LECTURE 2

EXTERNAL FEATURES OF BRAIN STEM

MEDULLA OBLONGATA

VENTRAL SURFACE:

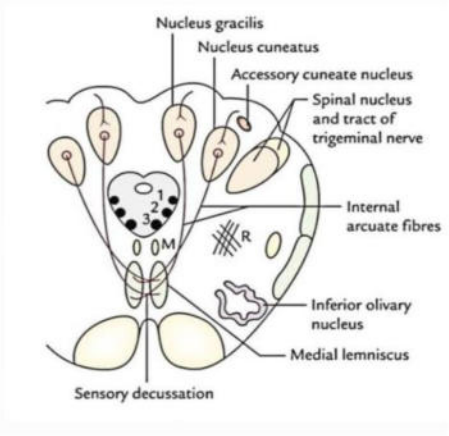
❶	3 Elevations:	On each side of the midline. ☑ **Pyramid:** ○ contains the **pyramidal tract.** ☑ **Olive:** ○ formed by the **inferior olivary nucleus.** ☑ **Inferior cerebellar peduncle (ICP):** ○ connects the **medulla to the cerebellum.**
❷	3 Fissures (sulci):	☑ **Anterior median fissure:** ○ In the midline. ○ Between the 2 pyramids. ○ Its lower part is obliterated. ○ by the pyramidal decussation. ☑ **Anterolateral (pre-olivary) fissure:** ○ Between the pyramid & olive. ○ Shows the exit of the XII nerve. ☑ **Posterolateral (post-olivary) fissure:** ○ Between the olive & ICP. ○ Shows the exit of IX, X and XI cranial nerves.
❸	Exit of the lower 4 cranial nerves:	☑ **Glossopharyngeal, vagus & cranial accessory nerves:** ○ exit at the **post-olivary fissure.** ☑ **Hypoglossal nerve:** ○ exit at the **pre-olivary fissure.**

DORSAL SURFACE:

Lower part (Closed medulla):

- **Shows 3 elevations on each side of the midline.**

	Site	Formed by
Gracile tubercle	Medially	Gracile nucleus
Cuneate tubercle	Intermediate	Cuneate nucleus.
Tuberculum cinereum	Laterally	Spinal nucleus of trigeminal nerve



Upper part (Open medulla):

- **Forms the lower part of the floor of the 4th ventricle.**

☑ **Sulcus limitans (Inferior fovea):**

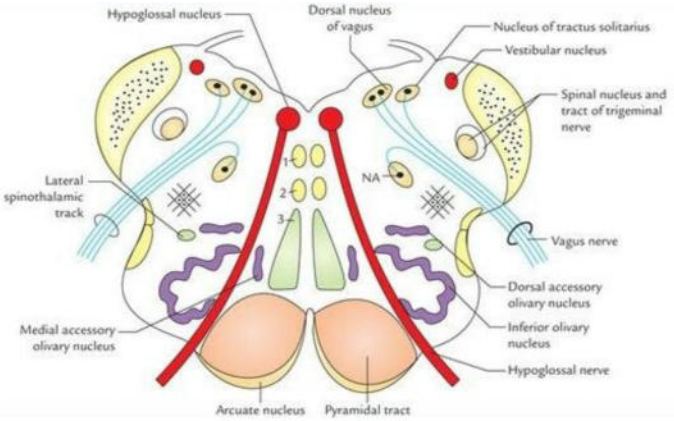
	Site	Formed by
Hypoglossal trigone:	medially	**hypoglossal** nucleus
Vagal trigone	Intermediate	dorsal motor nucleus of **vagus** nerve
Vestibular trigone	laterally	inferior & medial **vestibular** nuclei

