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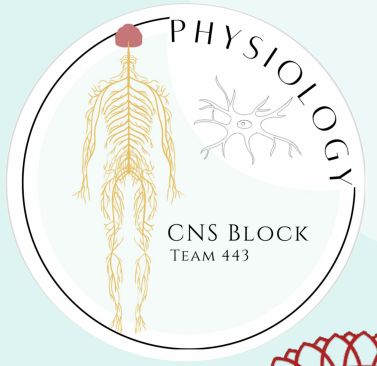

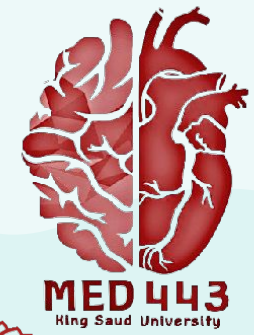

Color Index:

- Main text
- Important
- Girls Slides
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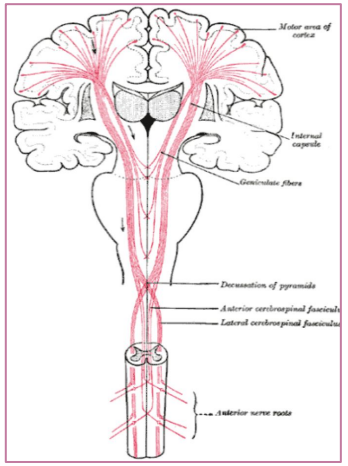
Physiology of motor tracts

Editing File

Objectives:

1. Appreciate what is upper motor neuron and lower motor neurons.
2. Explain the origin , course and functions \ functional role of the Pyramidal tracts(corticospinal & corticobulbar tracts) & Extrapyramidal tracts as:
   - ❖ Rubrospinal .
   - ❖ Vestibulospinal .
   - ❖ Reticulospinal .
   - ❖ Olivospinal .
   - ❖ Tectospinal
3. The pathway of the pyramidal tracts: (corticospinal & corticobulbar tracts)
4. The pathway & functional role of the extrapyramidal tracts as: Rubrospinal & Vestibulospinal & Reticulospinal & Olivospinal & Tectospinal

Components of Motor Neurons



For performance of motor acts we need:

Upper motor neurons (UMN):

These are the motor neurons whose cell bodies lie in the motor cortex, or brainstem and they activate the lower motor neuron (LMN). highest level Neurons of motor cortex & their axons that pass to brainstem & spinal cord to activate brainstem neurons (cranial) & spinal motor neurons.

There are two UMN Systems :

1- Pyramidal system (corticospinal tracts)

2- Extrapyramidal system

Lower motor neurons (LMN):

These are ,

1-spinal motor neurons (AHCs) in the spinal cord that innervates skeletal muscles directly.

2-cranial motor neurons in the brainstem

Cranial (motor)= Directly innervate muscles of head and neck
Spinal =Directly innervate Skeletal Muscles

Physiology Of Motor Neurons

Male slides

Descending Tracts:

1. The **descending** motor pathways (Upper motor neurons) have commonly been divided into "pyramidal" and "extrapyramidal" tracts.

2. This classification is based on the **finding** that the **motor tract** which originates from the cerebral cortex and descends to the spinal cord (the corticospinal tract) **passes through the pyramids** of the **medulla**, and therefore has been called the "the pyramidal tract".

3. The rest of the descending motor pathways **do not** travel through the **medullary pyramids**, and are therefore collectively gathered under the heading: "the **extrapyramidal** tracts".

Physiology Of Motor Neurons

The following are the important sets of **descending** motor tracts, named according to the **origin of their cell bodies and their final destination**

Descending Motor System (UMN)

Pyramidal tract

- Corticospinal Tract
- Corticobulbar tract

also called corticonuclear

Extrapyramidal tracts

- Rubrospinal tract
- Tectospinal tract
- Reticulospinal tracts
- Vestibulospinal tracts
- Olivospinal tract

Extra Slide

Figure 56-1 shows the functional areas of the cerebral cortex. Anterior to the central cortical sulcus, occupying approximately the posterior one third of the frontal lobes, is the *motor cortex.* Posterior to the central sulcus is the *somatosensory cortex* (an area discussed in detail in earlier chapters), which feeds the motor cortex many of the signals that initiate motor activities.

The motor cortex is divided into three subareas, each of which has its own topographical representation of muscle groups and specific motor functions: (1) the *primary motor cortex;* (2) the *premotor area;* and (3) the *supplementary motor area.*

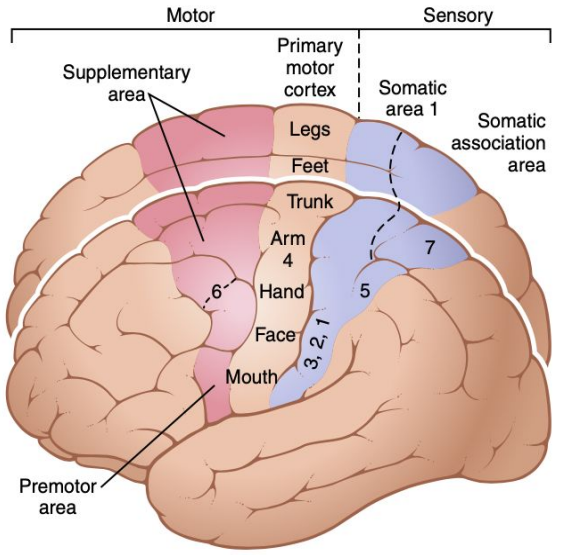


Figure 56-1. Motor and somatosensory functional areas of the cerebral cortex. The numbers 4, 5, 6, and 7 are Brodmann's cortical areas, as explained in Chapter 48.

بإختصار الـ Motor Area تنقسم إلى primary motor cortex , premotor Area ,supplementary motor area
والسلايدات القادمة تفصيل أكثر عنها..

Vertical Columnar Arrangement of the Neurons in the motor cortex:

- The neurons of motor cortex arranged in vertical columns
- Each column of cells functions as a unit & as integrative processing system, using information from multiple inputs to determine the output response from the column.
- Each column can function as an amplifying system to stimulate large numbers of pyramidal fibers to the same muscle or to synergistic muscles simultaneously

Motor Areas

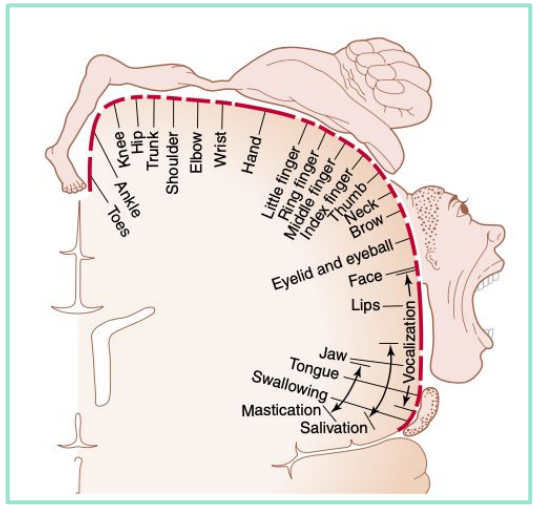
1-The Primary Motor Area (MI Motor area 4):

Occupies the precentral gyrus & contains large ,giant highly excitable Betz cells.
anterior to central sulcus, (Betz cells are also called pyramidal cells).
MI of one side controls skeletal muscles of the opposite side of the body.
Left motor area innervate right body side and vice versa.

