

Brain Stem

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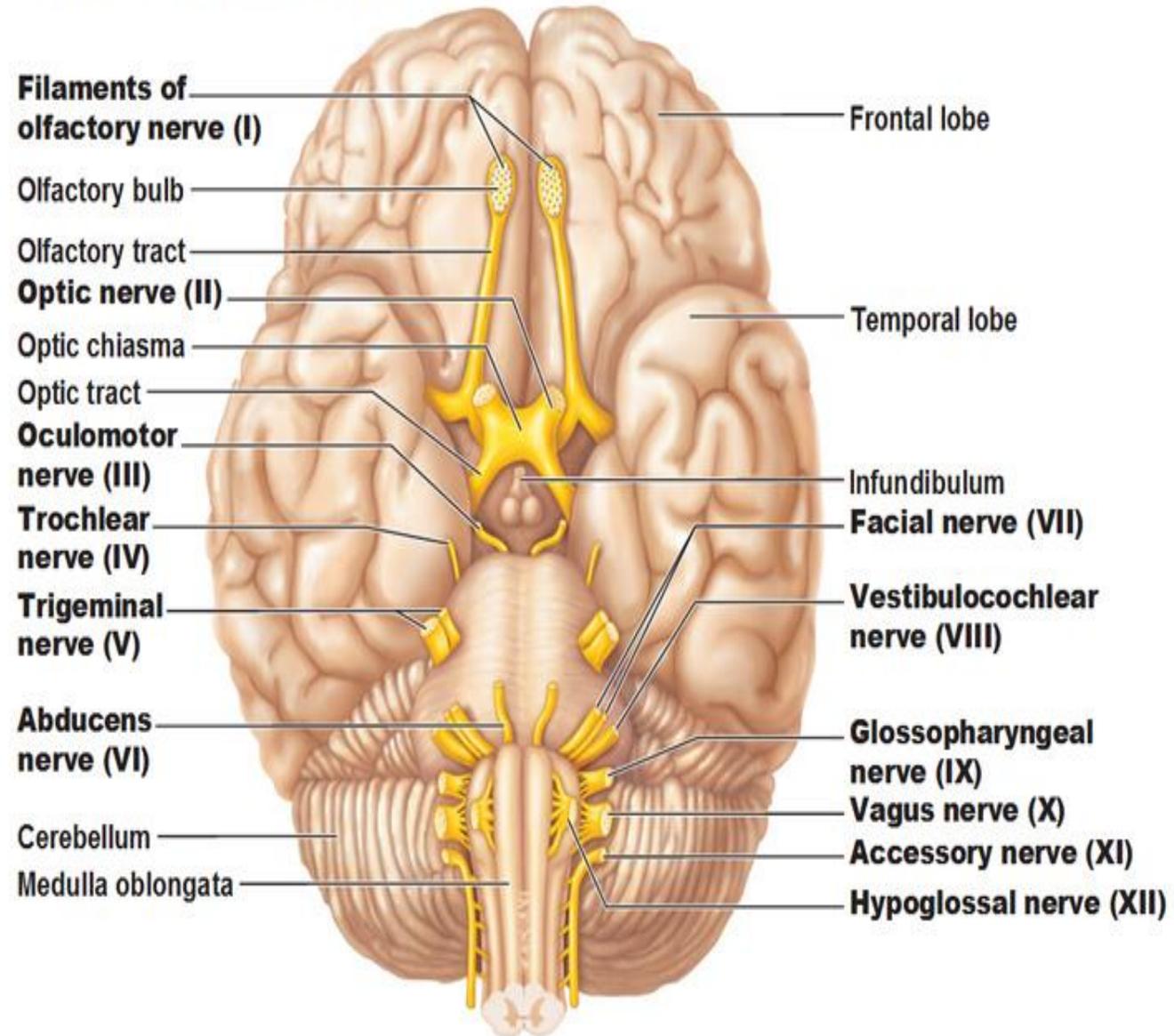
Lecture ILOs/ Objectives

- **By the end of this lecture the student will be able to:**
 - 1. Understand the gross anatomy of brain stem**
 - 2. Describe external features of medulla oblongata**
 - 3. Illustrate external features of pons**
 - 4. Explain external features of midbrain**

Brain Stem

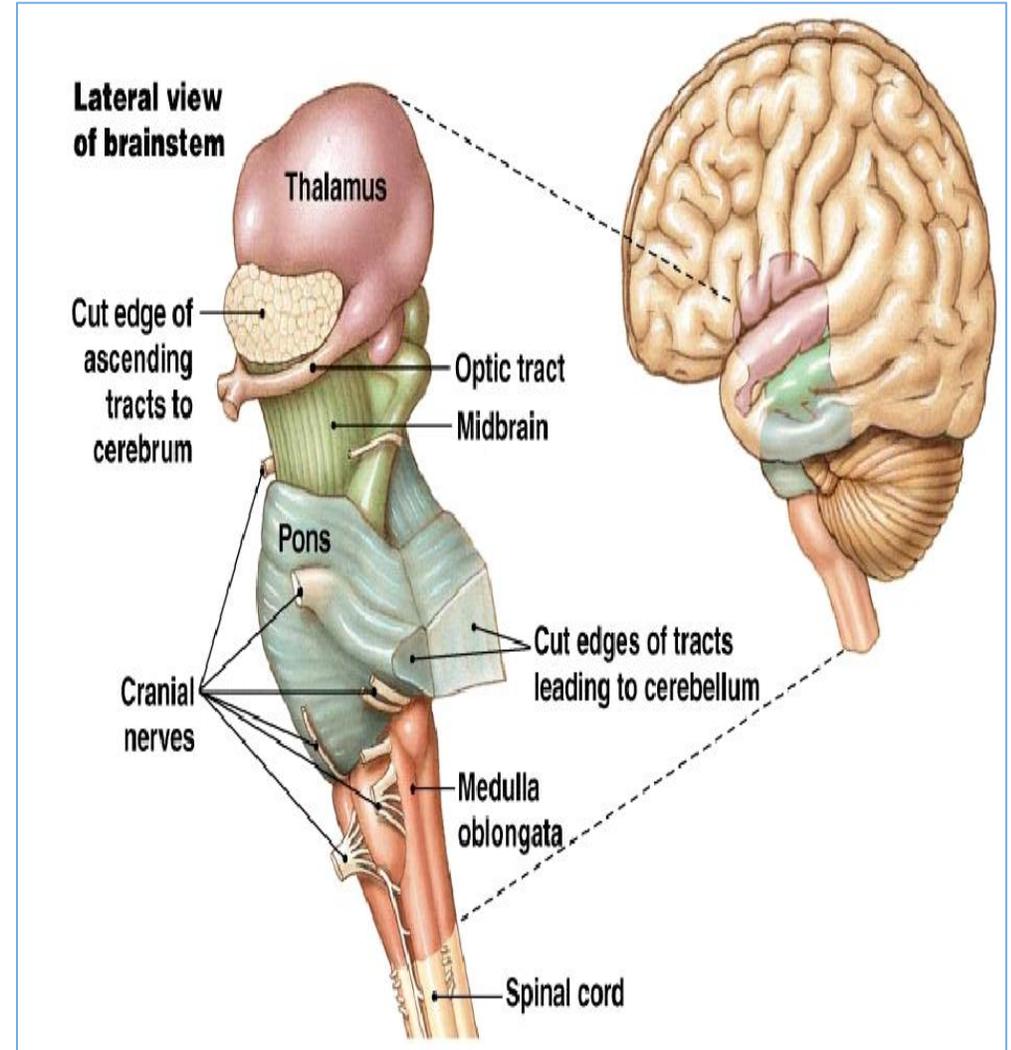
- Consists of medulla oblongata, pons and midbrain (form below upwards).
- Gives rise to cranial nerves (from CN III to XII).
- Receives its arterial supply from the vertebro-basilar system of arteries

The Cranial Nerves



MEDULLA OBLONGATA

- Is the lower part of the brain stem extending from the **foramen magnum below** to the **lower border of the pons above**.
- Is connected to the cerebellum by the inferior cerebellar peduncle.
- **Consists of two parts:**
 - a- Closed medulla:** constitutes the lower half and is traversed by the central canal.
 - b- Open medulla:** constitutes the upper half. It has no central canal and is separated from the cerebellum by the cavity of 4th ventricle.

