

431

CNS System
central Nervous

Block

Physiology Team

Female Side

Male side

Done By :

Sara Al-Anazy

Omar Barayyan

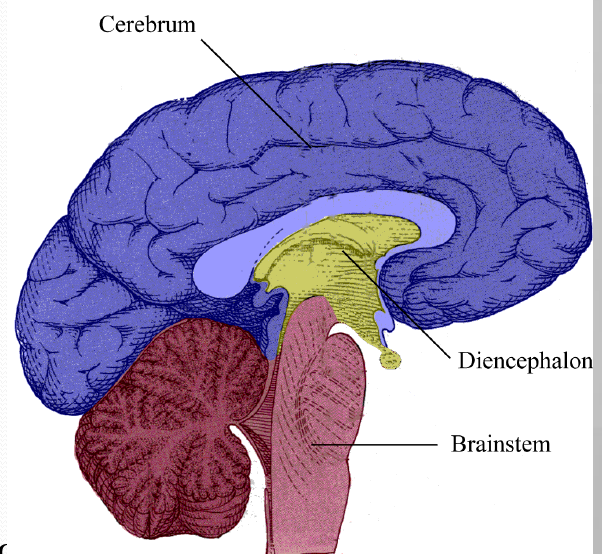
Revised By:

Block

Slide No.(1)

Brain Regions

1. Cerebrum
2. Diencephalon
3. Brainstem
4. Cerebellum



Team Notes :

Cerebrum : The largest portion of the Brain.

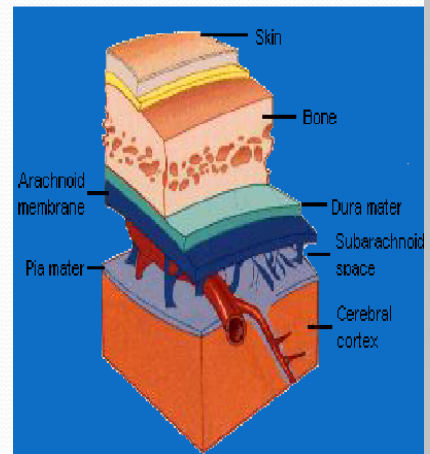
Diencephalon: inner most, composed of : Thalamus , Hypothalamus, Epithalamus. Subthalamus.

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Slide No.(2)

MENINGES

1. **DURA MATER** – Outer covering
2. **ARACHNOID MATER** – Middle covering
3. **PIA MATER** – Inner most covering



Team Notes :

Pia mater: direct contact with brain.

CNS System

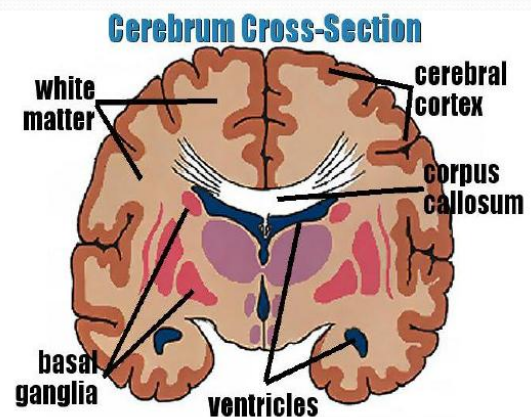
central Nervous

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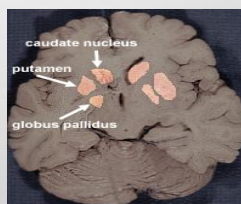
Slide No.(3)

- The largest portion of the brain.
- 2 hemispheres connected by the **corpus callosum**.
- outer cortex of gray matter
- an interior white matter, except for a few small portions.
- **basal nuclei** – islands of gray matter found within the white matter
- The surface is marked by ridges called **gyri** separated by grooves called **sulci**.

