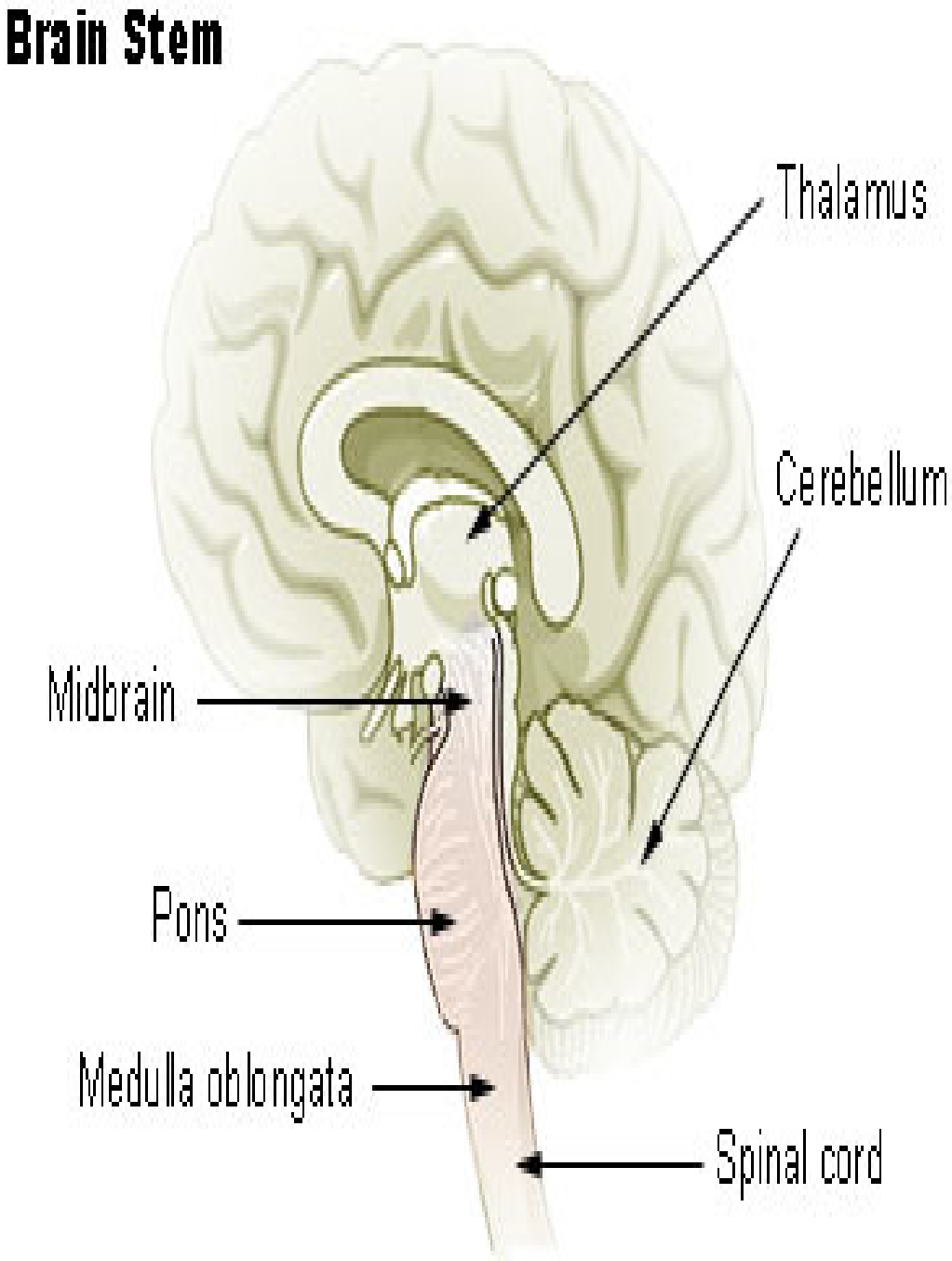
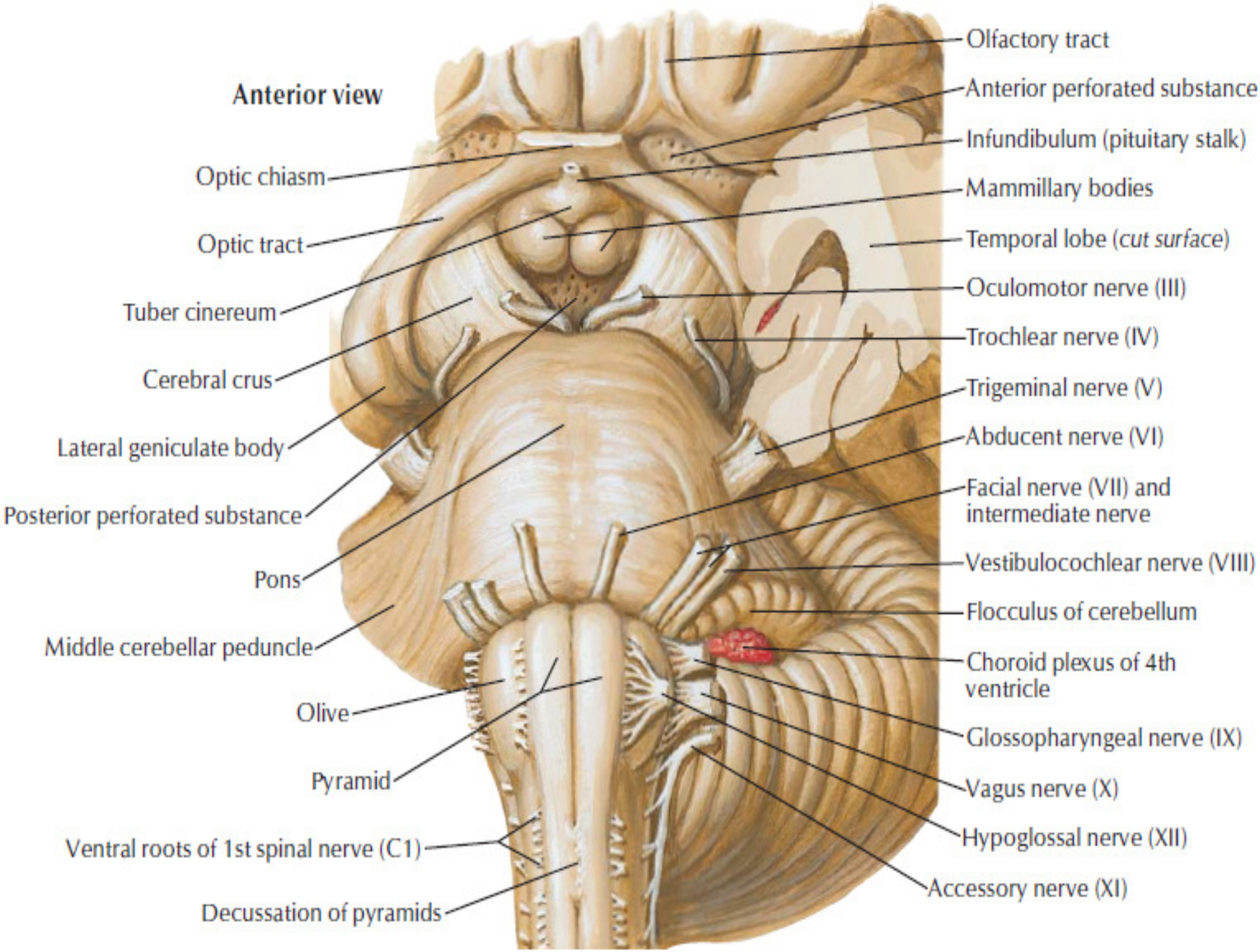
Brain stem