Feet are at the **top** of the gyrus and face at the **bottom** , arms and the hand area in the **mid** portion.Inverted.
Facial area is represented **bilaterally**, but rest of the representation is generally **unilateral**.

Area of representation is **proportional** with the complexity of function done by the muscle.
So, muscles of hands and speech (lips, tongue , and vocal cord) occupies 50% of this area.

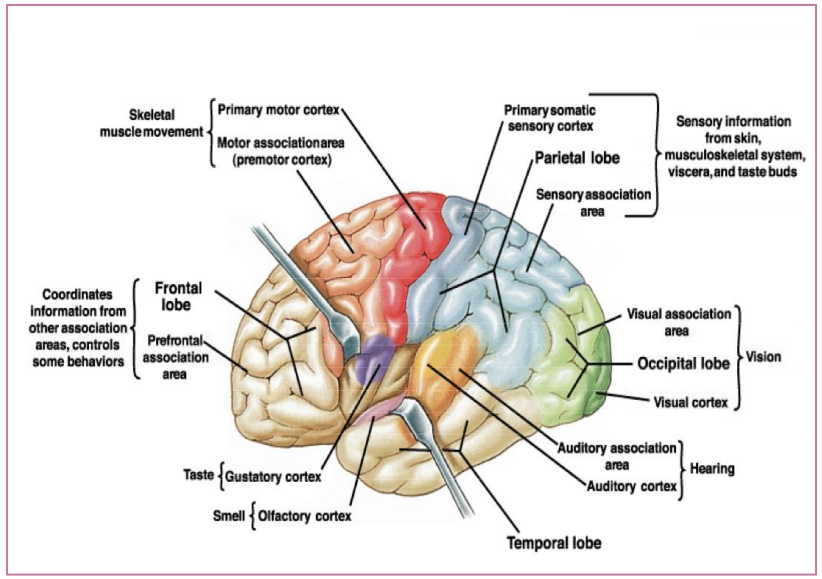
MI is the most important.
I want you to know the location and representation.
Representation is what happens if it is stimulated.

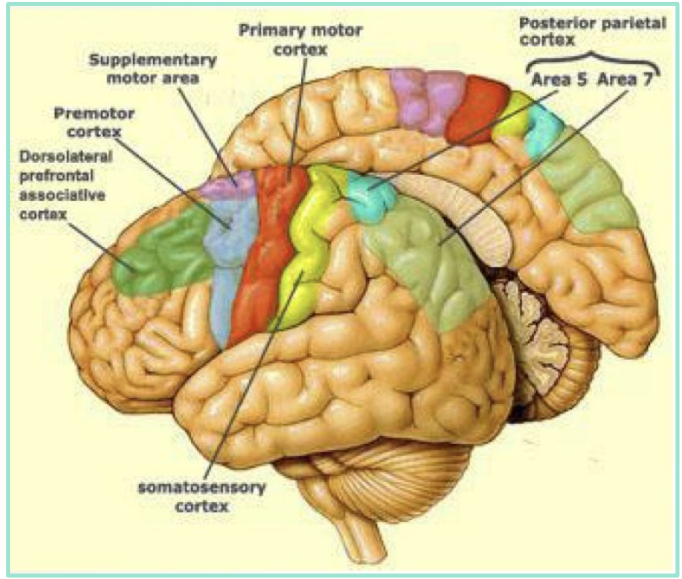


Motor areas

The Primary Motor Area (MI Motor area 4):

1- The neurons of this area arranged in **vertical columns**. **Each** column has **six** distinct layers of cells, The pyramidal cells that give rise to the to the corticospinal fibers all lie in the **fifth layer**.
2- The Betz cells fibers transmit nerve impulses to the spinal cord at a velocity of about 70 m/sec, the **most rapid** rate of transmission of signals from the brain to the cord.
3- Betz cells axons send short **collaterals** back to the cortex to **inhibit adjacent regions** of the cortex when the Betz cells discharge, thereby "**sharpening**" the excitatory signal.





Motor areas

2- The Premotor Area: skills and learned type of movements.

1. lies in **front** of the **primary** motor area & **below supplementary** motor area.
2. Stimulation of the premotor area produces **complex coordinated movements**, such as setting the body in a certain posture to perform a specific task.
3. It works in association with the supplemental motor area, establishing the motor programs necessary for execution of **complex** movements.
4. It contains **mirror neurons** which are important for understanding the action of other people and for learning new skills by **imitation.**

Steady position, مسؤولة عن الحركات المعقدة زي الكورشيه

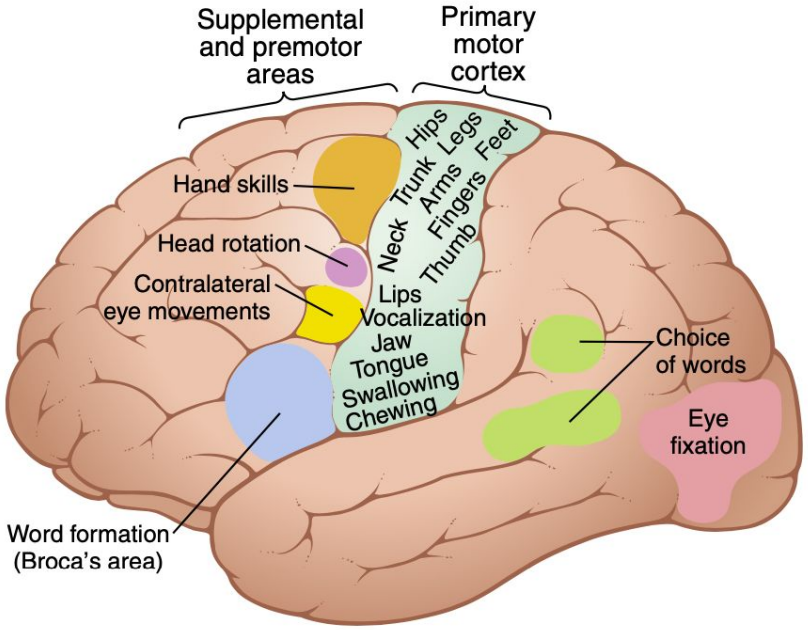


Figure 56-3. Representation of the different muscles of the body in the motor cortex and location of other cortical areas responsible for specific types of motor movements.

Motor areas

A few highly specialized motor centers have been found in the premotor areas of the human cerebral cortex:

Premotor Area	Location	Function
Broca's Area for Speech Damage to this area can cause Broca's aphasia (motor aphasia or aphemia)	Broca's Area	Speech
Frontal Eye Movements Area	**Above Broca's area in the frontal lobe**	**Controls voluntary movements of the eyes toward different objects in the visual field**
Head Rotation Area	**Above the Eye movement area in the motor cortex**	**Directing the head toward different visual objects**
Hand Skills Area **Damage to this area causes motor apraxia** (motor disorder in which the individual has difficulty with the motor planning to perform tasks or movements) بيخسر الحركات الدقيقة	Above the Head rotation area	Hand Skills

Motor areas

3- The Supplementary Motor Area: primitive type of movements.

