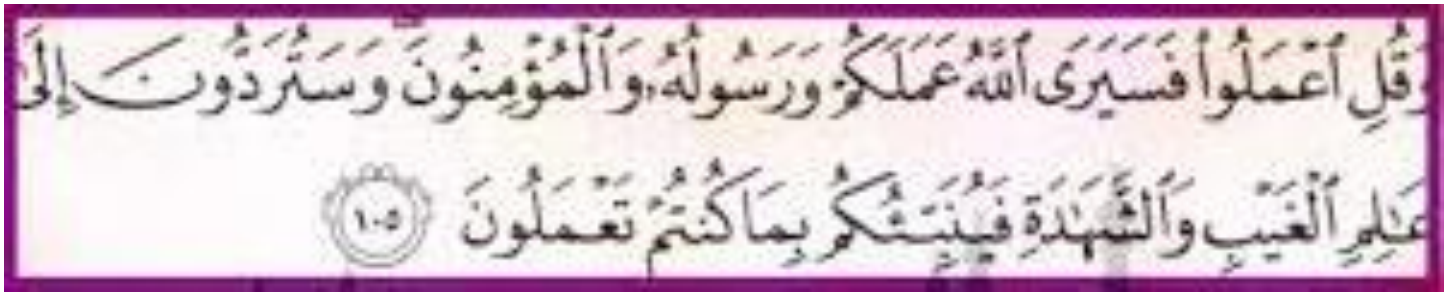
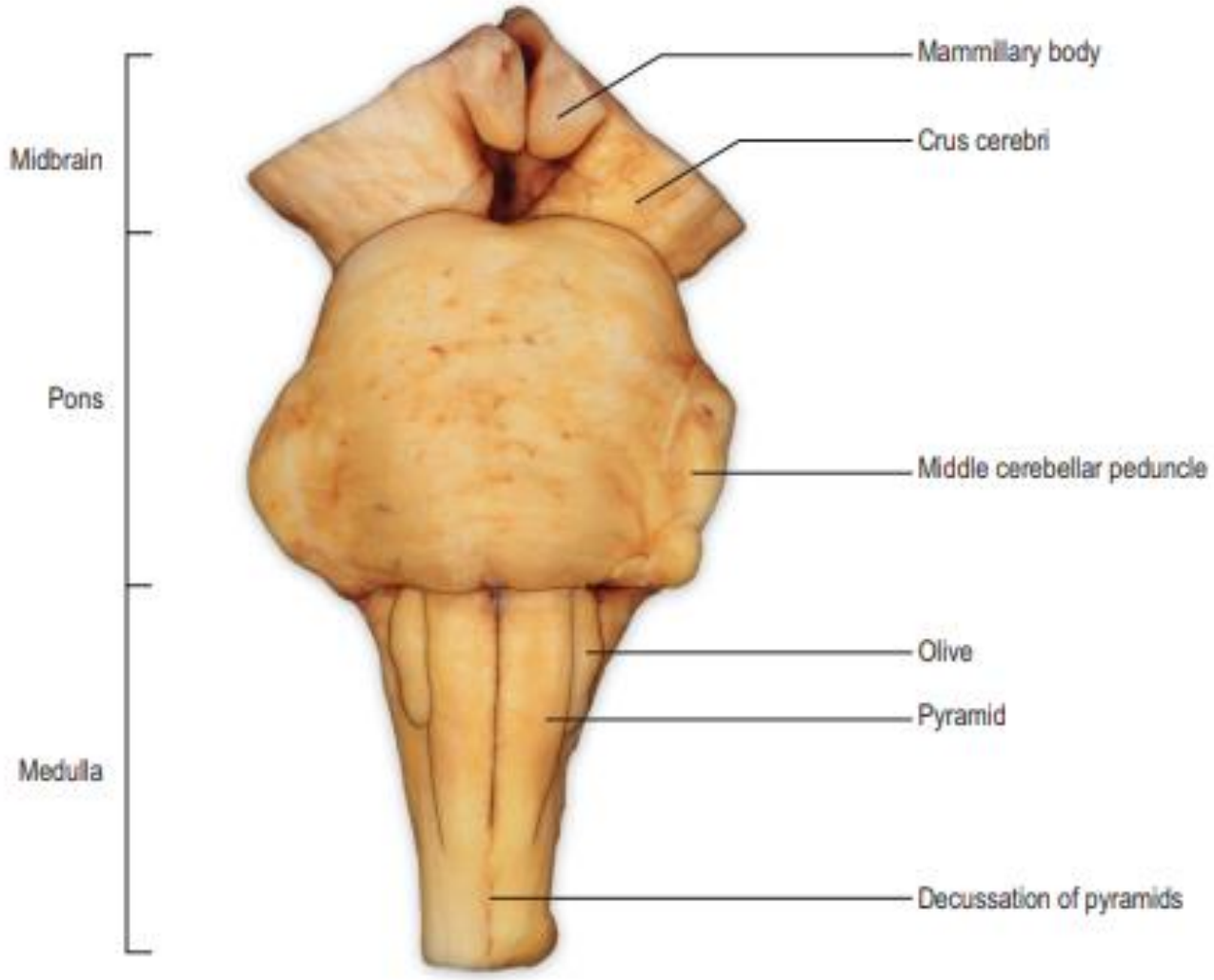
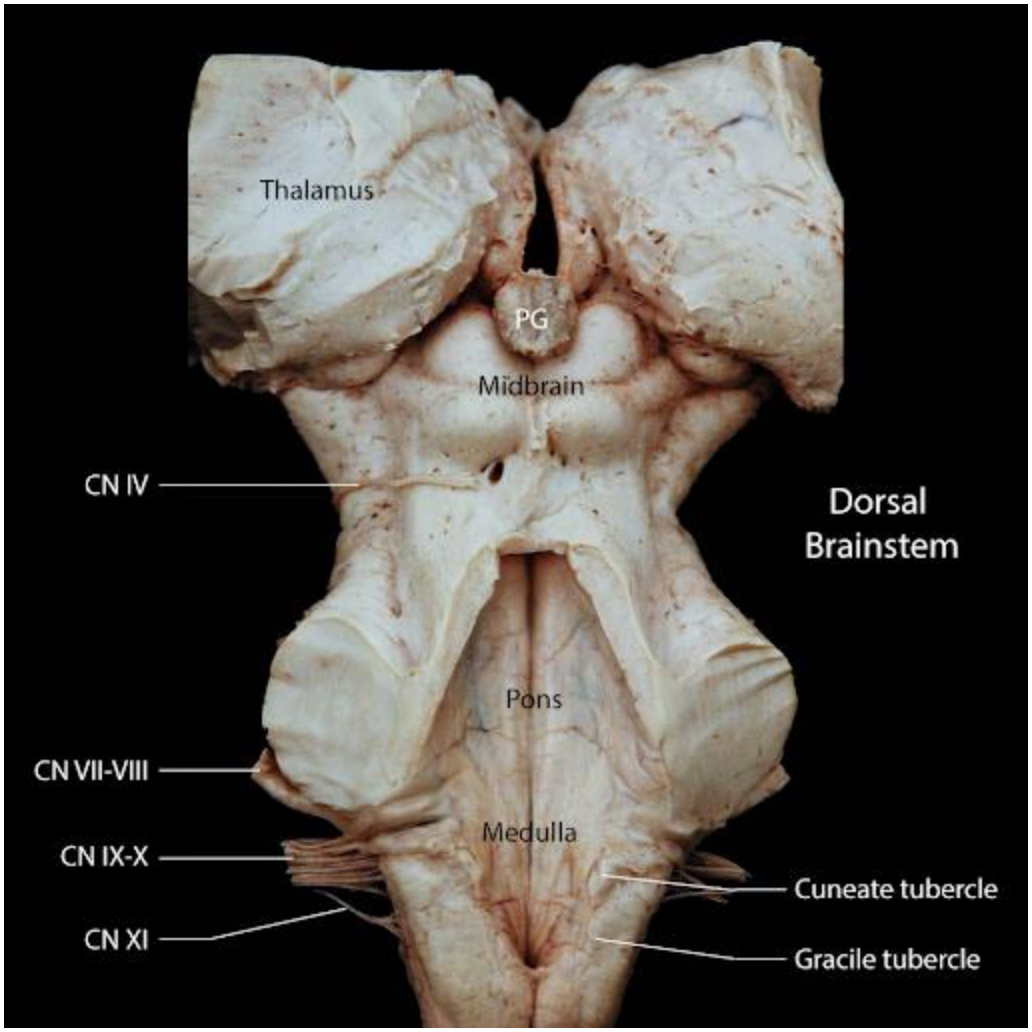

وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ ۖ وَسَتُرَدُّونَ إِلَىٰ
عَالِمِ الْغَيْبِ وَالشَّهَادَةِ فَيُنَبِّئُكُم بِمَا كُنتُمْ تَعْمَلُونَ ١٠٥