- Stalk like in shape
- Connects spinal cord forebrain

Parts:

1. Medulla oblongata
2. Pons
3. Midbrain



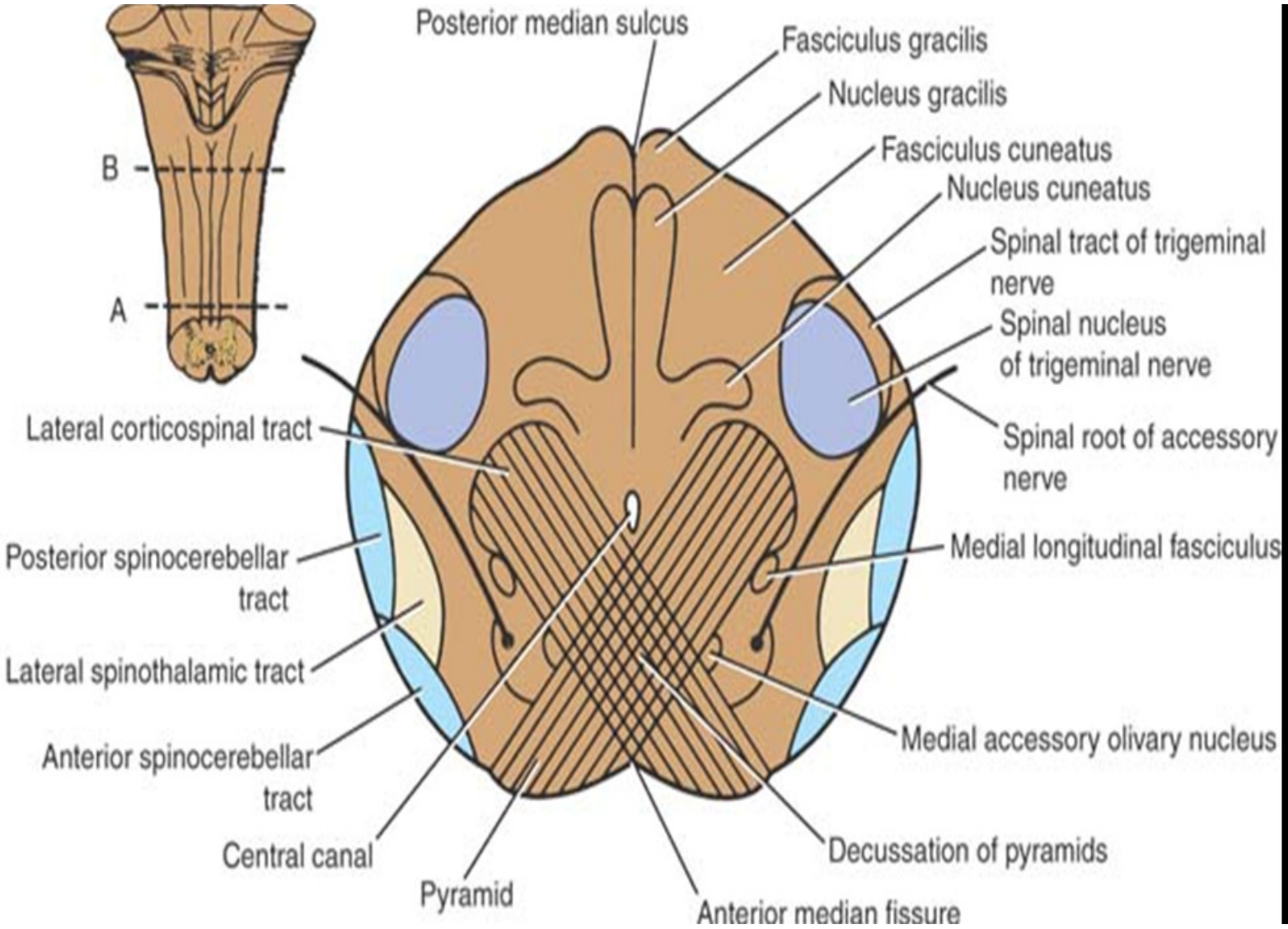

Anterior view
Optic chiasm
Optic tract
Tuber cinereum
Cerebral crus
Lateral geniculate body
Posterior perforated substance
Pons
Middle cerebellar peduncle
Olive
Pyramid
Ventral roots of 1st spinal nerve (C1)
Decussation of pyramids
Olfactory tract
Anterior perforated substance
Infundibulum (pituitary stalk)
Mammillary bodies
Temporal lobe (cut surface)
Oculomotor nerve (III)
Trochlear nerve (IV)
Trigeminal nerve (V)
Abducent nerve (VI)
Facial nerve (VII) and intermediate nerve
Vestibulocochlear nerve (VIII)
Flocculus of cerebellum
Choroid plexus of 4th ventricle
Glossopharyngeal nerve (IX)
Vagus nerve (X)
Hypoglossal nerve (XII)
Accessory nerve (XI)

Internal structure of medulla

1. Level of decussation of pyramids(motor / close medulla)
2. Level of decussation of leminisci (sensory/ close medulla)
3. Level of olives (open medulla)
4. Level Just Inferior to the Pons