If we stimulate this area the patient will produce meaningless words

1. located on the **lateral** side of the brain lies **in front of area 4 and above the pre-motor area** & extends on medial side of the cerebral hemisphere.
2. This area is concerned with \ involved in **planning, programming** or **organizing** motor sequences.
3. Stimulation of this area leads to **bilateral (bimanual)**grasping movements of both hands simultaneously. Example: playing piano
4. This area make motor **programs** for **axial muscles**. It provides background adjustment for fine motor control of the arms and the hands by the **premotor area** and **primary motor cortex.**

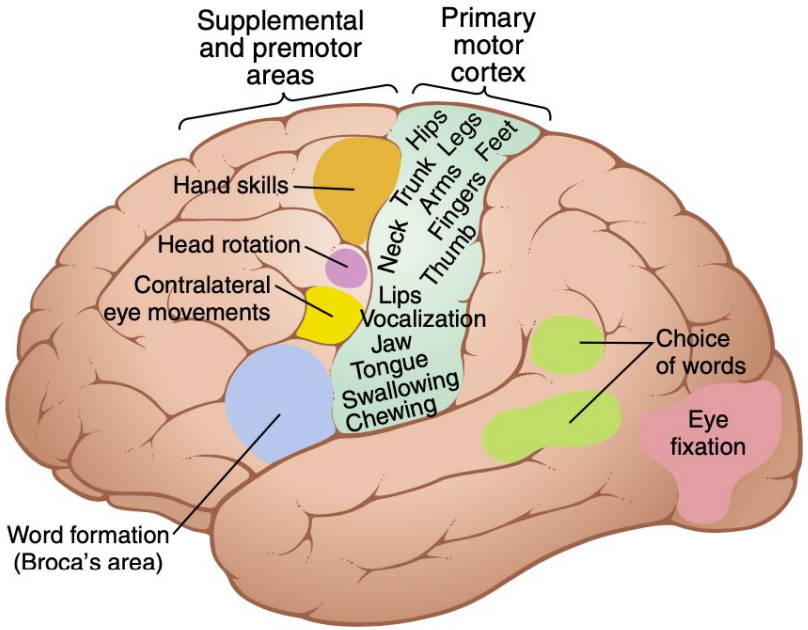


Figure 56-3. Representation of the different muscles of the body in the motor cortex and location of other cortical areas responsible for specific types of motor movements.

Corticospinal (Pyramidal) & corticobulbar Tracts

helpful video

Cells of origin

3

30%
originate from the primary motor area (MI) / motor area 4

2

30%
from the premotor areas, and supplementary cortex \ motor areas.

1

40%
from the somatic sensory areas (3, I, 2) / parietal cortex posterior to the central sulcus.
In مسؤول عن lobe parietal جميع الأحاسيس

Corticospinal (Pyramidal) & corticobulbar Tracts

helpful video

General Information Of Corticospinal (Pyramidal) and corticobulbar Tracts:

3% of the fibres are large myelinated fibres, derived from the large, highly excitable pyramidal Betz cells of MI. These fibers form monosynaptic connections with motor neurons of the spinal cord. But most of pyramidal fibers are unmyelinated.

Fibers from the cerebral cortex descend—>in corona radiata شعاع زي الشمس. to—>reach the posterior limb of internal capsule genu (between caudate and putamen nuclei of the basal ganglia) and the anterior two-third of the posterior limb then to—>Brain Stem (midbrain, pons and medulla oblongata).\ Then descend through the cerebral peduncle of midbrain and then through pons. Block in the lenticulostriate artery that supplies the internal capsule can lead to hemiplegia نصفي شلل

- Some fibers cross in brainstem to supply contralateral cranial nerve nuclei constitute the **corticobulbar tract.**
- In the lower medulla

In the brainstem midbrain, pons & medulla oblongata.

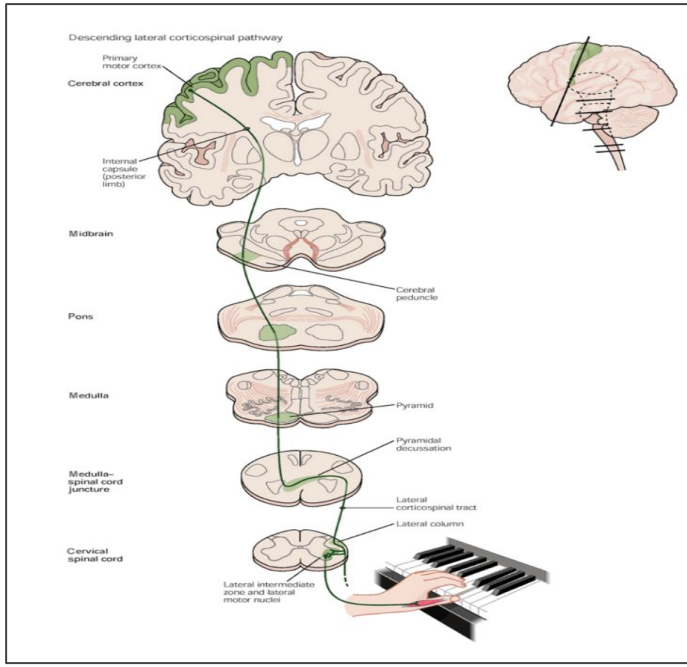
- 1- corticobulbar tract: carries information to motor neurons of the cranial nerve.
- 2-corticospinal tract (pyramidal): Descends through the midbrain and pons, then in the lower medulla oblongata the fibers form pyramids so called pyramidal tract

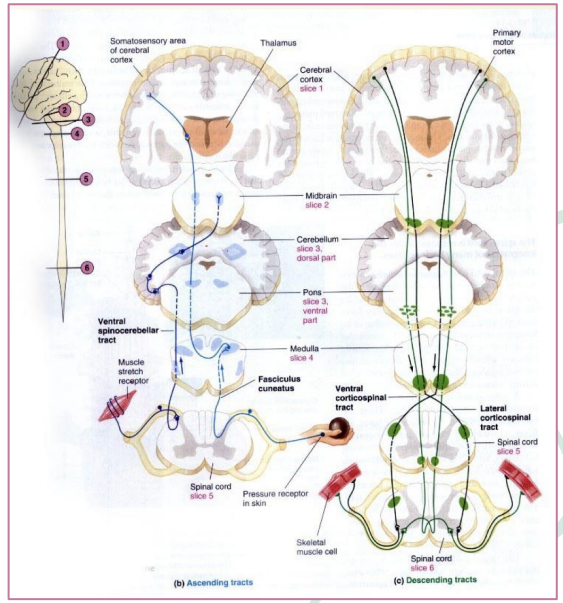
To be Continued..

Origin: Sensory Cortex, Primary Motor Cortex, Premotor and supplementary Cortex → Internal Capsule → Cerebral Peduncle (midbrain)

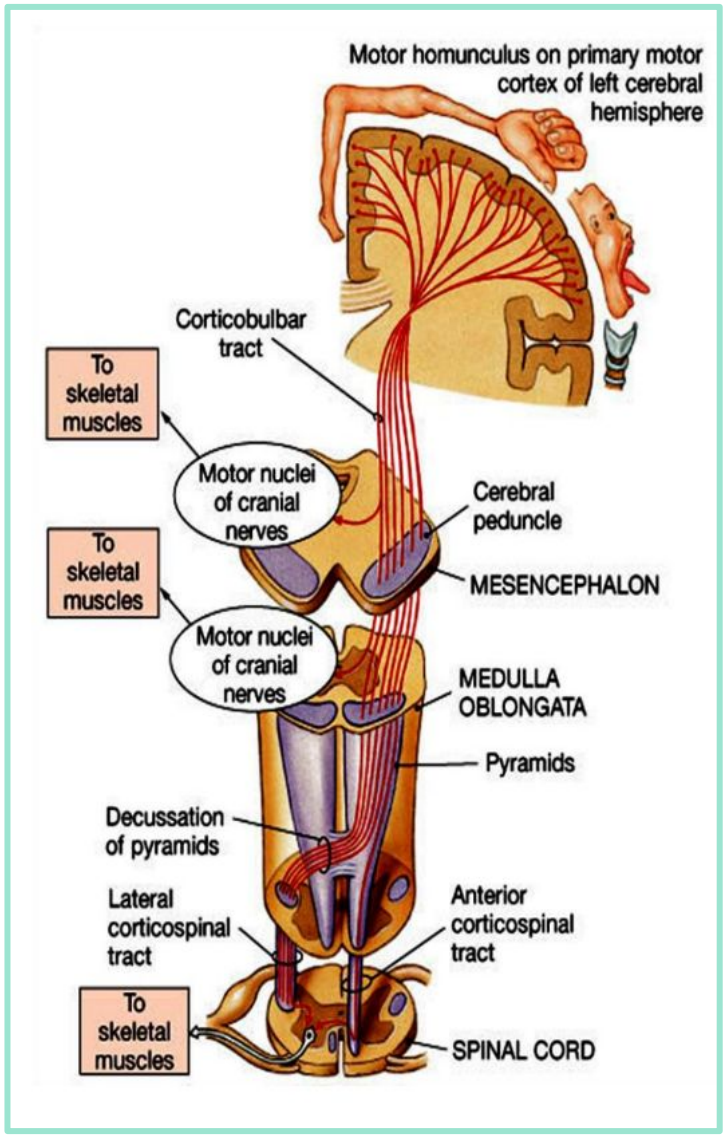
Pons → Medullary Pyramid → Pyramidal Decussation