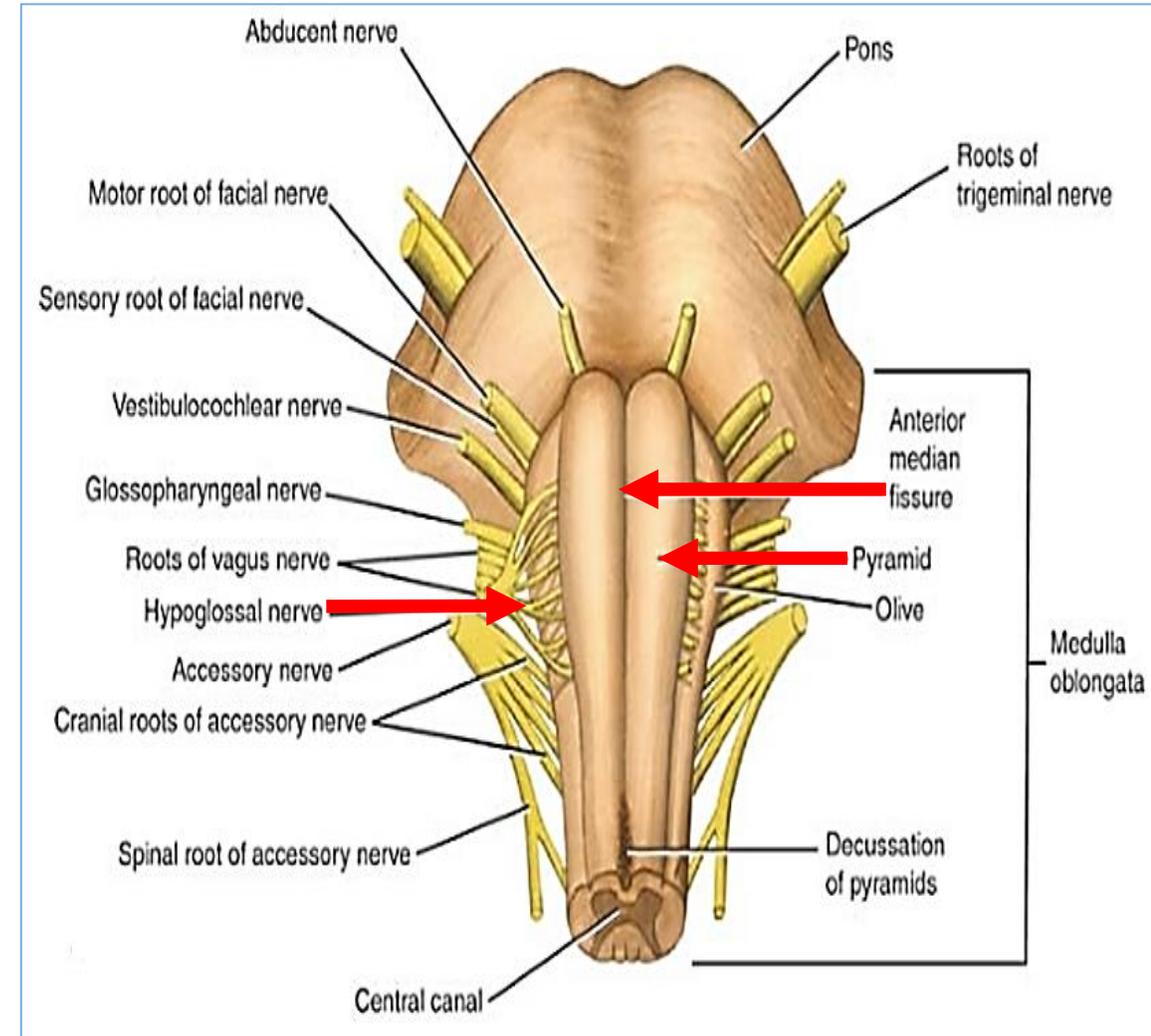


External Features:

- **A- Ventral surface:**

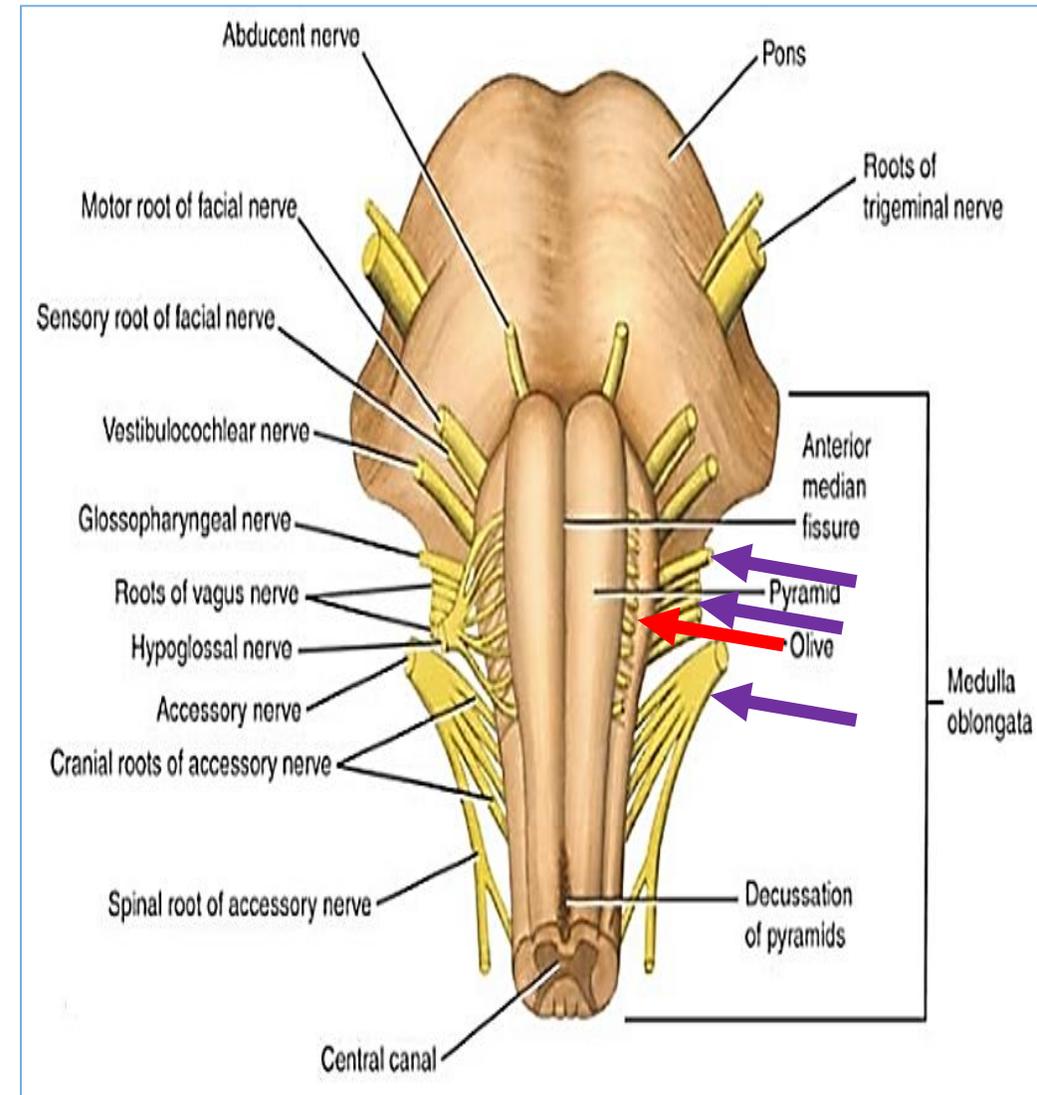
Shows the following features :