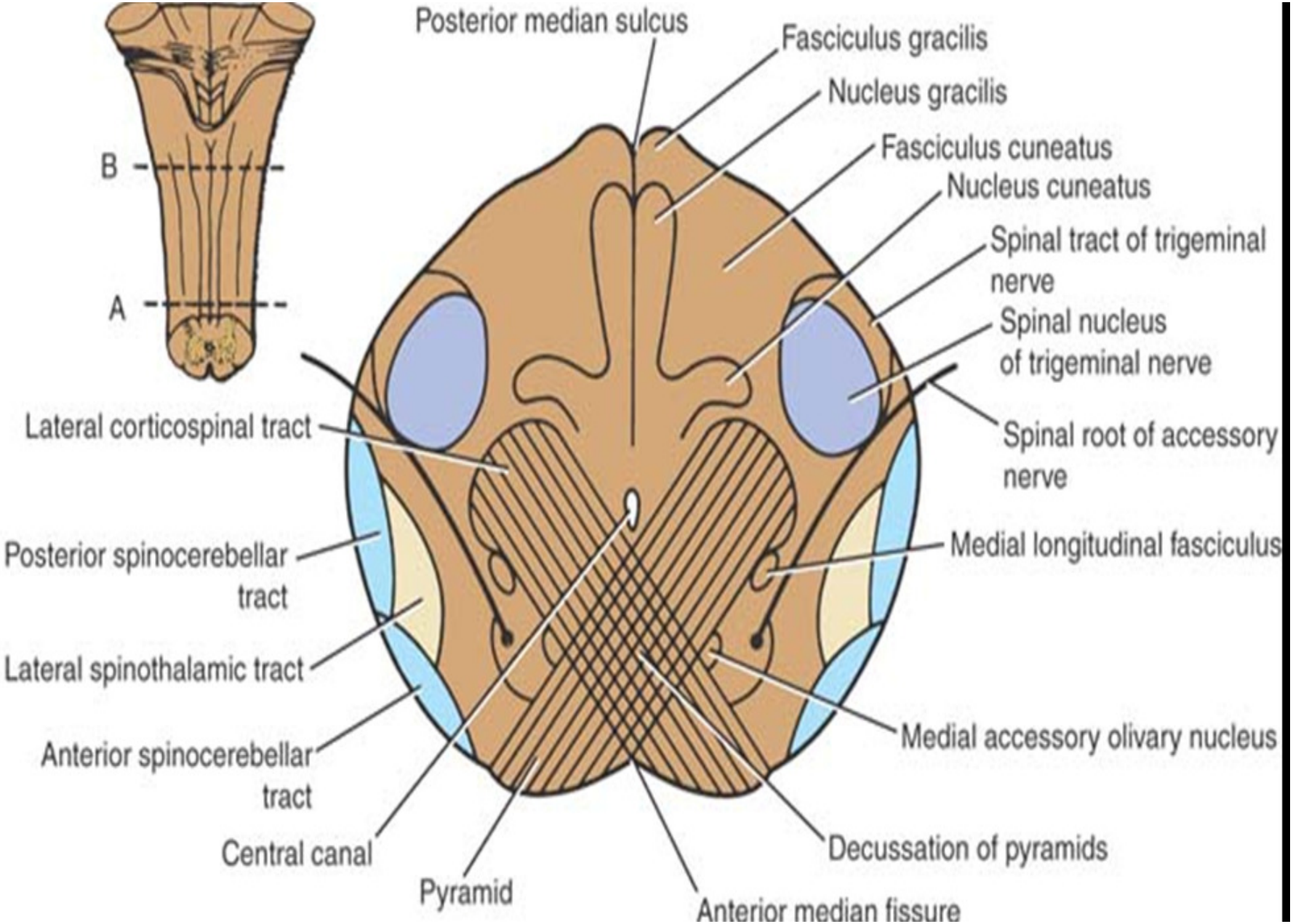
Level of decussation of pyramids

- Decussation of pyramids
- Fasciculus gracilis and the fasciculus cuneatus
- nucleus gracilis and the nucleus cuneatus (posterior to the central gray matter)
- Spinal nucleus of the trigeminal nerve
- Central canal



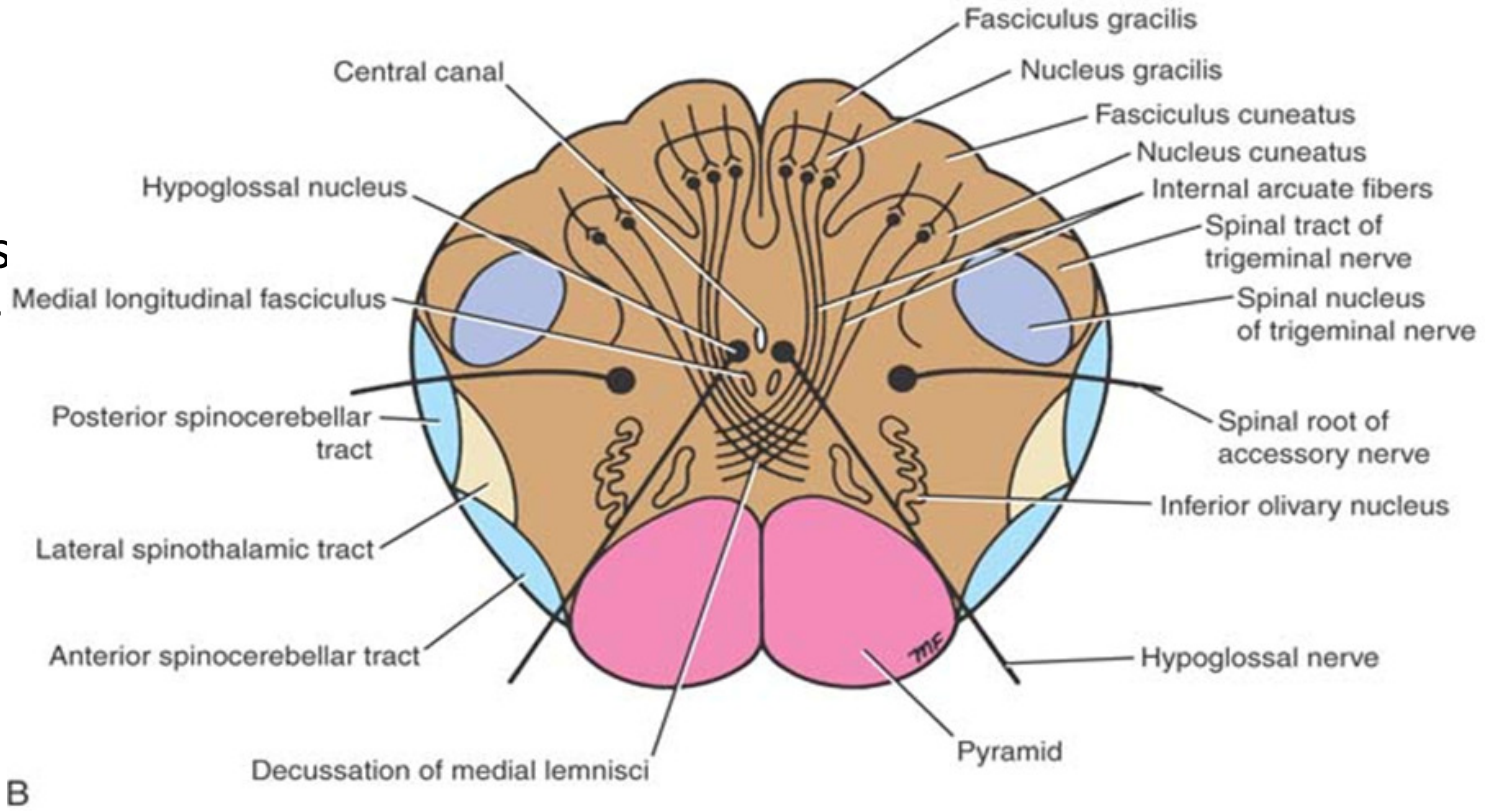
- The lateral and anterior white columns of the spinal cord is unchanged

