

وسهلا



أهلا

يُمنع أخذ السلايدات بدون
إذن المحرر واي اجراء
يخالف ذلك يقع تحت طائلة
المسؤولية القانونية
جميع المعلومات للاستخدام
التعليمي فقط

الأستاذ الدكتور يوسف حسين

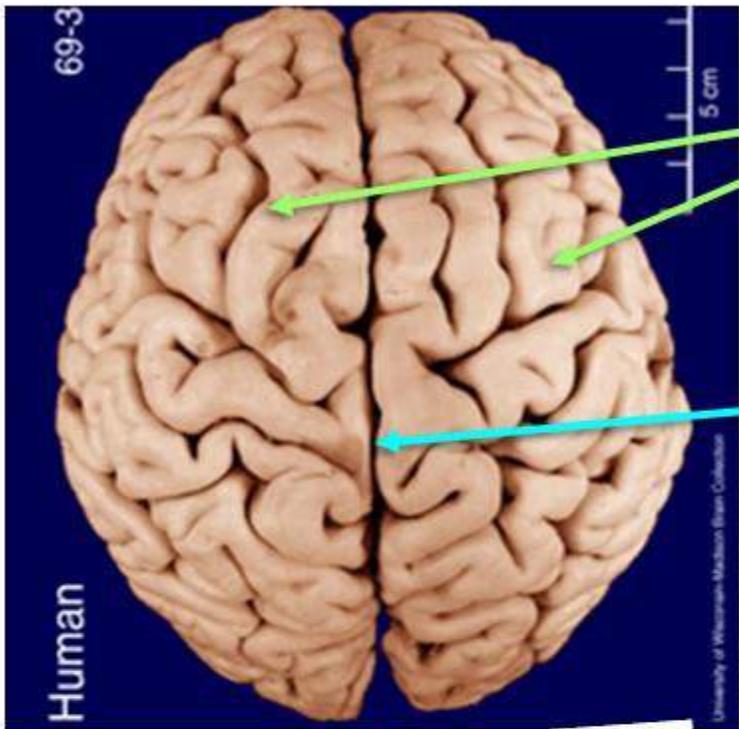
كلية الطب - جامعة مؤتة - الأردن

دكتورة من جامعة كولونيا المانيا

Prof. Dr. Youssef Hussein Anatomy - YouTube

الواتس (أي استفسار)
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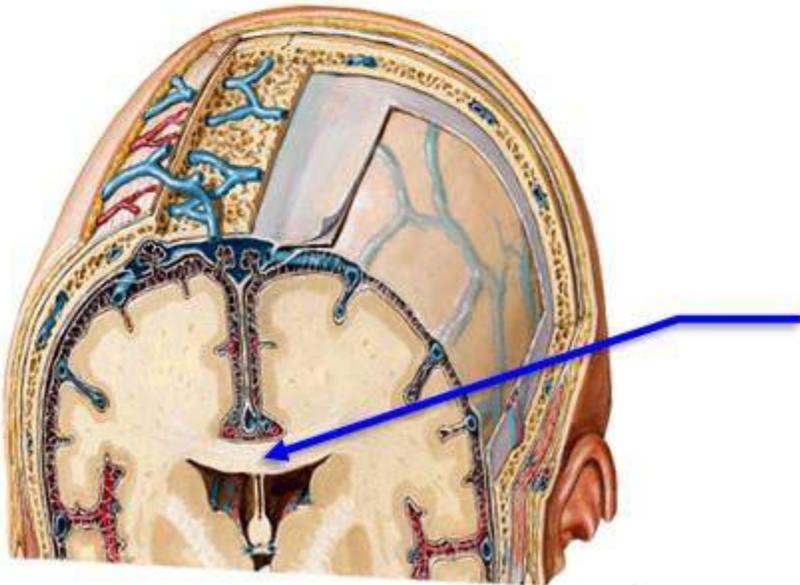
Cerebrum



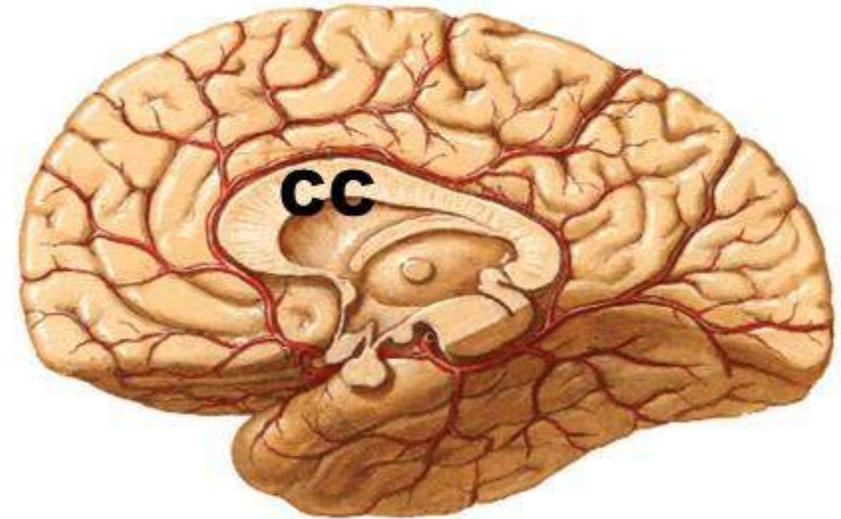
2 cerebral hemispheres

longitudinal fissure

- It is divided into two cerebral hemispheres,
- Separated by longitudinal fissure containing falx cerebri
- Connected by CC

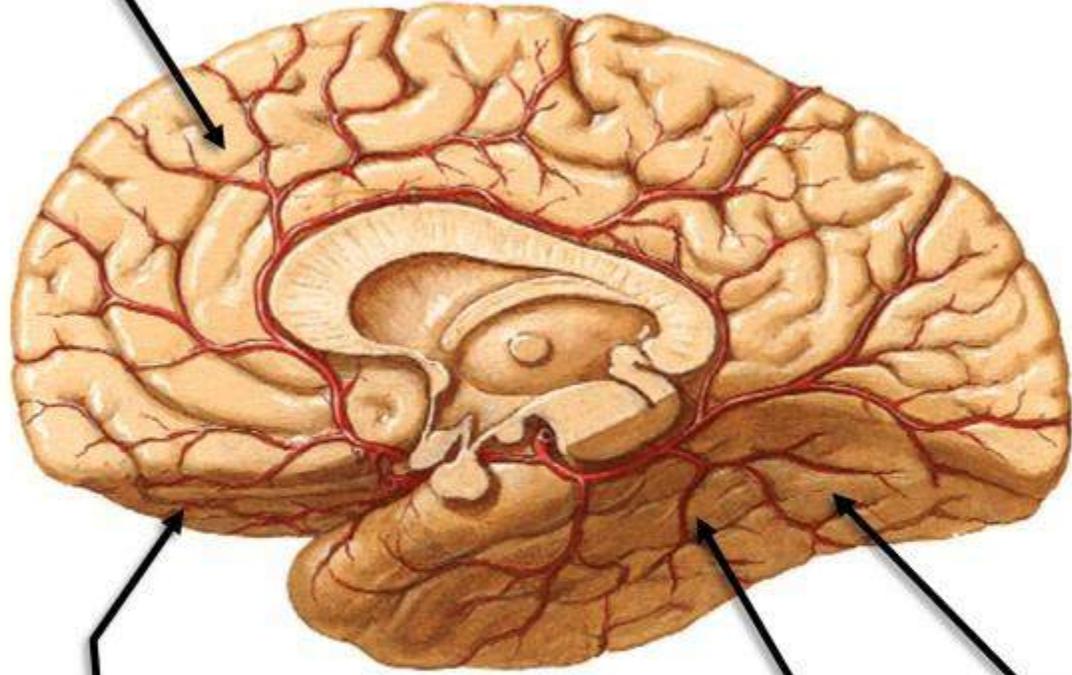


Corpus callosum



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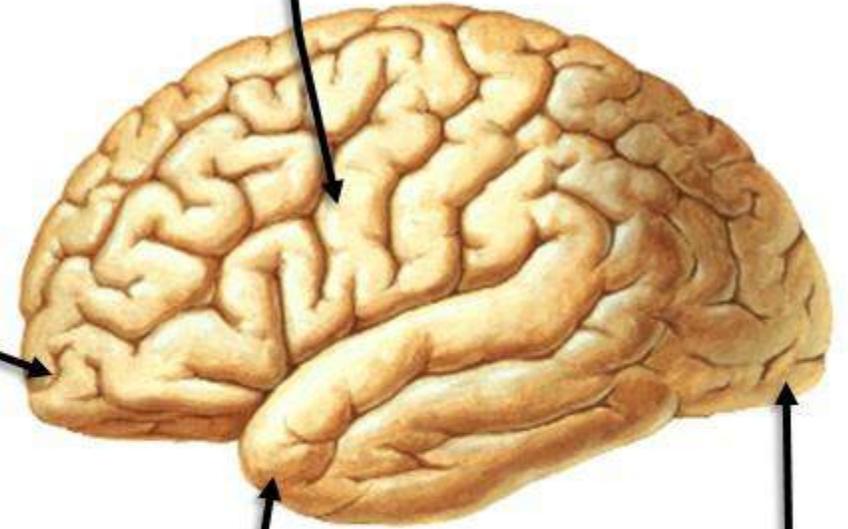
2- Medial Surface



3A- Orbital part
(anterior)

3B- Tentorial part
(Posterior)

1- Superolateral Surface



Frontal pole

Temporal pole

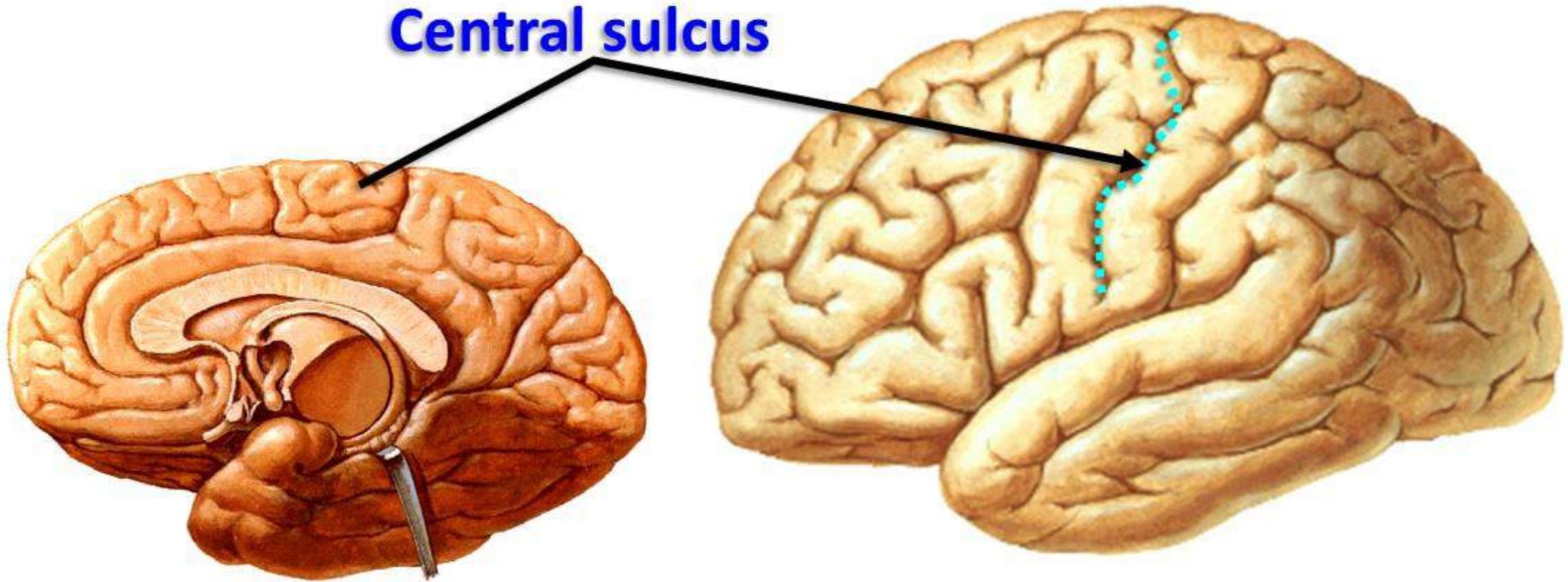
Occipital pole

3- Inferior Surface

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Each cerebral hemisphere has 3 surfaces and 3 poles

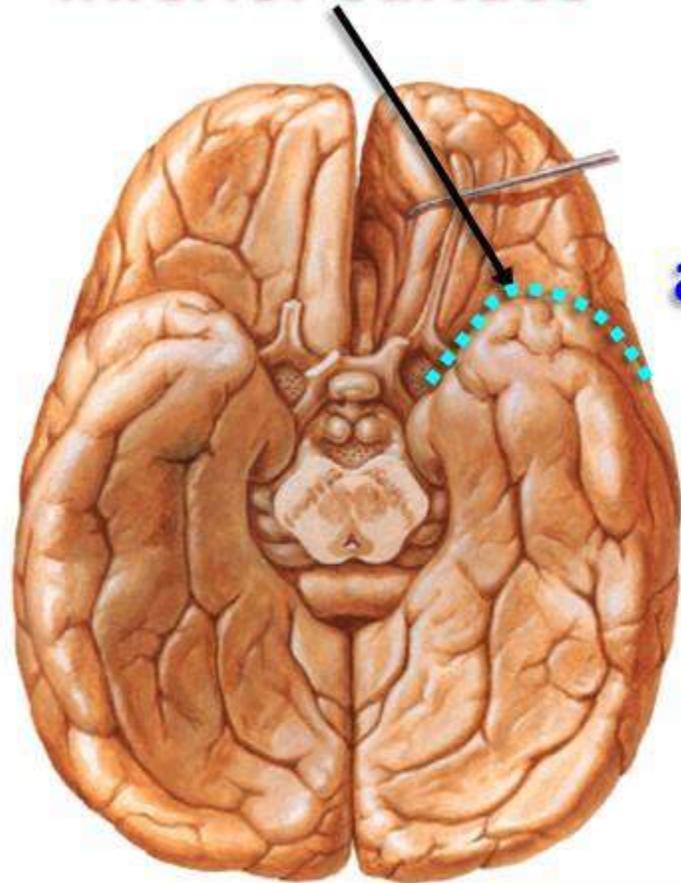
Central sulcus



1- Central sulcus (Fissure of Rolando) a deep sulcus on the superolateral surface about **1/2 inch behind** the midpoint between frontal and occipital poles.

