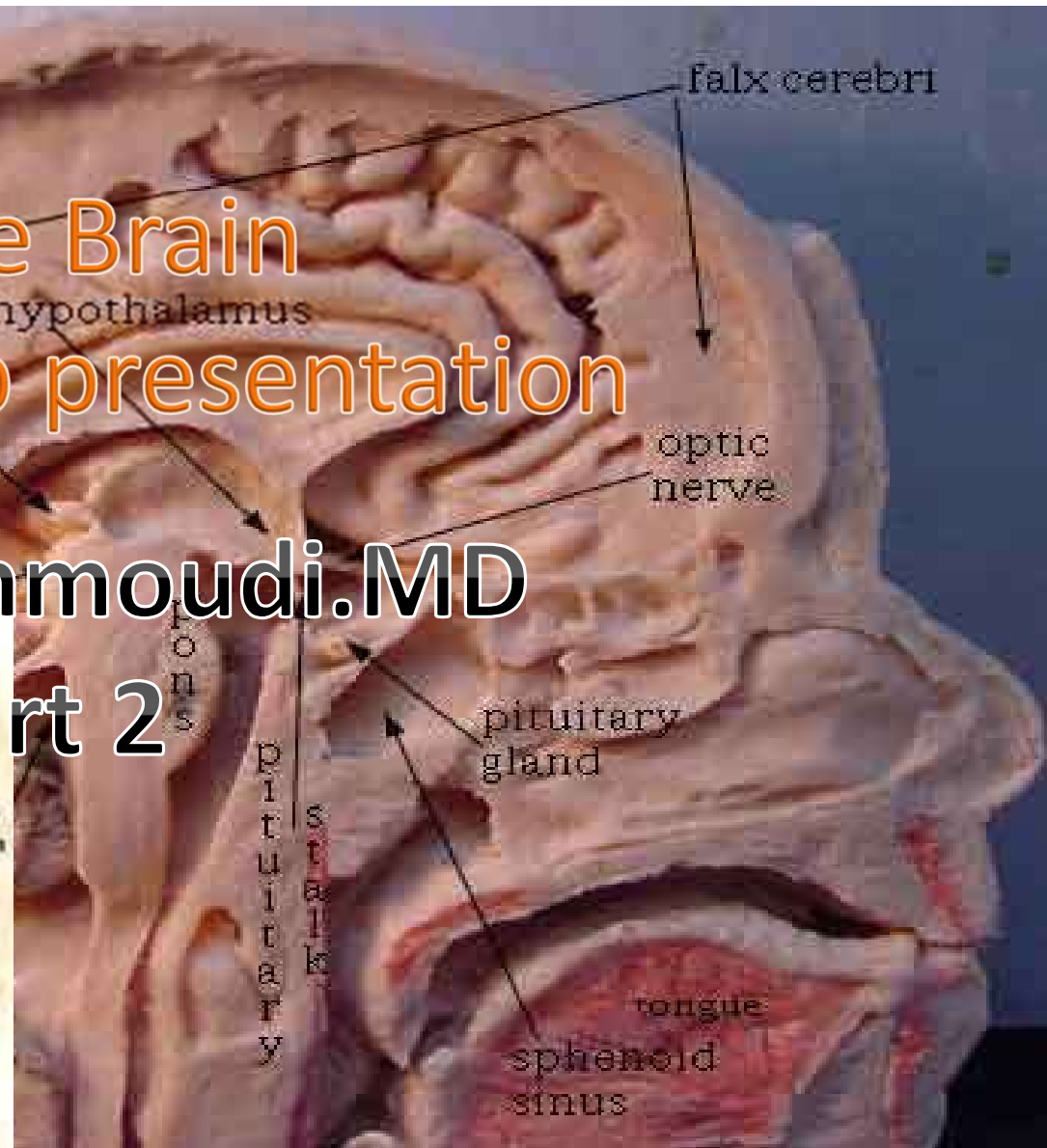
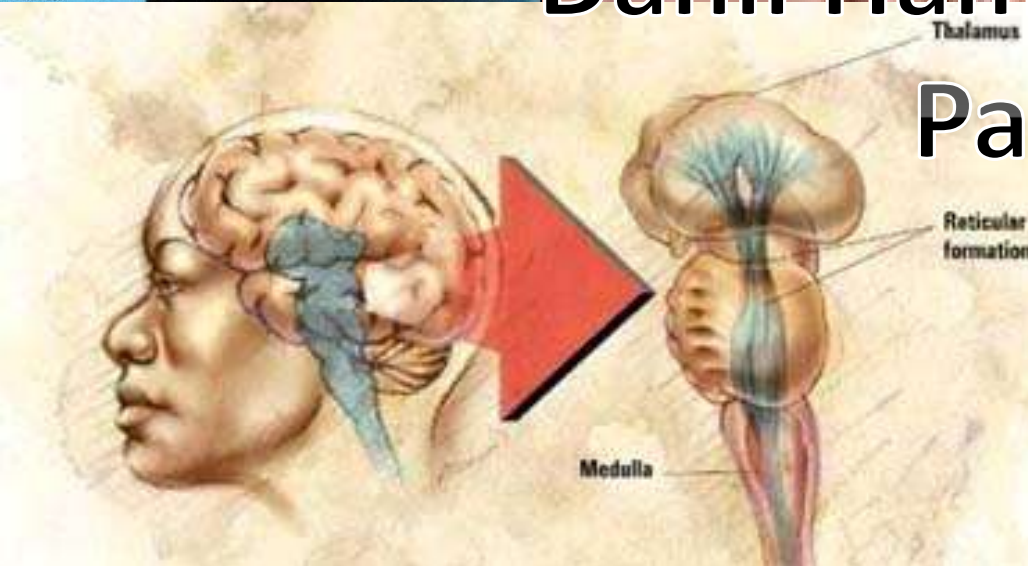


The Brain

lecture/lab presentation

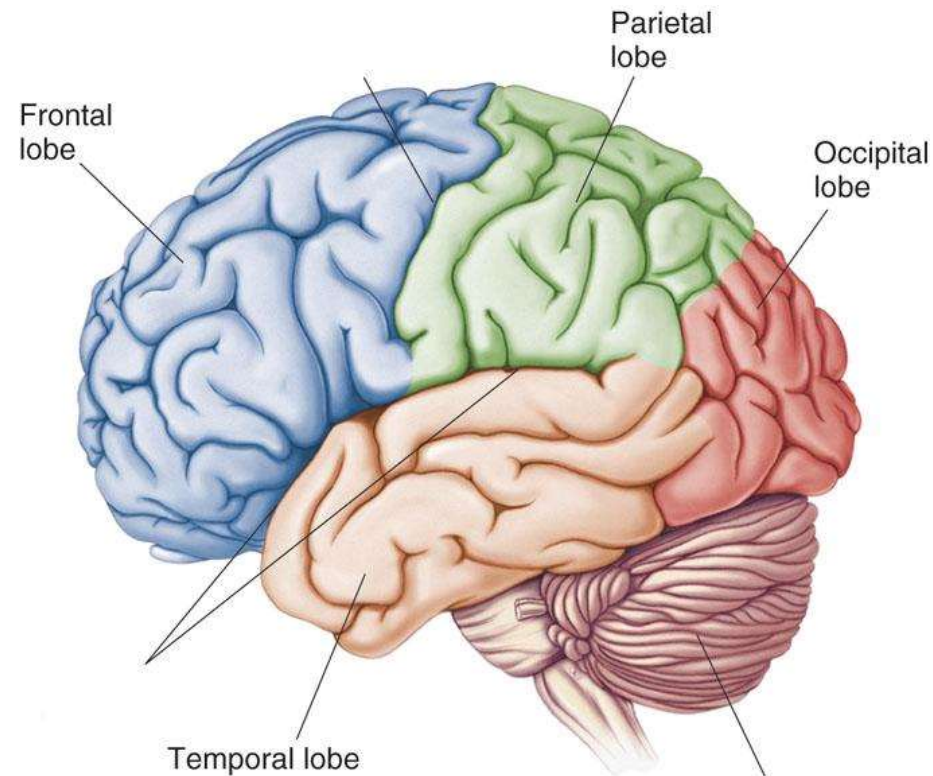
Danil Hammoudi.MD

Part 2



Lobes of the Brain (4)

- Frontal
- Parietal
- Occipital
- Temporal

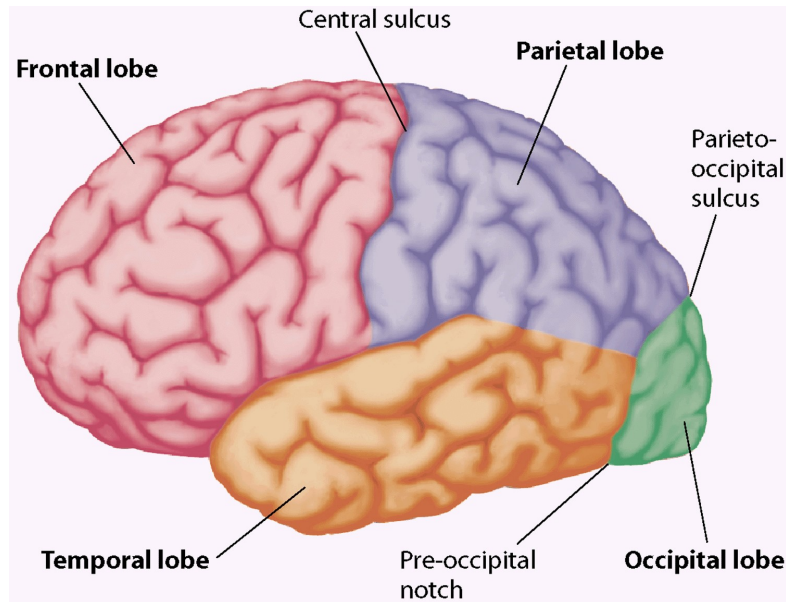


<http://www.bioon.com/book/biology/whole/image/1/1-8.tif.jpg>

* Note: Occasionally, the Insula is considered the fifth lobe. It is located deep to the Temporal Lobe.