Cerebrum (cerebral cortex)



Team Notes :



Basal Ganglia in the Cerebrum(Additional)

Dominant hemisphere:

- ✓ Right handed person → it is the left hemisphere (Most People)
- ✓ Left handed person → it is the left hemisphere also except a little portion
- Arterial supply comes from base and goes around the cerebrum.
- **Dominant hemisphere (Left) called** : Categorical hemi
- **Non Dominant hemisphere (Right) called**: Representational hemi (Appreciate things)



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Slide No.(4)

Cerebrum lobes

1-frontal lobe

2- Parietal lobe

3- Temporal lobe

4- Occipital lobe

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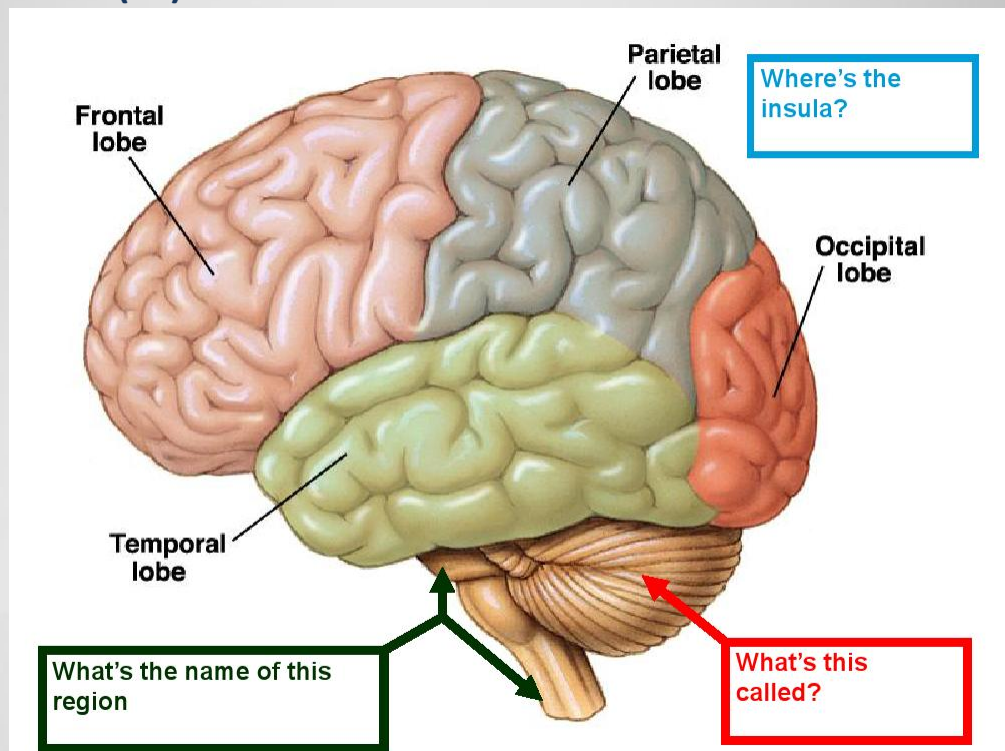
Team Notes :

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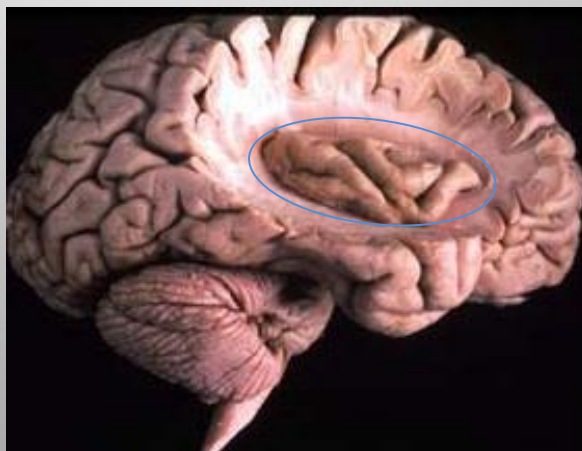
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Slide No.(5)



Team Notes :

The insula is located within the cerebral cortex, beneath the frontal, parietal and temporal opercula.



