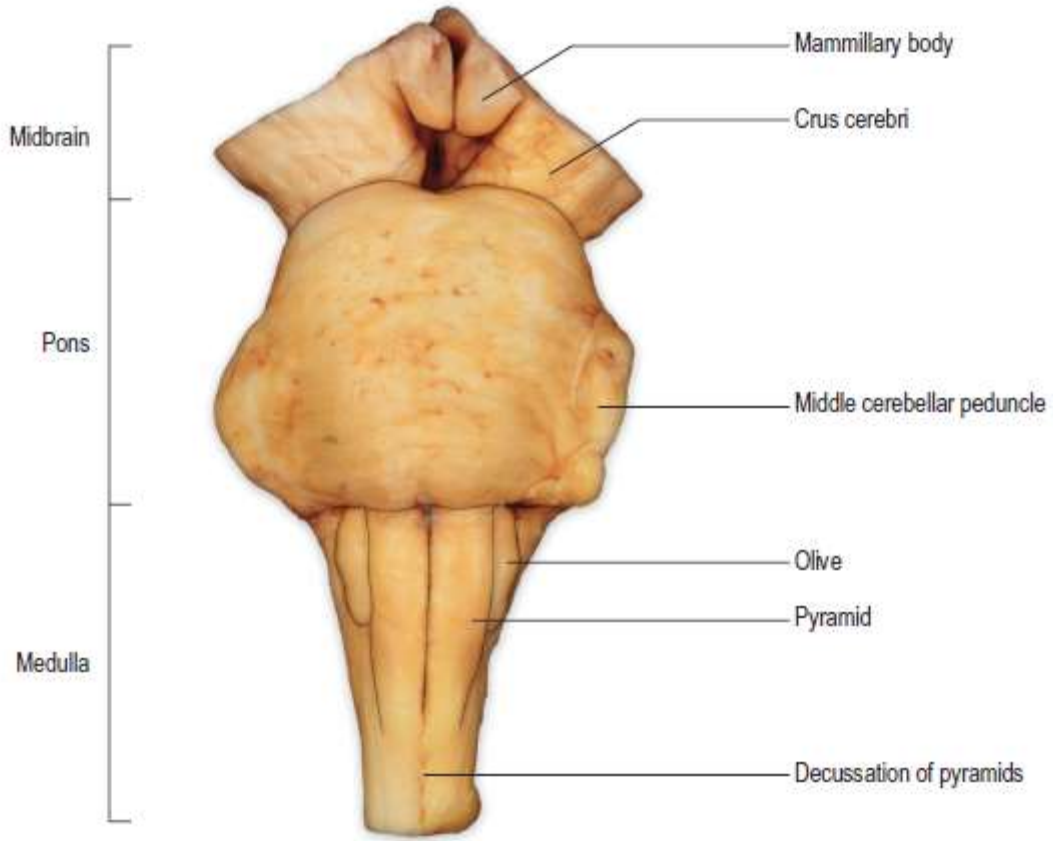
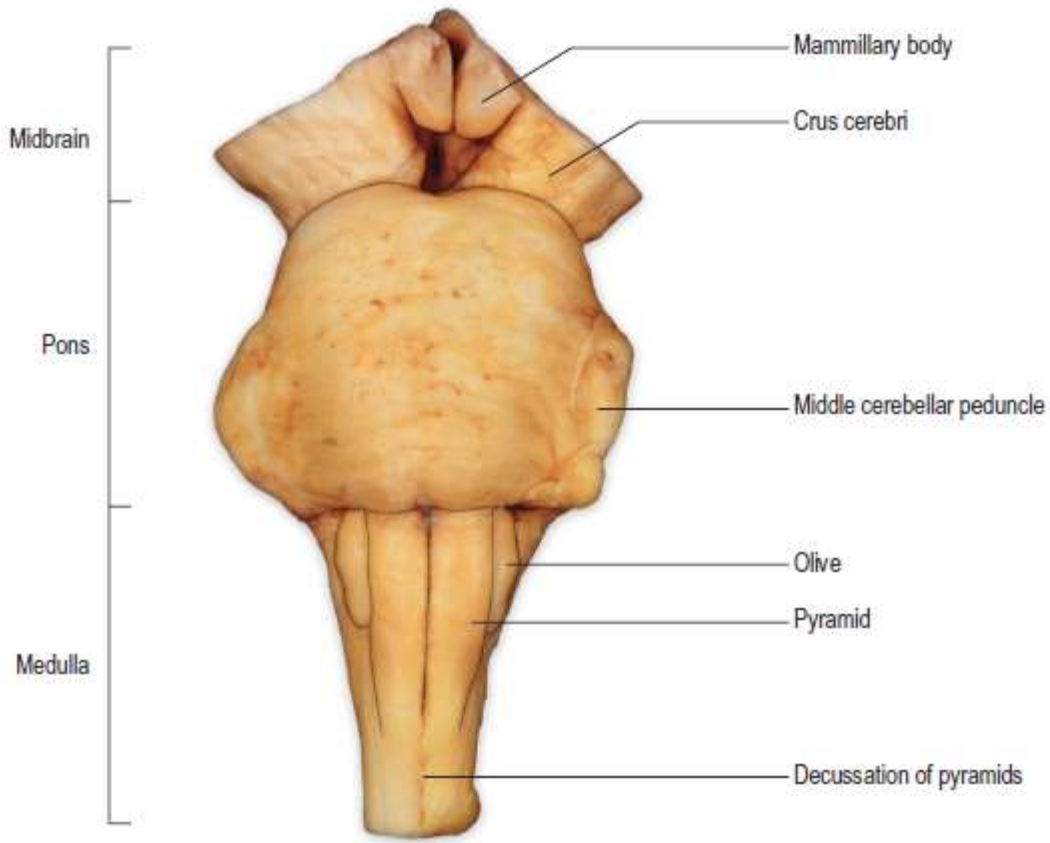