EXTERNAL FEATURES OF BRAIN STEM

CNS MODULE 2024

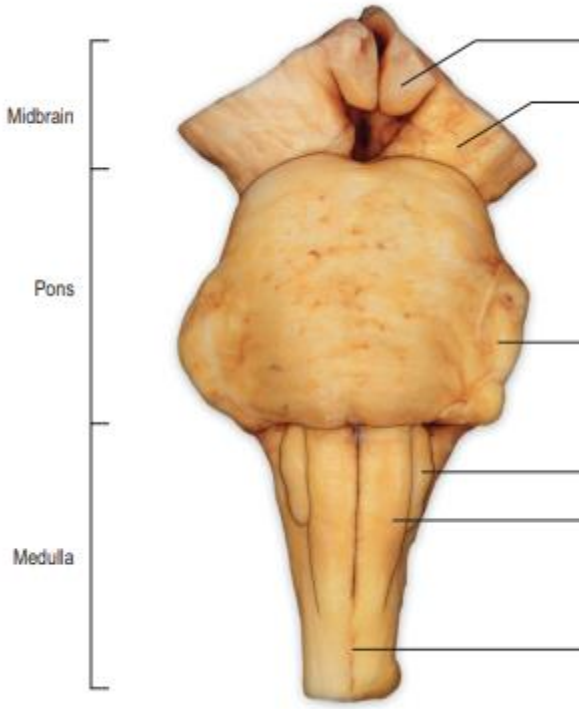
Dr. AMAL ALBTOOSH

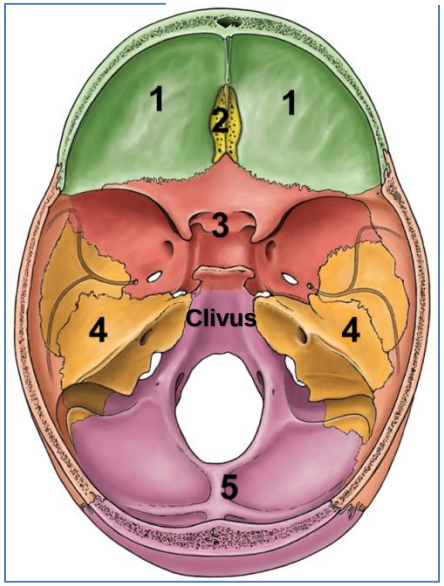

Midbrain
Pons
Medulla
Mammillary body
Crus cerebri
Middle cerebellar peduncle
Olive
Pyramid
Decussation of pyramids


Thalamus
PG
Midbrain
CN IV
Dorsal
Brainstem
Pons
CN VII-VIII
Medulla
CN IX-X
Cuneate tubercle
CN XI
Gracile tubercle

BRAIN STEM

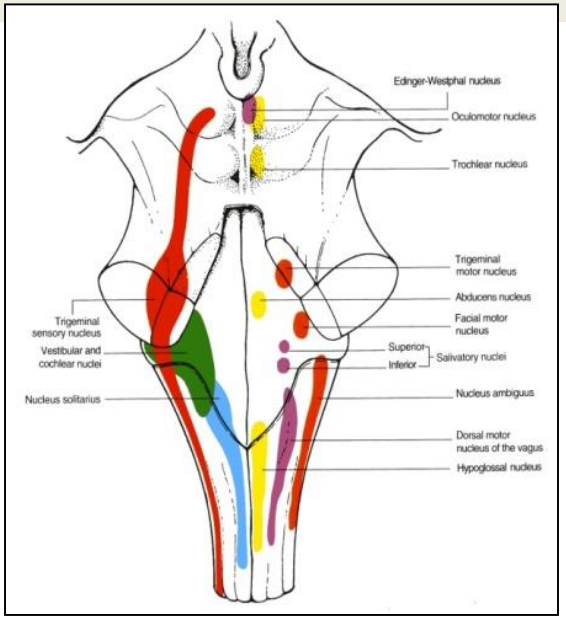
- ❑ The brainstem is the region of the brain that connects the cerebrum with the spinal cord
- ❑ **SITE:**
- It lies on the basilar part of occipital bone (clivus).
- ❑ **PARTS:** *From above downwards:*
- *Mid brain, pons & medulla oblongata*
- ❑ **CONNECTIONS WITH CEREBELLUM:**
- Each part of brain stem is connected to cerebellum by cerebellar peduncles (superior, middle & inferior).