Slide No.(6)

Brain lobes

1-frontal lobe.

-High intellectual functions/centers of thinking-
problem solving-intelligence-decision making-
verbal communication

-Speaking ability.

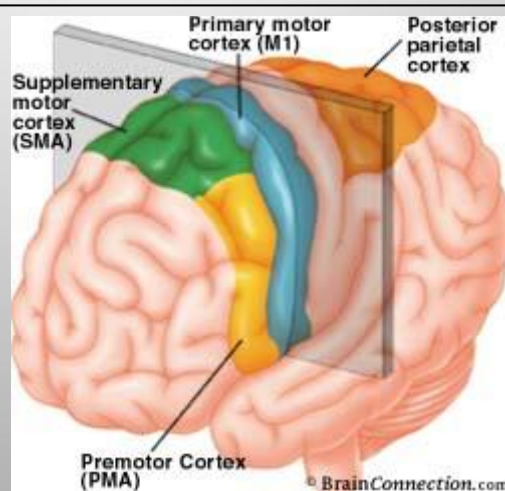
-Elaboration of thoughts.

- ***primary motor cortex***

- **premotor cortex**

- **Supplementary area**

Team Notes :



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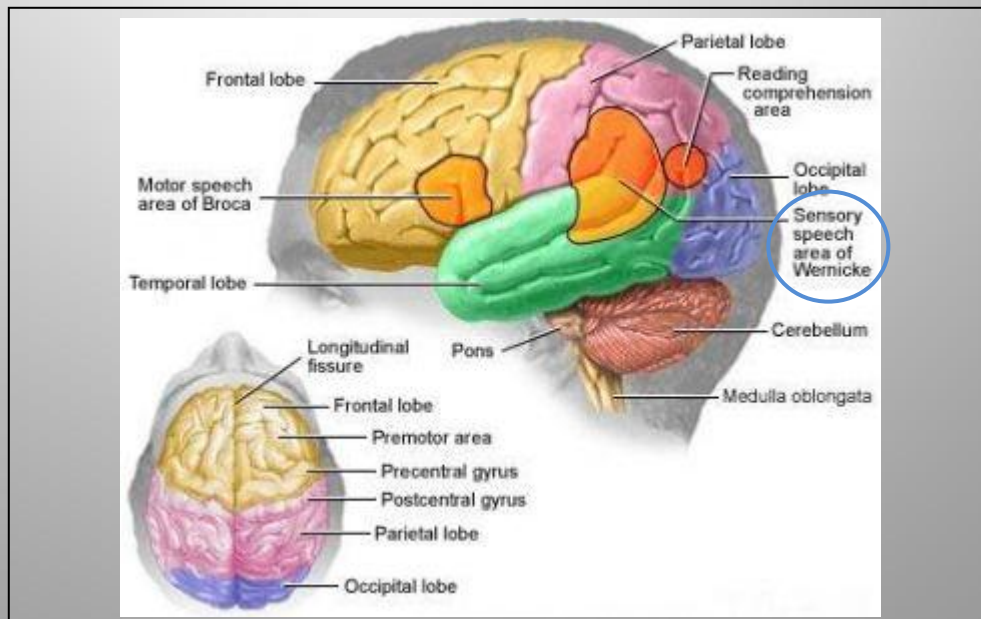
Slide No.(7)

2-parietal lobe

1- somatosensory area

-parietal lobe also has areas of speech for formulation of words and understanding of speech

Team Notes :



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Slide No.(8)

3- The temporal lobe:

*Contains auditory centers that receive informations from the cochlea of each ear.