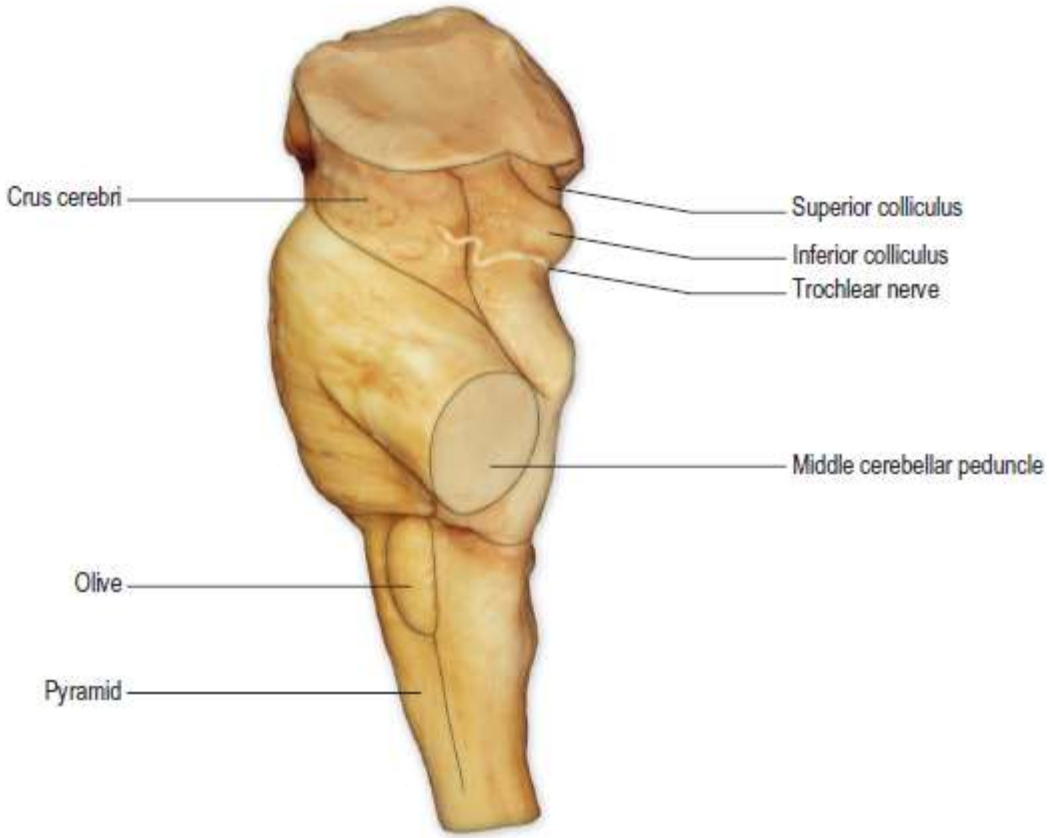
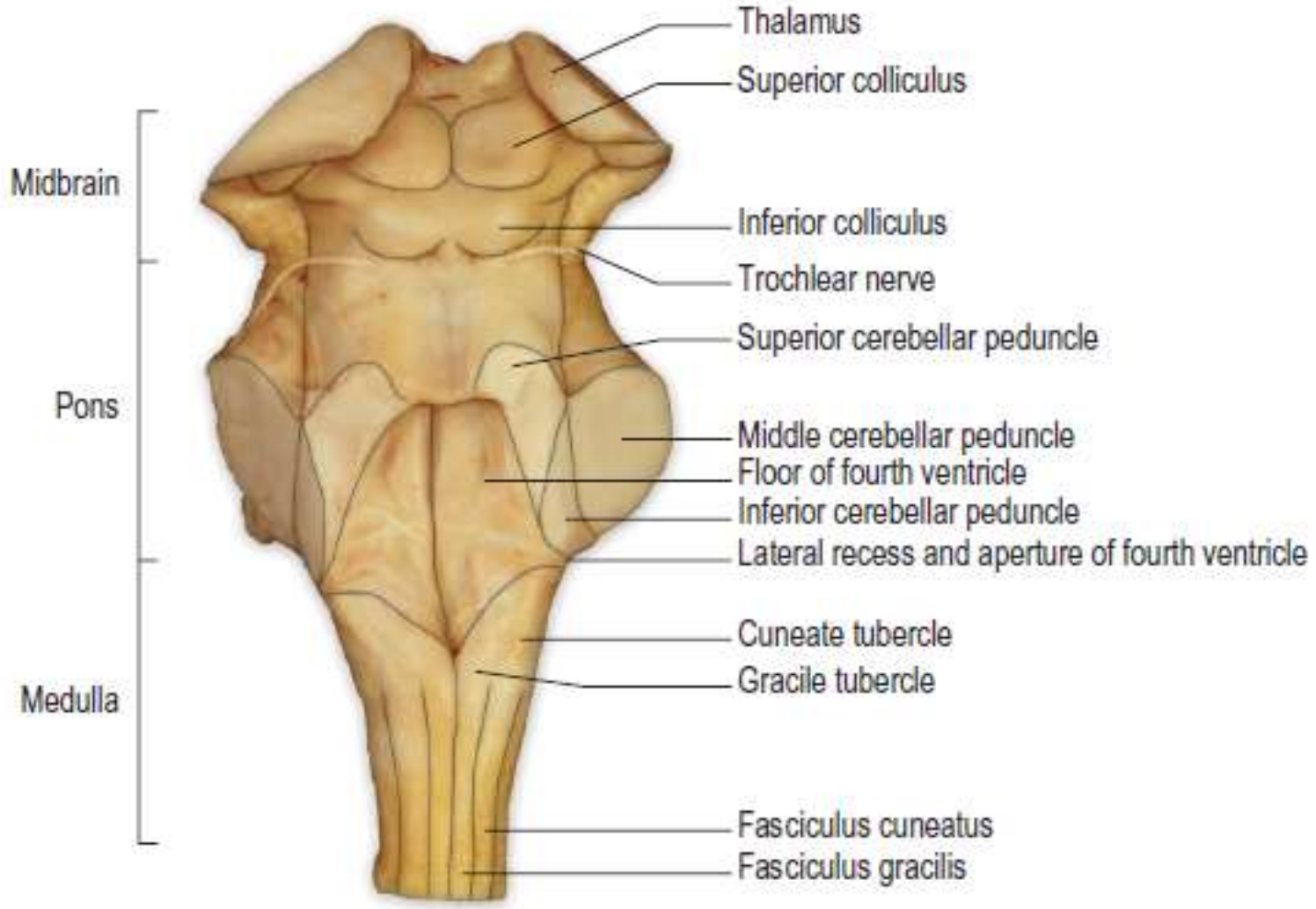
Brain stem internal features