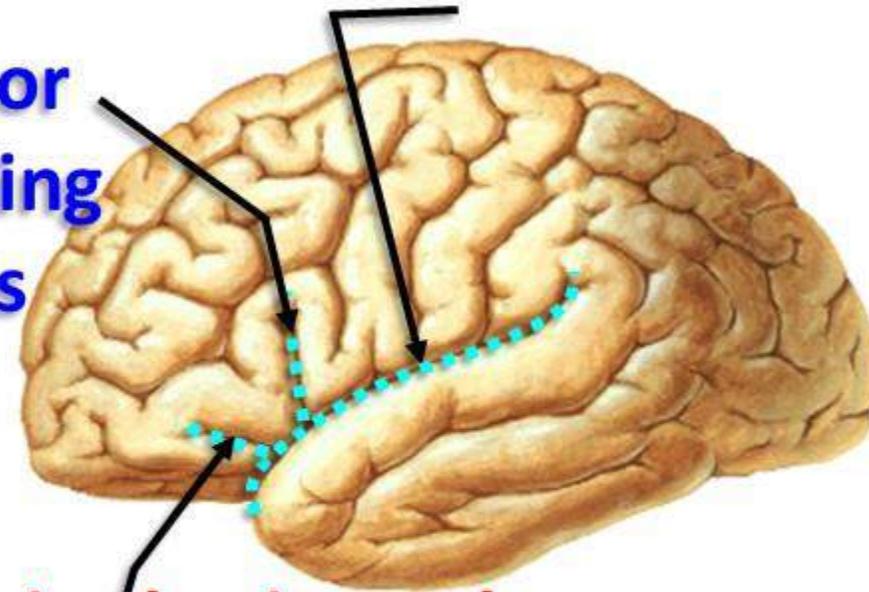
- It extends a little on the medial surface

The stem arises on the inferior surface



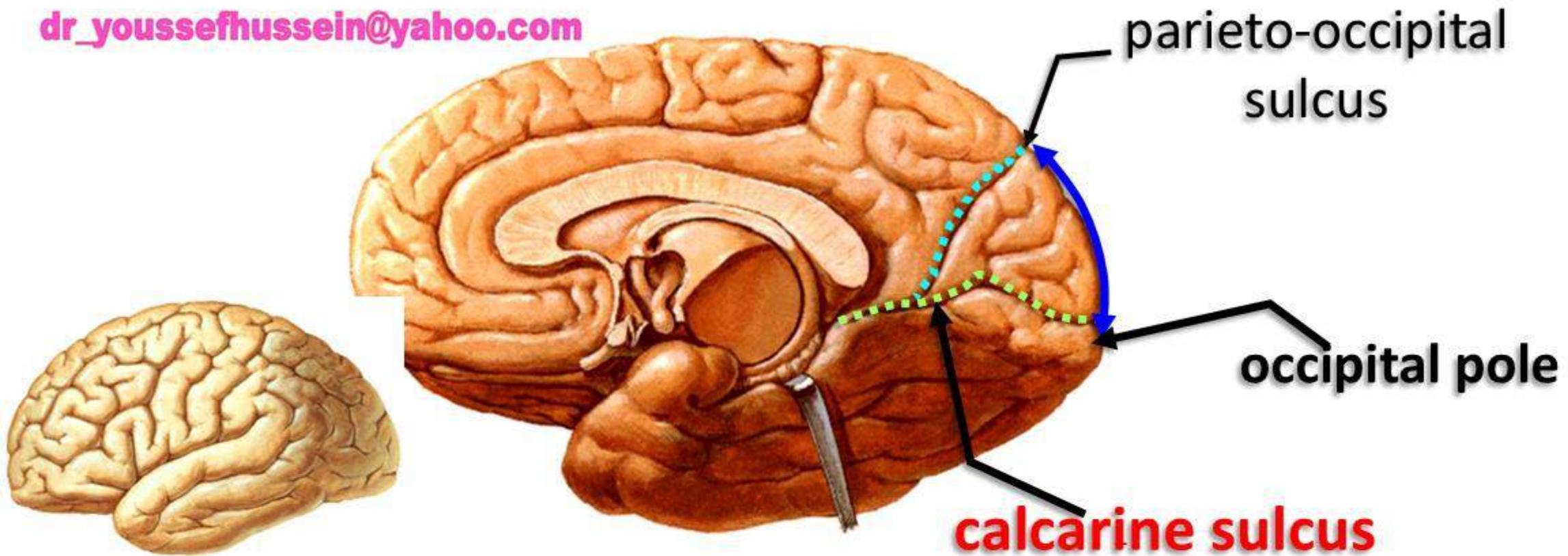
anterior ascending ramus

Long posterior ramus



Anterior horizontal ramus

2- Lateral sulcus (fissure of Sylvius) consists of a short stem (inferior surface) and on reaching the superolateral surface, it divides into three rami.



3- Parieto-occipital sulcus begins on the medial margin of the hemisphere about 2 inches (5 cm) anterior to the occipital pole. It is seen in the superolateral surface

4- Calcarine sulcus; begins below the splenium of the corpus callosum to the occipital pole.

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- It is divided by parieto-occipital sulcus into precalcarine and postcalcarine sulcus.

Medial

Frontal

Parietal

Occip

Temporal

frontal lobe

Parietal lobe

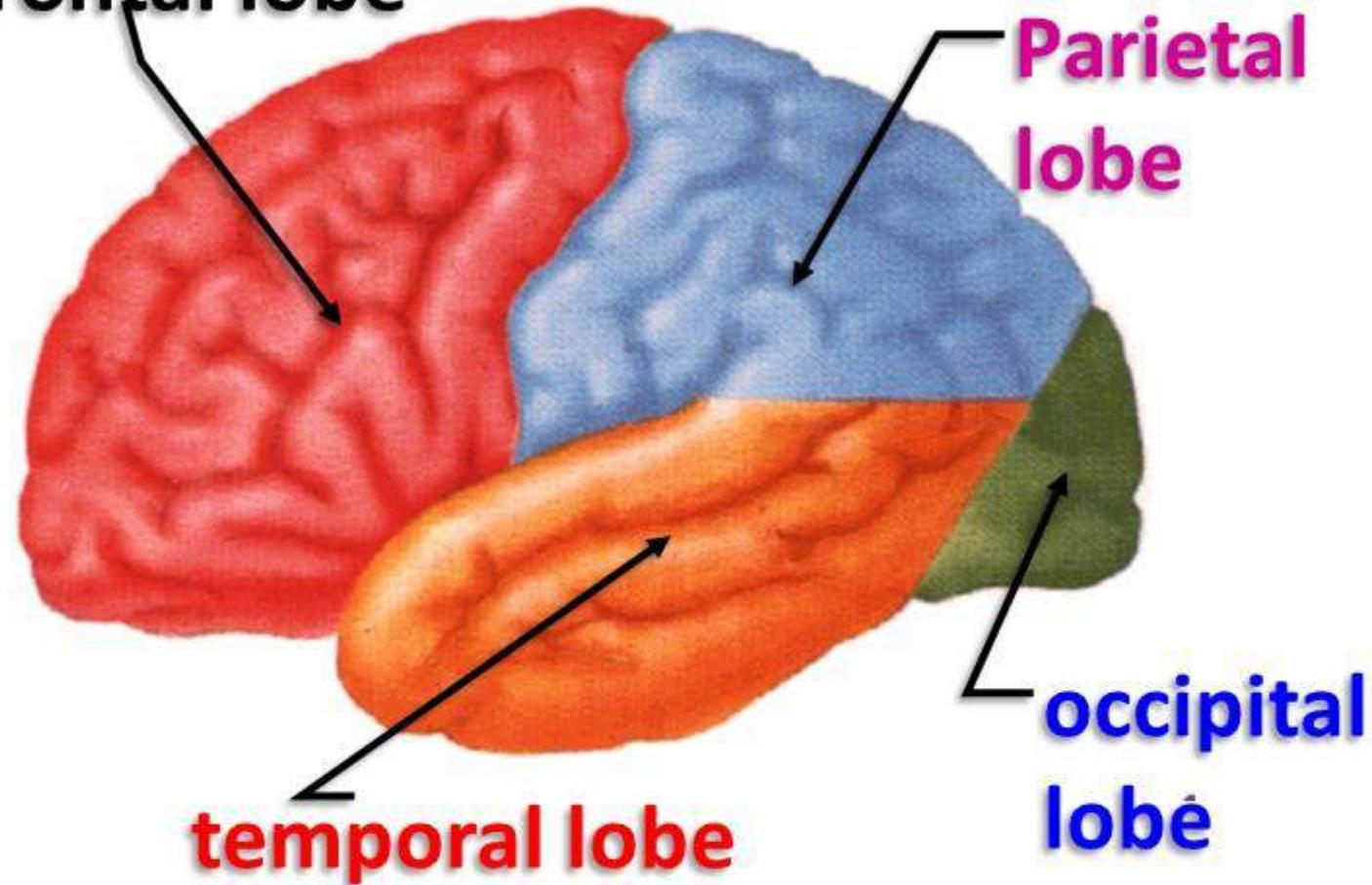
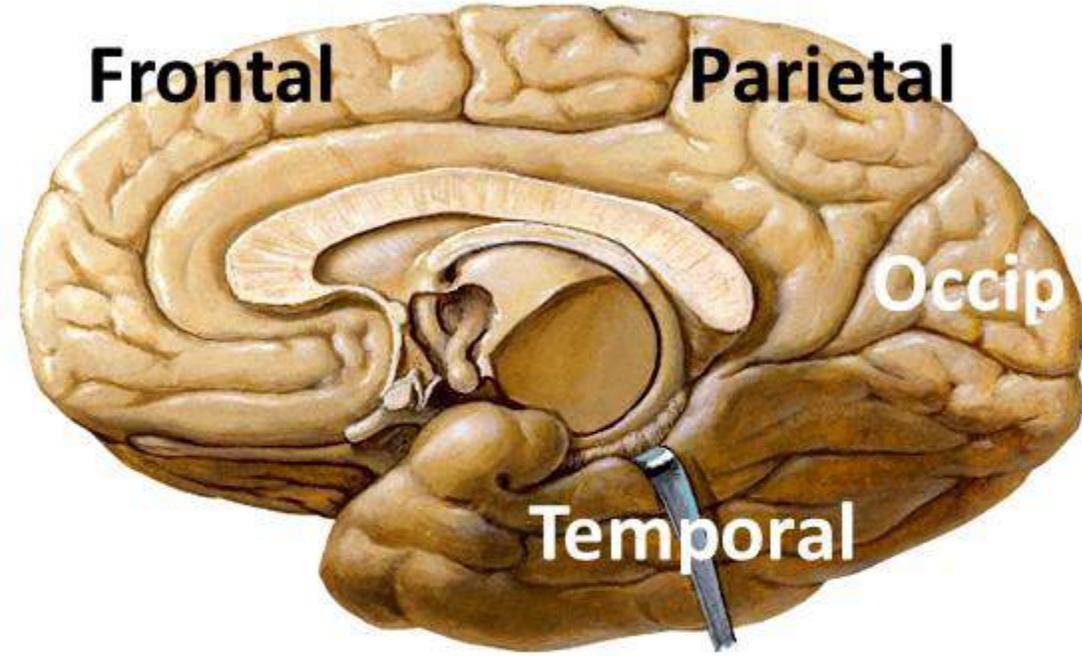
temporal lobe

occipital lobe

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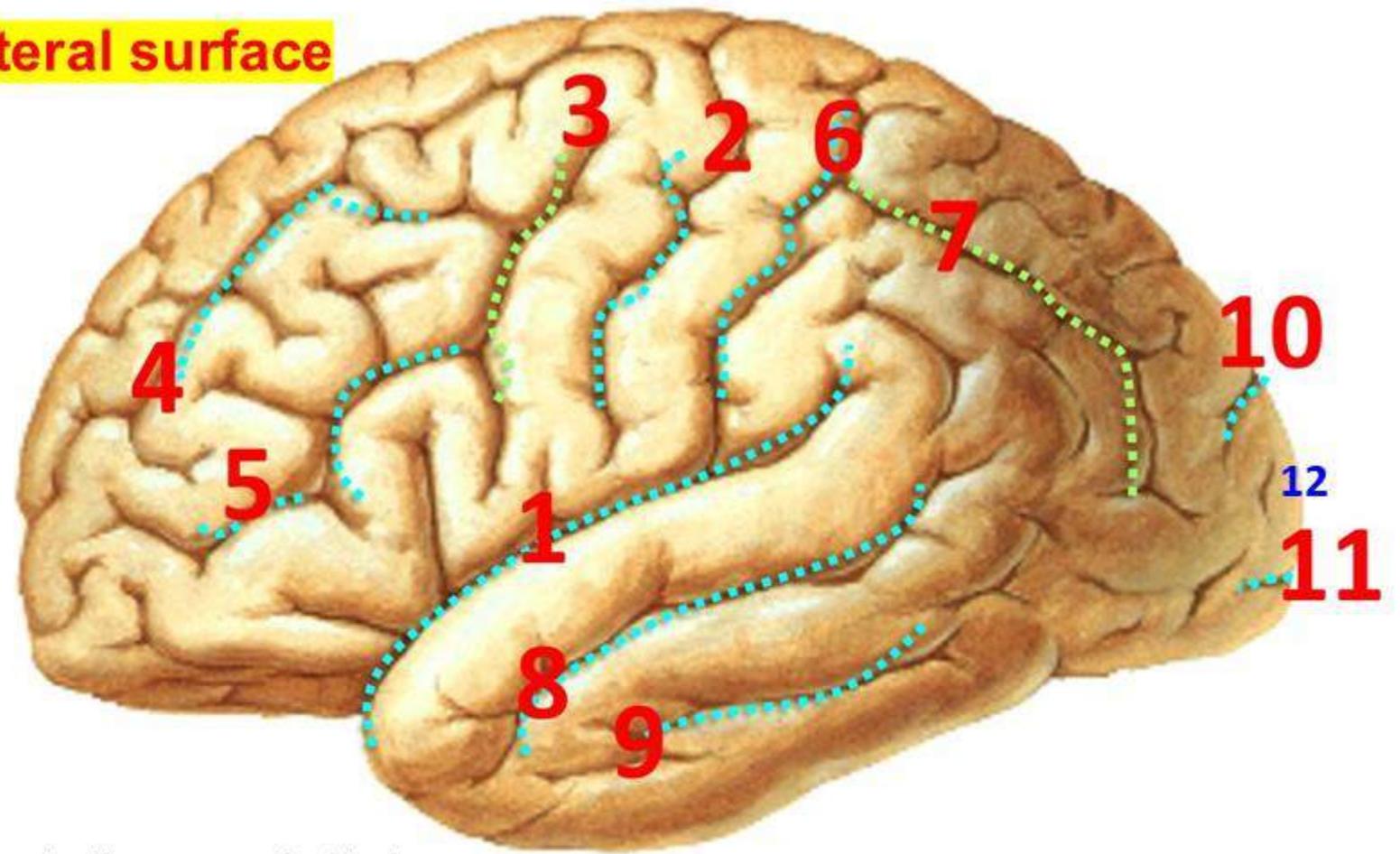
Superolateral

