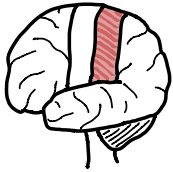


Somatosensory & Motor

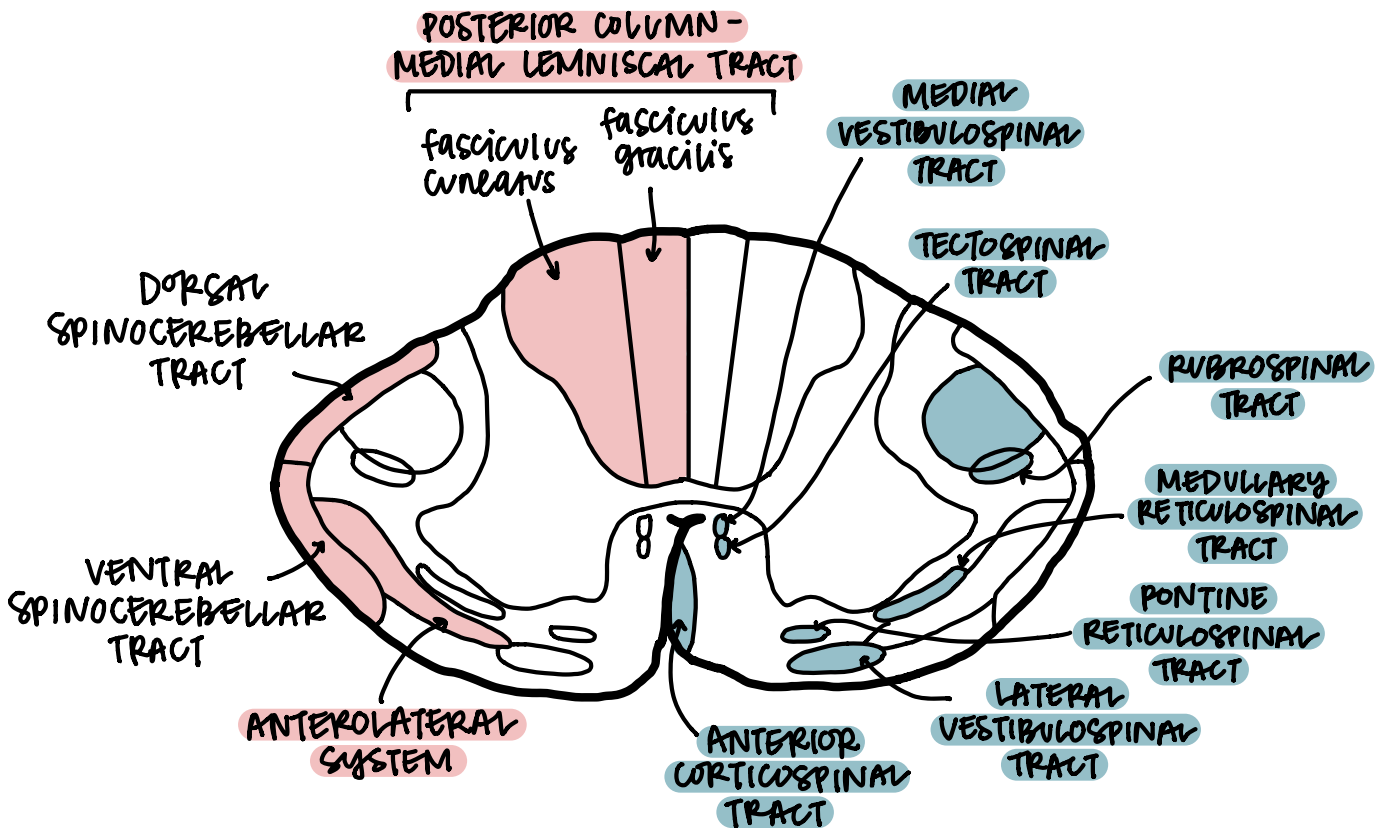


TRACTS

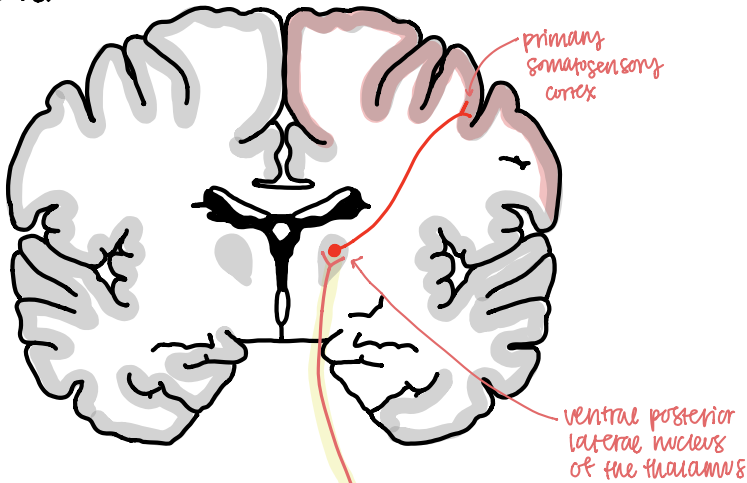


ASCENDING PATHWAYS

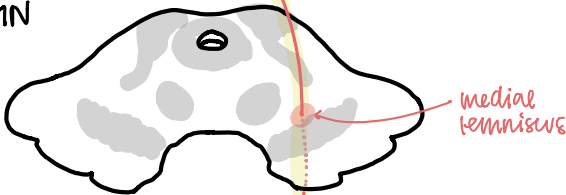
DESCENDING PATHWAYS



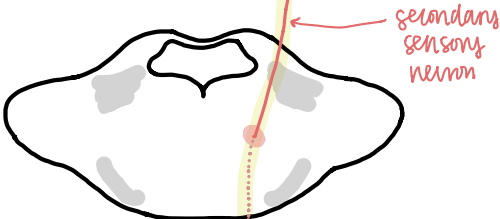
CORTEX



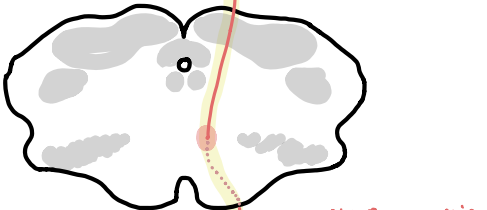