* Involved in interpretation of auditory stimuli

-storage of auditory & visual experiences

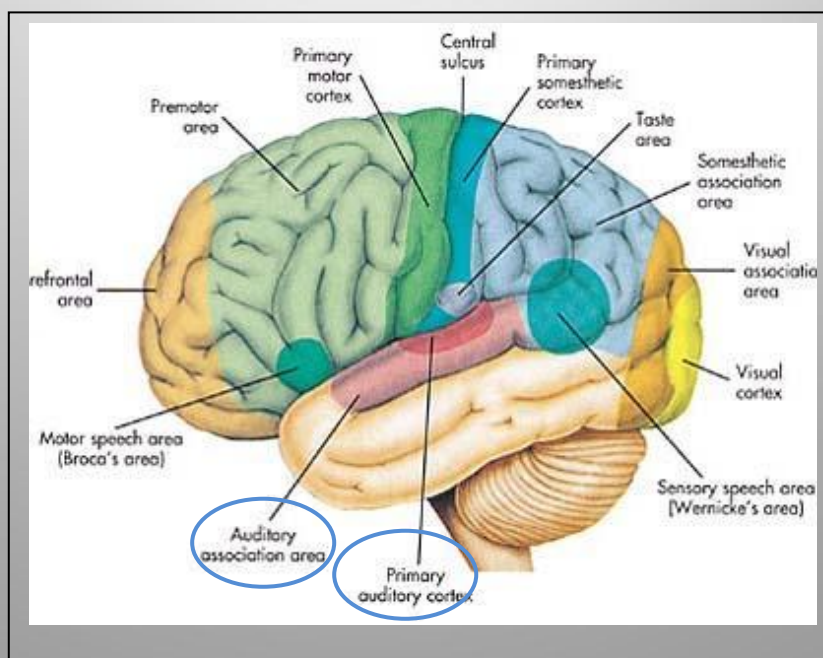
The insula:deep inside temporal lobe

* memory encoding.

*Integration of sensory information (pain) with visceral responses.

- insula involved in coordinating the cardiovascular responses to stress.

Team Notes :



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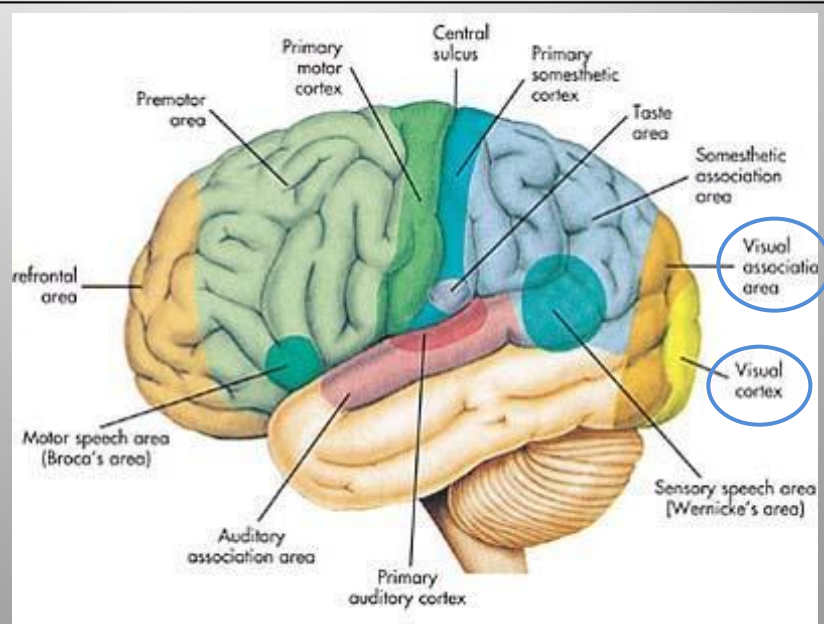
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Slide No.(9)

4-The occipital lobe:

Is the primary area responsible for conscious perception of vision and for coordination of eye movements.