Each cerebral hemisphere has 4 lobes



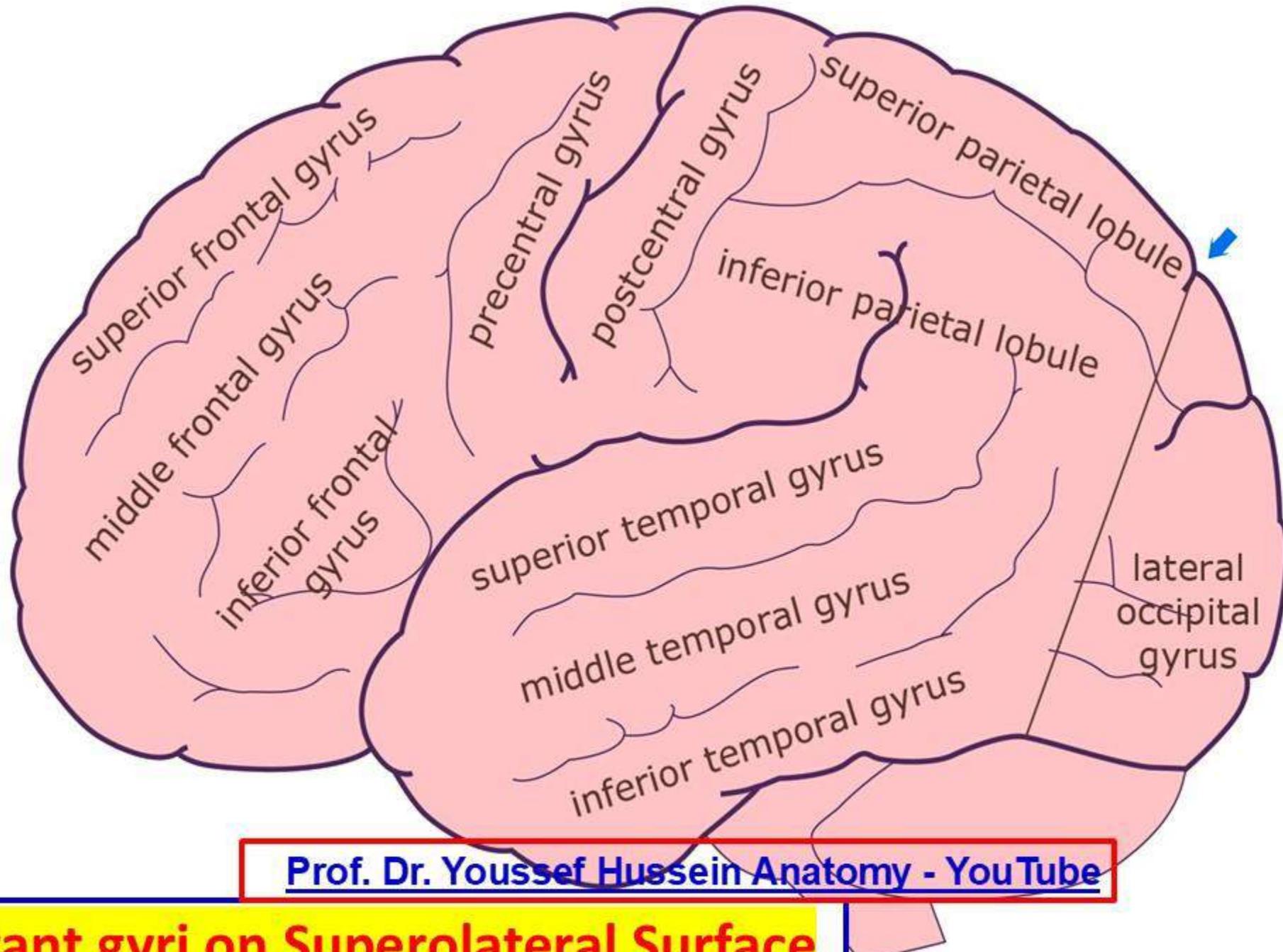
- **Sulci on the Superolateral surface**

- 1- Lateral sulcus
- 2- Central sulcus
- 3- Precentral sulcus:
- 4 Superior frontal sulci
- 5- inferior frontal sulci
- 6- Postcentral sulcus
- 7- Intraparietal sulcus.
- 8 Superior temporal sulci
- 9- inferior temporal sulci
- 10- Parieto-occipital sulcus.
- 11- Calcarine sulcus:
- 12- Lunate sulcus (Simian) at the occipital lobe



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Sulci on the superolateral surface



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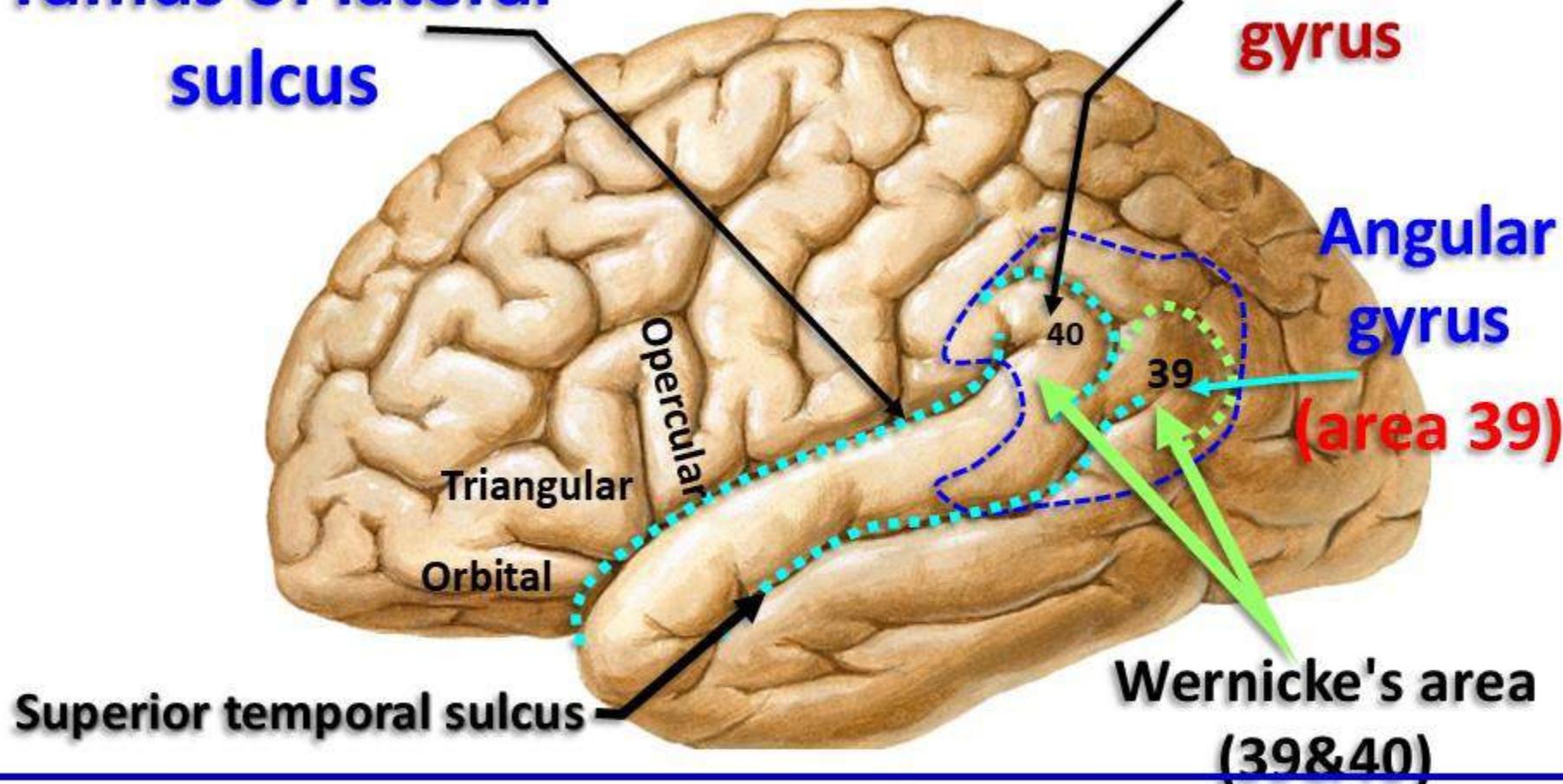
Important gyri on Superolateral Surface

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Long posterior
ramus of lateral
sulcus

(area 40) Supramarginal
gyrus

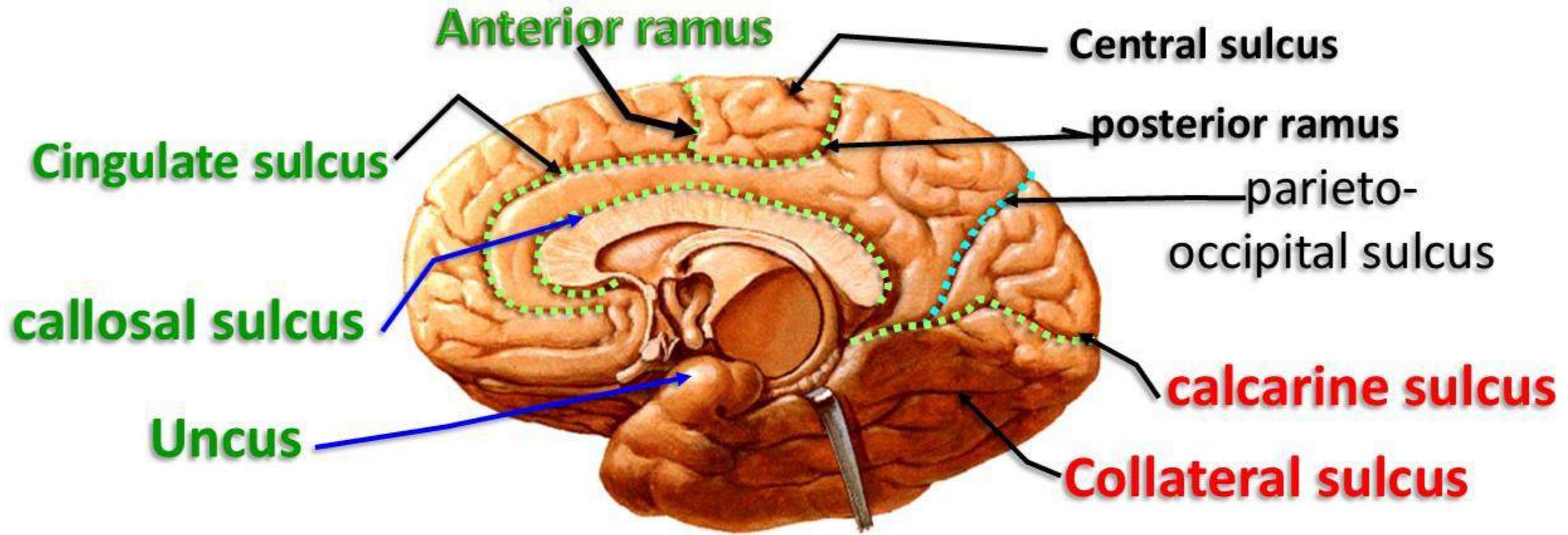
Angular
gyrus
(area 39)



Superior temporal sulcus

Wernicke's area
(39&40)

- **Supramarginal gyrus (area 40)** is gyrus around the posterior end of the lateral sulcus
- **Angular gyrus (area 39):** is gyrus around the posterior end of the superior temporal sulcus



- **Sulci on the Medial Surface**

1- **Callosal sulcus**: close to the upper surface of the corpus callosum.

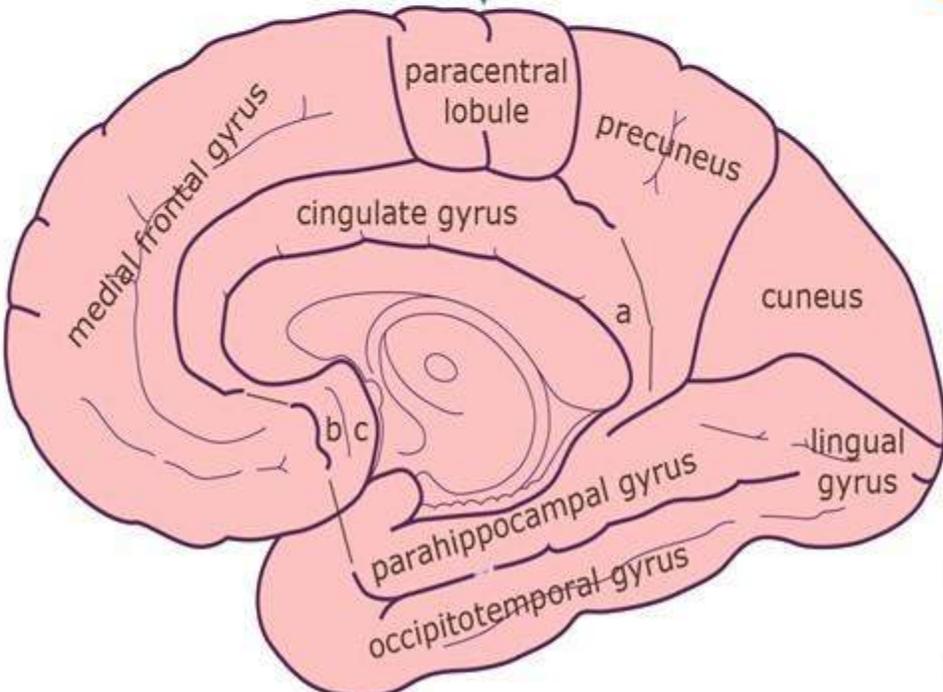
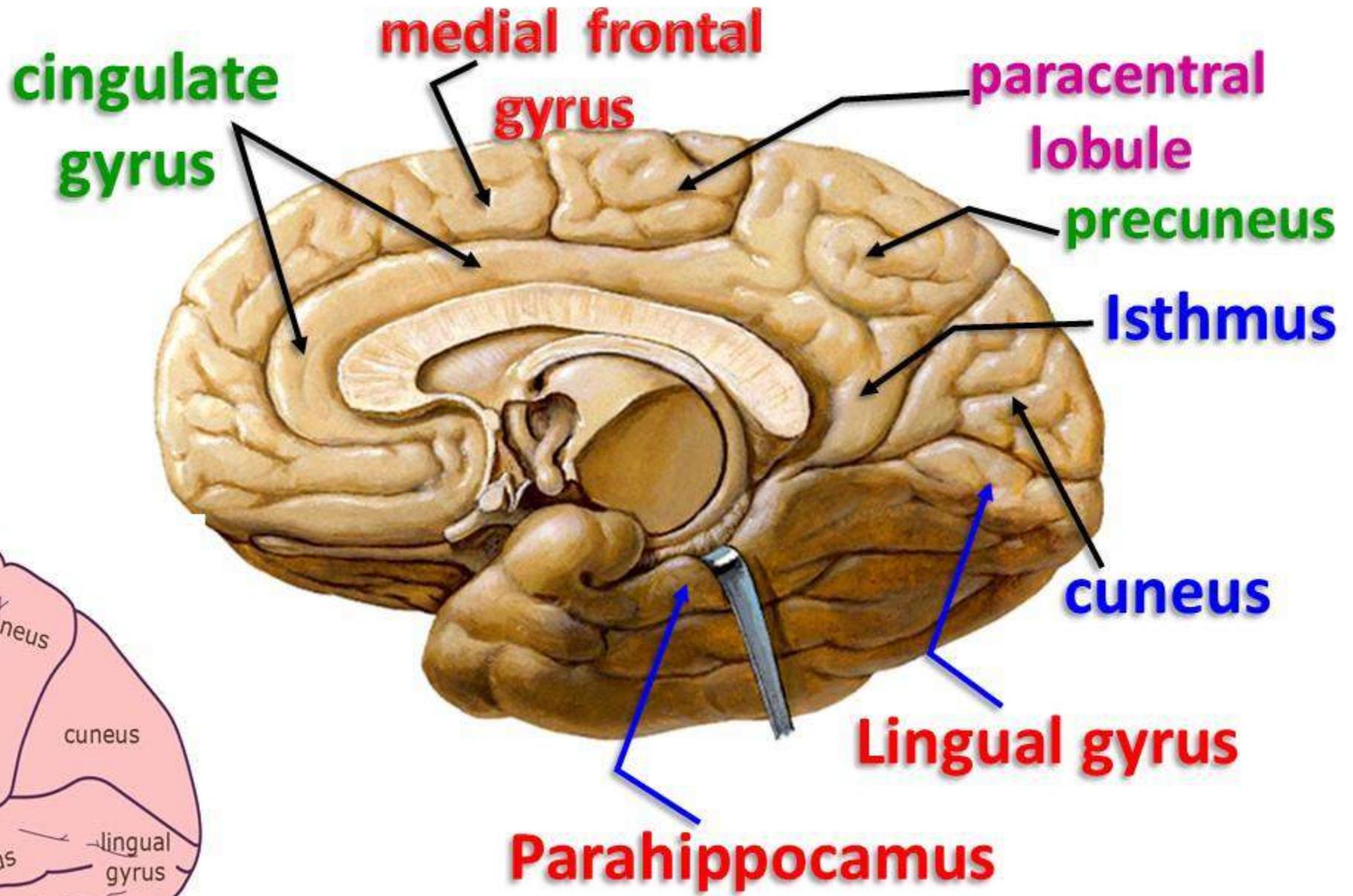
2- **Cingulate sulcus**; about finger's breadth above and parallel to the callosal sulcus.