LOBES

Cortical Function



- Frontal Lobe

- Higher thought processing; decision making; abstract thinking
- Primary “precentral” motor area

- Parietal Lobe

- Primary “postcentral” somatosensory area: sensation of muscles, organs, and skin

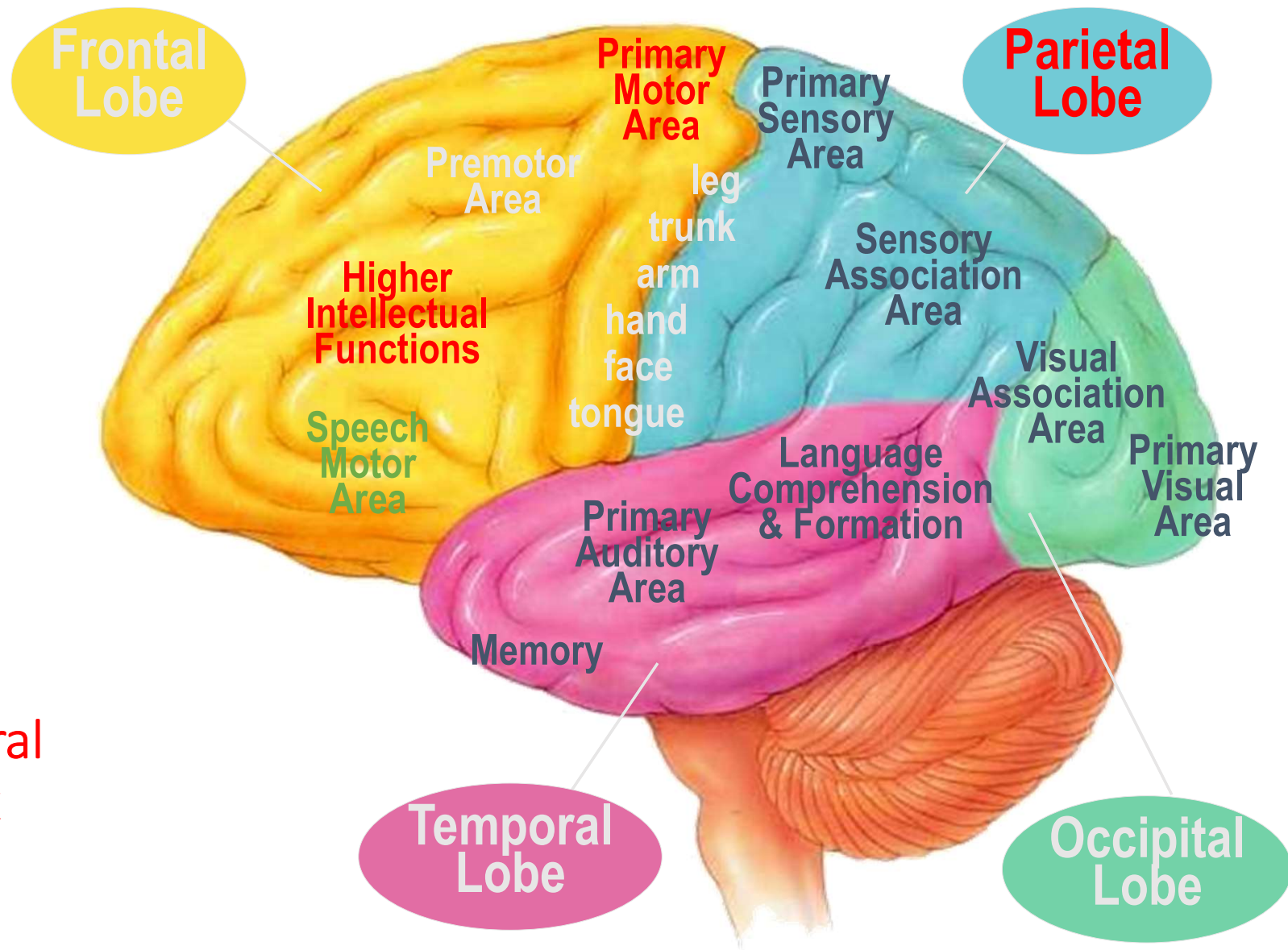
- Occipital Lobe

- Visual processing

- Temporal Lobe

- Auditory & equilibrium processing
- Left temporal lobe involved in speech and comprehension of language

The Cerebral Cortex



HOMUNCULUS



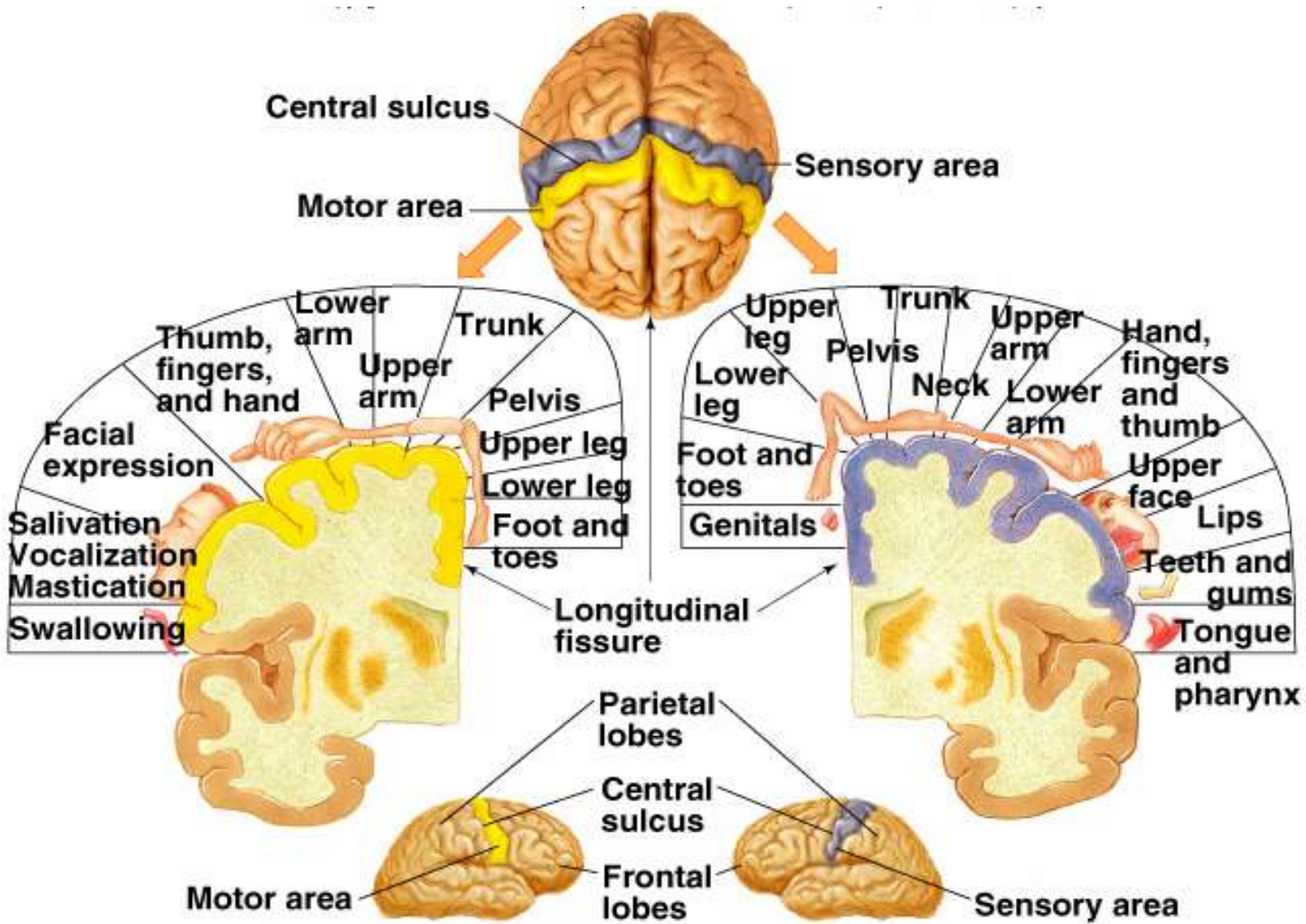


Figure 12.9: Motor and sensory areas of the cerebral cortex, p. 438.