- **Anterior median sulcus (fissure):**
- **Pyramid:** is a pyramidal elevation, one on each side of the anterior median fissure. It is formed by the descending pyramidal (cortico-spinal) fibers.
- **Antero-lateral sulcus and rootlets of the hypoglossal nerve XII.**



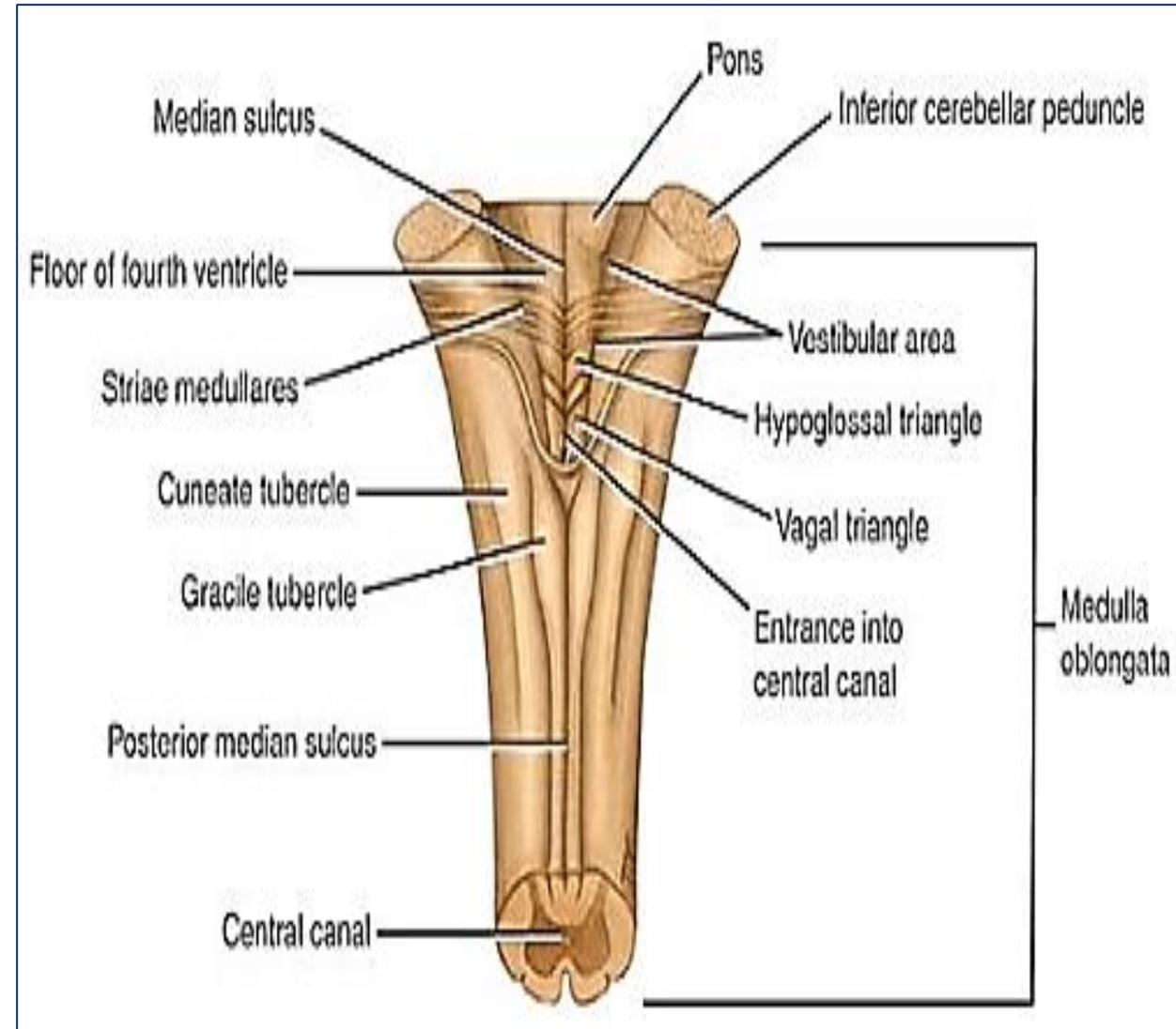
External Features:

- **B- Lateral Aspect:**
- Shows the following features:
- **Olive:** An oval elevation situated lateral to the upper part of the pyramid. It is the site of inferior olivary nucleus.
- **Postero-lateral sulcus :** Lies behind the olive and contains rootlets of **CNs IX, X & XI cranial nerves.**
- **Inferior cerebellar peduncle:**
- Lies postero-lateral to the olive.