- It **ends** by dividing into two rami in front and behind the central sulcus.

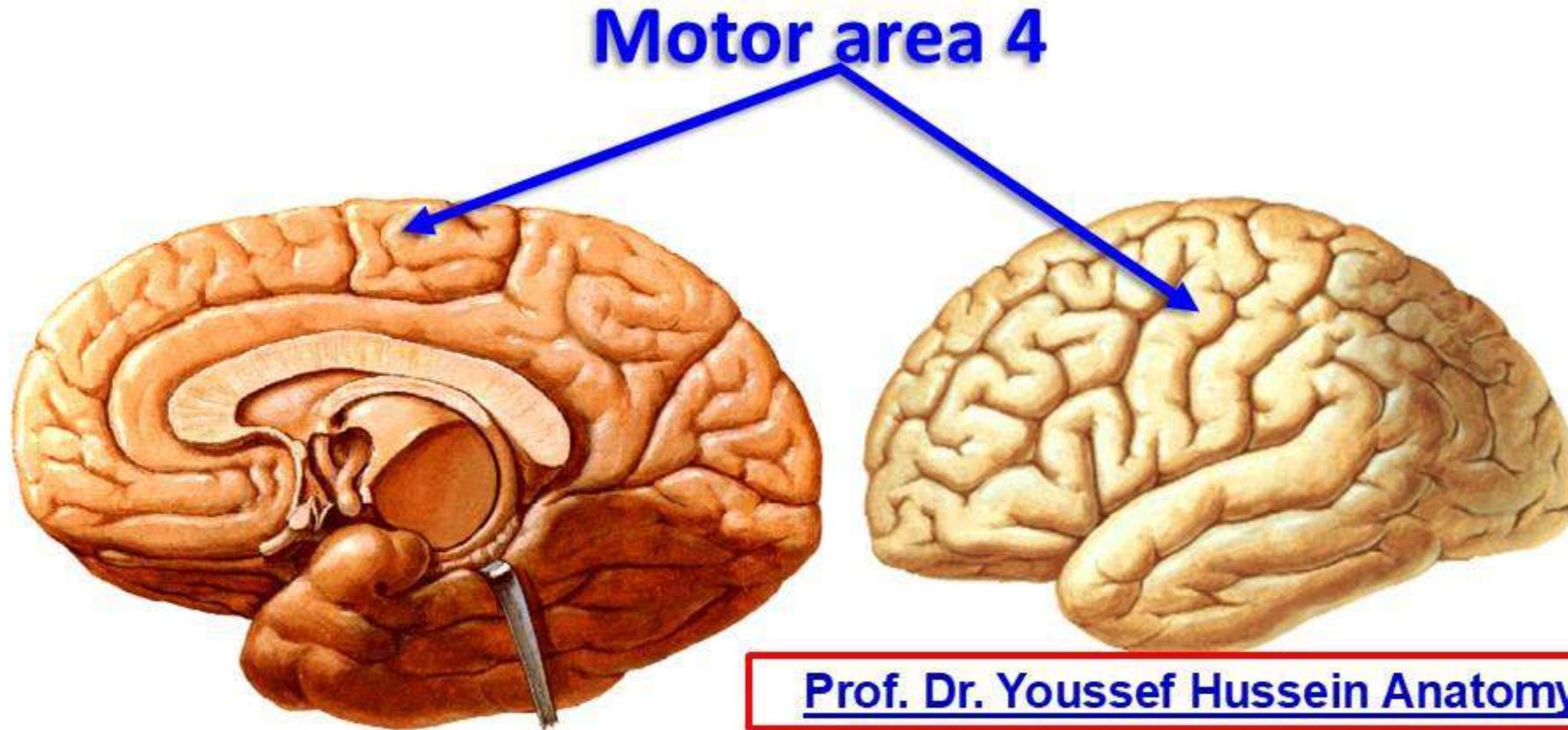
3- **Central sulcus**: between the two branches of the cingulate sulcus.

4- **Parieto-occipital sulcus.**

5- **Calcarine sulcus.**

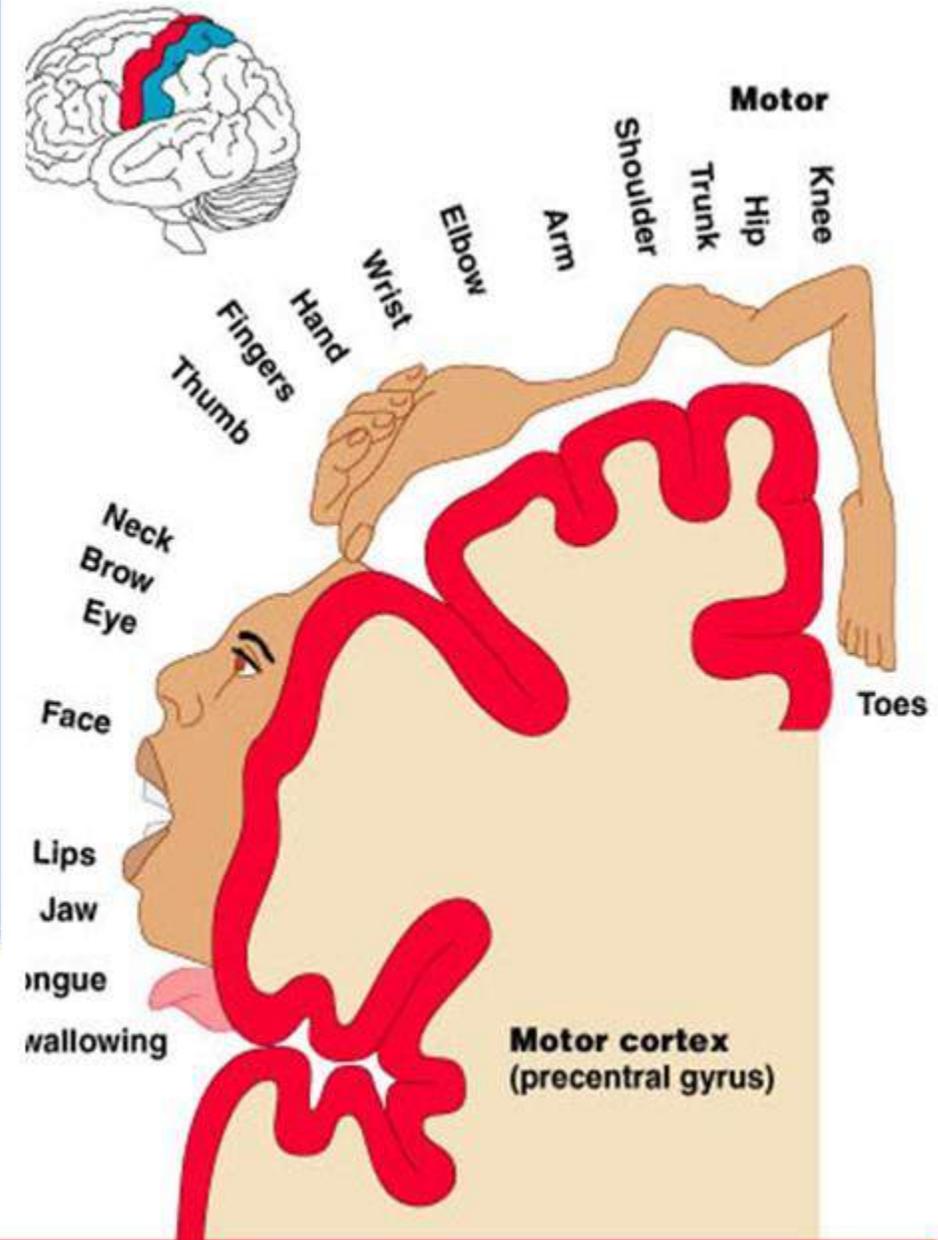


Functional areas of the Superolateral surface



- **Primary motor area** corresponds to the precentral gyrus (**Brodmann area 4**), anterior part of the paracentral lobule **Controls motor functions**, primarily on the opposite side of the body.

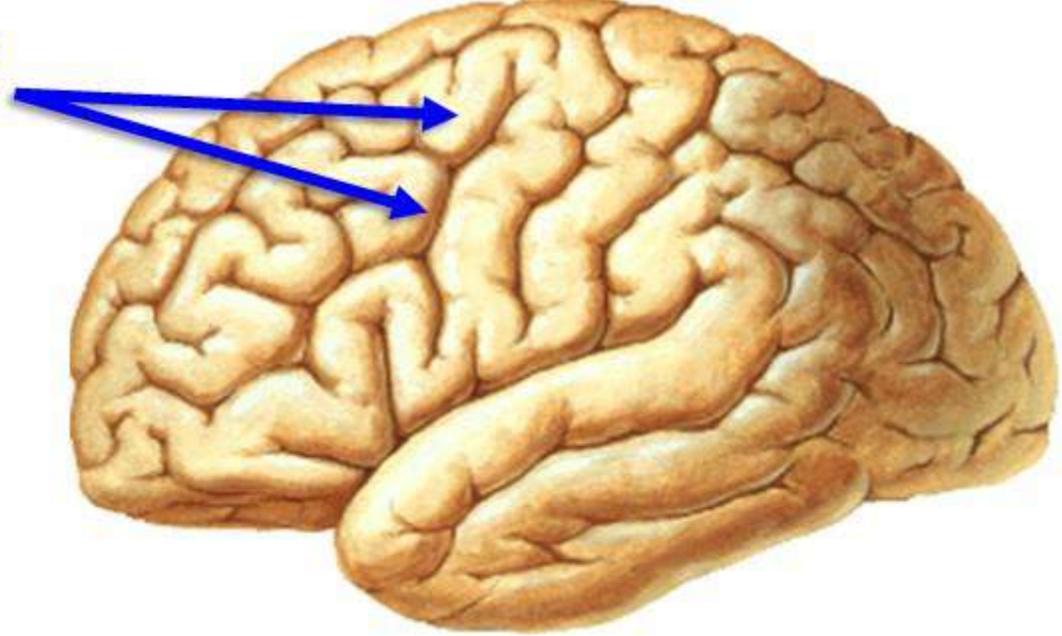
- A body represented in upside down.
- The muscles of the head are represented most ventrally closest to the lateral fissure; then, proceeding dorsally, are the regions for the neck, upper limb, and trunk on the lateral aspect of the hemisphere.
- On the medial aspect of the hemisphere is the motor representation for the pelvis and lower limb.
- size depends on skill, not mass of the muscle
- **Lesion** of the area 4 results in contra-lateral **hemiplegia (UMNL)**.