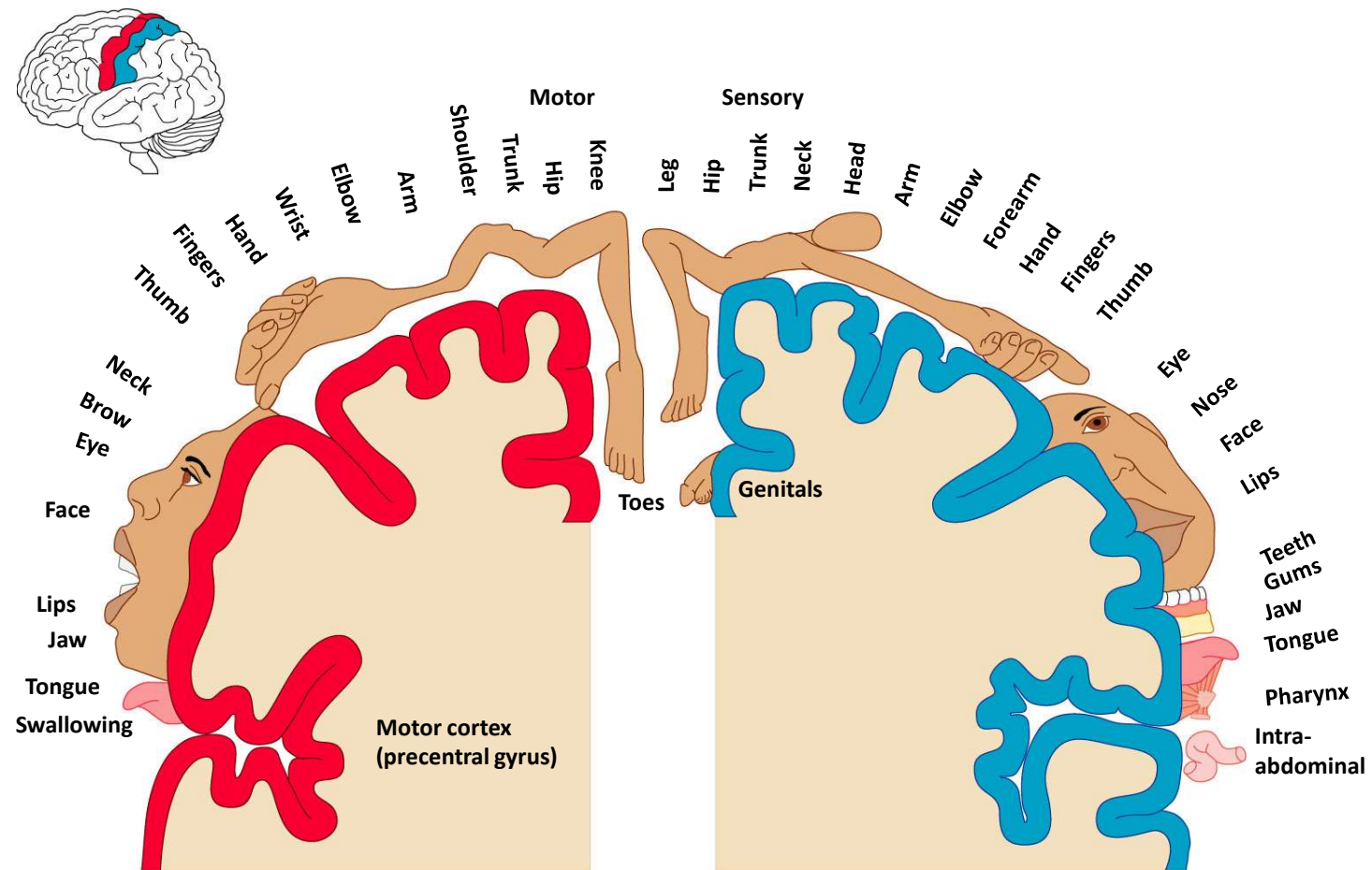
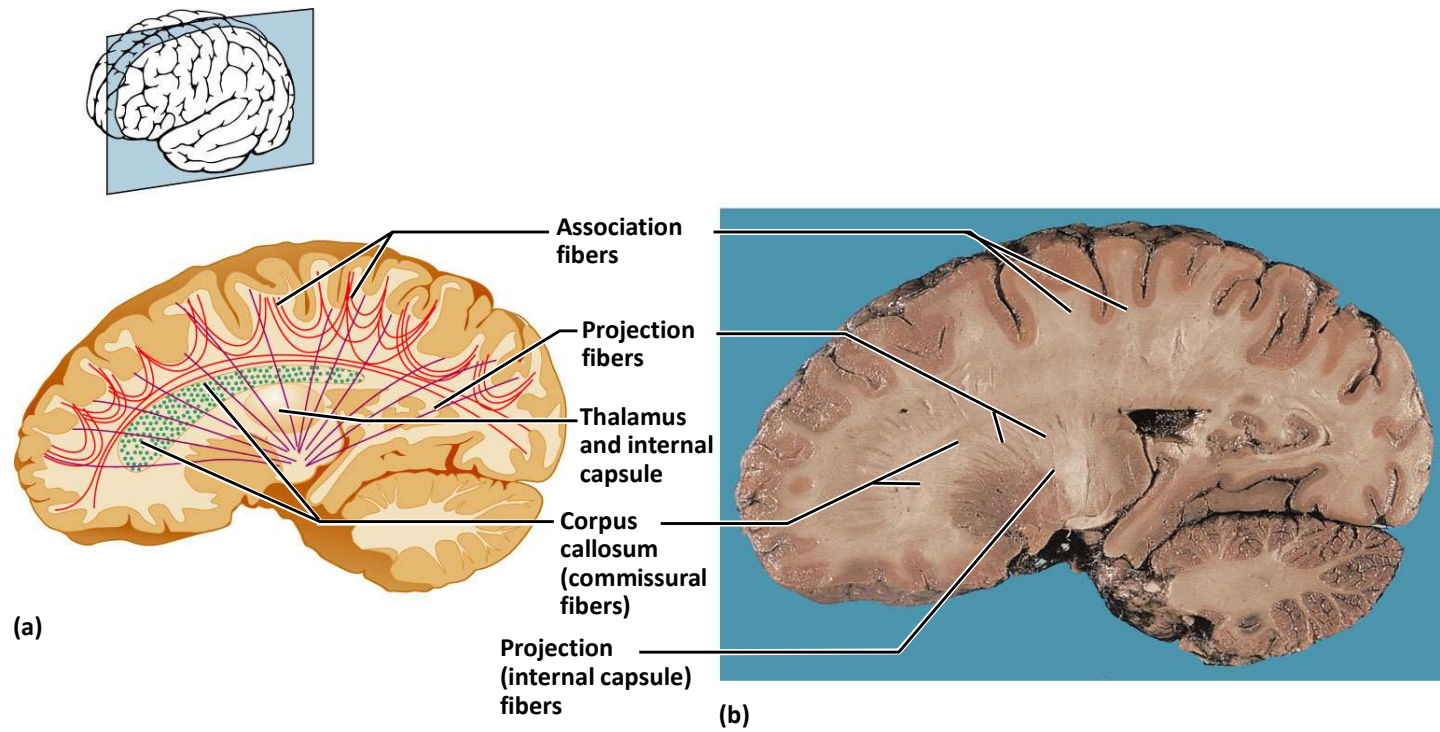
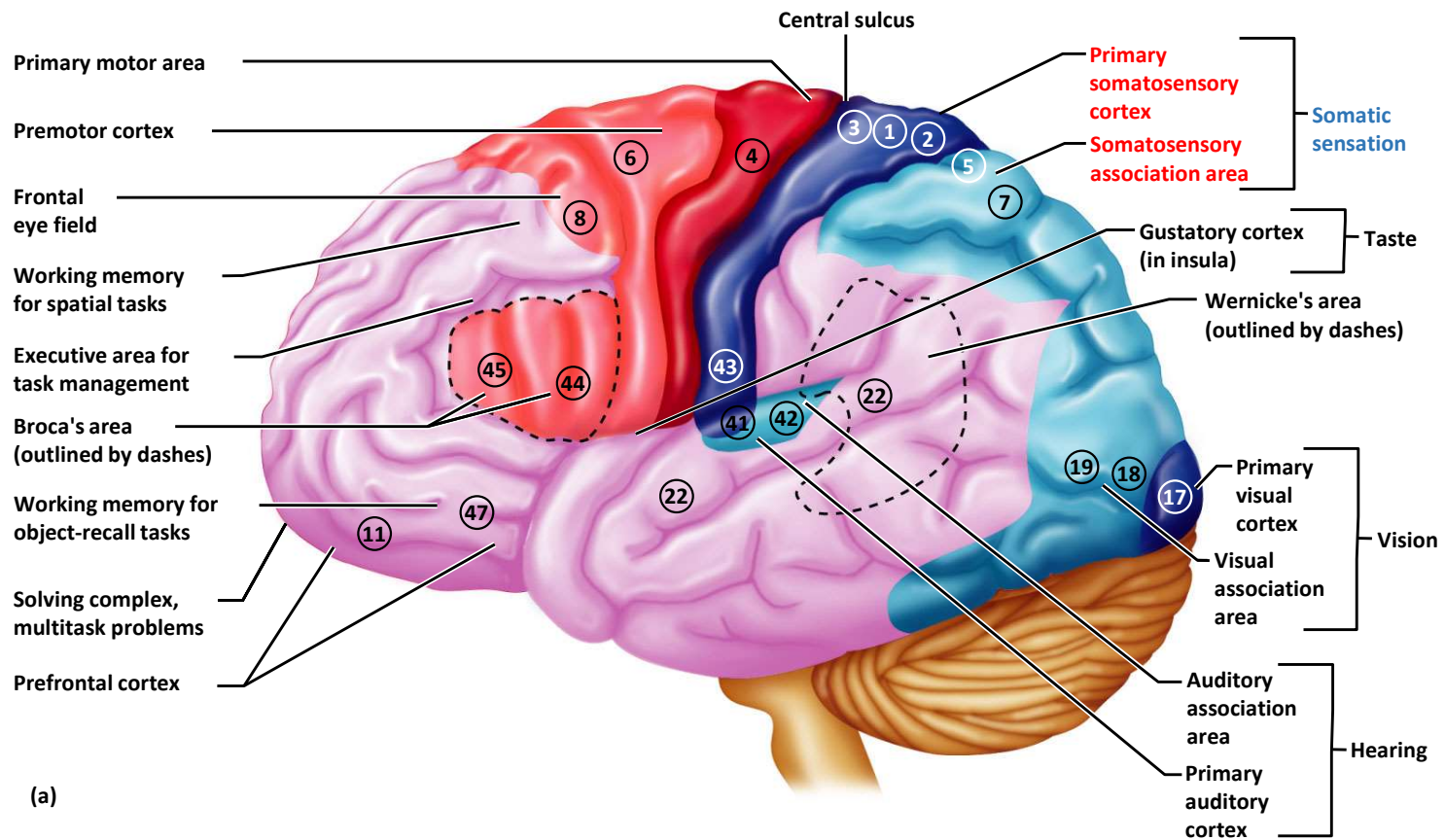