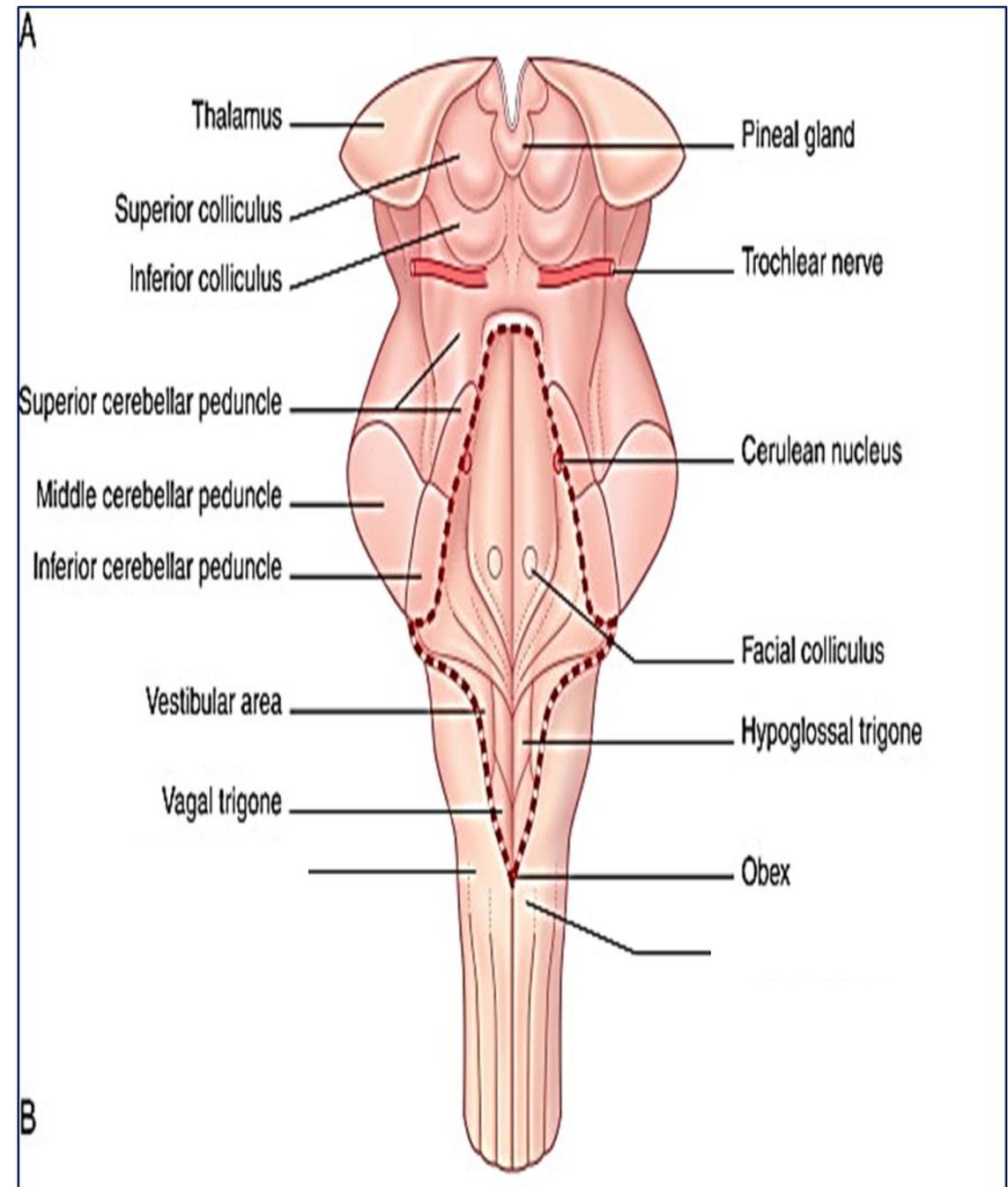
Dorsal Surface **Closed Medulla:**

- *It shows the following:*
- **Gracile tract and tubercle:** produced by the gracile tract and nucleus.
- **Cuneate tract and tubercle:** produced by the cuneate tract and nucleus.



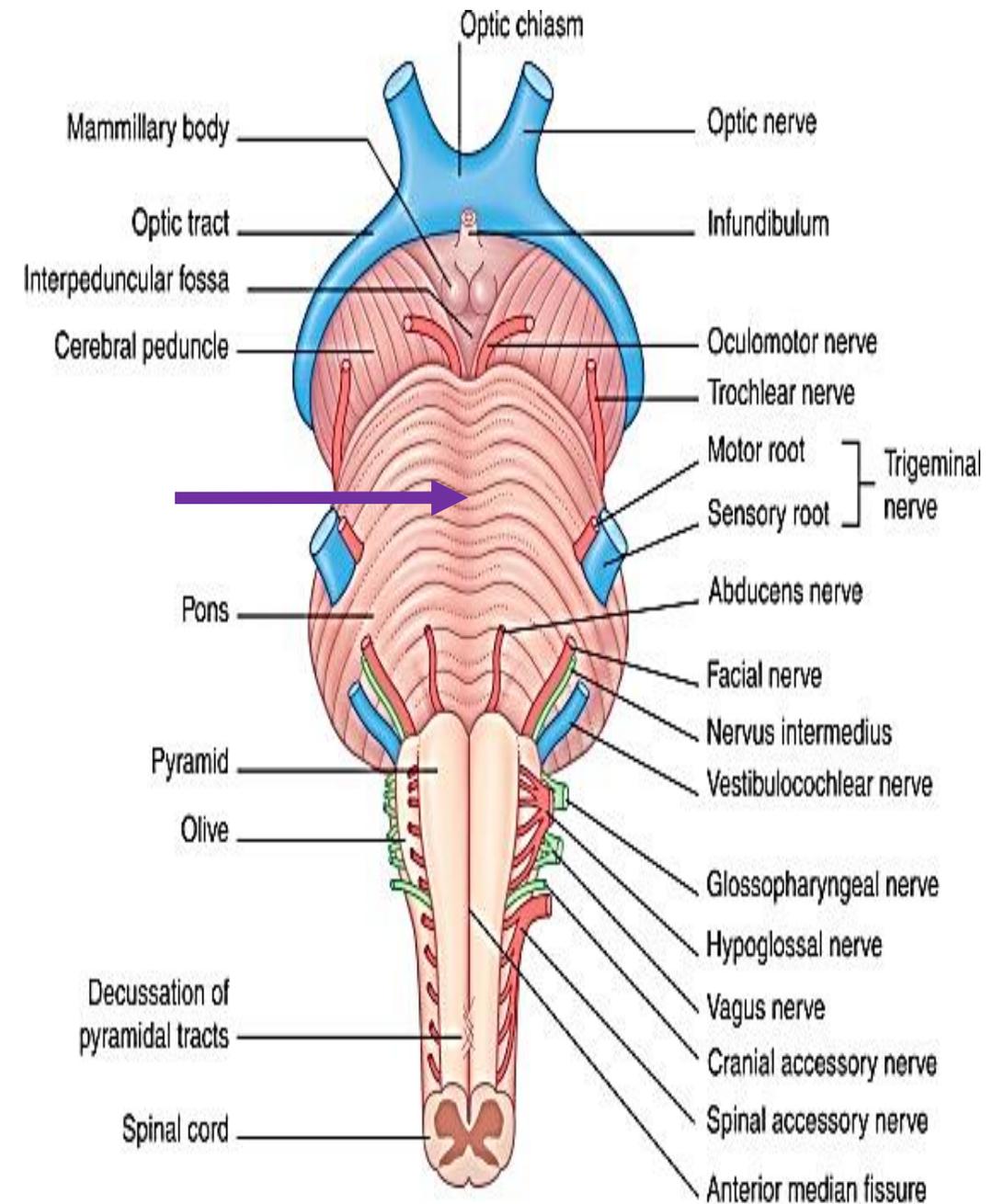
Open Medulla:

- Forms the lower half of **the rhomboid fossa**, which is bounded laterally by the inferior cerebellar peduncles.
- It shows the following:
 - **Striae medullaris**: Are transverse strands of fibres which demarcate between the open medulla and the pons. Its fibres are the external arcuate fibres.
 - **Dorsal median sulcus**:
 - **Inferior fovea** : A triangular depression separating between :
 - a- Hypoglossal trigone
 - b- Vagal trigone
 - c- Lower vestibular area
 - **Inferior cerebellar peduncle**



