Medulla Oblongata

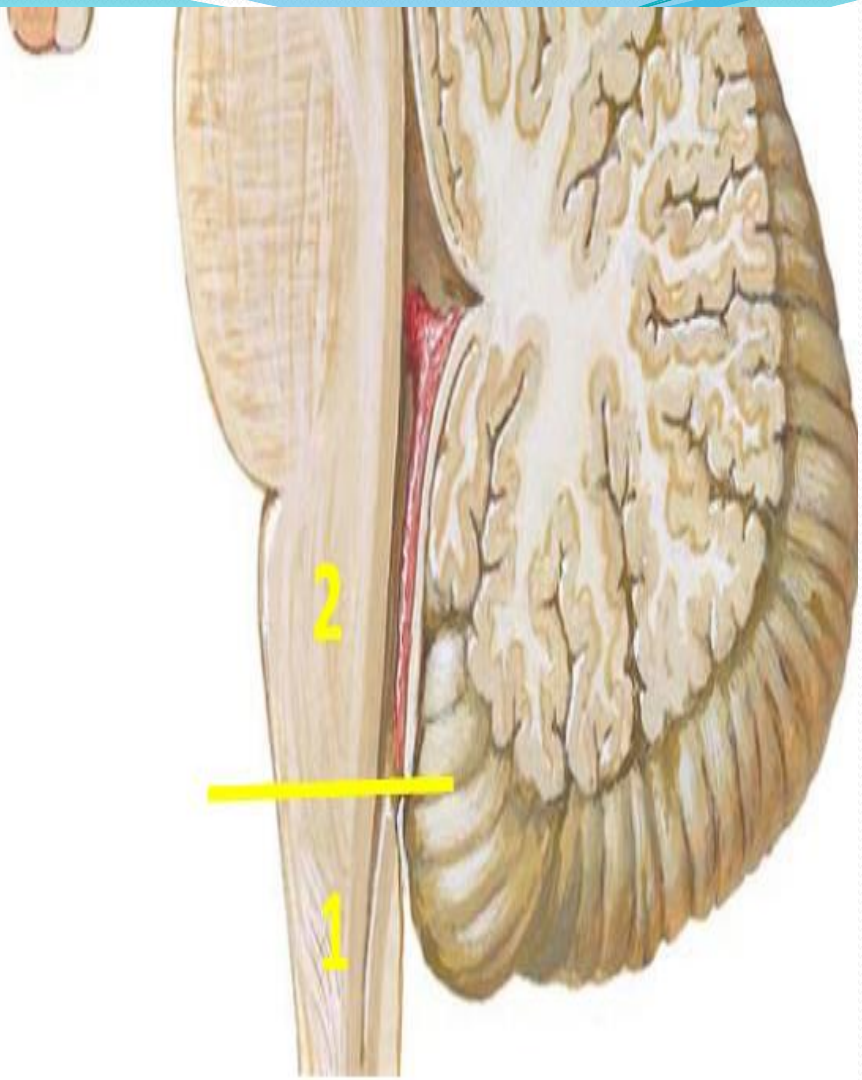
- **It is the lowest part of the brainstem located in front of the cerebellum and is connected to the midbrain by the pons moving down to the spinal cord.**
- **It extends through the foramen magnum at the level of atlas vertebra.**
- **Length- 3 cm**