Level of decussation of pyramids



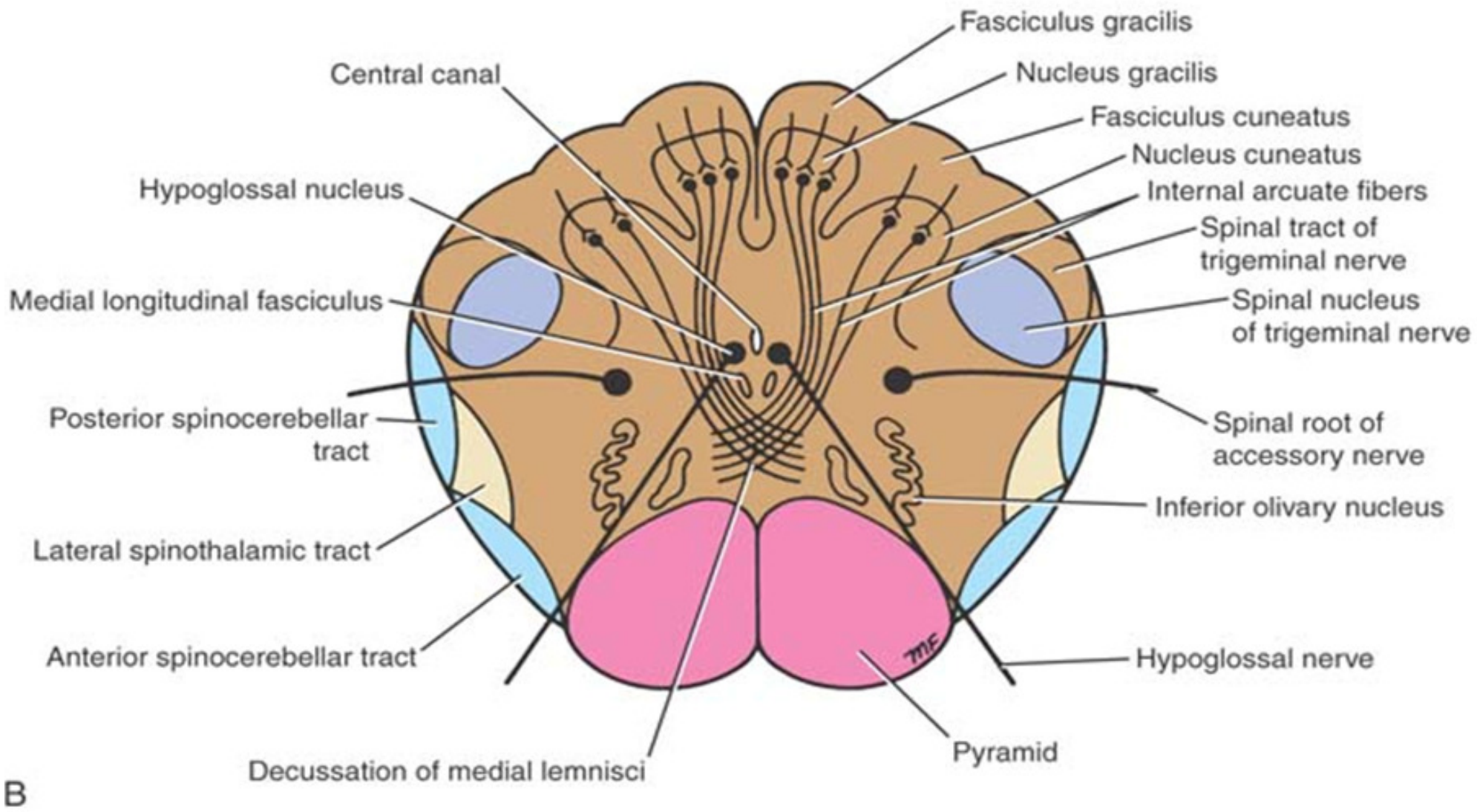
Level of decussation of leminsci

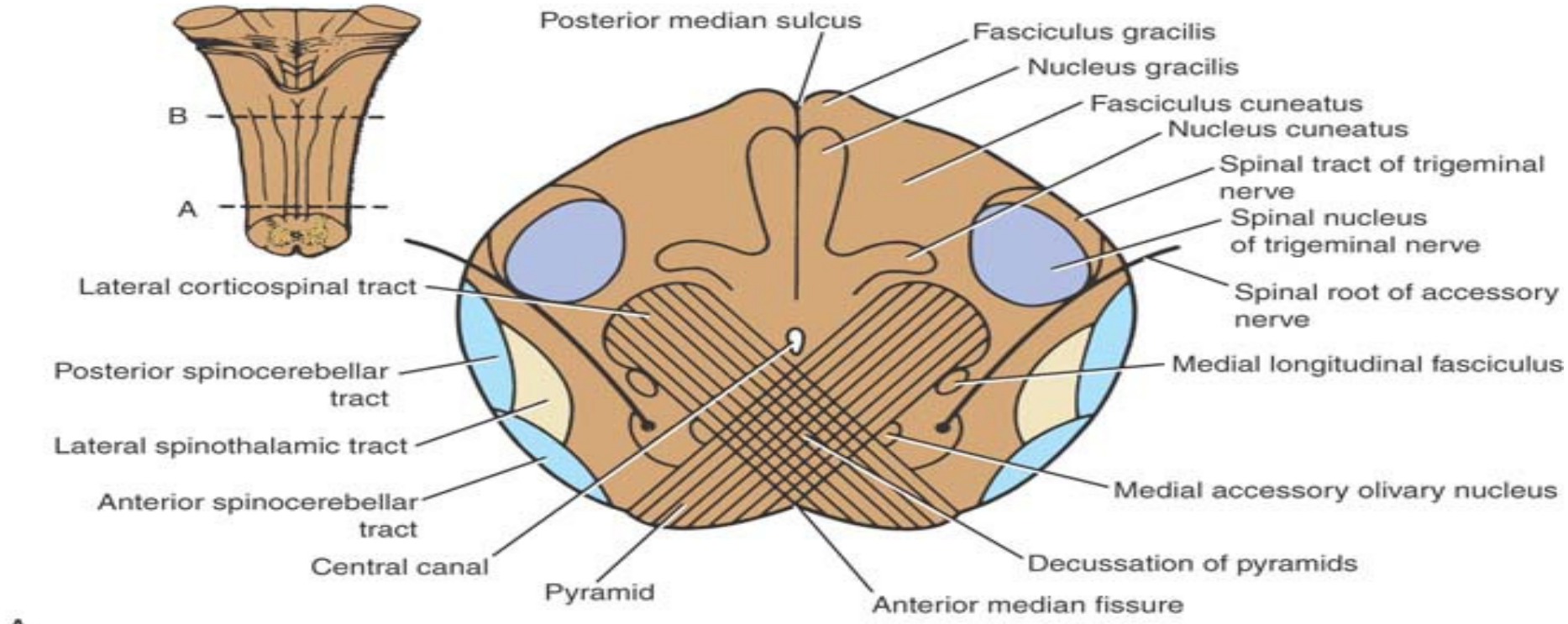
- Sensory decussation
- Leminisci are formed by internal arcuate fibers
- internal arcuate fibers emerge from anterior aspect of nucleus gracilis and nucleus cuneatus
- Decussation takes place posterior to pyramids
- Spinal nucleus of the trigeminal nerve (lateral to the internal arcuate fibers)
- spinal lemniscus lateral to the decussation of the lemnisci



