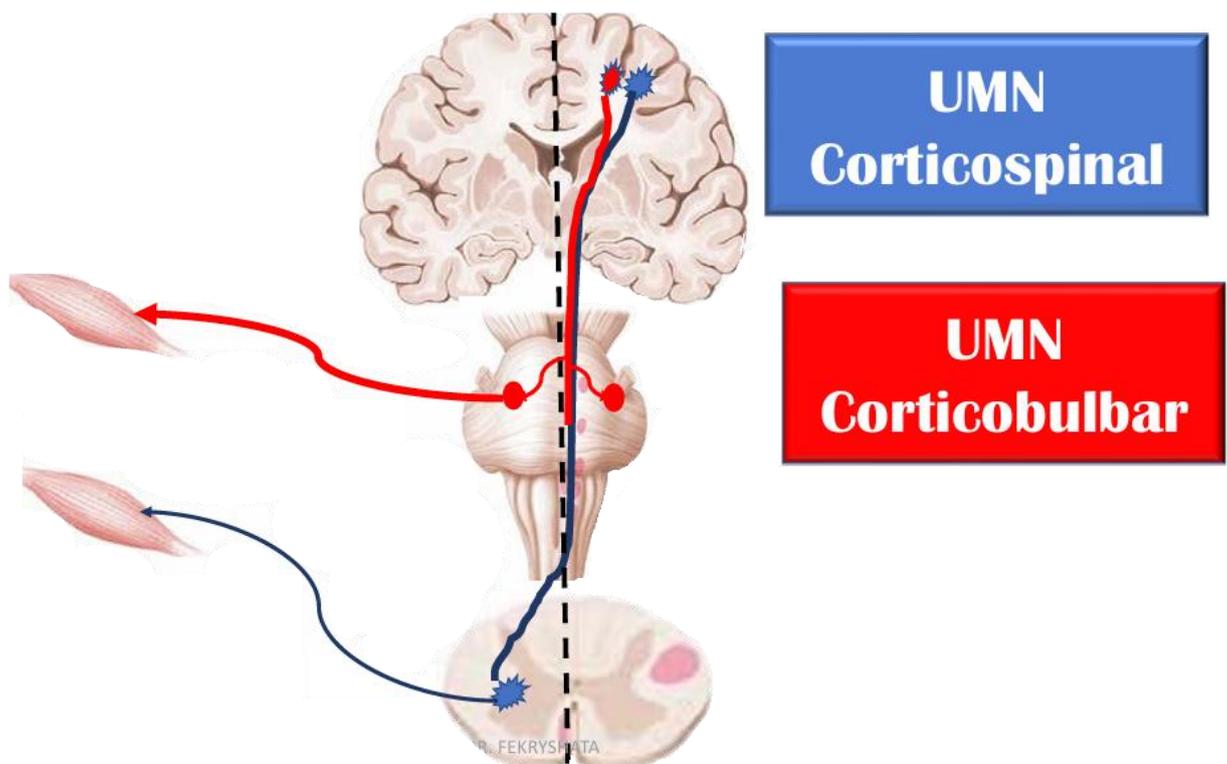


Descending tracts motor pathways

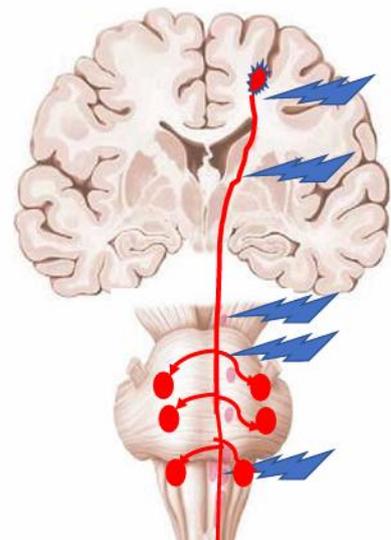
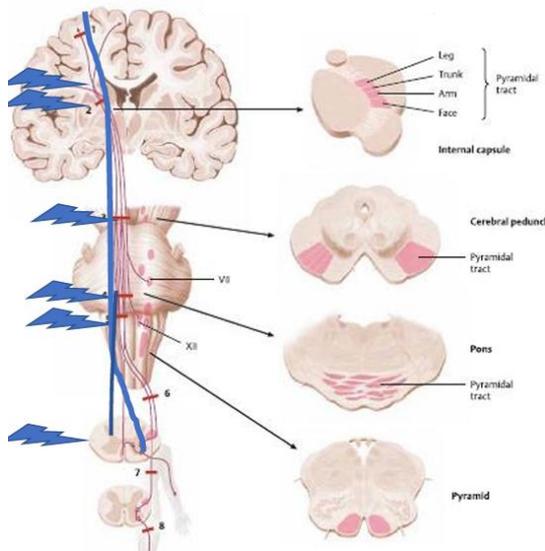
Types of descending tracts (Motor systems)

