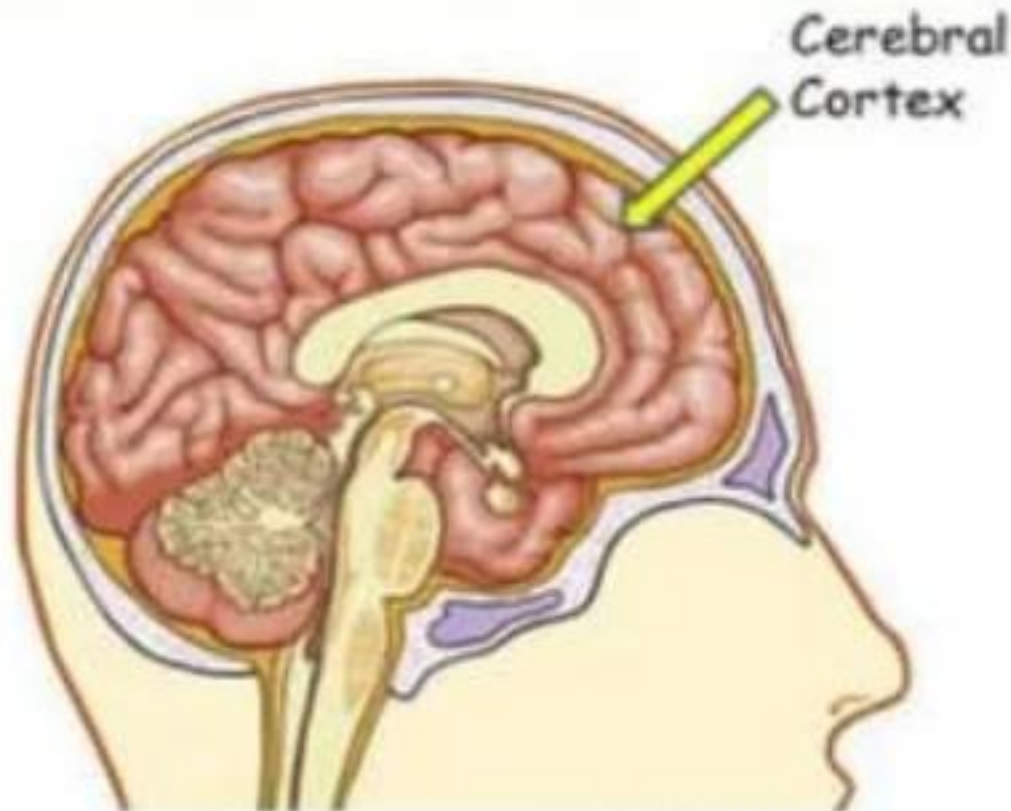
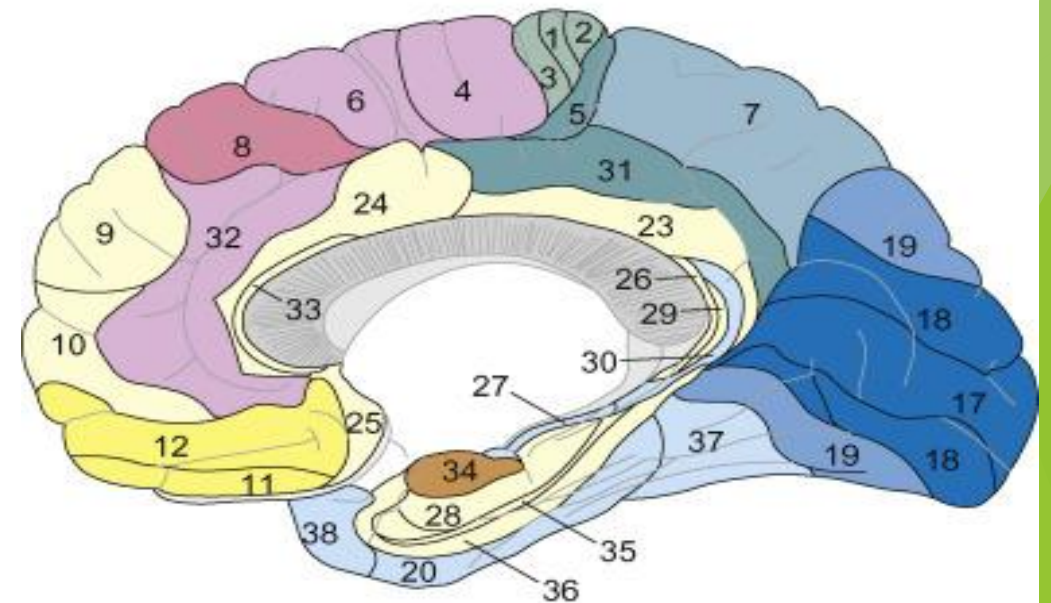
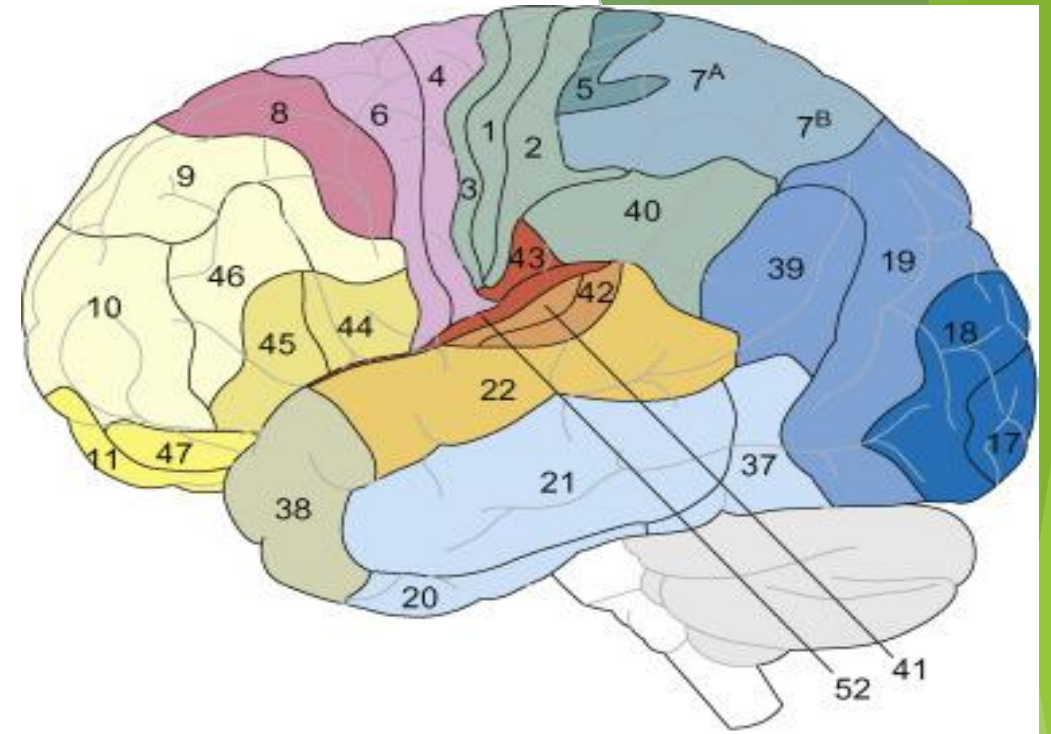


FUNCTIONAL AREAS OF CEREBRAL CORTEX



- Cerebral cortex is demarcated into large number of areas which differ from each other in structure as well as function.
- Brodmann mapping- 52 areas in cerebral cortex