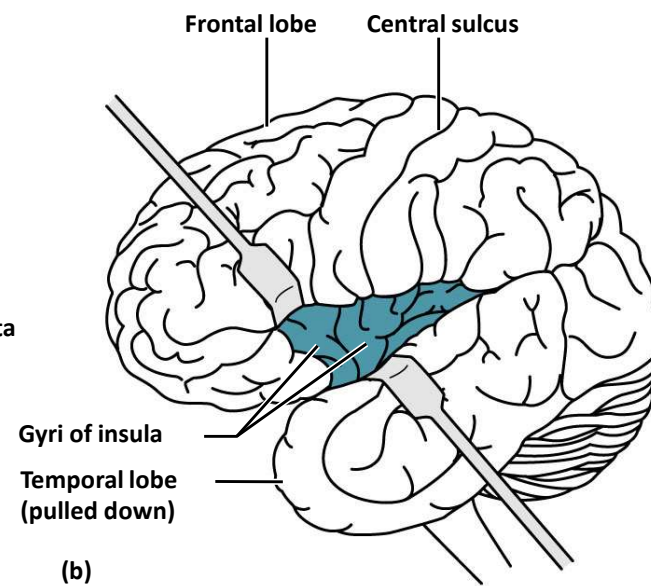
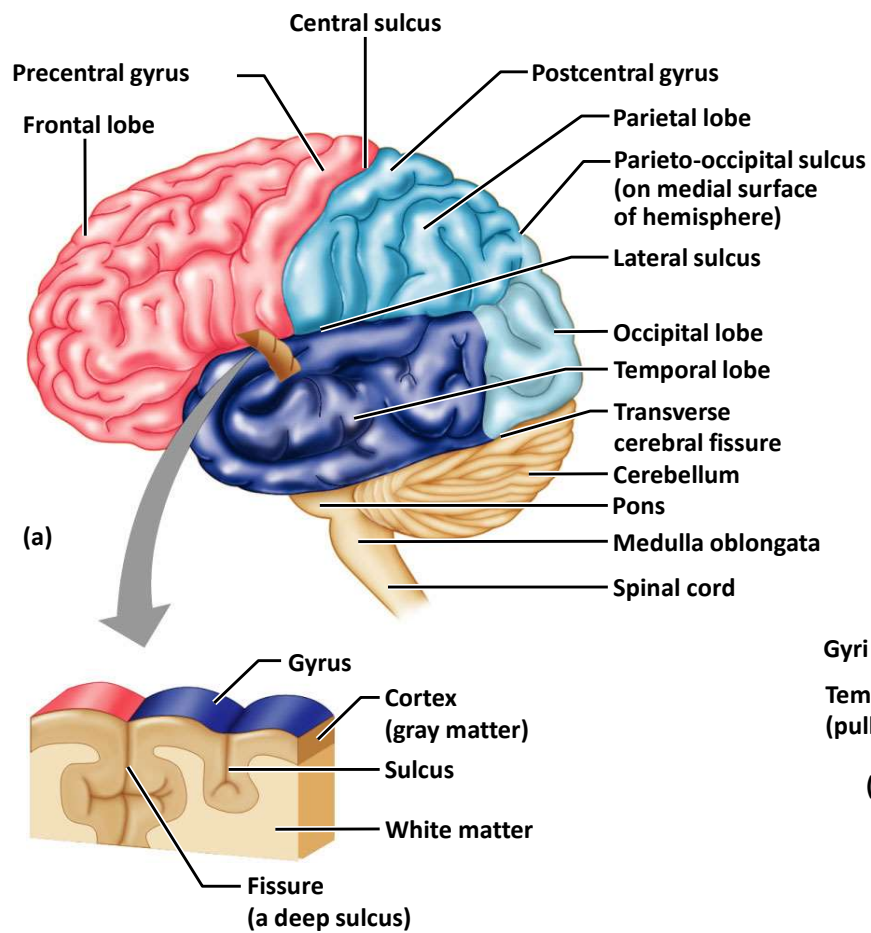