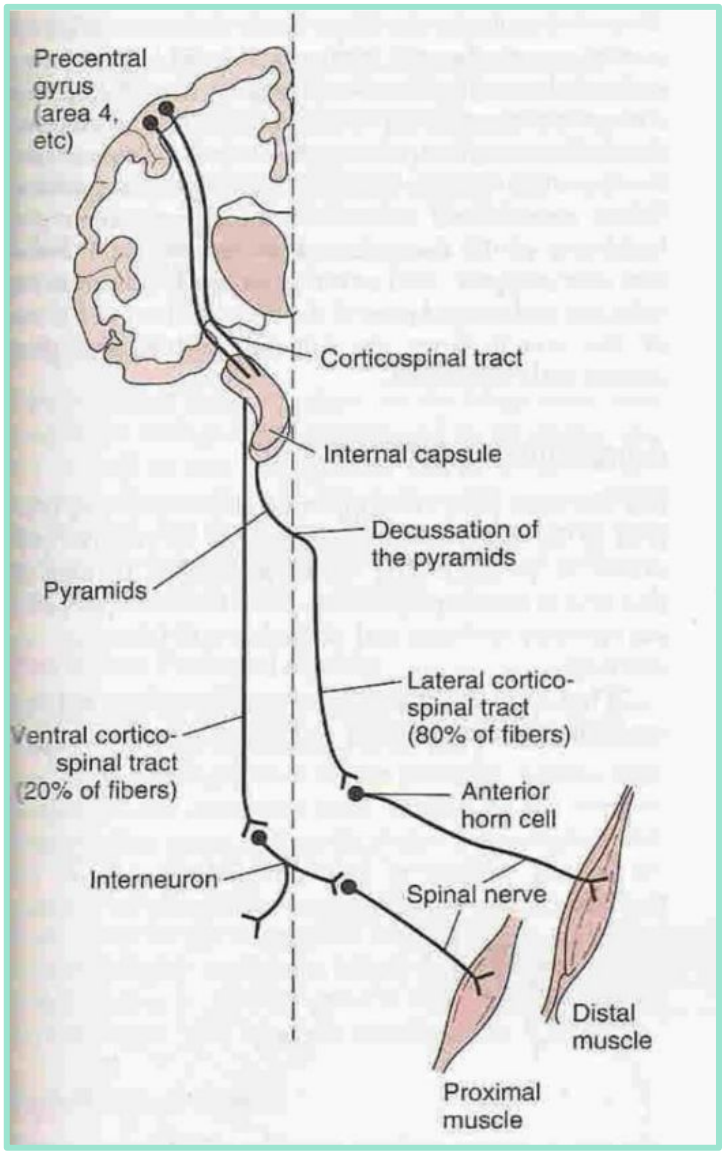
Lat.Cross & Vent. Uncross White matter in spinal cord → Ant. Horn of spinal cord through an interconnection → α motor neuron of opposite side

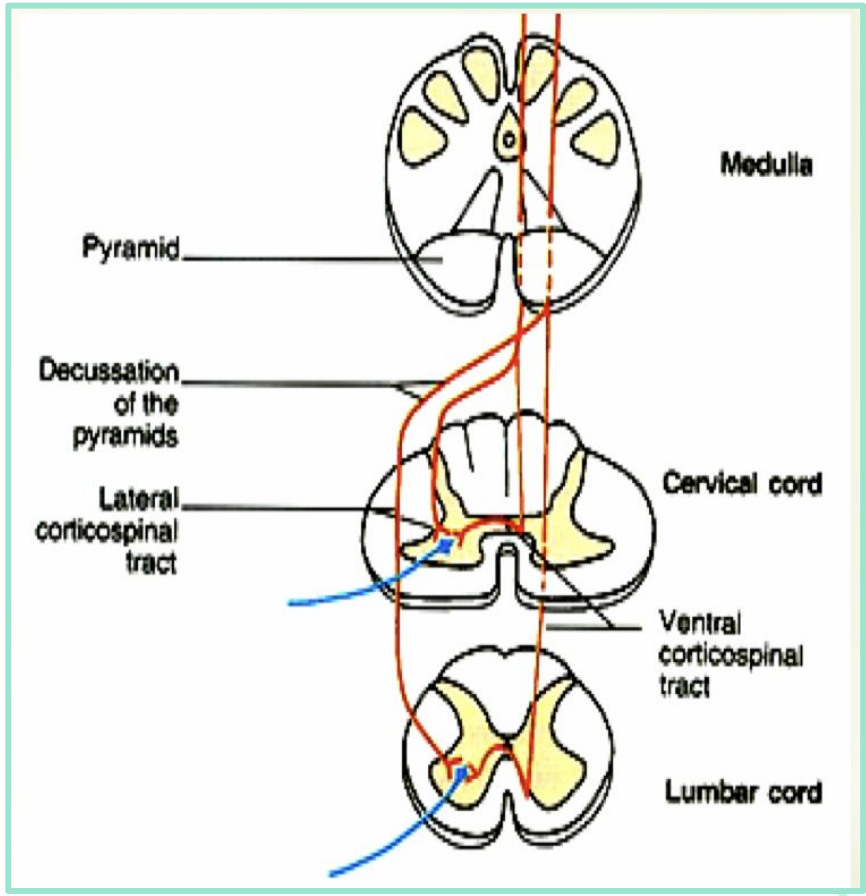




	Lateral C.S. Tract	Ventral (anterior) C.S. Tract
Pathway of the axons	• Around 80% of fibers cross to the opposite side and descend in the lateral column of spinal cord as the **Lateral Corticospinal Tract.** / 80% of fibers cross midline in pyramids then pass laterally in spinal cord white matter. Crossing to opposite side after medulla • Ends directly (not via interneurons = monosynaptic connections) on motor neurons (AHCs) of the opposite side here the lower motor neurons (LMNs) of the corticospinal cord are located • Then peripheral motor nerves carry the motor impulses from the anterior horn to the voluntary muscles. • The fibers pass laterally in spinal cord white matter, so they control distal limb muscles. -A few terminate on sensory relay neurons in the dorsal horn, and a very few end monosynaptically on contralateral anterior horn cells but the majority end on interneurons in the intermediate region of the spinal cord grey matter	• The remaining 20% of corticospinal fibers does not cross midline and at the pyramids and do not decussate in the medulla but pass directly until it Cross at level of their termination to synapse with interneurons, that synapse with motor neurons(AHCs) of opposite side. • Pass medially in ventral horn **so control axial & proximal limb muscles so control posture.** • NB\So corticospinal tract (ANT & LAT) supply skeletal muscles of the opposite side. • They descend **ipsilaterally** in the ventral column of the spinal cord white matter, constituting the ventral (anterior) corticospinal tract. • Finally they decussate (cross to the opposite side) & synapse on the contralateral spinal motor neurons in the neck or in the upper thoracic region
Function	These fibers controls and initiates fine discrete skilled movement of distal limb muscles (i.e. Fingers and hands)	These fibers control the axial and proximal limbs muscles so it concern with bilateral control of postural movements by the supplementary motor cortex.