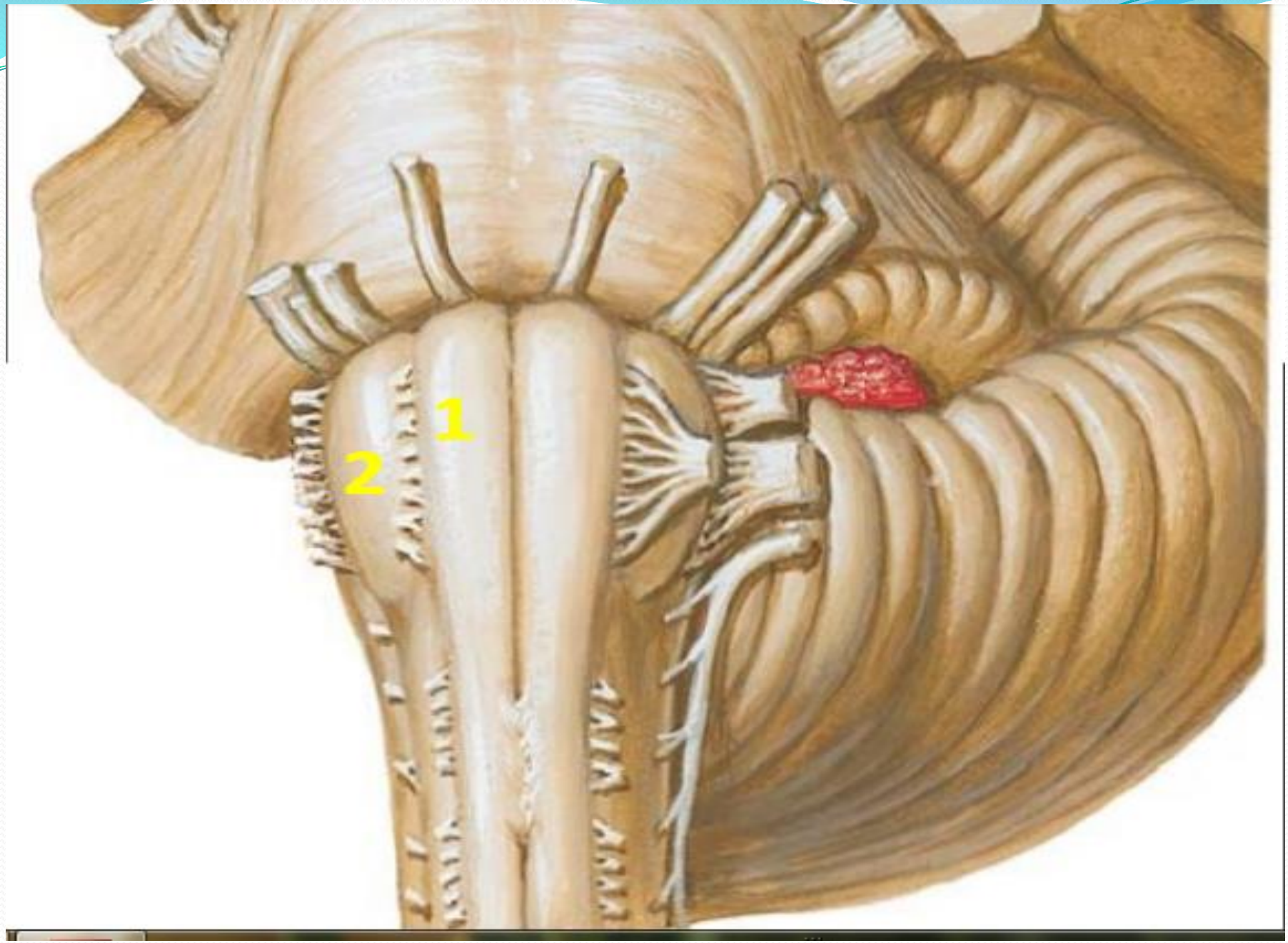
- **It helps in transmitting messages between the spinal cord and various sections of the brain.**

- **It is responsible for controlling various autonomic functions in the body, such as digestion, blood vessel functions, heart vessel functions, breathing, sneezing, and swallowing.**

1. The lower end which contains the upward continuation of the central canal of the spinal cord is the 'closed part of the medulla',

2. the upper end, where the canal comes to the surface as the lower part of the floor of the fourth ventricle, is the 'open part'.