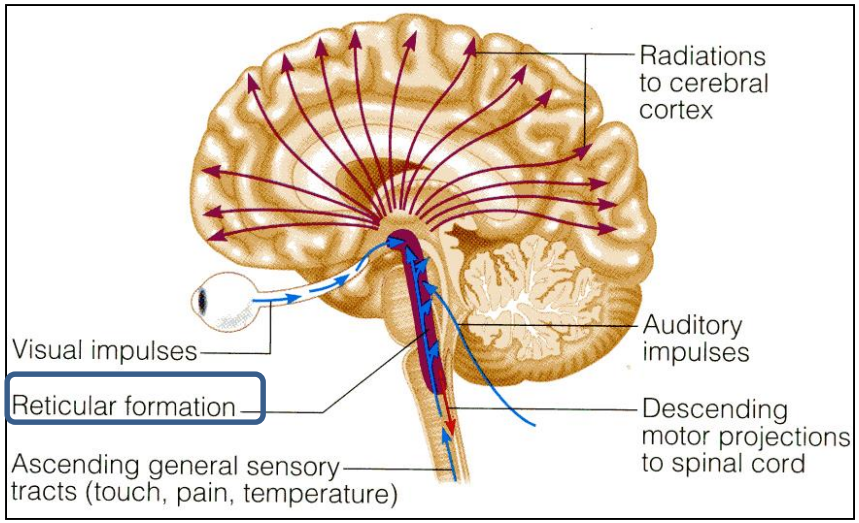




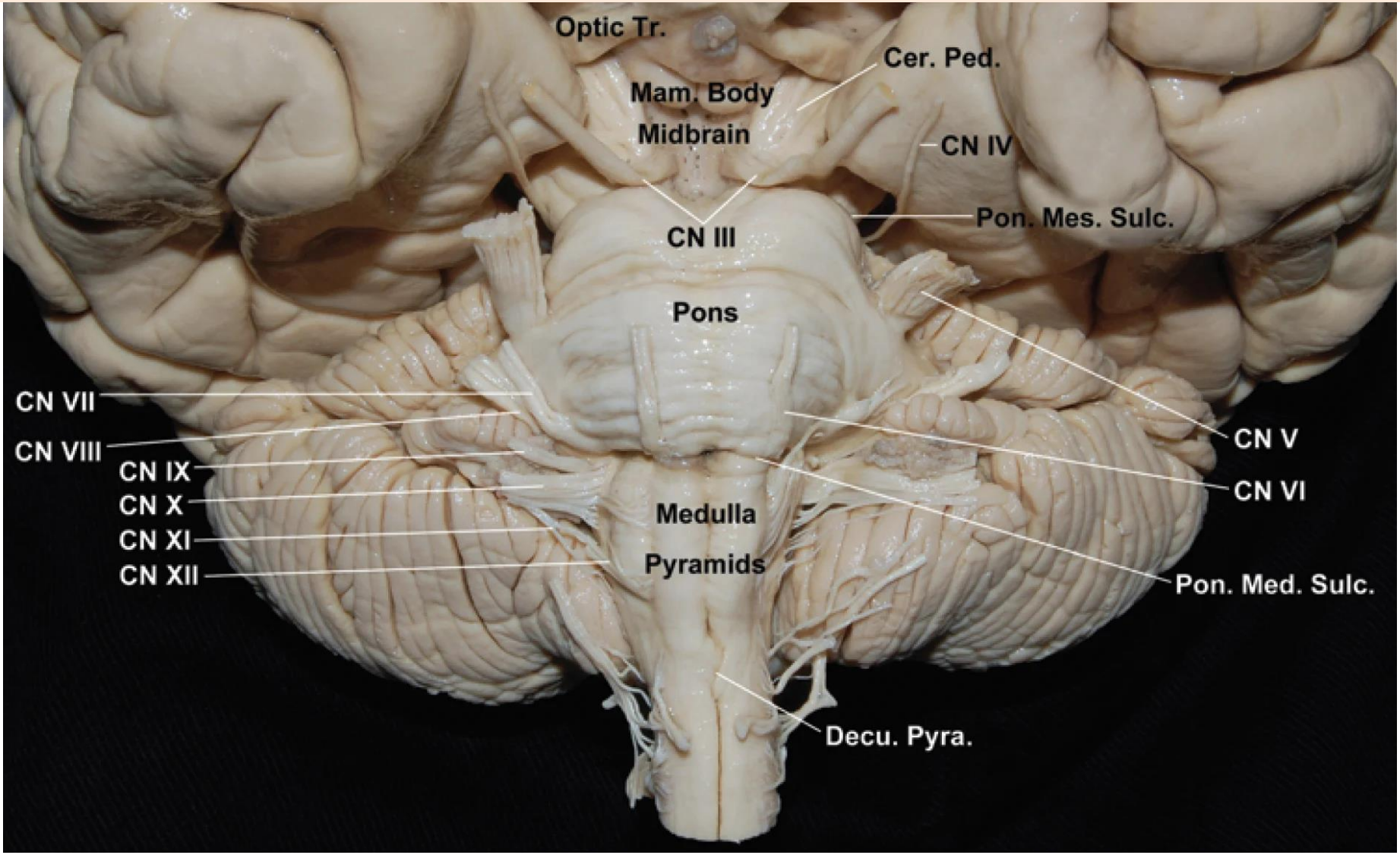
FUNCTIONS OF BRAIN STEM

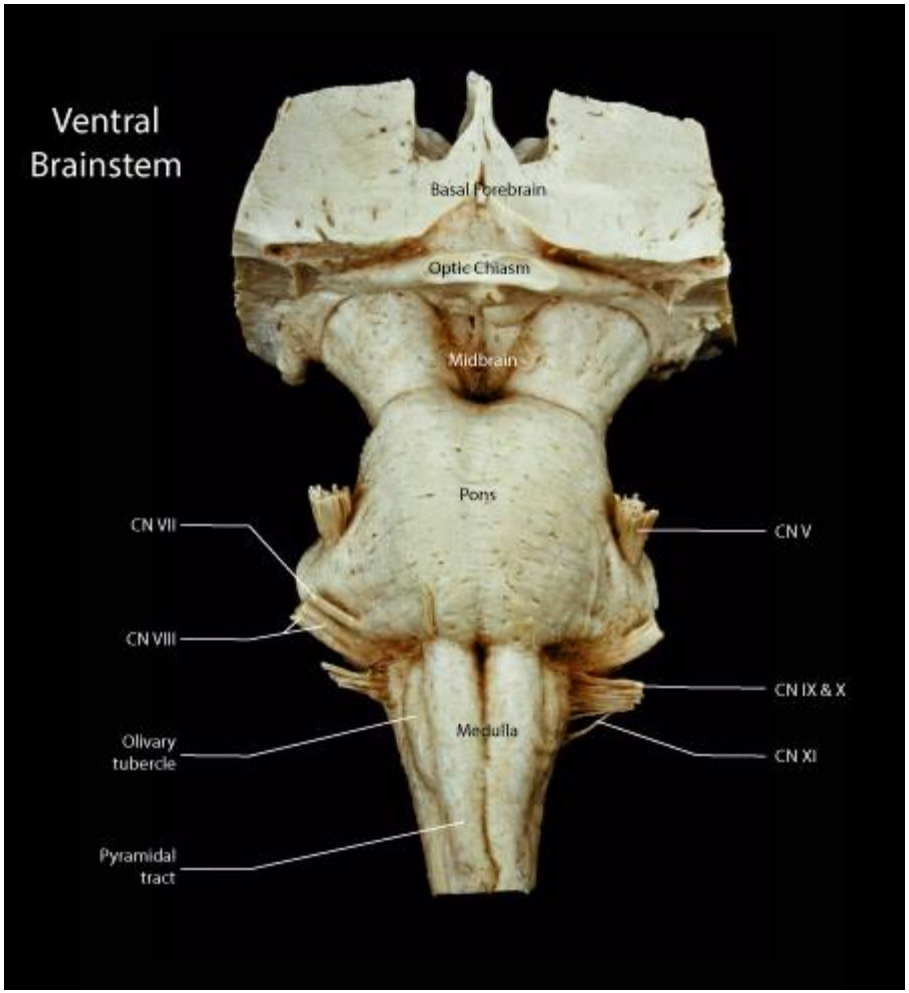
1. **Pathway of tracts between cerebral cortex & spinal cord.**
2. **Site of nuclei of cranial nerves (from 3rd to 12th).**
3. **Contains groups of nuclei & related fibers known as reticular formation responsible for: *control of level of consciousness, perception of pain, regulation of cardiovascular & respiratory systems.***

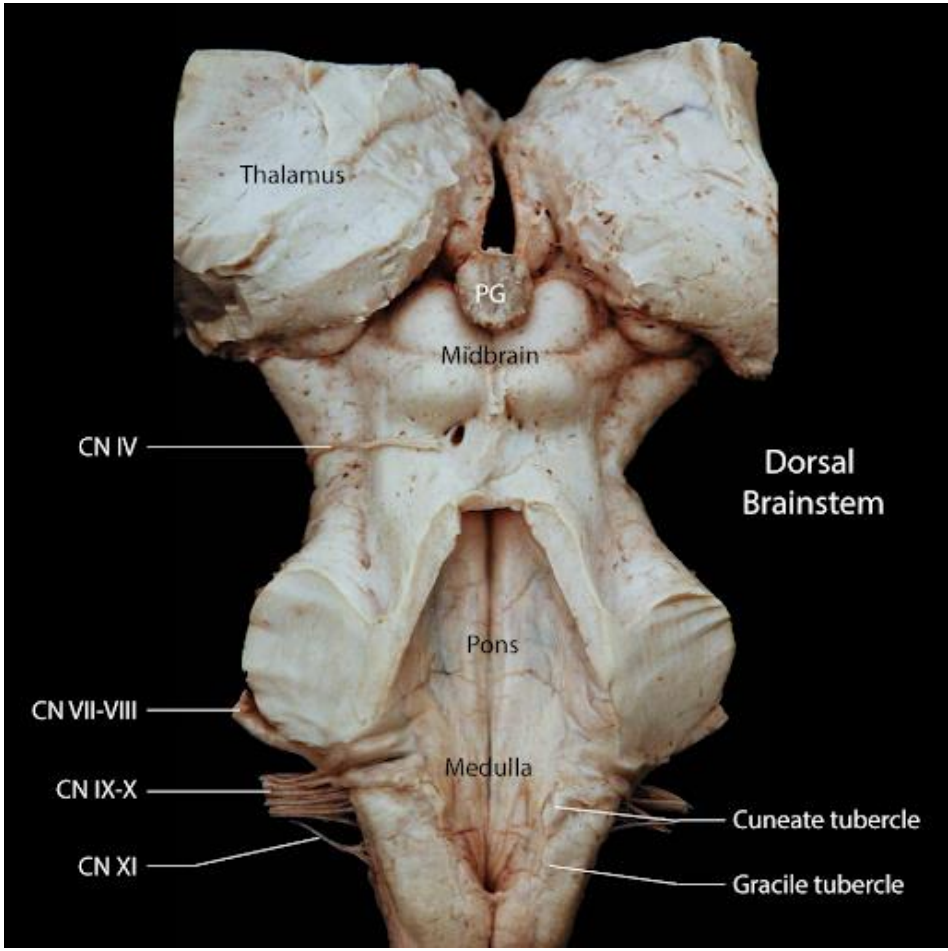




BRAIN – VENTRAL SURFACE

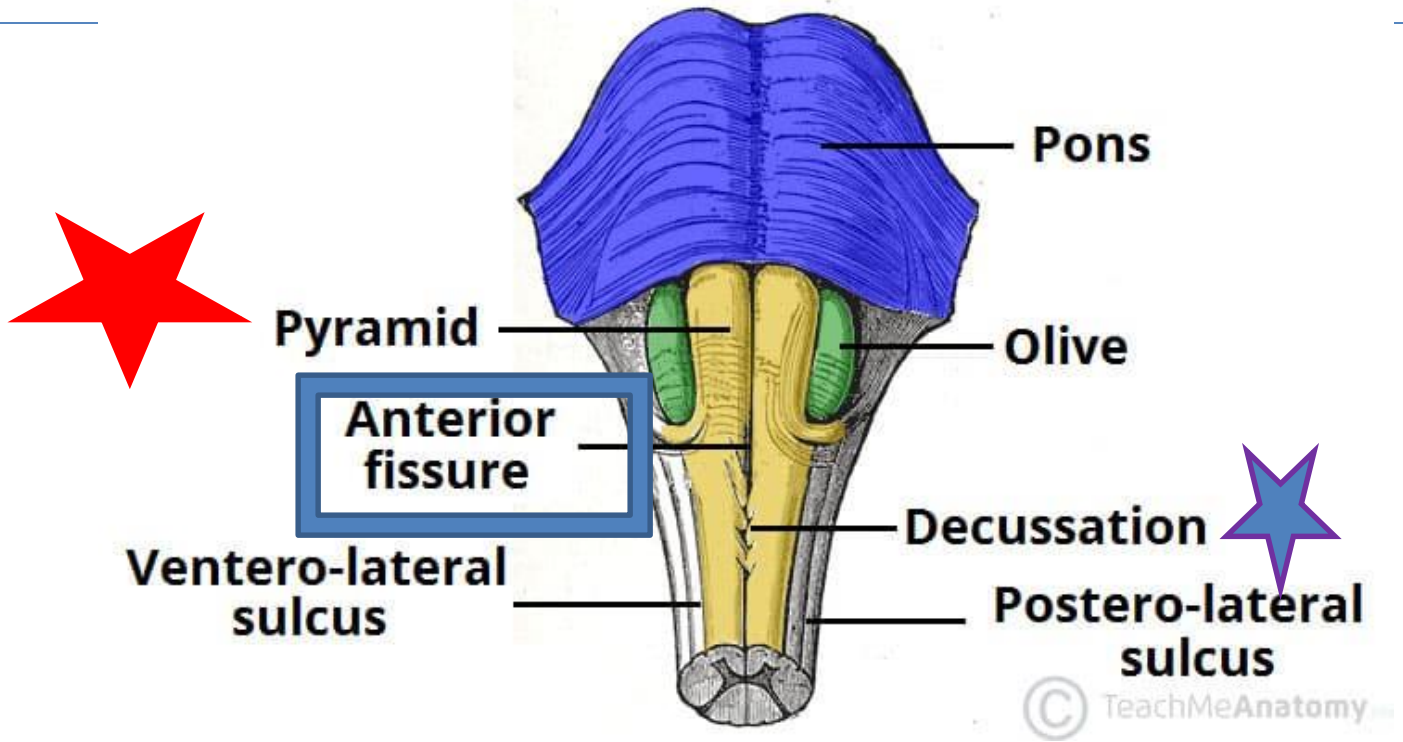



Ventral
Brainstem
Basal Forebrain
Optic Chiasm
Midbrain
Pons
CN VII
CN V
CN VIII
CN IX & X
Olivary
tubercle
Medulla
CN XI
Pyramidal
tract