Why trunk not affected during hemiplegia



Premotor area 6

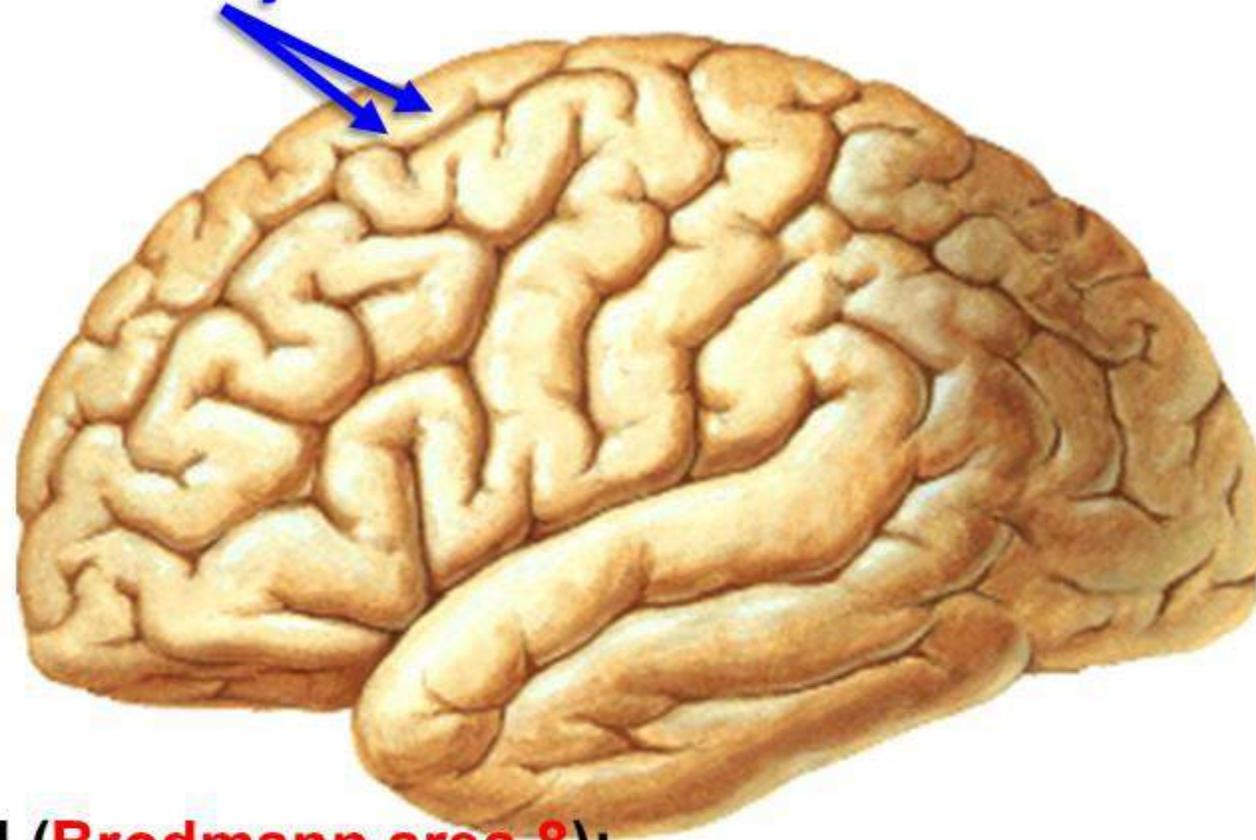


- Located anterior to the precentral gyrus
- It is the origin of extrapyramidal fibers
- Controls more complex movements
- Involved in the *planning of movements* and storage of the learned movements to bring them later on.

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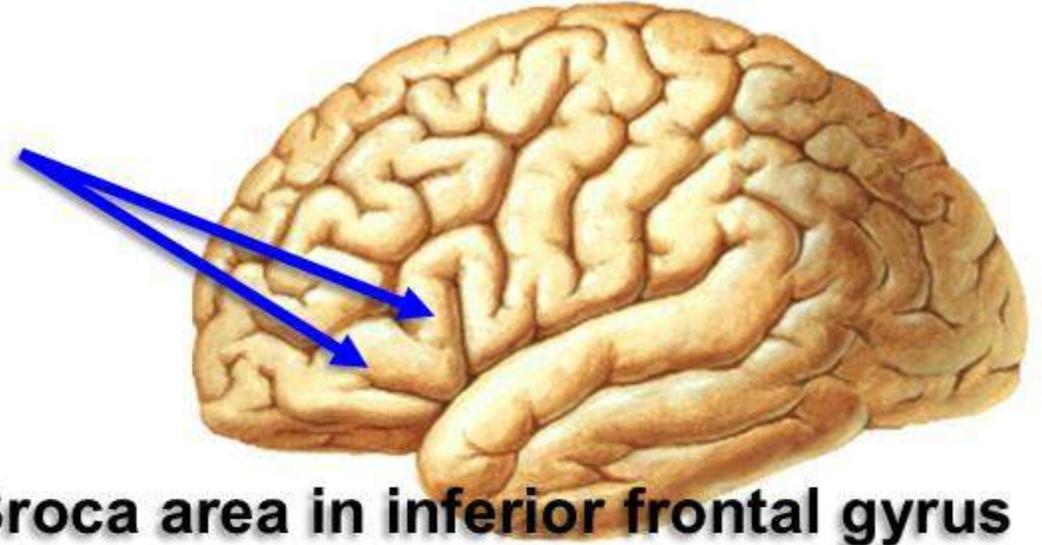
- Damage here results in an **apraxia**, a disruption of the patterning and execution of learned motor movements.
- Individual movements are intact, and there is no weakness, but the patient is unable to perform movements in the correct sequence.

Frontal eye field area 8



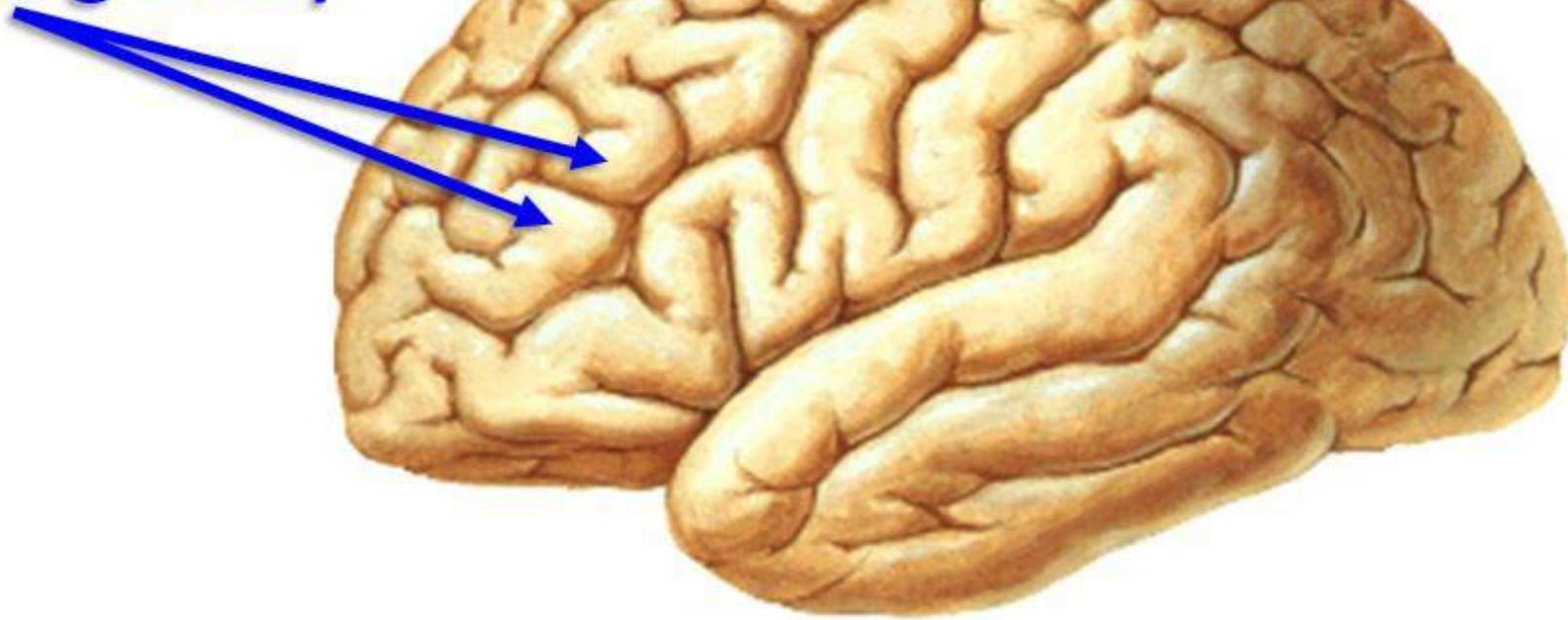
- **Frontal eye field (Brodmann area 8):**
 - It lies anterior to the premotor cortex
 - **It controls movements of the eyes when eyes follow a moving target.**
- A lesion here results in an inability to make voluntary eye movements toward the contralateral side.

(Broca's area) 44, 45



- **Motor speech (Broca's) area (areas 44, 45)** Broca area in inferior frontal gyrus of frontal lobe of the dominant hemisphere (95%). Associated with language production. It brings about the formation of words by its **connections** with the adjacent primary motor areas; the muscles of the speech.
- Lesion in this area produces **Motor Aphasia**—higher-order language deficit (inability to understand/produce/use language appropriately); caused by pathology in dominant cerebral hemisphere (usually left in righthanded people).
- Damage of Broca area and primary motor cortex = full loss of language
- **Dysarthria**—partial loss of language (difficulty speaking), damage to the muscles or nerves that control speech.

(Writing area)

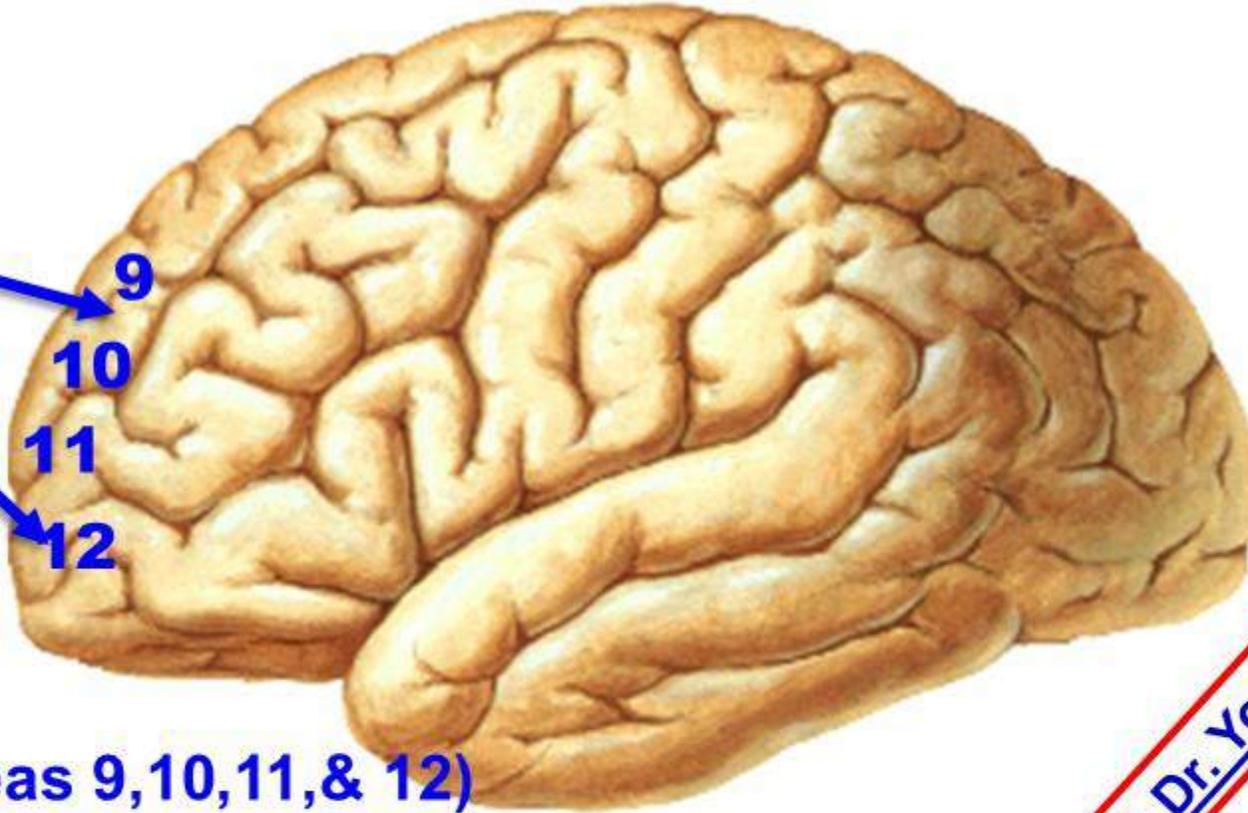


- **Writing area (Exner's area);**
 - It lies in the middle frontal gyrus.
 - The person able to express himself in written words
 - Lesion leading to **Agraphia** (loss of ability to write)

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Prefrontal areas



Prefrontal area (areas 9,10,11,& 12)

- It lies in the most anterior part of the frontal lobe **الناصية**

- **It is responsible for:**

A- Planning, thinking, remember and problem solving

B- Motivating, emotions, good & sinful behavior, mood, psychological activities.

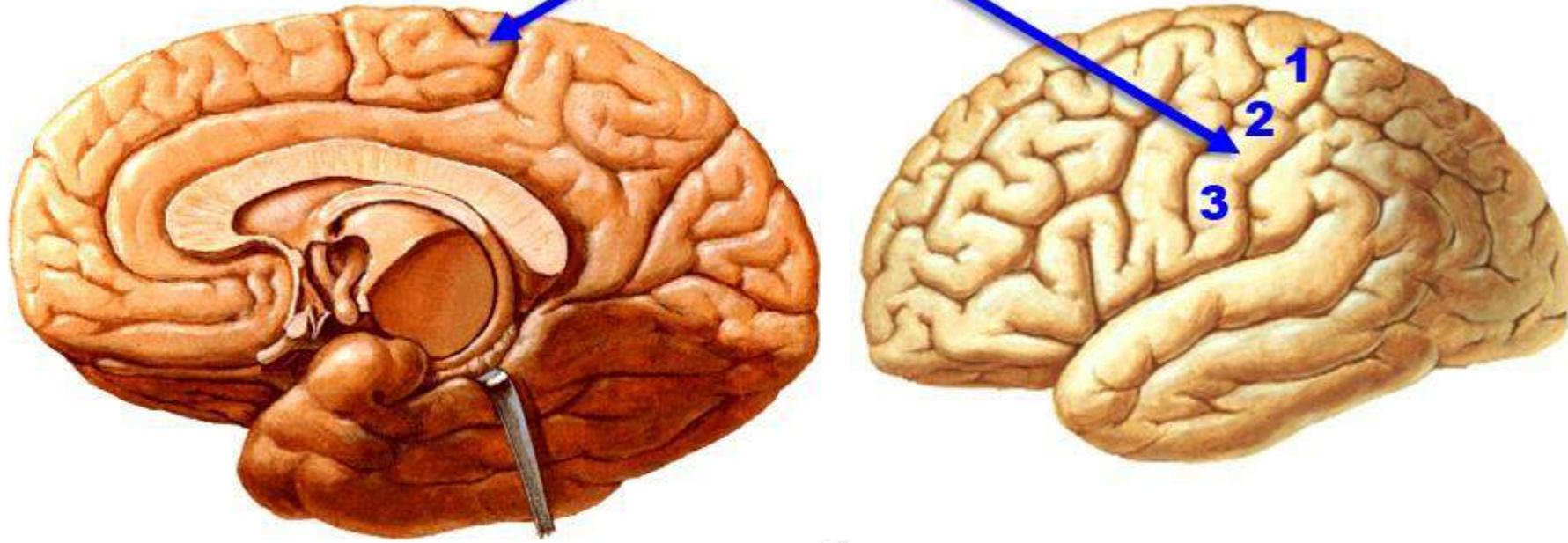
C- Telling of lie and truth

- Lesions in the prefrontal area produce what is called the **frontal lobe syndrome**.