Team Notes :

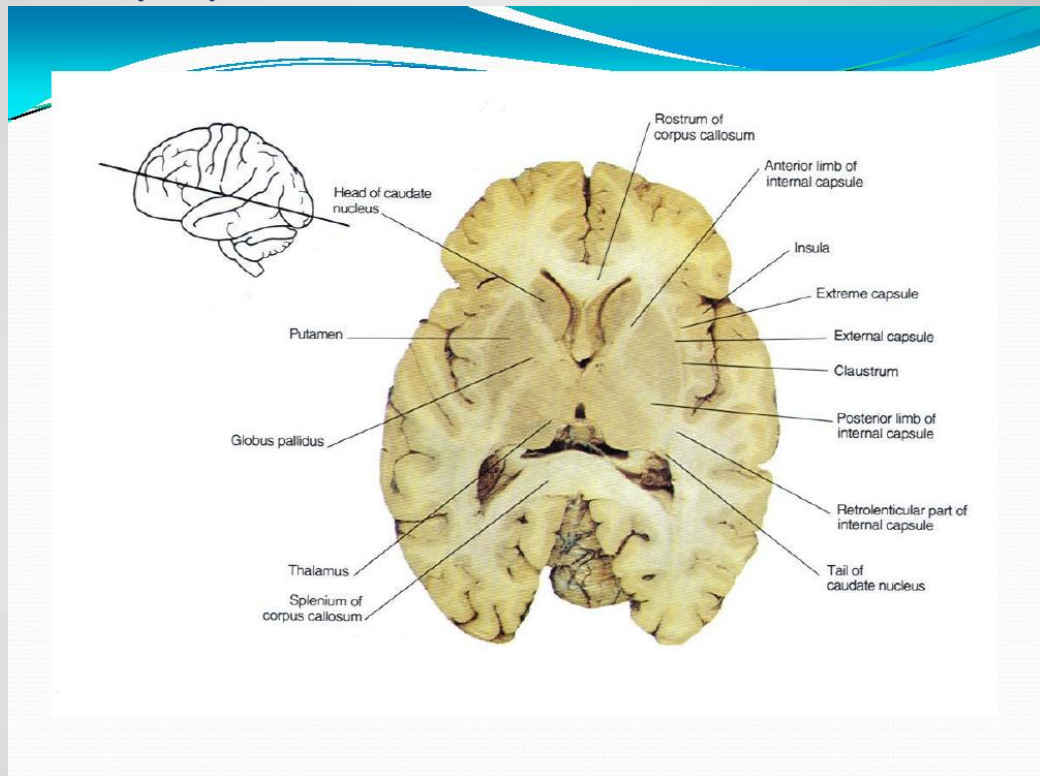


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Slide No.(10)



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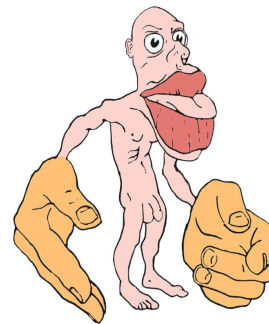
CNS System central Nervous Block

Slide No.(11)

MOTOR AREAS OF CEREBRAL CORTEX

1. Primary Motor Cortex
2. Premotor Cortex
3. Supplementary motor area
4. Broca's Area

(c) Motor homunculus



Team Notes :

Nothing else was mentioned about this slide

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Slide No.(12)

1- Primary Motor Cortex - (motor area 4) (VI-1) (Brodmann's area 4)-

- Site (precentral gyrus)

- Body presentation:-

1-upside down(inverted)

2-face represented **bilaterally** , but rest of body **unilateral**

3- crossed (each control opposite side=contralateral)