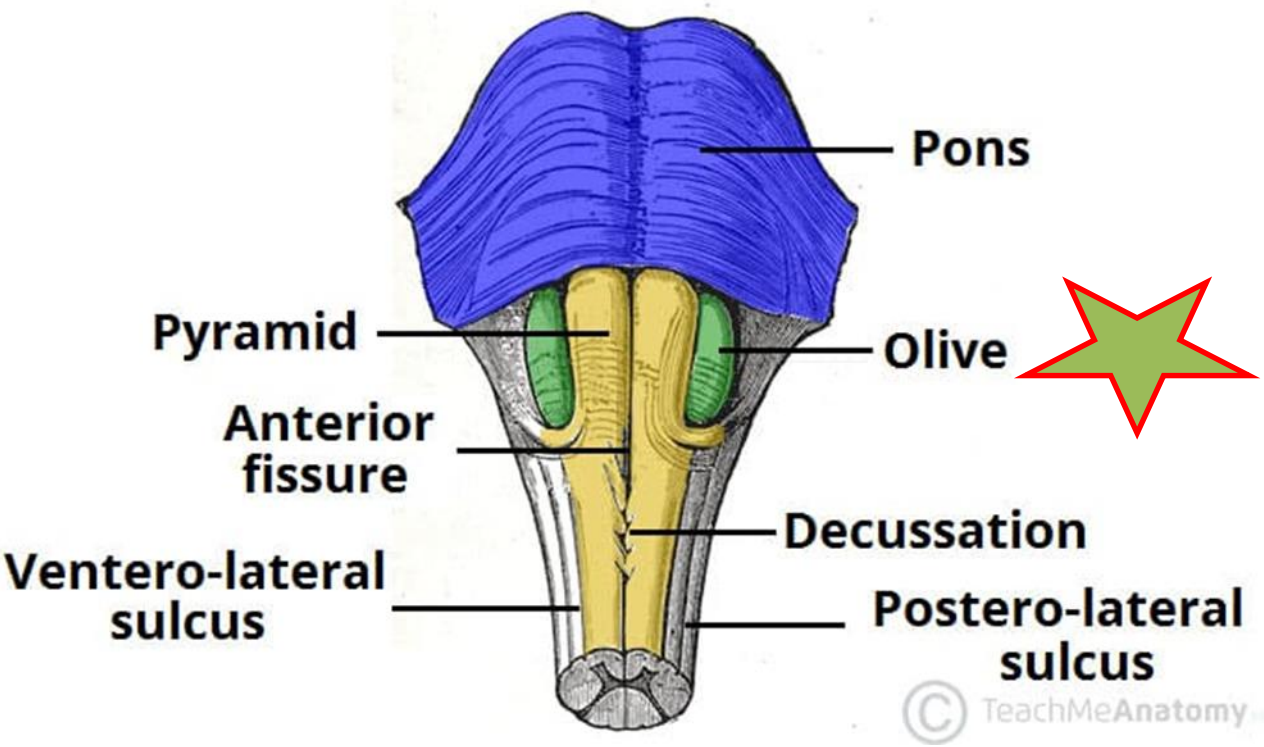

Thalamus
PG
Midbrain
CN IV
Dorsal
Brainstem
Pons
CN VII-VIII
Medulla
CN IX-X
Cuneate tubercle
CN XI
Gracile tubercle

MEDULLA – VENTRAL SURFACE

- **Ventral median fissure:**
- Continuation of ventral median fissure of spinal cord
- Divides the medulla into 2 halves
- Its lower part is marked by decussation of most of pyramidal (corticospinal) fibers (75%-90%).
- **Pyramid:**
- An elevation, lies on either side of ventral median fissure
- Produced by corticospinal tract.