Types of cortical areas

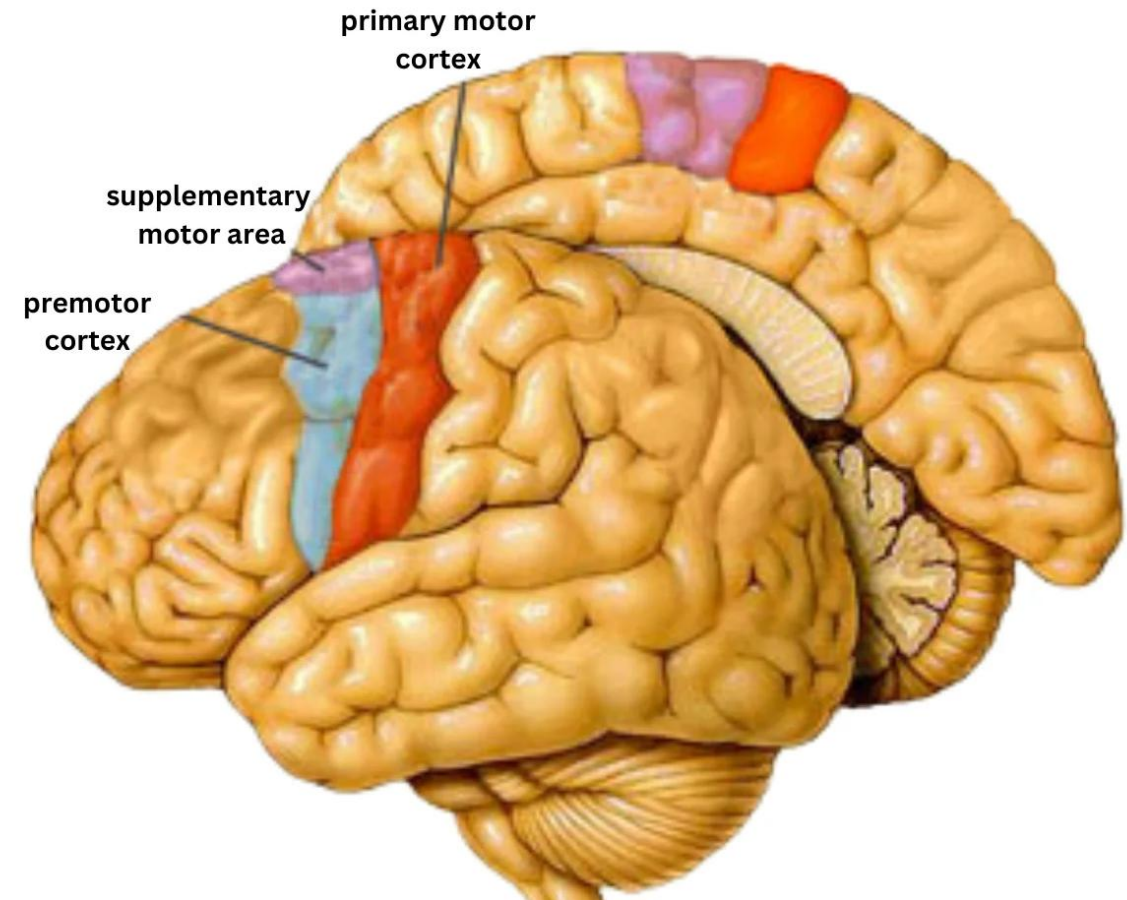
- ▶ 3 types of functional areas:

- ▶ *Motor areas*- primarily concerned with motor functions
- ▶ *Sensory areas*- primarily concerned with sensory functions
- ▶ *Association areas*- have important associative, integrative and cognitive functions

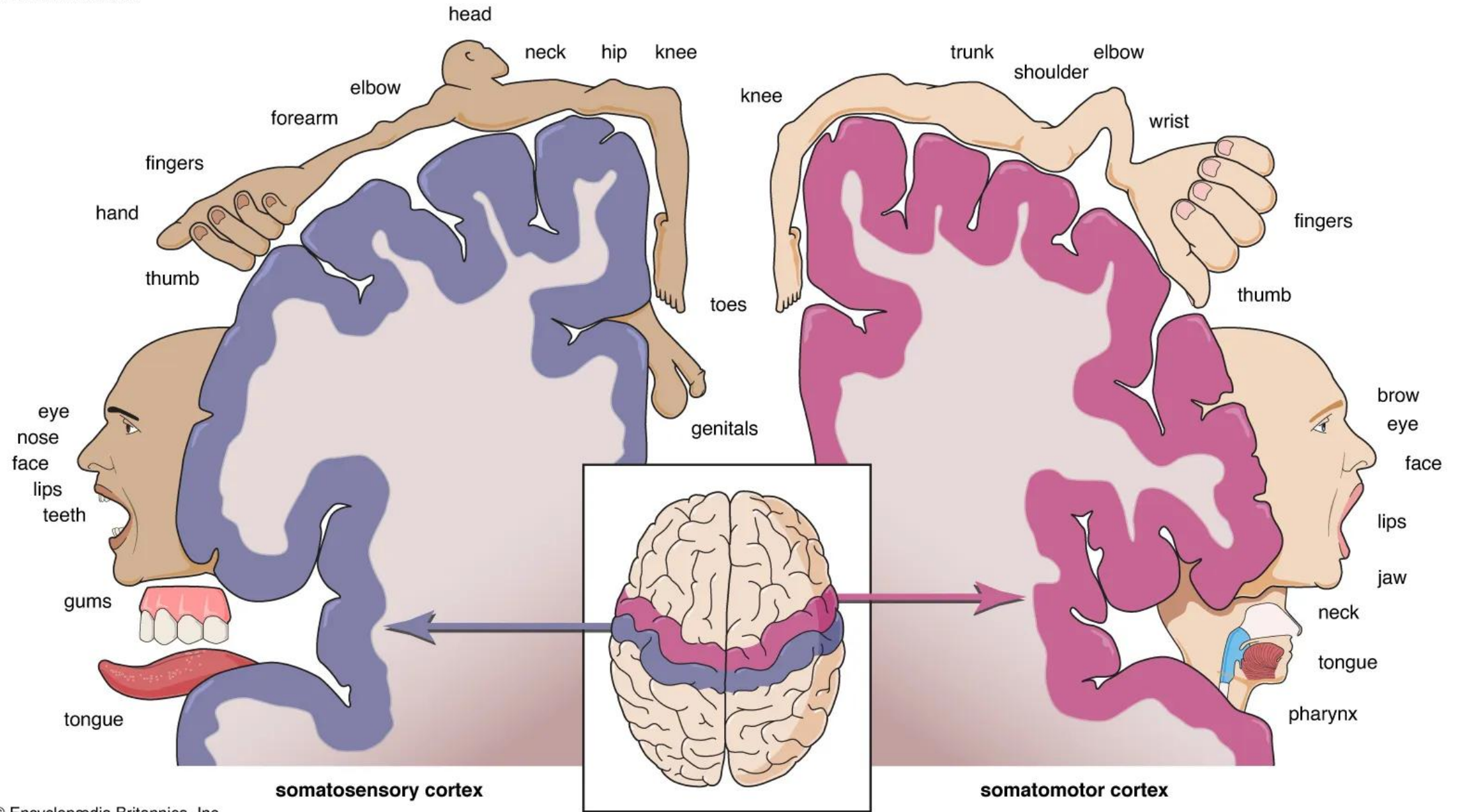
FUNCTIONAL AREAS IN FRONTAL LOBE

Primary Motor Area (Area 4)

- ▶ Located in the *precentral gyrus*, extends to *ant. part of paracentral lobule*.
- ▶ Controls movements of voluntary muscles of oppo. half of body.
- ▶ Somatotopic representation- *Motor homunculus*
- ▶ Lesion in one hemisphere produce spastic paralysis of extremities of oppo half of body(*hemiplegia*)