- **Pyramidal system** (Originate from **pyramidal cells** in the brain) consists of:
 - **Corticospinal tract:**
 - Lateral corticospinal tract.
 - Ventral corticospinal tract.
 - **Corticobulbar tract:**
 - To cranial nerve motor nuclei, where:
 - CN III, IV, VI → Eye muscles.
 - CN V → Mastication muscles (mandibular branch only).
 - CN VII → Facial expressions.
 - CN IX → Stylopharyngeus muscle.
 - CN X, XI → Vago-accessory complex.
 - CN XII → Tongue muscles.
- **Extrapyramidal** system.
- **Motor pathway to the cerebellum** (Cortico-ponto-cerebellar pathway).



a) Pyramidal system:
Corticospinal VS Corticobulbar tracts

	Corticospinal tract	Corticobulbar tract
Origin	<p><u>Upper 2/3 of Primary motor area (4) → 40%.</u></p> <p><u>Premotor area (6) → 40%.</u></p> <p><u>General sensory area (3,1,2) → 20%.</u></p>	<p><u>Lower 1/3 of Primary motor area (4) → 40%.</u></p> <p><u>Premotor area (6) → 40%.</u></p> <p><u>General sensory area (3,1,2) → 20%.</u></p>
Course	<p>Corona radiata → Posterior limb of internal capsule → Crus cerebri → Basis pontis → Pyramid.</p>	<p>Corona radiata → Genu of internal capsule → Crus cerebri → Basis pontis → Pyramid.</p>
Function	<ul style="list-style-type: none"> - Facilitation of the flexor muscle tone. - Initiation of highly skilled fine movements. - Modulate sensory input of the spinal cord. 	<p>Motor control of head and neck muscles.</p>
N.B.	<ul style="list-style-type: none"> - 85% of fibers cross to opposite side; forming lateral corticospinal tract - 15% remain uncrossed; forming ventral corticospinal tract. 	<ul style="list-style-type: none"> - It terminates on the cranial nerve motor nuclei of the two sides. - All cranial nerve motor nuclei receive bilateral corticobulbar fibers except the lower part of facial nucleus & Genioglossus muscle of Hypoglossal nucleus which receives fibers from opposite side only.

