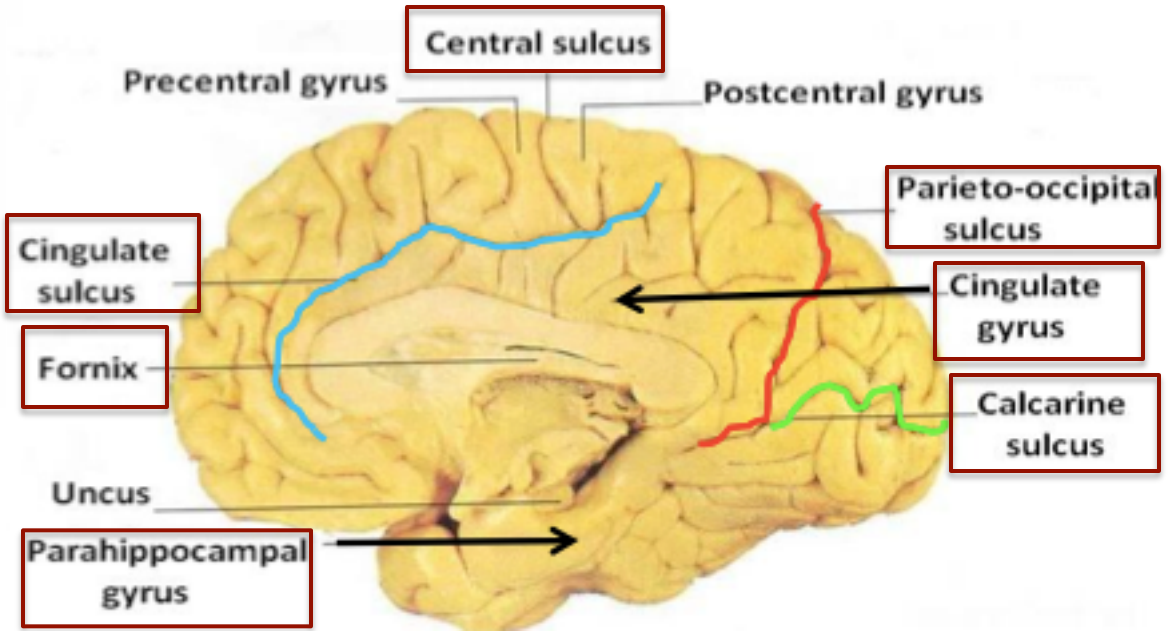


Fornix connect between hippocampus and mammillary body

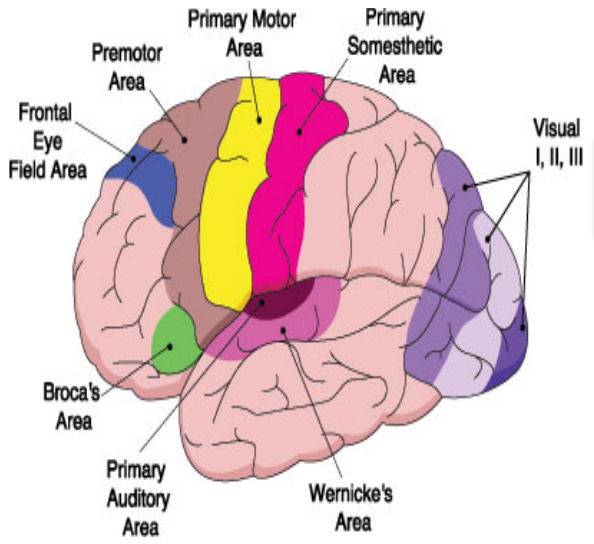
Name of gyri and sulci

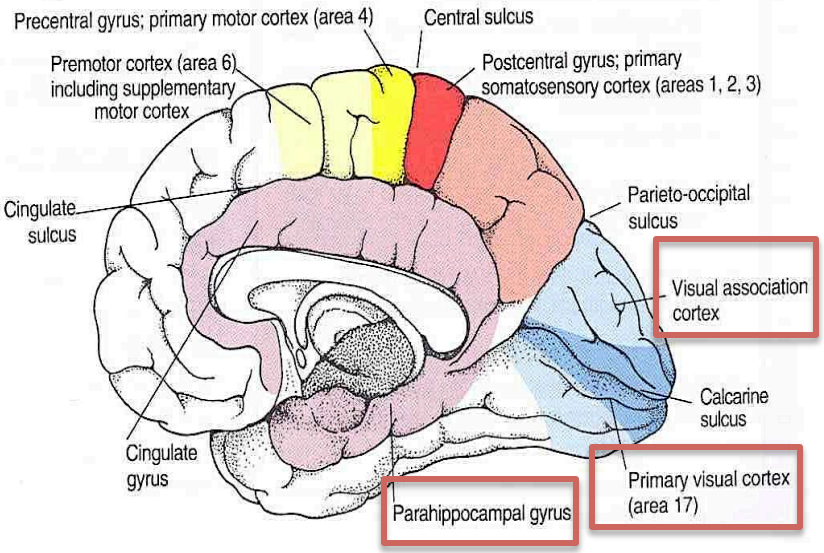


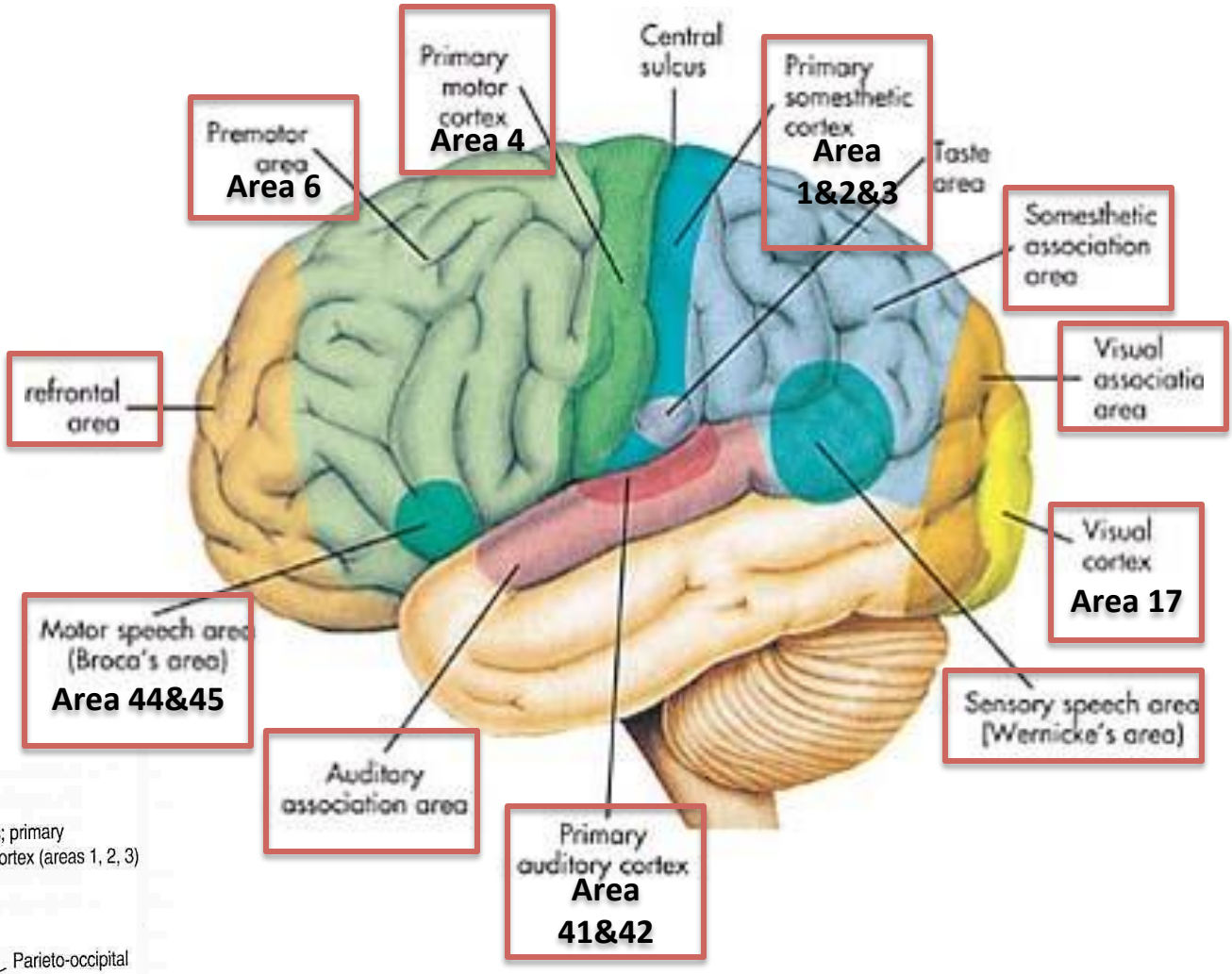




Important functional areas







There is a difference between the name of gyrus (e.g. precentral gyrus) and the name of the functional of area (e.g. primary motor area)

Anatomy and Functional Areas of the Brain

Functional Areas of the Cerebral Cortex

1 Visual Area:
- Sight
- Image recognition
- Image perception

2 Association Area
- Short-term memory
- Equilibrium
- Emotion

3 Motor Function Area
- Initiation of voluntary muscles

