SPINAL CORD

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Tutor
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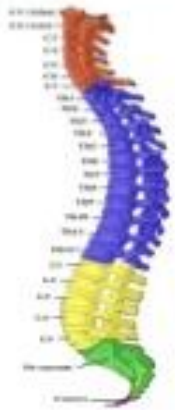
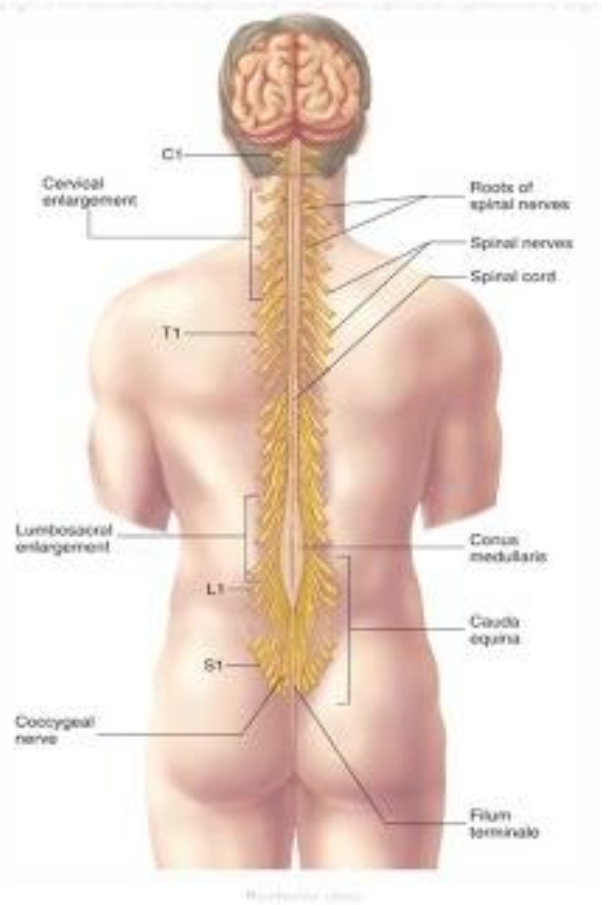
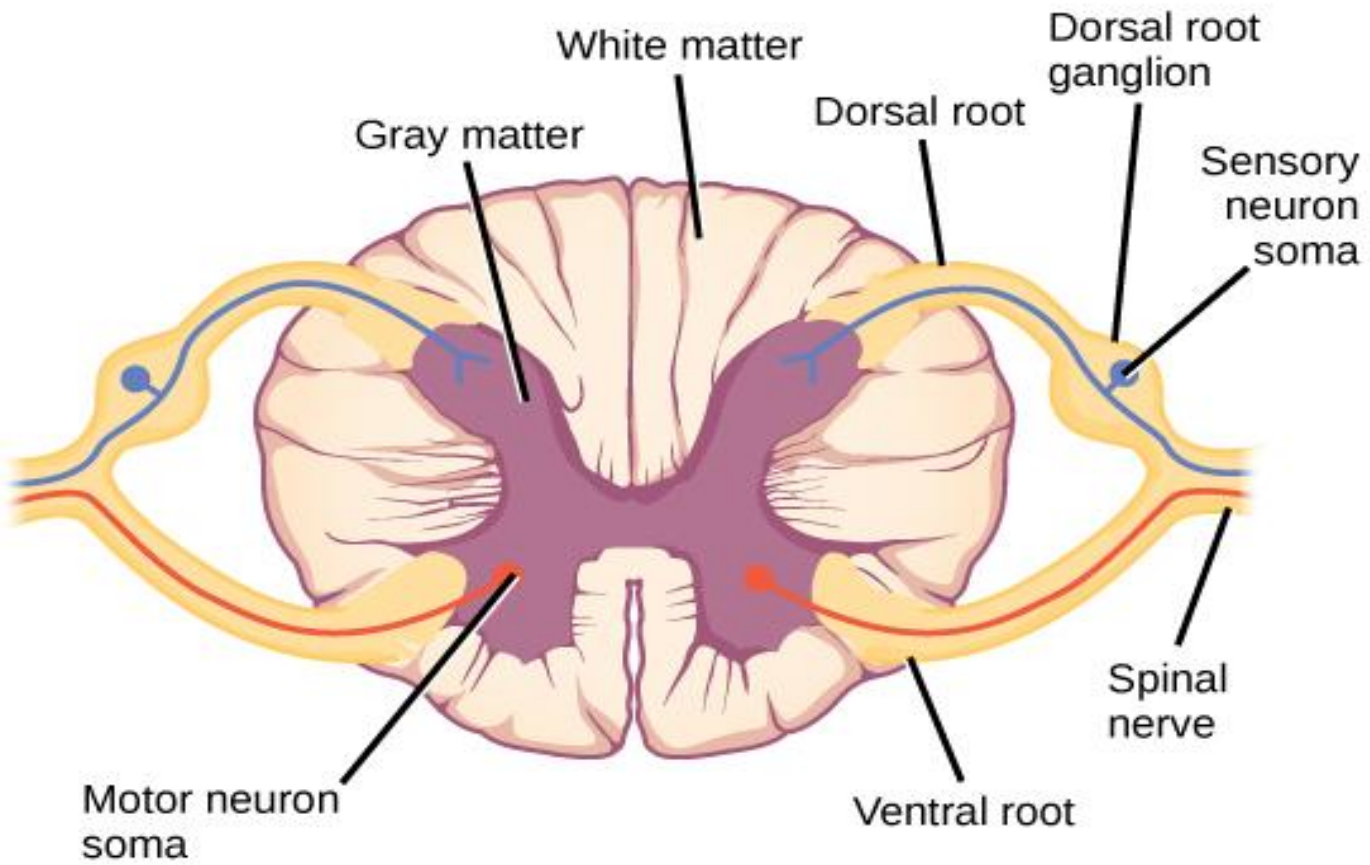
Spinal Cord

- Gives rise to 31 pairs of spinal nerves
- The bundle of spinal nerves extending inferiorly from *lumbosacral enlargement* and *conus medullaris* surround the *filum terminale* and form *cauda equina*
- Segmented
  - ✓ 8 Cervical
  - ✓ 12 Thoracic
  - ✓ 5 Lumbar
  - ✓ 5 Sacral
  - ✓ 1 Coccygeal
- Has two enlargements:
  - Cervical Enlargement: supplies upper limbs.
  - Lumbosacral Enlargement: supplies lower limbs.