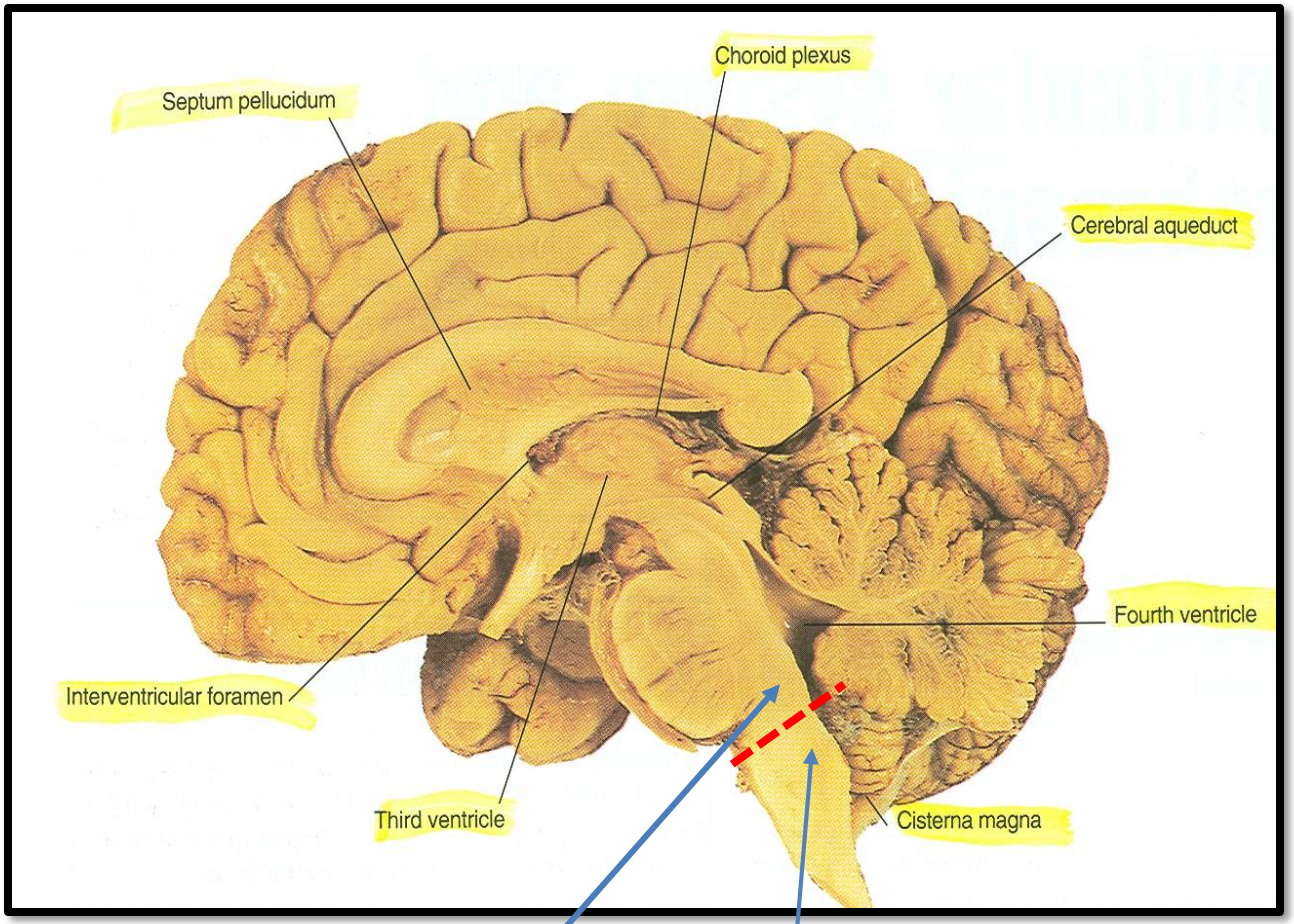


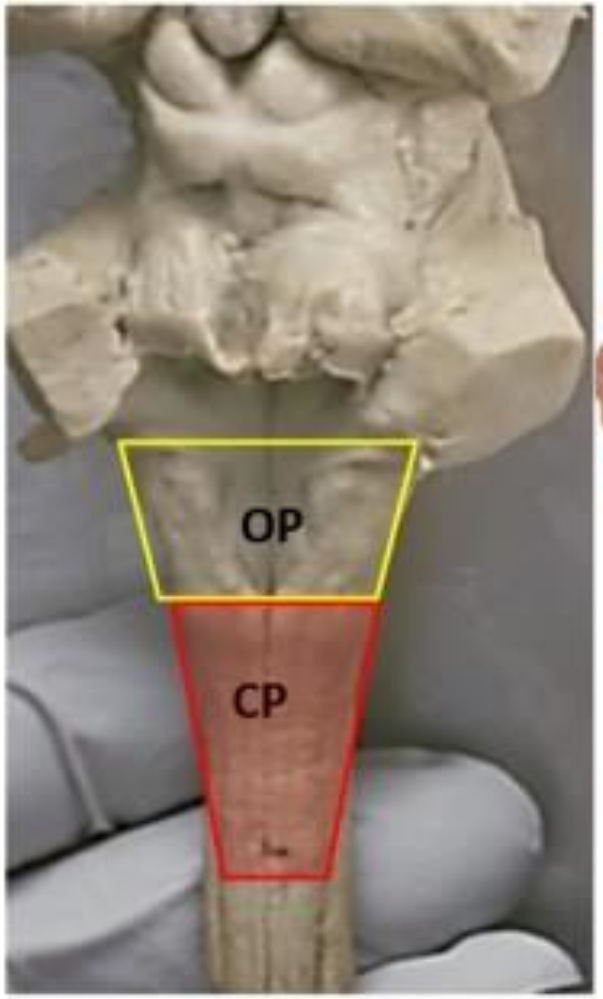
- **Olive:**
- **An elevation, lies lateral to the pyramid.**
- **Produced by inferior olivary nucleus (important in control of movement).**

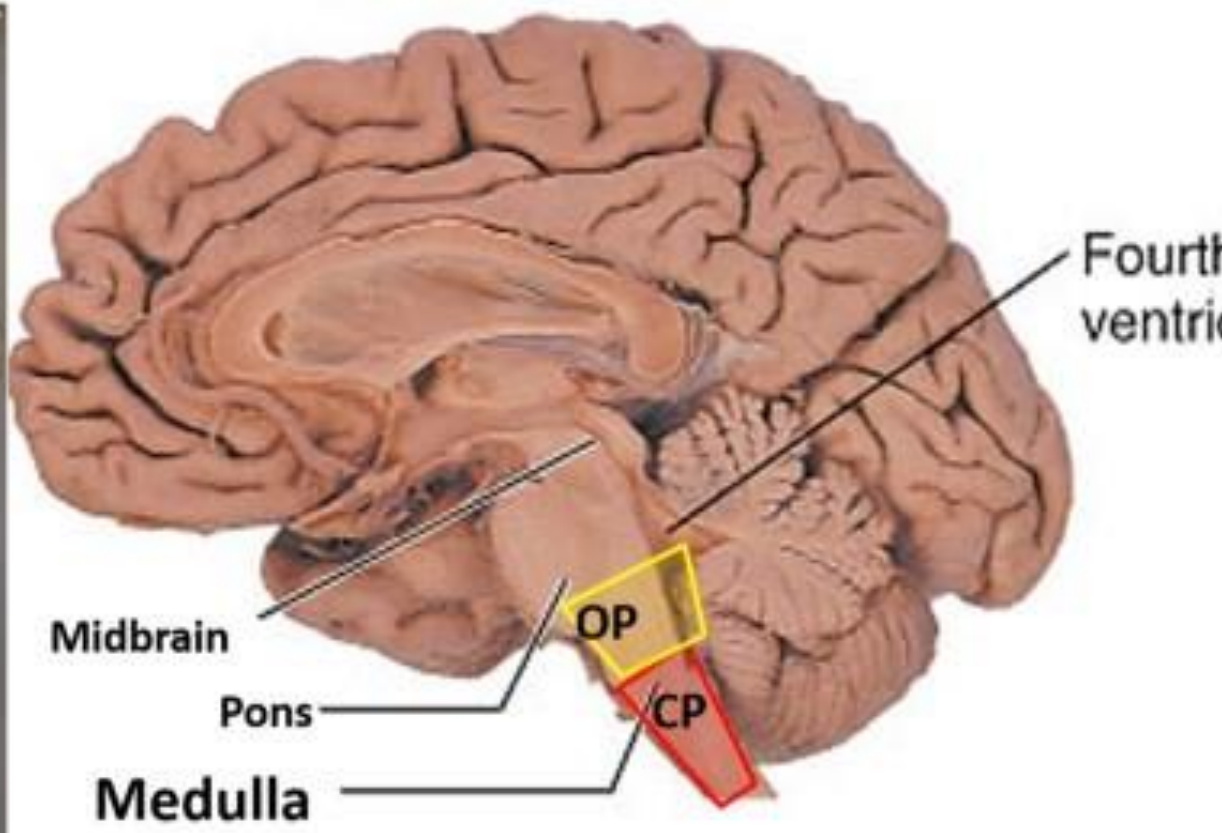


MEDULLA – DORSAL SURFACE

- **<u>The features differ</u> in the caudal part (closed medulla) and the cranial part (open medulla).**

