

SPINAL CORD FUNCTIONS & SPINAL REFLEXES

- **Team Members:** Reema Allhidan - Monirah Alsalouli - Abdullah Aldhibaib.

OBJECTIVE SUMMARY - QUICK REVIEW

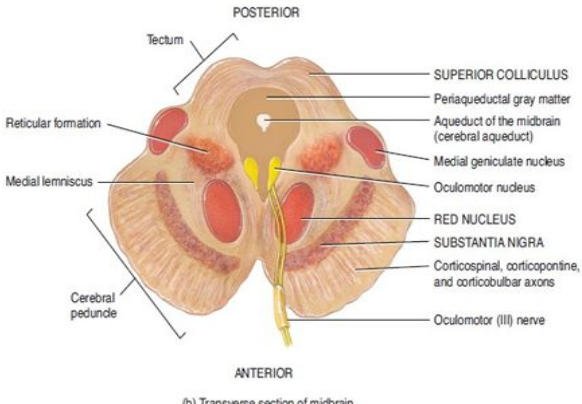
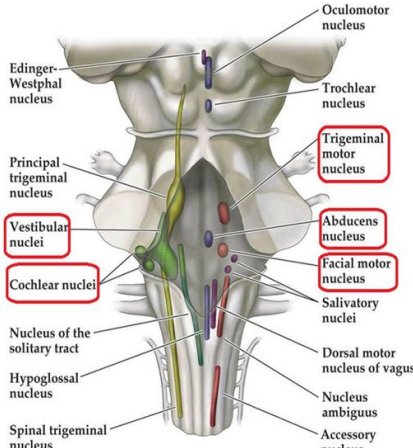
❖ Components of Brain stem:

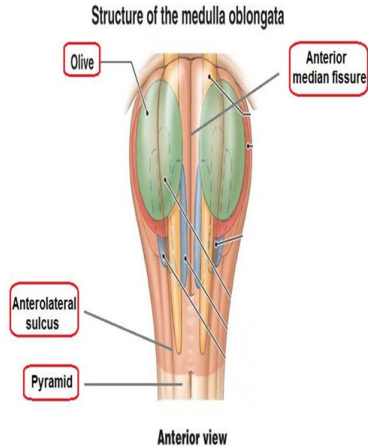
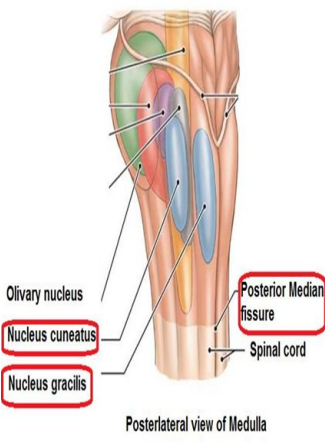
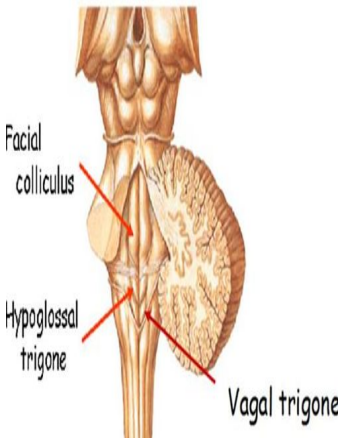
Midbrain, pons and medulla oblongata.

❖ Definition of brainstem:

is the **lower** part of the brain, adjoining and structurally continuous with the **spinal cord**.

❖ Important and internal structures in brainstem

Internal structures of midbrain	pons
 <p>(b) Transverse section of midbrain</p> <p>Labels: Tectum, SUPERIOR COLLICULUS, Periaqueductal gray matter, Aqueduct of the midbrain (cerebral aqueduct), Medial geniculate nucleus, Oculomotor nucleus, RED NUCLEUS, SUBSTANTIA NIGRA, Corticospinal, corticopontine, and corticobulbar axons, Oculomotor (III) nerve, Reticular formation, Medial lemniscus, Cerebral peduncle.</p>	 <p>Labels: Oculomotor nucleus, Trochlear nucleus, Trigeminal motor nucleus, Abducens nucleus, Facial motor nucleus, Salivatory nuclei, Dorsal motor nucleus of vagus, Nucleus ambiguus, Accessory nucleus, Spinal trigeminal nucleus, Hypoglossal nucleus, Nucleus of the solitary tract, Cochlear nuclei, Vestibular nuclei, Principal trigeminal nucleus, Edinger-Westphal nucleus.</p>