PONS

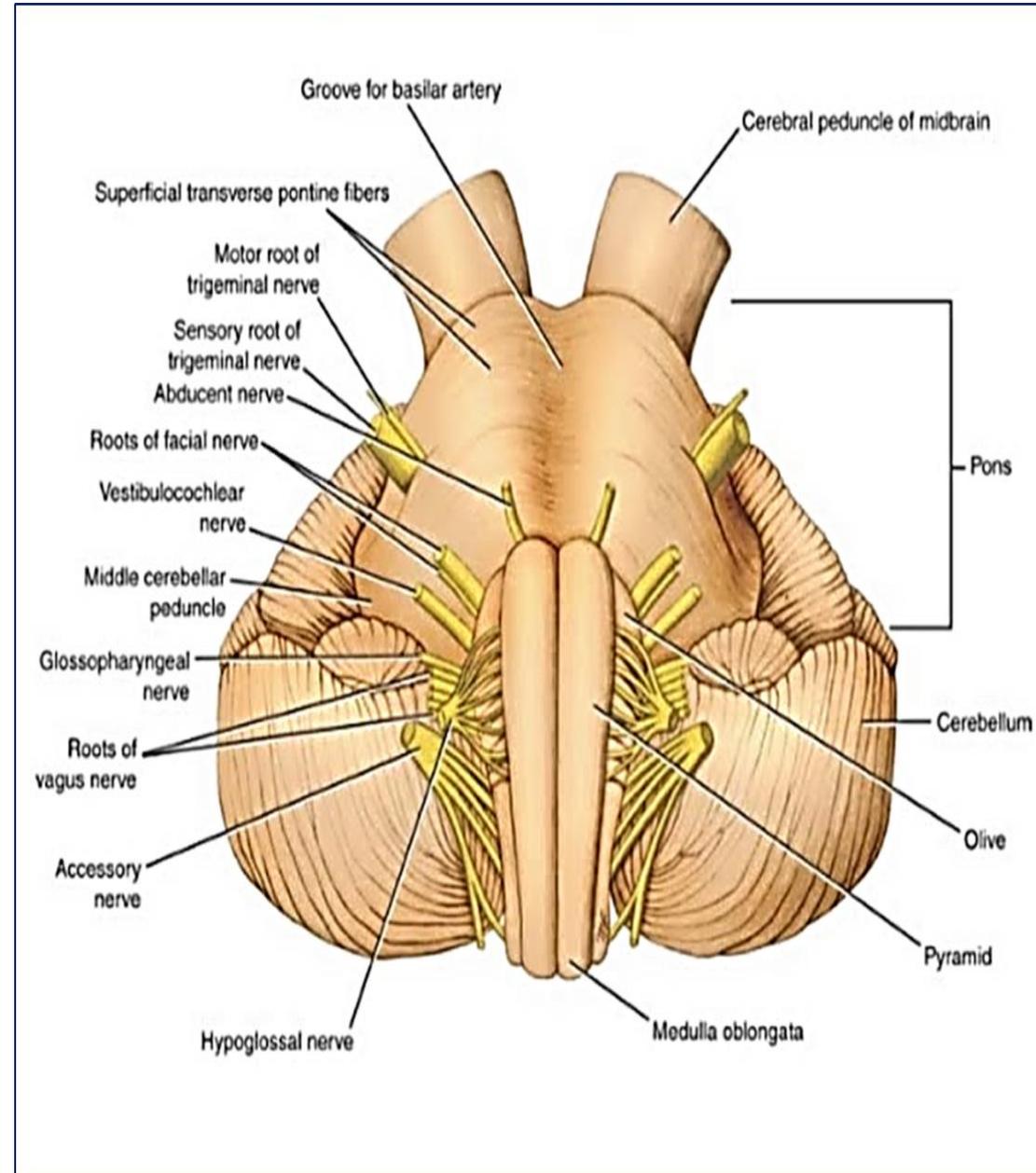
- **External features:**
- **A- Ventral surface**
- Shows the following features :
- **Basilar sulcus:** Lodges the basilar artery.
- **Transverse striations:** Is made of the transverse pontine fibres which are collected laterally to form the middle cerebellar peduncle (MCP).
- **Cranial nerves VI, VII, VIII** are related to its inferior border



PONS

B- Lateral surface:

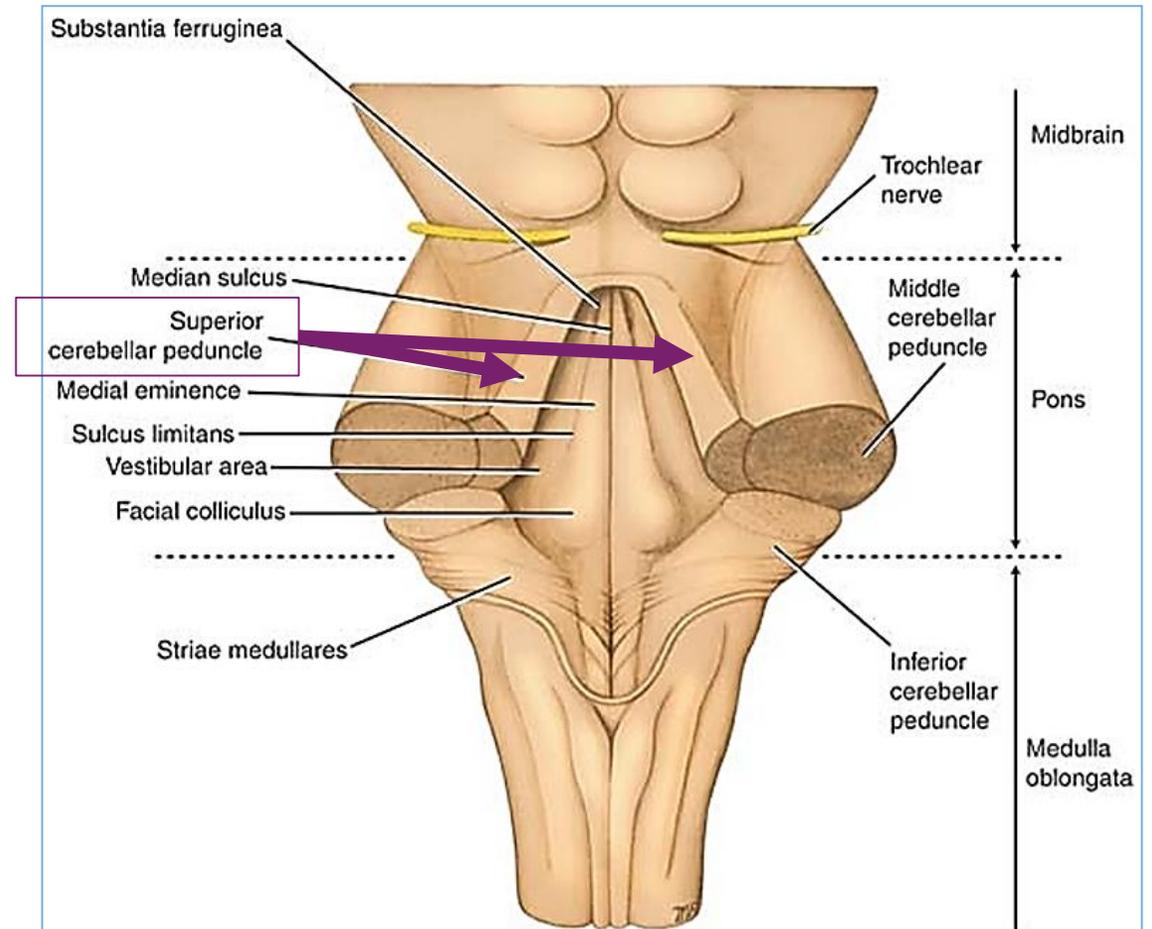
- Shows the following features:
- **Roots of trigeminal nerve (V):** Attached to the surface at the junction between basilar part of the pons and middle cerebellar peduncle.
- **Middle cerebellar peduncle:** Formed by the transverse pontine fibers of the opposite half
- **Facial (VII) and vestibulo-choclear nerves (VIII):** Emerge at the anterolateral angle
- **Abducent nerve (VI):** emerges at the junction of pons and medulla, on the anterior aspect.



