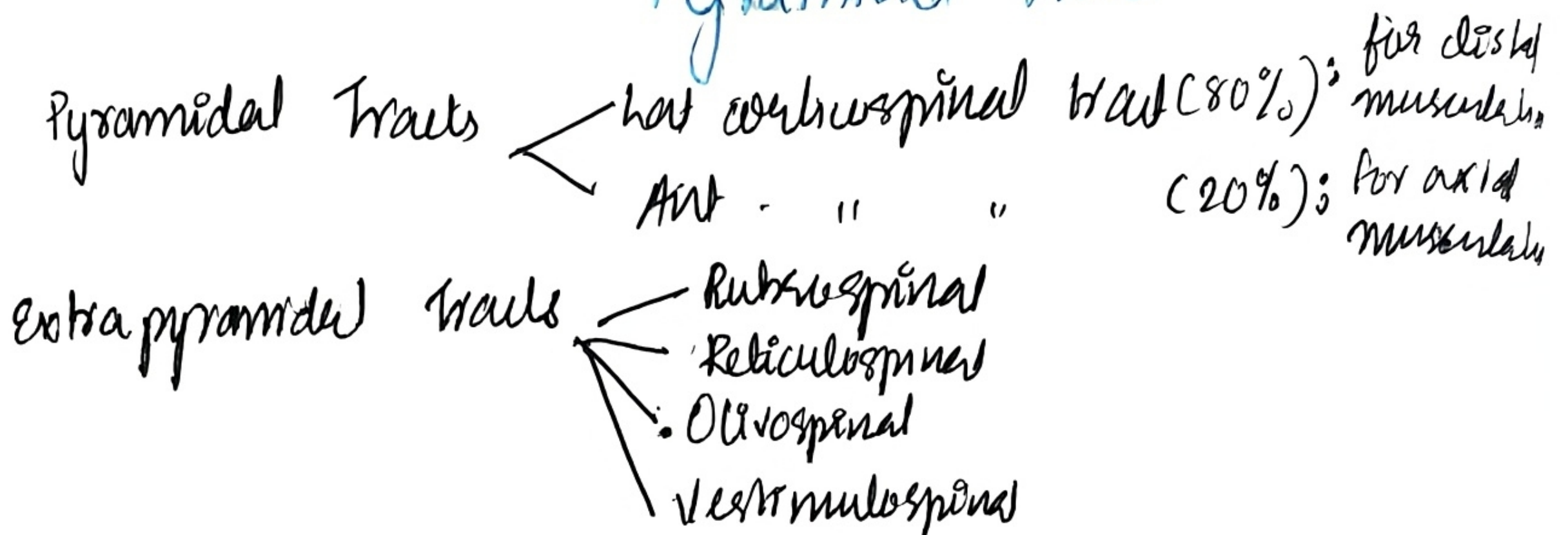


CORTICOSPINAL TRACT

— Pyramidal Tract



Different Areas of Brain.

- 4 lobes
- (a) Frontal → central sulcus. deep
 - (b) Parietal → Parieto-occipital sulcus
 - (c) Occipital → Sylvian/lat sulcus
 - (d) Temporal

Brain stem — Pons
Medulla Oblongata

Sensory areas of brain.

- 1° somatic sensory area. [3, 1, 2]
- 2° somatic sensory area.
- 1° visual area
- 2° ~~visual area~~ area
- 2° visual area.
- 1° auditory area
- 2° auditory area

All these info link up in associatⁿ area
in posterior part;

- (a) Parieto-occipital temporal association area
- (b) Limbic, Ass. area
- (c) Prefrontal Ass area