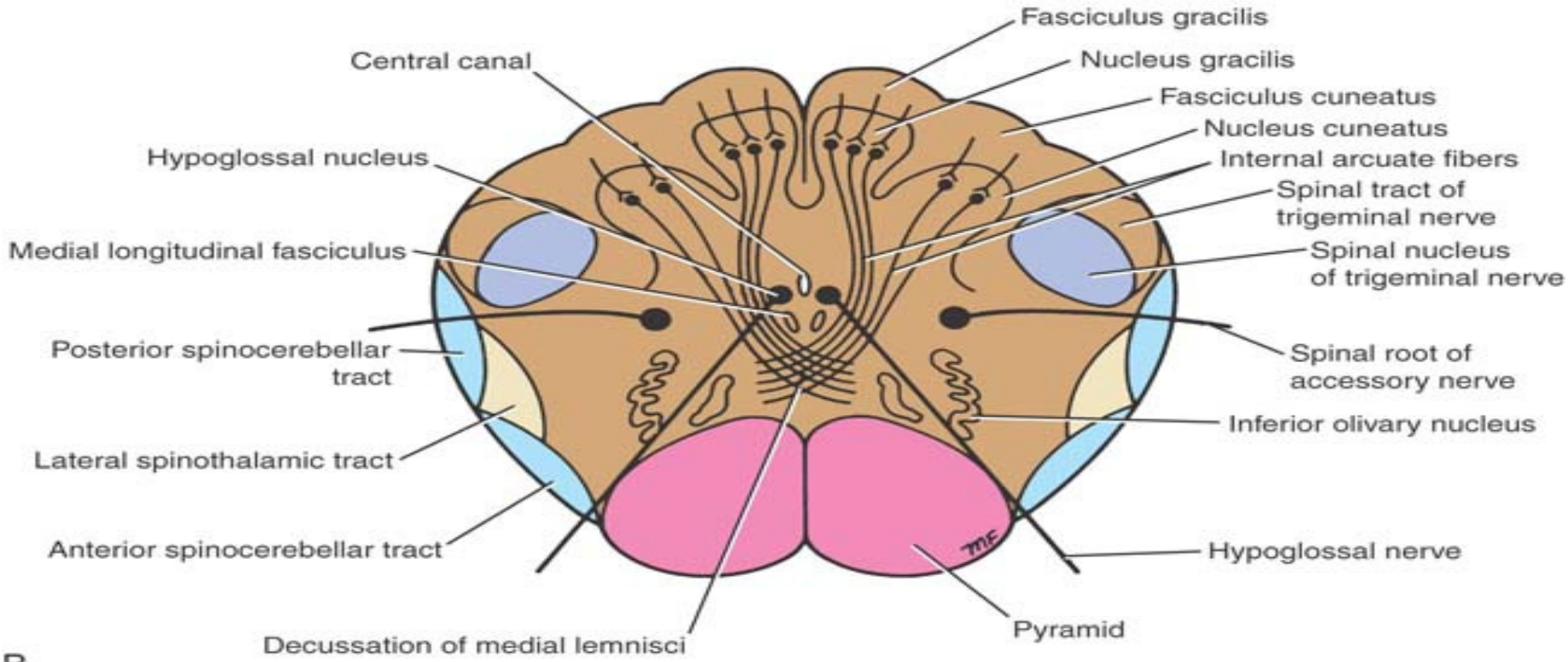
- The spinocerebellar vestibulospinal, and the rubrospinal tracts (anterolateral)
- Central canal

Level of sensory decussation




B
A
Posterior median sulcus
Fasciculus gracilis
Nucleus gracilis
Fasciculus cuneatus
Nucleus cuneatus
Spinal tract of trigeminal nerve
Spinal nucleus of trigeminal nerve
Spinal root of accessory nerve
Medial longitudinal fasciculus
Medial accessory olivary nucleus
Decussation of pyramids
Anterior median fissure
Pyramid
Central canal
Anterior spinocerebellar tract
Lateral spinothalamic tract
Posterior spinocerebellar tract
Lateral corticospinal tract

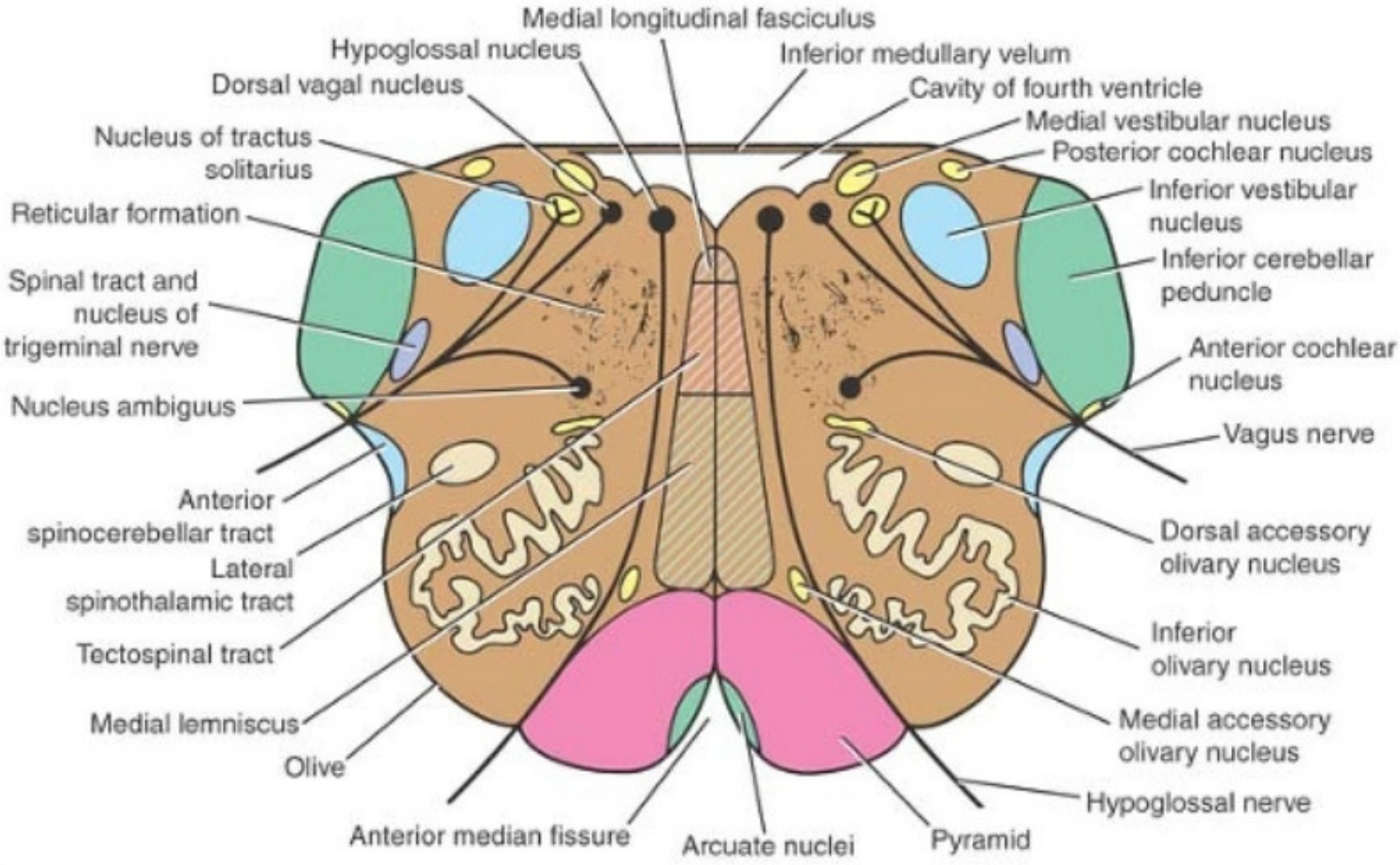
A


Fasciculus gracilis
Central canal
Nucleus gracilis
Fasciculus cuneatus
Nucleus cuneatus
Hypoglossal nucleus
Internal arcuate fibers
Spinal tract of trigeminal nerve
Medial longitudinal fasciculus
Spinal nucleus of trigeminal nerve
Posterior spinocerebellar tract
Spinal root of accessory nerve
Inferior olivary nucleus
Lateral spinothalamic tract
Anterior spinocerebellar tract
Hypoglossal nerve
Pyramid
Decussation of medial lemnisci