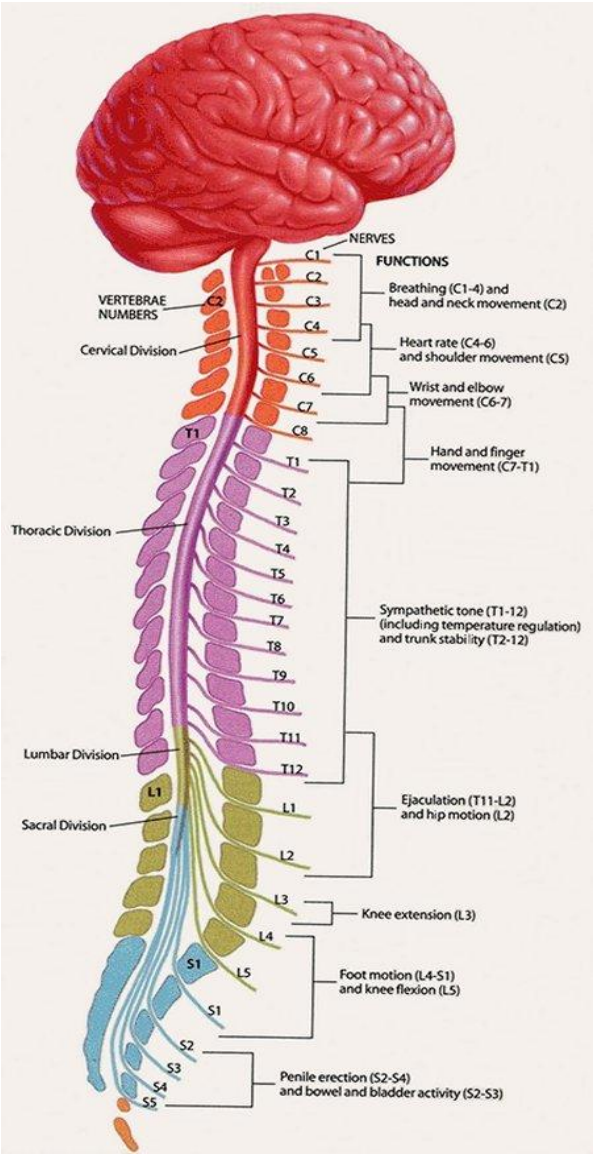
Spinal cord



Cross Section of Spinal Cord

Functions of spinal cord

- Sensory (conveys all sensations)
- Motor (power, tone of muscles, movements, reflexes)
- Autonomic (visceral reflexes)



Somatosensory system(Ascending tracts)

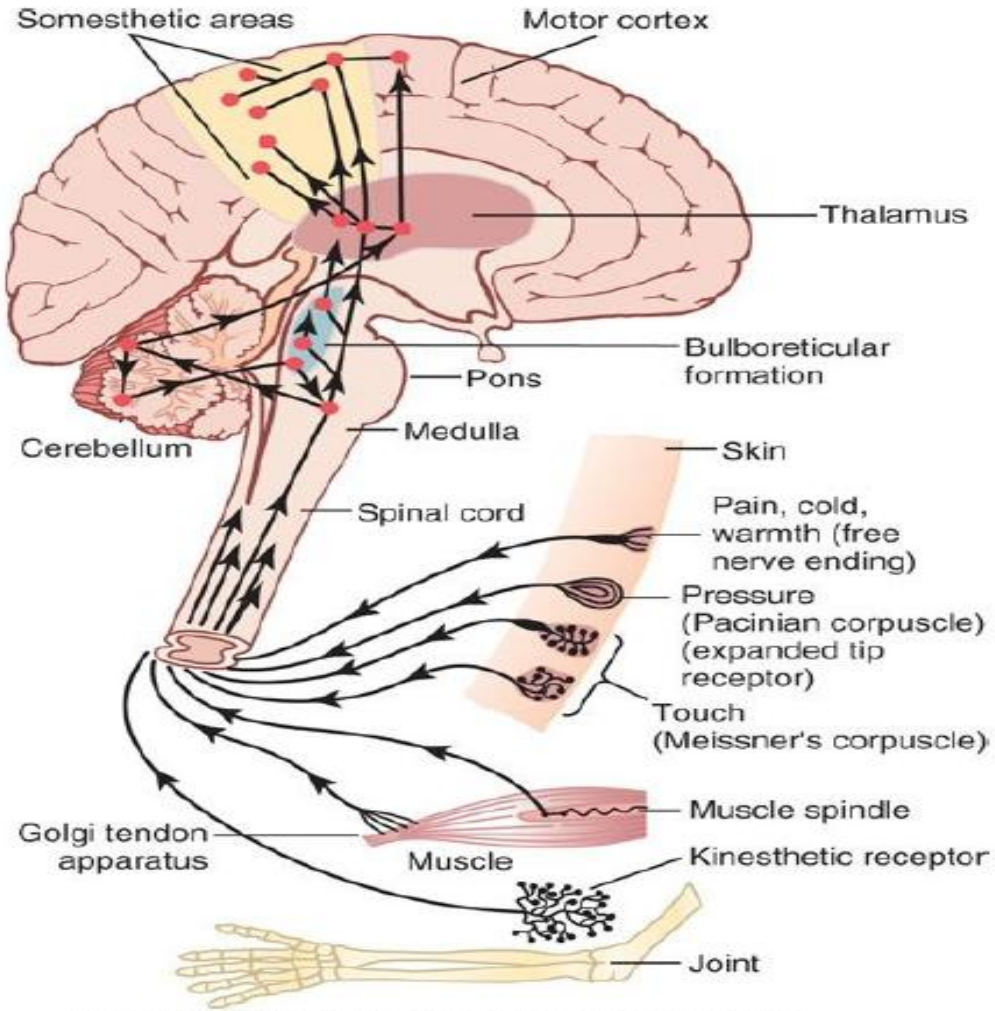
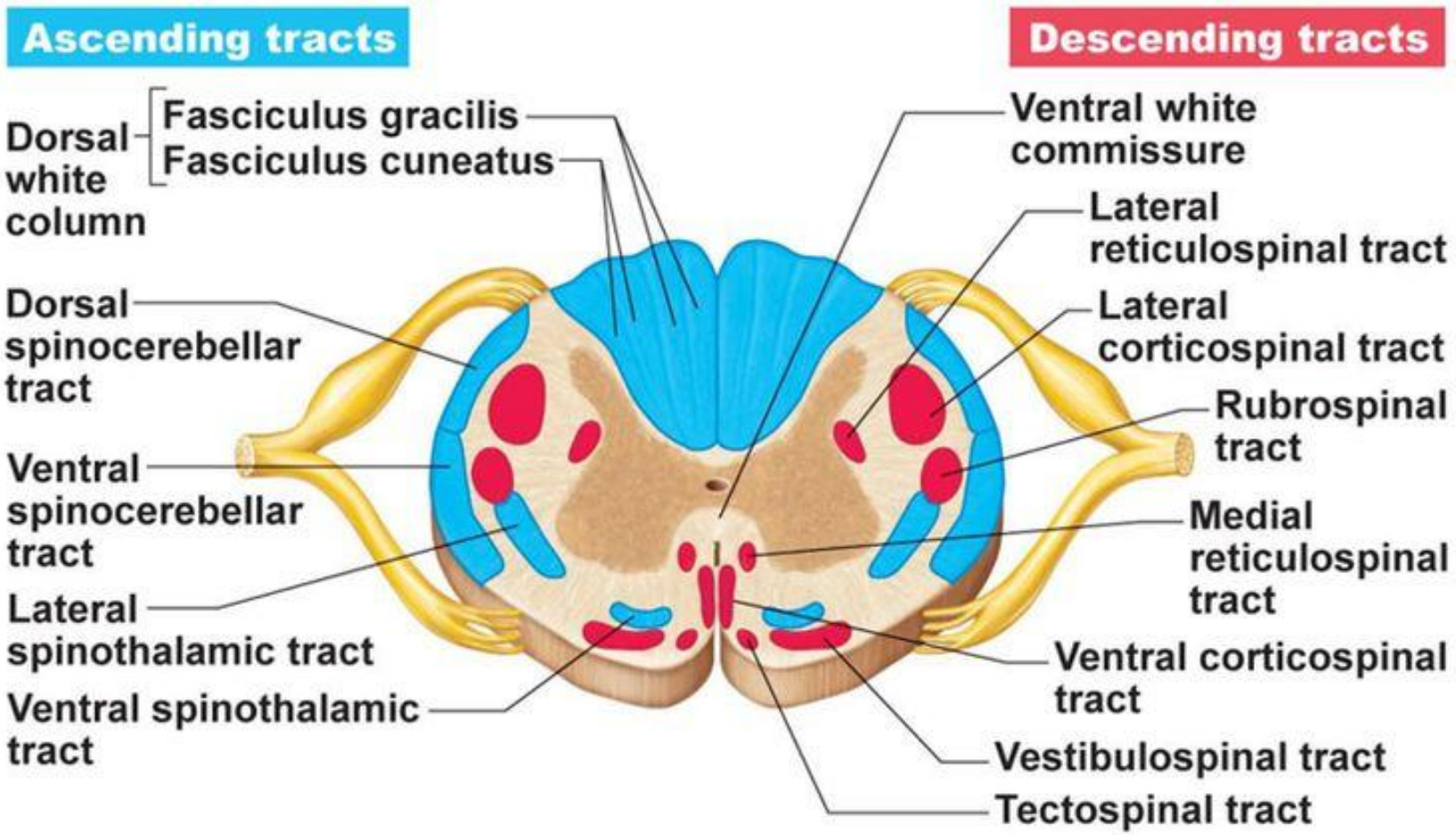