Info reach (a) → (b) → (c) → motor areas
decide the action

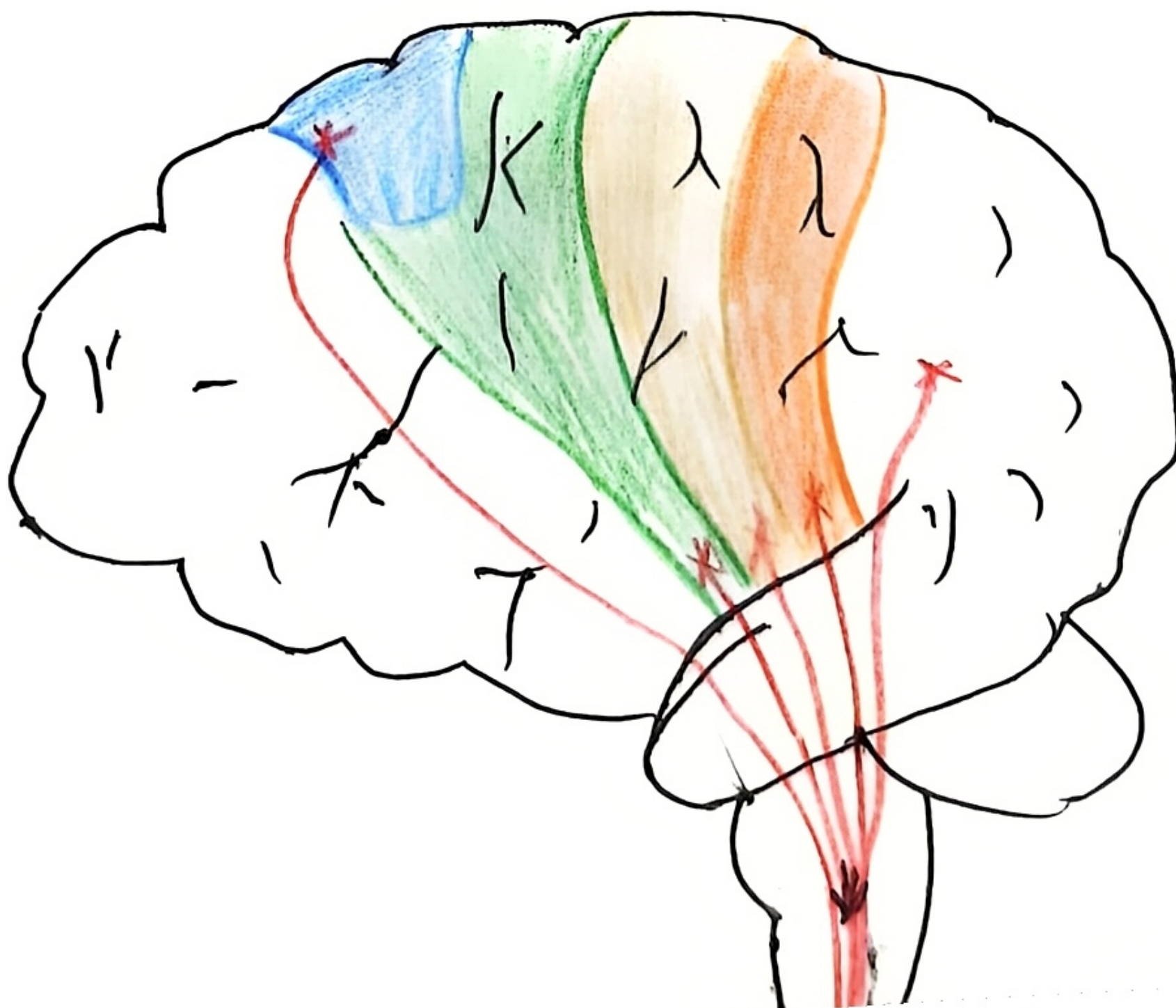
Motor areas of brain.

1^o motor area (4)

Premotor area

Supplementary Association area (SMA) [6]

the fibres from SMA + premotor cortex + 1^o motor area.
(29%) (31%)
(40%)
+ somato sens area + somat. sens. associatⁿ areas
(and parietal area)
form a tract → corticospinal tract [5, 7]



From all motor areas → Basal ganglia & thalamus.

from where planning & programming of movement

It also receives proprioceptive info from cerebellum

i.e. position for action/reaction

then this info later go back to motor areas

↳ corticospinal tract → diff parts of body

Brain

Primary Motor Cortex

located in Broadmans area four. MEI 4

→ Brodmann's Area - 4.