B

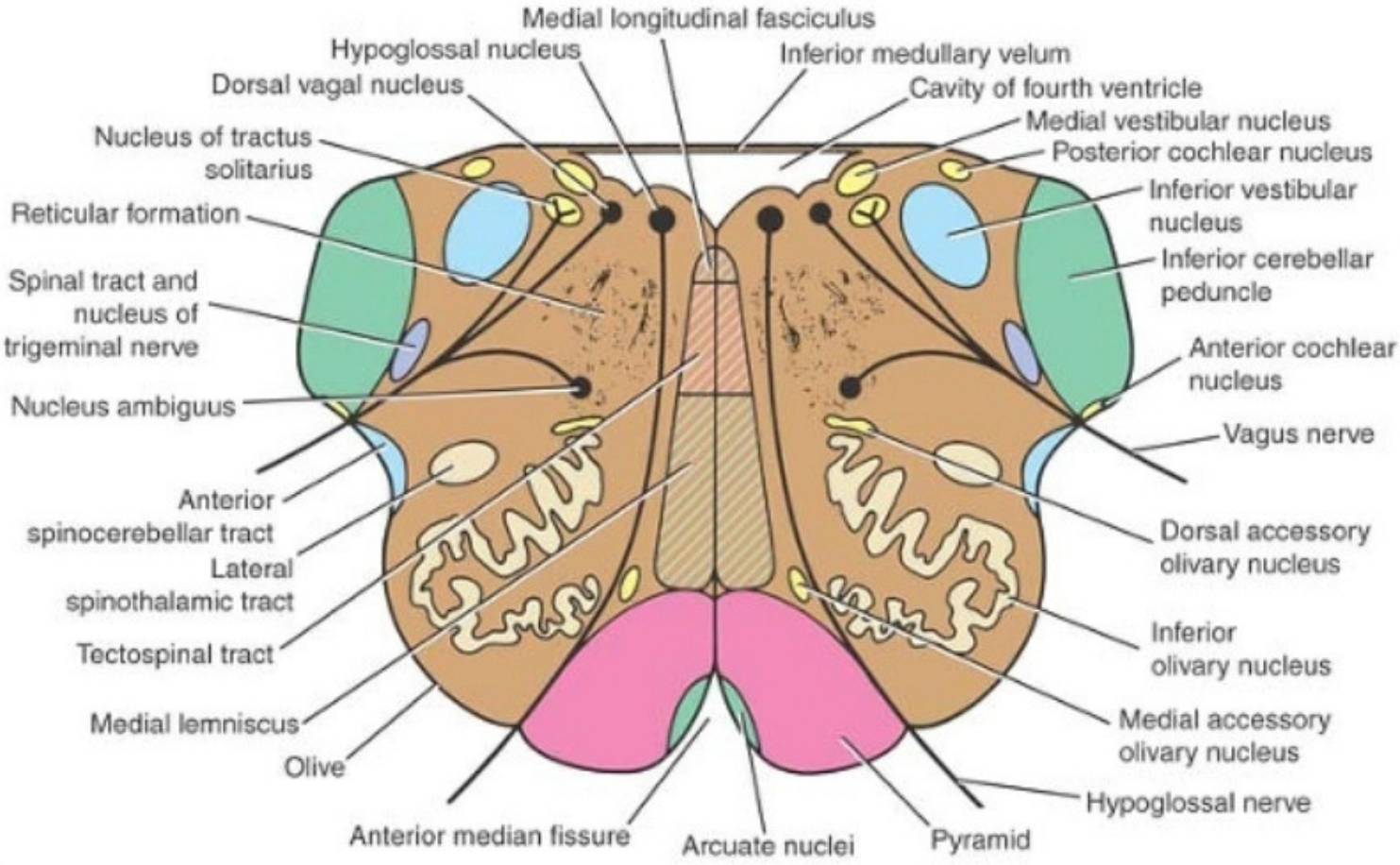
Level of olives (open medulla)

- inferior part of 4th ventricle
- Pyramids
- ICP (posterolateral corner)
- Medial leminiscus
- RF
- Spinal nucleus of trigeminal and its tract (anteriomedial to ICP)
- Nuclei of 12th 11th 10th & 9th
- Inf Olivary nucleus
- Medial longitudinal fasciculus