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External Anatomy of Medulla Oblongata

1. Anterior Surface of Medulla Oblongata

- The anterior median fissure is located in the midline of the medulla that is continuous along the spinal cord. Moving away from the midline, there are two visible sulci – the posterolateral sulcus and the anterolateral sulcus.

Pyramid – These are two circular masses situated on the opposite areas of the anterior median fissure.

Pyramid b/w- anterior median fissure and anterolateral sulcus

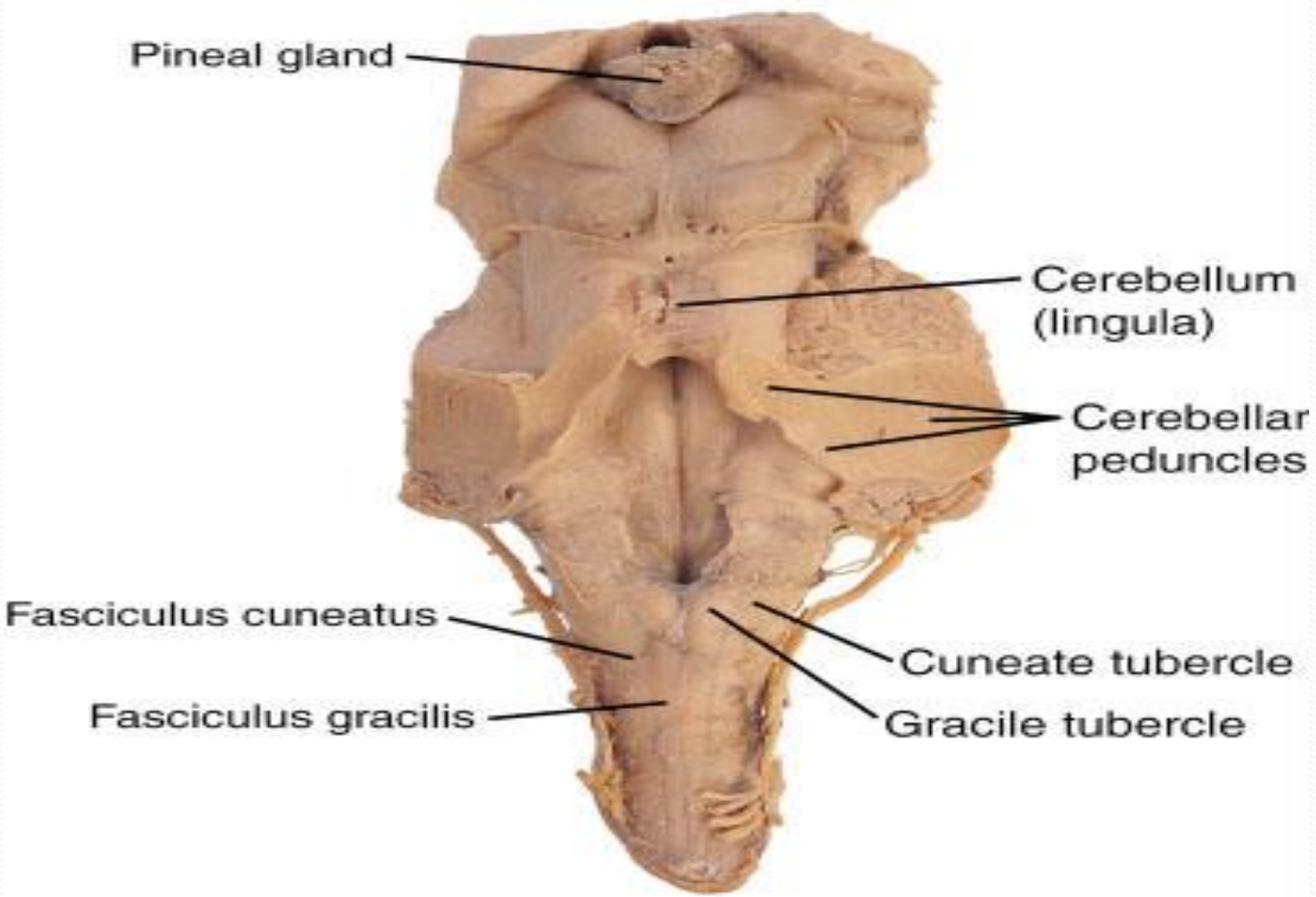
- **Olive – These are coupled oval structures on the surface of medulla.**