* LPS in the

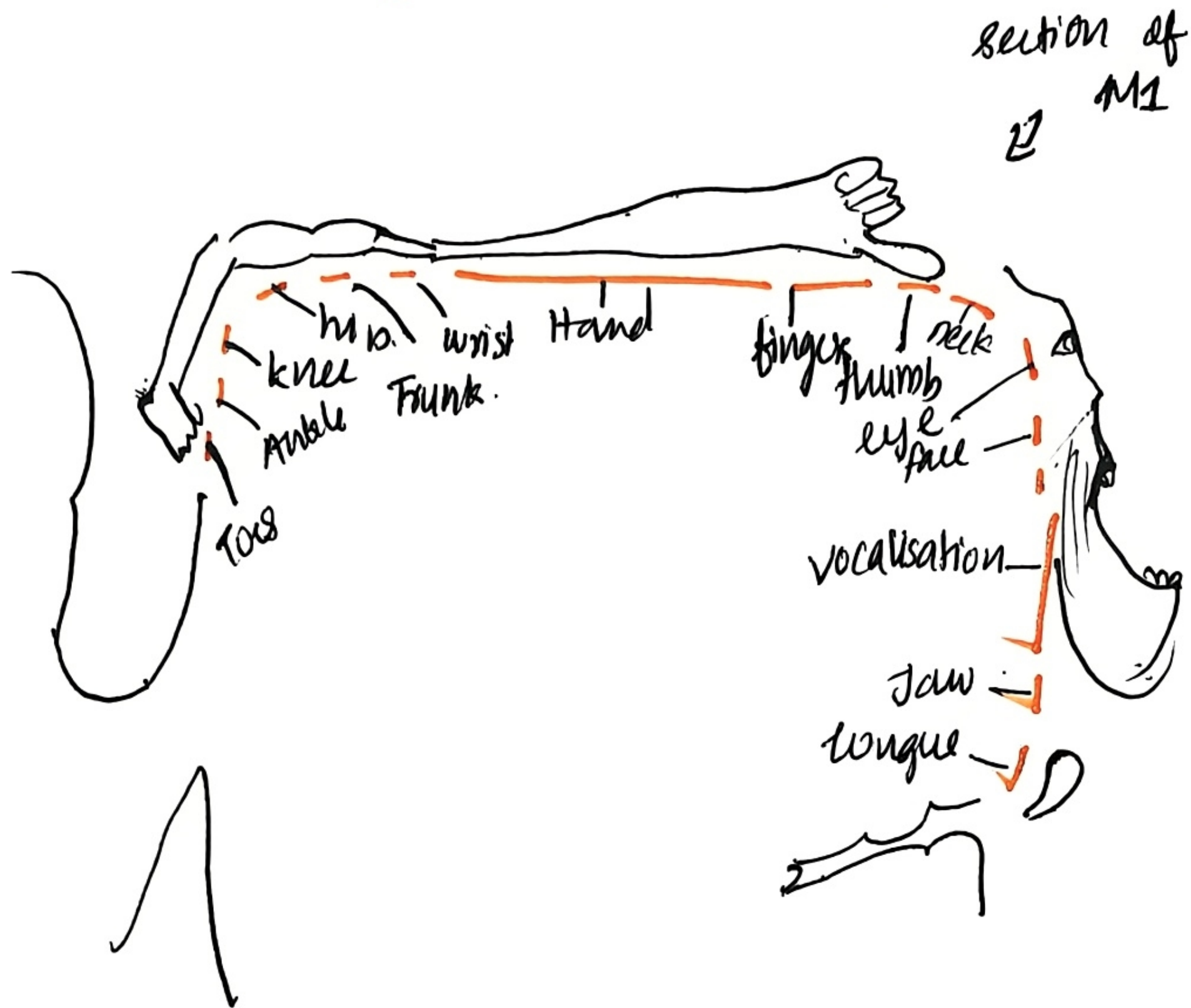
- precentral gyrus and on and paracentral lobule on medial surface of brain.
- first convolution of frontal lobes anterior to central sulcus
- Begins laterally in sylvian fissure
↓
superiorly to uppermost portions of brain.