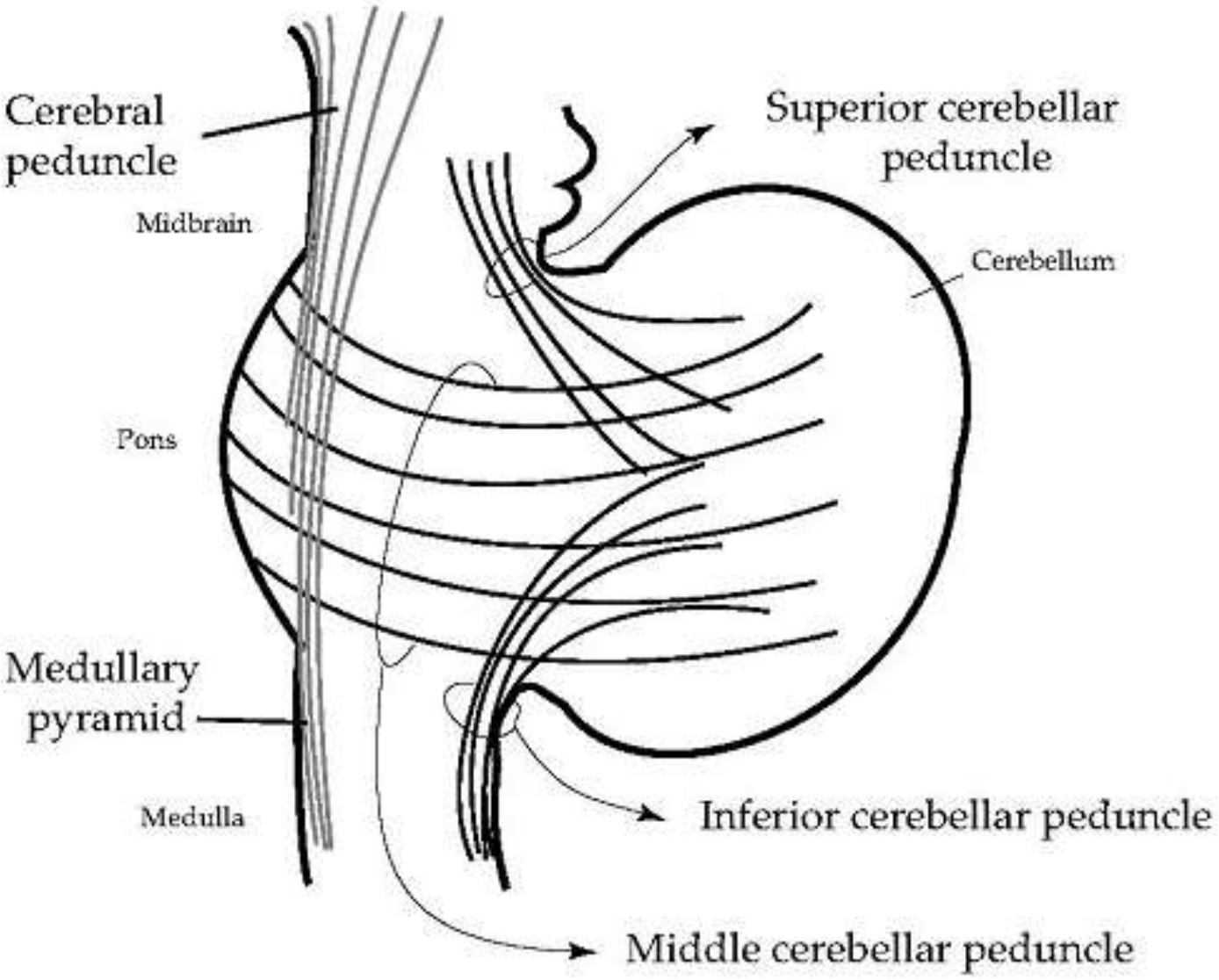


Dr Amal Aqeel Albtoosh


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


Crus cerebri
Superior colliculus
Inferior colliculus
Trochlear nerve
Middle cerebellar peduncle
Olive
Pyramid


Midbrain
Pons
Medulla
Thalamus
Superior colliculus
Inferior colliculus
Trochlear nerve
Superior cerebellar peduncle
Middle cerebellar peduncle
Floor of fourth ventricle
Inferior cerebellar peduncle
Lateral recess and aperture of fourth ventricle
Cuneate tubercle
Gracile tubercle
Fasciculus cuneatus
Fasciculus gracilis


Cerebral peduncle
Midbrain
Pons
Medullary pyramid
Medulla
Superior cerebellar peduncle
Cerebellum
Inferior cerebellar peduncle
Middle cerebellar peduncle

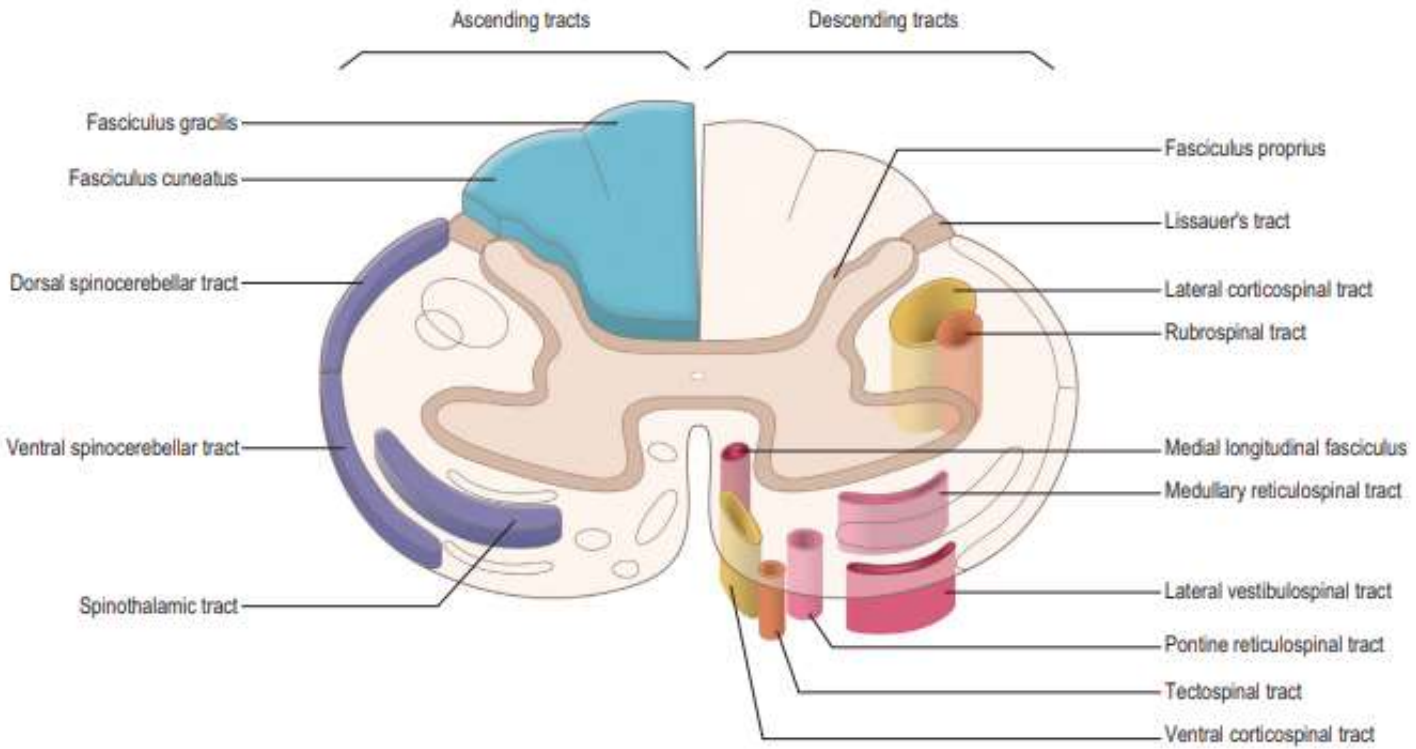
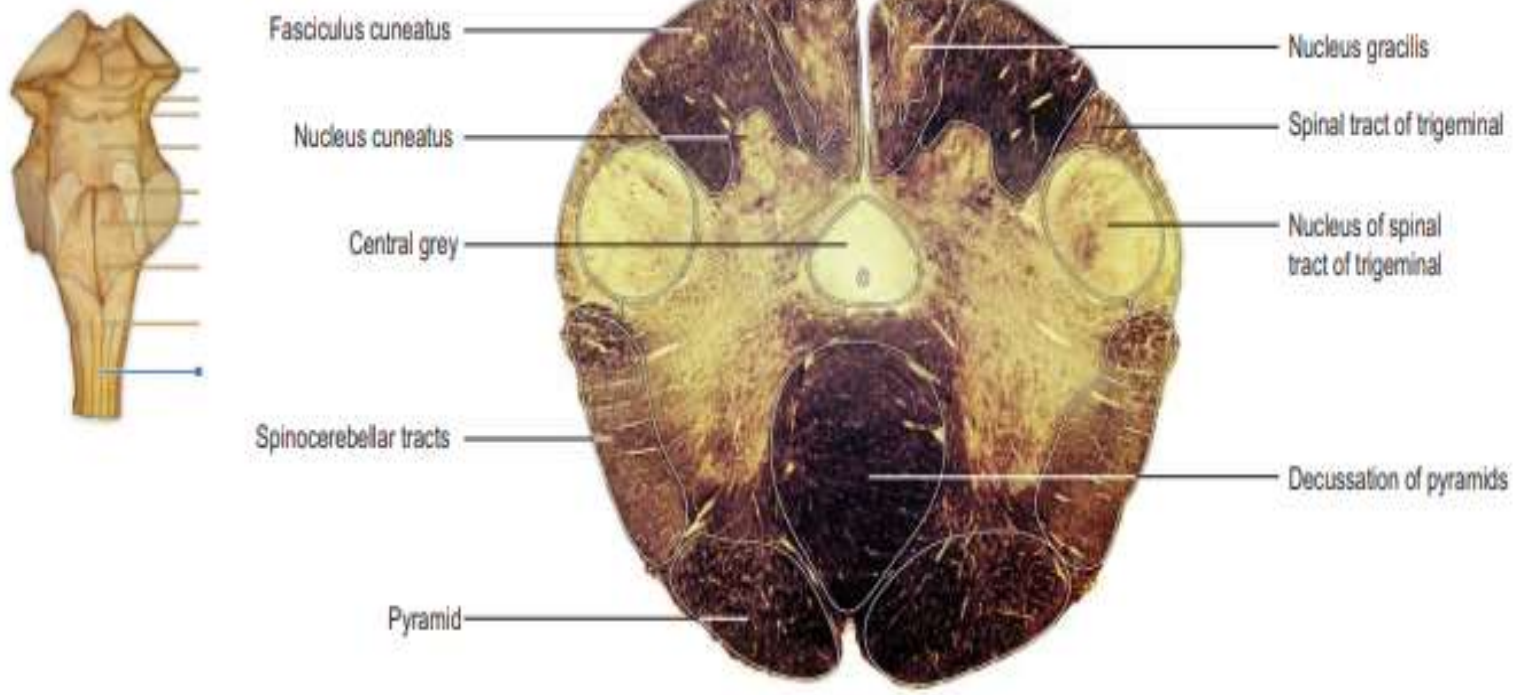