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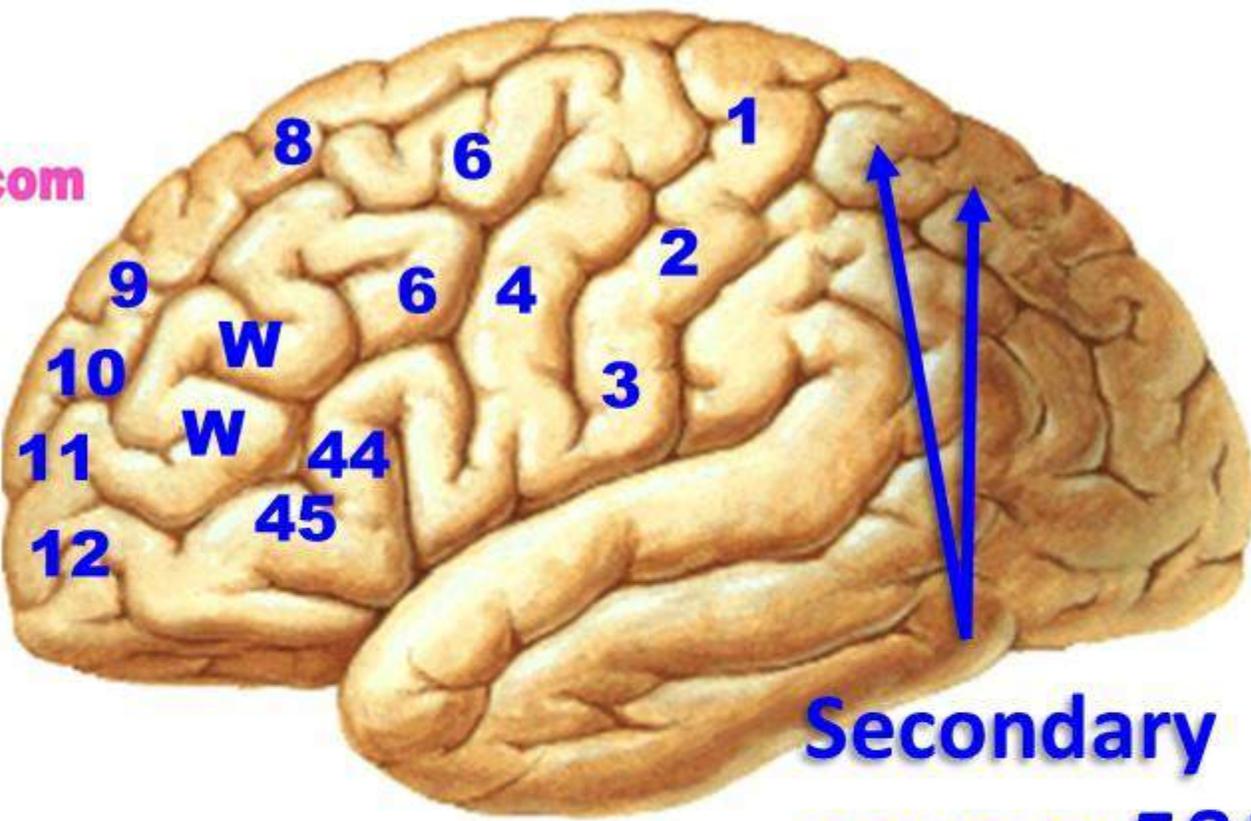
Somatosensory area 1,2,3

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- Somatosensory (**Primary sensory**) cortex corresponds to postcentral gyrus (**areas 1,2,3**), posterior part of paracentral lobule
- It receives sensations from opposite side of body.
- The body represented upside down [Prof. Dr. Youssef Hussein Anatomy - YouTube](https://www.youtube.com/channel/UC...)
- Lesion in this area leads to **loss of sensation** in opposite side of the body.

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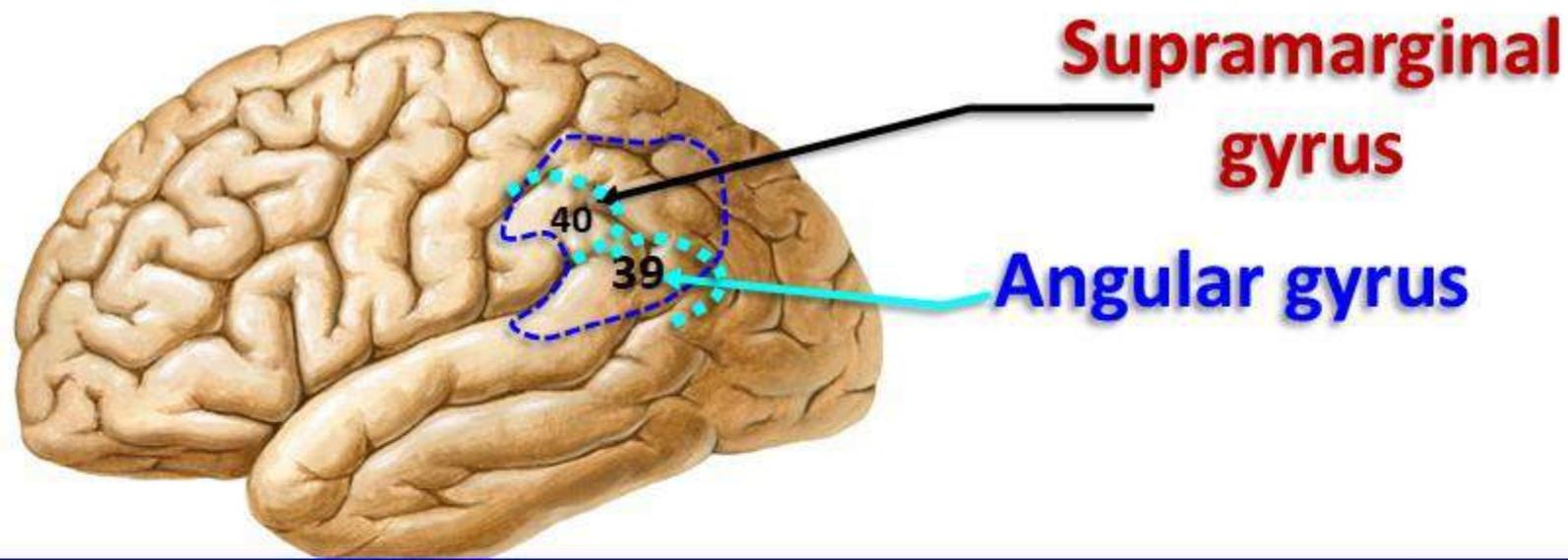


Secondary
sensory 5&7

Secondary (Association) sensory area (area 5, 7);

- It occupies the superior parietal gyrus.
- Function, **stereognosis** (ability to identify the familiar objective manually) **shape, roughness, size of objects**
- Lesion results in **asteriognosis**

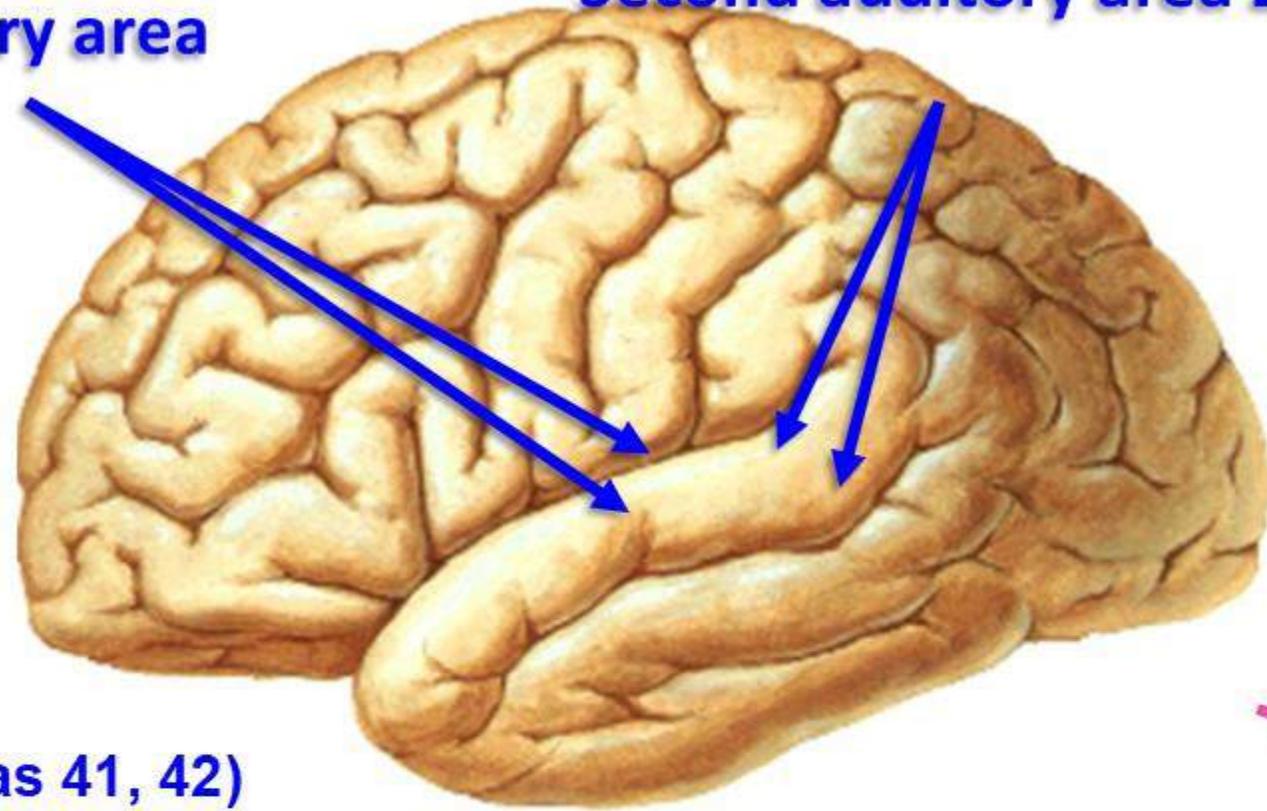
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- **Sensory speech area (Wernicke's- area 39, 40).** language comprehension
- **Wernicke area (receptive)** in superior temporal gyrus of temporal lobe extending to inferior parietal gyrus, angular and marginal gyri .
- It is connected to motor speech area, auditory area and visual area.
- **It is responsible for understanding spoken and written words.**
- **Lesion Associated with impaired language comprehension.**
- **Patients do not have insight. Wernicke is a word salad and makes no sense.**
- Lesion in this area produces **sensory aphasia** (can not understanding spoken and written words.). The deficit is characterized by fluent verbalization and lacks meaning.
- **Global aphasia is caused by lesion both Broca and Wernicke areas.**

Primary auditory area
41&42

Second auditory area 22



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- **Primary auditory area (areas 41, 42)**

- It is present in the floor of the lateral sulcus and the middle part of the superior temporal gyrus (**Heschel's gyrus**).

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- It receives auditory radiation from the medial geniculate body (MGB).

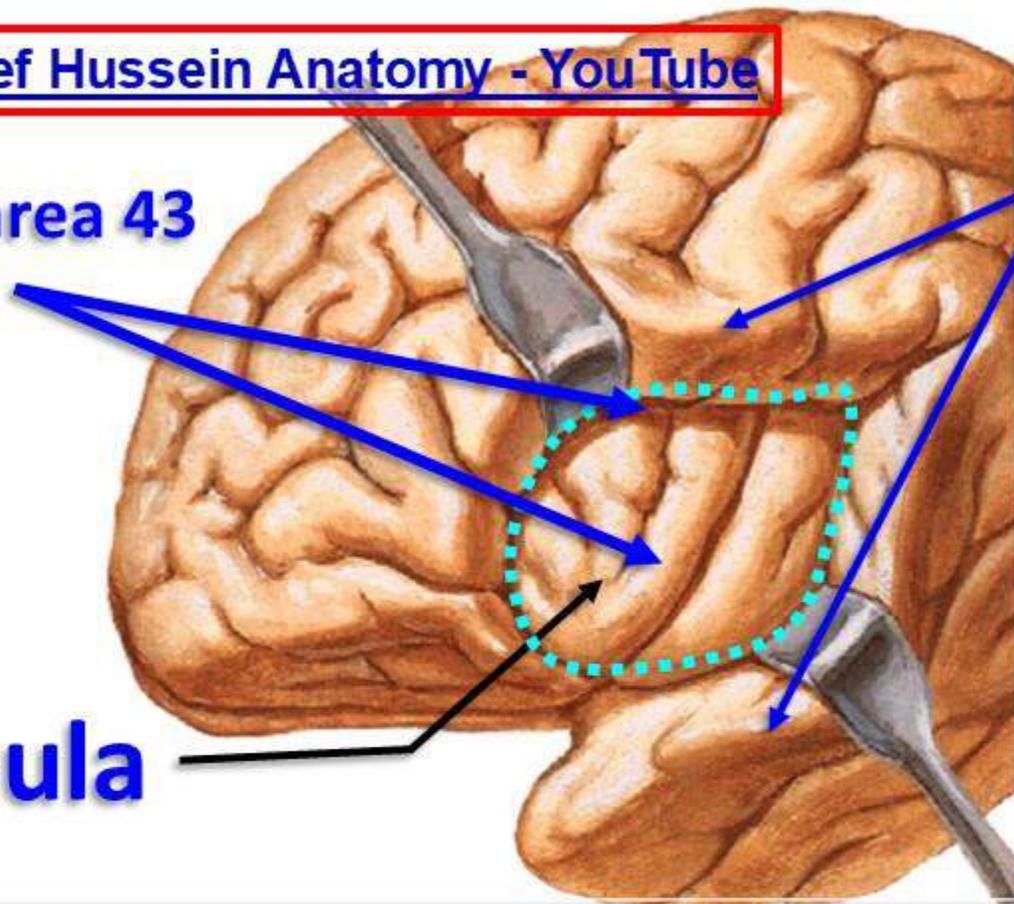
- Lesion of this area leads to **diminished hearing**.

- **Auditory association area (Secondary) (area 22):** behind the primary auditory area.

- It is responsible for recognition and interpretation of the sounds.

Gustatory area 43

Insula



the lips of the
lateral sulcus
are
separated

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- **Insula** lies at the bottom of the deep lateral sulcus and cannot be seen from the surface unless the lips of the sulcus are separated.
- **Gustatory area** (area 43): lies in the insula .
 - It is concerned with the recognition of the taste sensation.

1- Paracentral lobule;

- It continues with the motor and sensory areas in the lateral surface.
- It gives motor fibres and receives sensation from the pelvis and lower limb of the opposite side.
- It controls the micturition and defecation.