Runs into longi feature of mass.

* Layer V is the distinctive neuronal layer which also contains giant cells.

* Contributes to the 30% of the fibres of corticospinal tract

HOMUNCULUS REPRESENTATION / TOPOGRAPHICAL MAP



Outline of Map

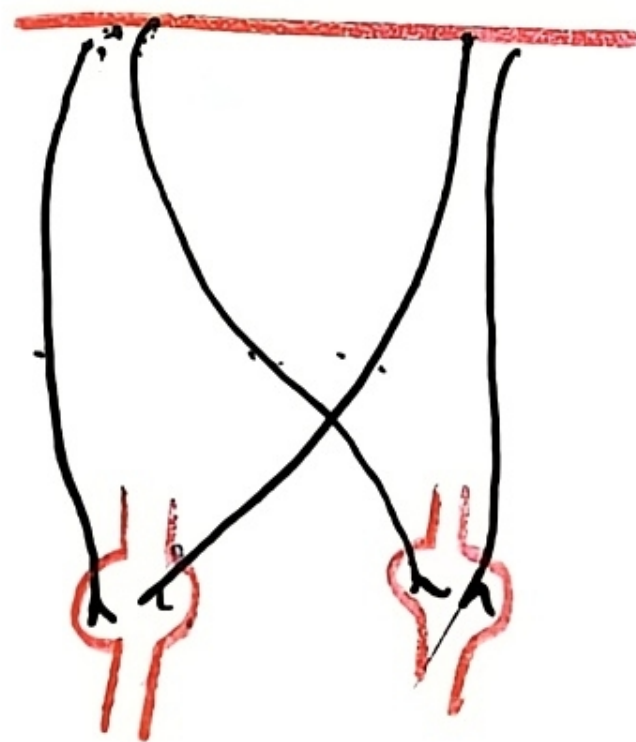
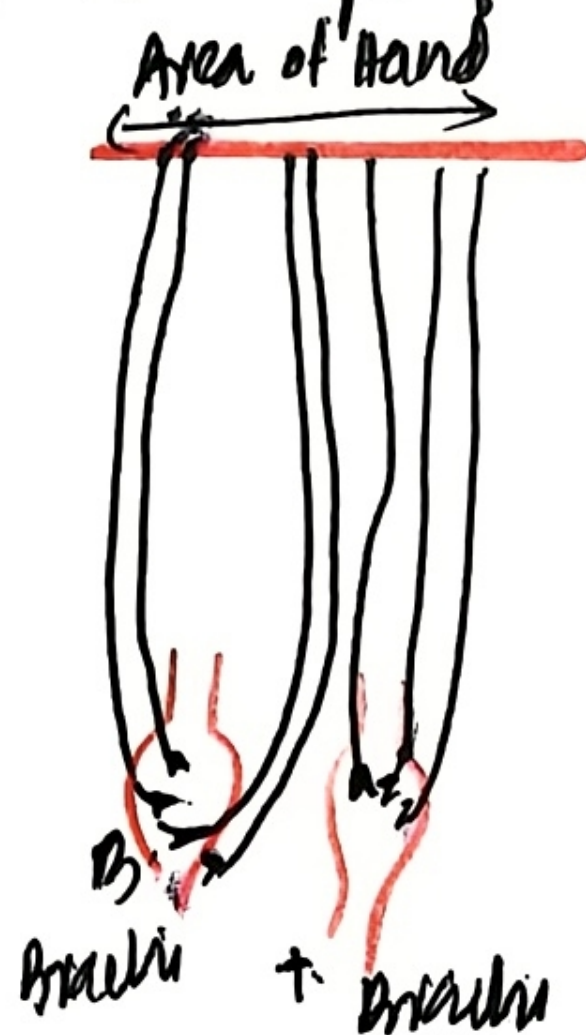
- x Face & mouth → laterally, near Sylvian sulcus.
- x Arm & Hand → midportion
- x Trunk → Apex, medially.
- x Leg & Foot → Dips in the longi fissure, in ant paracentral lobule.