Figure 12.10a-b: Types of fiber tracts in white matter, p. 442.

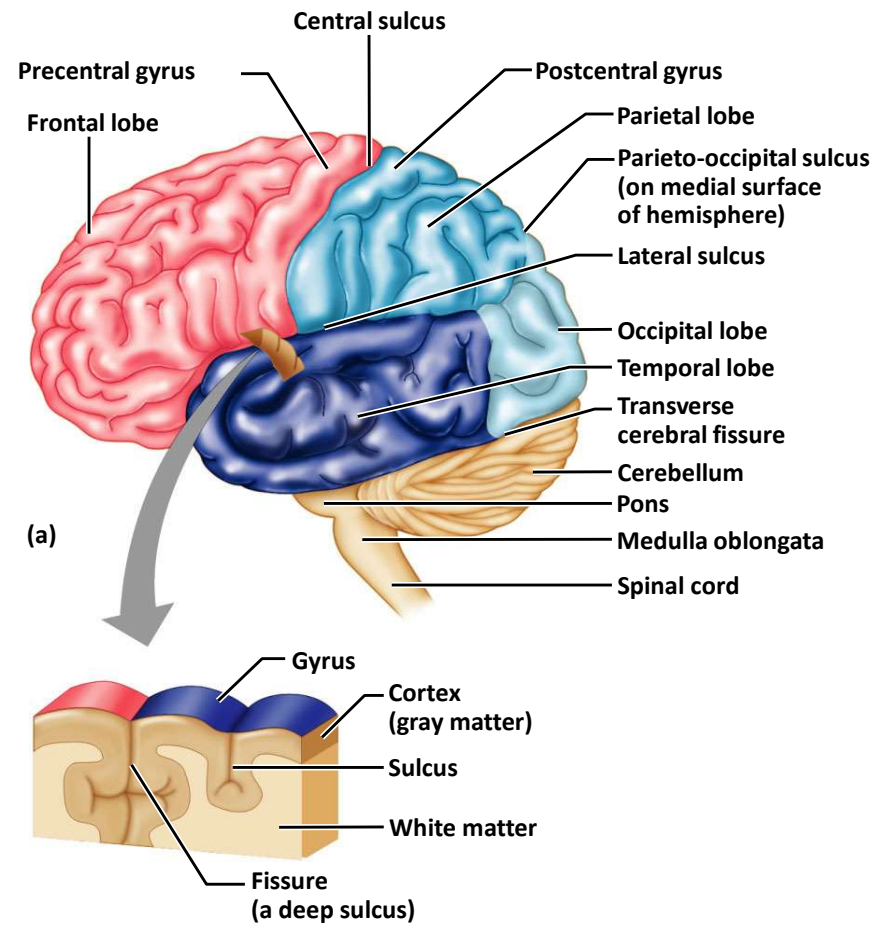


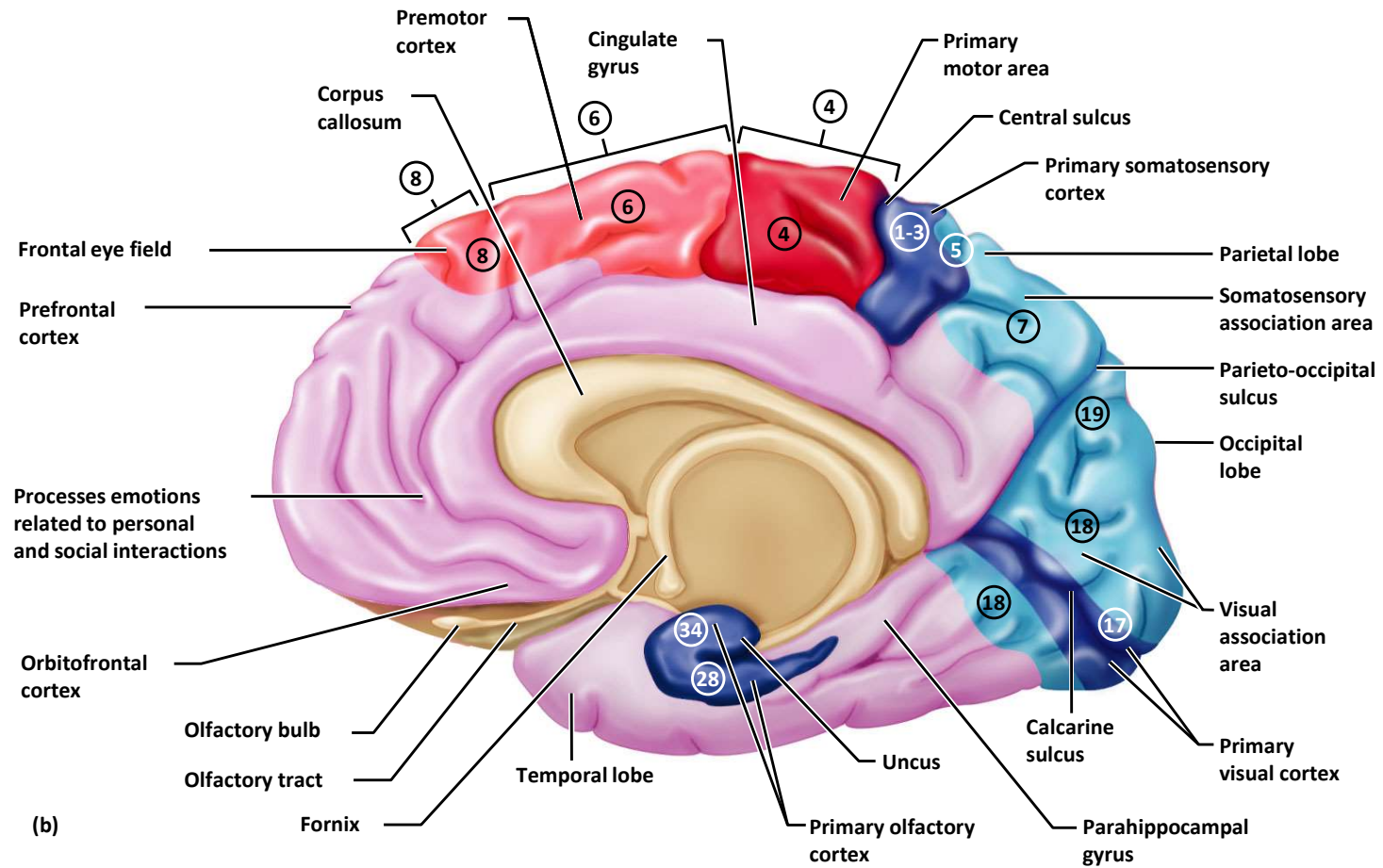
Functional and structural areas of the cerebral cortex





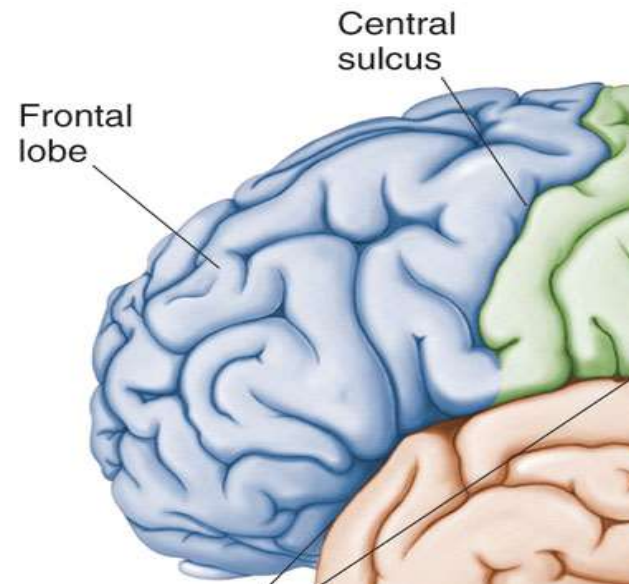
Lobes and fissures of the cerebral hemispheres, •





Lobes of the Brain - Frontal

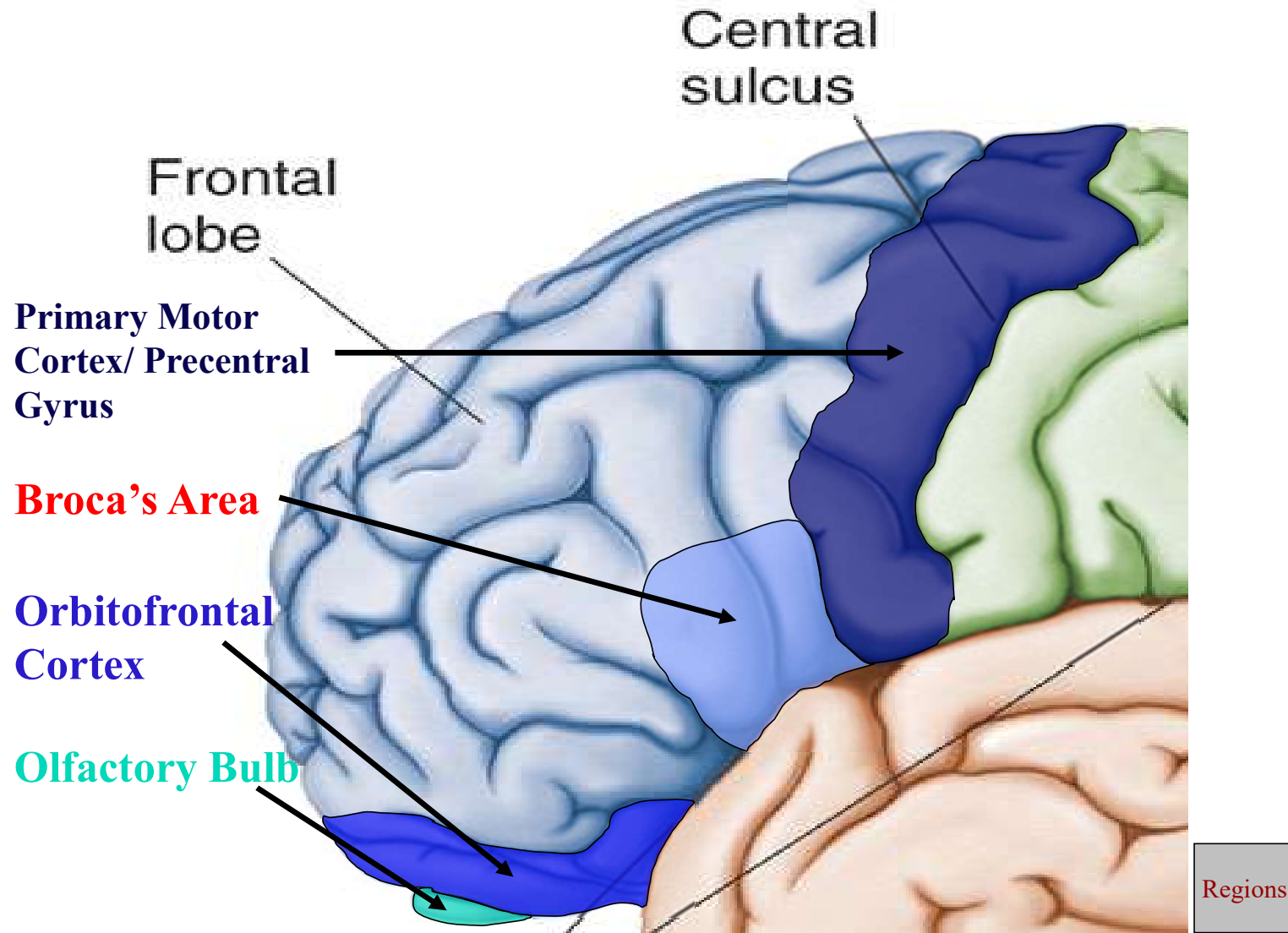
- The Frontal Lobe of the brain is located deep to the Frontal Bone of the skull.
- It plays an integral role in the following functions/actions:
 - Memory Formation
 - Emotions
 - Decision Making/Reasoning
 - Personality