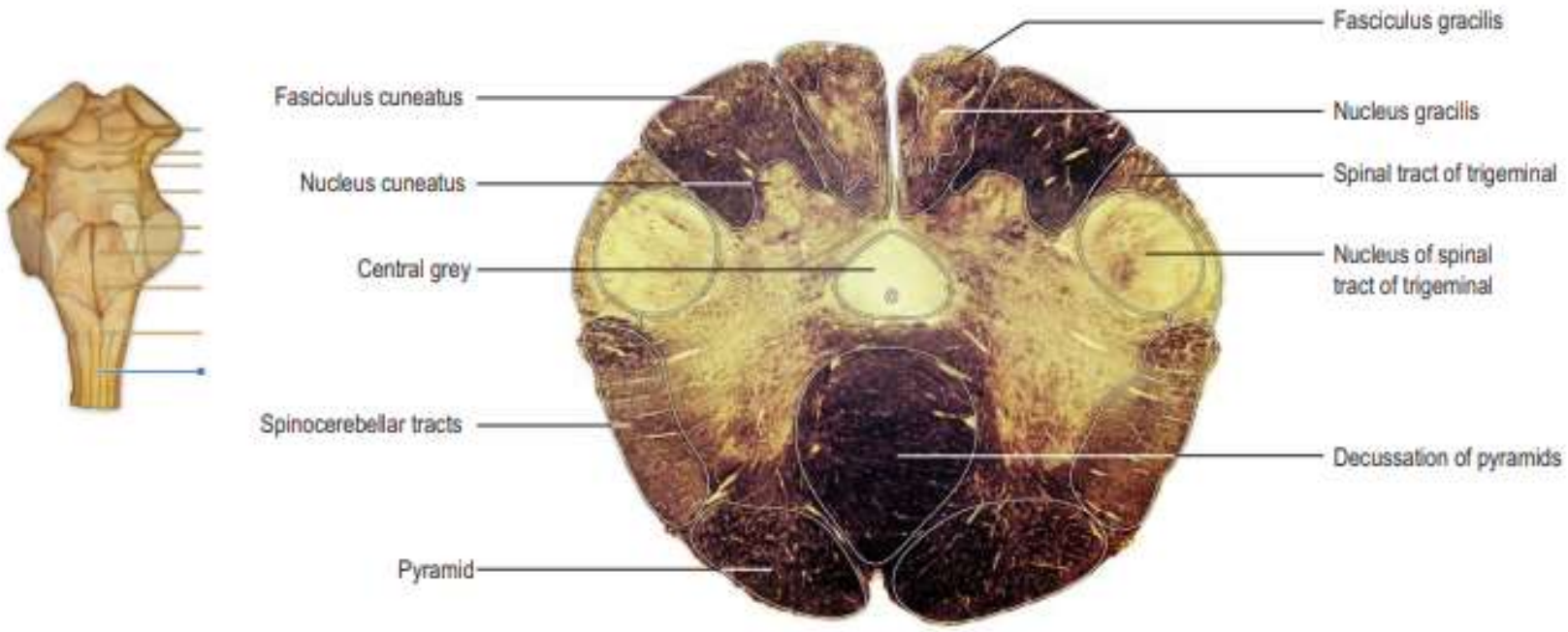
Figure 8.15 **Ascending and descending tracts of the spinal cord.** All ascending and descending tracts are present bilaterally. In this figure, ascending tracts are emphasised on the left side and descending tracts are emphasised on the right side. In addition, the location of Lissauer's tract and the fasciculus proprius (which contain both ascending and descending fibres) are shown.

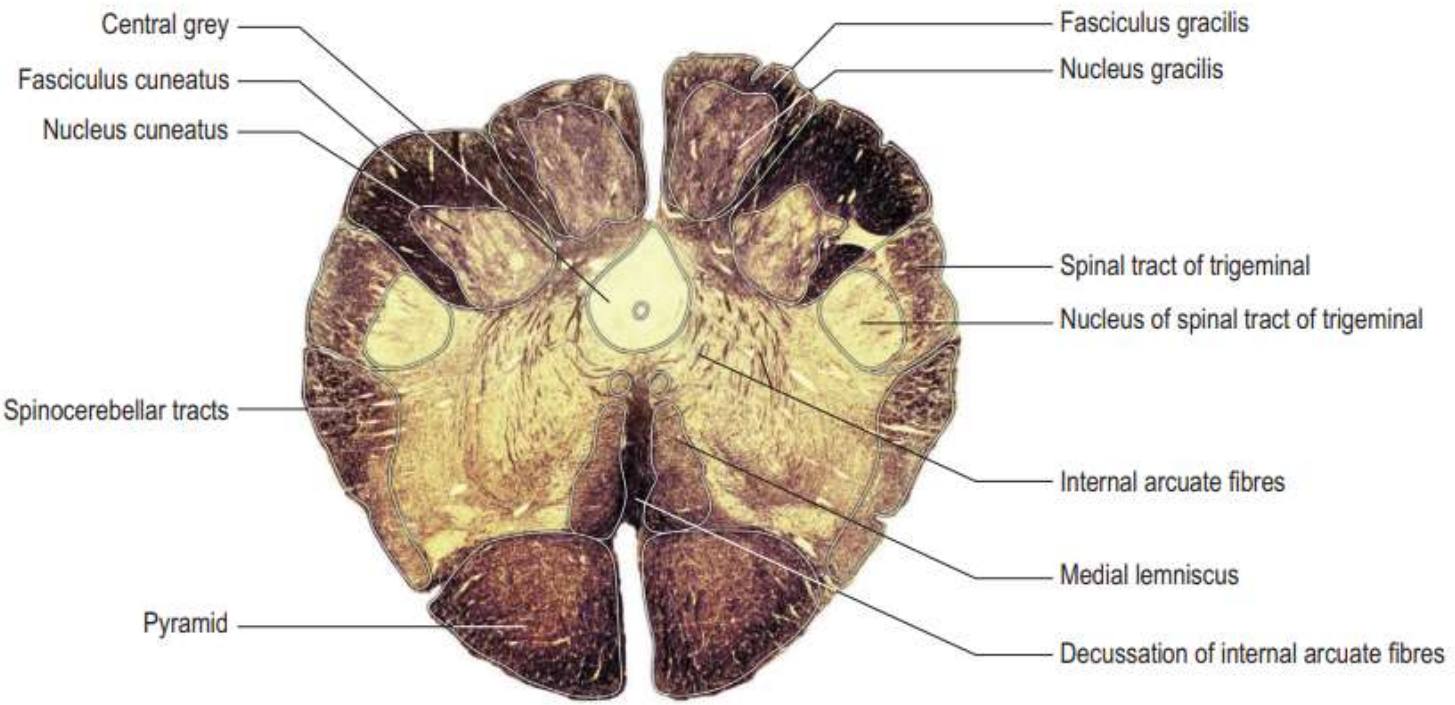
CADUAL MEDULA: pyramid decussation



❖<u>The outline:</u> Similar to cervical segment of the spinal cord. At this level we can identify: <u>1. **central canal**</u>**., 2.** Trigeminal N& T 3. pyramidal decussation: motor decussation.