Medulla oblongata		
 <p>Structure of the medulla oblongata</p> <p>Labels: Olive, Anterior median fissure, Anterolateral sulcus, Pyramid.</p> <p>Anterior view</p>	 <p>Labels: Olivary nucleus, Nucleus cuneatus, Nucleus gracilis, Posterior Median fissure, Spinal cord.</p> <p>Posterolateral view of Medulla</p>	 <p>Labels: Facial colliculus, Hypoglossal trigone, Vagal trigone.</p>

❖ Functions of the Brainstem:

1. **Conduct** functions.
2. provides the **origin** of cranial nerves (CN III-XII).
3. Conjugate eye movements.
4. **Integrative** functions.

❖ Signs & Symptoms of brain stem lesion:

	Midbrain lesion	Pons lesion	Medulla lesion
Cranial nerve (CN) deficits:	Ipsilateral CN III, CN IV palsy and ptosis (drooping)	CN V, CN VI, CN VII, CN VIII	CN IX, CN X, CN XI, CN XII
pupils	Size: Midposition to dilate Reactivity: sluggish to fixed	size: Pinpoint	Size: Dilated. Reactivity: Fixed.
Movement:	Abnormal extensor	Abnormal extensor.	Ipsilateral paralysis.
Respiratory:	Hyperventilating.	-Hyperventilation. -Apneustic (Abnormal respiration marked by sustained inhalation).	Abnormal breathing patterns
Loss of consciousness (LOC):	Varies	Semi-coma	comatose
CN Palsies:			Inability to control movement. Absent cough, gag.

❖ Brain stem function tests.

To test **reticular formation** → Alertness, Consciousness & Sleep.

To test **Corticospinal tract** → Motor power, reflexes

To test **Pain response** → Facial grimacing on firm pressure over the supraorbital ridge.

To test **respiratory center** → Look for the normal pattern of respiration

To test **cardiovascular center** → Look for normal circulatory function

brainstem reflexes

Pupillary and corneal reflexes

To test **Vestibulo-ocular reflex** → Injection of iced water into the ear will produce eyes movement.

To test **Oculo-cephalic reflex** → Eyes will be fixed when head is moved in one or another directions

Gag reflex

Cough reflex

Check your understanding!

1- The superior colliculus is responsible for :		2- the reticular formation is located :	
A	Vision	A	In the midbrain
B	Hearing	B	In the pons
C	General Touch	C	In the medulla oblongata
D	-	D	through all the brain stem
3- Which one of the following is responsible for Parkinson's disease in case of its destruction:		4- Which of the following does not originate from brain stem	
A	Periaqueductal Gray.	A	CNI
B	Substantia Nigra.	B	CNIII
C	Reticular Formation	C	CNII
D		D	A +C
5- Which of the following is an ascending tract :		6- Which of the following arises from pons:	
A	Cortico spinal tract	A	CNIII
B	Rubrospinal tract	B	CNXII
C	Vestibulospinal tract	C	CNVII
D	Spinothalamic	D	CNIX
7- Vertical conjugate gaze is controlled by:		8- Pinpoint pupil size, hyperventilation and sustained inhalation is characteristic of a lesion in:	
A	the nuclei of 3rd and 4th Cranial nerves	A	Pons
B	the nuclei of 3rd and 6th Cranial nerves	B	Midbrain
C	-	C	Medulla Oblongata
D	-	D	-
9- which of the following supplies the superior oblique muscle:		10- a patient came to the ER after hard fall on his shoulder, he couldn't move his right shoulder and turn his head to the right either, which nerve could be effected:	
A	CNI	A	CNX

B	CNII	B	CNXI
C	CNII	C	CNXII
D	CNIV	D	-

Answers :

1- A	2- D	3- B	4- D	5- D	6- C	7- A	8- A	9- D	10- B
-------------	-------------	-------------	-------------	-------------	-------------	-----------------	-------------	-------------	--------------