Figure 45-2 Somatosensory axis of the nervous system

Tracts


Ascending tracts
Descending tracts
Dorsal white column
Fasciculus gracilis
Fasciculus cuneatus
Dorsal spinocerebellar tract
Ventral spinocerebellar tract
Lateral spinothalamic tract
Ventral spinothalamic tract
Ventral white commissure
Lateral reticulospinal tract
Lateral corticospinal tract
Rubrospinal tract
Medial reticulospinal tract
Ventral corticospinal tract
Vestibulospinal tract
Tectospinal tract

Sensory tracts

- Ascending tracts carry group of sensory fibres from the receptor to the CNS.
- **<u>Important tracts in spinal cord:-</u>**

➢Tracts in ***dorsal*** white column-

- ➢ Fasciculus gracilis
- ➢ Fasciculus cuneatus

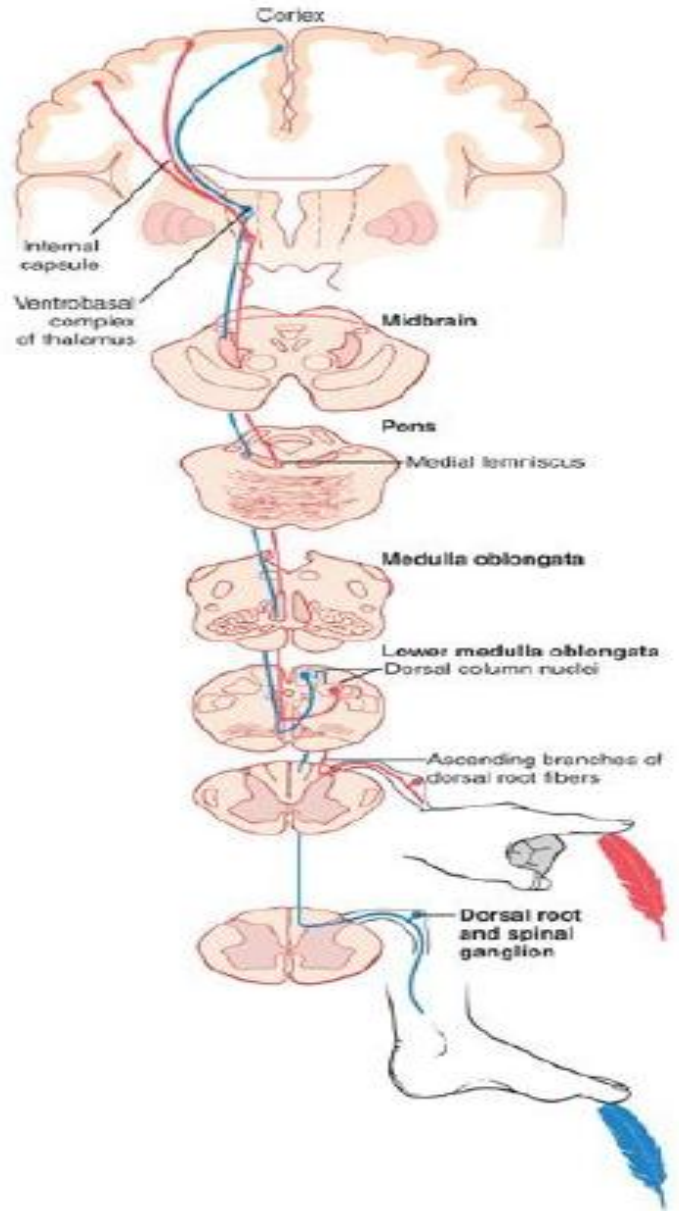
➢Tracts in ***lateral*** white column-

- ➢ Lateral spinothalamic tract
- ➢ Dorsal & ventral spinocerebellar tract

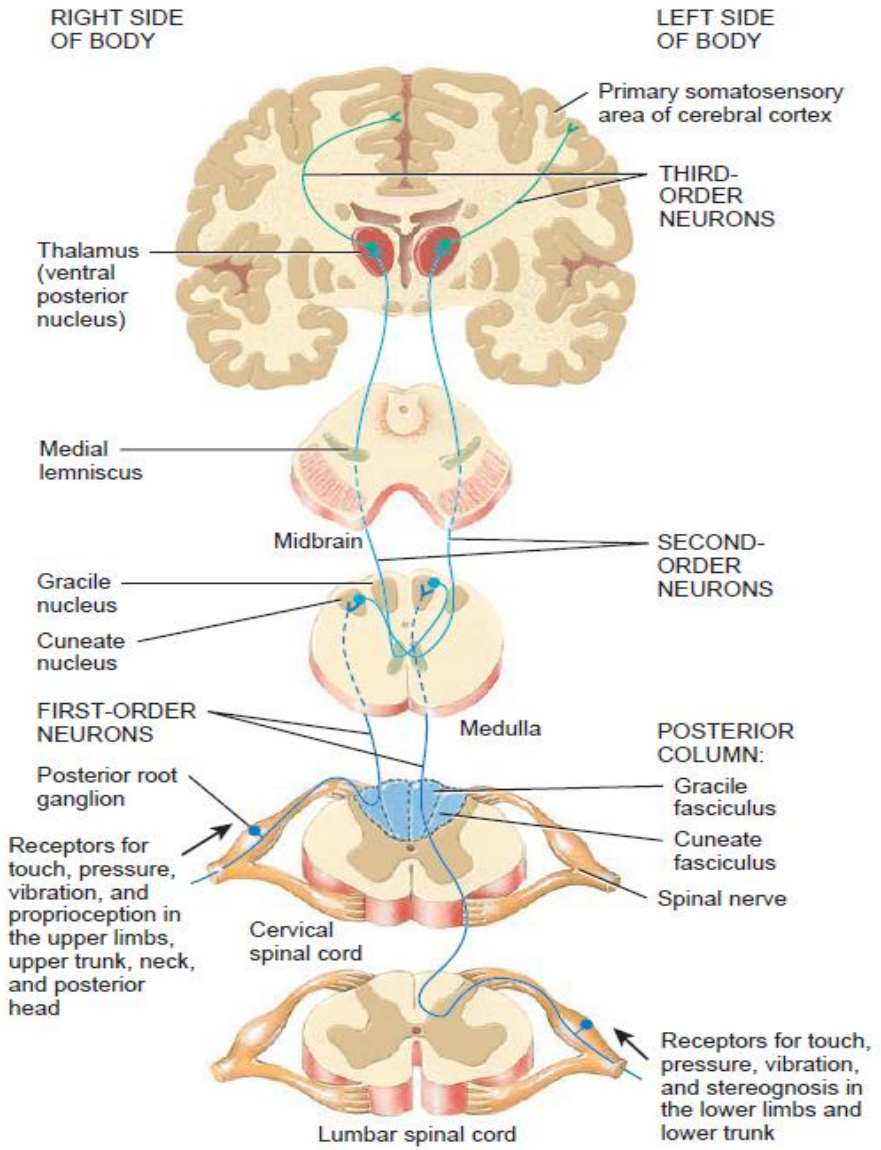
➢Tracts in ***ventral*** white column-

- ➢ Ventral spinothalamic tract

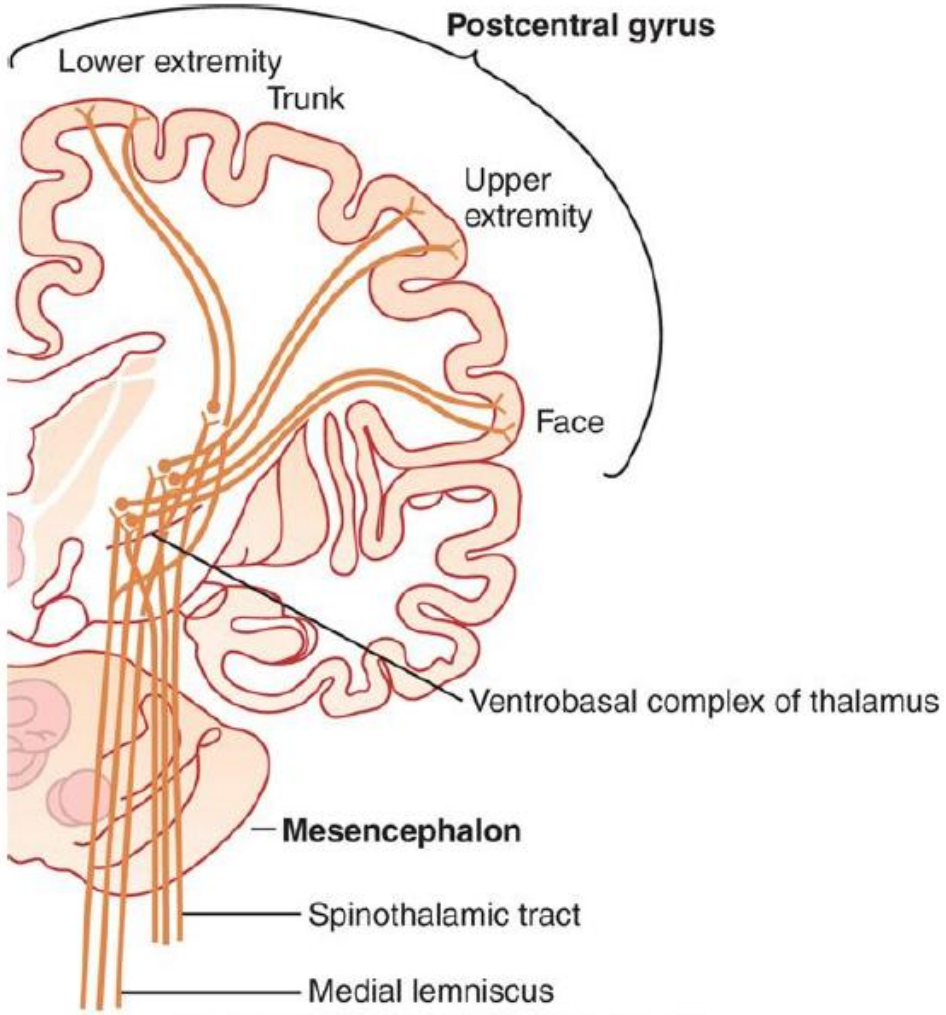
Dorsal column-medial lemniscus pathway