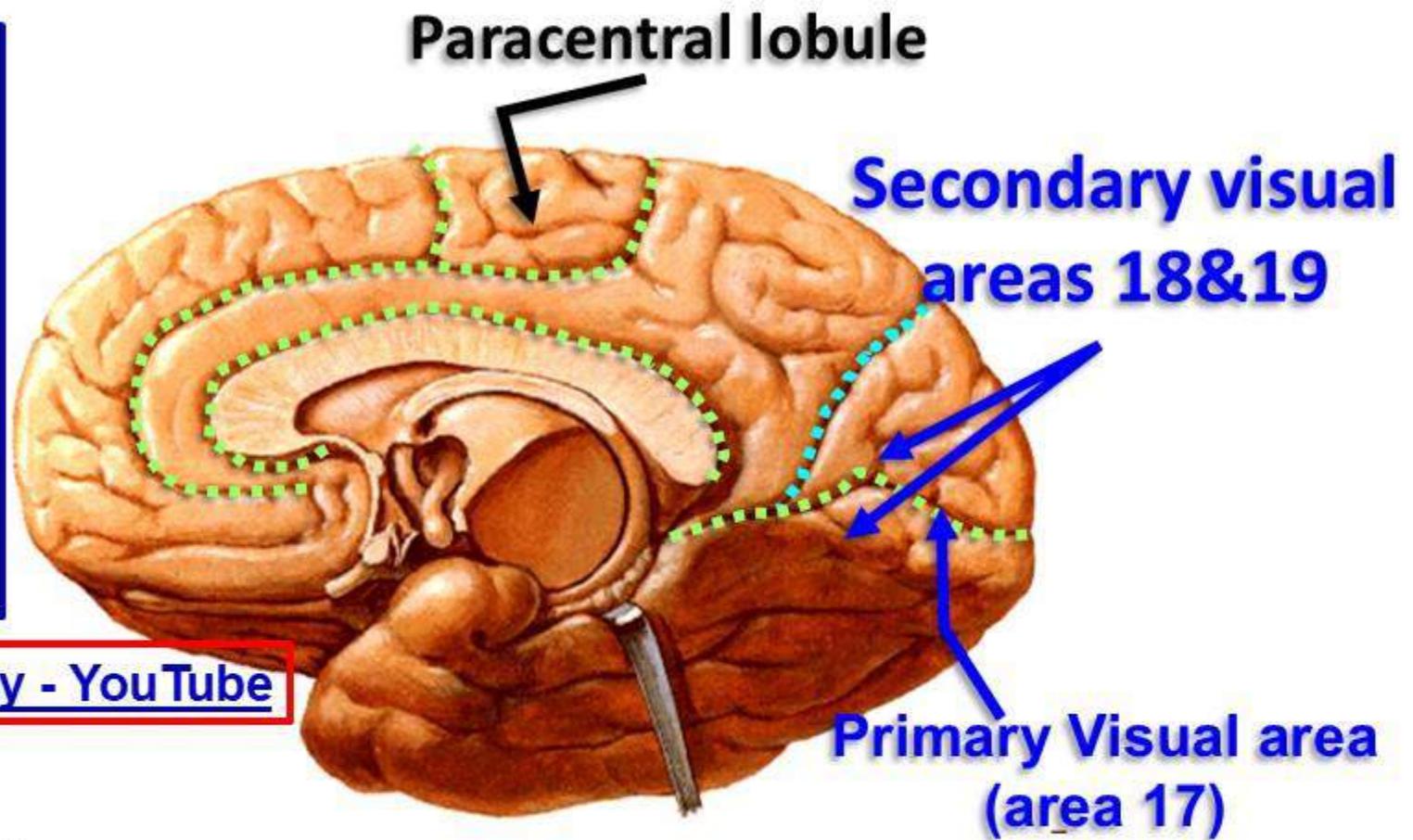
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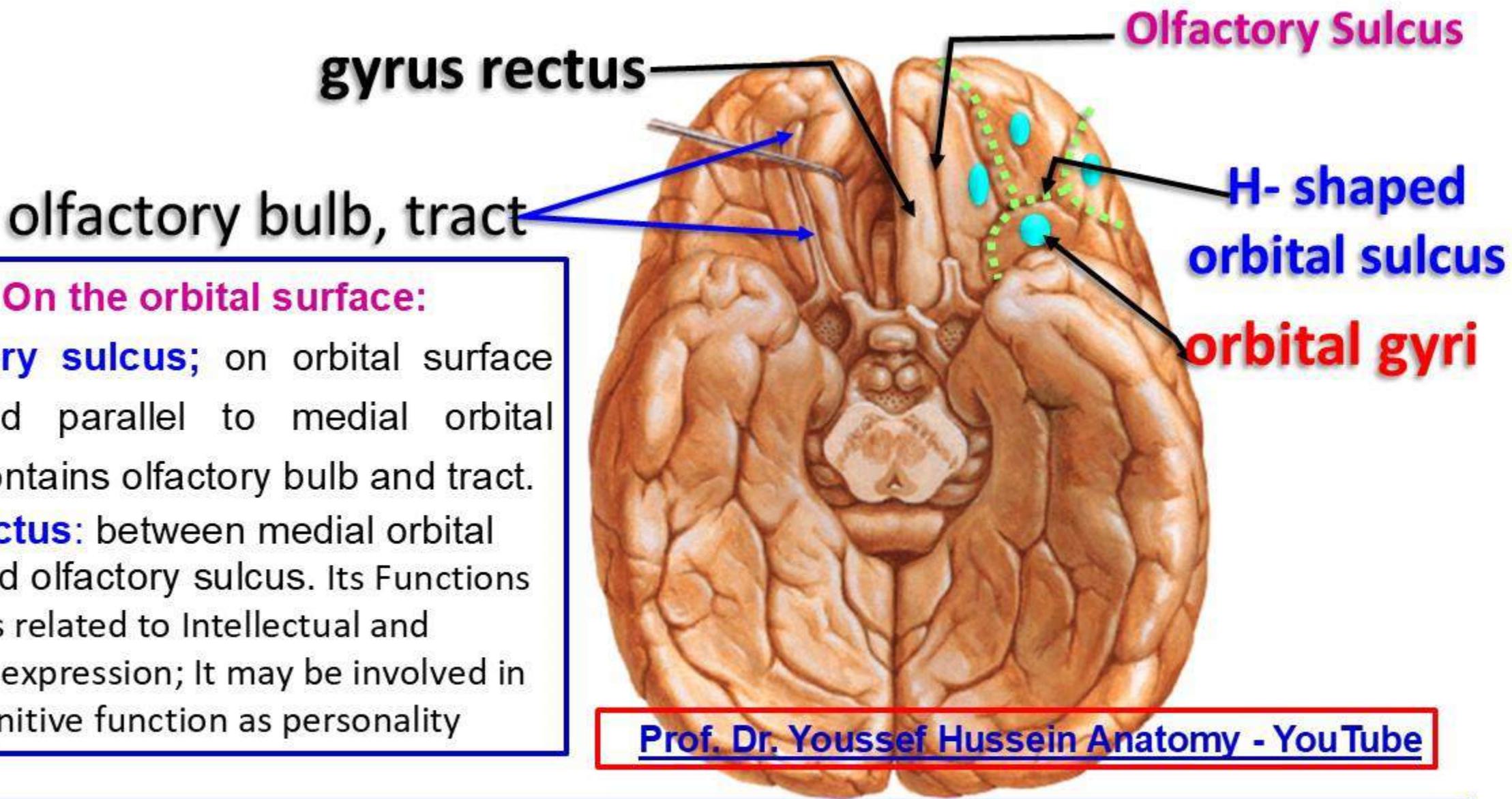
2- Primary Visual area (area 17);

- It lies on the depth of calcarine sulcus
- It receives visual sensation from the lateral geniculate body (**LGB**) via the optic radiation..
- Damage of the primary visual area causes **blindness**.

3- Secondary Visual (association) area (area 18, 19):

- It lies in the occipital lobe surrounding the primary visual area.
- Damage of this area causes **visual agnosia** (people can not identify the objects).





• **On the orbital surface:**

- **Olfactory sulcus**; on orbital surface close and parallel to medial orbital border, contains olfactory bulb and tract.
- Gyrus rectus**: between medial orbital border and olfactory sulcus. Its Functions (unclear) is related to Intellectual and emotional expression; It may be involved in higher cognitive function as personality

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- **Orbital sulcus**: is H shaped sulcus lateral to the olfactory sulcus.
- **Anterior, posterior, lateral and medial orbital gyri**: on the orbital surface.

- On the tentorial surface:

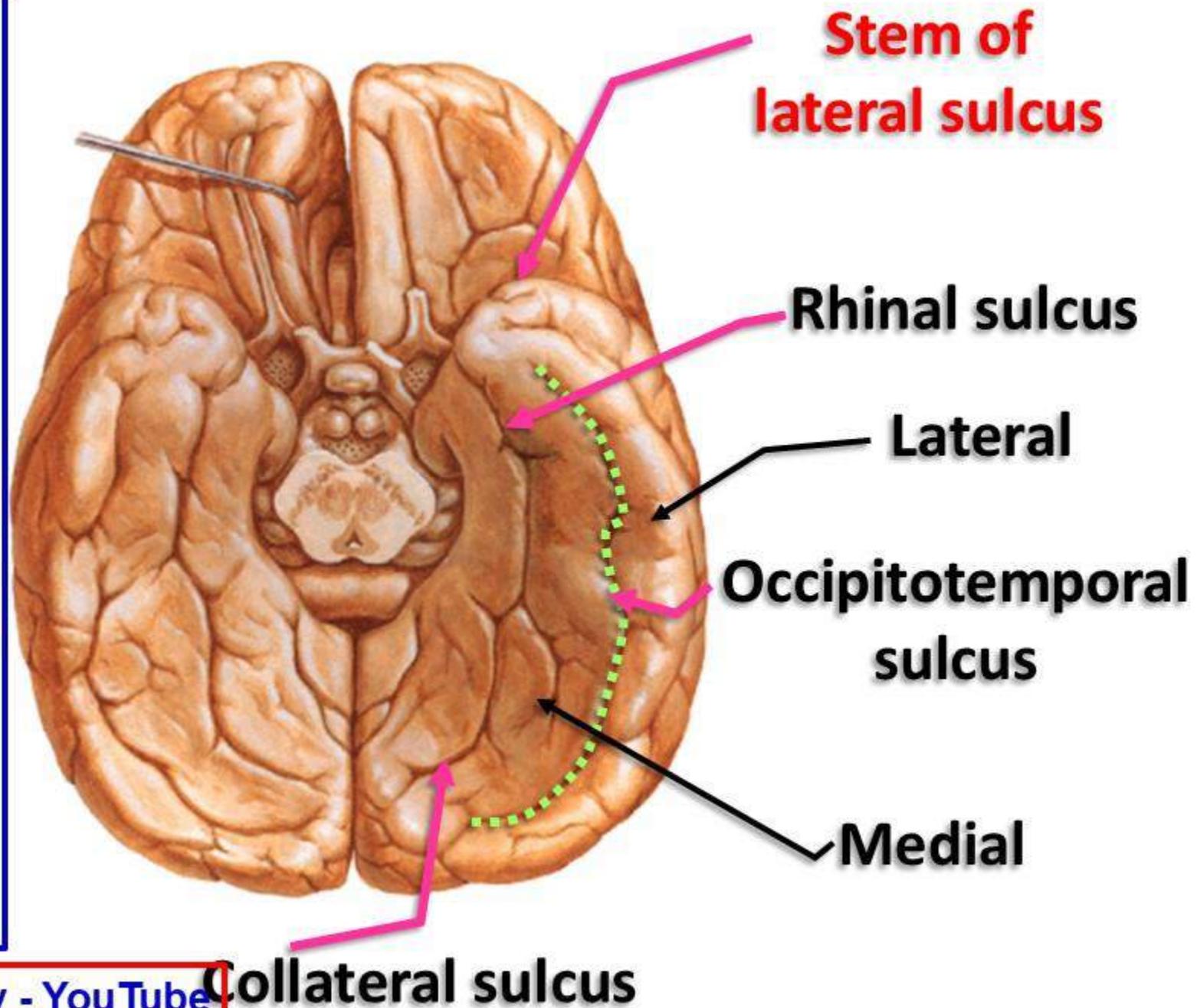
1- Stem of lateral sulcus between the frontal and temporal lobes.

2- Occipito-temporal sulcus: from occipital pole to temporal pole.

3- Medial and Lateral occipitotemporal gyrus: medial and lateral to occipitotemporal sulcus.

4- Collateral sulcus: It runs anteriorly below the calcarine sulcus.

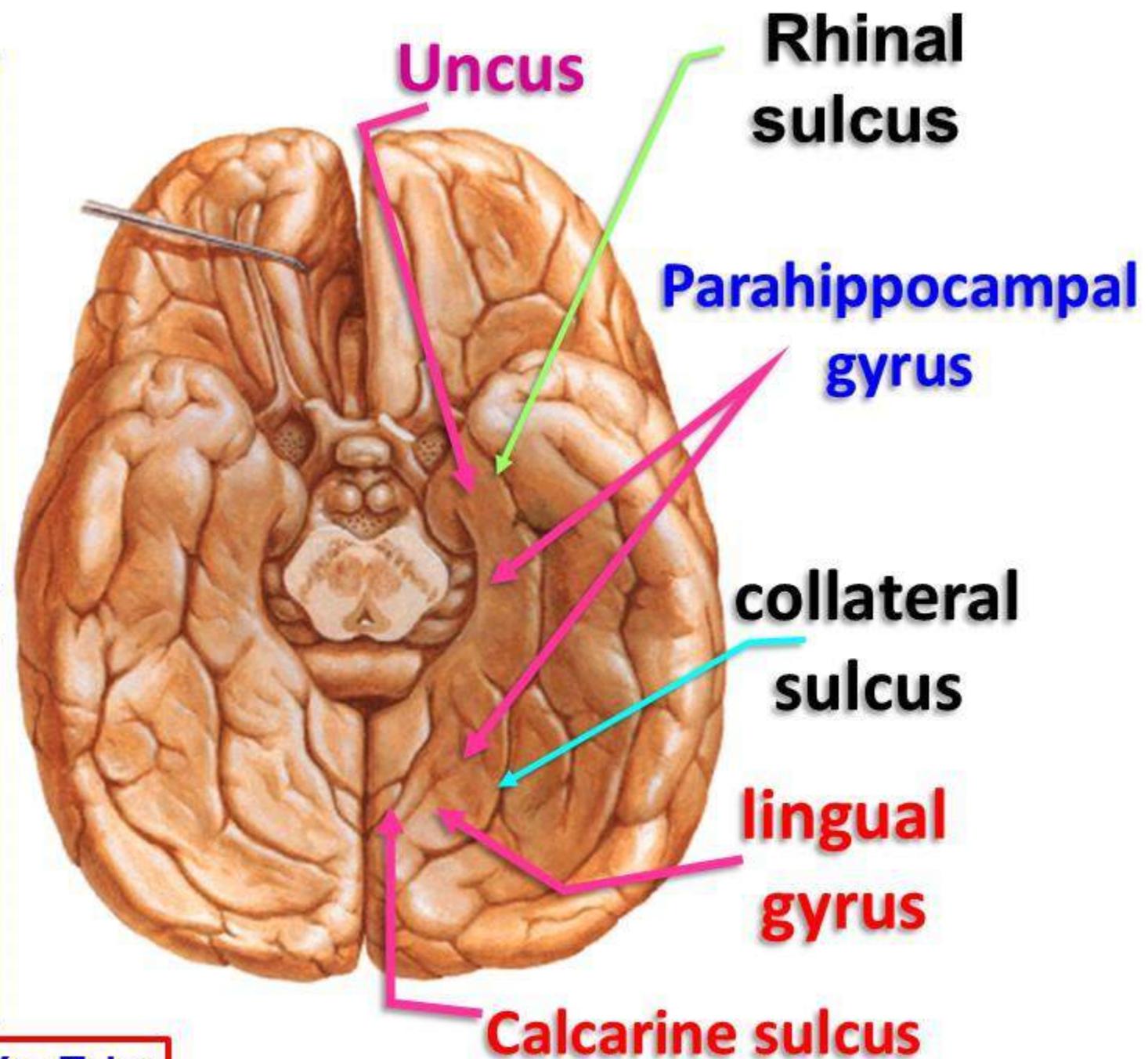
5- Rhinal sulcus: extends anteriorly from collateral sulcus.