4 Broca's Area
- Muscles of speech

5 Auditory Area
- Hearing

6 Emotional Area
- Pain
- Hunger
- "Fight or flight" response

7 Sensory Association Area

8 Olfactory Area
- Smelling

9 Sensory Area
- Sensation from muscles and skin

10 Somatosensory Association Area
- Evaluation of weight, texture, temperature, etc. for object recognition

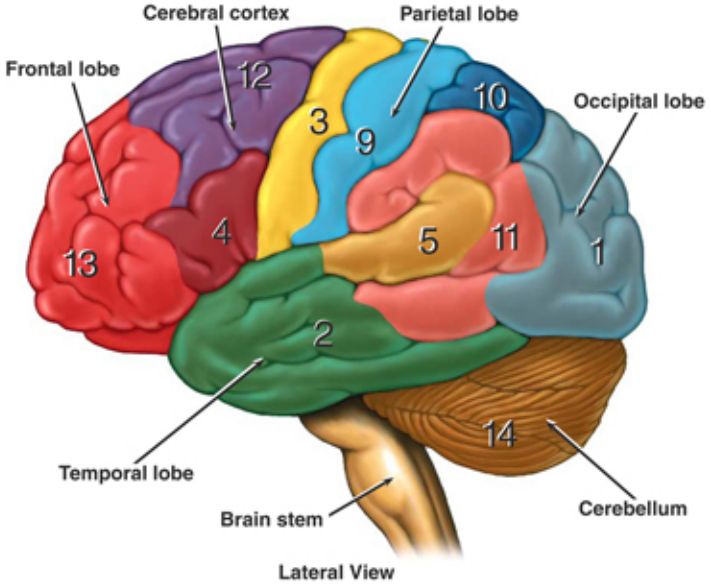
11 Wernicke's Area
- Written and spoken language comprehension

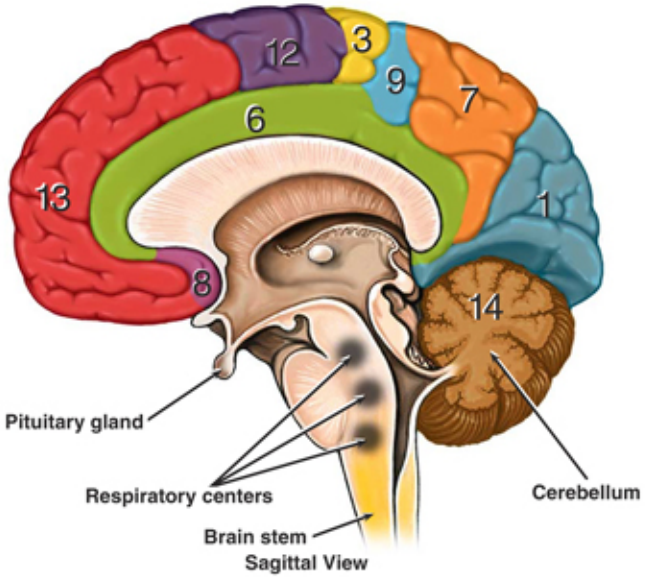
12 Motor Function Area
- Eye movement and orientation

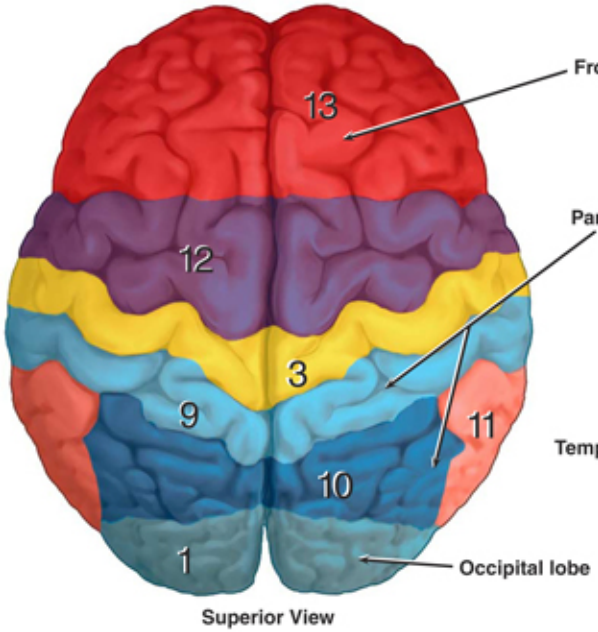
13 Higher Mental Functions
- Concentration
- Planning
- Judgment
- Emotional expression
- Creativity
- Inhibition