Dorsal column-medial lemniscus pathway



Dorsal column-medial lemniscus pathway

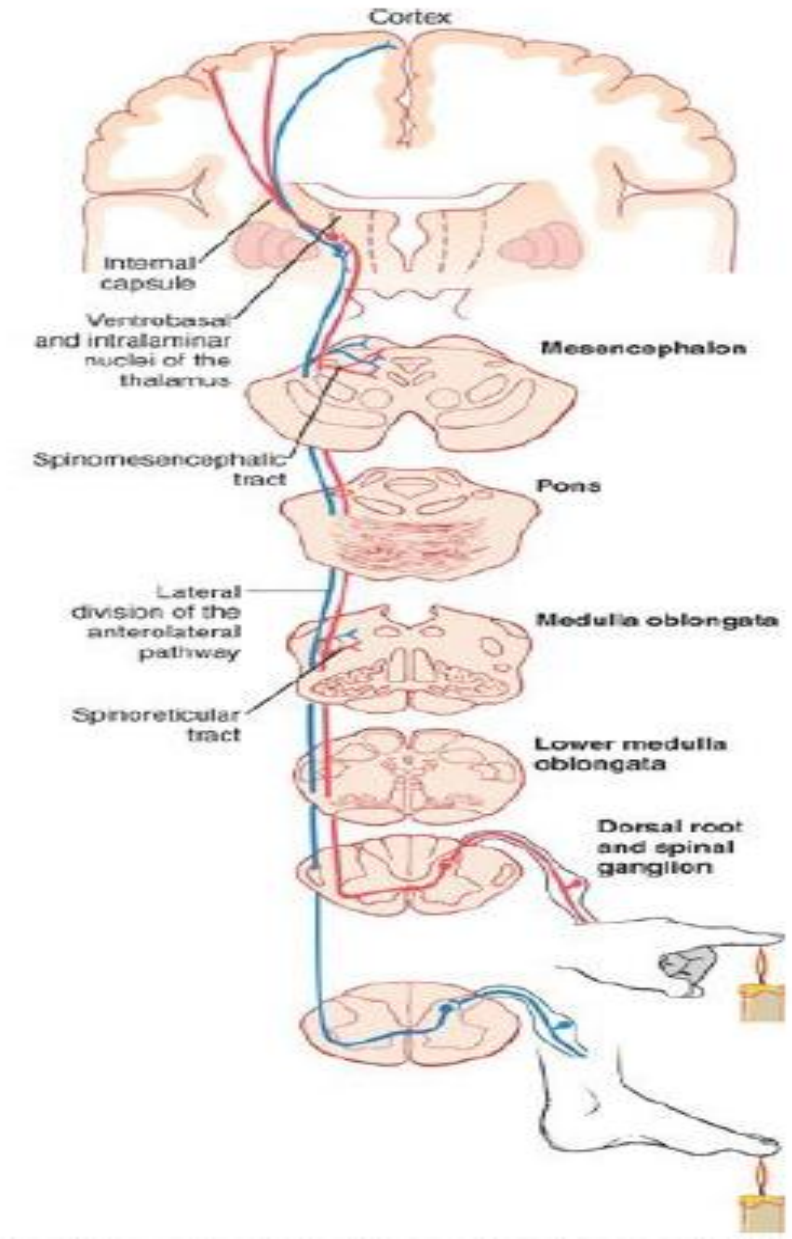


functions

It conveys to higher centre:-

- Fine touch
- Tactile localization & discrimination
- Vibration sense
- Proprioceptive and kinesthetic sensation
- Sense of deep pressure
- Stereognosis

Anterolateral sensory pathway



functions

<u>Anterior (ventral) spinothalamic tract</u>:-

It conveys

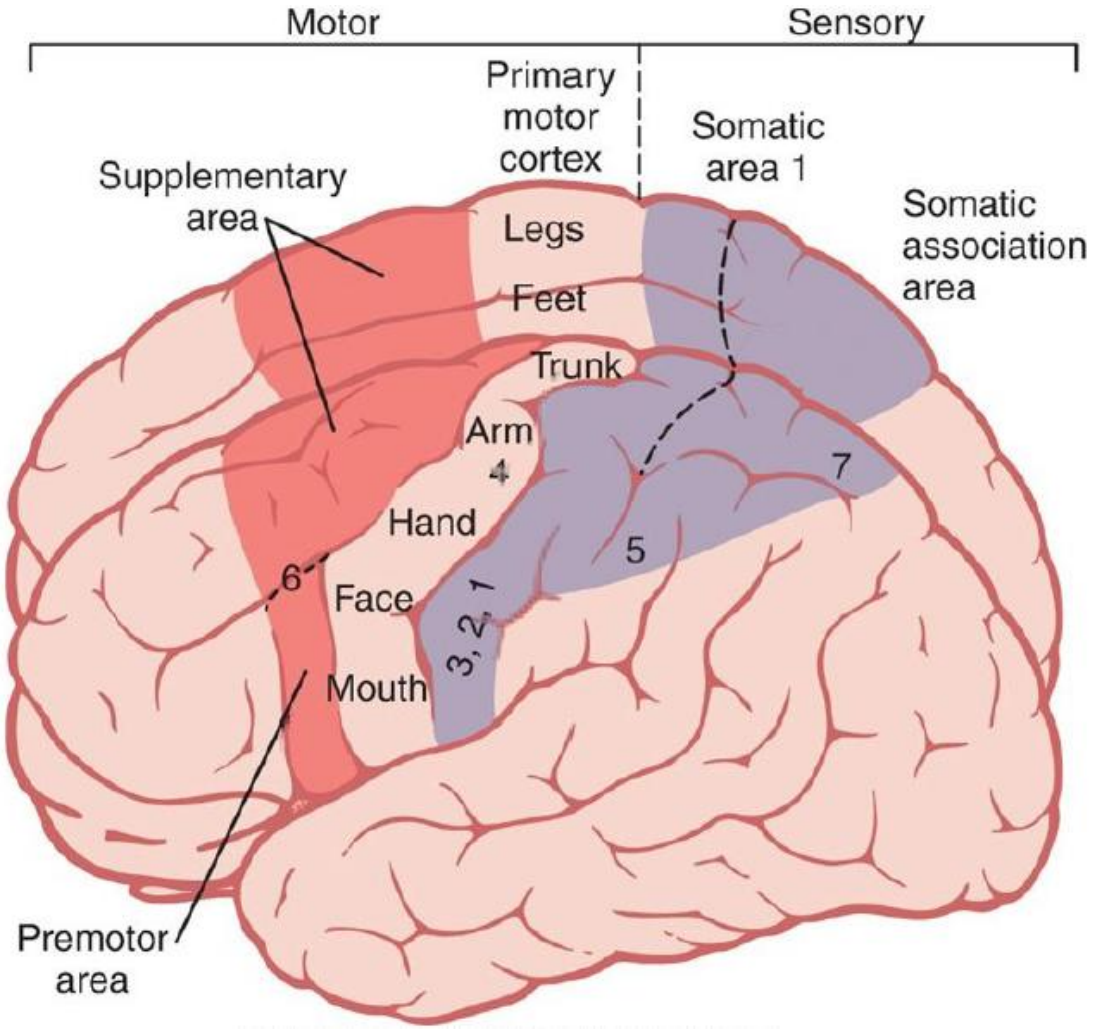
- Gross(crude) touch sensation
- Tactile localization