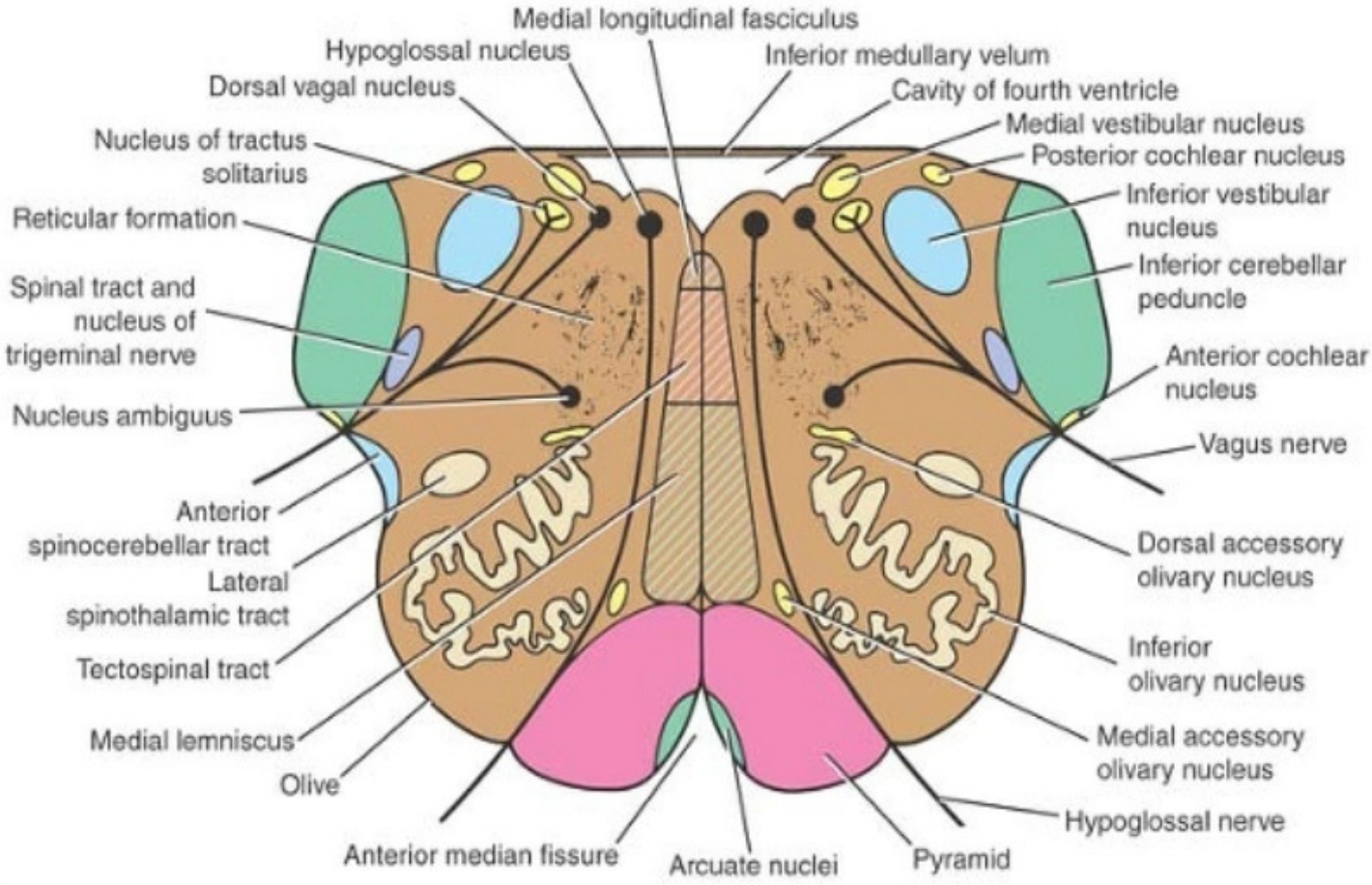
Olivary nuclear complex

- Mainly Inf. Olivary nucleus
- Gray matter is shaped like a crumpled bag with its mouth directed medially
- Responsible of the elevation olive
- Has communications with spinal cord, cerebellum & cortex
- Function is associated with voluntary muscle movement



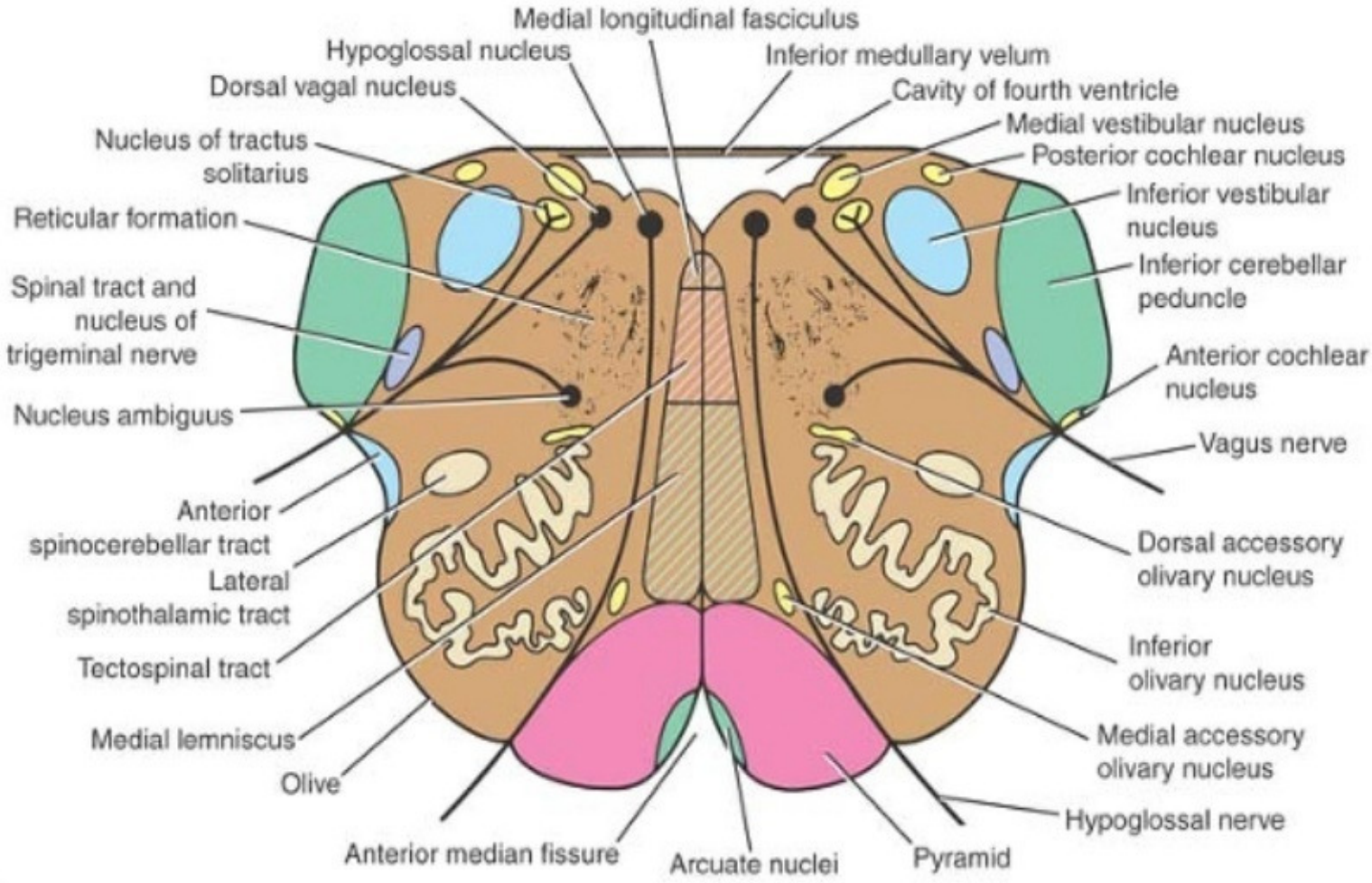
Nucleus ambiguus

- Large motor neurons
- Situated deep in RF
- Emerging fibers join 9th, 10th and 11th (cranial root of accessory)
- An elongated nucleus in the medulla oblongata that gives rise to the motor fibers of the glossopharyngeal, vagus, and accessory (cranial) nerves supplying striated muscle of the larynx and pharynx and soft palat