Motor homunculus on primary motor cortex of left cerebral hemisphere
Corticobulbar tract
To skeletal muscles
Motor nuclei of cranial nerves
Cerebral peduncle
To skeletal muscles
MESENCEPHALON
Motor nuclei of cranial nerves
MEDULLA OBLONGATA
Pyramids
Decussation of pyramids
Lateral corticospinal tract
Anterior corticospinal tract
To skeletal muscles
SPINAL CORD


Precentral gyrus (area 4, etc)
Corticospinal tract
Internal capsule
Decussation of the pyramids
Pyramids
Lateral cortico-spinal tract (80% of fibers)
Ventral cortico-spinal tract (20% of fibers)
Anterior horn cell
Interneuron
Spinal nerve
Distal muscle
Proximal muscle


Medulla
Pyramid
Decussation of the pyramids
Lateral corticospinal tract
Cervical cord
Ventral corticospinal tract
Lumbar cord

Course and termination

1. fibers of the CBS tract descend from the cerebral cortex
2. collect together and descend through the posterior limb of the internal capsule
3. through the middle portion of the cerebral peduncles of the midbrain
4. The fibers are separated by transverse pontine fibers in the pons
5. In the upper medulla oblongata where they form the pyramids of the medulla (medullary pyramids)
6. In the lower region of the medulla, most of the fibers cross to the opposite site forming the "medullary (Pyramidal)decussation"

About 80% to 90% cross to the opposite side of the spinal cord (contralaterally) and continue as the "lateral corticospinal tract".

fibers which do not decussate in medulla (about 10-20%) descend on the same side of the spinal cord (ipsilaterally) as the "ventral corticospinal tract".

Function of corticospinal tract (pyramidal system) :

1. Initiation of fine, discrete, skilled voluntary movements, on which side? for opposite side

2. The lateral corticospinal tracts fibers (main bulk of the tract) control distal muscles of limb as fingers & thumb & toes which concerned with fine skilled movement الدقيقة الحركات e.g Painting ,writing, picking up of a small object etc.\ The lateral corticospinal tract fibers that descend in the spinal cord for control of muscles of the distal parts of the limbs, especially the hand and digits muscles, which sub serve fine skilled movements used in manipulation by hand and fingers, and other accurate motor actions done by the limbs .

3. The Ventral corticospinal tracts control posture of axial & proximal limb muscle for balance, climbing, walking. Upper arm , upper leg

4. Effect on stretch reflex: Facilitate muscle tone and deep reflexes through gamma motor neurons intrafusal fibers

5. Those Fibers originate from parietal lobe are for sensory-motor coordination. Coordination between sensory and motor activity . اللي تأخذ صورة من الأحاسيس وتعمل لهامعالجة وتنظم الحركات المناسبة للأحاسيس حاساها

6. Corticobulbar tracts control face & neck muscles & facilitate their tone, and are involved in facial expression, mastication & swallowing.+ Extraocular muscle in eye movement

Excitation of the Spinal Cord Motor Control Areas by the Primary Motor Cortex and Red Nucleus

- Vertical Columnar Arrangement of the Neurons in the Motor Cortex.

Function of Each Column of Neurons :

- Each column of cells functions as a unit & as integrative processing system, using information from multiple inputs to determine the output response from the column.

- Each column can function as an Amplifying system to stimulate large numbers of pyramidal fibers to the same muscle or to synergistic muscles simultaneously.

Dynamic and Static Signals Transmitted by the Pyramidal Neurons:

- Each column of cells excites two types of pyramidal cell neurons:

  1- The Dynamic Neurons : are excited at a high rate for a short period at the beginning of a contraction, causing the initial rapid development of contraction.

  2- The Static Neurons: fire at a much slower rate, but continue firing at this slow rate to maintain the force of contraction as long as the contraction is required.

- The neurons of the red nucleus have similar dynamic and static characteristics, but greater percentage of dynamic neurons is in the red nucleus and a greater percentage of static neurons is in the primary motor cortex.

Removal of (Area Pyramidalis) of the Primary Motor Cortex

Removal of the area that contains the giant Betz pyramidal cells (Area Pyramidalis) **causes loss of voluntary control of discrete movements of the distal segments of the limbs,** especially of the hands and fingers (**This does not mean that the hand and finger muscles themselves cannot contract (paralysis), but the ability to control the fine movements is gone**).
That is because area pyramidalis is essential for voluntary initiation of finely controlled movements, especially of the hands and fingers.

Male slides

Effects of Lesions in the Motor Cortex or in the Corticospinal Pathway (The stroke)

The motor control system can be damaged by stroke.
-the result is loss of blood supply to the cortex or to the corticospinal tract where it passes through the **internal capsule is a common side of stroke**. Muscle Spasticity Caused by Lesions That Damage Large Areas Adjacent to the Motor Cortex.
-The primary motor cortex normally exerts a continual tonic stimulatory effect on the motor neurons of the spinal cord; when this stimulatory effect is removed, hypotonia results.
-Most lesions of the motor cortex, especially those caused by a stroke, involve the primary motor cortex & adjacent parts of the brain such as the basal ganglia. In these instances, muscle spasm occurs in the muscles on the opposite side of the body.

Extrapyramidal Tracts

- It's a tracts other than corticospinal tract & are outside pyramids .

- The extrapyramidal system is made up of all those part in the CNS that are concerned with motor control , other than pyramidal system. They consist of :
  1- cortical motor areas, especially the premotor area and parietal cortex
  2- the basal ganglia
  3- The reticular formation, the red nuclei, the tectum of the brain & vestibular nuclei

General Function of the Extrapyramidal Tracts \ synapse :

1	Sets the postural background needed for performance of skilled movements.
2	Controls \ Responsible for subconscious gross movements (swinging of arms during walking)
3	Keep equilibrium and adjust body posture.
4	Help pyramidal tract in initiation of voluntary movement
5	Regulation of muscle tone.
6	Share in planning and programming of voluntary movement.

Course of the Extrapyramidal Tracts:

Female slides

Origin:
-motor area 4
-premotor area 6
-suppressor area 4

→ corona radiata → internal capsule → basal ganglia → brain stem → bulbospinal tract descend to spinal cord as:
Reticulospinal Tract.
Vestibulospinal Tract. Rubrospinal Tract.
Olivospinal Tract.
Tectospinal Tract.

Extrapyramidal Tracts

They include the following tracts:

helpful video

1 Rubrospinal Tract

- After emerging from the red nucleus located in the mesencephalon(midbrain),fibers decussate at same level of red nucleus.
- It receives direct fibers from the primary motor cortex through the corticorubral tract & from the corticospinal tract.
- It receives afferents connections from contralateral cerebellum & from basal ganglia & Ipsilateral cortical motor area (corticorubral tract) —> Descend with the lateral corticospinal tract —>In spinal cord tract occupies \crosses to the opposite side in the lower brain stem into the lat.white column , & fibers together with corticospinal tract And synapse on the contralateral AHCs.