Closed medulla = Motor decussation



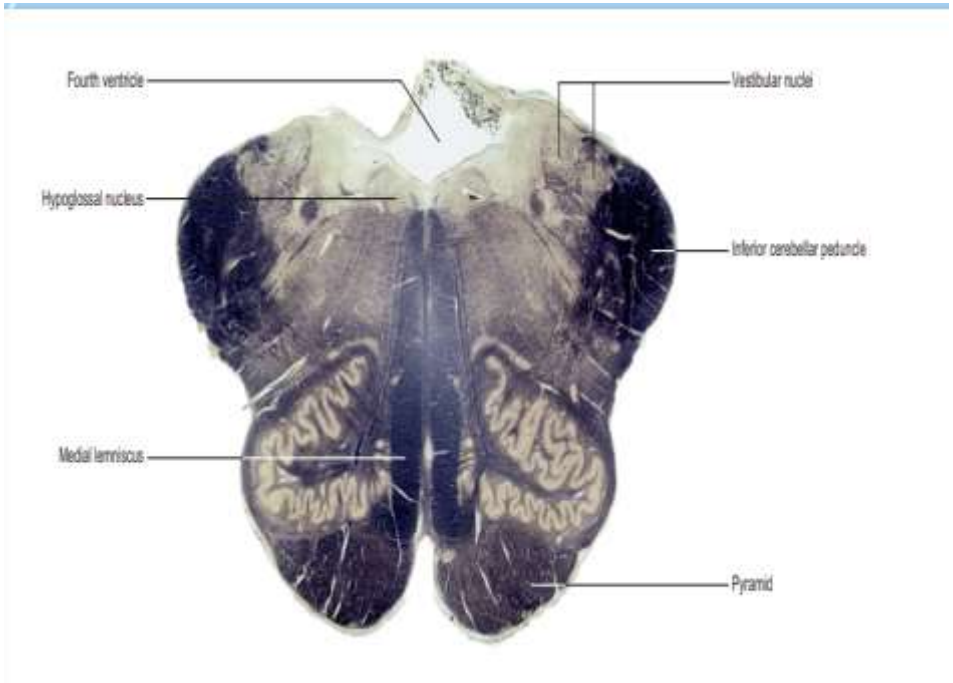


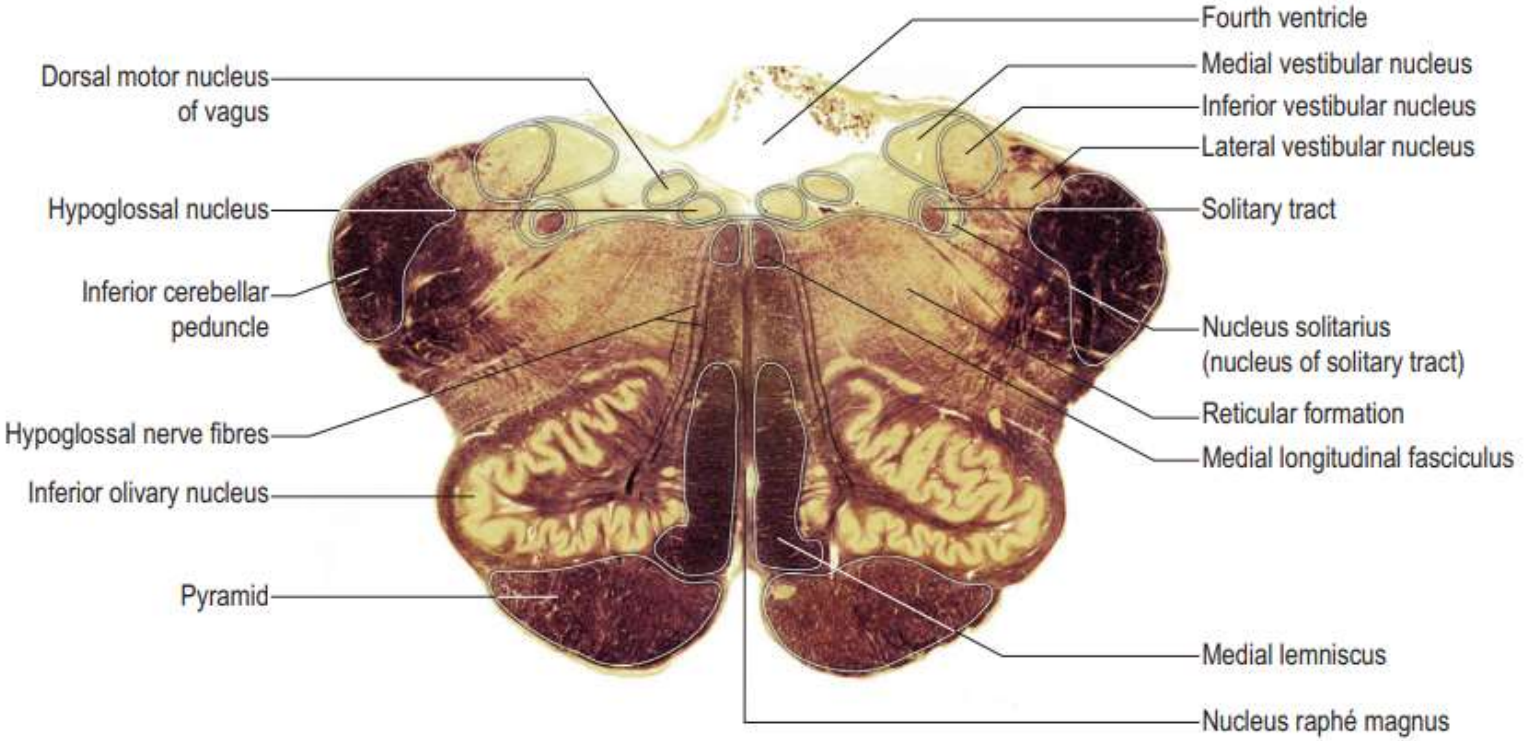
1. **Gracile nucleus &Fasciculus gracilis**
2. **Cuneate nucleus& Fasciculus cuneatus**
3. **Spinal N. & tract of trigeminal nerve**
4. **Sensory decussation (crossed internal arcuate fibers) Medial lemniscus**