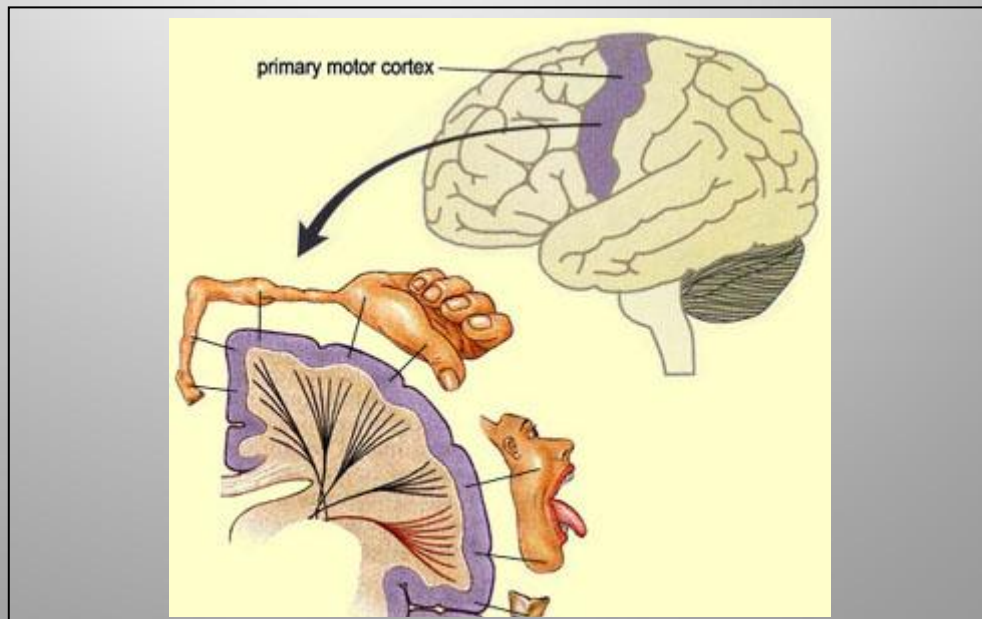
4-area of presentation is proportionate to skill with which this part is used in fine voluntary movement
(**lips ,tongue,thumb,hands have large area**)


5- axial & proximal parts of limbs at anterior edge of precentral gyrus & **distal parts at posterior edge**

-this area+ supplementary motor area has increased blood supply during movements

-cells arranged in columns receive sensory input directly from peripheral areas in which they produce movements & from somatic sensory area I in postcentral gyrus.

Team Notes :





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Slide No.(13)

Functions:-

- 1- execution of fine discrete skilled movements
 - 2- controls the direction, force and velocity of movements.
 - 3- facilitates muscle tone
- 30% origin of corticospinal tracts or pyramidal tracts to AHC s of SC
 - Contains large neurons (pyramidal cells called betz cells)

Lesions:-

-
- contralateral weakness in distal muscle (fingers) (paresis)
- loss of ability to control fine movements
- hypotonia as it is facilitatory to muscle tone.

Team Notes :

Nothing else was mentioned about this slide

Slide No.(14)


2- Supplementary motor area

- **(In frontal lobe medial and lateral side & extends to premotor cortex on lateral surface**
 - **-blood flow increase in it during planning even before movement performance**
 - **Function:**
It works together with premotor cortex.
1-programming & planning of motor sequences of movements
2-bimanual (bilateral) coordinated movements for movements that requires both hands
3-mental rehearsal of movements before performing a complex motor functions.
4- With premotor cortex it translates a motor task into a series of motor command (**MENTAL LEARNING**).
5-together with premotor area 6 give 30% origin to corticospinal & corticobulbar tracts
- Lesions:**
Produces weakness in performing complex activity like bimanual coordinated activity

Team Notes :

Example of Bilateral coordinated movements: typing .

Mental Reharsal: going over what you intend to do ... in your mind. Or Visualizing what are you going to do before you do it.



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Slide No.(15)

3-Premotor cortex (area 6)(motor association area)

- on lateral surface of frontal lobe in front of area 4

Functions:

- 1-set posture at start of planned movements
- 2- getting ready to perform movements
- 3- Premotor & supplementary motor cortex are involved in coordinating & planning complex sequences of movement (motor learning)
- 4-together with supplementary motor area give 30% origin to corticospinal & corticobulbar tracts
- 5- **control gross subconscious movements**

Lesion:-- When damaged with supplementary cortex it may result in **APRAXIA** (no paralysis but only **slowing** of the **complex** limb movement & loss of short-term working memory)