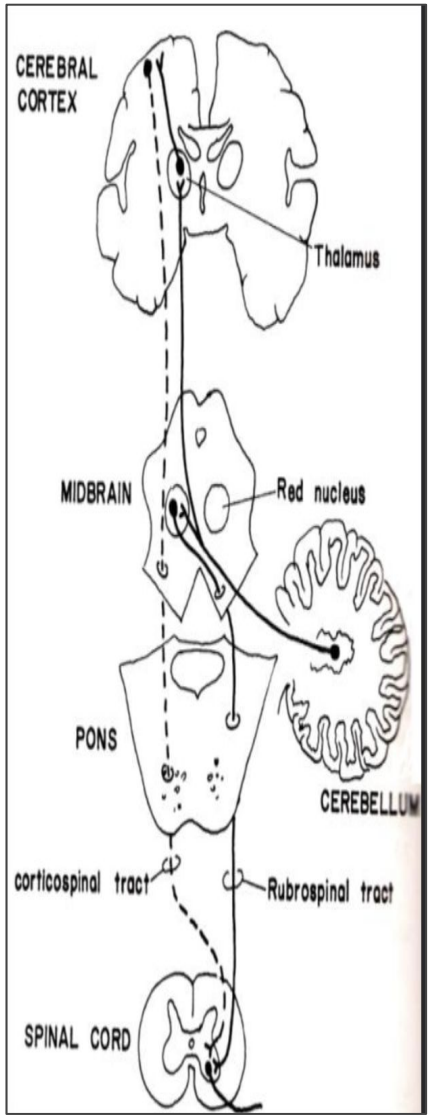
- **Function of the Corticorubrospinal System (Rubrospinal tract) :**

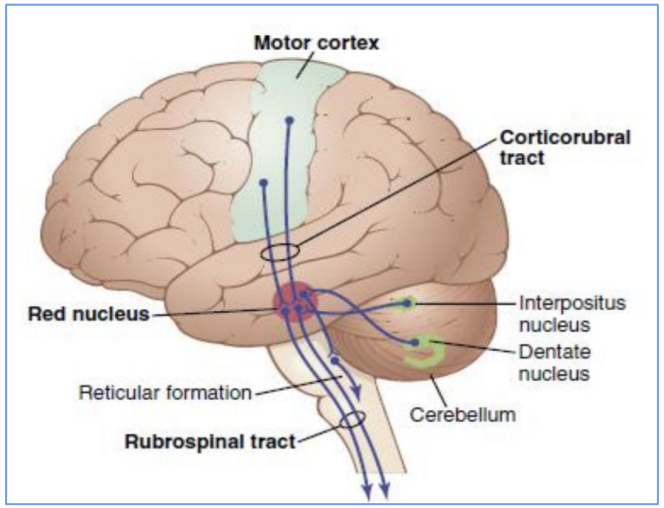
-The corticorubrospinal pathway serves as an accessory route for transmission of discrete signals from the motor cortex to the spinal cord.
-An additional pathway for transmission of cerebral cortical motor commands to the lower motor neurons similar to those of the corticospinal tract.
-This tract is excitatory for flexors & inhibitory for extensors (anti-gravity muscles).

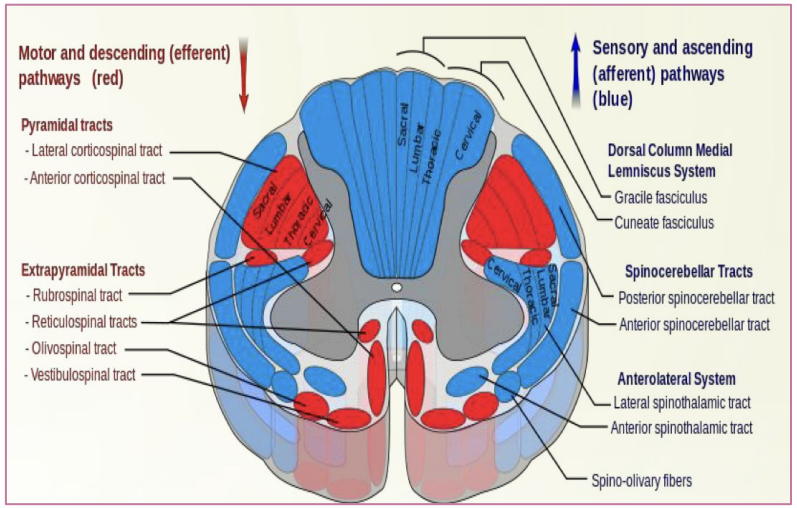
-When the corticospinal fibers are destroyed , discrete movement can still occur but fine control of the fingers and hand is impaired.

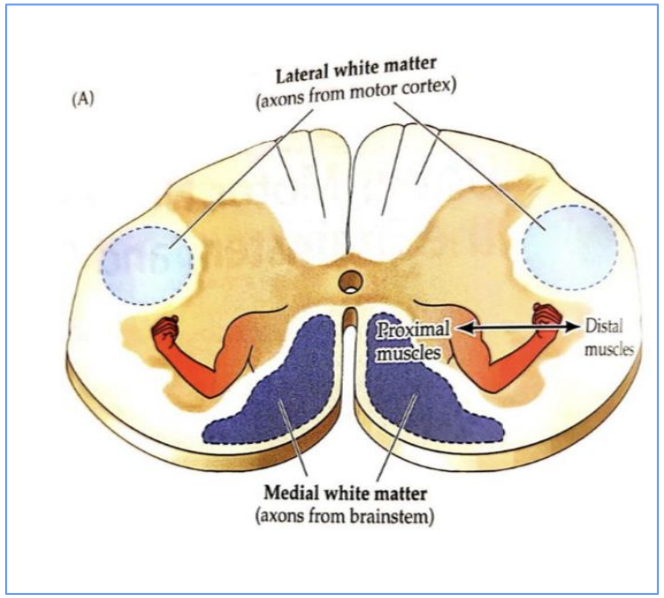
- Rubrospinal tract lies in the lateral columns of the spinal cord, along with the corticospinal tract and terminates on the interneurons and motor neurons that control the more distal muscles of the limbs.
- Therefore, (corticospinal & rubrospinal tracts) together are called the lateral motor system of the cord, in contradistinction to a vestibulo-reticulospinal system, which lies mainly medially in the cord and is called the medial motor system of the cord.

Pictures for more understanding..