MIDBRAIN



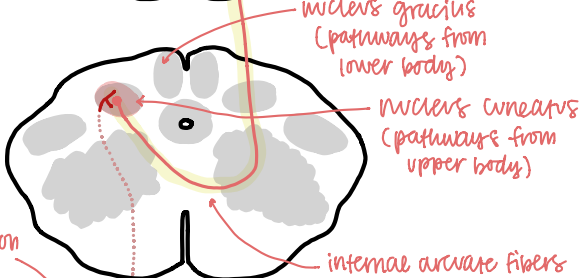
PONS



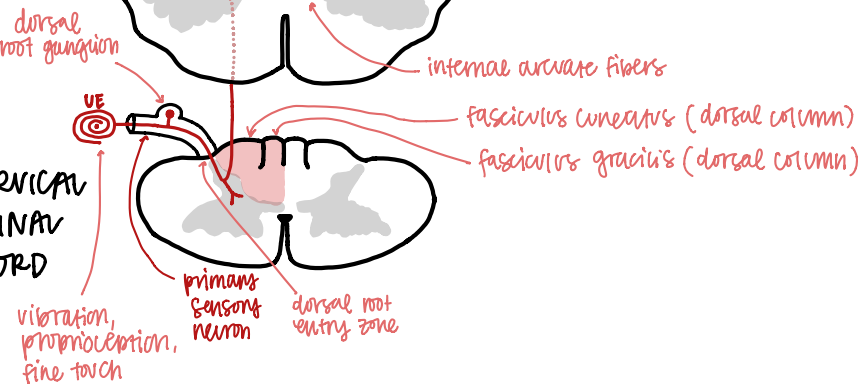
MEDULLA



CAUDAL MEDULLA



CERVICAL SPINAL CORD



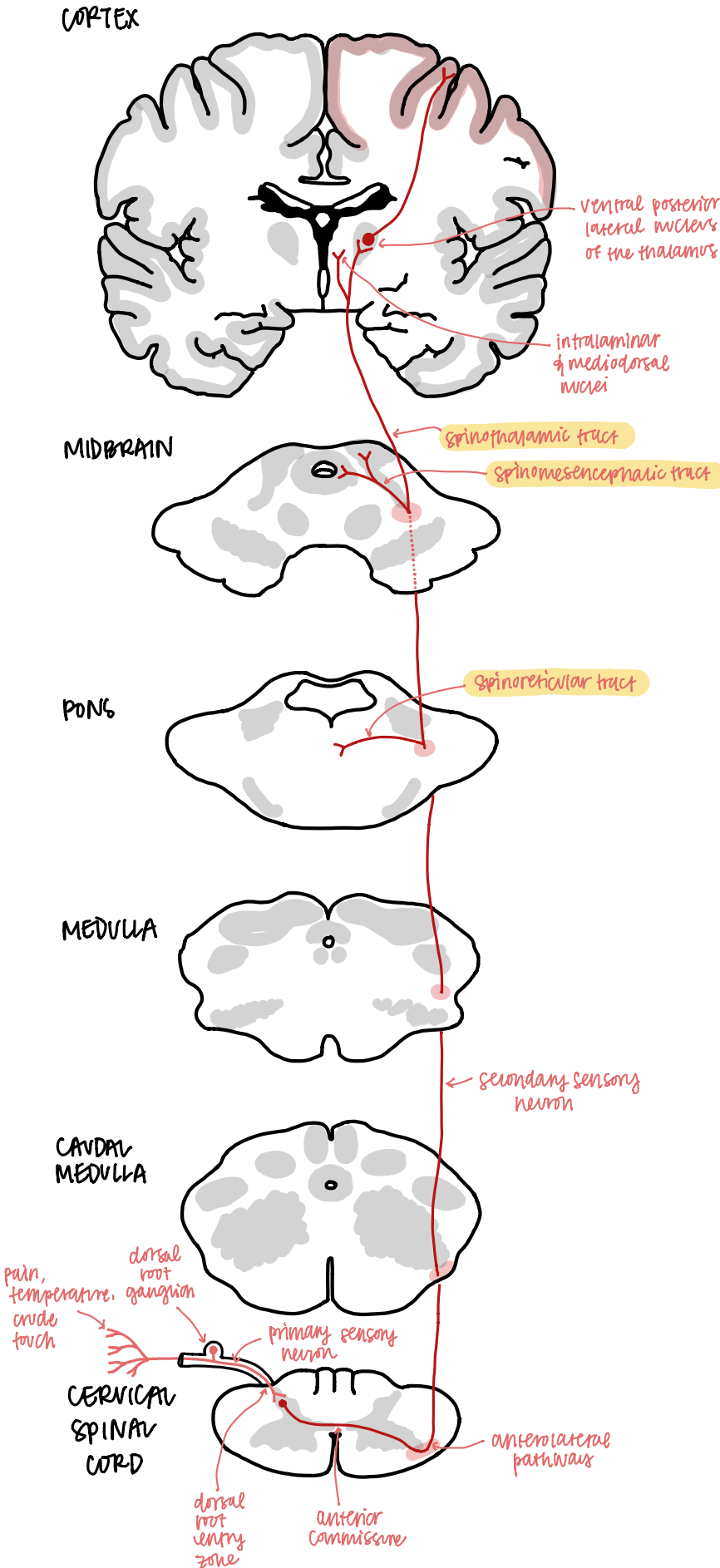
POSTERIOR COLUMN - MEDIAL LEMNISCAL PATHWAY

- large diameter, myelinated axons
- originates at primary somatosensory cortex
- decussates at internal arcuate fibers (lower medulla)
- neurons that go to the nucleus cuneatus & fasciculus cuneatus go to the upper extremities
↳ terminate in cervical spinal cord
- neurons that go to the nucleus gracilis & fasciculus gracilis go to the lower extremities
↳ terminate in lumbar spinal cord

RESPONSIBLE FOR:

- vibration
- proprioception
- fine touch

* also known as DCLM or dorsal column medial lemniscal pathway



ANTEROLATERAL SYSTEM

- smaller diameter, unmyelinated axons
- originates at the primary somatosensory cortex
- decussation at the anterior commissure (spinal cord)
- terminates throughout spinal cord
 - ↳ cervical : UE
 - ↳ lumbar : LE
- includes :
 - ↳ **spinothalamic tract**: localization and intensity of stimuli
 - spinal cord → thalamus
 - ↳ **spinomesencephalic tract**: modulation of pain
 - spinal cord → midbrain
 - ↳ **spinoreticular tract**: emotion & arousal
 - spinal cord → reticular formation

RESPONSIBLE FOR:

- pain
- temperature
- crude touch

- ex) step on a thumb tack:
- realize something sharp puncturing your foot
 - ↳ spinothalamic
 - "ouch, that hurts"
 - ↳ spinoreticular
 - "ah, that feels better" (pain modulation)
 - ↳ spinomesencephalic

Lateral motor systems

LATERAL CORTICOSPINAL TRACT

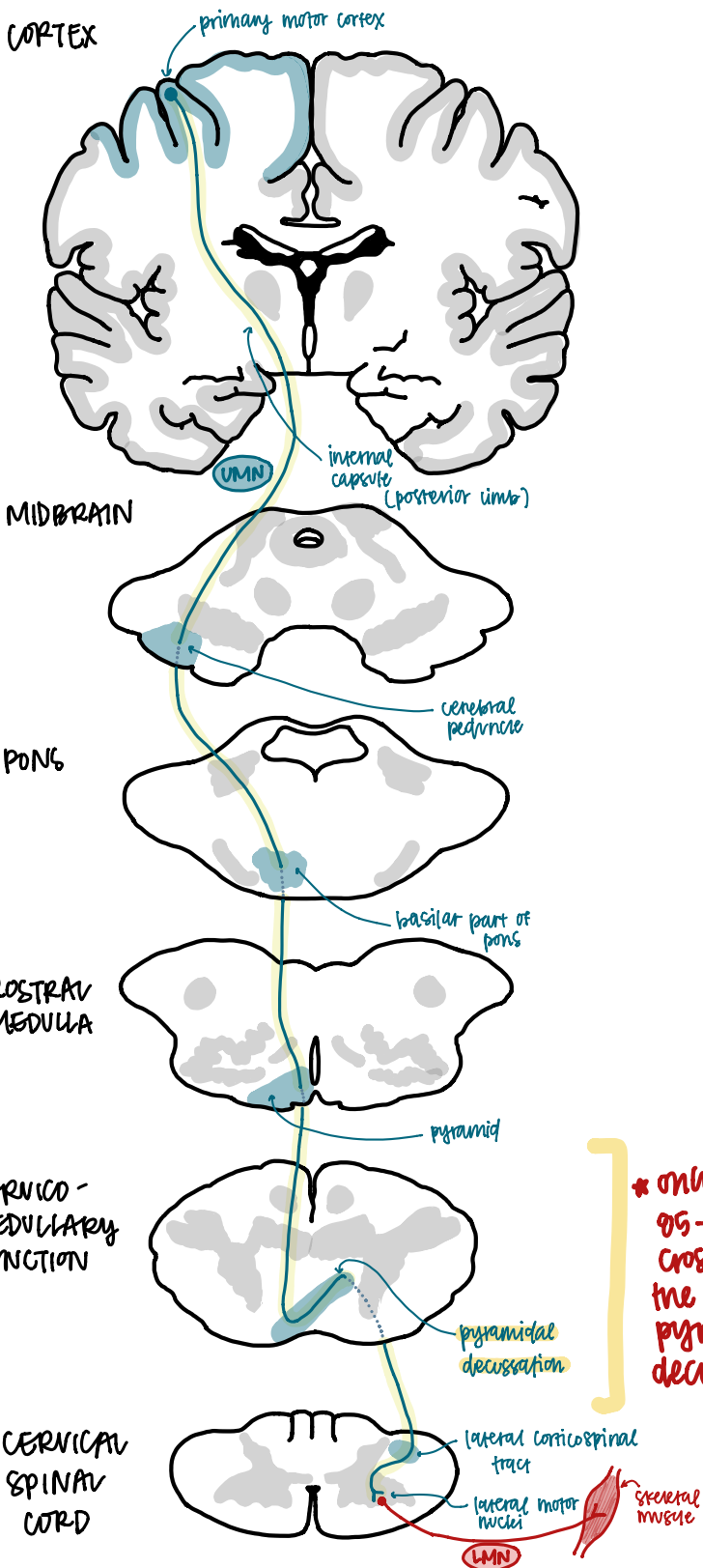
- most clinically important descending motor pathway
- most fibers originate in primary motor cortex (BA 4)
- terminates in entire cord