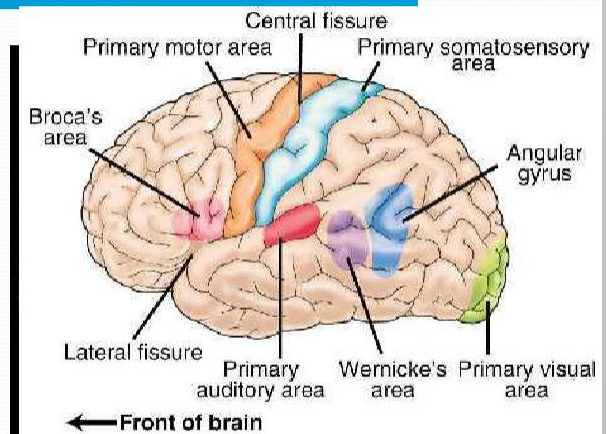
Team Notes :

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Slide No.(16)

Broca's Area

- Found in only one hemisphere (often the left), anterior to the inferior portion of the premotor cortex.
- Directs muscles of tongue, lips, and throat that are used in speech production.



Team Notes :

Nothing else was mentioned about this slide

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Slide No.(17)



Sensory Areas

- Found in the parietal, occipital, and temporal lobes.
 1. Primary somatosensory cortex
 2. Somatosensory association cortex
 3. Visual areas
 4. Auditory areas
 5. Olfactory cortex
 6. Gustatory cortex

Team Notes :

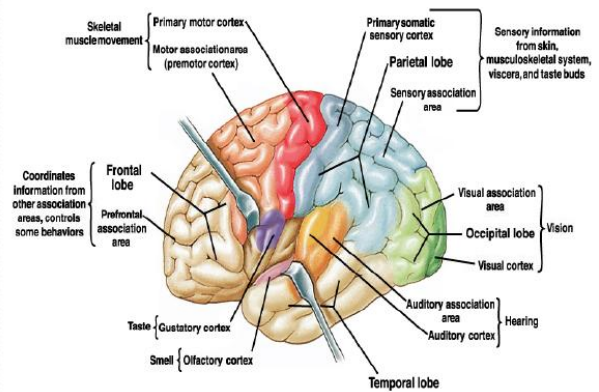
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Slide No.(18)

Primary Somatosensory Cortex(AREA I-Primary)

- Found in the postcentral gyrus in the **parietal lobe**
- Receives sensory information from Contralateral side of body except face is bilaterally represented in both sides



Team Notes :

Nothing else was mentioned about this slide

Primary Somatosensory Cortex:

It receives sensory information from contralateral side of body except face is bilaterally represented in both sides.

- **It has two areas:**

- **Dominant area:** calculation and language

- **Non dominant area:** spatial orientation (Drawing)

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Slide No.(19)

Representation of the body in it:

- The body is represented in an **upside down (inverted)**
- The area of representation depend on the number (density) of receptors** and on the complexity of the sensation (lips,face& hands specially thumbs have wide area of representations , trunk & legs have small area)
- **crossed representation(contralateral)**

Team Notes :

Nothing else was mentioned about this slide



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Slide No.(20)

FUNCTIONS:-

- Receiving cutaneous and muscular sensations, receiving sensory input such as touch, pressure, heat, cold, and pain from the surface of the body
- Interpreting texture and shapes
-
- also perceives awareness of the body position, a process called proprioception.
- also perceives awareness of the body position, a process called proprioception
- discrimination of weights,
- stereognosis
- localization of site of stimulation & 2 points discrimination

Team Notes :

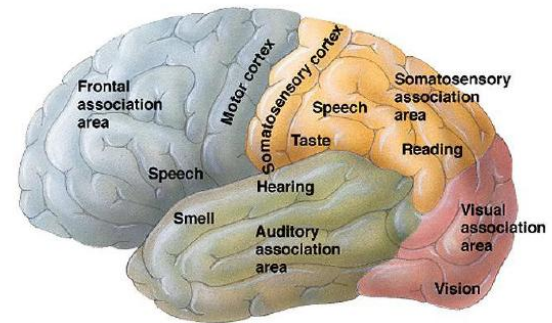
Stereognosis: the ability to perceive and recognize the form of an object using cues from texture, size, spatial properties, and temperature(eyes are close) .