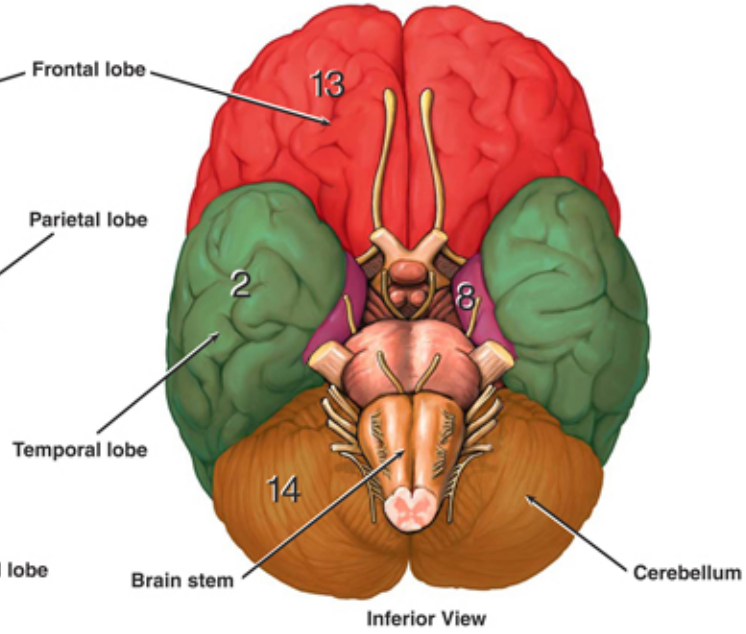
Functional Areas of the Cerebellum

14 Motor Functions
- Coordination of movement
- Balance and equilibrium
- Posture



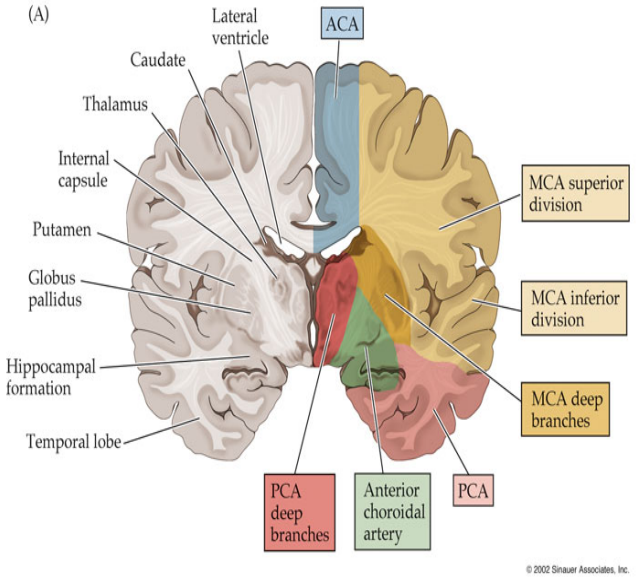


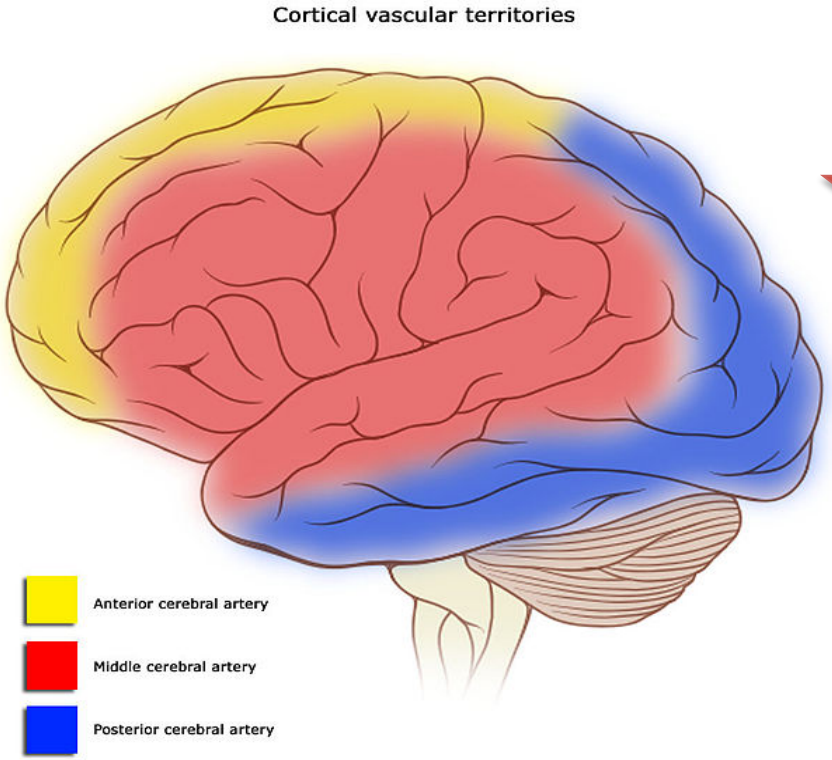


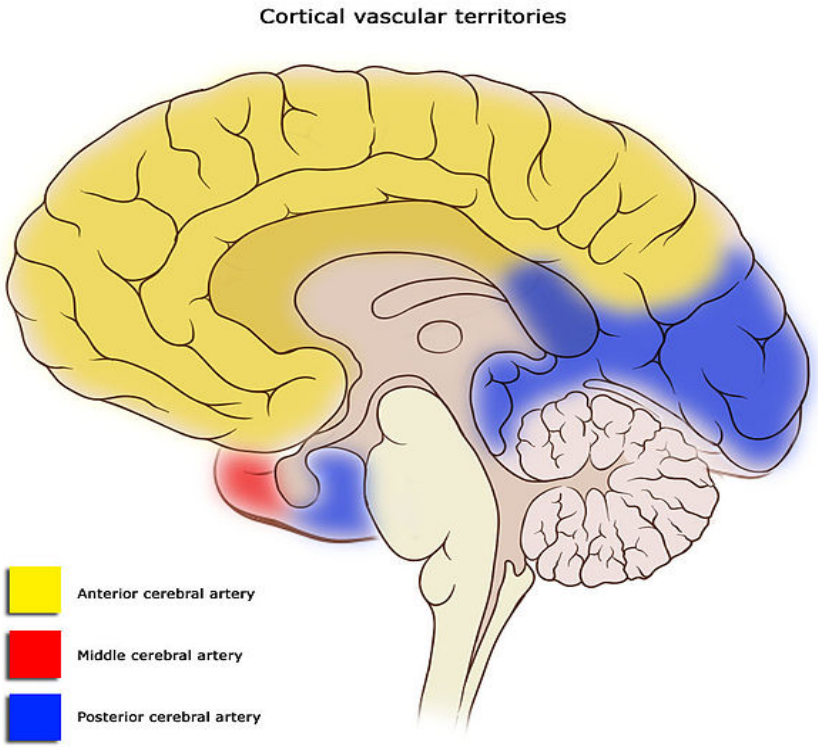


Blood supply

1-**Anterior cerebral artery:** Supply medial side of frontal and parietal lobes
2-**Middle Cerebral Artery:** Supply most of superiolaterla side.
3-**Posterior Cerebral Artery:** Supply inferior temporal and medial & inferior occipital lobes.