RESPONSIBLE FOR:

- controlling voluntary, fine, skilled movements of contralateral extremities

LESIONS:

- ↳ above decussation = contralateral weakness
- ↳ below decussation = ipsilateral weakness
- ↳ UMN lesion:
 - weakness
 - hyperreflexia
 - increased tone / spasticity
- ↳ LMN lesion:
 - muscle atrophy
 - fasciculations
 - hyporeflexia
 - decreased tone



Lateral motor systems

RUBROSPINAL TRACT

- originates at red nucleus of midbrain
- decussates immediately
- involved in movement of contralateral limbs
- terminates in cervical cord

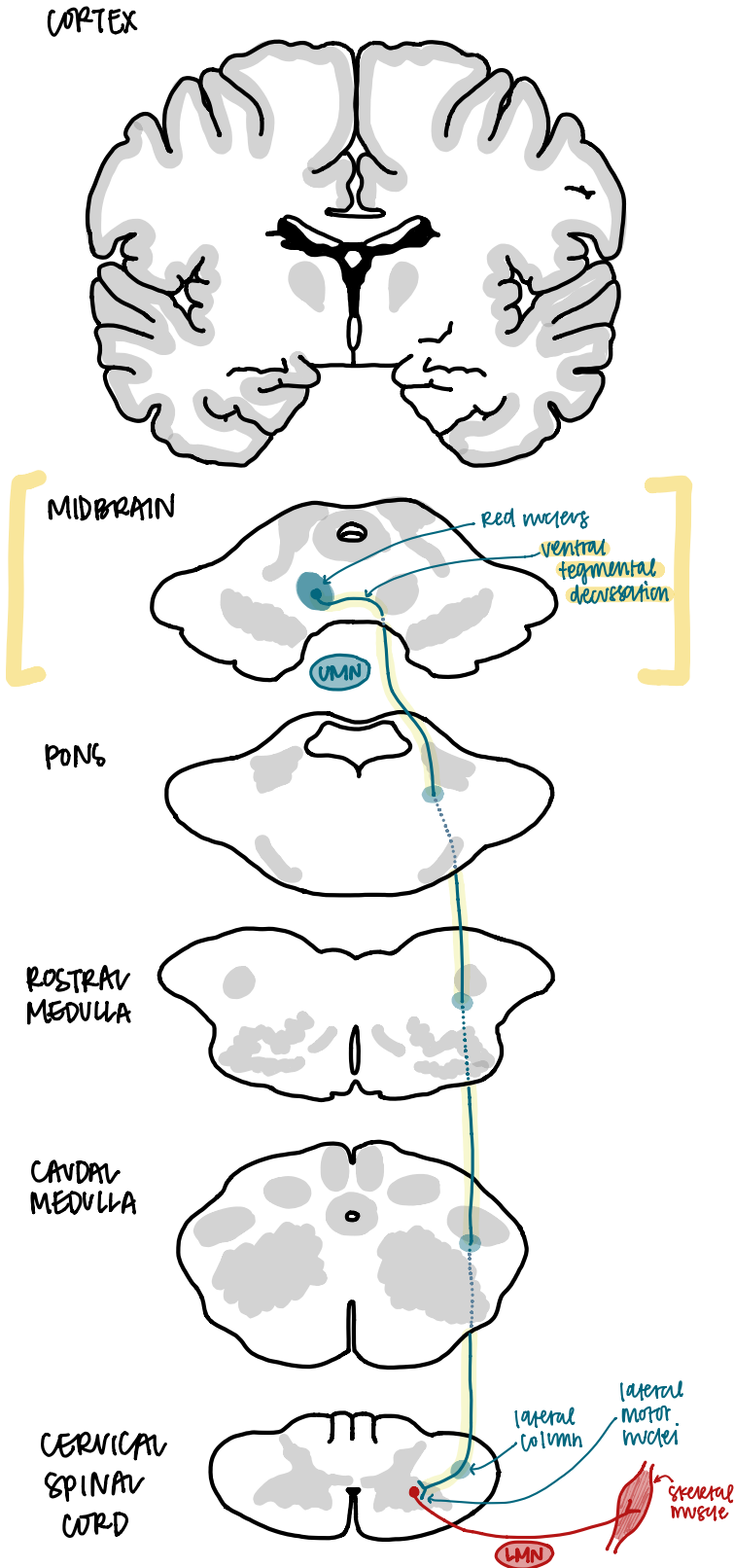
* function is uncertain in humans

RESPONSIBLE FOR:

- movement of contralateral limbs

LESIONS:

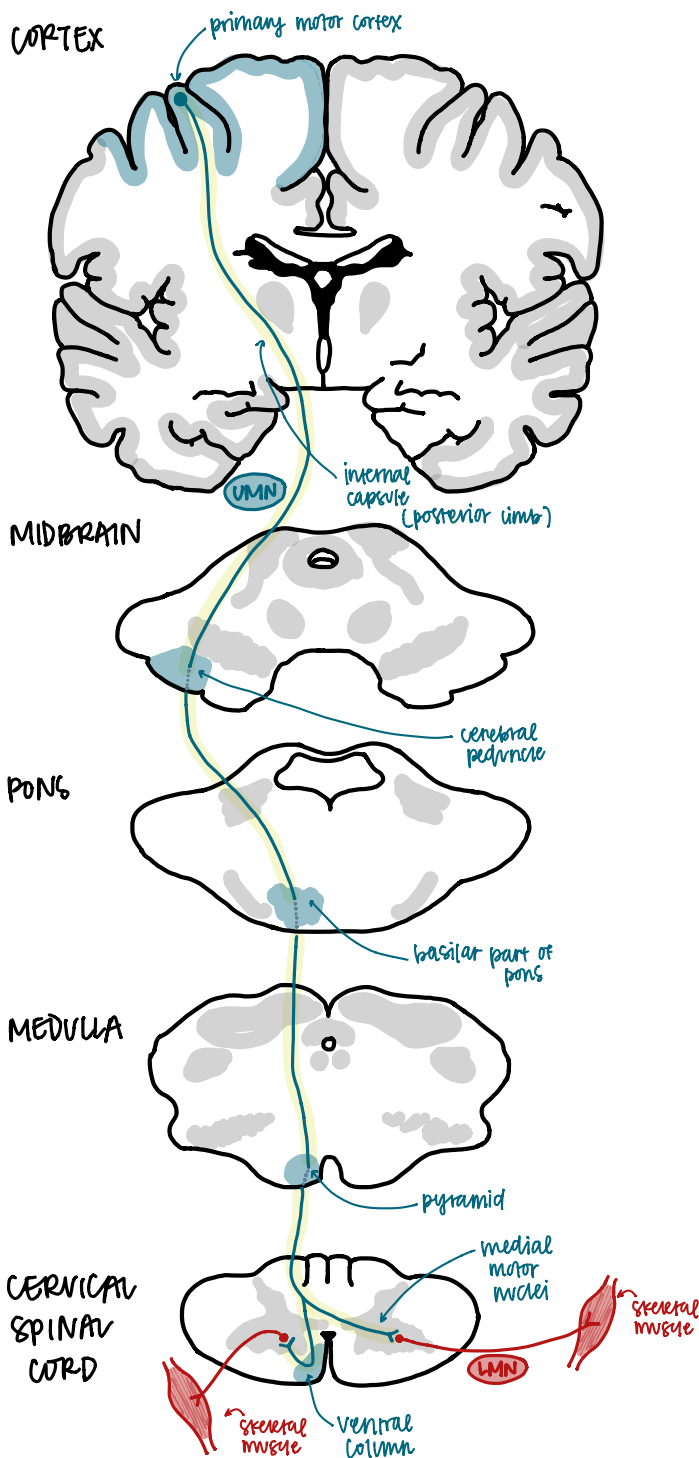
↳ lesion to one entire half of midbrain = bilateral deficits