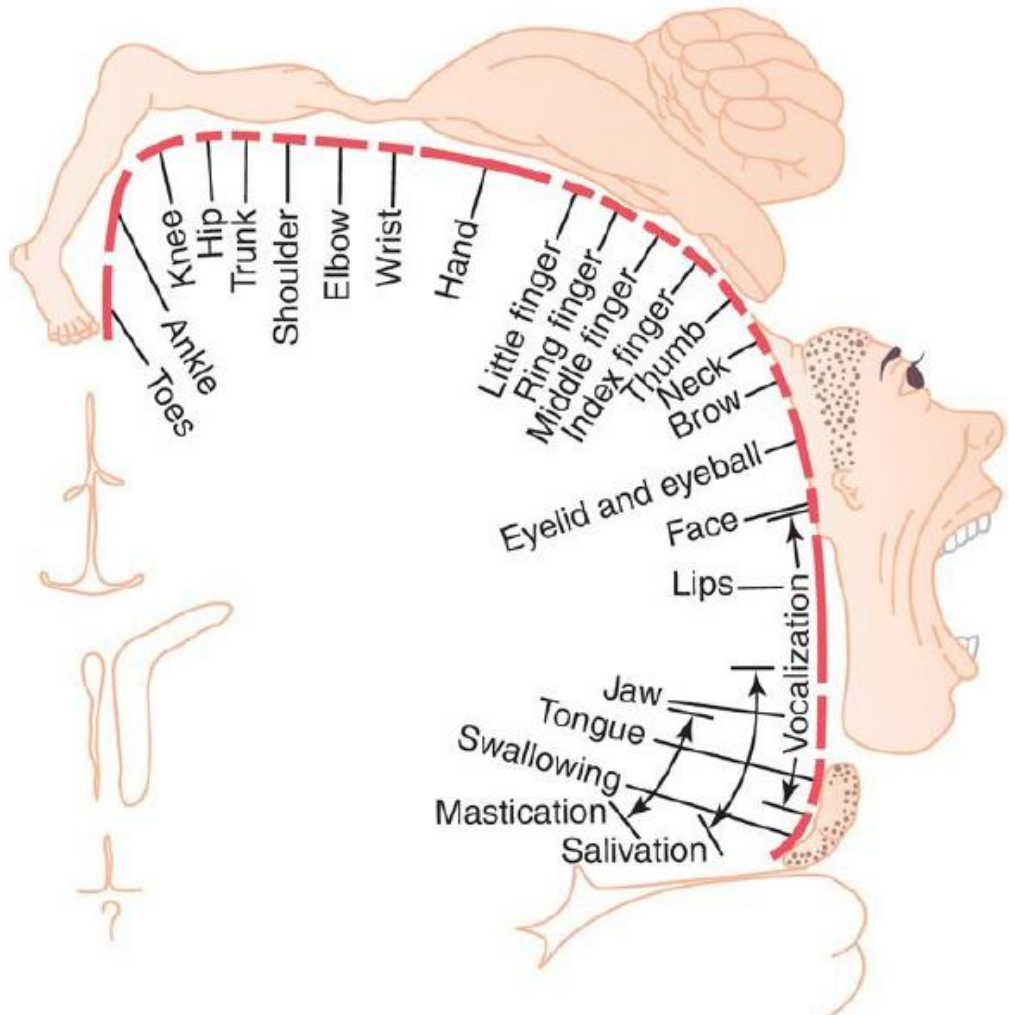
<u>Lateral spinothalamic tract</u>:-

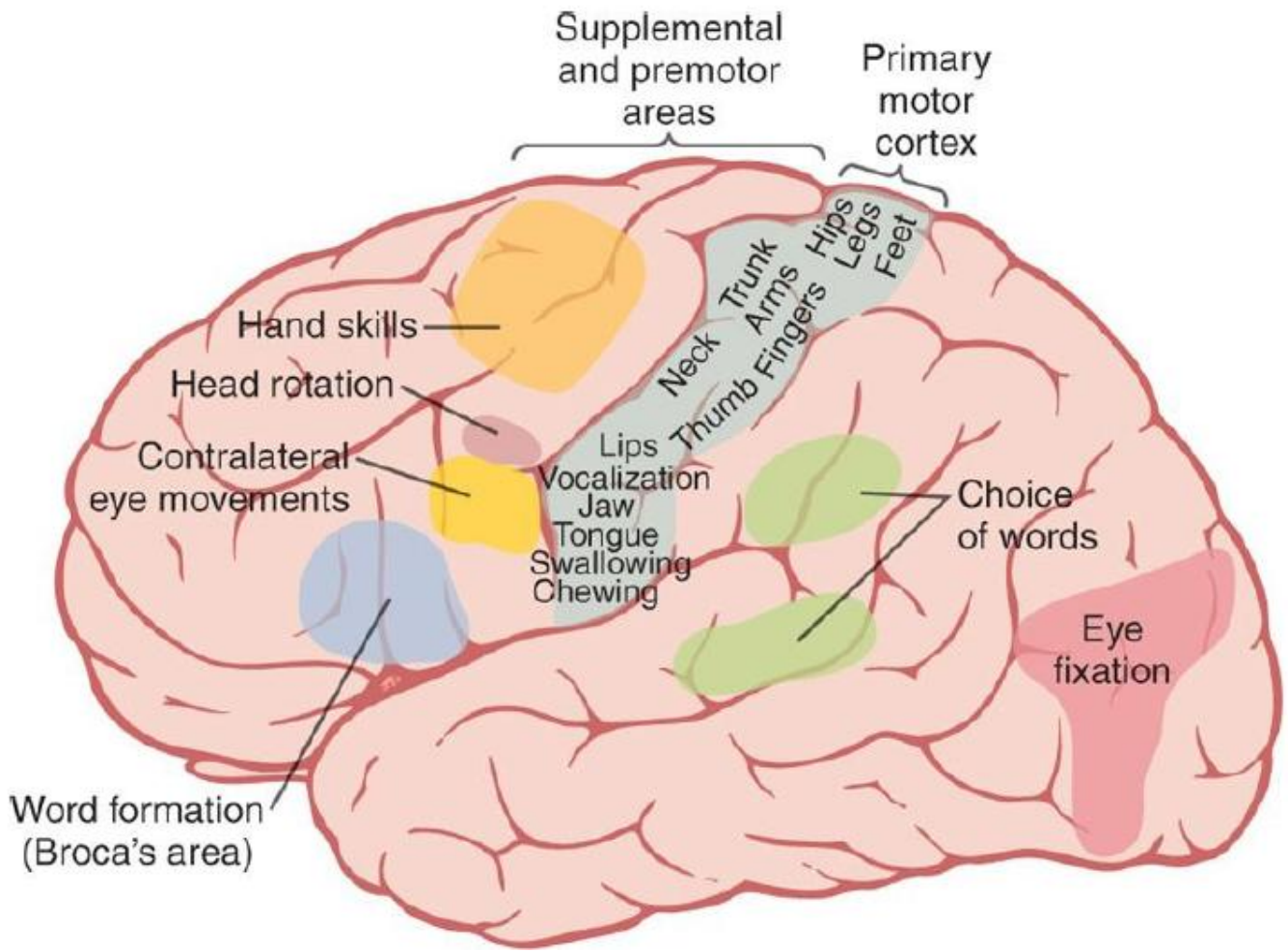
It transmits

- Pain
- temperature

Descending (motor) tracts




Toes
Ankle
Knee
Hip
Trunk
Shoulder
Elbow
Wrist
Hand
Little finger
Ring finger
Middle finger
Index finger
Thumb
Neck
Brow
Eyelid and eyeball
Face
Lips
Jaw
Tongue
Swallowing
Mastication
Salivation
Vocalization


Supplemental and premotor areas
Primary motor cortex
Hips
Legs
Feet
Trunk
Arms
Fingers
Thumb
Neck
Hand skills
Head rotation
Contralateral eye movements
Lips
Vocalization
Jaw
Tongue
Swallowing
Chewing
Choice of words
Eye fixation
Word formation (Broca's area)