Olive b/w- anterolateral sulcus and posterolateral sulcus

Lateral to the olive the lateral surface of the medulla is formed by the inferior cerebellar peduncle, which enters the cerebellum medial to and below the middle peduncle.

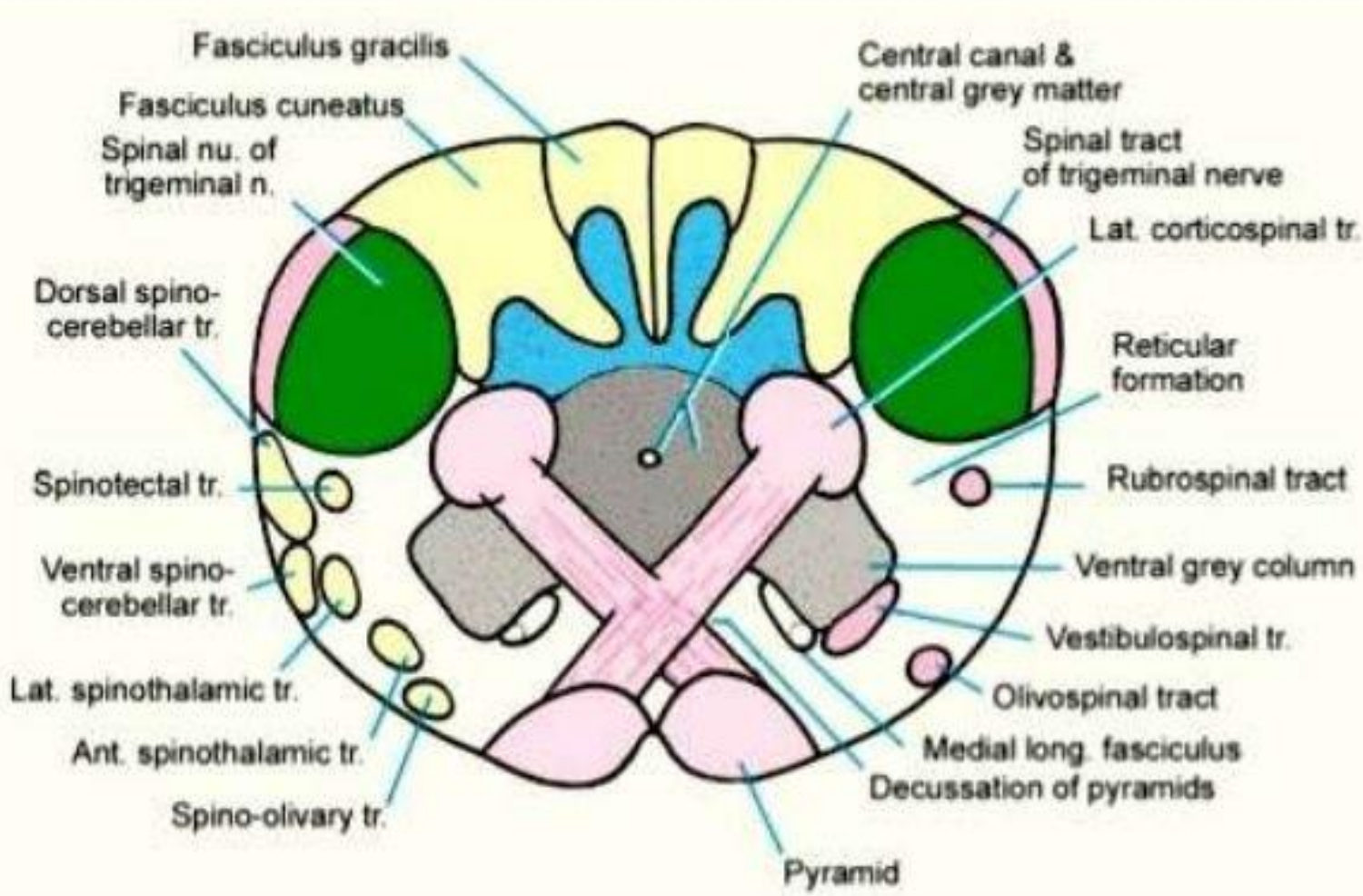
Posterior Surface of Medulla Oblongata

- There is a midline structure in the posterior median sulcus of the Medulla that extends continuously below to the surface of posterior median sulcus of the spinal cord.
- Moving laterally from the midline, the fasciculus cuneatus and fasciculus gracilis are identified.
- Fasciculus gracilis: (medial side) on either side of posterior median sulcus
- Fasciculus cuneatus:(lateral side) on either side of fasciculus gracilis.


Pineal gland
Cerebellum
(lingula)
Cerebellar
peduncles
Fasciculus cuneatus
Cuneate tubercle
Fasciculus gracilis
Gracile tubercle