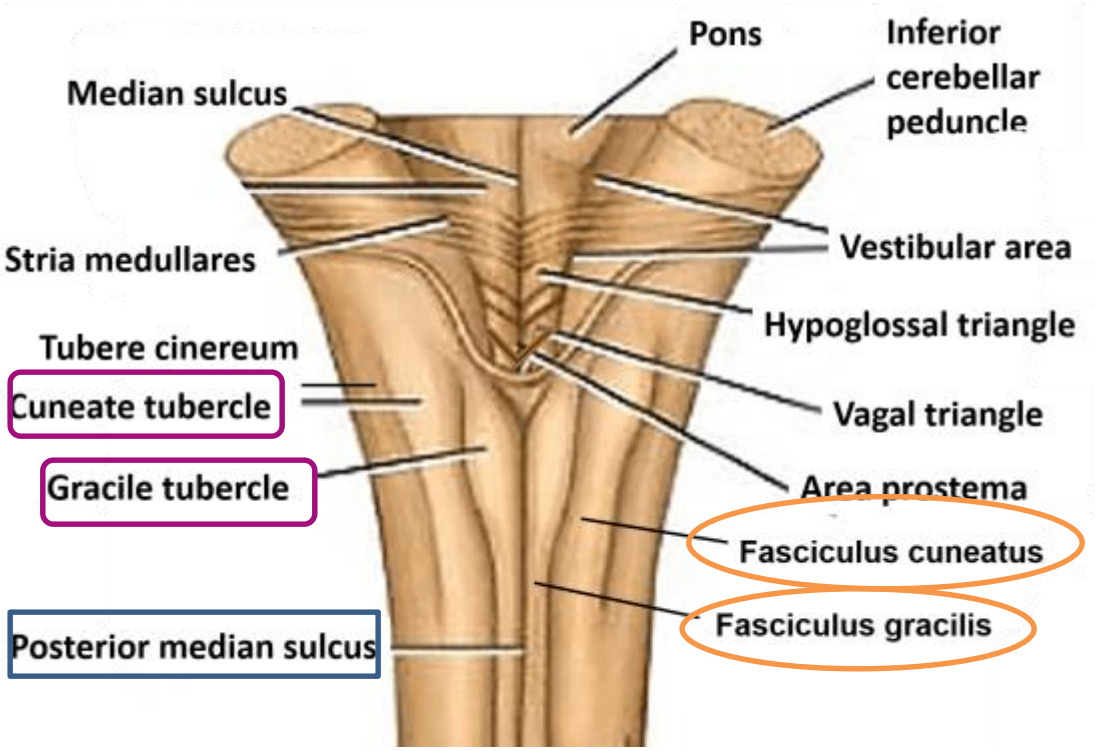



OP
CP


Midbrain
Pons
Medulla
OP
CP

CLOSED MEDULLA

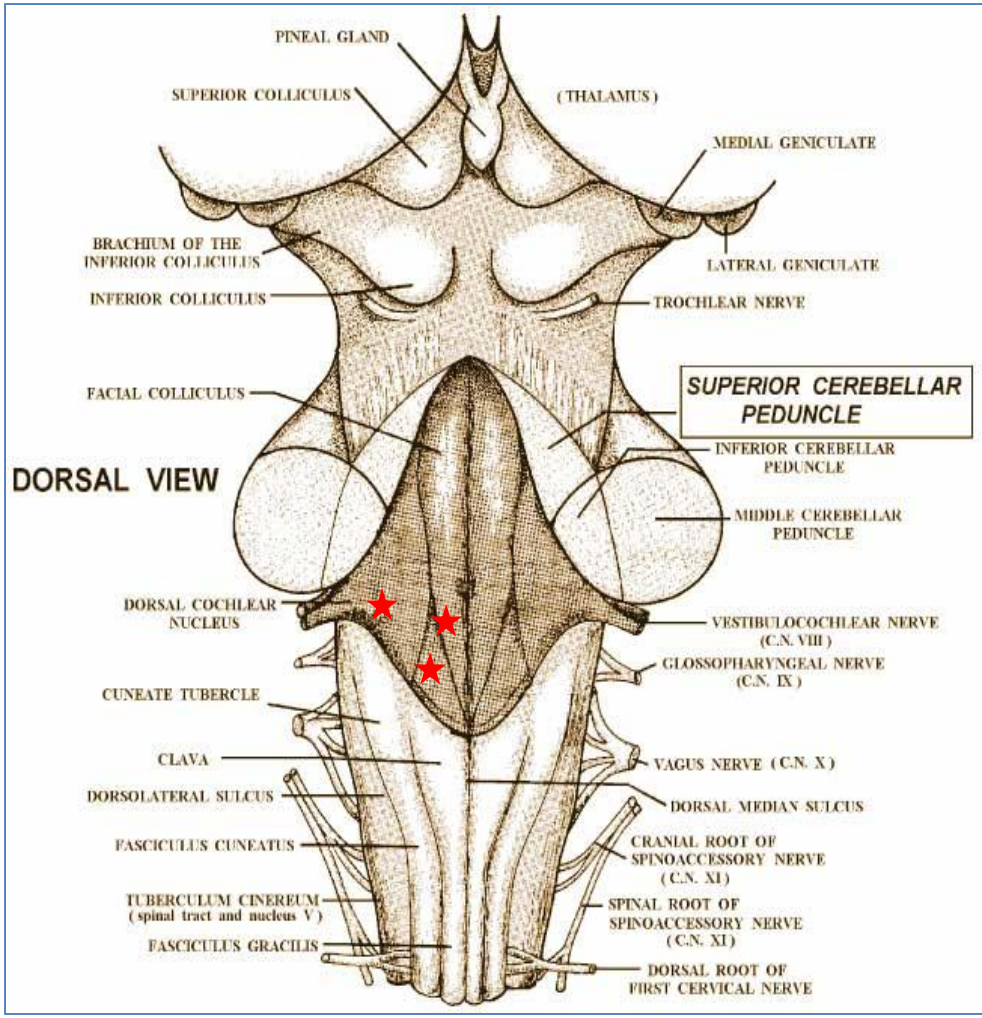
- ❑ Cavity: central canal.
- ❑ Composed of:
- Dorsal median sulcus: divides the closed medulla into 2 halves.
- Fasciculus gracilis: on either side of dorsal median sulcus.
- Gracile tubercle: an elevation produced at the upper part of fasciculus gracilis, marks the site of gracile nucleus.
- Fasciculus cuneatus: on either side of fasciculus gracilis.
- Cuneate tubercle: an elevation produced at the upper part of fasciculus cuneatus, marks the site of cuneate nucleus.



OPEN MEDULLA

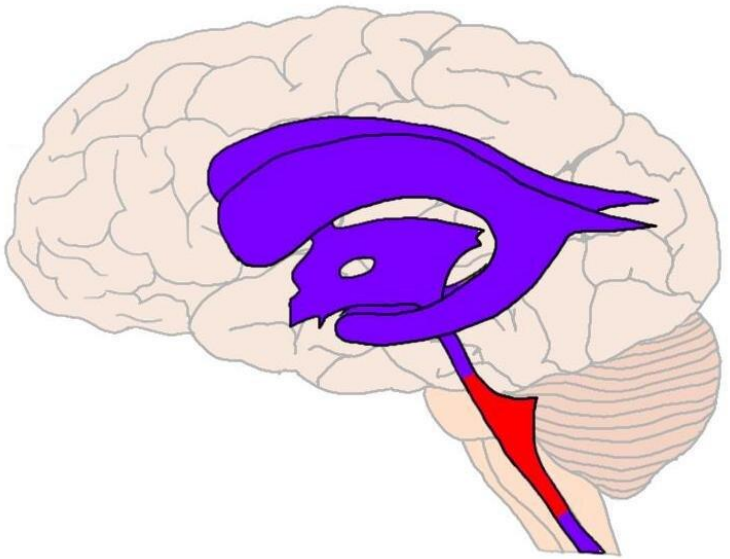
- Cavity: 4th ventricle
- On either side, an inverted V-shaped sulcus divides the area into 3 parts *(from medial to lateral):*

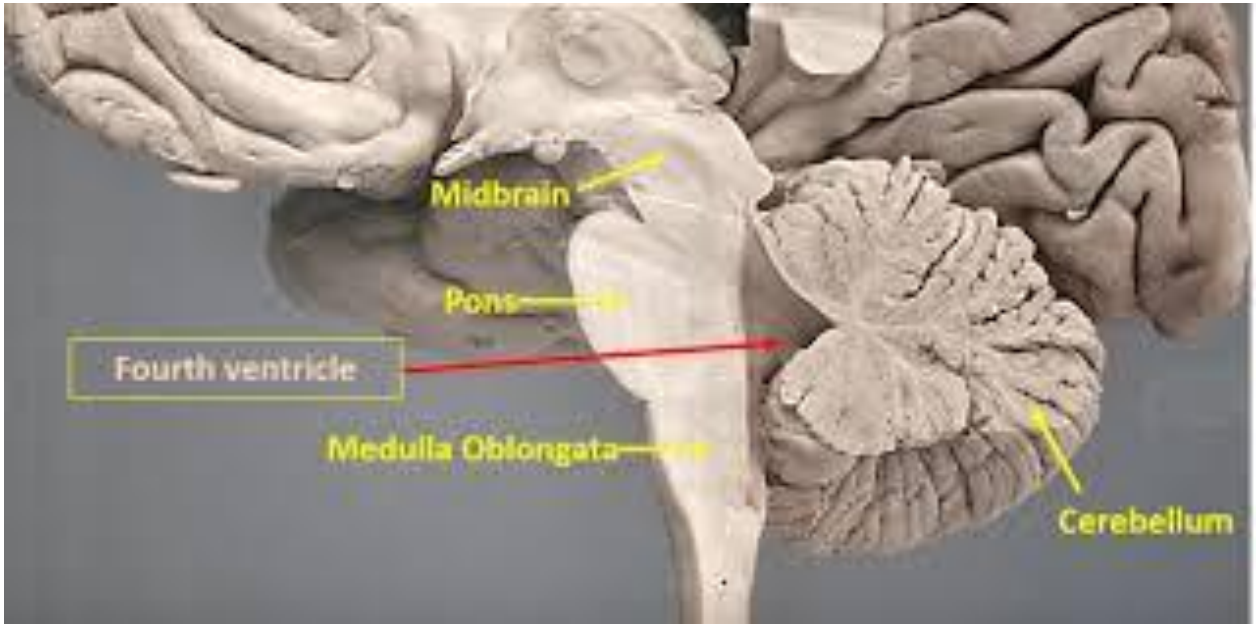
1. Hypoglossal triangle*: overlies hypoglossal nucleus.
2. Vagal triangle*: overlies dorsal vagal nucleus.
3. Vestibular area*: overlies vestibular nuclei.



Fourth ventricle

- Diamond shaped cavity of hindbrain
- Extent from superior border of pons to middle of medulla.
- Above continuous with the cerebral aqueduct, below with the central canal of inferior half of medulla.
- Widest at the junction of pons and medulla