Muscles of hand & Speech = $\frac{1}{2}$ of area of 1 motor area

NB: this representation does not mean that all nerves to specific muscle is present in a specific area.

this map only shows that a specific body part is assigned to a specific area

Eg:



* Functions of M1.

Least amount of electric current

↓ stimulates

1° motor cortex

↓ sends neurons

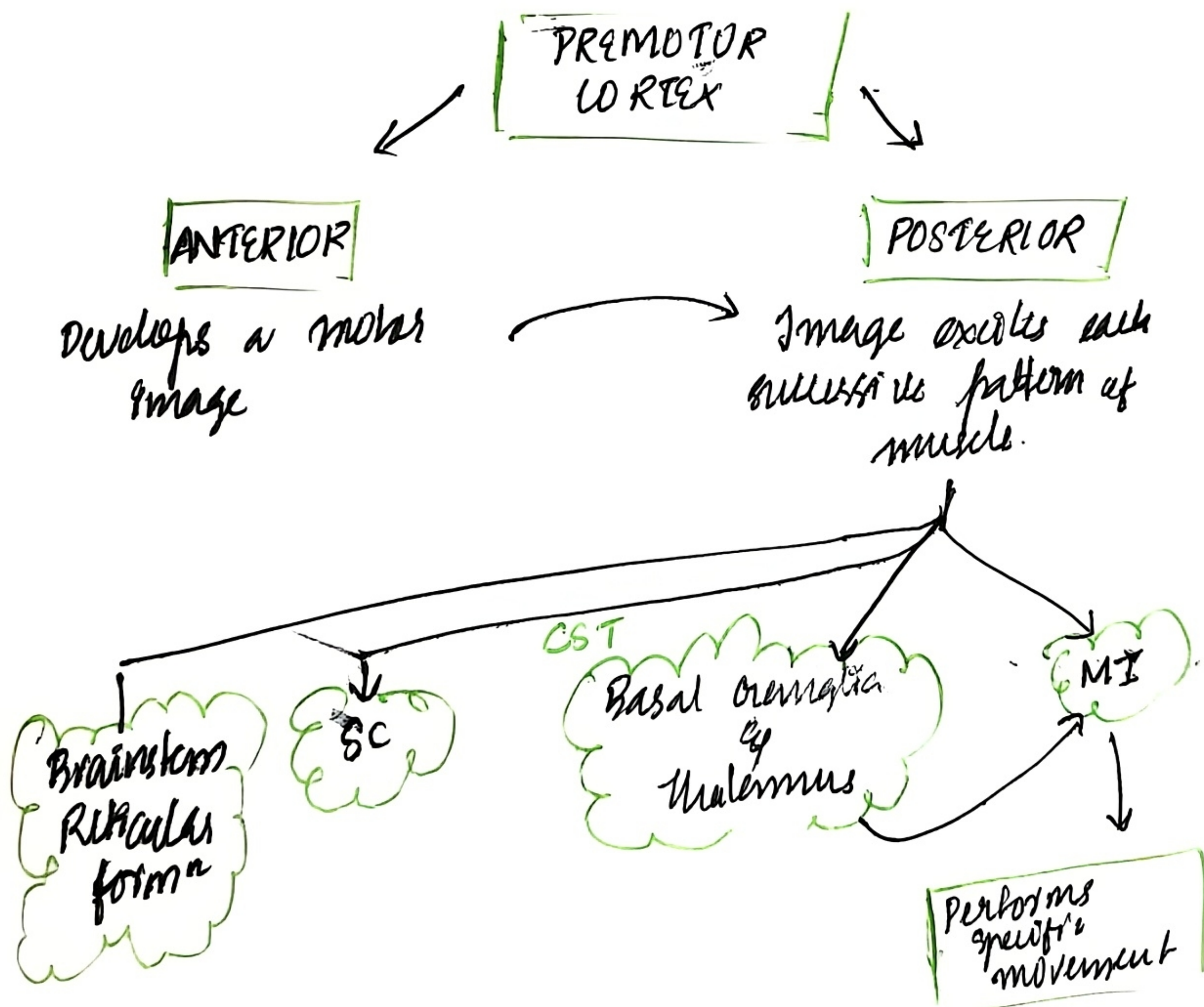
a motor neuron

↓ elicits

simple movements of individual body parts

PREMOTOR AREA (6-lateral)