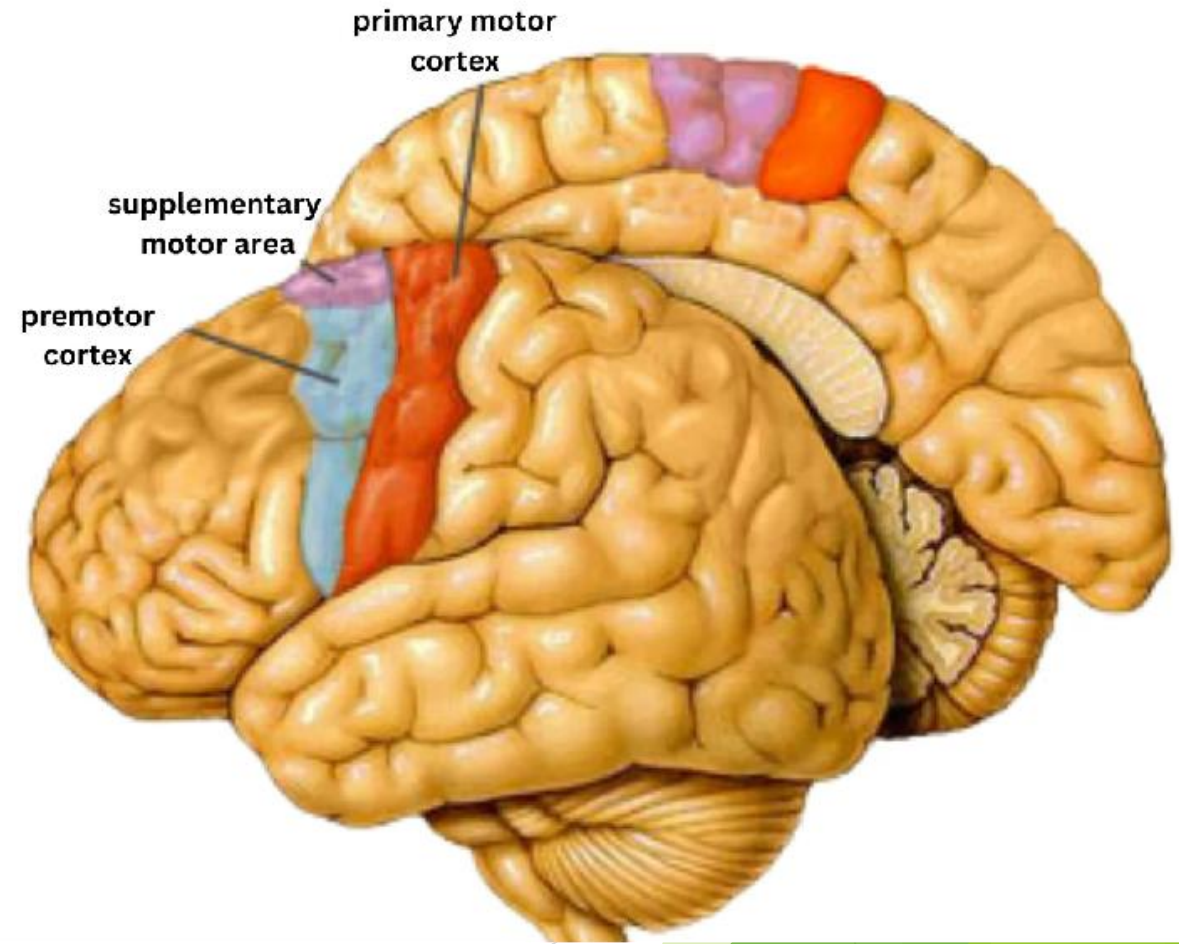


Homunculus



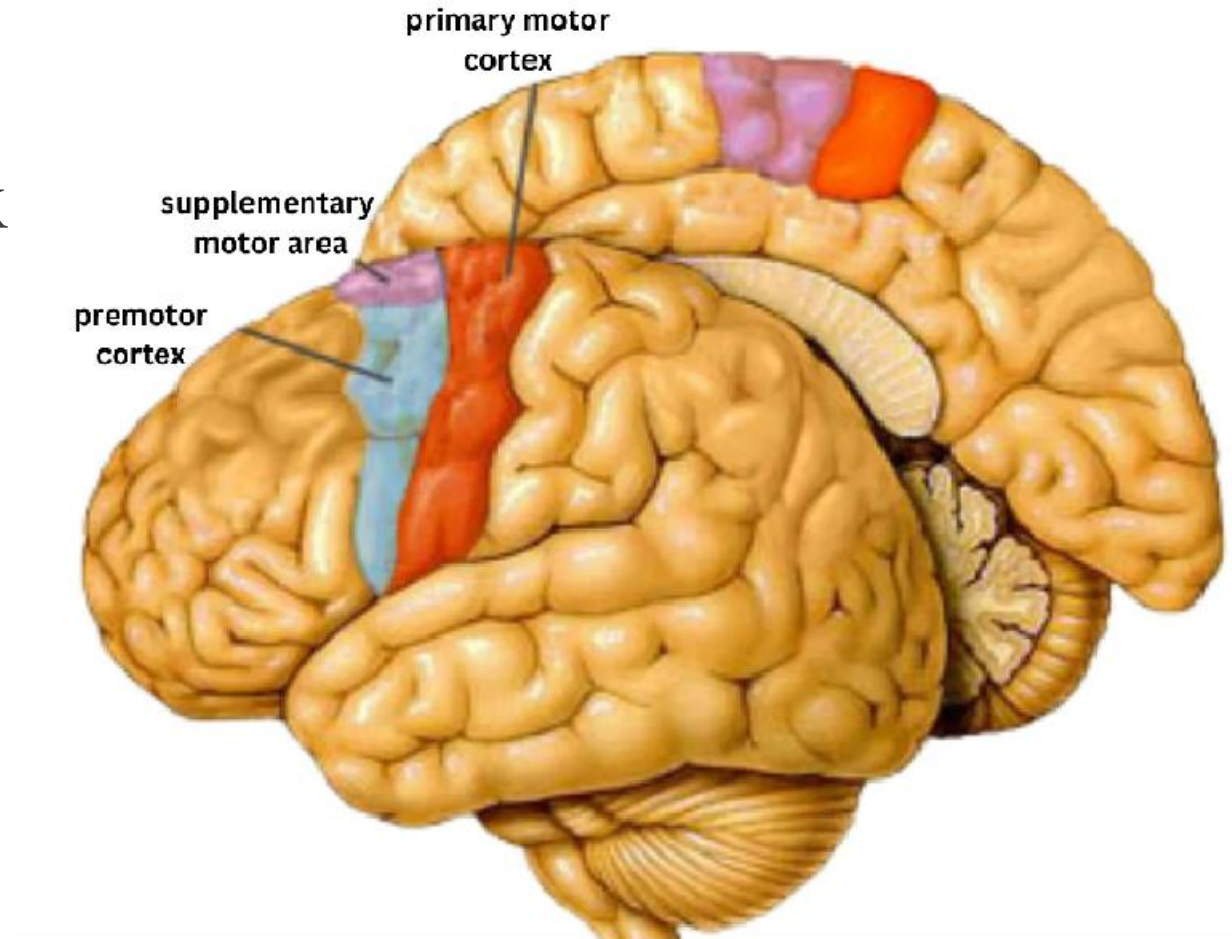
Premotor Area (Area 6)

- ▶ Located anterior to primary motor area in the *post. parts of superior, middle and inferior frontal gyri* and extends on medial surface.
- ▶ Main site for the cortical origin of extrapyramidal fibers.
- ▶ Responsible for voluntary movements to perform skilful acts.
- ▶ Lesion produce *difficulty in performance of skilled movements*.



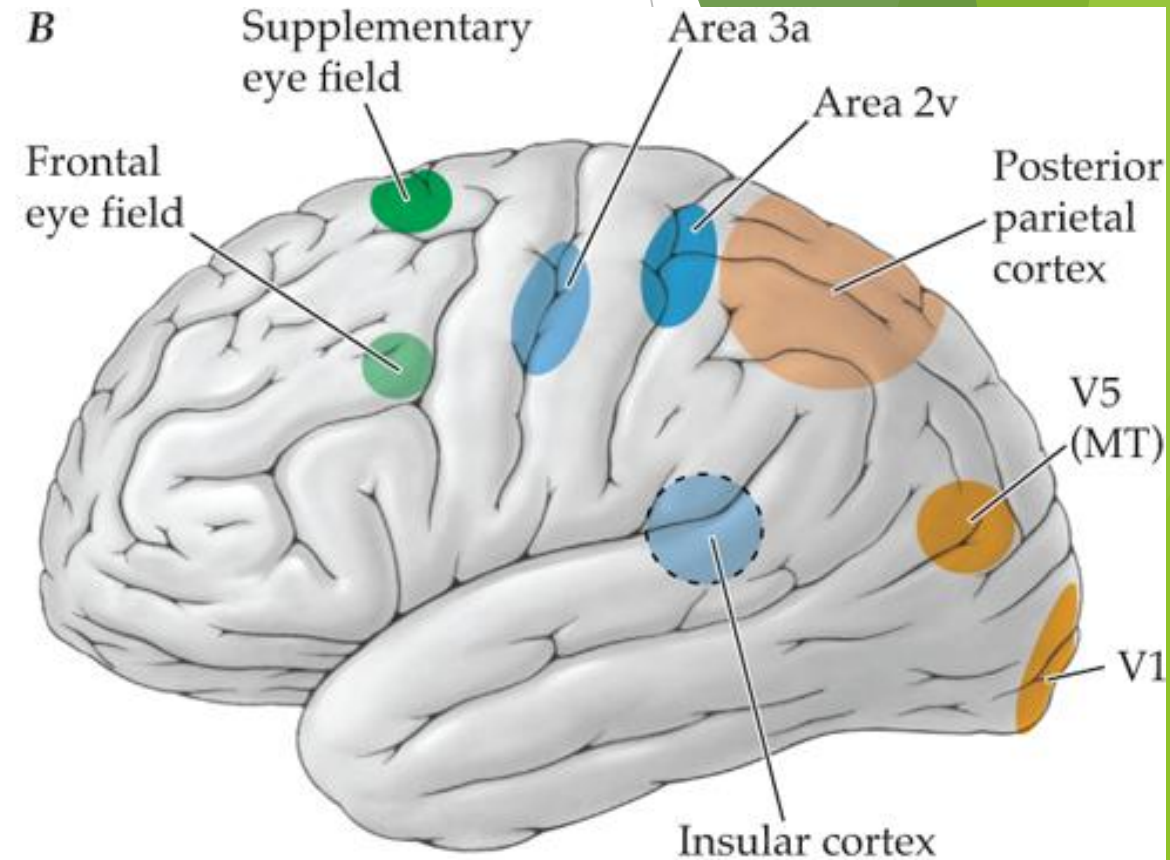
Supplementary Motor Area (MsII)

- ▶ Located in the posterior part of *medial frontal gyrus*.
- ▶ Function is to control the complex movements which require sequential organisation.
- ▶ Lesion produce *akinesia*.