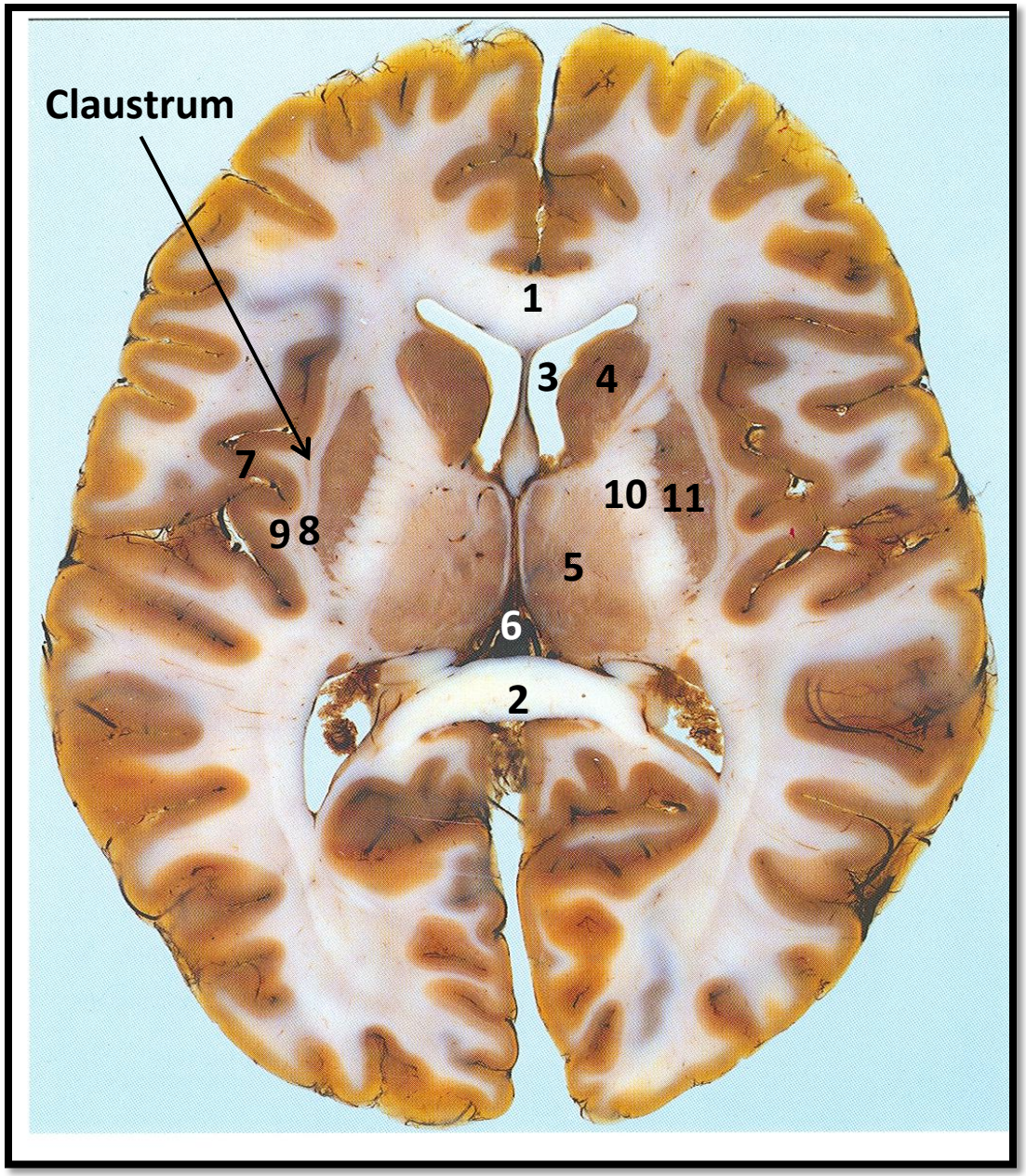


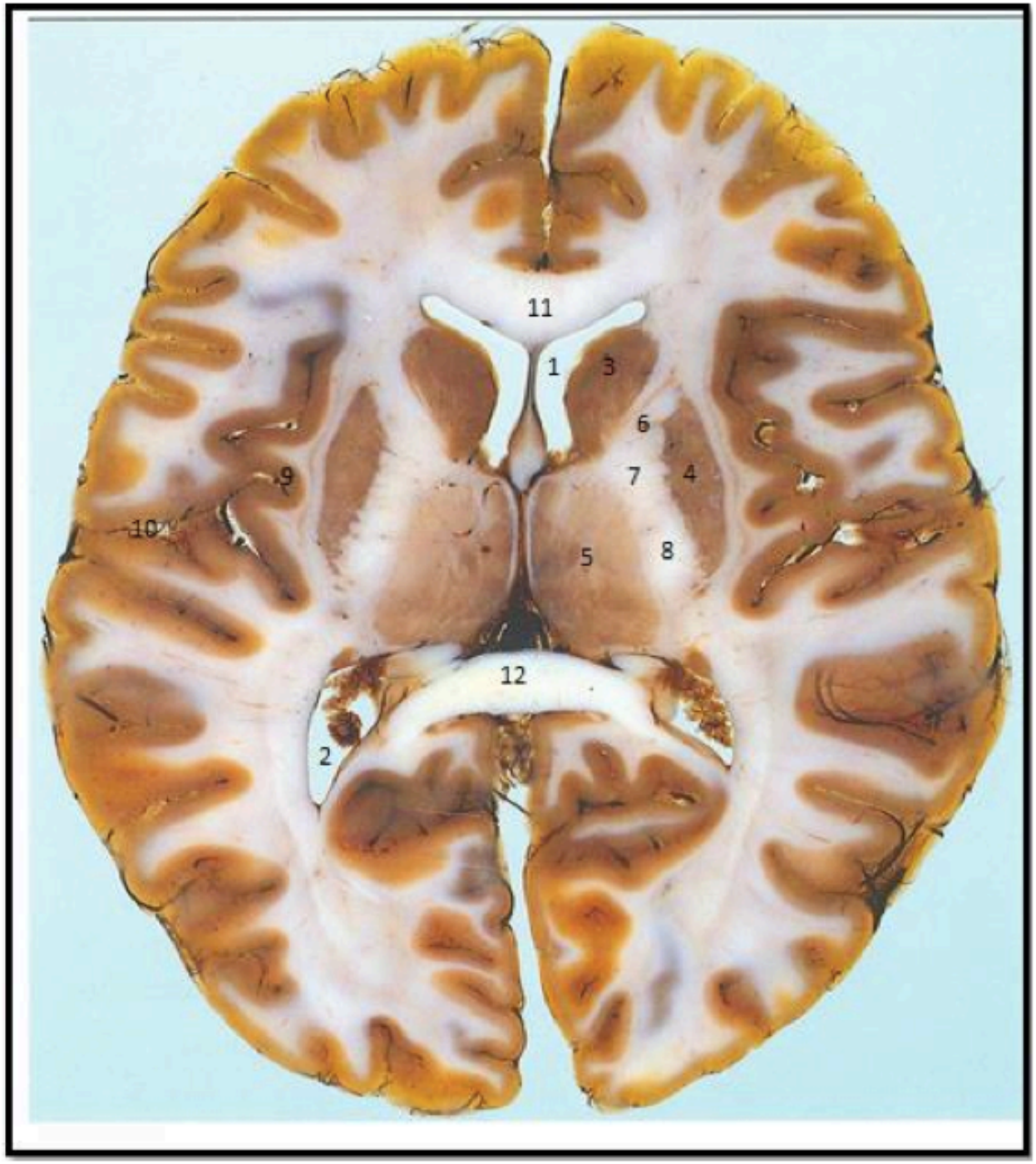




Identification

1- Forceps minor
2- Forceps major
3- Lateral ventricle
4-Caudate nucleus
5- Thalamus
6- Third ventricle
7- Insula
8-External capsule
9- Extreme capsule
10- Internal capsule
11- Lentiform nucleus

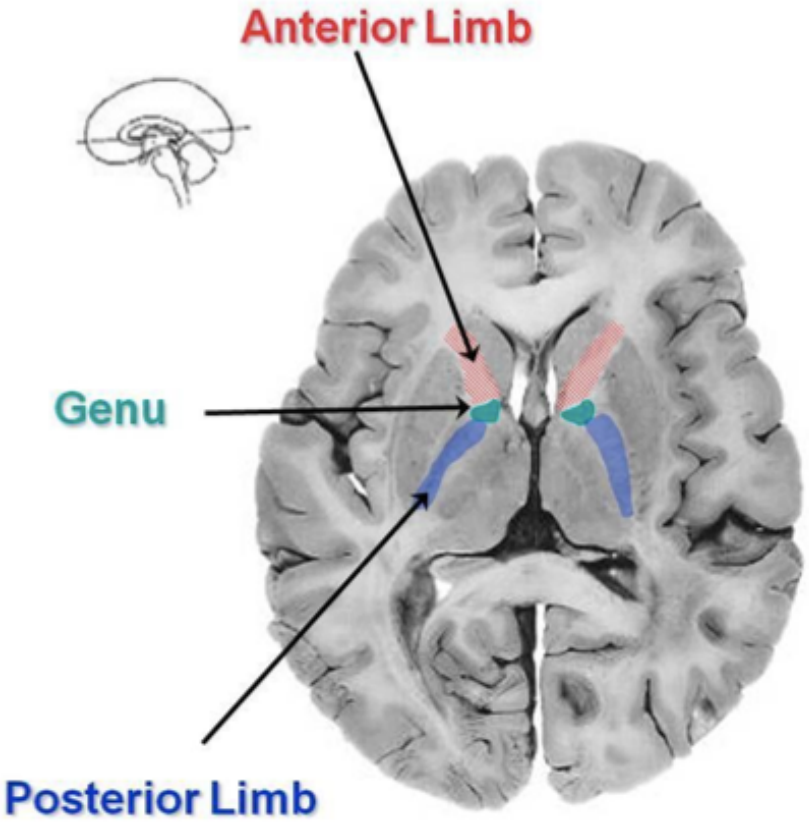




Horizontal section:

1- Anterior horn of lateral ventricle
2- Posterior horn of lateral ventricle