Internal structure of MO

Cross section at the level of pyramidal decussation

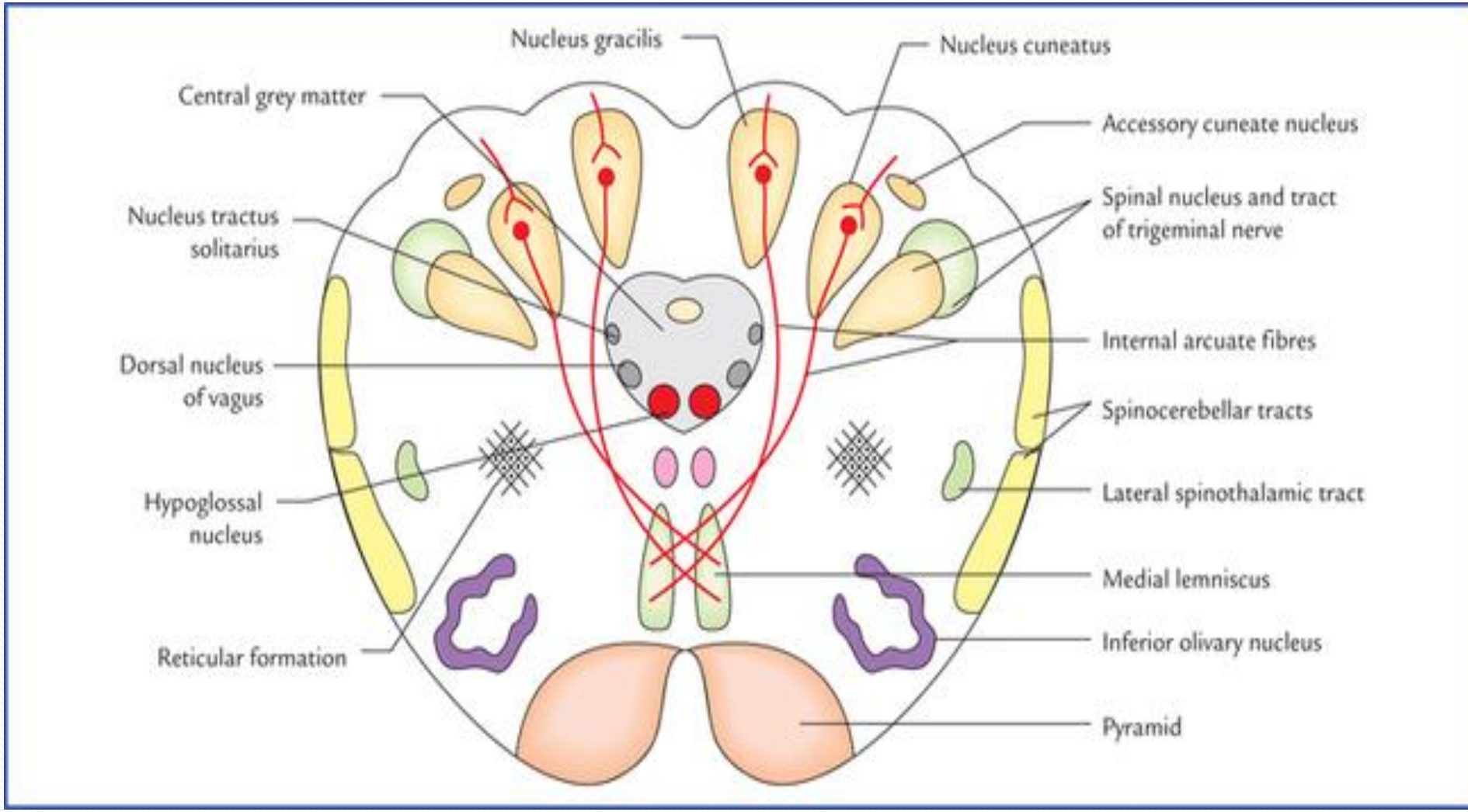


Internal structure

- **Pyramid is the major decussation point of the descending motor fibres. Roughly 75% of motor fibres housed within the pyramids cross diagonally and posteriorly, and continue down the spinal column as the lateral corticospinal tracts.**
- **At this level, the central portion of the medulla contains gray matter, while the outer portions consist of white matter.**
- **The posterior white matter contains the fasiculus gracilis and the more lateral fasiculus cuneatus. Corresponding portions of gray matter extend to these regions and are the nucleus gracilis and nucleus cuneatus respectively.**

- The large **spinal nucleus of trigeminal nerve and tracts** can be found.
- This is a continuation of the substantia gelatinosa of the spinal cord.