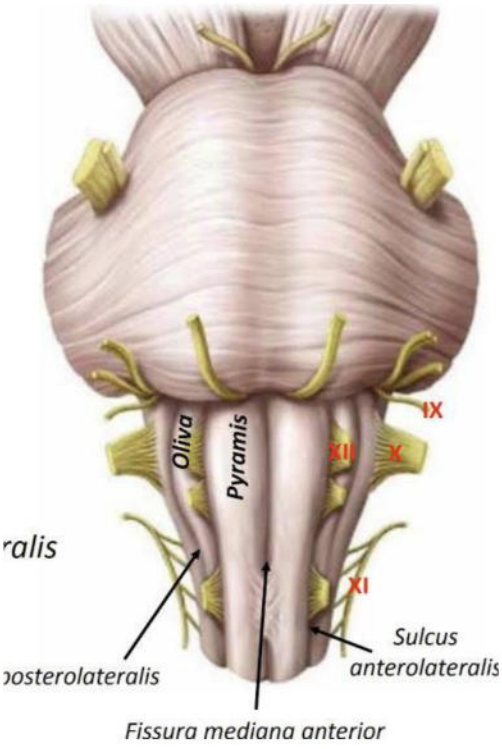
☑ **Area postrema (Obex):**

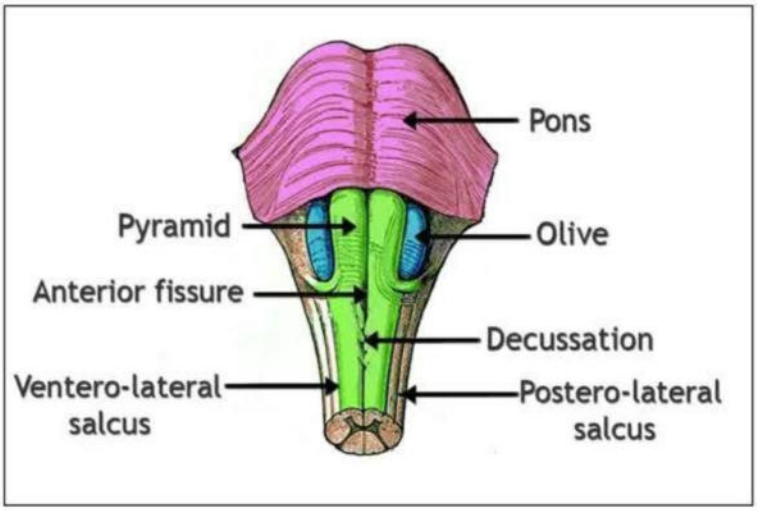
- a vomiting center located at the inferior angle of the 4th ventricle.

☑ **Stria medullaris of 4th ventricle:**

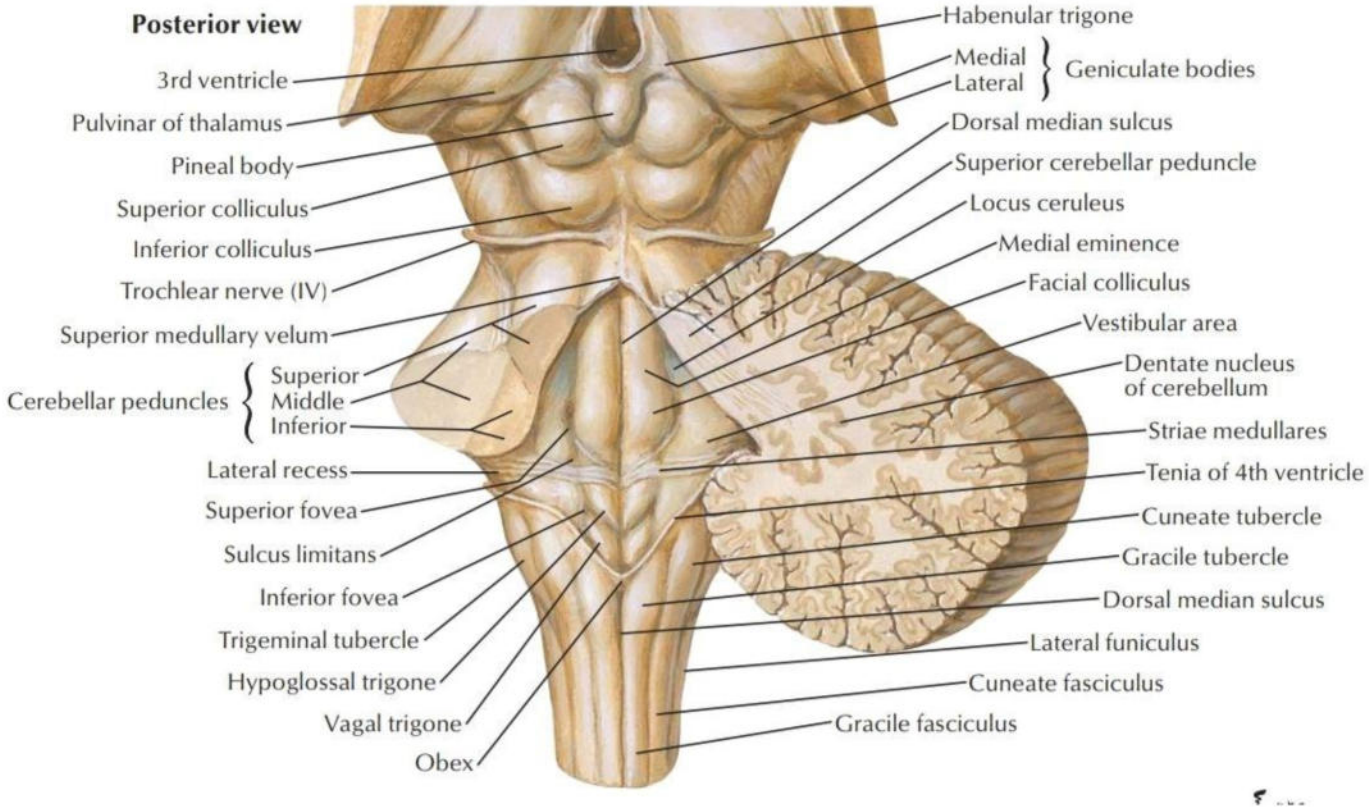
- at the upper end of medulla.
- They are arcuate-cerebellar fib.