- * extends from sylvian fissure to superior longitudinal fissure
- * Homunculus representation on topographical map of this area is the most similar to 1° motor area.
- * contributes to 29% of corticospinal tract along with SMA
- * sends neuron to 1° motor area as well as spinal cord



Functions of Premotor Area

| Higher amount of electric stimulus |

↓ stimulates.

| Premotor cortex |

↓ sends neurons.

| α motor neuron |

↓ elicits

| complex pattern of movement |

| selection of approp motor plans. |

Based on visual stimulus + abstract association ↗

↘ execution by 1° motor cortex

SUPPLEMENTARY ASSOCIATION AREA

- * Brodmann's Area - 6 (medial)
- * Lies in
 - mainly in longitudinal fissure but extends to a small extent into superior frontal cortex.
- * Contributes 29% of corticospinal fibres with premotor cortex
- * Homonymous presentation is not very clearly distinguishable as in case of M1 & premotor area

Functions of SMA.

Higher ~~of~~ amt of electric stimulus
↓ stimulates

~~stimulates~~

SMA

↓ sends neurons

α motor neuron

↓ elicits.

complex pattern of movements.

organizing planning of motor sequences.

selection of complex motor plans ~~motor~~



based on remembered seq. of movements

Execution by 1° motor cortex

Attainment
motor skills

Uncoordinated bilateral contraction

↓
e.g.: Bilateral grasping movements of both hands simultaneously.

Some Specialised Areas of Motor cortex

~~1) Broca's Area~~

1) Broca's Area (44/45)

- * located in premotor area
- * motor speech area
- * lies
 - immediately ant to m1.
 - immediately above sylvian fissure
- * Damage leads to Broca's aphasia / Motor aphasia
 - Vocalisation is unaffected
 - Uncoordinated utterance and use of some common occasional words like yes, no, umm...

2) Voluntary Eye Movement Field (8)