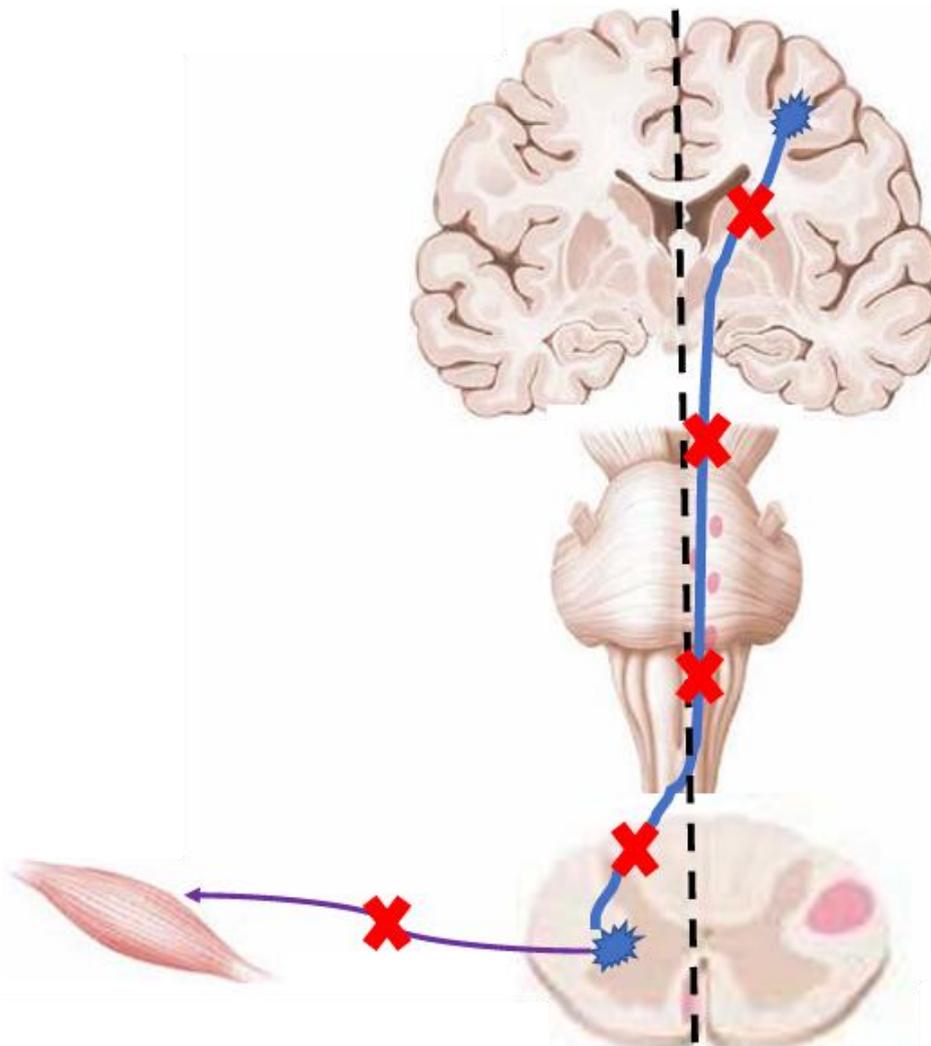


Motor system lesion:

- **Causes** (from the most common):
 - **Vascular**: Occlusion of the artery.
 - **Compression**: Tumors or herniated disc.
 - **Trauma**: Fracture, stab or bullets.

Types of paralysis & their signs:

UMNL	LMNL
Spasticity	Flaccidity
Hypertonia	Hypotonia
Hyper-reflexia	Hypo-reflexia
Babinski sign	Fibrillation
Clonus	Atrophy