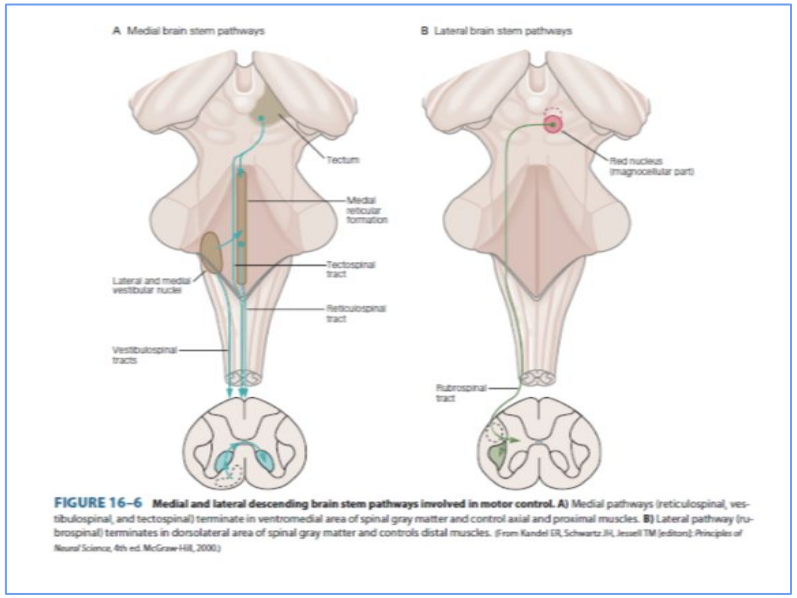


FIGURE 16–6 **Medial and lateral descending brain stem pathways involved in motor control. A)** Medial pathways (reticulospinal, vestibulospinal, and tectospinal) terminate in ventromedial area of spinal gray matter and control axial and proximal muscles. **B)** Lateral pathway (rubrospinal) terminates in dorsolateral area of spinal gray matter and controls distal muscles. (From Kandel ER, Schwartz JH, Jessell TM [editors]: *Principles of Neural Science*, 4th ed. McGraw-Hill, 2000.)

Extrapyramidal tracts count...

helpful video

2 Vestibulospinal (V.S) tracts

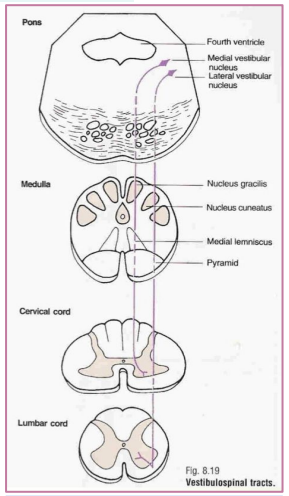
- Fibers originate in vestibular nuclei in pons (which receive inputs from inner ear, Vestibular Apparatus (sensory organs for detecting sensations of equilibrium, found in the ear) and cerebellum)
- Axons descend in the ipsilateral ventral white column of spinal cord
- N.B/ Vestibular nuclei tracts are always excitatory to Gamma Efferents (whereas Red nucleus is always inhibitory)

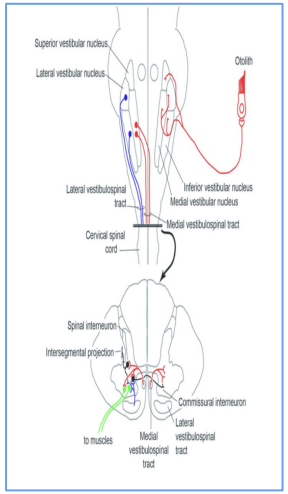
General Functions of (V.S):

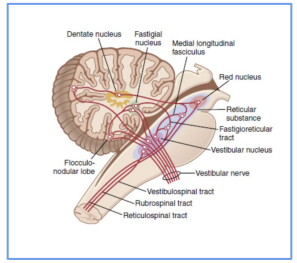
1- VST controls reflexes, e.g. postural & righting reflexes(which correct body position).

2- control eye movements.

3-Excitatory to ipsilateral spinal motor neurons that supply axial & postural muscles.





2 components of the tract:	Major component → Lateral V.S Tract	Minor component → Medial V.S Tract.
Cells of origin	Lateral V.S Nucleus	Medial V.S Nucleus
Pathway of the axons + The Function 	- Axons descend in the ipsilateral ventral white column of spinal cord. - This tract mediates excitatory influences upon extensor motor neurons to maintain posture and righting reflexes. (gets stimulated when the otolith organs signal deviations from stable balance and upright posture)	-As it's axons descend bilaterally in the ventral white column of spinal cord to the end at the cervical segments of the spinal cord, some fibers form of the Medial Longitudinal Fasciculus fibers (consists of both ascending & descending fibers) in the brainstem that link vestibular nuclei to nuclei supplying the extraocular muscles for coordination of head and eye movement.

Extrapyramidal tracts count...

helpful video

3 Reticulospinal tracts:

- Tract arises from the reticular formation of the brain stem (groups of scattered neurons along with nerve fibers present in midbrain, pons & medulla).
- Contains sensory & motor neuronal groups.
- Pontine and medullary nuclei projects to the AHCs (anterior horn cells) of the spinal cord via Reticulospinal Tract.

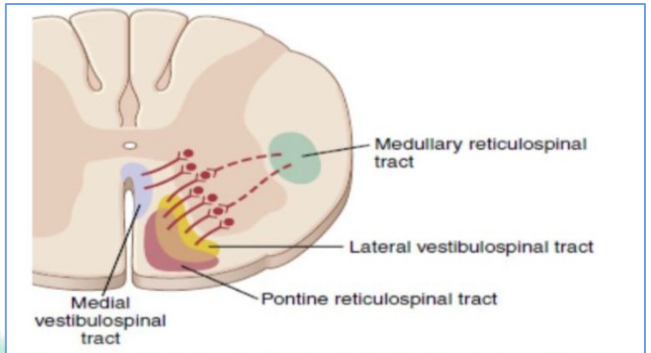


Figure 56-8. Vestibulospinal and reticulospinal tracts descending in the spinal cord to excite *(solid lines)* or inhibit *(dashed lines)* the anterior motor neurons that control the body's axial musculature.

Divisions\ components:	Pontine (Medial) Reticulospinal Tract	Medullary (Lateral) Reticulospinal Tract
Cells of origin	Arises from neurons of the "pontine reticular formation"which has high degree of natural excitability & it receives strong excitatory signals from the vestibular nuclei and the neocerebellum.	arises from neurons in the "medullary reticular formation"
Pathway of the axons + The Function	-Axons descends in anterior (ventral) white column to all levels of the spinal cord. -Terminate mainly on interneurons in the spinal gray matter which excite the medially situated Alpha and Gamma MNs innervating the antigravity muscles, that is, the muscles of the vertebral column and the extensor muscles of the lower limbs.\ Increases Gamma efferent activity (excitatory to axial & antigravity, extensor muscles of the body & increases muscle tone) -It causes powerful excitation of antigravity muscles **-Function**: It is excitatory for extensors & inhibitory for flexors (unlike rubro-spinal).	-Its fibers descend in lateral white column to all levels of the spinal cord on both sides. -The medullary reticular formation receives strong input (afferent) signals from: 1. The corticospinal tract (the premotor area of cerebral cortex) 2. The rubrospinal tract (red nucleus) 3. The paleocerebellum - These activate the medullary reticular inhibitory system to counterbalance the excitatory signals from the pontine reticular system. - synapse with interneurons that medullary reticulospinal tract inhibit the Gamma and Alpha MNs \ efferent activity of antigravity and extensor muscles , but they facilitate the Gamma and Alpha MNs of flexor muscles. **-Function**: Transmit inhibitory signals to antigravity extensor muscles & decreases muscle tone. (inhibitory for extensors like rubro-spinal)

Extrapyramidal tracts count...