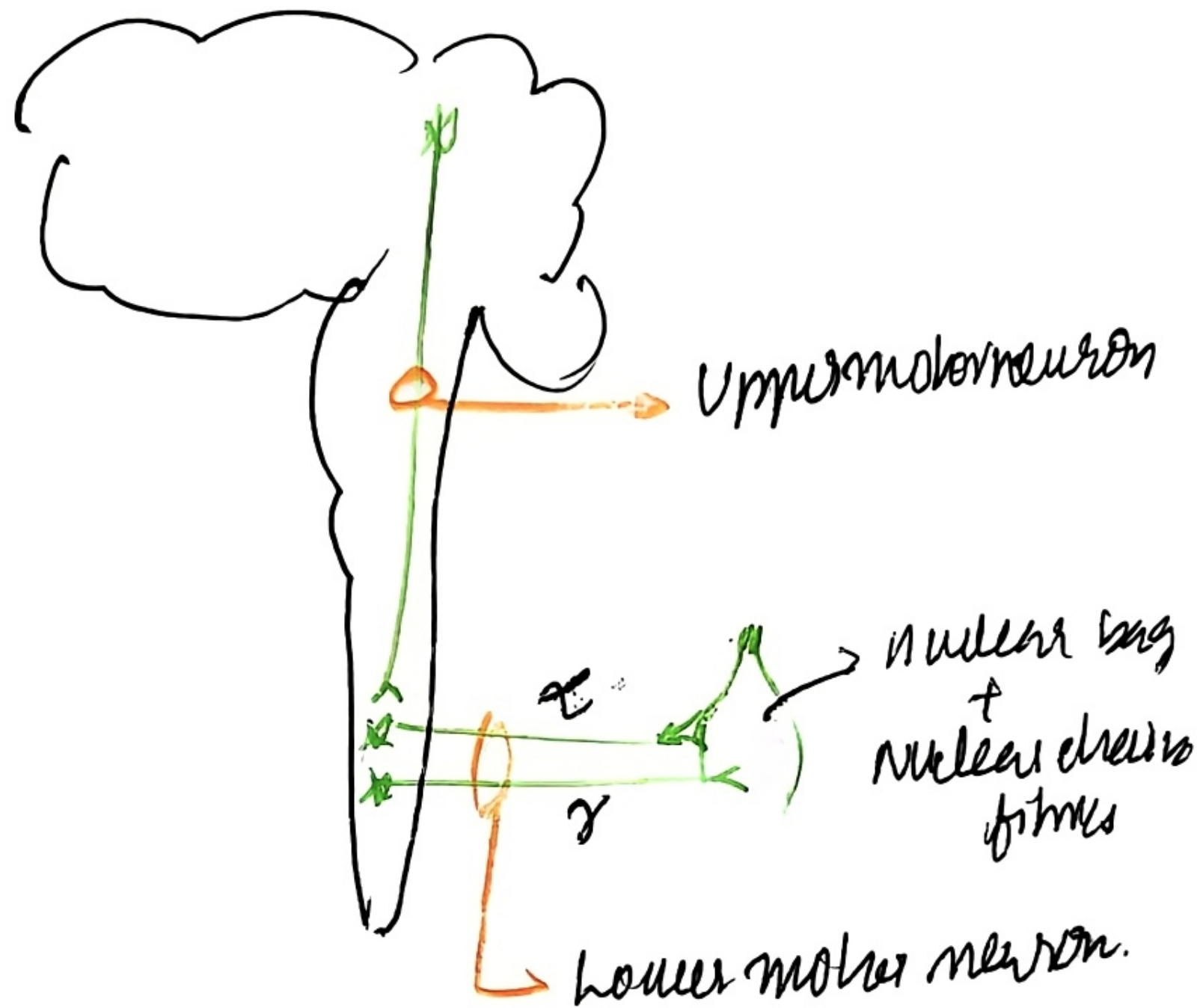
- * located in premotor area
- * motor visual area
- * lies
 - immediately above Broca's area
- * Damage of this area affects voluntary movement of eye towards left objects

3) Area of Head Rotation

4) Area for hand skills

THE PATHWAY

Basics



α -LMN fibres

↳ supplies extrafusal fibres
(contractile fibres)

γ -LMN fibres

↳ supplies intrafusal fibres
(proprioception)

X

some giant pyramidal cells

or

Betz cells

from 1° motor area.