Level of: Inferior Olivary N = open medulla

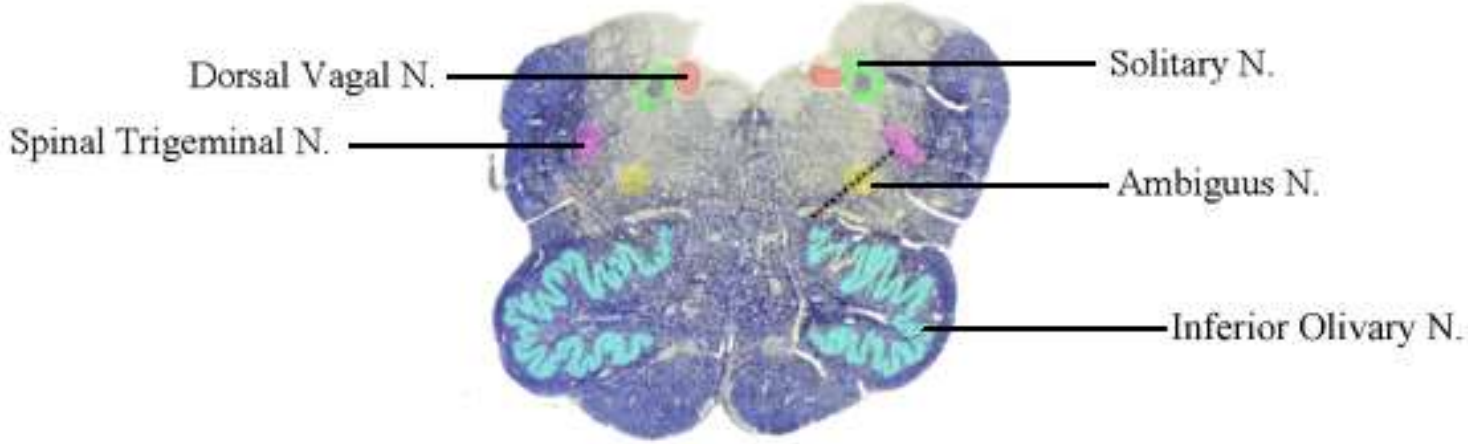
1. open 4th ventricle
2. Inferior cerebellar peduncle
3. Inferior olivary nucleus
4. Pyramid
5. Anterior median fissure
6. Medial lemniscus
7. Medial longitudinal fasciculus
8. Hypoglossal nucleus
9. Dorsal vagal nucleus
10. Nucleus solitarius
11. Medial & Lateral vestibular N
12. Vagus nerve & Hypoglossal nerve

- The fully formed olivary nuclei 3
- Dorsal spinocerebellar T **disappear**




Dorsal motor nucleus of vagus
Hypoglossal nucleus
Inferior cerebellar peduncle
Hypoglossal nerve fibres
Inferior olivary nucleus
Pyramid
Fourth ventricle
Medial vestibular nucleus
Inferior vestibular nucleus
Lateral vestibular nucleus
Solitary tract
Nucleus solitarius (nucleus of solitary tract)
Reticular formation
Medial longitudinal fasciculus
Medial lemniscus
Nucleus raphé magnus

Vagal Component	Associated Nucleus	Innervated Structures
Parasympathetic	Dorsal Vagal N.	Autonomic ganglia of thorax and abdomen
Motor	Ambiguus N.	Pharynx, larynx, palate
Viscerosensory	Solitary N.	Pharynx, larynx, esophagus, thoracic and abdominal viscera
Chemosensory	Solitary N.	Taste buds of epiglottis
Somatosensory	Spinal Trigeminal N.	Outer ear canal, pinna, dura



Pons

The pons consists of **two parts:**

A- The Basis Pontis (ventrally)

It consists of:

1- **Pontine nuclei:** which appear as scattered gray matter masses.

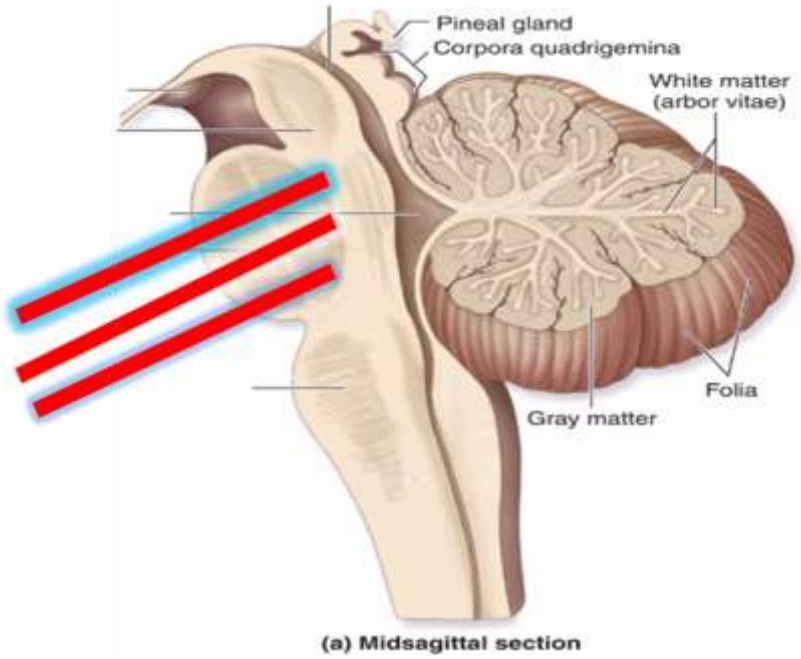
2- **Transverse pontine fibers (Diagnostic).**

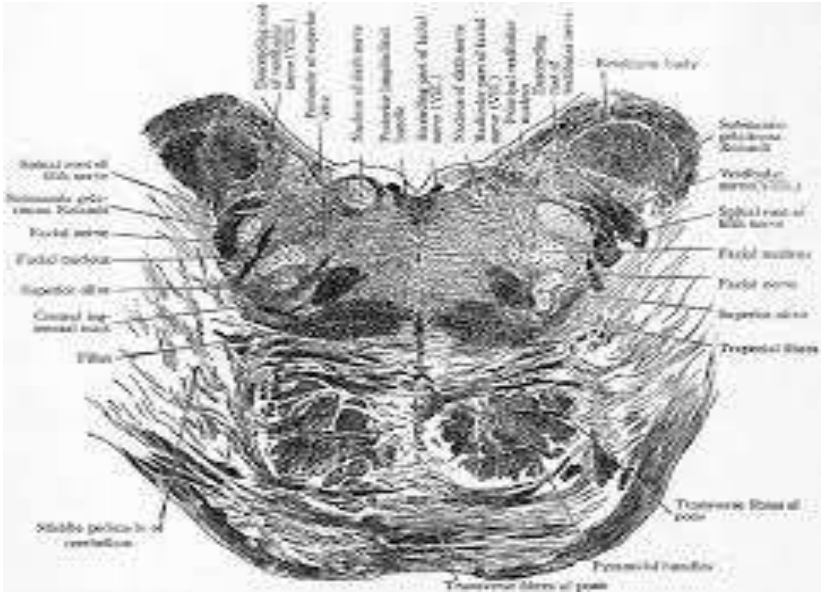
3- **Descending longitudinal fibers (pyramidal fibers).**

B- The Pontine Tegmentum (dorsally).

Pons: 3- levels

- **1- lower pons (facial colliculus)**
- **2- middle pons (trigeminal nuclei)**
- **3- upper pons (4 lemnisci)**



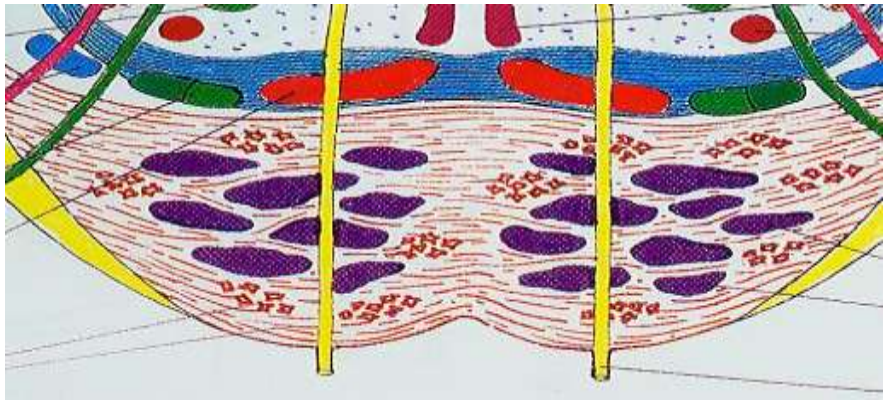


The Pons

The Basis Pontis

Expanded anterior part

- Descending longitudinal fibers
- Pontine nuclei
- Transverse pontine fibers



The Pontine Tegmentum

Is the upward continuation of the medulla.