Modified from: <http://www.bioon.com/book/biology/whole/image/1/1-8.tif.jpg>

Frontal Lobe - Cortical Regions

- **Primary Motor Cortex (Precentral Gyrus)** – Cortical site involved with controlling movements of the body.
- **Broca's Area** – Controls facial neurons, speech, and language comprehension. **Located on Left Frontal Lobe**.
 - **Broca's Aphasia** – Results in the ability to comprehend speech, but the decreased motor ability (or inability) to speak and form words.
- **Orbitofrontal Cortex** – Site of Frontal Lobotomies
 - * **Desired Effects:**
 - Diminished Rage
 - Decreased Aggression
 - Poor Emotional Responses
 - * **Possible Side Effects:**
 - Epilepsy
 - Poor Emotional Responses
 - Perseveration (Uncontrolled, repetitive actions, gestures, or words)
- **Olfactory Bulb** - Cranial Nerve I, Responsible for sensation of Smell



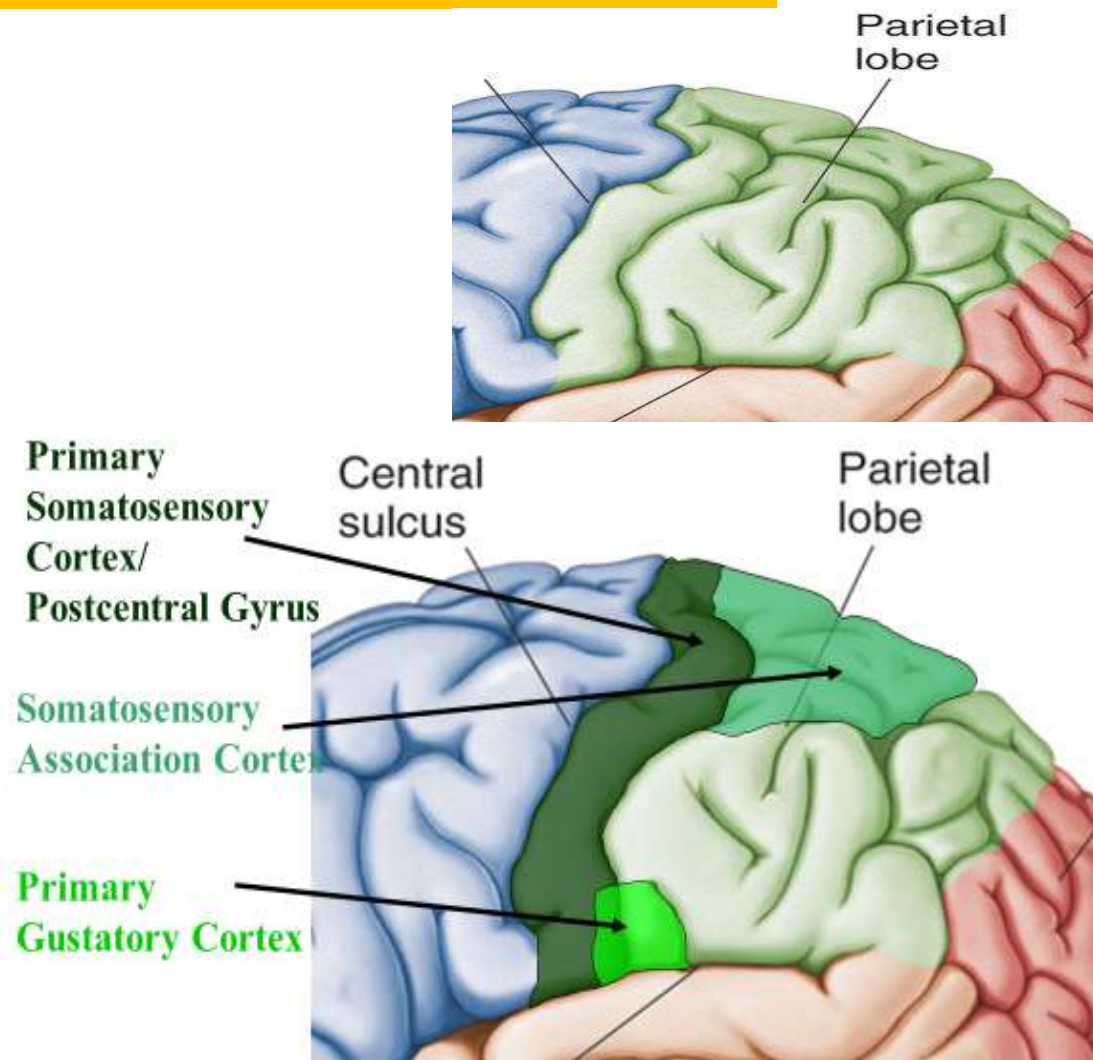
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Parietal Lobe - Cortical Regions

- **Primary Somatosensory Cortex (Postcentral Gyrus)** – Site involved with processing of tactile and proprioceptive information.
- **Somatosensory Association Cortex** - Assists with the integration and interpretation of sensations relative to body position and orientation in space. May assist with visuo-motor coordination.
- **Primary Gustatory Cortex** – Primary site involved with the interpretation of the sensation of Taste.

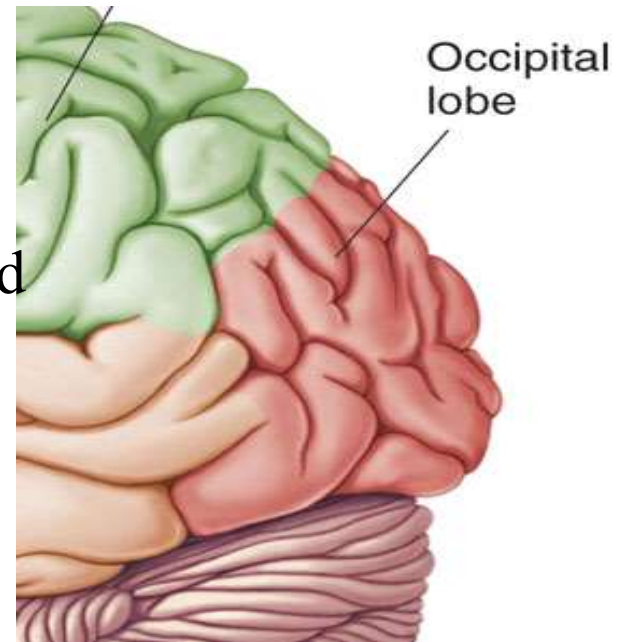
Lobes of the Brain - Parietal Lobe

- The Parietal Lobe of the brain is located deep to the Parietal Bone of the skull.
- It plays a major role in the following functions/actions:
 - Senses and integrates sensation(s)
 - **Spatial awareness and perception**
(Proprioception - Awareness of body/ body parts in space and in relation to each other)