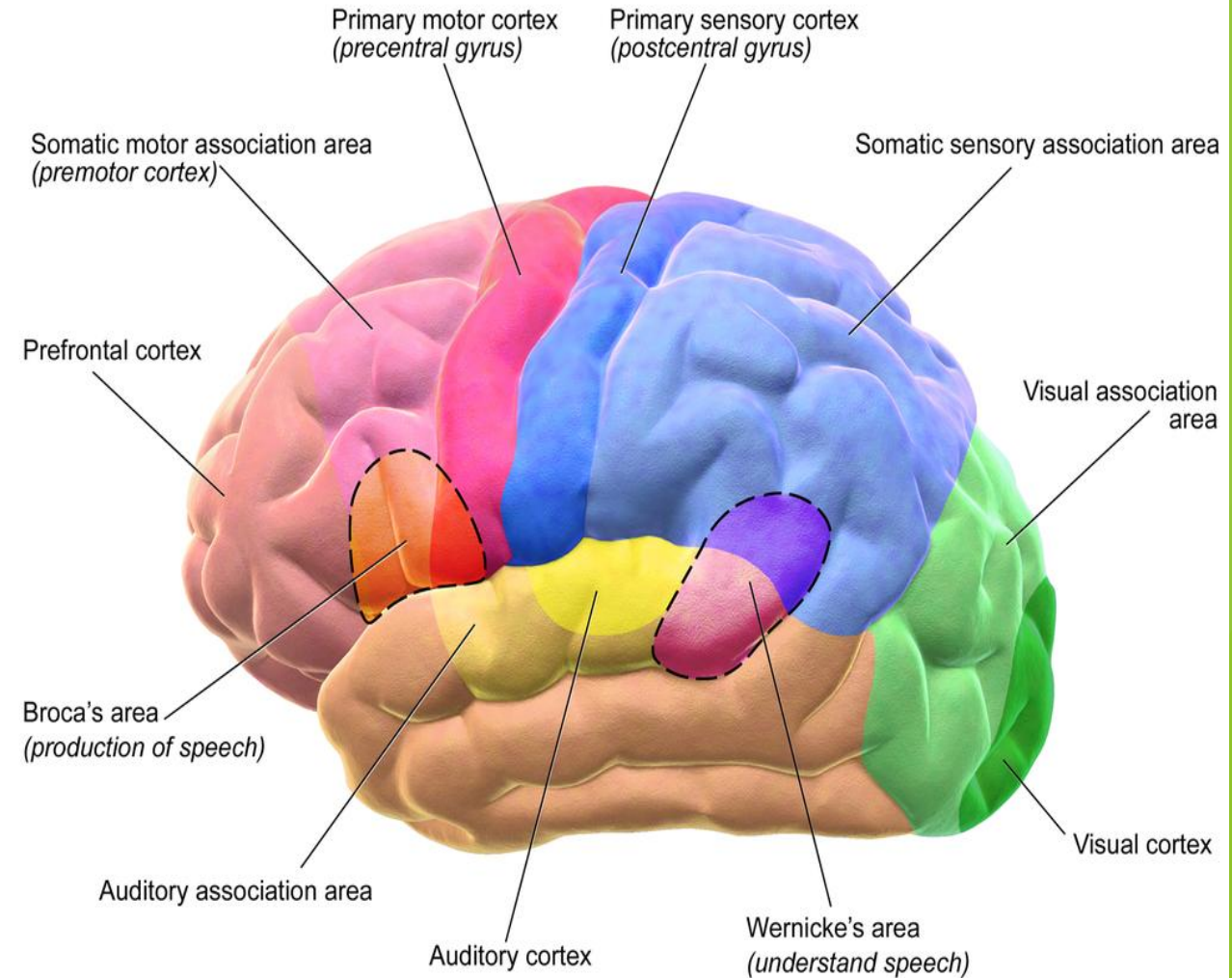
Frontal Eye Field (Area 8)

- ▶ Located in the *posterior part of middle frontal gyrus*.
- ▶ Regulates voluntary conjugate movements of eyes.
- ▶ Lesion of one hemisphere *cause the two eyes to deviate to the side of lesion and an inability to turn eyes to the opposite side*.



Motor Speech Area of Broca (Areas 44 and 45)

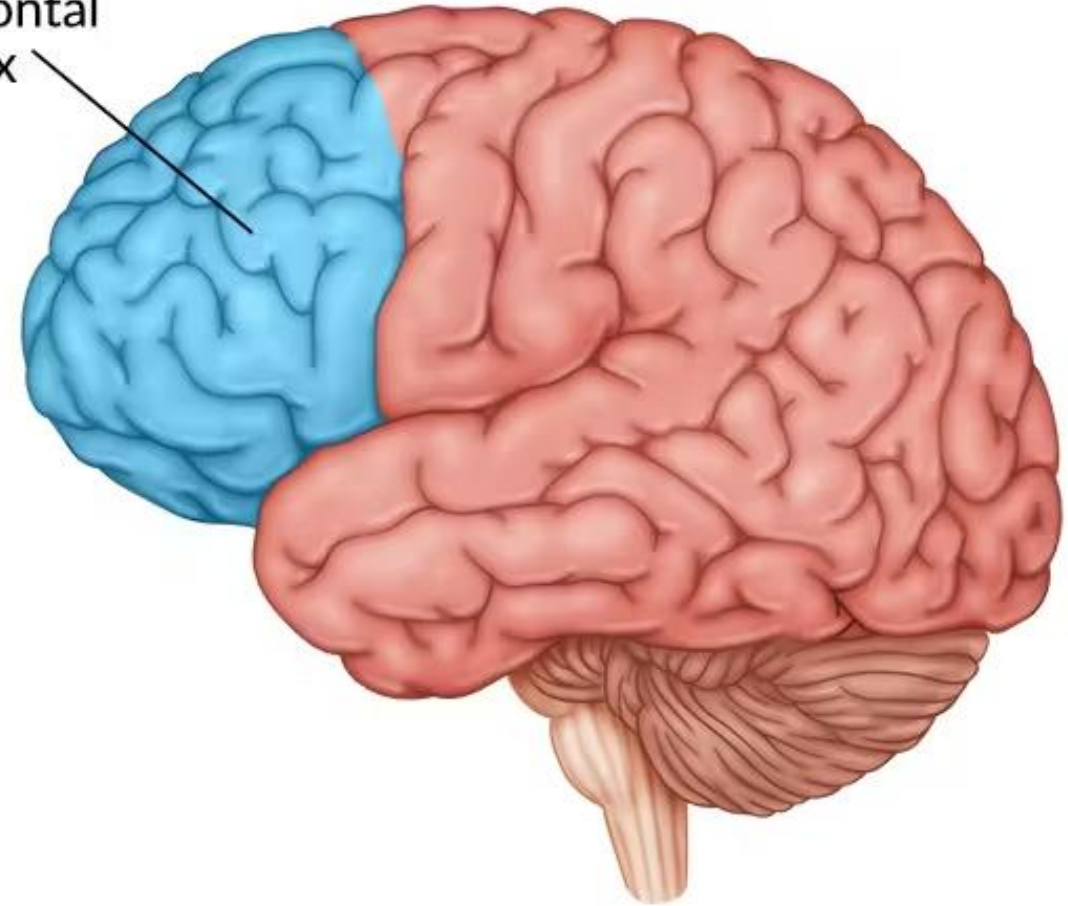
- ▶ Located in *pars triangularis* (area 45) and *pars opercularis* (area 44) of inferior frontal gyrus.
- ▶ Responsible for production of expressive speech/vocalization.
- ▶ Lesion *results in loss of ability to produce speech, i.e. expressive aphasia (motor aphasia)*.