PONS

C- Dorsal surface:

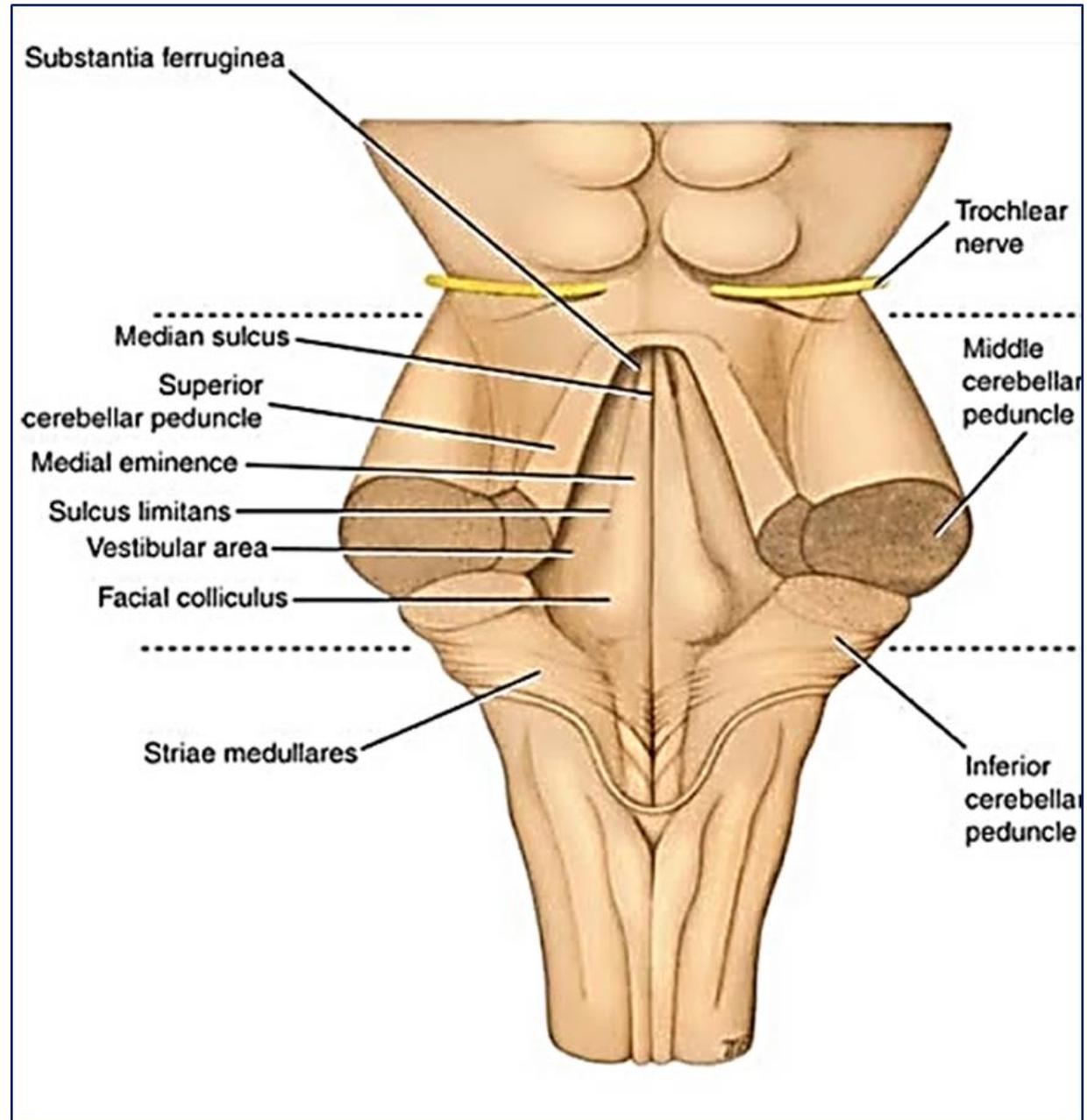
- Shows the following features:
- **Triangular in shape** and forms the upper half of rhomboid fossa.
- It extends between the two superior cerebellar peduncles and forms the upper part of floor of the 4th ventricle .



PONS

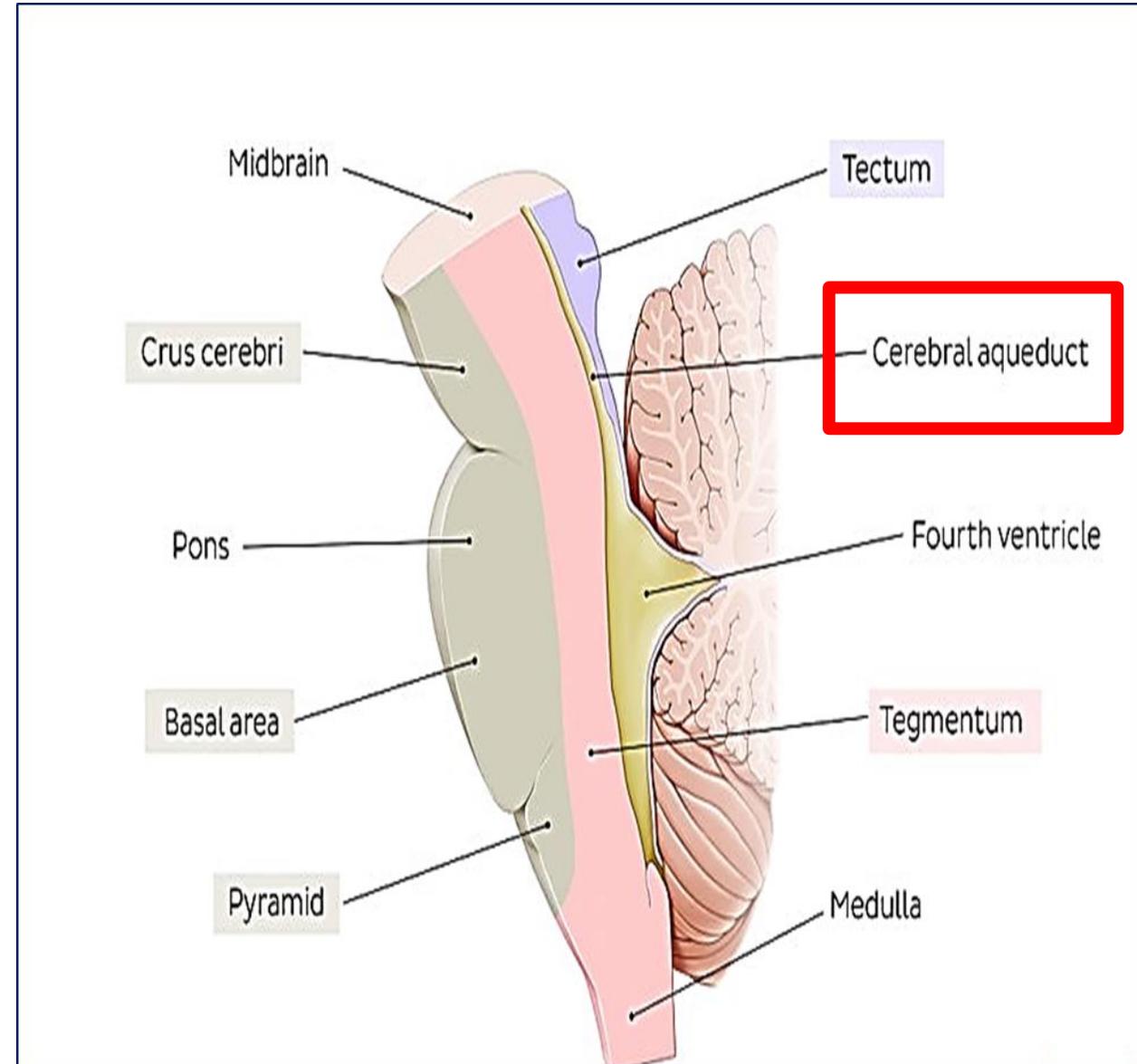
C- Dorsal surface:

- Structures on the pontine part of rhomboid fossa are:
- 1- Median sulcus :
- 2-Medial eminence:
- 3-Facial colliculus: formed by abducent nerve nucleus and fibres of facial nerve.
- 4- Upper vestibular area: is related to the vestibular nuclei.
- 6- Stria medullaris: are transverse strands of fibers.



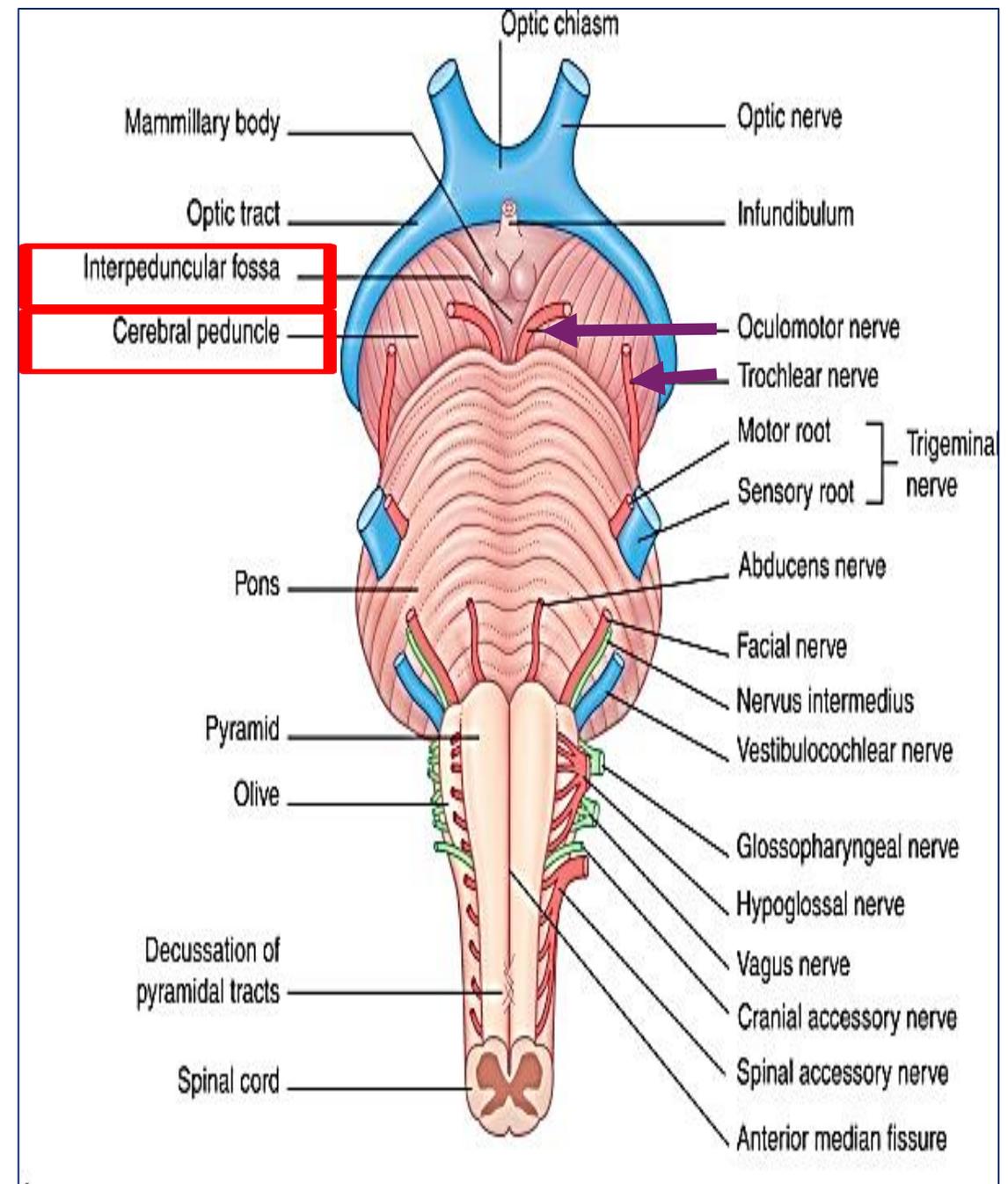
MIDBRAIN

- Is the upper part of the brain-stem,
- lies between the diencephalon (thalamus & subthalamus) and the pons.
- It is divided into dorsal part (tectum) and ventral part (cerebral peduncle).
- It gives rise to two cranial nerves:
 - Oculomotor (III)
 - Trochlear (IV) .
- *Its cavity is the aqueduct of sylvius (Cerebral Aqueduct).