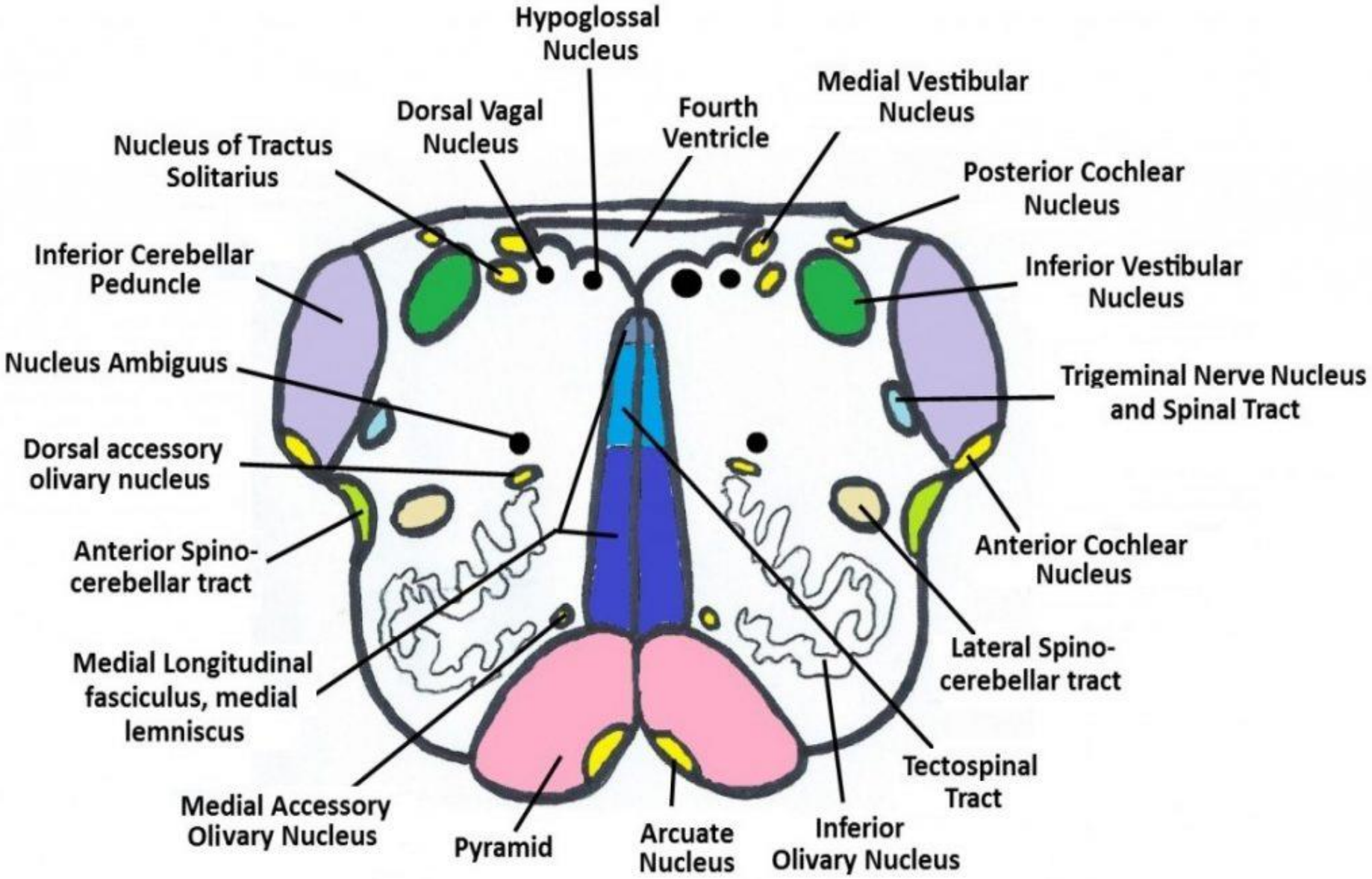
At the level of medial lemniscus



Internal arcuate fibres as they run from the nucleus gracilis and nucleus cuneatus around and anterior to the central gray matter to form the **medial lemniscus**.

Accessory cuneate nucleus- dorsolateral to the cuneate nucleus. It receives proprioceptive impulses from the upper limb.

- **hypoglossal nucleus -** ventral to central canal.
- **Dorsal nucleus of vagus**
- **Nucleus of the solitary tract**


Hypoglossal Nucleus
Medial Vestibular Nucleus
Dorsal Vagal Nucleus
Fourth Ventricle
Nucleus of Tractus Solitarius
Posterior Cochlear Nucleus
Inferior Cerebellar Peduncle
Inferior Vestibular Nucleus
Nucleus Ambiguus
Trigeminal Nerve Nucleus and Spinal Tract
Dorsal accessory olivary nucleus
Anterior Cochlear Nucleus
Anterior Spino-cerebellar tract
Lateral Spino-cerebellar tract
Medial Longitudinal fasciculus, medial lemniscus
Tectospinal Tract
Medial Accessory Olivary Nucleus
Pyramid
Arcuate Nucleus
Inferior Olivary Nucleus

- **The large inferior olivary nucleus is responsible for the external expansion of the olives.**
- **The large inferior cerebellar peduncles come into view and are surrounded by multiple nuclei.**
- **The two vestibular nuclei (medial and inferior) are both found towards the midline while the two cochlear nuclei (anterior and posterior) are found somewhat above and below the peduncles.**

- **Nucleus ambiguus-** **nucleus of 9^{th},10^{th} and 11^{th} cranial nerve**