3- Caudate
4- Lentiform nucleus
5- Thalamus
6- Anterior limb of internal capsule
7- Genu
8- Posterior limb of internal capsule
9- Insula
10-Lateral sulcus
11-Forceps minor
12-Forceps major

Internal capsule (projection fiber)



Internal Capsule:

- Anterior limb:

Thalamocortical & Frontopontine

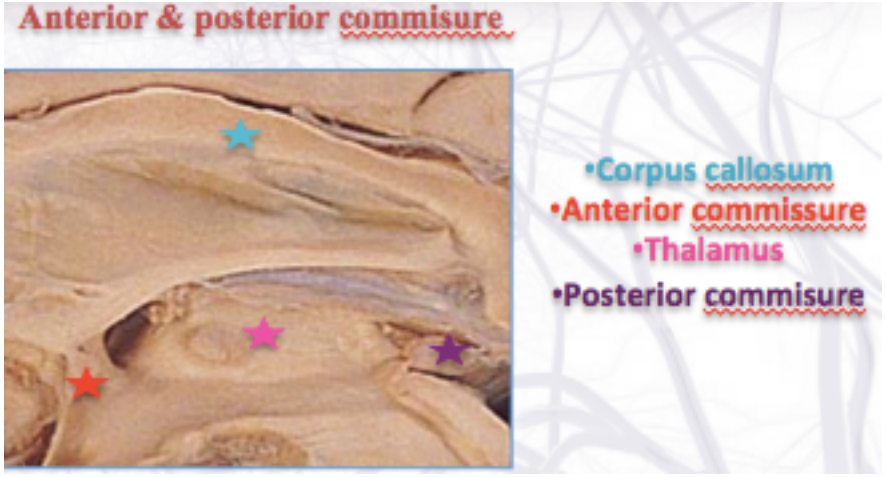
- Genu:

Corticobulbar

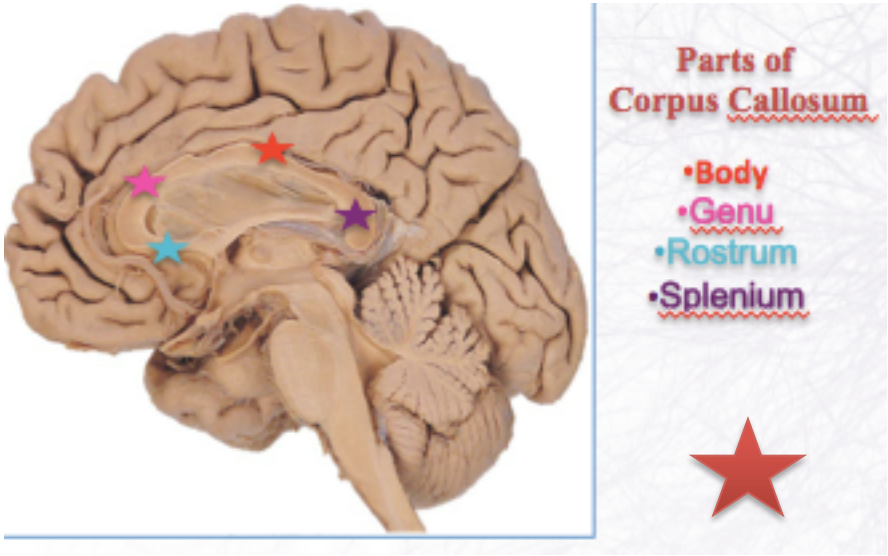
- Posterior limb:

Corticospinal & Corticobulbar

432 teamwork



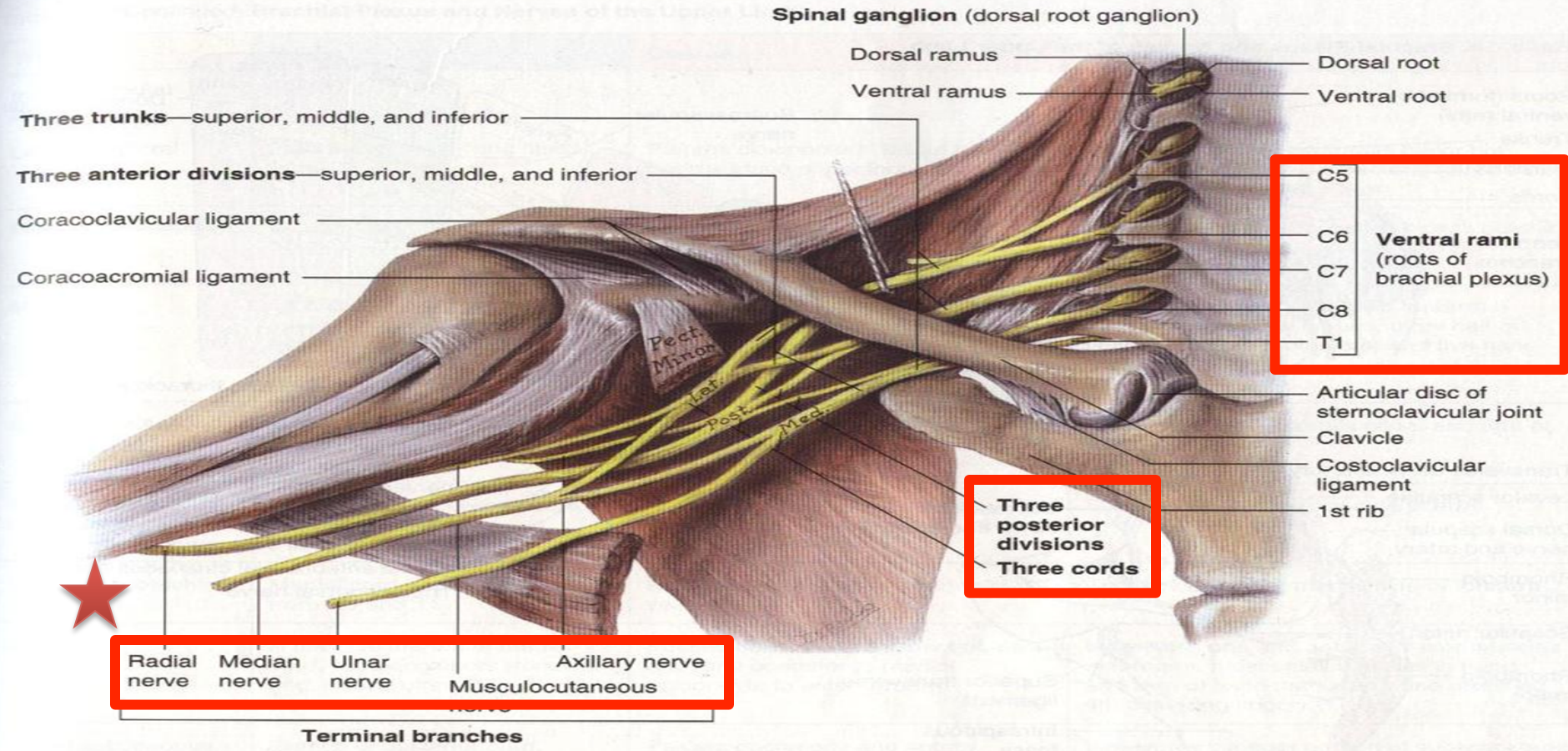
Corpus callosum (Commissural fibers)