Lobes of the Brain – Occipital Lobe

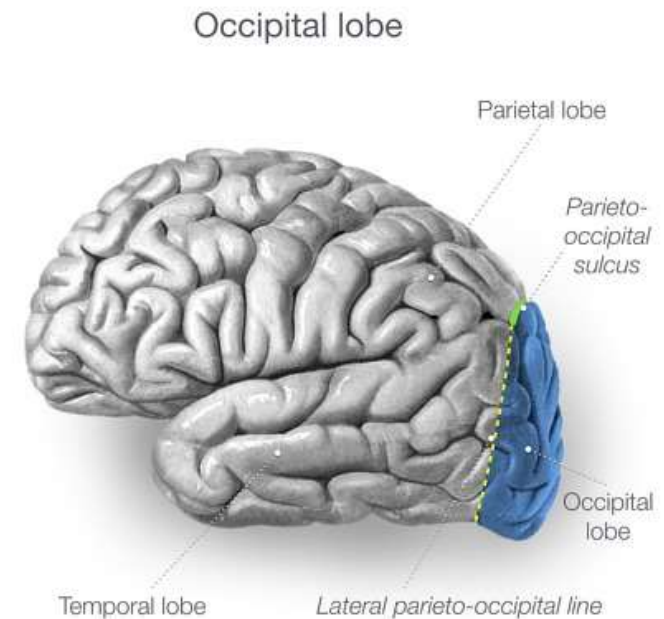
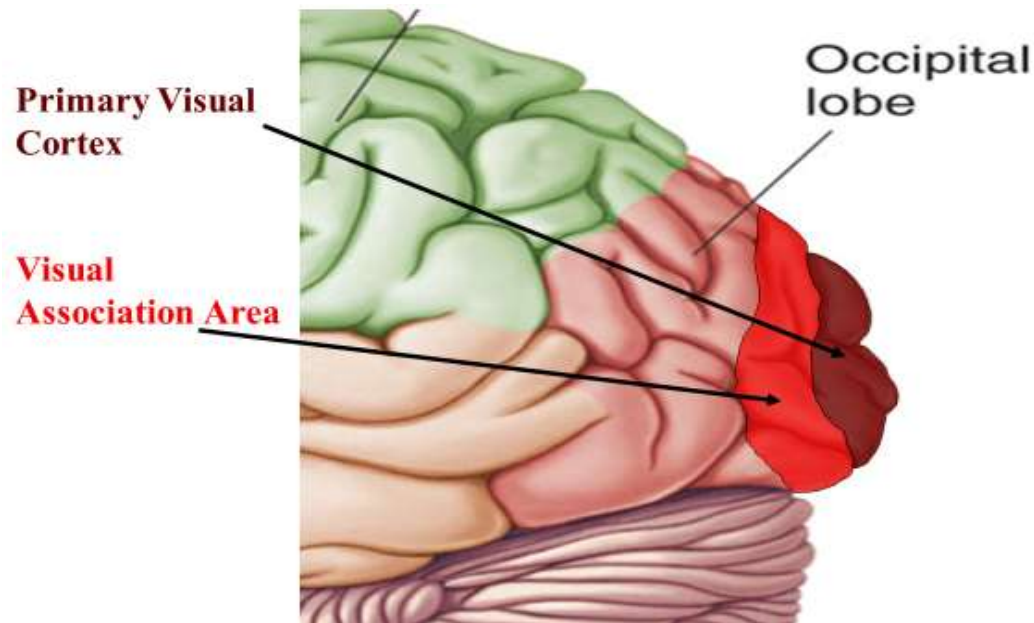
- The Occipital Lobe of the Brain is located deep to the Occipital Bone of the Skull.
- Its primary function is the processing, integration, interpretation, etc. of VISION and visual stimuli.



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Occipital Lobe – Cortical Regions

- **Primary Visual Cortex** – This is the primary area of the brain responsible for sight -recognition of size, color, light, motion, dimensions, etc.
- **Visual Association Area** – Interprets information acquired through the primary visual cortex.



Lobes of the Brain – Temporal Lobe

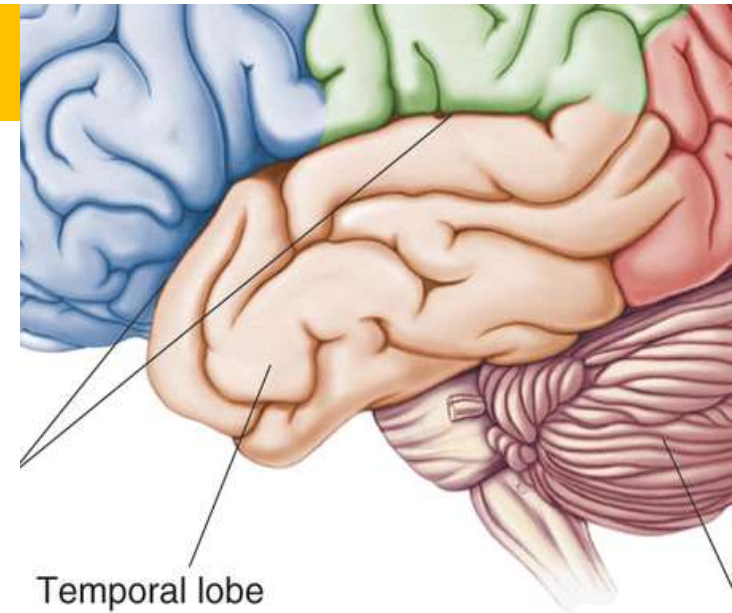
- The Temporal Lobes are located on the sides of the brain, deep to the Temporal Bones of the skull.

• They play an integral role in the following functions:

- Hearing

- Organization/Comprehension of language

- Information Retrieval (Memory and Memory Formation)



- **Primary Auditory Cortex** – Responsible for hearing
- **Primary Olfactory Cortex** – Interprets the sense of smell once it reaches the cortex via the olfactory bulbs. (Not visible on the superficial cortex)
- **Wernicke's Area** – Language comprehension. Located on the Left Temporal Lobe.
 - **Wernicke's Aphasia** – Language comprehension is inhibited. Words and sentences are not clearly understood, and sentence formation may be inhibited or non-sensical.