medial motor systems

ANTERIOR CORTICOSPINAL TRACT

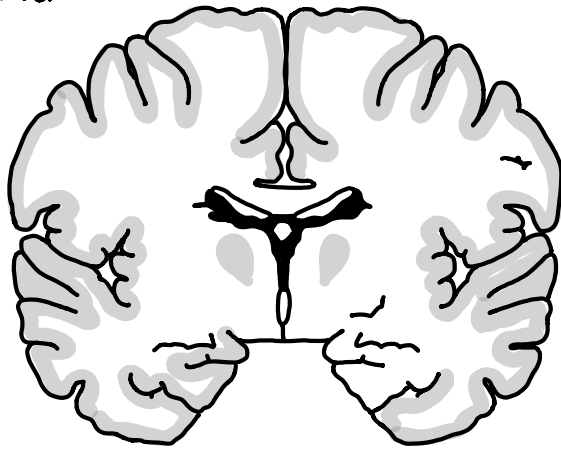
- originates in primary motor cortex & other supplementary motor areas
- does NOT decussate or cross over
- splits so it goes to both sides of the spinal cord
- terminates in cervical and upper thoracic cord
- * the remaining 10-15% of fibers that did not cross at LOST form this tract



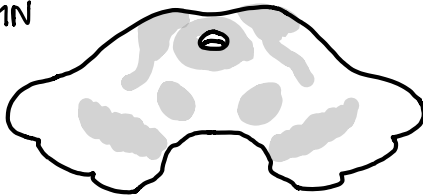
RESPONSIBLE FOR:

- voluntary movement of axial & girdle muscles

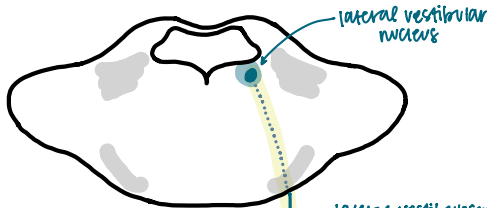
CORTEX



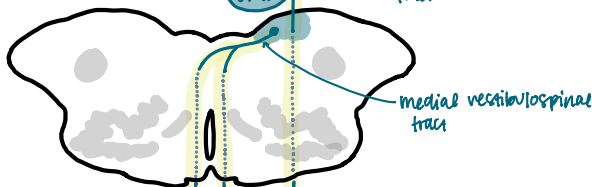
MIDBRAIN



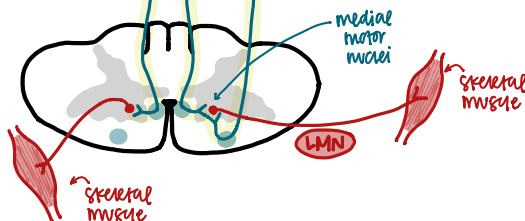
PONS



ROSTRAL
MEDULLA



CERVICAL
SPINAL
CORD



medial motor systems

VESTIBULOSPINAL

TRACTS

- **Medial VST:**

- ↳ originates at medial and inferior vestibular nuclei
- ↳ splits & descends bilaterally
- ↳ terminates at cervical & upper thoracic cord

- **lateral VST:**

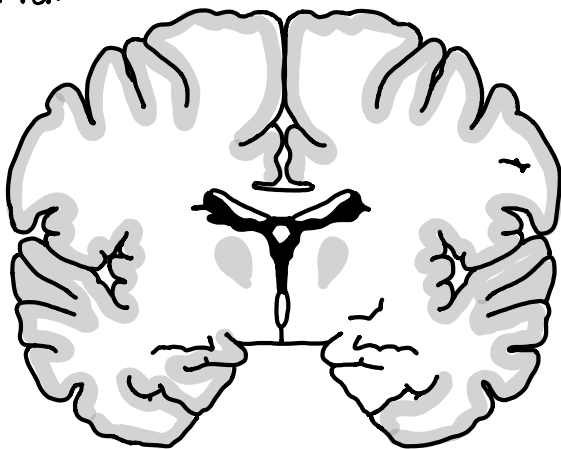
- ↳ originates at lateral vestibular nuclei
- ↳ terminates throughout entire cord

★ most significant of 2 tracts

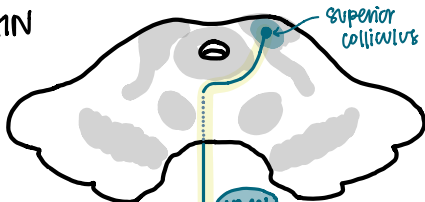
RESPONSIBLE FOR:

- MVST: positioning of head & neck
- LVST: balance

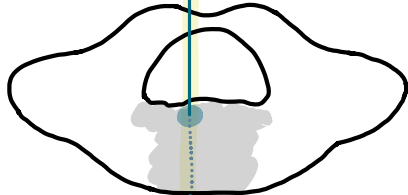
CORTEX



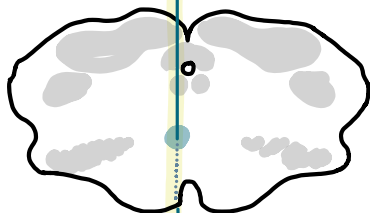
MIDBRAIN



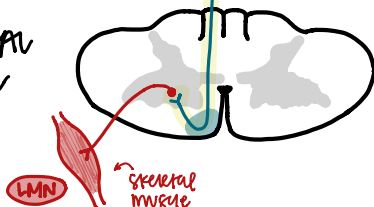
PONS



MEDULLA



CERVICAL SPINAL CORD



medial motor systems

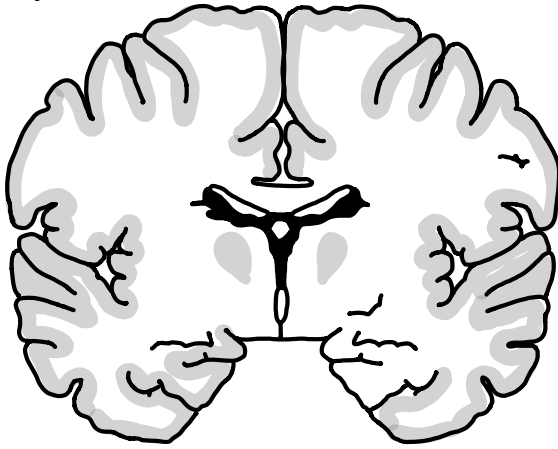
TECTOSPINAL TRACT

- originates at the superior colliculus
- crosses over at the dorsal tegmental decussation in the midbrain
- terminates in the cervical cord
- responsible for coordination of head and eye movement (uncertain in humans)

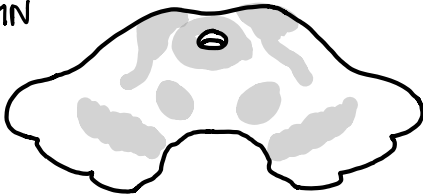
RESPONSIBLE FOR:

- Coordination of head & eye movement

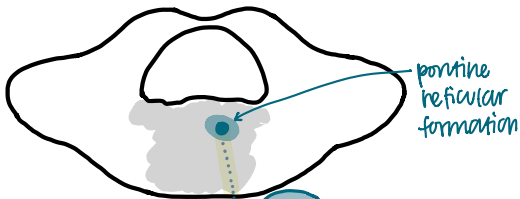
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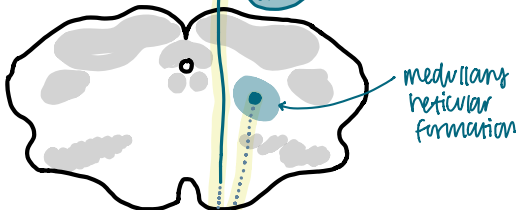
MIDBRAIN



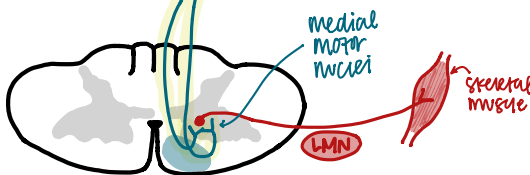
PONS



MEDULLA



CERVICAL SPINAL CORD



medial motor systems

RETICULOSPINAL TRACTS

- originates at the pontine & medullary reticular formation
 - ↳ pontine RST: originates at reticular formation in pons
 - ↳ medullary RST: originates at reticular formation in medulla
- terminates throughout the entire cord
- stays ipsilateral!

RESPONSIBLE FOR:

- automatic posture
- gait-related movements