Medial longitudinal fasciculus

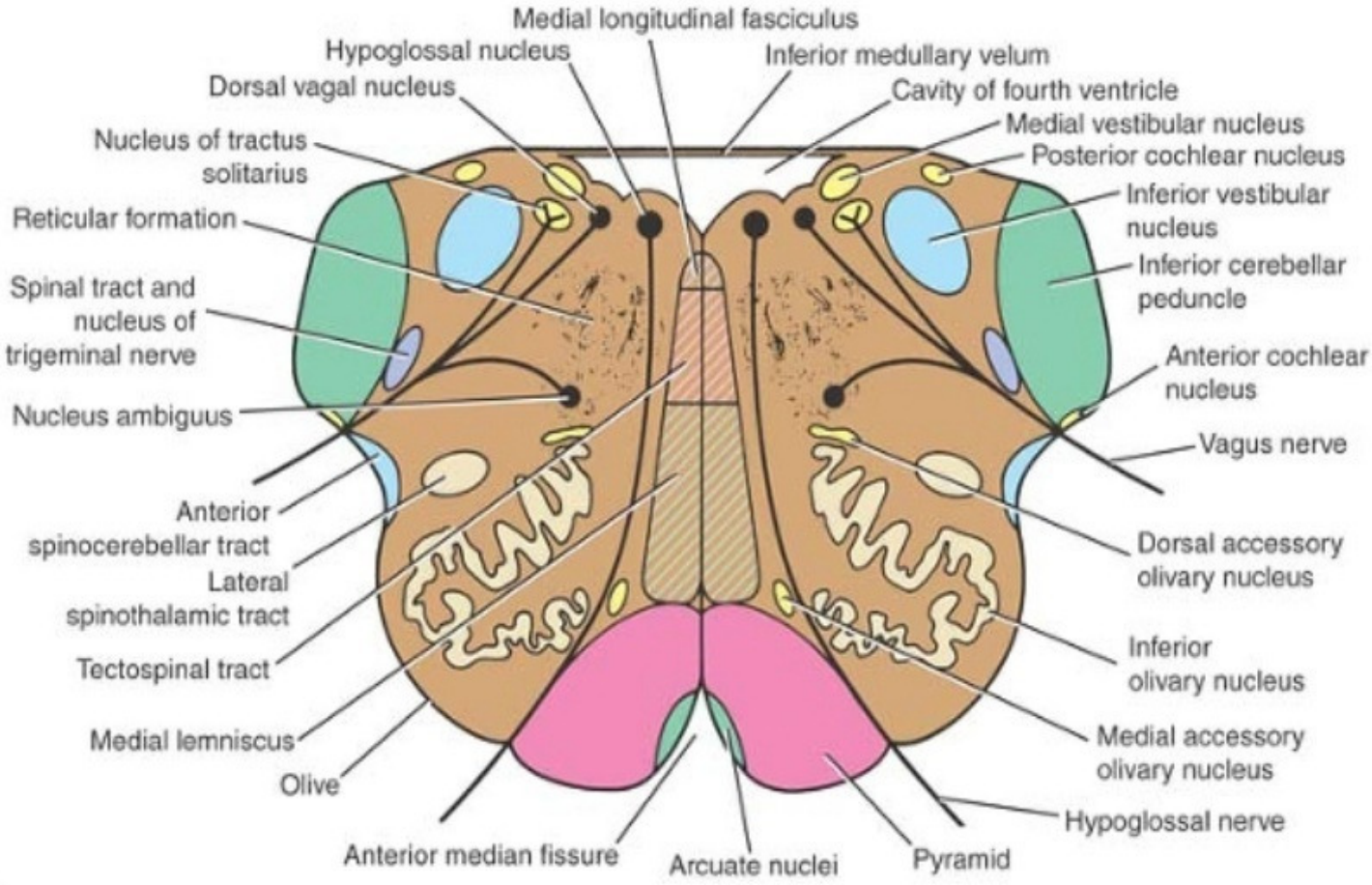
- Small tract of nerve fibers
- situated on each side of the midline
- Posterior to med. Leminiscus
- Anterior to 12th nucleus
- It is composed largely of ascending fibers from the vestibular nuclei and cochlear nuclei ascending to the motor nuclei (third, fourth and sixth)



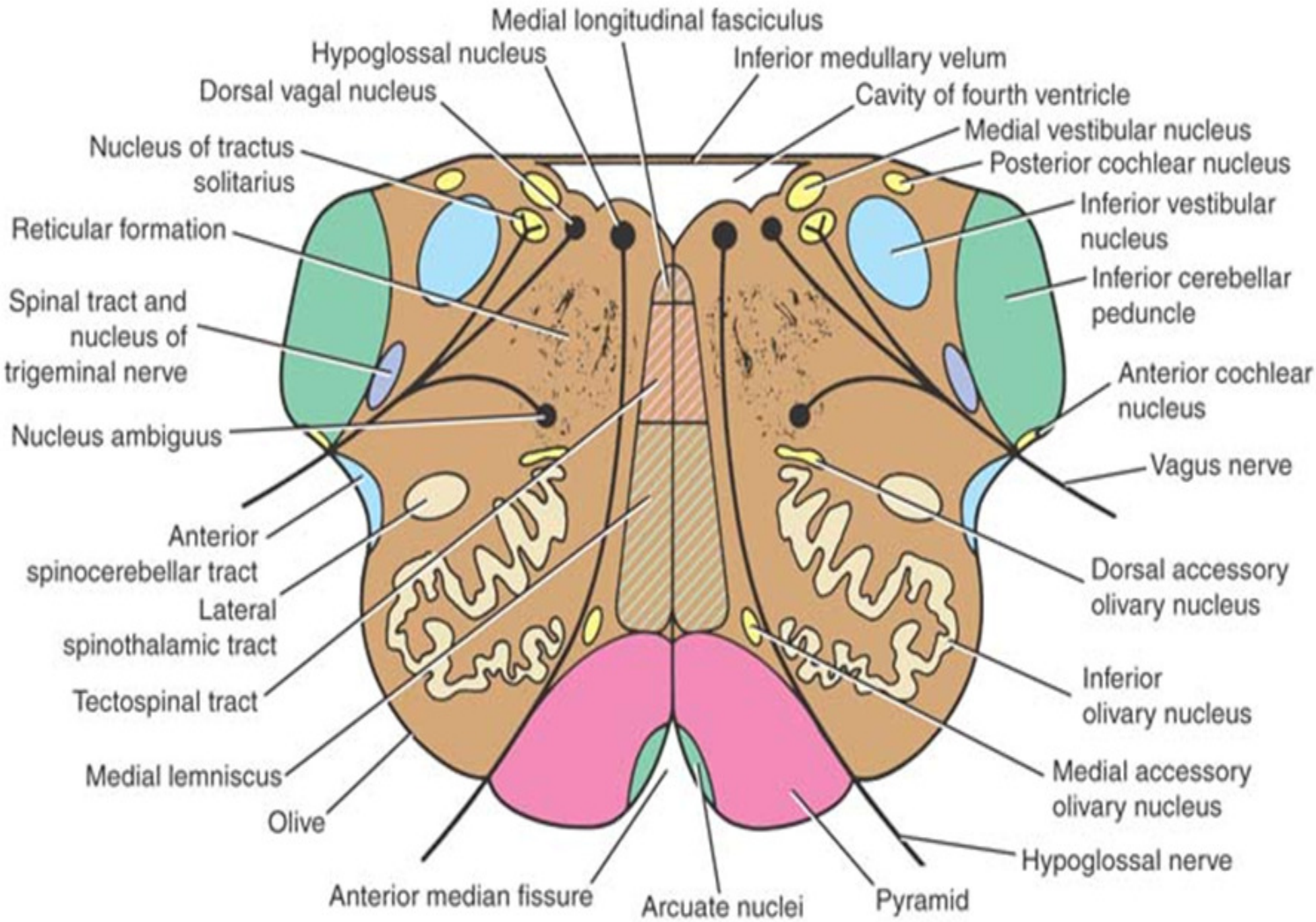
Central gray matter

- Lies beneath the floor of 4th ventricle
- Passing from M to L:

1. Hypoglossal nucleus
2. Dorsal nucleus of vagus
3. Solitary nucleus
4. Vestibular nuclei (medial and inferior)



Medulla oblongata at the level of olives



Level Just Inferior to the Pons

- No major changes
- **Lateral vestibular nucleus** replaced the inferior vestibular nucleus
- **Cochlear nuclei** visible on the anterior and posterior surfaces of the inferior cerebellar peduncle.