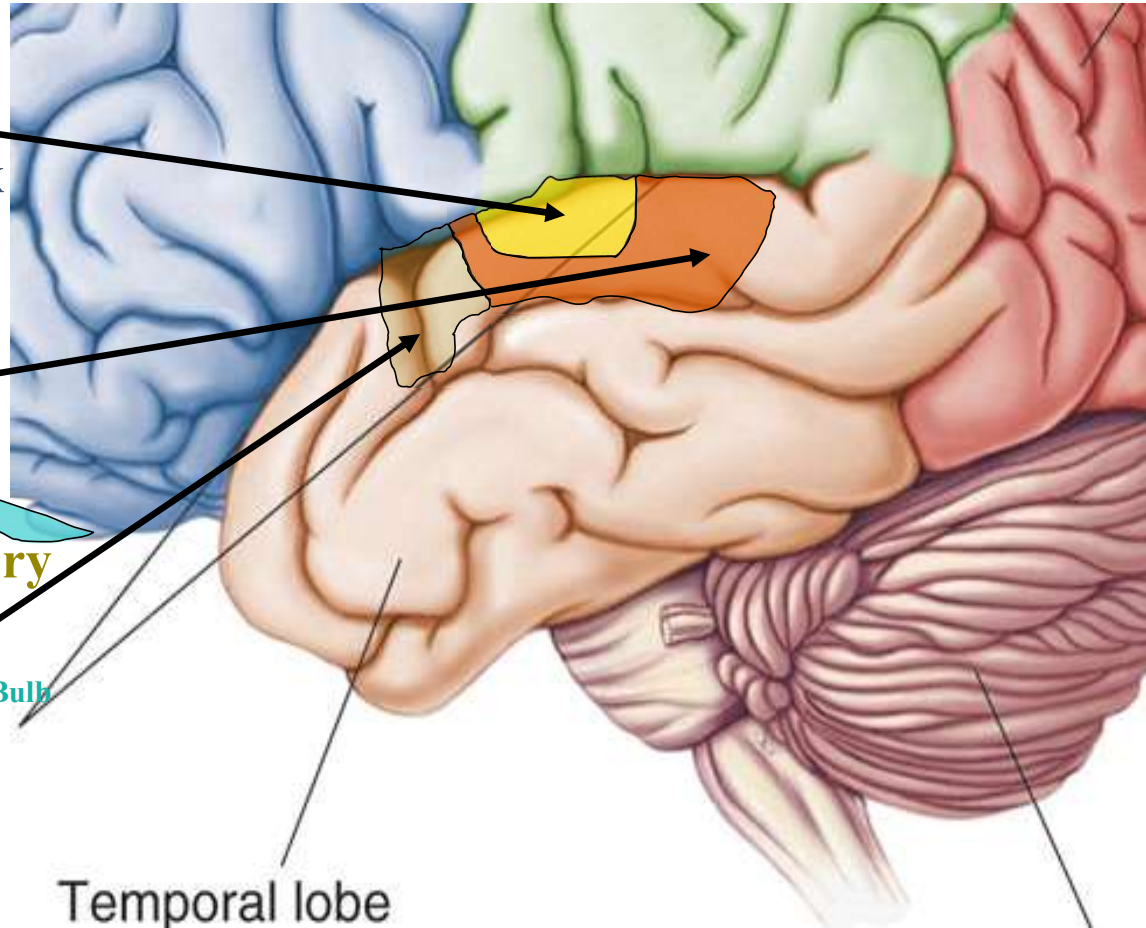
**Primary
Auditory Cortex**

Wernike's Area

**Primary Olfactory
Cortex (Deep)**

Conducted from Olfactory Bulb

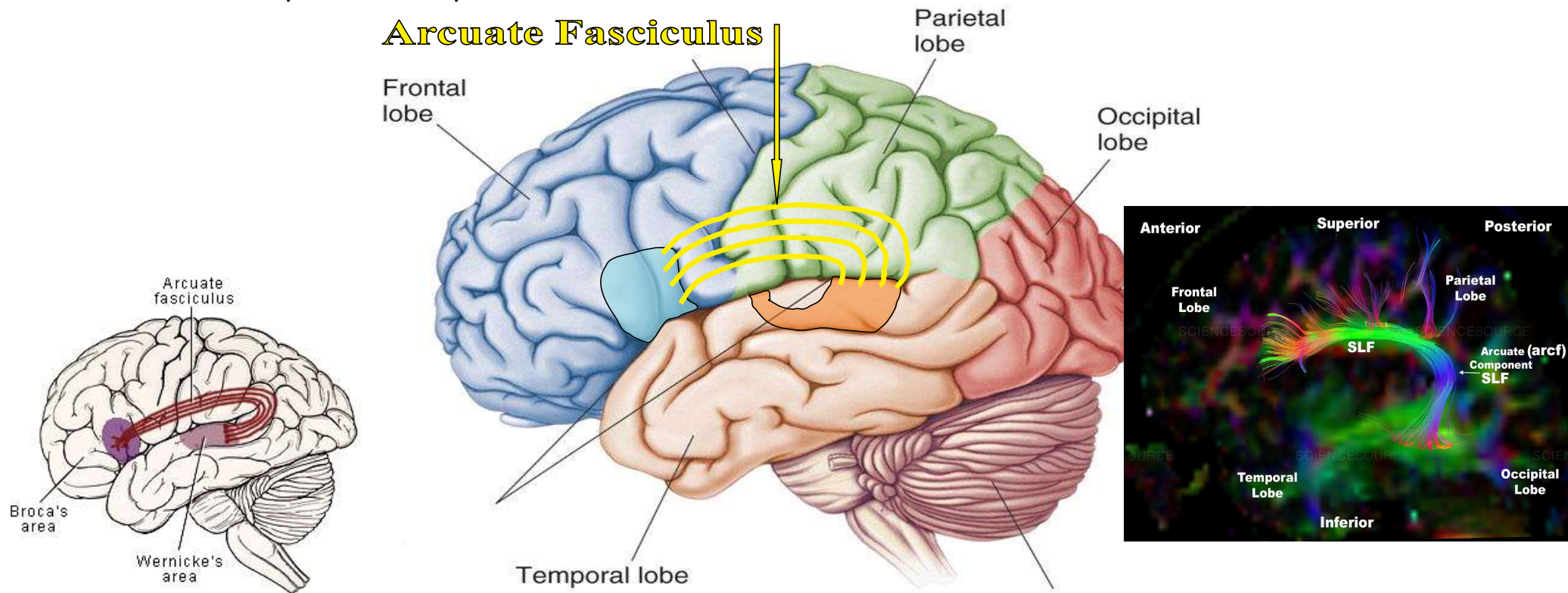
Temporal lobe



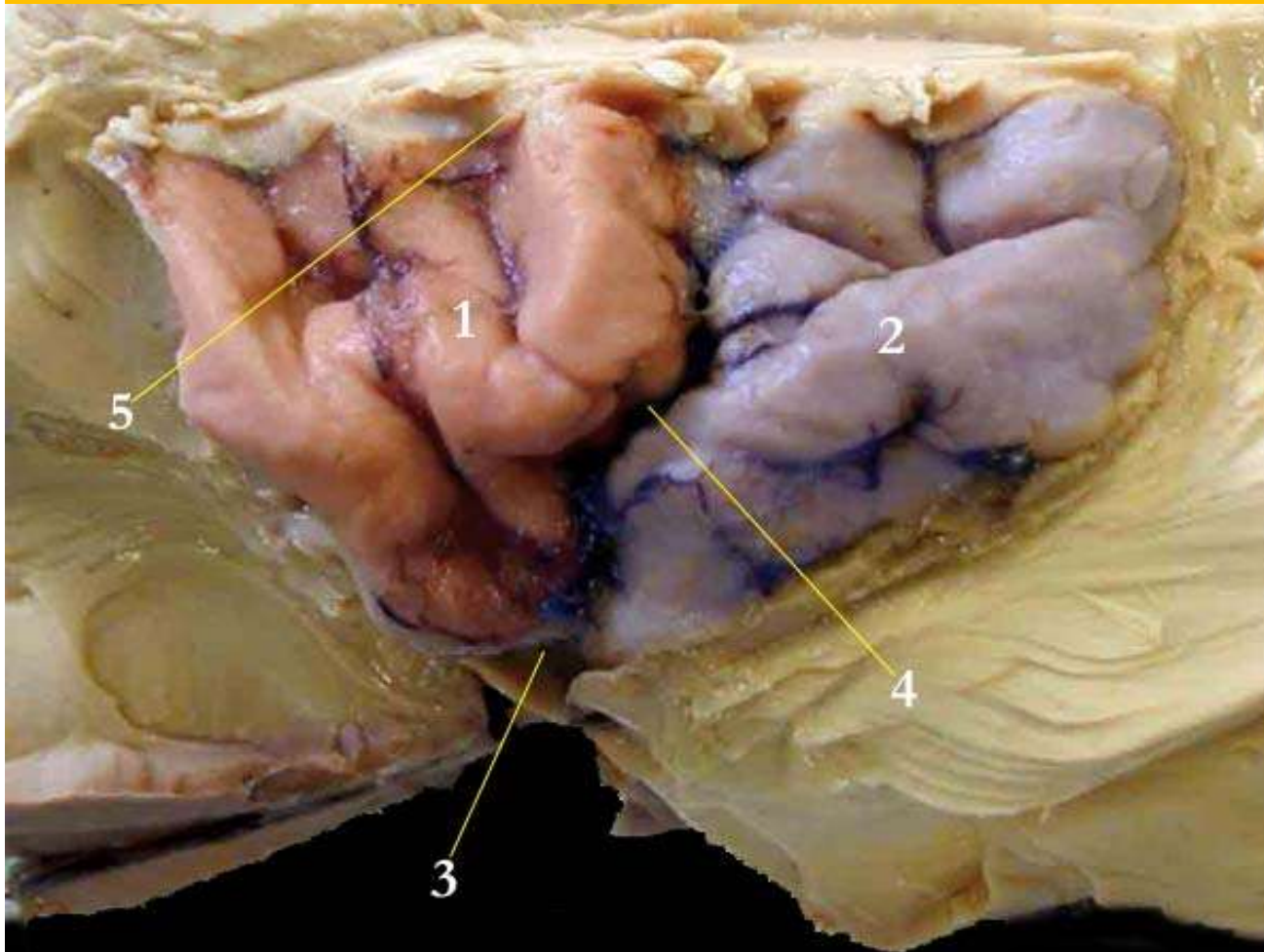
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Regions

- **Arcuate Fasciculus** - A white matter tract that connects Broca's Area and Wernicke's Area through the Temporal, Parietal and Frontal Lobes.
 - Allows for coordinated, comprehensible speech. Damage may result in:
 - **Conduction Aphasia** - Where auditory comprehension and speech articulation are preserved, but people find it difficult to repeat heard speech.



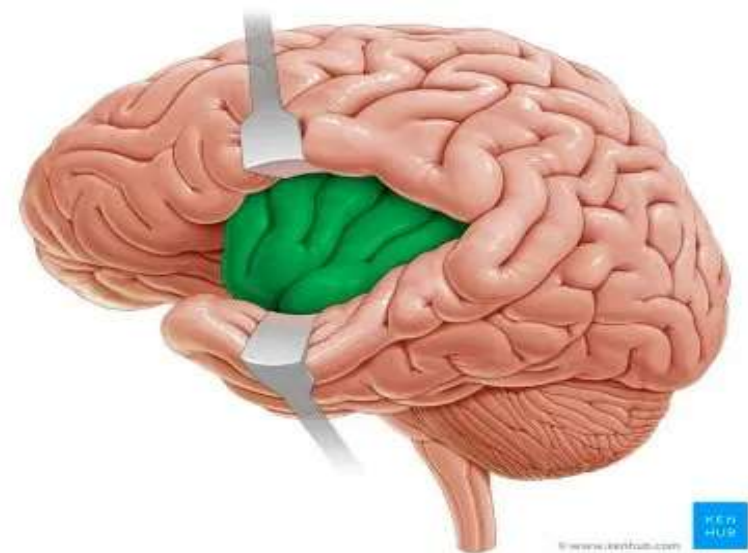
Insular cortex



lies deep to the brain's lateral surface, within the lateral sulcus which separates the temporal lobe and inferior parietal cortex.

These overlying cortical areas are known as opercula (meaning "lids"), and parts of the frontal, temporal and parietal lobes form opercula over the insula. The latin name for the insular cortex is *lobus insularis*. insular cortex is also known by the name **Island of Reil**,

1. Gyri breves insula
2. Gyri longi insula
3. Limen insula
4. Sulcus centralis insula
5. Sulcus circularis insula



Insula:

Implicated in memory encoding.

Integration of sensory information with visceral responses.

Coordinated cardiovascular response to stress.