Prefrontal Area (Area 9 to 12)

- ▶ Part of frontal lobe *rostral to motor and premotor area.*
- ▶ Concerned with individual's personality.
- ▶ Essential for abstract thinking, mature judgement, foresight and tactfulness.
- ▶ *Bilateral destruction of prefrontal areas results in profound change in personality.*

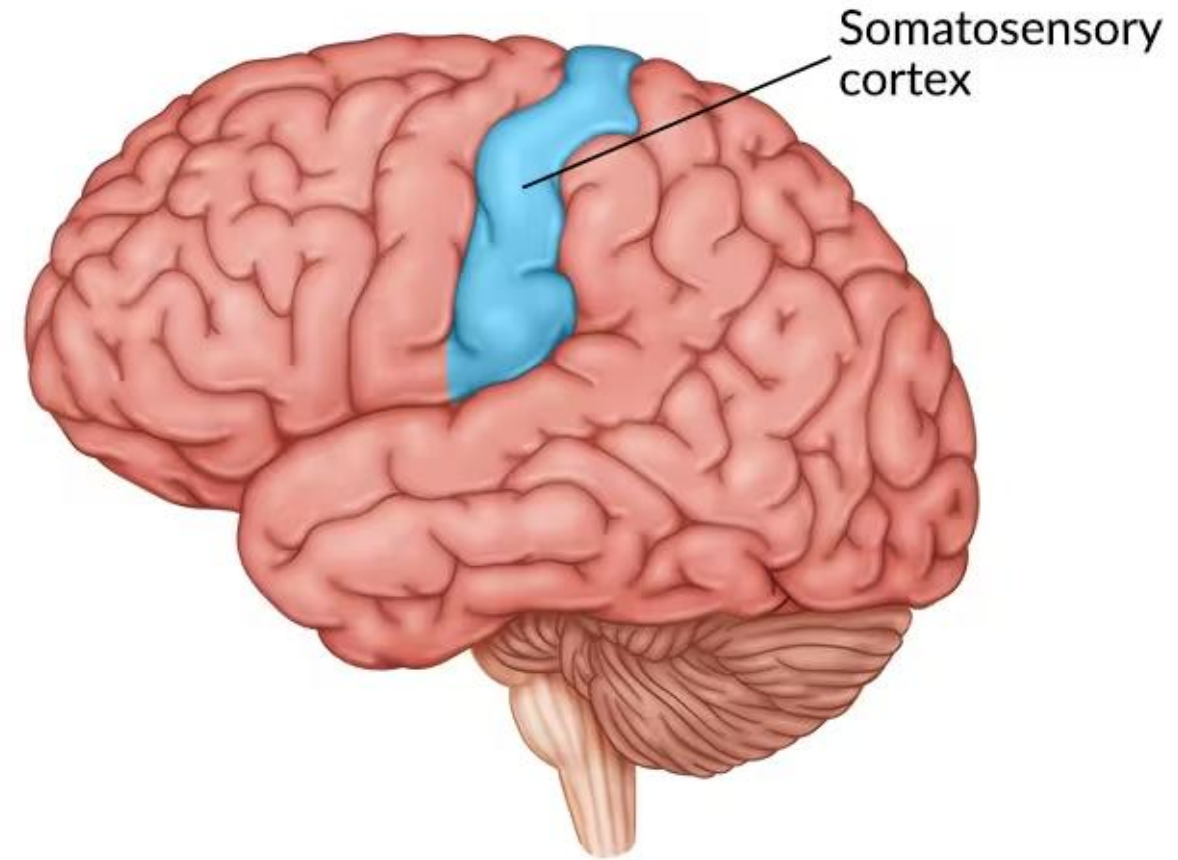
Prefrontal cortex



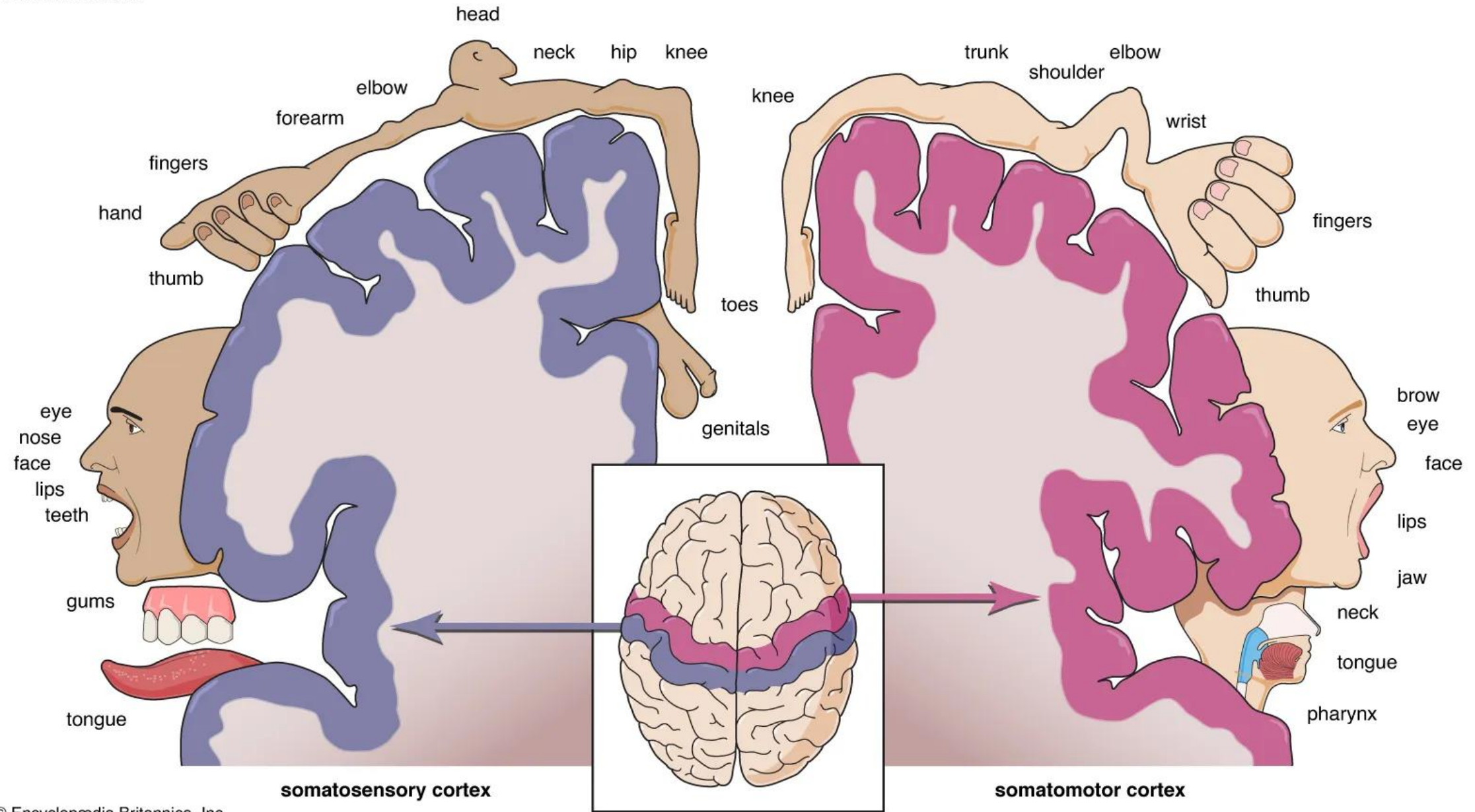
FUNCTIONAL AREAS IN PARIETAL LOBE

Primary Sensory Area (Area 3, 1, 2)

- ▶ Located in *the postcentral gyrus and extends into posterior part of paracentral lobule.*
- ▶ *Sensory homunculus*
- ▶ Concerned with perception of exteroceptive and proprioceptive sensations from opposite half of body.
- ▶ Lesion leads to *loss of appreciation of exteroceptive and interoceptive sensations from opposite half of body.*