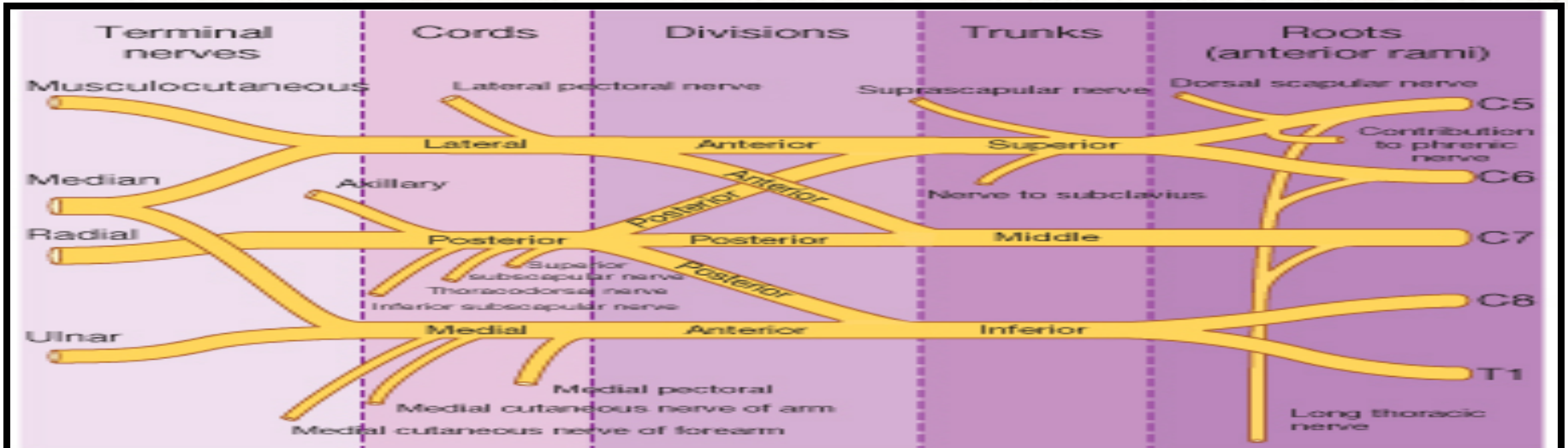


Peripheral nerves

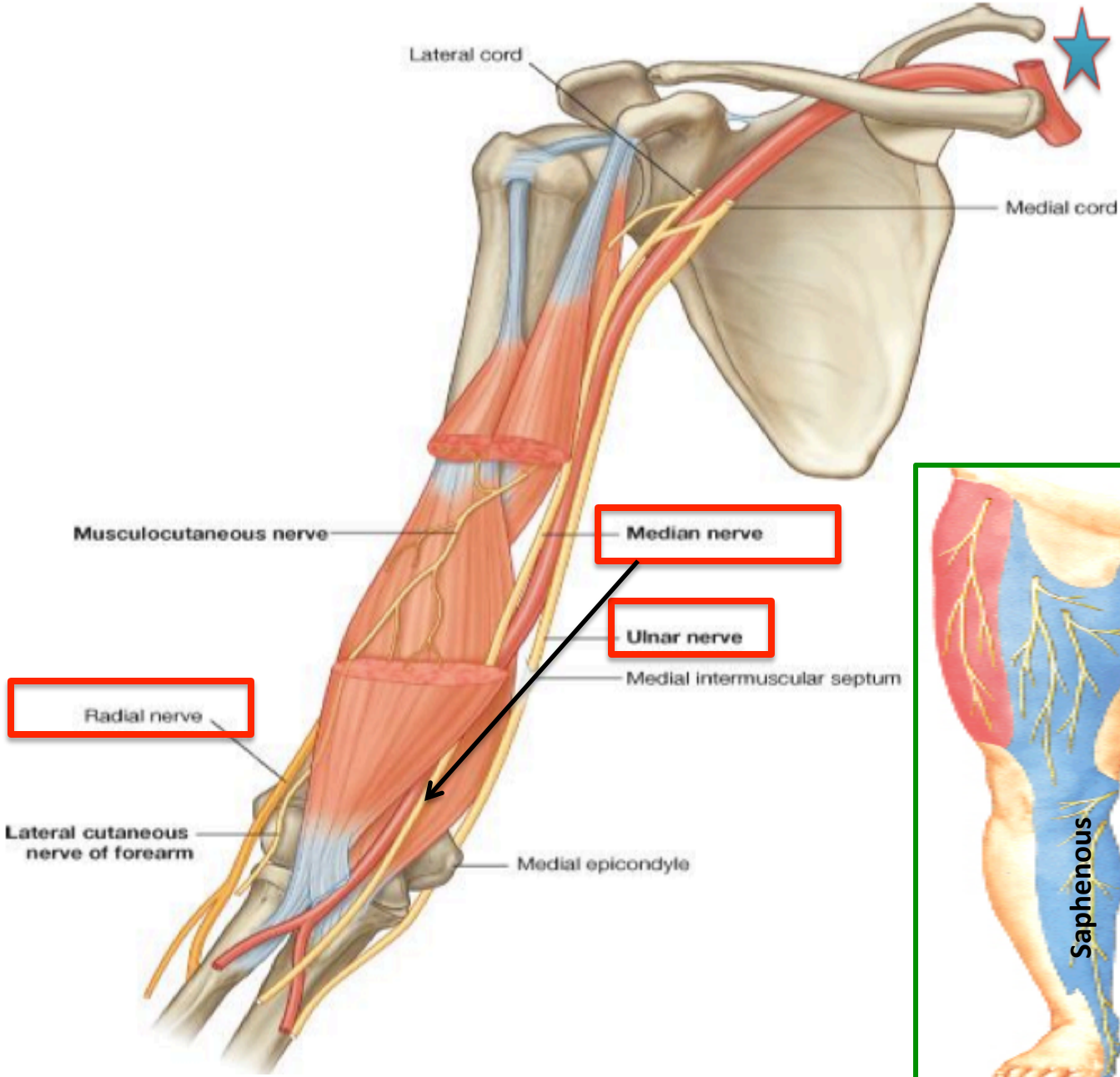
(Ulnar, median, radial, sciatic, common peroneal & tibial)

- Root values of each nerve
- Name of plexus from which arise
- Name of cords from which arise
- Name of muscles or groups of muscles supplied by nerve and their main action
- Areas of skin supplied by the nerve
- Name of lesion or deformity caused by nerve injury

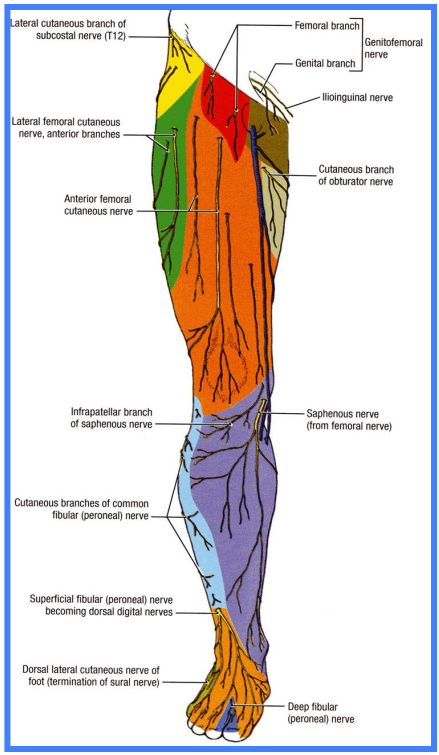

Spinal ganglion (dorsal root ganglion)
Dorsal ramus
Ventral ramus
Dorsal root
Ventral root
Three trunks—superior, middle, and inferior
Three anterior divisions—superior, middle, and inferior
Coracoclavicular ligament
Coracoacromial ligament
C5
C6
C7
C8
T1
Ventral rami (roots of brachial plexus)
Articular disc of sternoclavicular joint
Clavicle
Costoclavicular ligament
1st rib
Three posterior divisions
Three cords
Radial nerve
Median nerve
Ulnar nerve
Axillary nerve
Musculocutaneous
Terminal branches