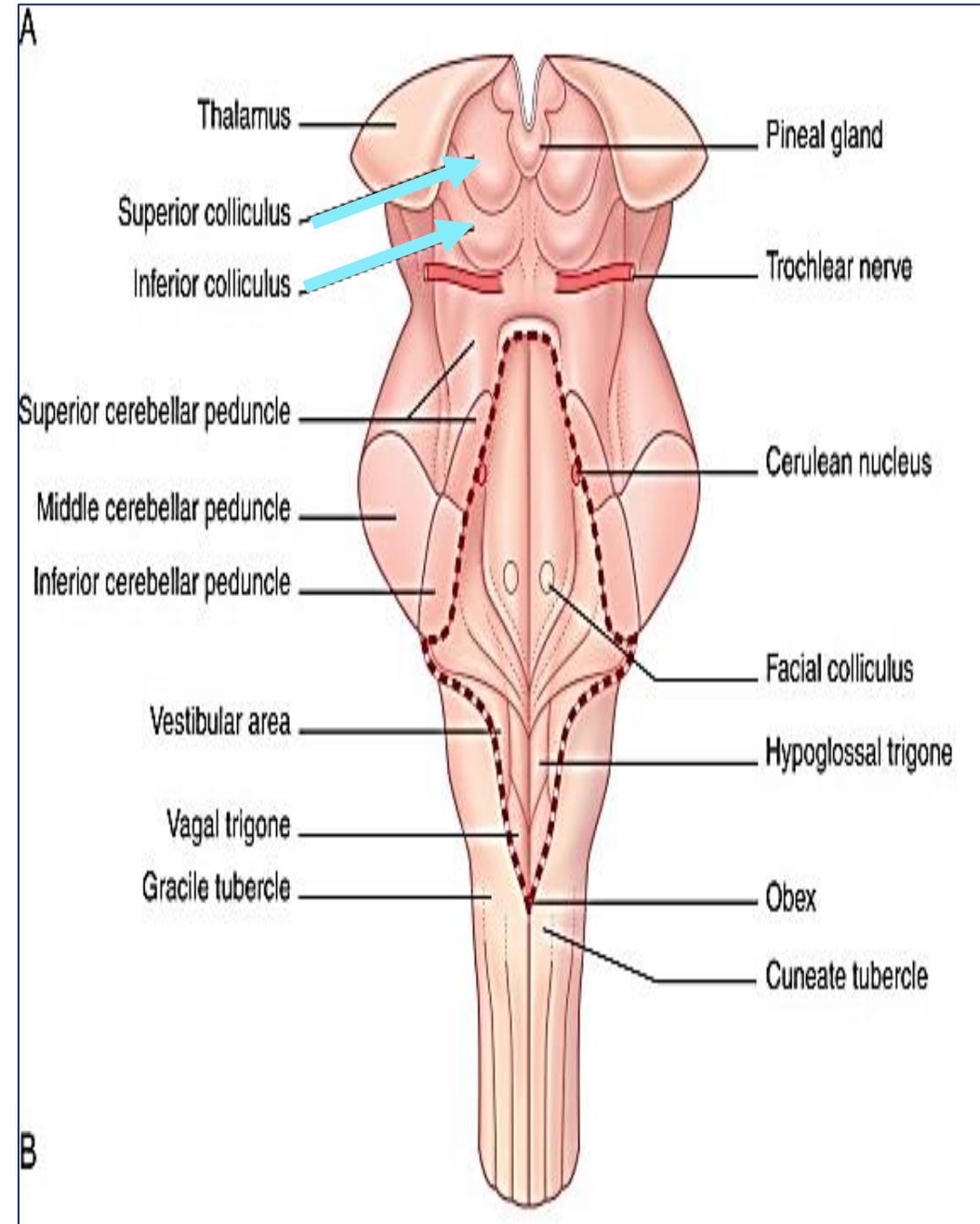
MIDBRAIN

- **External Features:**
- **A- Ventral surface:**
- *Shows the following :*
- **Two crus cerebri**
- **Inter peduncular fossa** in between the crura and contains:
 - a- Tuber cinereum and infundibulum of the pituitary gland.
 - b- Mamillary bodies.
 - c- Posterior perforated substance.
 - d- **Oculomotor nerve**, emerging medial to the crus.



MIDBRAIN

- **b- Dorsal surface:**
- *Shows and related to :*
- **Superior colliculus;** is connected with the lateral geniculate body by the superior brachium.
- **Inferior colliculus :** is connected with the medial geniculate body by the inferior brachium.
- **Trochlear nerve (CN; IV)** emerges from this surface below the inferior colliculus.



MIDBRAIN

- **C- Sagittal section:**

- The cerebral aqueduct divides the midbrain at different levels into the following:

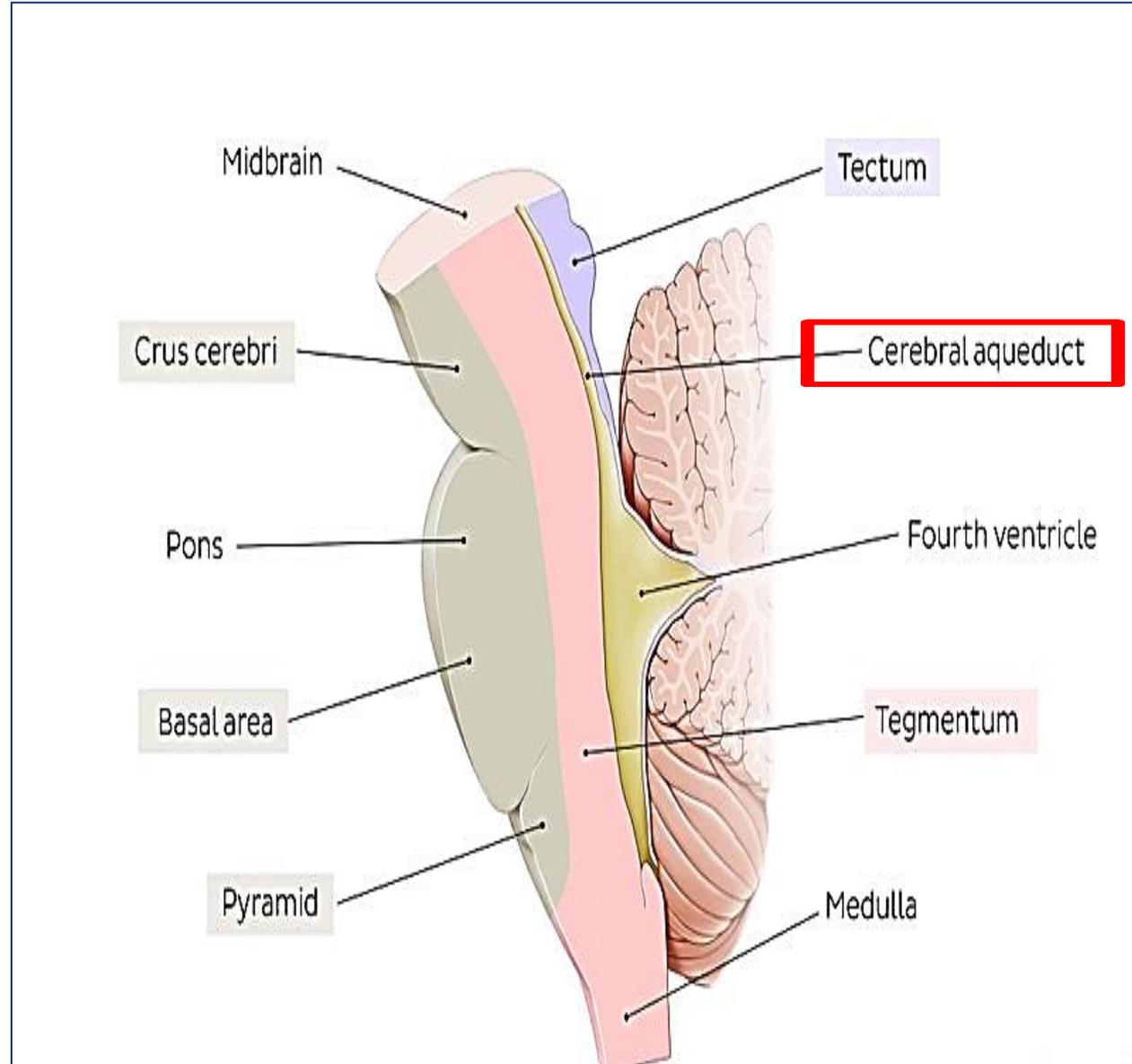
- 1) Dorsal part Tectum:**

- (Superior colliculus & Inferior colliculus)*

- 2) Ventral part (Cerebral peduncle)**

- which is subdivided into:

- a. Crus cerebri
 - b. Substantia nigra
 - c. Tegmentum



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THANK

YOU!