Major descending pathways

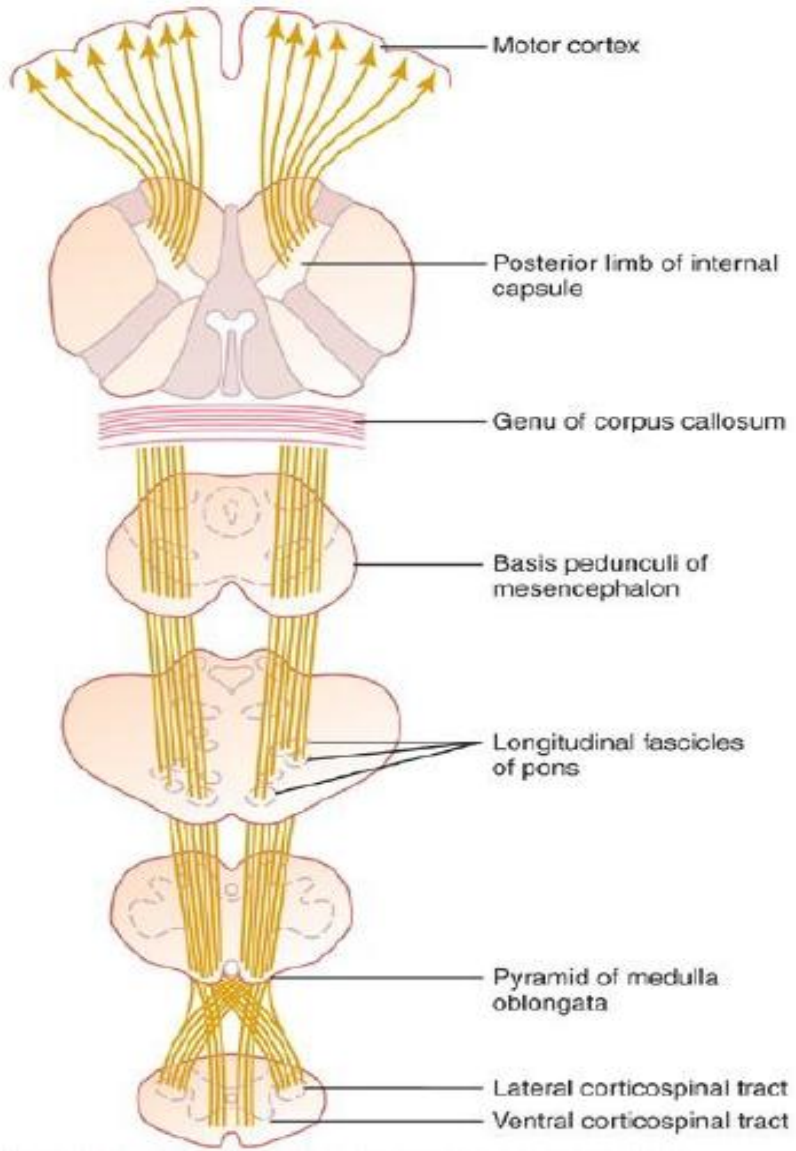
Pyramidal tracts

- Corticospinal
- Corticobulbar

Extrapyramidal tracts:-

- Rubrospinal (red nucleus)
- Tectospinal (superior colliculus)
- Tectobulbar (superior colliculus)
- Reticulospinal (reticular formation)
- Vestibulospinal (vestibular nuclei)

Pyramidal tracts



Functions of pyramidal tracts

- Corticospinal tracts

Lateral anterior

- Corticobulbar tracts

Corticospinal tracts

Lateral

- Control voluntary movements of *distal* limb muscles
- Concerned with *fine*, precise movements of fingers & hands to carry out skilled work

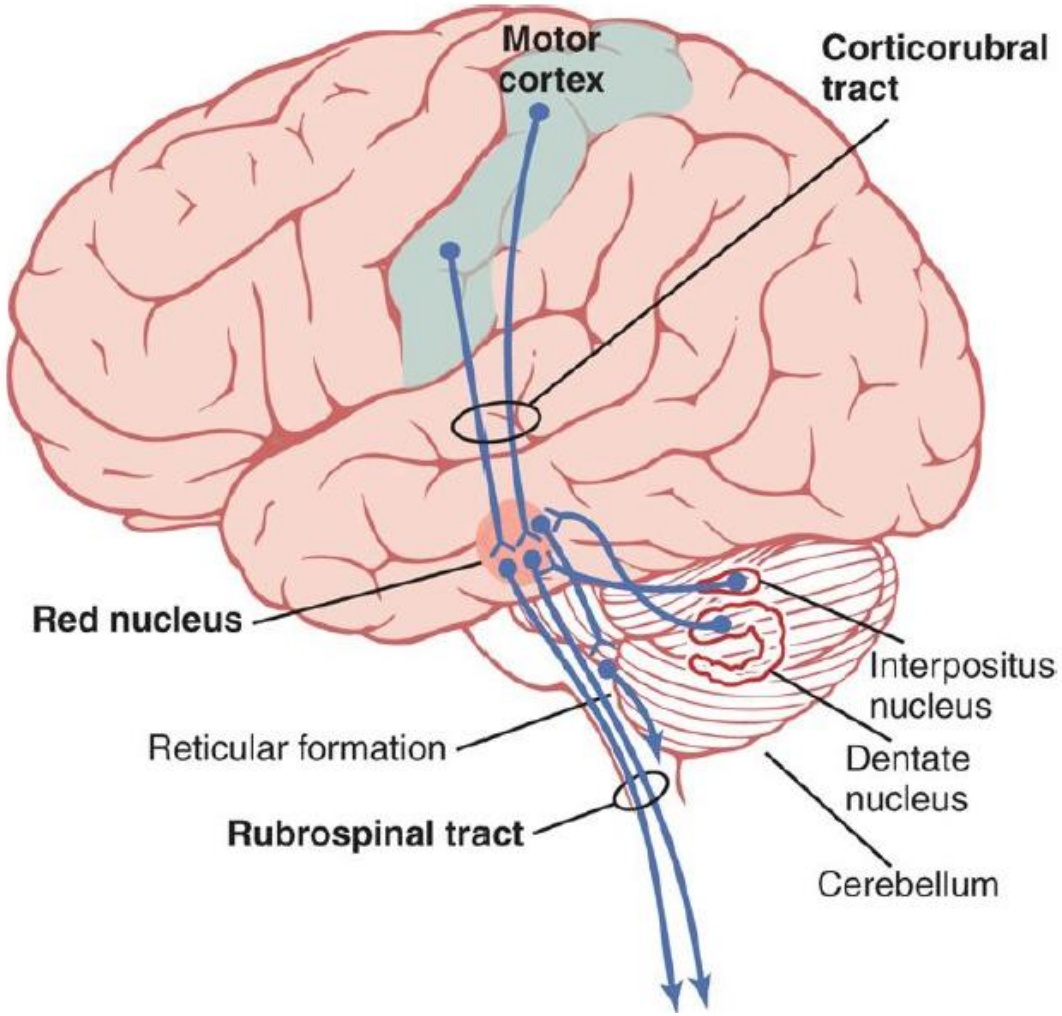
Anterior

- Control voluntary movements of *proximal* limb muscles
- Concerned with *gross* movements of trunk and *posture* adjustments