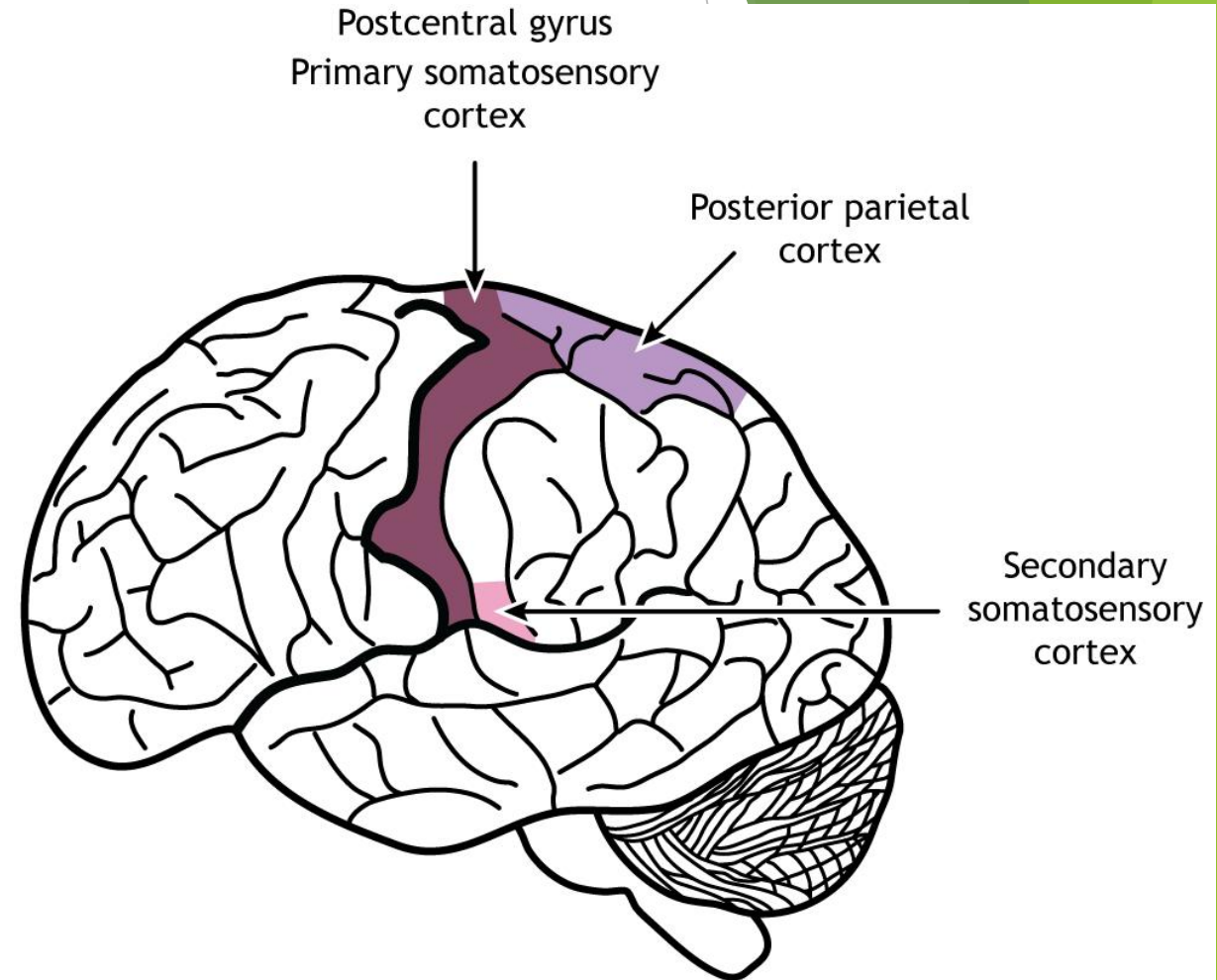


Homunculus



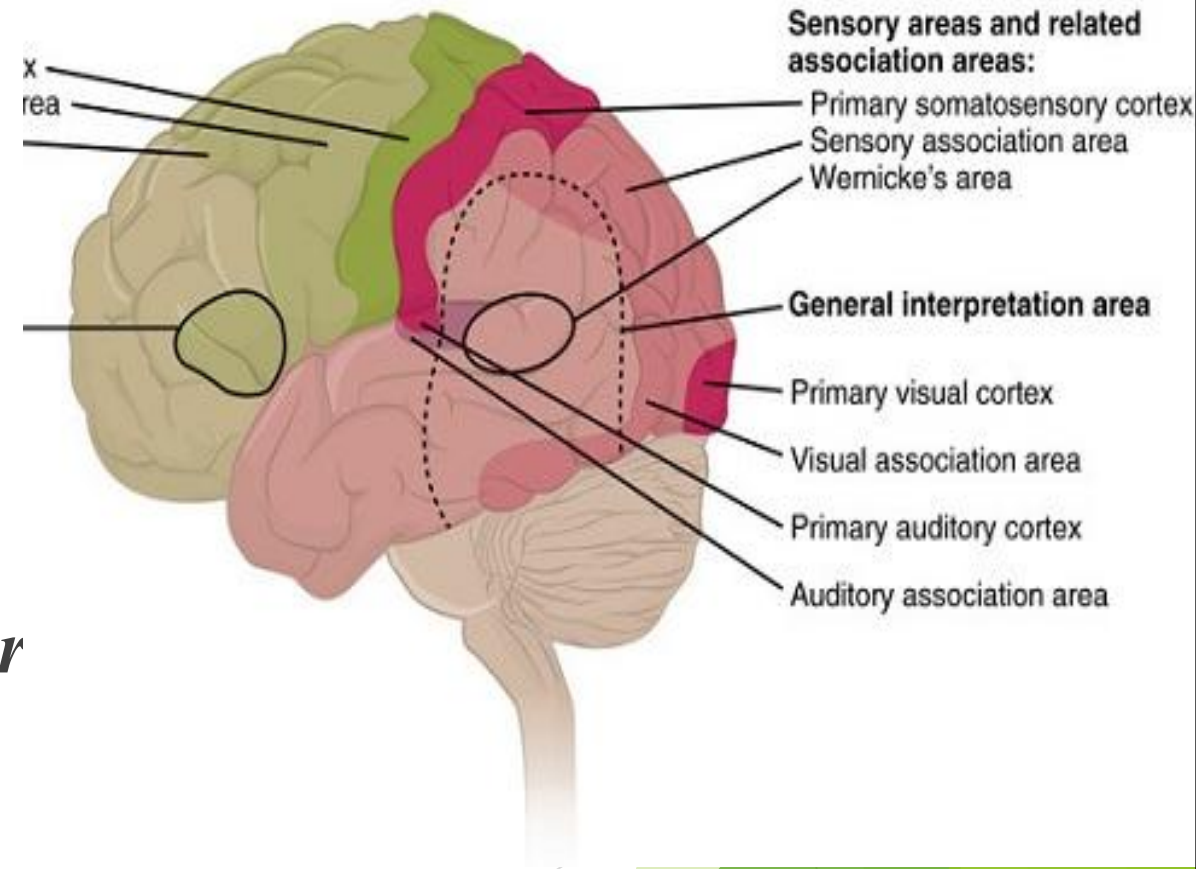
Secondary Sensory Area (SmII)

- ▶ Located in the *upper lip of posterior ramus of lateral sulcus*.
- ▶ Ablation of this area may relieve intractable pain.



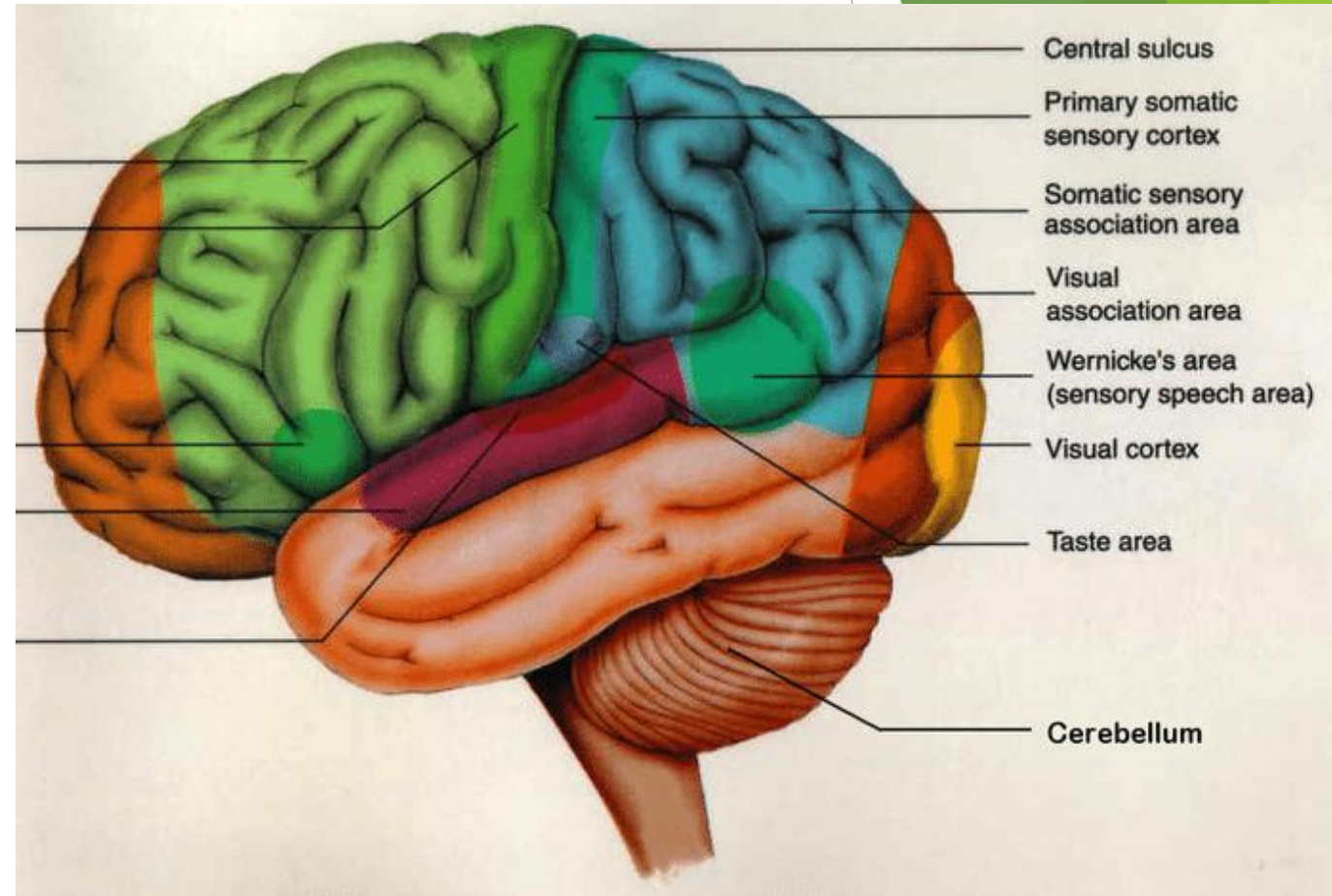
Sensory Association Area (Area 5 and 7)