ventral surface



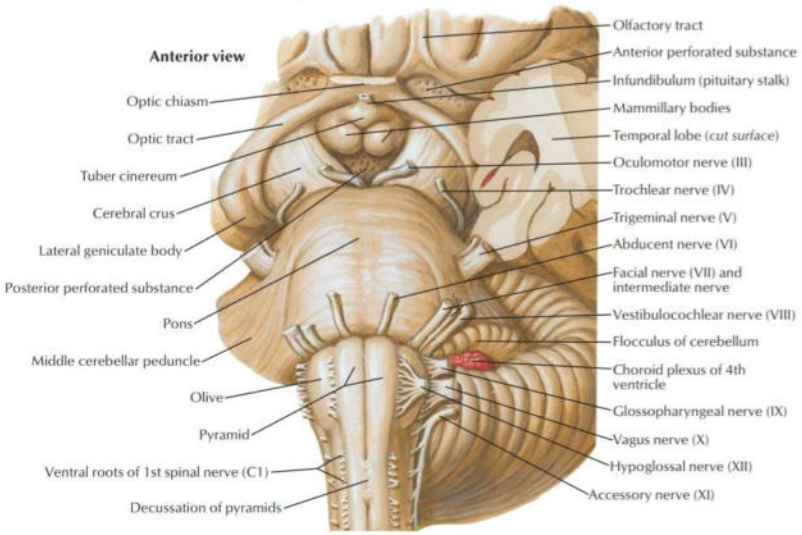
Dorsal surface

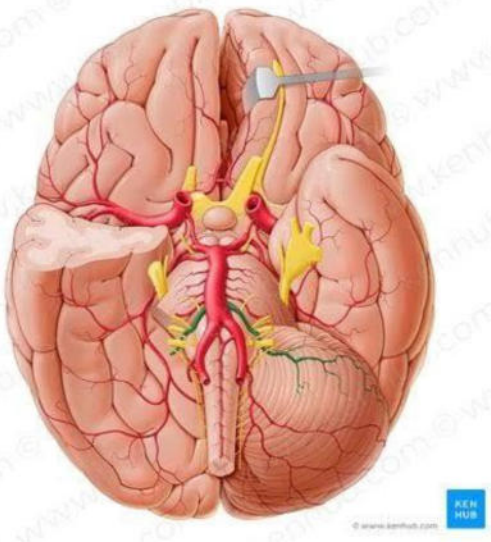
PONS

- **It is the middle part of the brain stem.**
- **Extends from the midbrain (superiorly) to the medulla (inferiorly).**
- **Divided into:**
  - Ⓐ Ventral part (**basis pontis**)
  - Ⓑ Dorsal part (**tegmentum**).