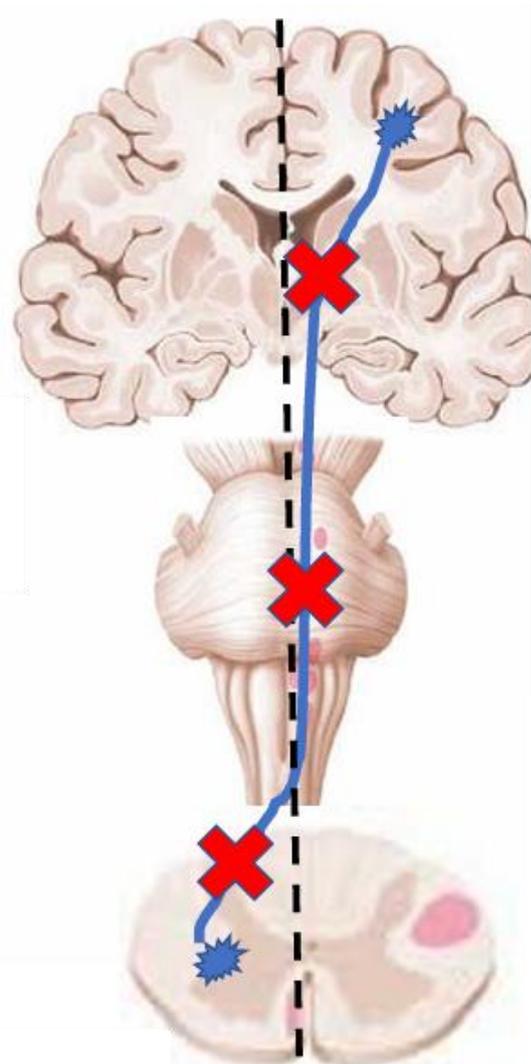


Lesion of the Corticospinal tract

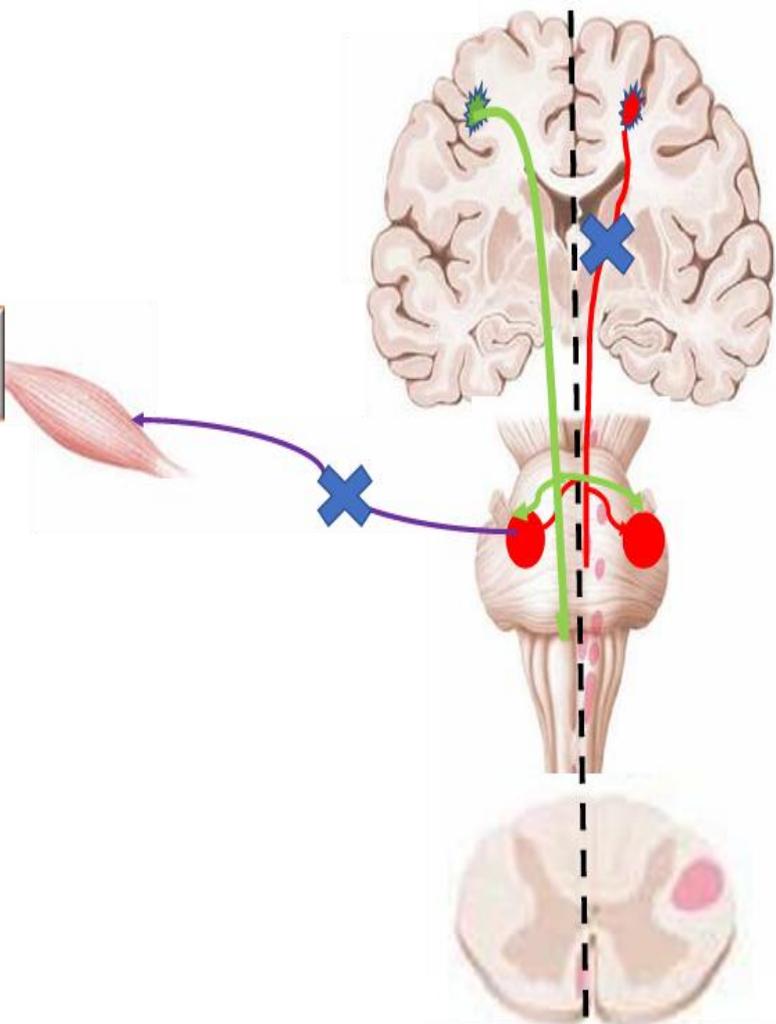
Type	UMNL	
Lesion	Above decussation:	Contralateral hemiplegia
	Below decussation:	Ipsilateral paralysis
Signs	As mentioned before +Loss of the superficial abdominal reflexes and cremasteric reflex.	

Lesion of the Corticobulbar tract

Type	UMNL	
Signs	<ul style="list-style-type: none"> - Paralysis of the lower part of the facial nerve nucleus and the genioglossus muscle on the contralateral side. - Weakness of the muscles supplied by the cranial nerves. 	



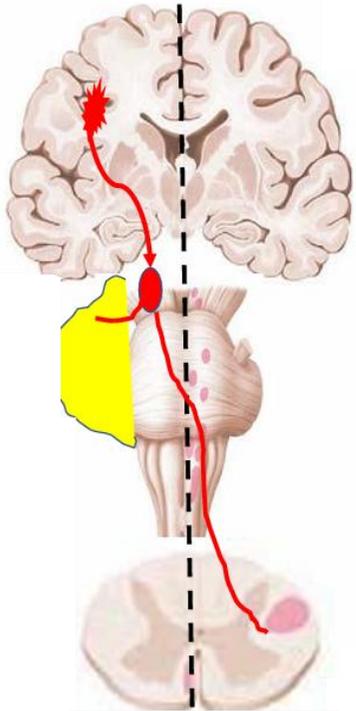
Muscles of H&N



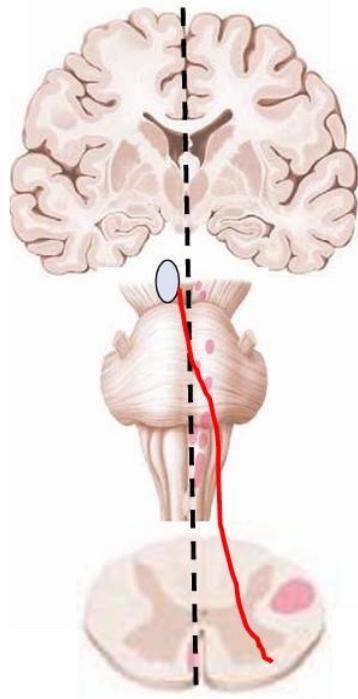
b) Extrapyramidal system:

- **Def:** Connection between the cerebral cortex and spinal cord through the brain stem.
- **Function:** All pyramidal and extrapyramidal tracts facilitate the flexor muscle tone **except** the 2 tracts which **arise from the pons**; facilitate the **extensor** muscle tone:
 - Pontine vestibulospinal tract (vestibulospinal).
 - Pontine reticulospinal tract.

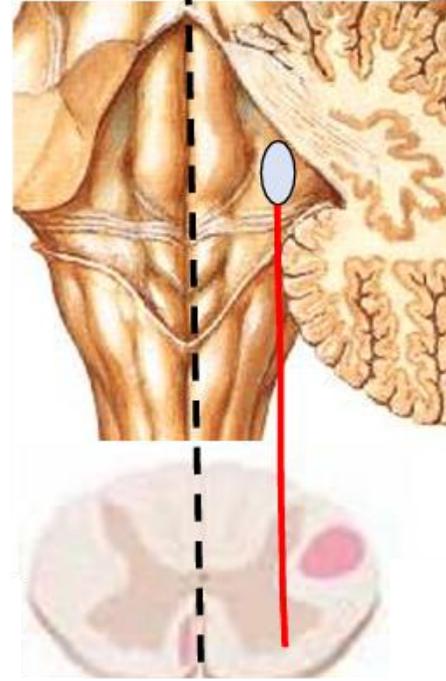
Tract	Origin	Function
Rubrospinal tract	<u>Red nucleus</u> of the opposite side. (Midbrain)	- Carries information from cerebral cortex & cerebellum to the spinal cord. - Facilitate the flexor muscle tone.
Tectospinal tract	<u>Superior colliculus</u> of the opposite side. (Midbrain)	Reflexes associated with vision and hearing.
Pontine vestibulospinal tract (Vestibulospinal)	From <u>lateral vestibular</u> nucleus. (Vestibular nuclei)	Facilitate the extensor muscles tone.
Medullary vestibulospinal tract (Sulcomarginal)	From <u>medial vestibular</u> nucleus. (Vestibular nuclei)	Facilitate the flexor muscles tone.
Pontine reticulospinal tract	From <u>pontine reticular</u> formation. (RF)	Facilitate the extensor muscles tone.
Medullary reticulospinal tract	From <u>medullary reticular</u> formation. (RF)	Facilitate the flexor muscles tone.