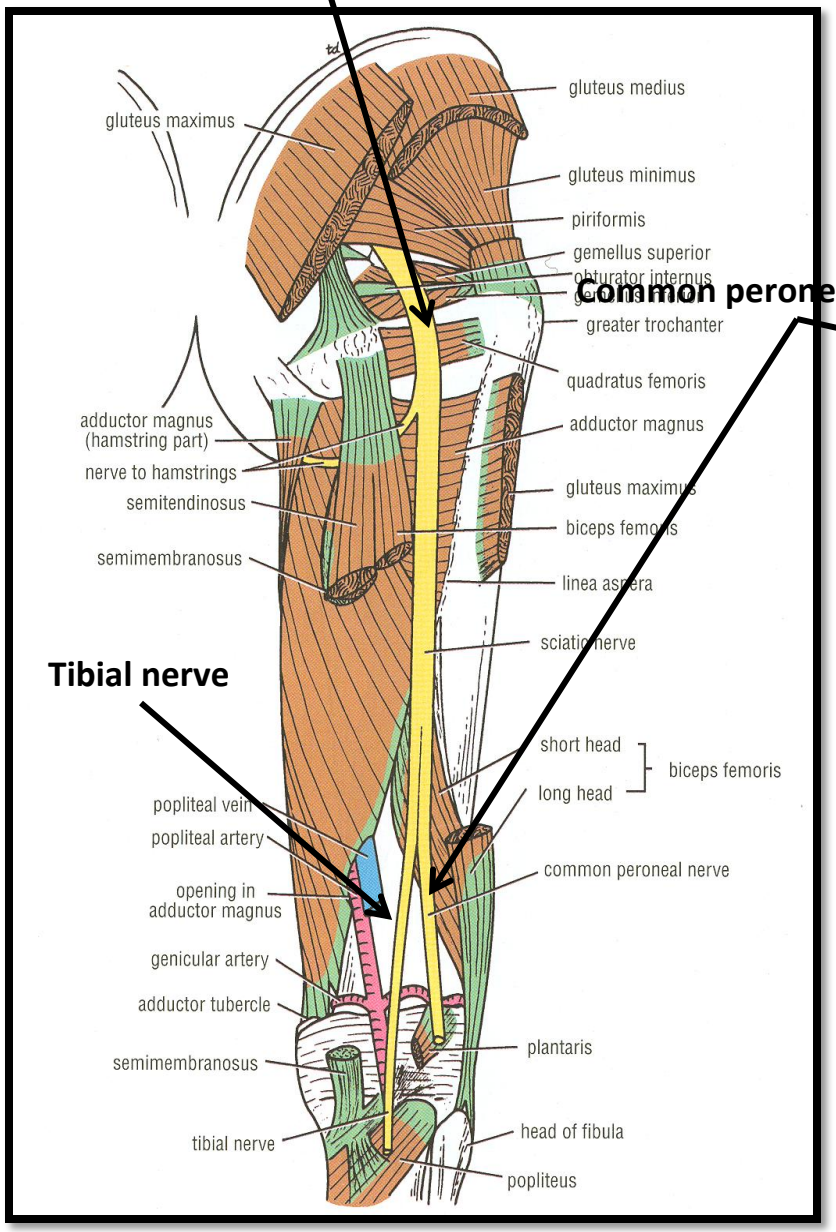

Terminal nerves
Cords
Divisions
Trunks
Roots (anterior rami)
Musculocutaneous
Lateral pectoral nerve
Suprascapular nerve
Dorsal scapular nerve
C5
Lateral
Anterior
Superior
Contribution to phrenic nerve
Median
Axillary
Anterior
Posterior
Nerve to subclavius
C6
Radial
Posterior
Posterior
Middle
C7
Superior subscapular nerve
Thoracodorsal nerve
Inferior subscapular nerve
Posterior
C8
Ulnar
Medial
Anterior
Inferior
T1
Medial pectoral
Medial cutaneous nerve of arm
Medial cutaneous nerve of forearm
Long thoracic nerve

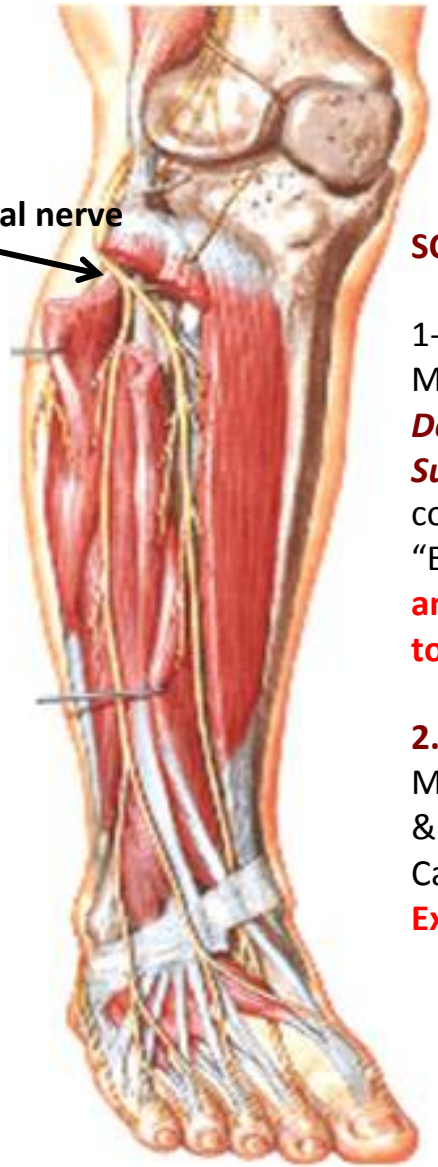
NAME	RADIAL	ULNAR	MEDIAN	FEMORAL	SCIATIC
PLEXUS	Brachial	Brachial	Brachial	Lumber	Sacral
ROOT	C5,6,7,8,T1	C7,8,T1	C5,6,7,8,T1	L2,3 and 4	L4,5, S1, 2,3
CORD	Posterior	Medial	Medial, lateral		
MUSCLES SUPPLY "REMEMBER 2"	1-Triceps 2- anconeu 3-brachialis (extensor)	1- Flexor carpi ulnaris 2- Three hypothenar muscles 3- Adductor pollicis (intrinsic ms. Of hand)(flexor)	1-Pronator teres, 2-Flexor carpi radialis 3-Palmaris longus, (flexor)	1-Sartorius 2-Pectineus 3-**Quadriceps femoris**.	1-gastrocnemius 2-soleus 3-**Hamastring**
AREA OF SKIN	1- posterior and lateral parts of arm 2- Posterior of forearm 3- dorsum of the hand (skin of lateral 2/3 of back of hand. Skin over the back of proximal phalanges of lateral 3 1⁄2 fingers)	1- front & dorsum of medial 1/3 of hand + medial 1 & 1⁄2 fingers 2-Medial part of forearm ((medial cutaneous branch))	1- palmar surfaces of lateral 3 1⁄2 fingers.	To antero-medial aspect of the thigh. To medial side of: 1-Knee 2-Leg 3-Foot (saphenous nerve). Next slide*	To all leg & foot EXCEPT: areas supplied by the Saphenous nerve (branch of Femoral nerve). Next slide*
LESIONS	Wrist drop	Claw hand	Ape hand	Loss of extension of knee	Foot Drop


Lateral cord
Medial cord
Musculocutaneous nerve
Median nerve
Ulnar nerve
Medial intermuscular septum
Radial nerve
Lateral cutaneous nerve of forearm
Medial epicondyle

Saphenous


Lateral cutaneous branch of subcostal nerve (T12)
Femoral branch
Genitofemoral nerve
Genital branch
Ilioinguinal nerve
Lateral femoral cutaneous nerve, anterior branches
Cutaneous branch of obturator nerve
Anterior femoral cutaneous nerve
Infrapatellar branch of saphenous nerve
Saphenous nerve (from femoral nerve)
Cutaneous branches of common fibular (peroneal) nerve
Superficial fibular (peroneal) nerve becoming dorsal digital nerves
Dorsal lateral cutaneous nerve of foot (termination of sural nerve)
Deep fibular (peroneal) nerve





432 teamwork

SCIATIC NERVE Divied into :

1- **Common peroneal (fibular):**
Muscles of
Deep peroneal >anterior &
Superficial peroneal >lateral compartments of leg, lesion of it "Equinovarus" (**plantar flexors of the ankle joint, inversion and Flexors of toes**)

2. Tibial:
Muscles of <u>posterior compartment</u> of leg & <u>intrinsic muscles of sole</u>, Lesion of it Calcaneovalgus (**Dorsi flexors of ankle, Extensors of toes, Evertors of foot)**

GOOD LUCK

We hope this revision has been of great benefit

Good luck ☺

Anatomy team leaders

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