VENTRAL SURFACE

❶	**Transverse pontine fibers:**	☑ They form the middle cerebellar peduncle (MCP) which connects the pons with the cerebellum.
❷	**Exit of the middle 4 cranial nerves:**	☑ **Trigeminal:** ○ Exit at the lateral border between the upper & lower borders of pons by 2 roots: Ⓐ small medial motor Ⓑ large lateral sensory. ☑ **Abducent nerve:** ○ Exit between the pyramid and pons. ☑ **Facial nerve:** ○ **Exit at the cerebellopontine angle by 2 roots:** Ⓐ large medial motor. Ⓑ small lateral sensory (nervous intermedius). ☑ **Vestibulocochlear nerve:** ○ Exit at the cerebellopontine angle lateral to the facial nerve.
❸	**Cerebellopontine angle:**	☑ **What is it?** ○ It is the angle between pons, medulla, & cerebellum. ☑ **It contains:** ① Cranial nerves: VII, VIII & IX. ② Lateral recess & choroid plexus of 4th ventricle. ③ Flocculus of cerebellum. ④ AICA (anterior inferior cerebellar artery).





DORSAL SURFACE:

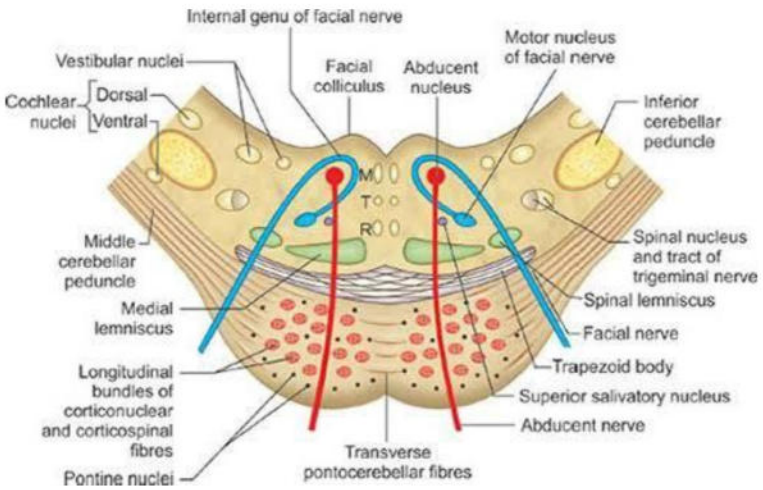
- **It forms the upper part of the floor of the 4th ventricle.**
- **It shows the followings:**

☑ **Sulcus limitans (Superior fovea):**

	Site	Formed by
Medial eminence:	Medially	Its lower part is called **facial colliculus** which is formed by **abducent nucleus** encircled by **facial nerve fibers.**
Vestibular area:	Laterally	the superior & lateral **vestibular nuclei.**

☑ **Locus ceruleus:**

- is a pigmented area at the **upper end of superior fovea.**
- It is a **noradrenaline** secreting center.

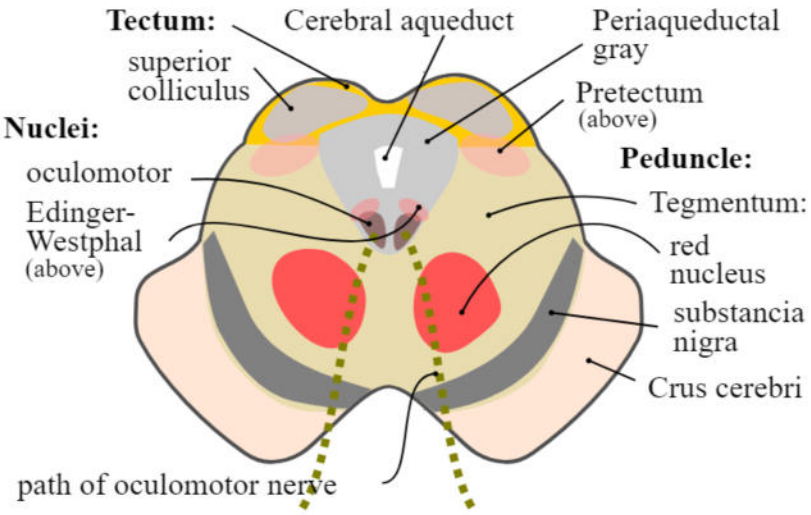


MIDBRAIN

- **It is the upper part of the brain stem.**
- **Extends from the pons (inferiorly) to the diencephalon (superiorly).**
- **It contains a cavity called cerebral aqueduct of Sylvius which divides it into:**
  - Ⓐ ventral part (cerebral peduncle)
  - Ⓑ dorsal part (tectum).