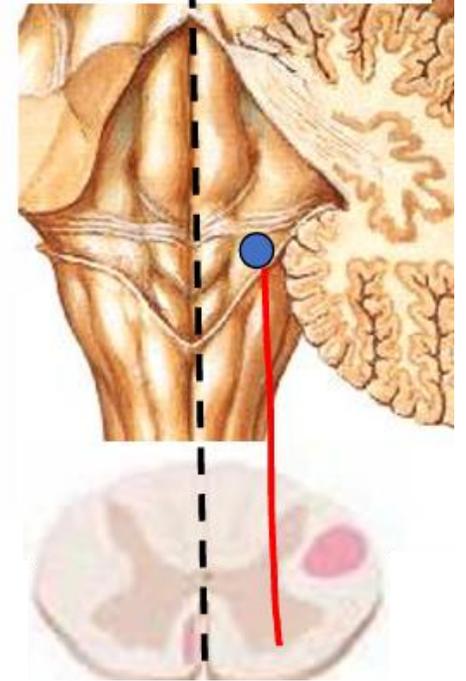
Rubrospinal tract



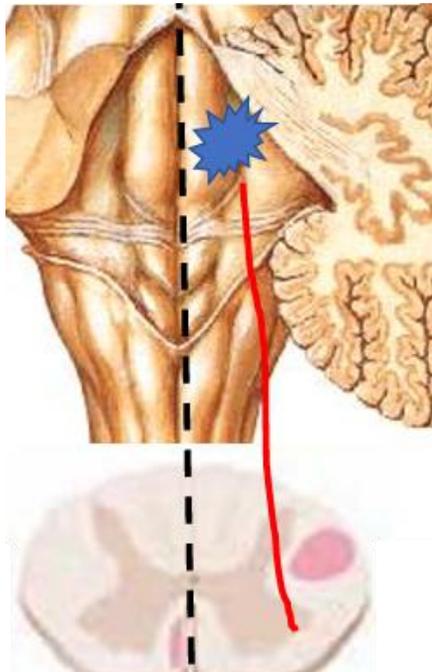
Tectospinal tract



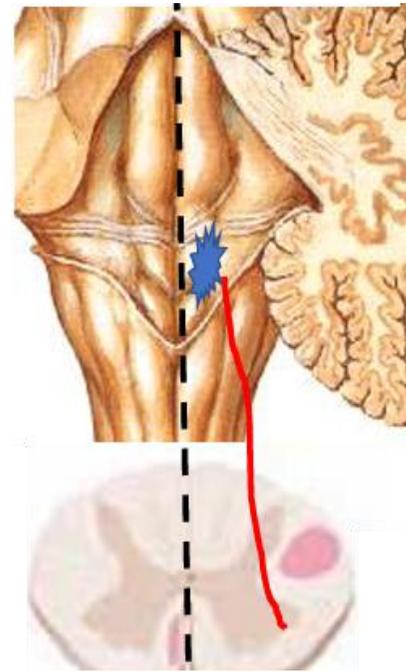
Vestibulospinal tract



Sulcomarginal tract



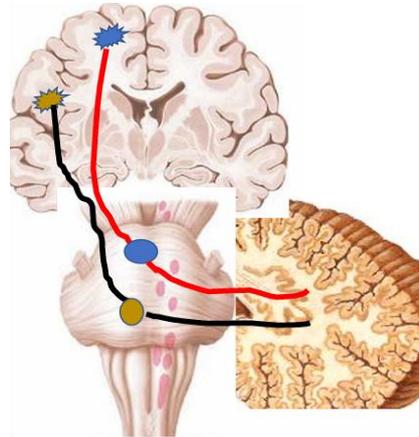
Pontine reticulospinal tract



Medullary reticulospinal tract

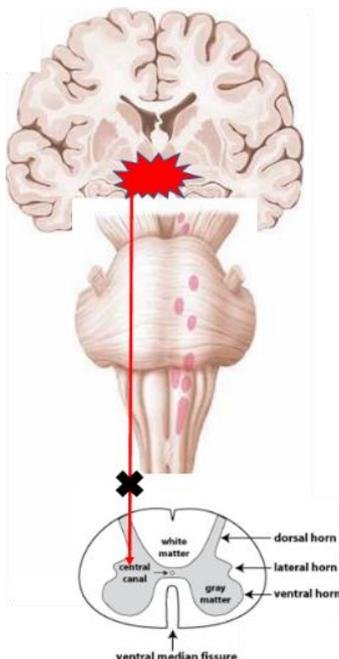
c) Motor pathway to the cerebellum:

Cortico-ponto-cerebellar pathways:		
	Fronto-pontine fibers	Non fronto-pontine fibers
Origin	From the frontal lobe.	Other lobes.
Function	Transmit motor functions .	Transmit sensory functions .



Descending Autonomic Fibers:

Origin	From hypothalamus and autonomic centers in the <u>reticular formation</u> .
Termination	- Sympathetic nucleus in the lateral horn of spinal cord (T1—L3). - Sacral parasympathetic nucleus (S2—S4).
Lesion	Above T1 will cause Horner's syndrome
Horner's Syndrome	- Ptosis : paralysis of muller's muscle. - Miosis : constriction of pupil. - Anhidrosis : dry face due to paralysis of sweat glands. - Enophthalmos : retraction of the eyeball. - Flushing : warm and red face.



Horner's Syndrome

▪ Quiz:

1. 40% of the corticobulbar fibers from:

- A. lower third of primary motor area 4
- B. Upper two thirds of primary motor area 4
- C. Hippocampus
- D. General sensory area

Answer: A

2. 40% of the corticospinal fibers from:

- A. lower third of primary motor area 4
- B. Upper two thirds of primary motor area 4
- C. Hippocampus
- D. General sensory area

Answer: B