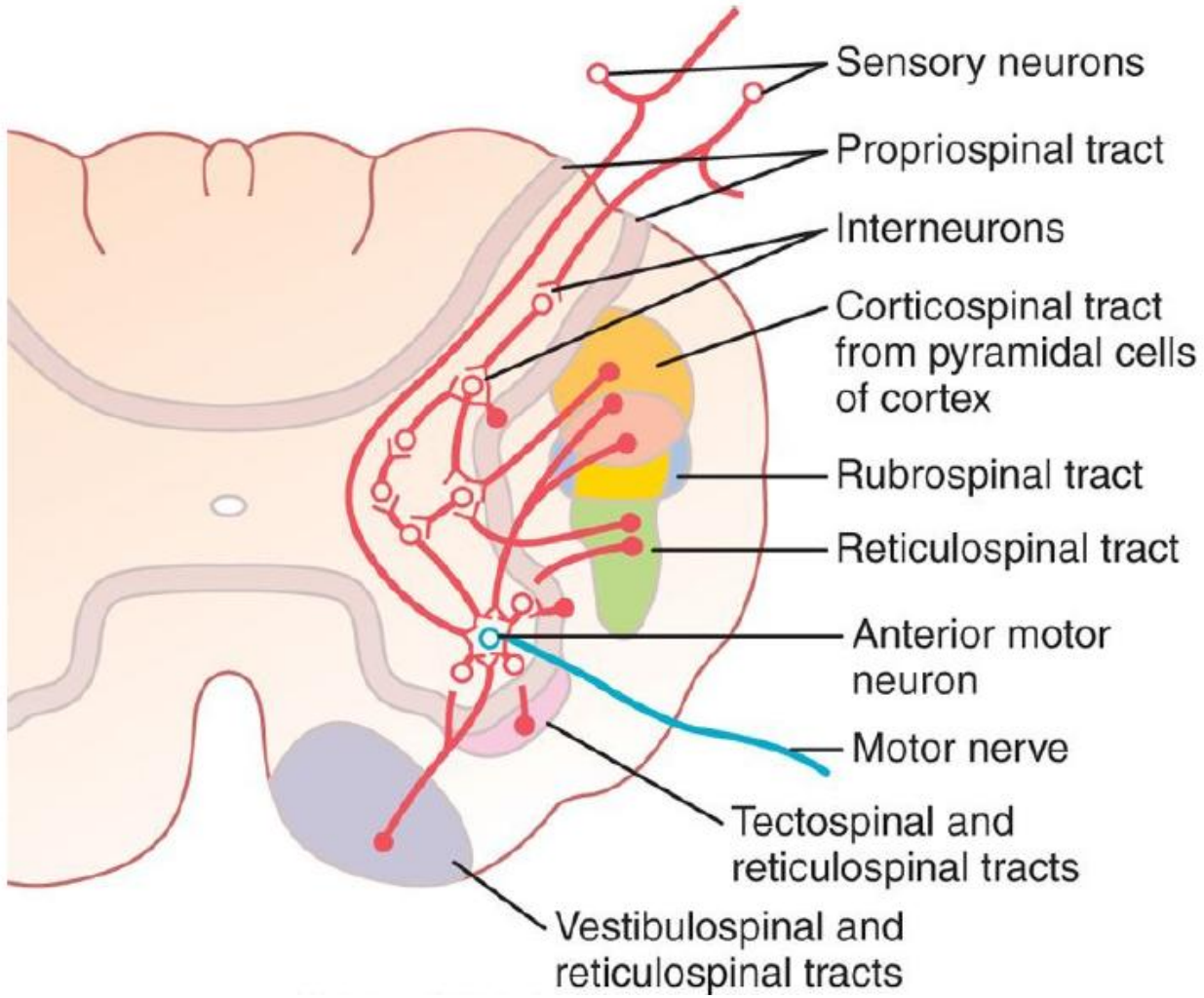
Corticobulbar tracts

- Voluntary control of muscles of larynx, pharynx, palate, face, jaw, eye etc.

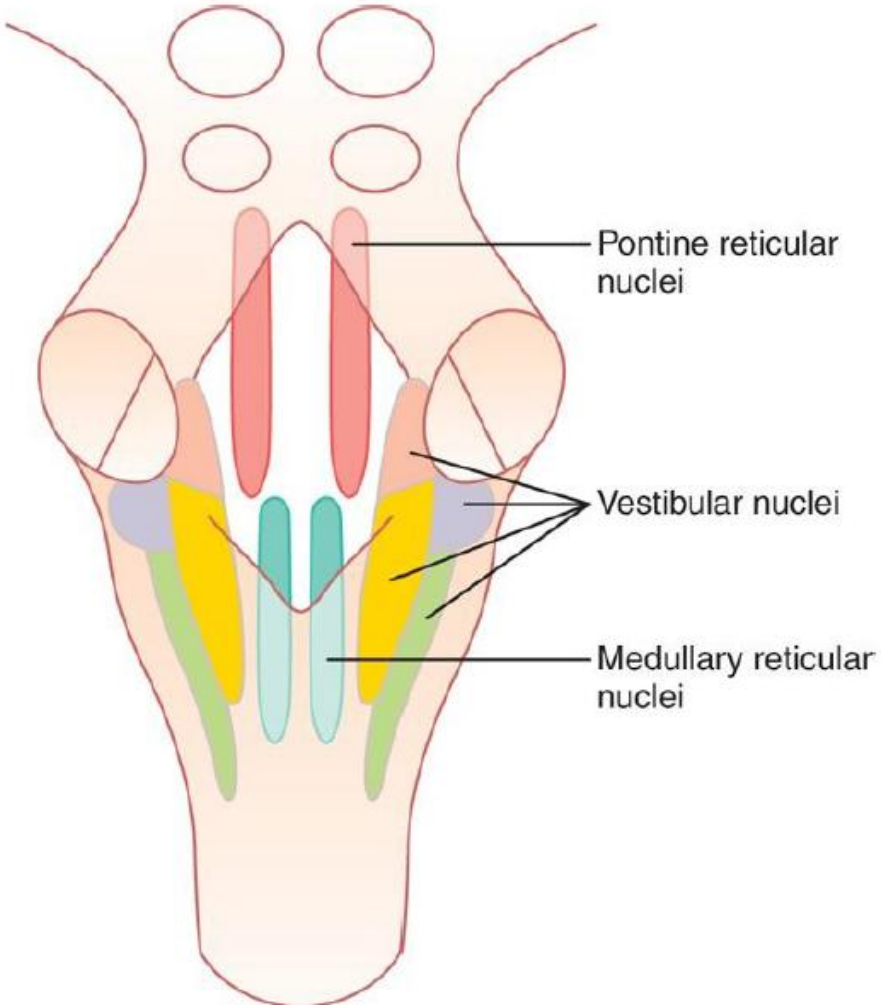
Extrapyramidal tracts



Extrapyramidal tracts



Extrapyramidal tracts



Functions of extrapyramidal tracts

- Control of tone, posture and equilibrium (Rubrospinal-tone, Tectospinal-posture, Vestibulospinal-equilibrium)
- Control complex movements of body (like walking)
- Control of movements of eye balls(Corticobulbar)
- Tonic inhibitory control over lower centres
- If pyramidal tracts are damaged, they carry out voluntary movements to some extent