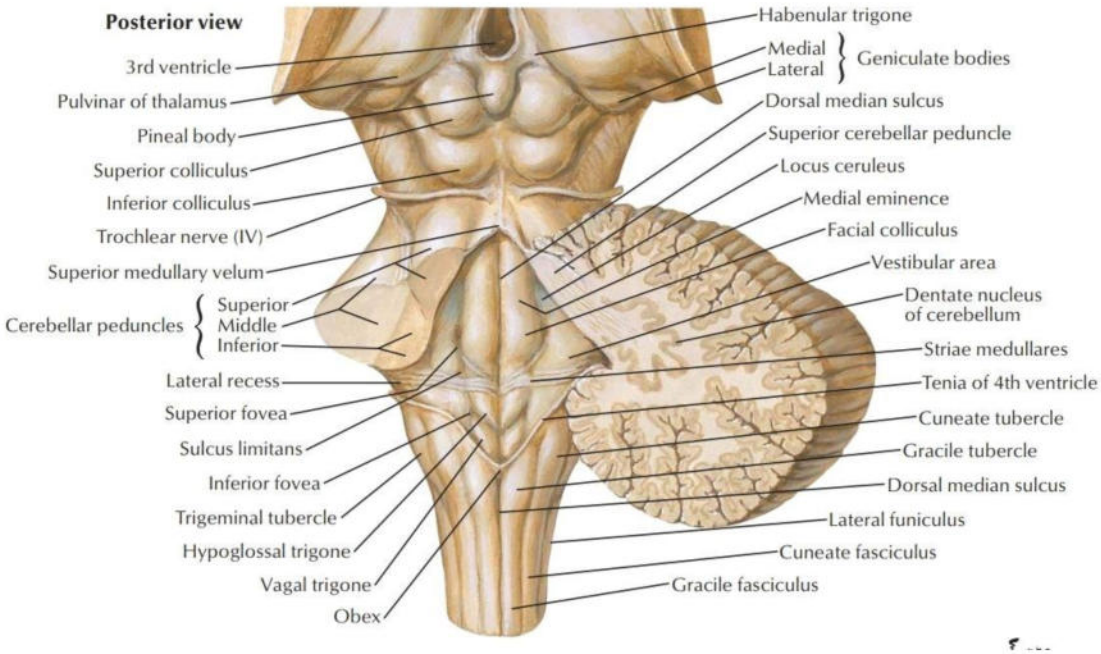
VENTRAL SURFACE

❶	**2 Cerebral peduncles:**	☑ **Each is divided into:** ① **Crus cerebri:** it is the anterior part. ② **Substantia nigra:** ○ It is the middle-pigmented part. ○ Contains melanin pigment. ○ Secretes dopamine. ③ **Tegmentum:** it is the posterior part.
❷	**Interpeduncular fossa:**	☑ Between the 2 cerebral peduncles.
❸	**Exit of oculomotor nerve:**	☑ Exit from the interpeduncular fossa medial to the crus cerebri.



DORSAL SURFACE

❶	**4 colliculi:**	☑ **They are rounder elevations.** ① **Superior colliculi:** ○ They are visual reflex centers. ○ Connected to the lateral geniculate body by superior brachium. ② **Inferior colliculi:** ○ They are auditory reflex centers and lower auditory centers. ○ Connected to the medial geniculate body by inferior brachium.
❷	**Exit of trochlear nerve:**	☑ Exit below the inferior colliculus.



LATERAL SURFACE

❶	**Superior brachium**	☑ Connects the superior colliculus with the lateral geniculate body.
❷	**Inferior brachium:**	☑ Connects the inferior colliculus with the medial geniculate body.
❸	**Related to:**	① **Nerves:** o optic tract & trochlear nerve. ② **Arteries:** o SCA (superior cerebellar artery) o PCA (posterior cerebral artery). ③ **Vein:** o Basal vein.