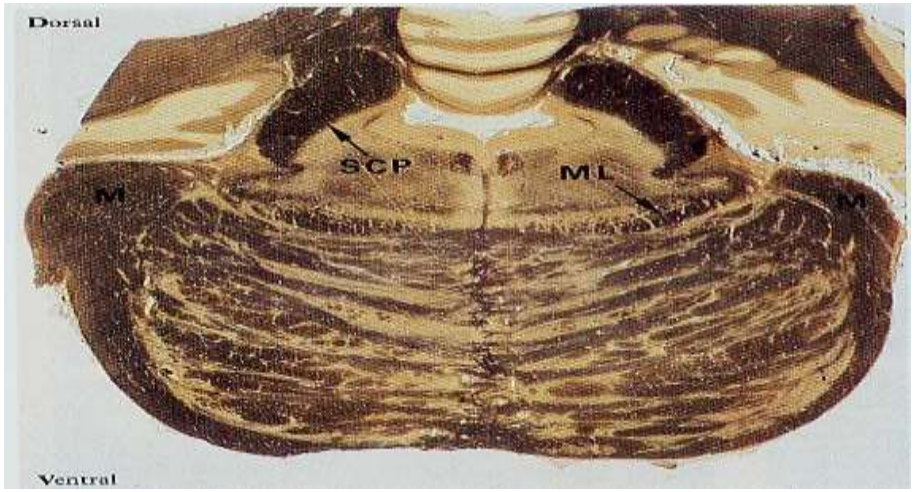
It contains:

1-Tracts ascending & descending

2- lemnisci

3- cranial nerve nuclei.

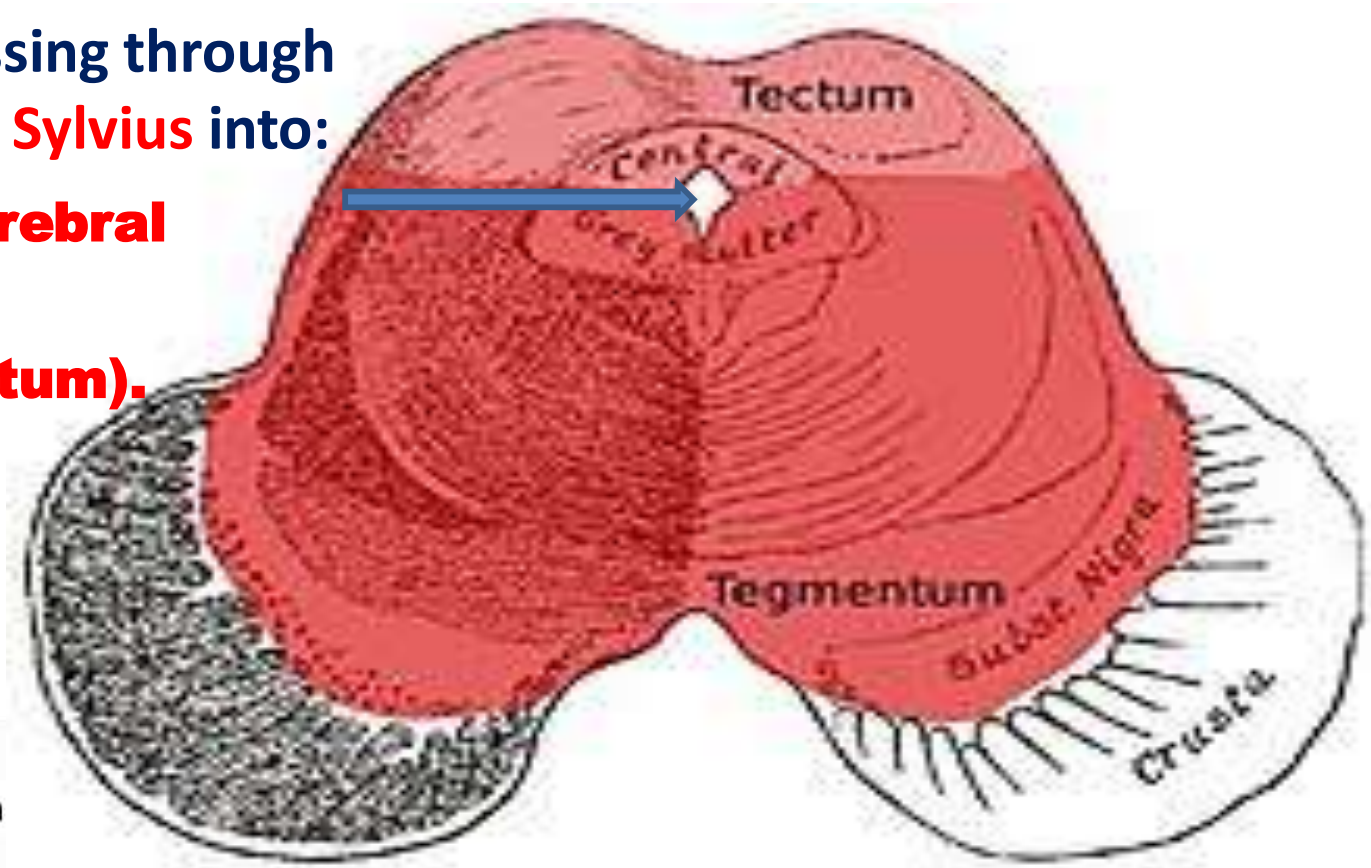
4- cerebellar peduncles.

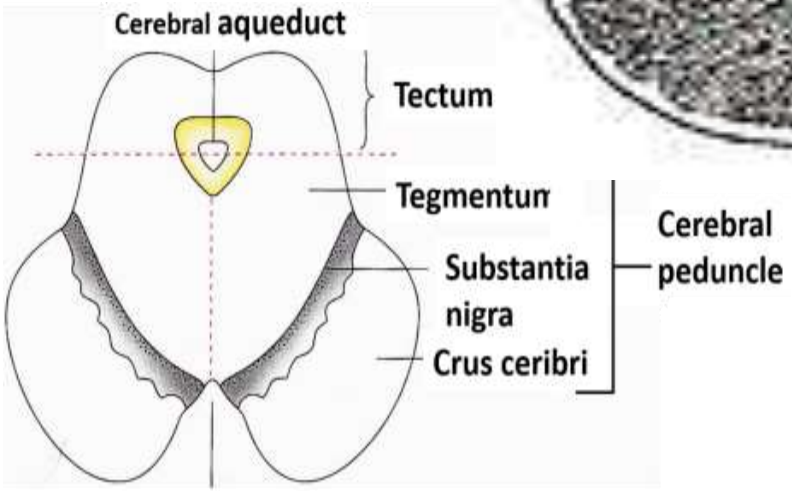


The midbrain

Divided by line passing through the aqueduct of Sylvius into:

- ventral part **(cerebral peduncle)**
- dorsal part **(tectum).**





The cerebral peduncle:

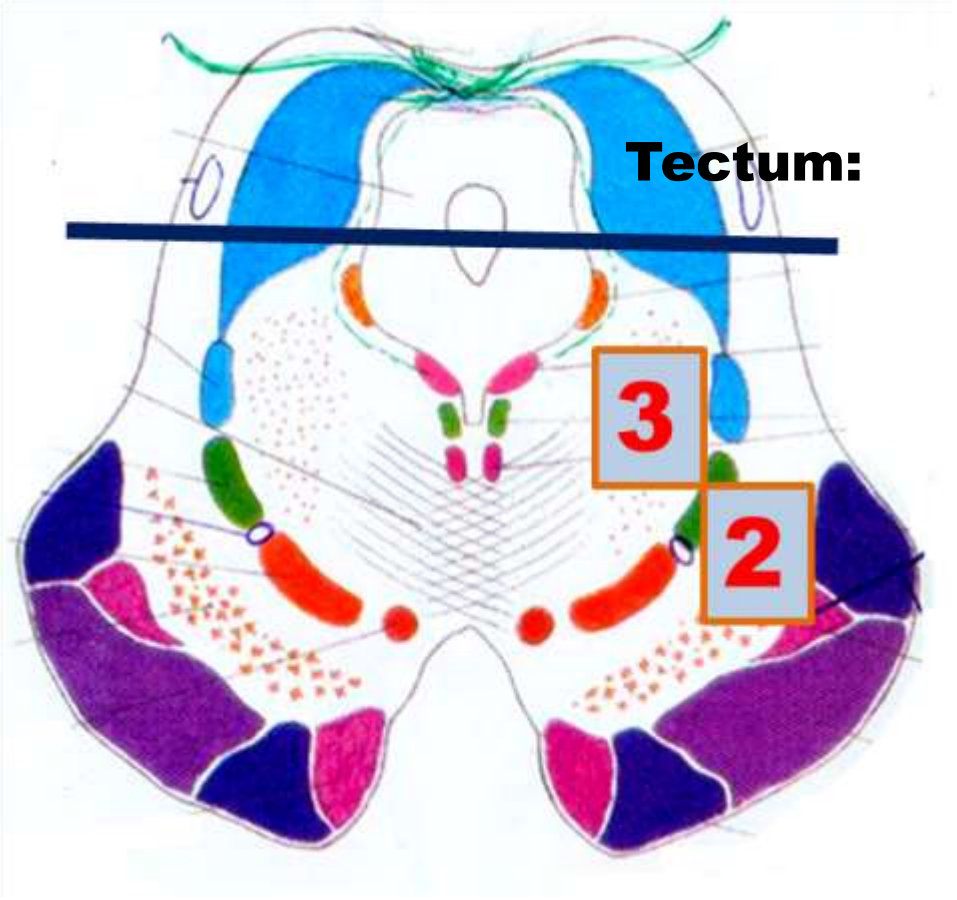
1. **Crus cerebri : cortico-bulbar, cortico-pontine & cortico-spinal tracts.**

2. **Substantia Nigra: pigmented masses of gray matter that belong to the extra-pyramidal system.**

3. **Tegmentum: contains certain nuclei, nerve tracts & decussations.**

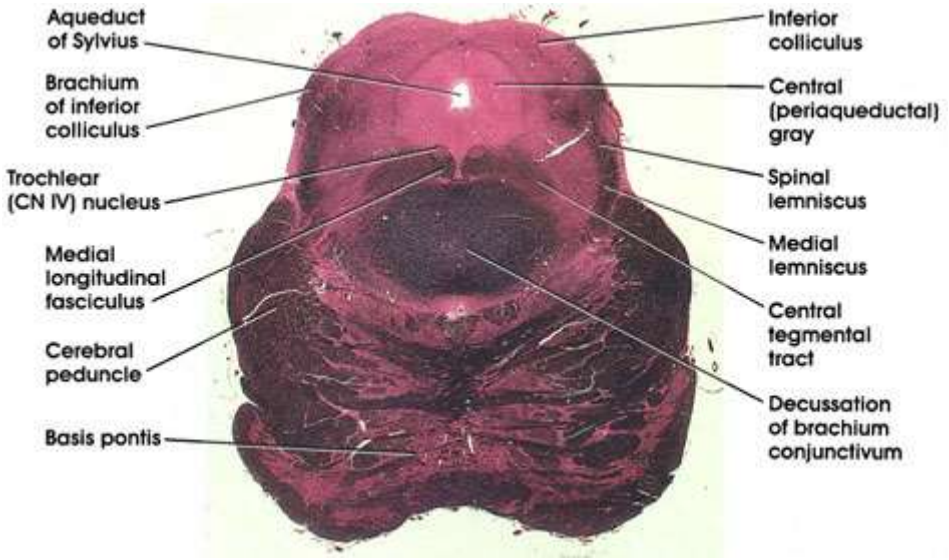
Tectum:

- **2 superior colliculi.**
- **2 inferior colliculi.**



Midbrain at the level of the inferior colliculus (lower level)

Inferior colliculus

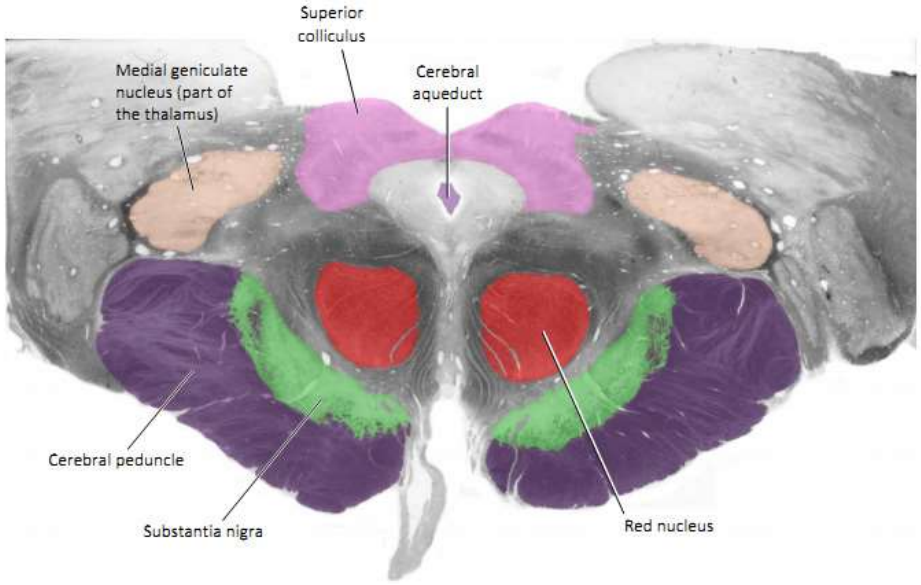


- ❑ Cerebral aqueduct
- ❑ **Inferior colliculus**
- ❑ Mesencephalic nucleus of trigeminal
- ❑ **Trochlear nucleus**
- ❑ MLB & MTS
- ❑ Decussation of superior cerebellar peduncle
- ❑ Medial lemniscus
- ❑ Spinal lemniscus
- ❑ **Lateral lemniscus ????**
- ❑ **Substantia nigra**
- ❑ **Crus cerebri**

Corticobulbar and Corticospinal N.

Midbrain Level of: Superior Colliculus

Superior colliculus



- ❑ Superior colliculus
- ❑ **The mesencephalic nucleus of trigeminal (5th)**
- ❑ **Oculomotor nucleus**
- ❑ **MLB & 3 lemnisci.**
- ❖ **NO Lateral Lemniscus**
- ❑ **The dorsal tegmental decussation of tecto-spinal tract.**
- ❑ **The ventral tegmental decussation of rubro-spinal tract.**
- ❑ **The red nucleus.**
- ❑ Substantia nigra
- ❑ Crus cerebri