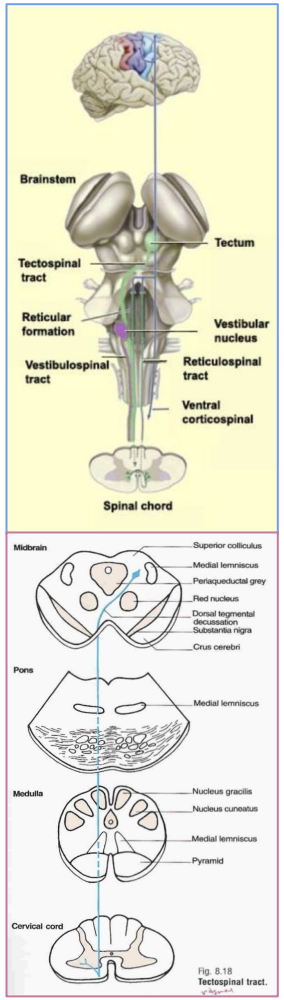
4 Tectospinal tracts

- Originates in Superior Colliculus in the tectum of midbrain → then decussate in the dorsal tegmentum
- From superior colliculi of midbrain (for VISUAL reflexes)
- From inferior colliculi of midbrain (for AUDITORY reflexes)

-Axons descend in ventral white column of spinal cord

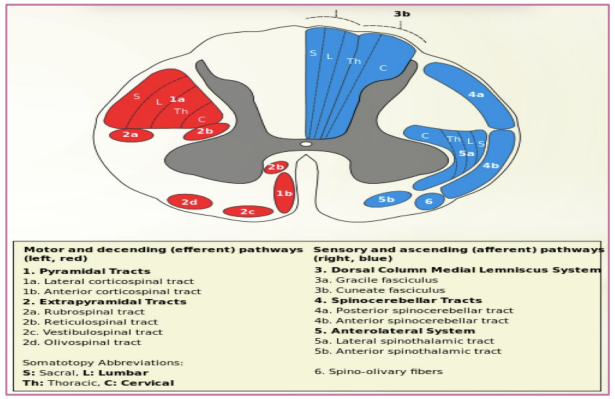
- Terminate \ Ends on contralateral cervical motor neurons

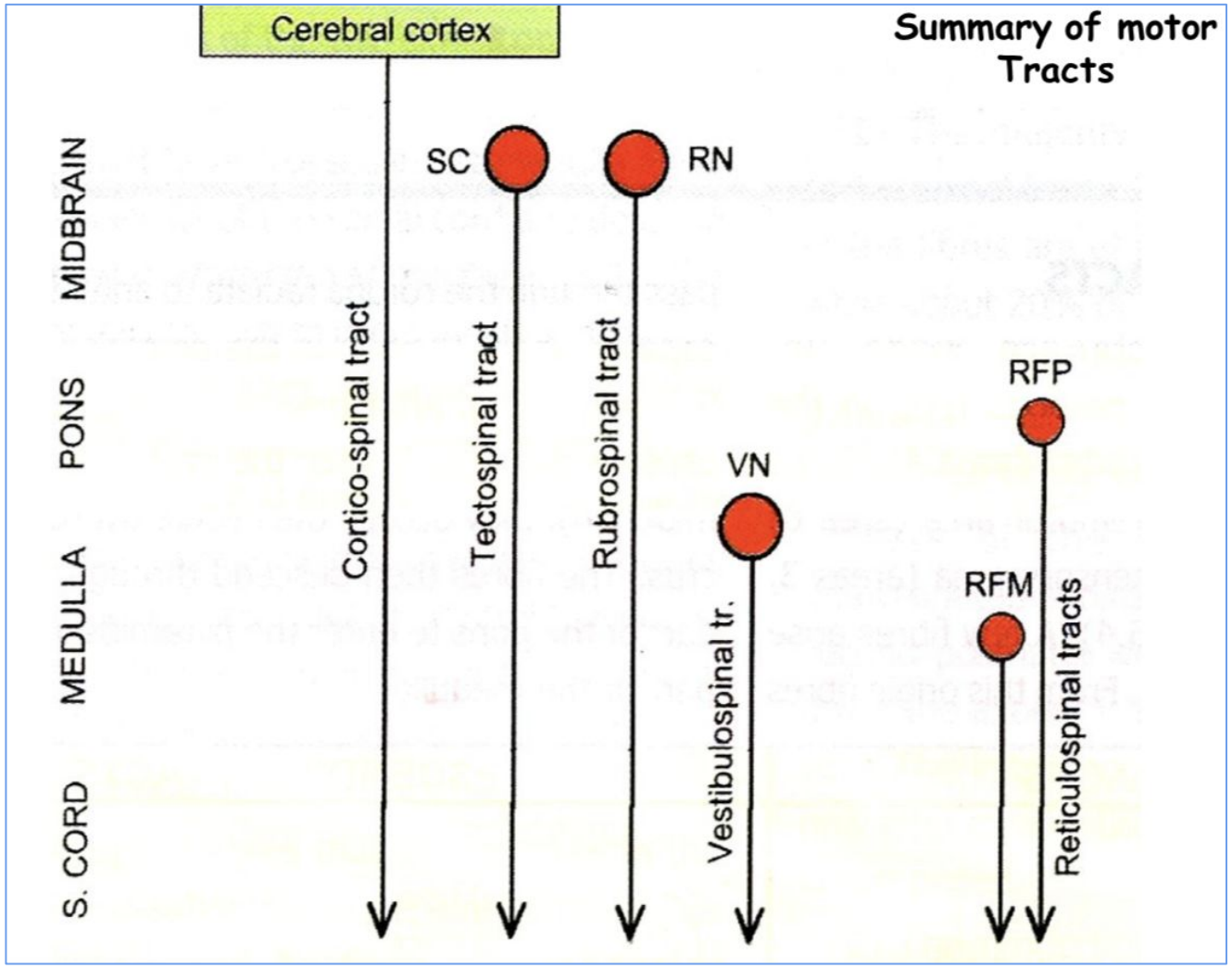
- **Function**: This tract produces \ Mediate\facilitate reflex turning of the head and neck (in response to visual and auditory stimuli)



5 Olivospinal tracts

Cells of origin	It arises from \ originate in inferior olivary Nucleus of the medulla
Pathway of the axon	Found only in the cervical region of the spinal cord
Function	- Supply neck muscles of unknown function (Function is uncertain, but thought to muscle tone) - Secondary olivocerebellar fibers transmit signals to multiple areas of the cerebellum.




Summary of motor Tracts
Cerebral cortex
MIDBRAIN
PONS
MEDULLA
S. CORD
SC
RN
VN
RFP
RFM
Cortico-spinal tract
Tectospinal tract
Rubrospinal tract
Vestibulospinal tr.
Reticulospinal tracts

TEST YOURSELF !

from team439

1- Which one of the following tracts is a pyramidal tract?

A)Olivospinal tract

B)Tectospinal tract

C)Corticospinal tract

D)Rubrospinal tract

2- The lateral motor system of the cord is formed by:

A)Rubrospinal tract

B)Corticospinal tract

C)Vestibulospinal tract

D)both A and B

3- Stimulation of Supplementary Motor area leads to:

A)Word formation

B)Turning head to visual objects

C)Complex coordinated movements

D)bilateral grasping of hands

4- Rubrospinal tract originate from :

A)Reticular formation

B)Red nucleus

C)Vestibular nucleus

D)Tectum

Answers: C, D, D, B

SAQ

from team439

1- List the motor centers areas found in premotor area and their function.

Broca's Area (Speech), Frontal Eye Movements Area (voluntary movements of the eyes toward different objects), Head Rotation Area (directing the head toward different visual objects) and Hand Skills Area (Hand Skills)

2- List the extrapyramidal tracts.

Rubrospinal tract, Vestibulospinal Tract, Reticulospinal Tract, Tectospinal Tract, and olivospinal tract.

3- Explain what will happen in case of removal of (Area Pyramidalis) of the Primary Motor Cortex.

loss of voluntary control of discrete movements of the distal segments of the limbs, especially of the hands and fingers.

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Team logo and design was done by **Rafan Alhazzani**
Special Thanks to Physiology **Team441 And ALEEN ALKULYAH** for the Theme!!

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