- ▶ Occupies the *superior parietal lobule*.
- ▶ Concerned with perception of shape, size, roughness and texture of the objects.
- ▶ Enables individual to recognize the object placed in his/her hand without seeing- stereognosis.
- ▶ Lesion result in *inability to recognize or identify an object by its feel (tactile agnosia or astereognosis)*.



Sensory Speech Area of Wernicke

- ▶ Located in the *posterior part of superior temporal gyrus of temporal lobe and angular (area 39) and supramarginal (area 40) gyri*
- ▶ Concerned with interpretation of language through visual and auditory input.
- ▶ Lesion produce *loss of ability to understand spoken and written speech (receptive sensory aphasia)*.

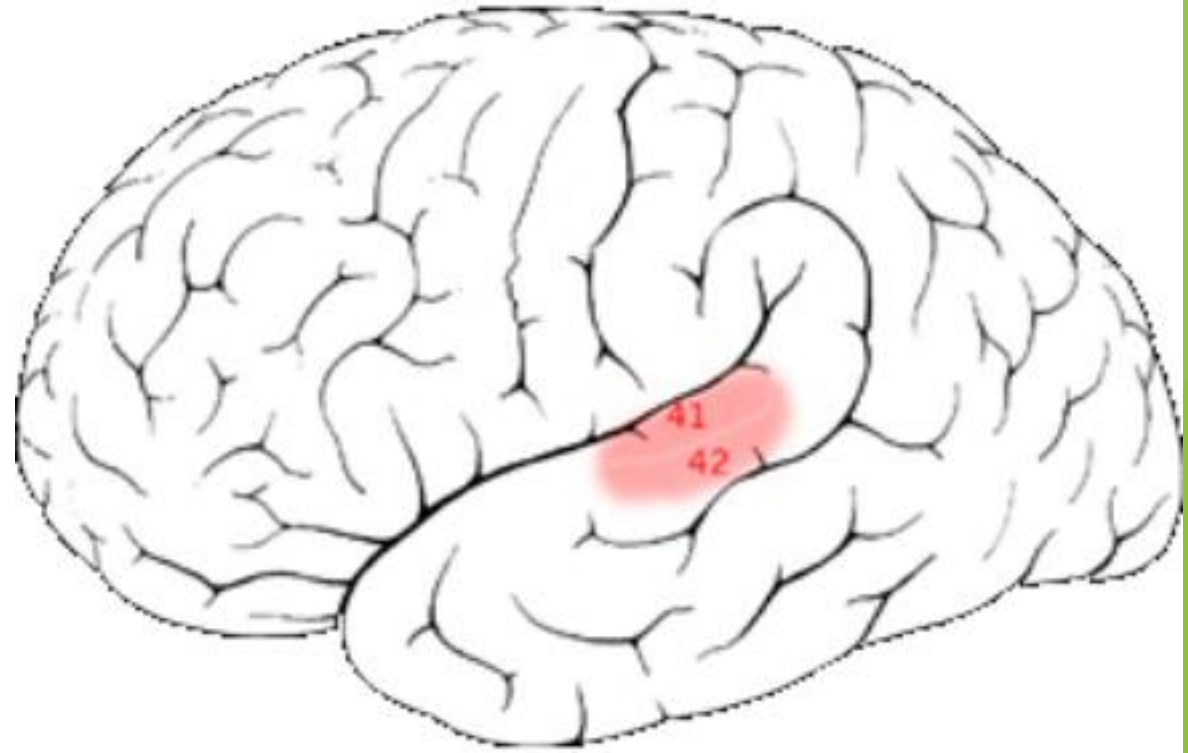


FUNCTIONAL AREAS IN TEMPORAL LOBE

Primary Auditory Area (Areas 41 and 42)

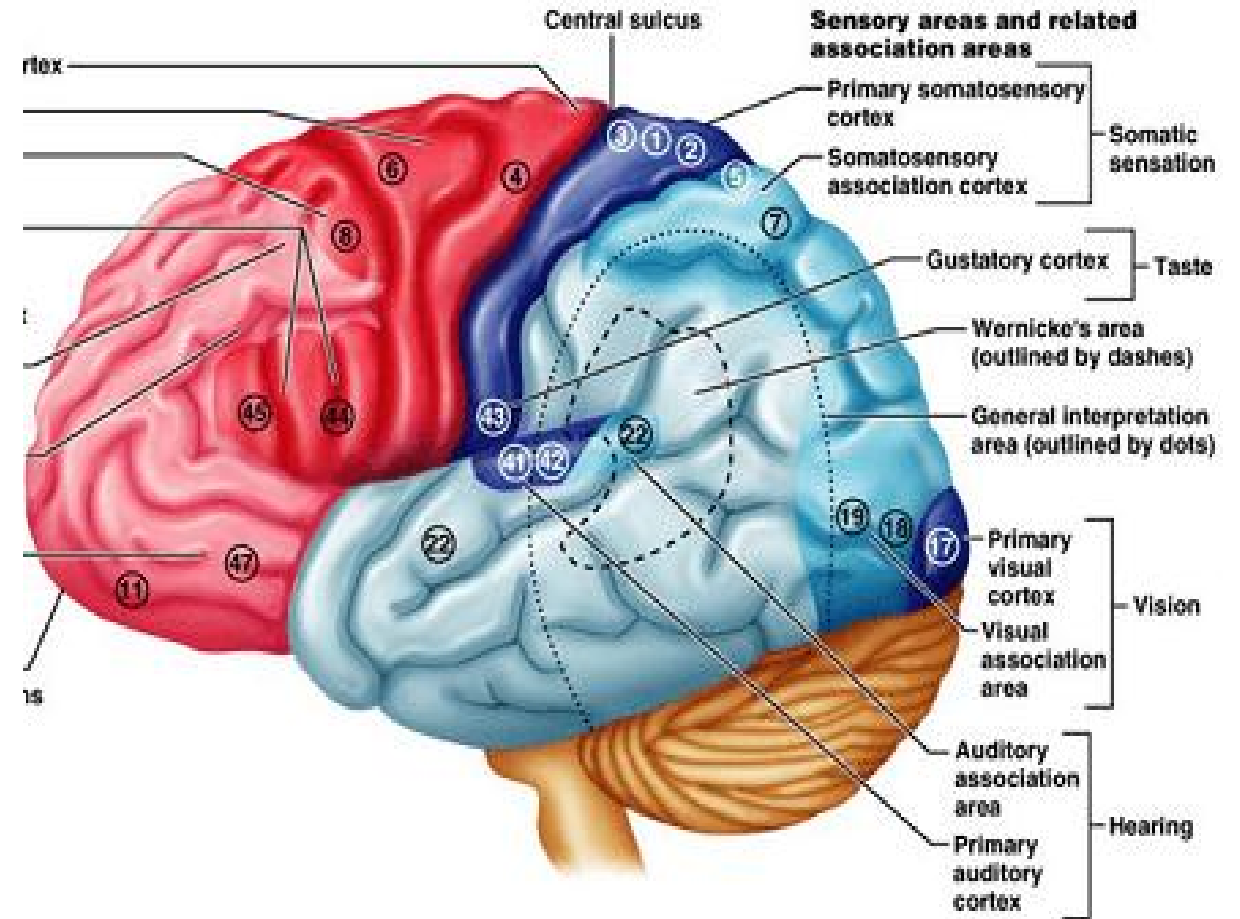
- ▶ Located in *Heschl's gyrus*
- ▶ Concerned with reception of isolated impressions of loudness, quality and pitch of the sound.
- ▶ *Unilateral lesions result in slight loss of hearing.*