Midbrain
Pons
Fourth ventricle
Medulla Oblongata
Cerebellum

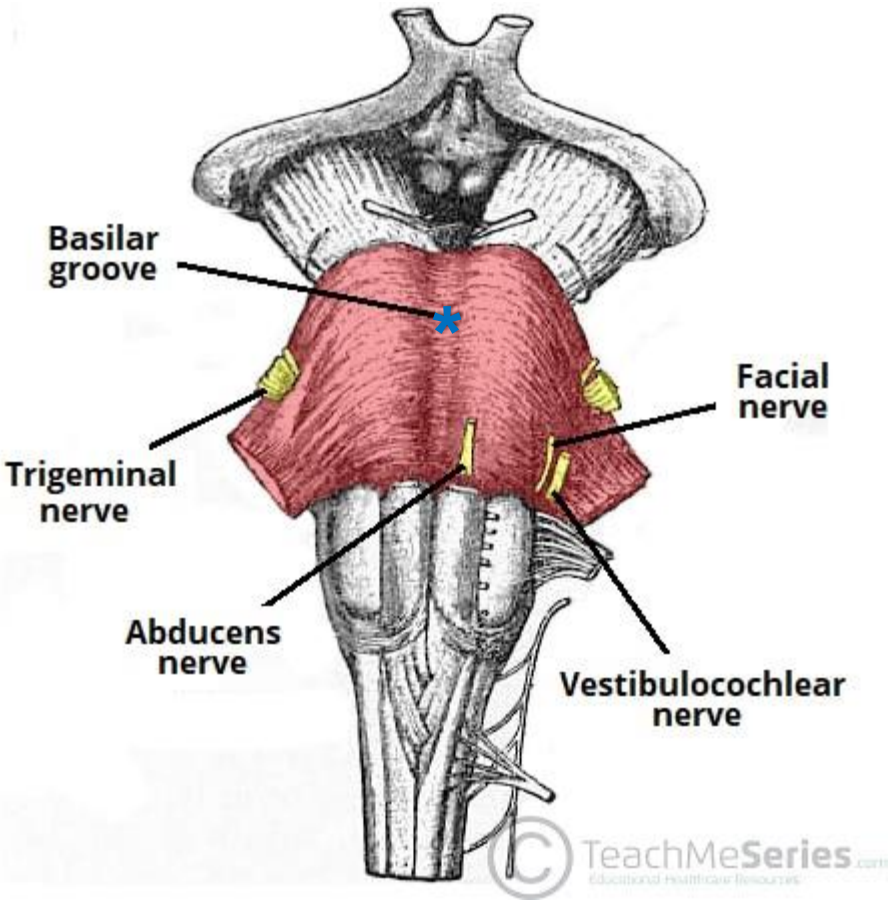
PONS – VENTRAL SURFACE

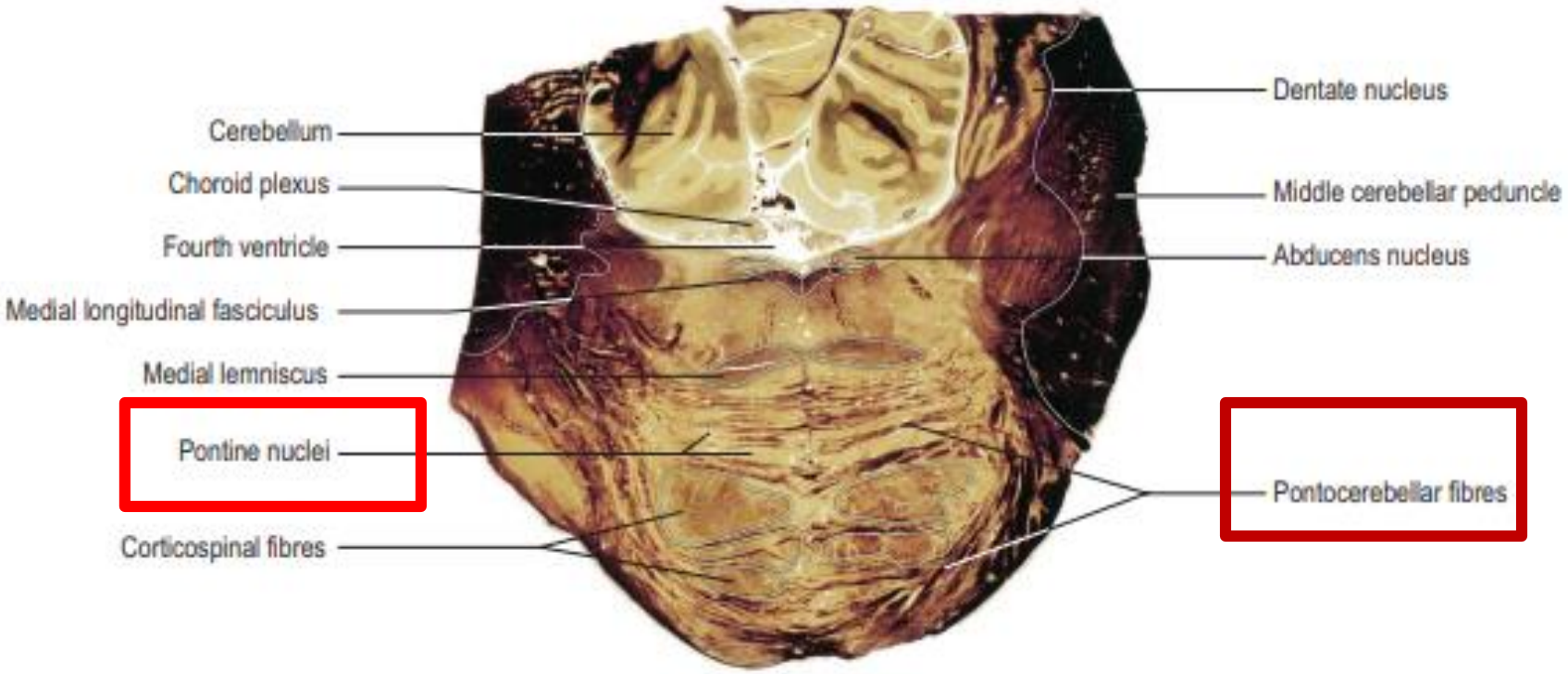
- **Basilar sulcus:**

Divides the pons into 2 halves, occupied by basilar artery.

- **Transverse pontine (pontocerebellar) fibers:**

Originate from pontine nuclei, cross the midline & pass through the contralateral middle cerebellar peduncle to enter the opposite cerebellar hemisphere.

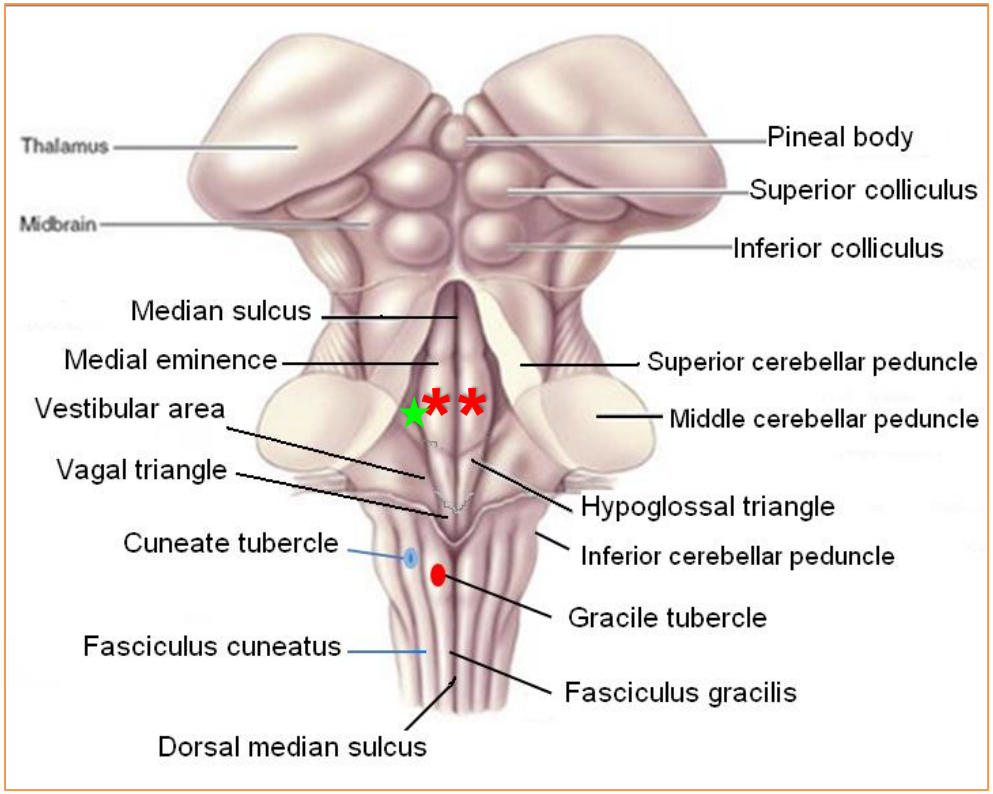




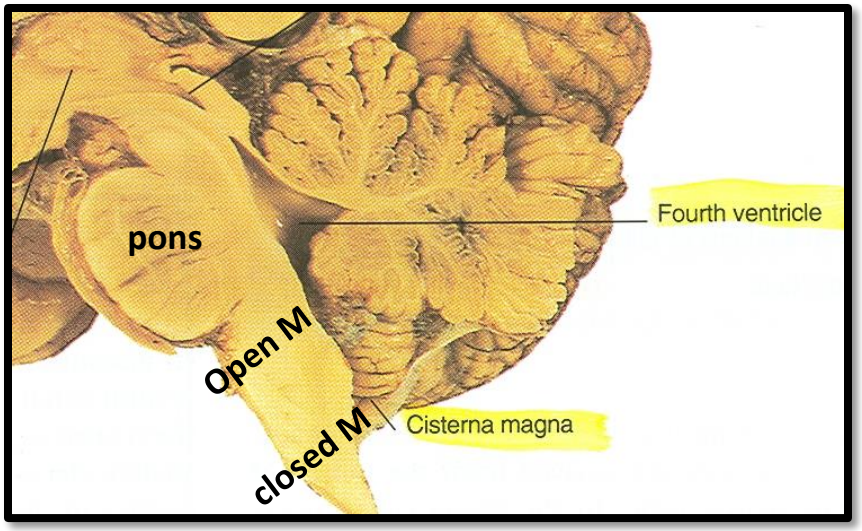
Transverse section through the caudal pons.