3% of
total
AHCs

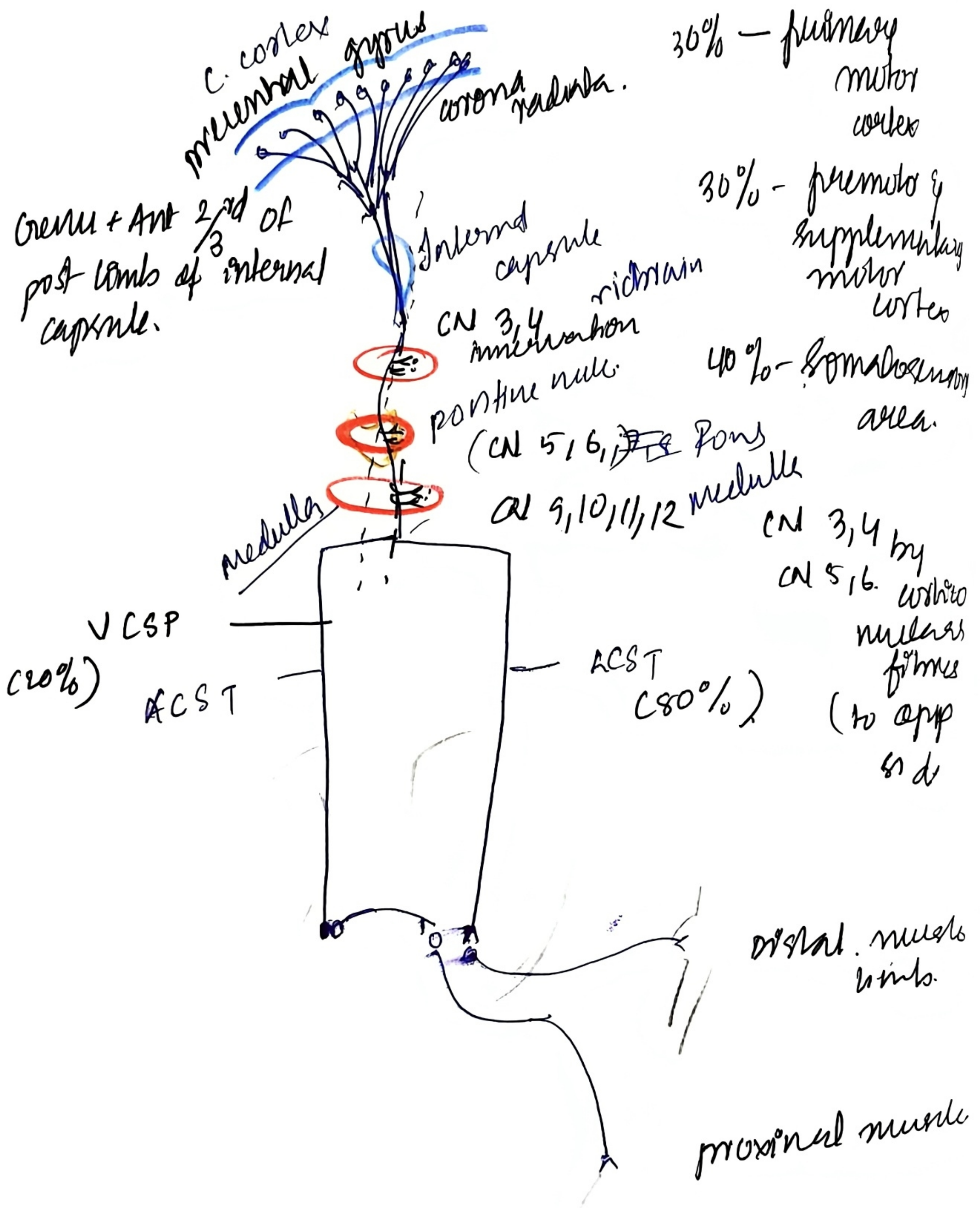
Large Myelinated
AHCs



Most rapid rate
of transmission

Diameter 16 μ
vel = 70 m/s

Sp1 point: for next
page.



* Info. from cerebral cortex → corona radiata
[fan like projection of neurites]

Pontine Nuclei ← internal capsule (post limb)
; nuclei on pons
some fibres crosses midline in the middle cerebellar peduncle of opp side and receive proprioceptive signals
↳ Pyramidal decussation, ^{of CST} happens @ level of medulla.

↳ Spinal cord: descend downward laterally
and then enter anterior horn; lat CST (80%)
* 20% fibres descend down ipsilaterally and enter
anterior horn, ventral CST
↳ lat CST; @ anterior horn ^{where} motor neuron ^{originates} _{terminates} ←

↳ supply intrafusal & extrafusal fibres (K & T)

while

ventral CST; descend ~~at~~ on reaching anterior
white horn & reach app part of SC &
↓
terminate → origin of LMN

↳ supplies muscles (axial) (K & T)

Questions .

1. Name all ascending & descending tracts of CNS ?

2. Describe

- i) 1^o motor cortex
- ii) pre motor area
- iii) SMA

3. Explain the location & function of Broca's area?

4. Describe the condition of Broca's aphasia?

5. Diff b/w & of α & γ - LMN fibres

6. Elaborate the pathway of CST / pyramidal tracts.