Primary auditory cortex



Auditory Association Area (Area 22)

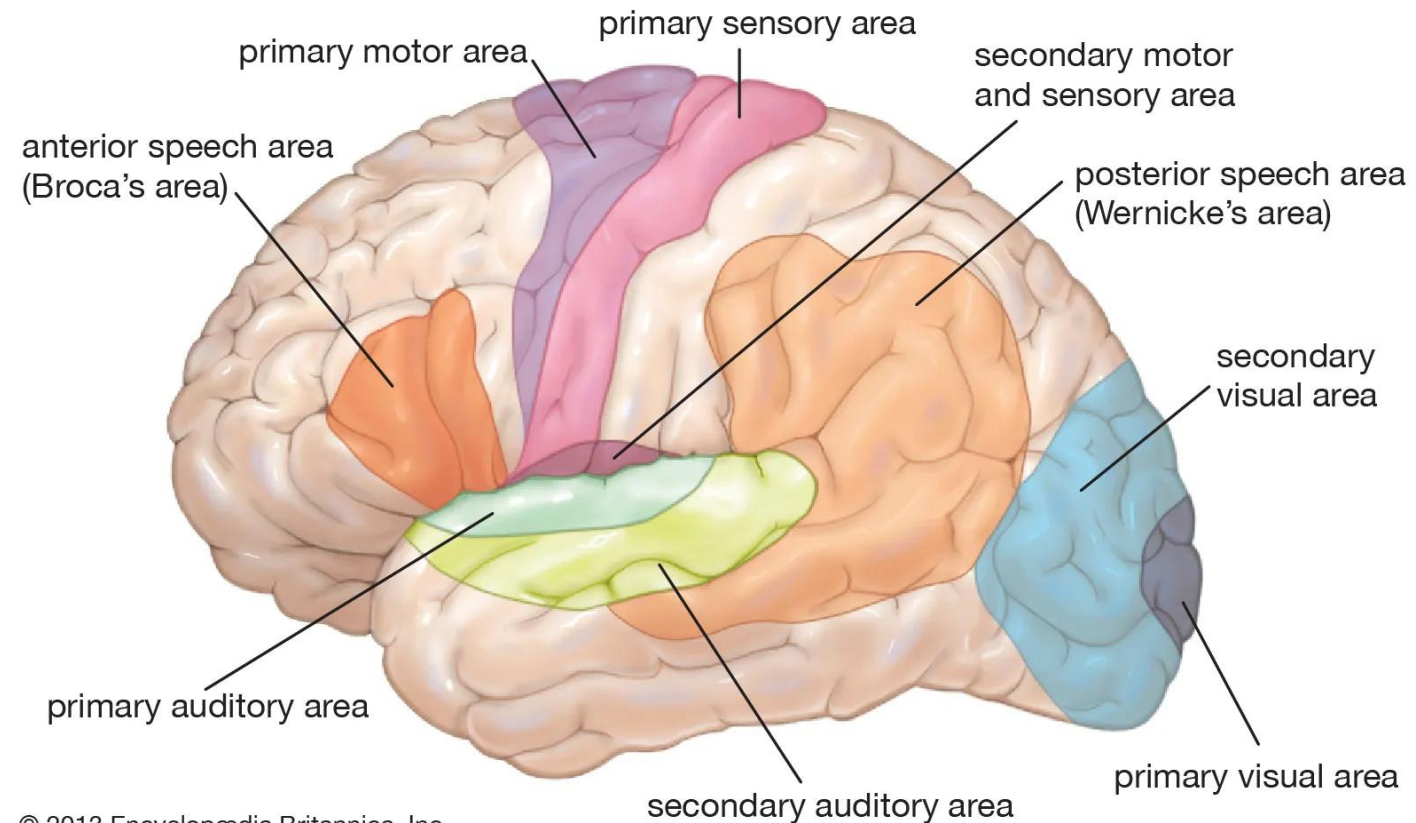
- ▶ Situated on *lateral surface of superior temporal gyrus*
- ▶ Helps in interpretation of sound heard
- ▶ Lesion result in an *inability to interpret the meaning of the sounds heard and patient may experience word deafness (auditory verbal agnosia)*



FUNCTIONAL AREAS IN THE OCCIPITAL LOBE

Primary Visual Area (Area 17)

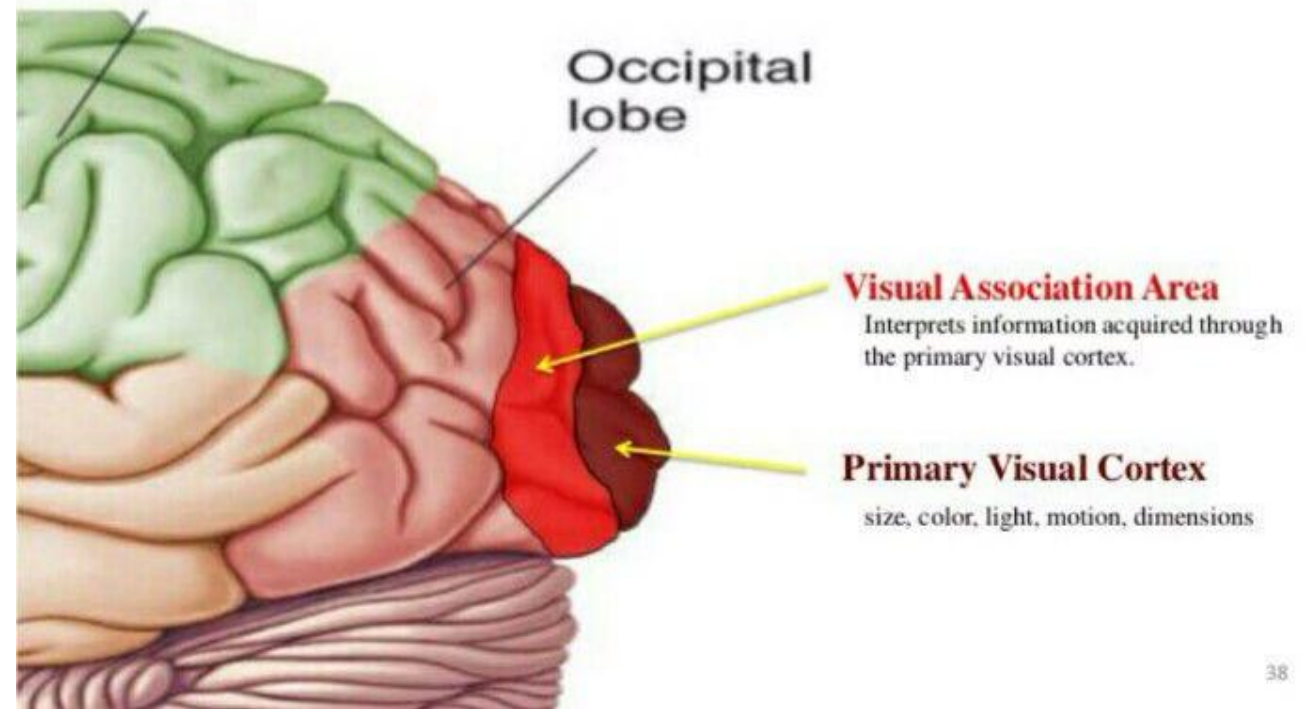
- ▶ Situated *in walls and lips of posterior part of calcarine sulcus*
- ▶ Concerned with reception and perception of isolated visual impressions like colour, size, form, motion, illumination and transparency.
- ▶ Lesions *result in the loss of vision in the opposite visual field.*



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Visual Association Area (Area 18 and 19)

- ▶ *Surrounds the primary visual area*
- ▶ Responsible for recognition of the objects seen.
- ▶ Lesions *result in loss of ability to recognize objects (visual agnosia) seen in opposite field of vision.*



Other Functional Areas

Gustatory Area

- ▶ Located in inferior part of parietal lobule.

Vestibular Area

- ▶ Probably located near the part of postcentral gyrus

Olfactory Area (Area 28)

- ▶ Located in the anterior part of parahippocampal gyrus and uncus.

*Thank
you*

The background is a solid light beige color. It is decorated with several small, faint, circular floral motifs scattered across the surface. There are also small, colorful dots in shades of green, yellow, and pink. Two small, stylized green leafy branches are positioned on either side of the text, one above the 'k' and one below the 'y'.