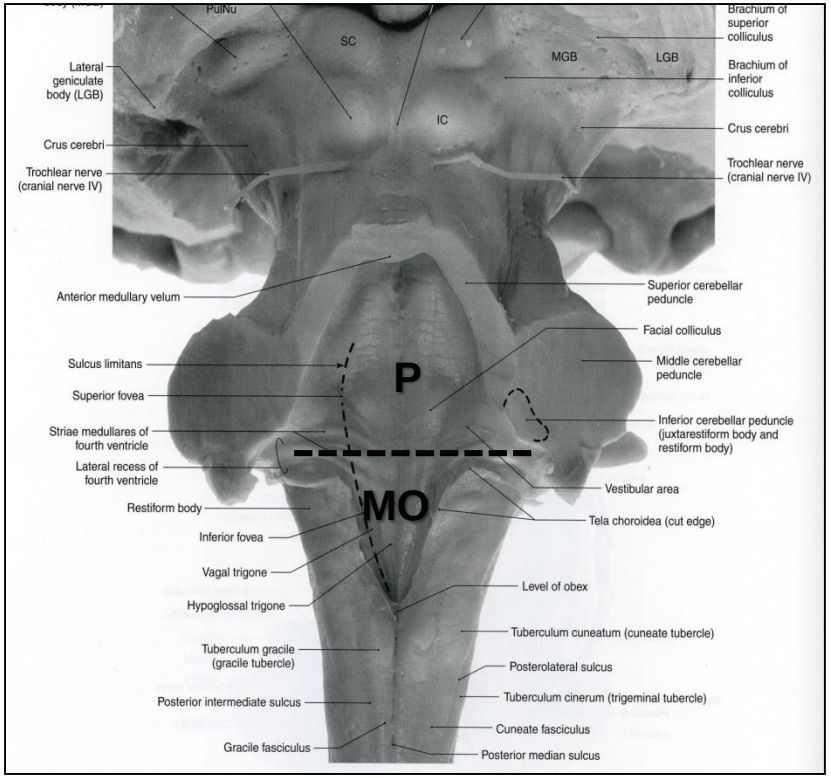
PONS – DORSAL SURFACE

- Separated from the medulla by an imaginary line passing between the caudal margins of middle cerebellar peduncle.
- On either side, a median sulcus divides the area into 2 parts *(from medial to lateral):*
  - **Medial eminence & facial colliculus*:** overlies **abducent nucleus.**
  - **Vestibular area *:** overlies **vestibular nuclei.**



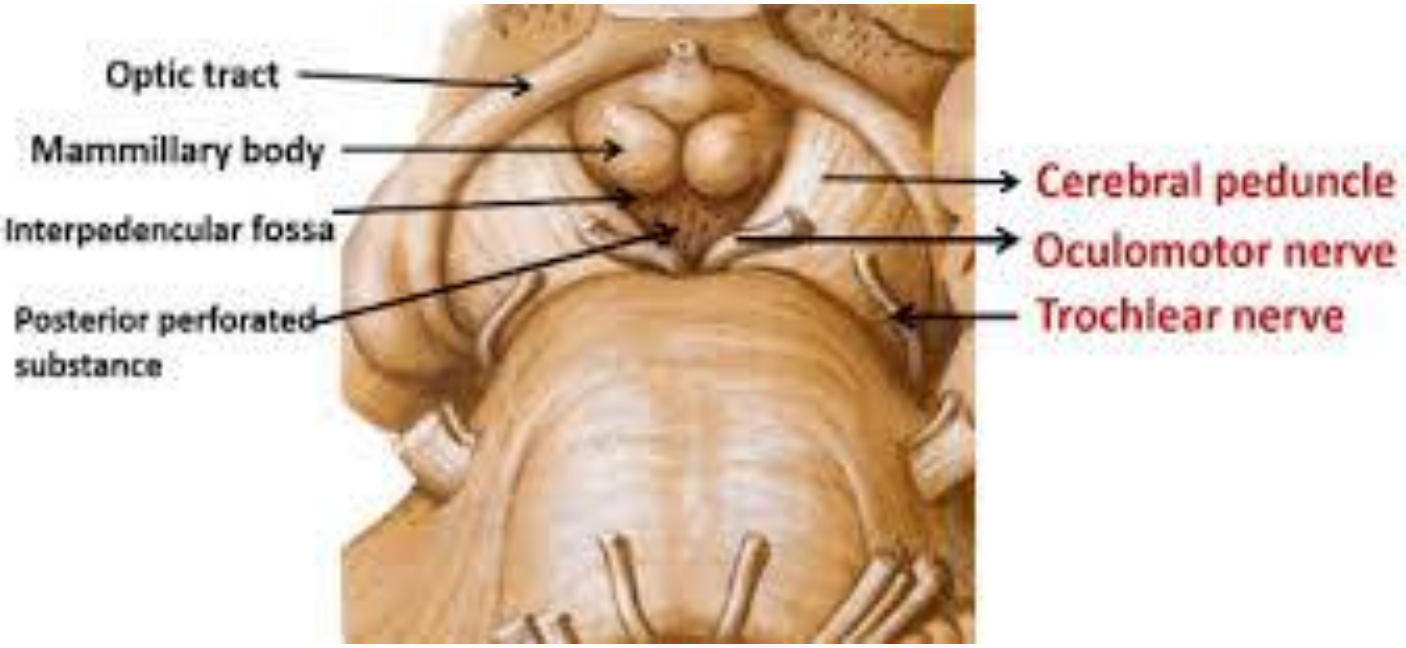
- The dorsal surfaces of open medulla and pons lie in the caudal 1/3rd and the rostral 2/3rd of the floor of the 4th ventricle respectively.





MID BRAIN – VENTRAL SURFACE

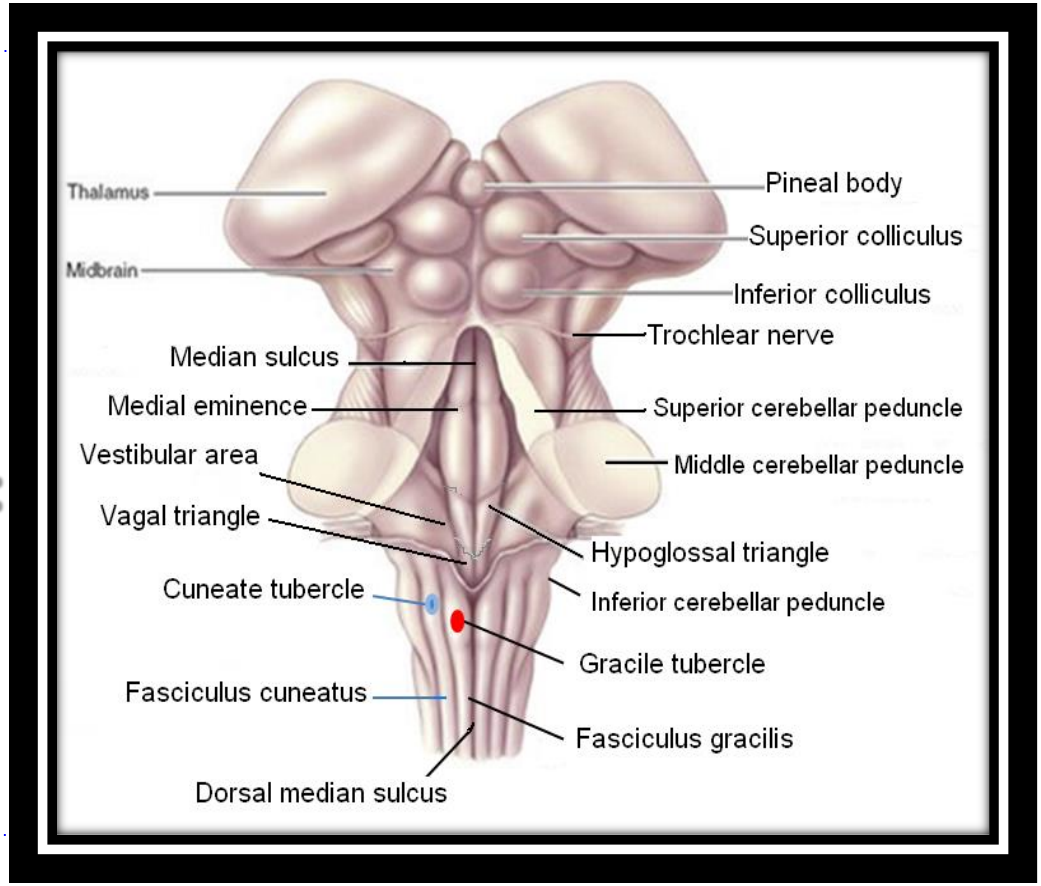
large column of descending fibers (crus cerebri or basis pedunculi), on either side, separated by a depression called the interpeduncular fossa.



MID BRAIN – DORSAL SURFACE

- Marked by 4 elevations:

1. Two superior colliculi: concerned with visual reflexes.
2. Two inferior colliculi: forms part of auditory pathway.




THANK YOU