Slide No.(21)

Somatosensory Cortex

(somatosensory association areall)

- Found posterior & inferior to the primary somatosensory cortex
- create a complete comprehension of the object being felt& interpretation of meaning of sensation
- -Face represented anteriorly& arms centrally& legs posteriorly



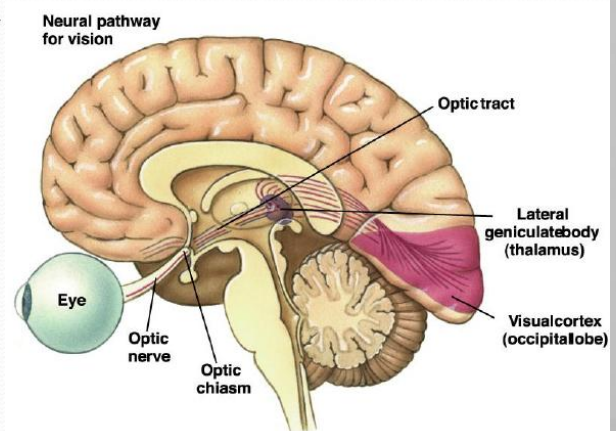
Team Notes :

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Slide No.(22)

Primary Visual Cortex

- Found in the occipital lobe.
- **Vision without meaning**
- **Visual association area**
- Surrounds the primary visual cortex.
- . (meaning)



Team Notes :

Nothing else was mentioned about this slide

- **The primary area responsible for:**

- ✓ Vision
- ✓ Coordination of eye movements

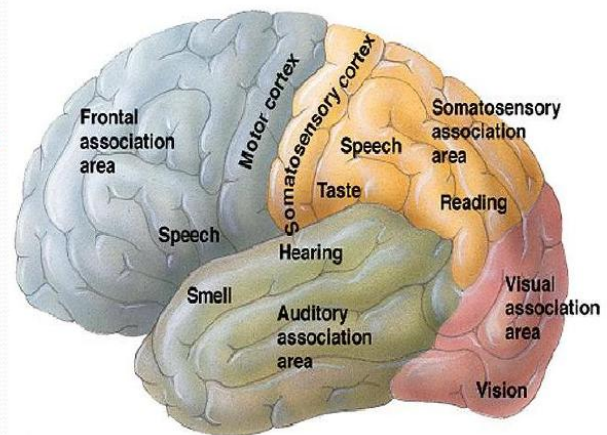
- **Visual association area is responsible for:**

- ✓ Recognition of objects
- ✓ Perception of color, depth, motion, and other aspects of vision.

Slide No.(23)

Auditory Cortex

- in the superior margin of the temporal lobe, next to the lateral sulcus.
- **auditory association area** lets us interpret and remember sounds.



Team Notes :

Nothing else was mentioned about this slide

Slide No.(24)

Olfactory Cortex

- Found in the **frontal lobe**
- **-smelling**

- **Gustatory** cortex for taste - in the **parietal lobe** deep to the temporal lobe.

Team Notes :

Nothing else was mentioned about this slide

Questions:

1- The area of representation in motor areas depend on:

- a. Number of receptors.
- b. Skills.

2- The area of representation in Sensory areas depend on:

- a. Number of receptors.
- b. Skills.

3- Coordination of bilateral movements is function of:

- a. Primary motor area
- b. Premotor area.
- c. Supplementary area.

4- Controlling the gross subconscious movement is function of :

- a. Primary motor area
- b. Premotor area.
- c. Supplementary area.

5- Lesion in the primary motor area will result in:

- a- Hypertonia
- b- Hypotonia
- c- Apraxia.

Answers:

1-B

2-A

3-C

4-B

5-B