On the tentorial surface:

- **Lingual gyrus** between collateral sulcus and calcarine sulcus
- **Para hippocampal gyrus** anterior to the lingual gyrus (**Limbic system**)

- **Uncus** anterior to Para hippocampal gyrus, a hook-shaped convolution close to the temporal pole medial to the rhinal sulcus. **Center of the olfactory**



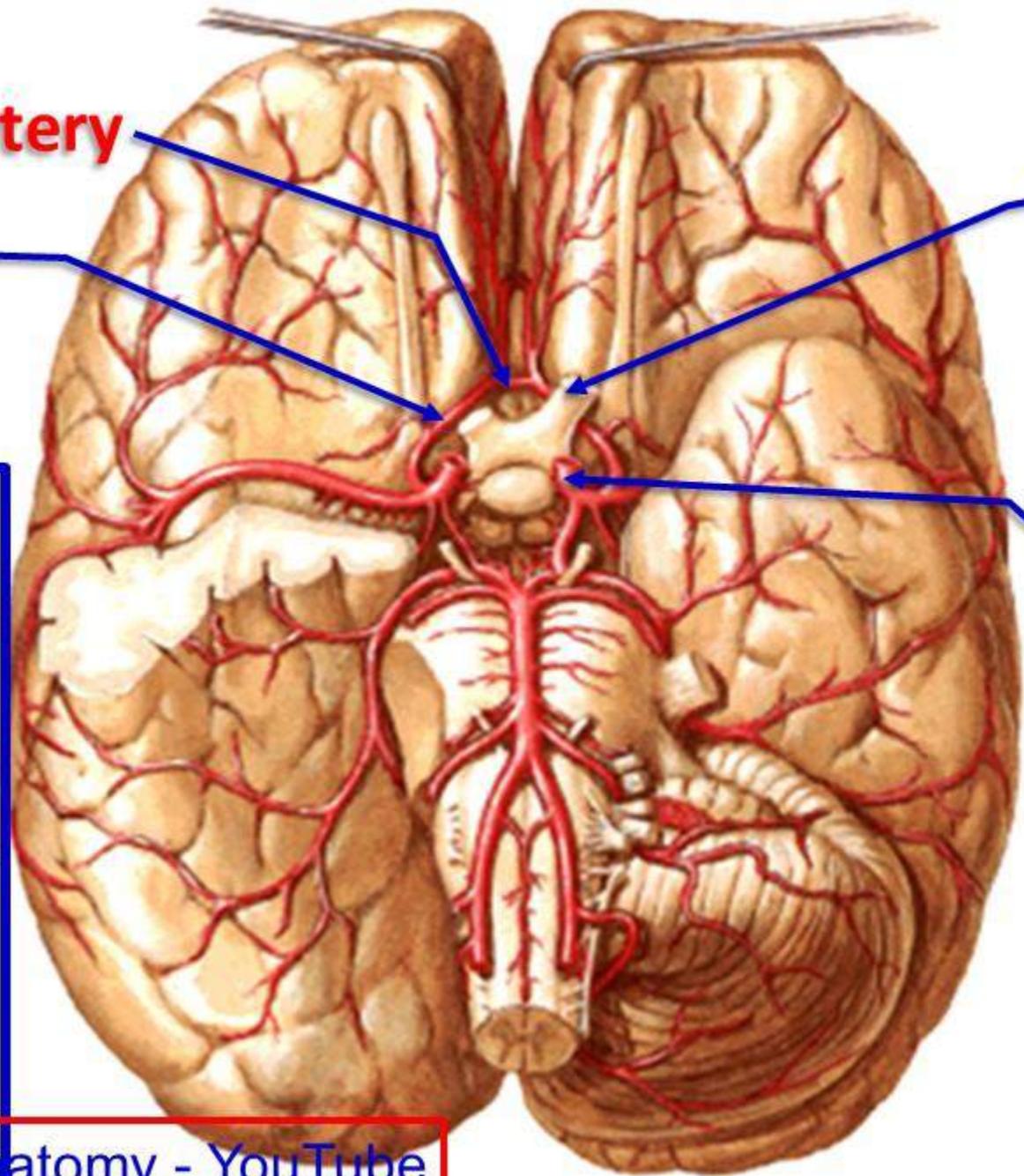
Blood supply of the Cerebrum

Anterior communicating Artery

Anterior cerebral Artery

Optic nerve

Internal carotid Artery



- **Anterior Cerebral Artery**

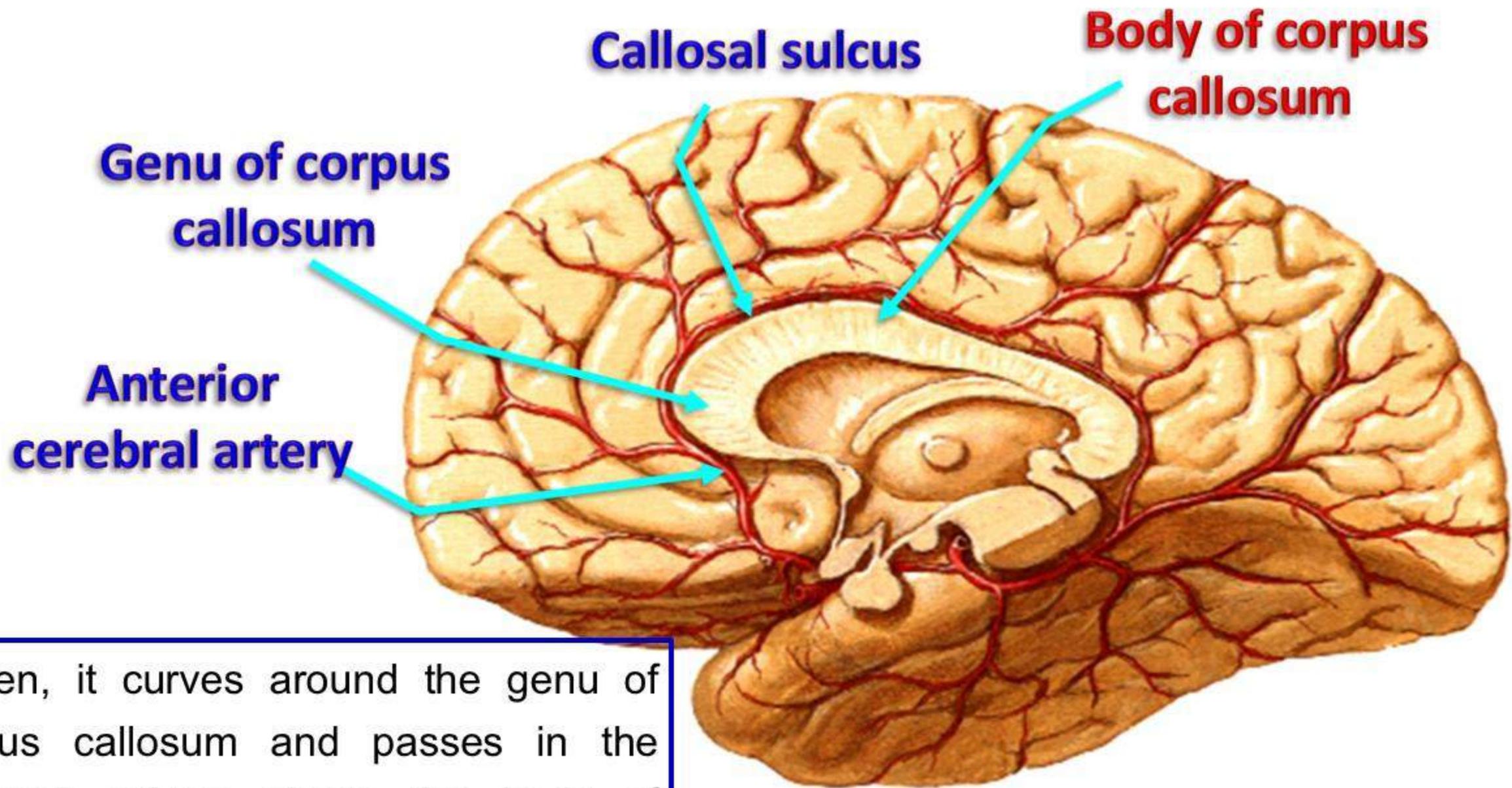
** **Origin:** one of 2 terminal branches of internal carotid artery.

** **Course:**

- It passes medially above optic nerve to median longitudinal fissure.

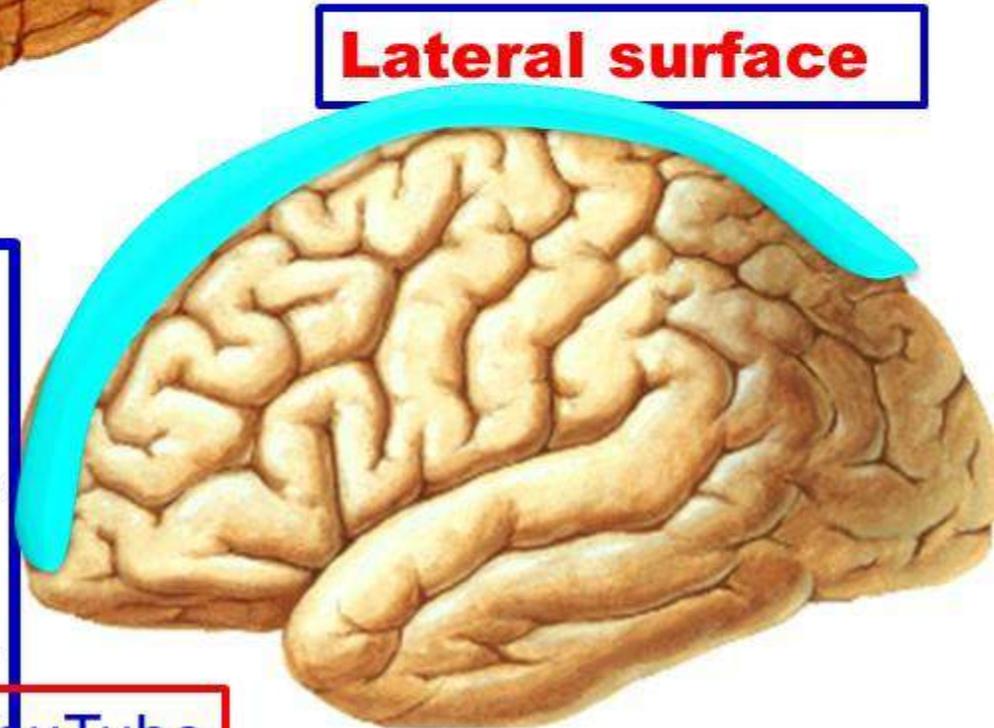
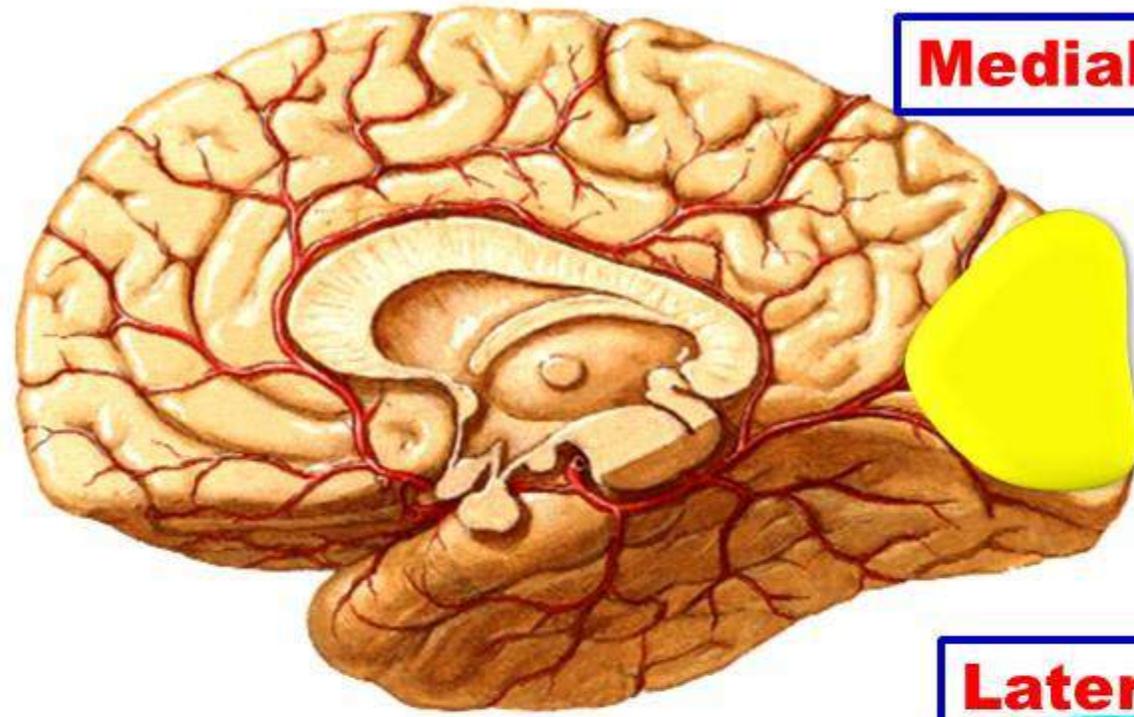
- It communicates with the opposite side by anterior communicating

artery. [Prof. Dr. Youssef Hussein Anatomy - YouTube](#)



- Then, it curves around the genu of corpus callosum and passes in the **callosal sulcus** above the body of corpus callosum in the medial surface.

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- **Cortical branches of anterior cerebral artery,**

a- Medial surface except the occipital lobe.

b- Upper one finger breadth of superolateral surface except the occipital lobe.

c- Medial part (1/3) of the orbital surface on the inferior surface.

Middle cerebral artery

Posterior ramus of lateral sulcus

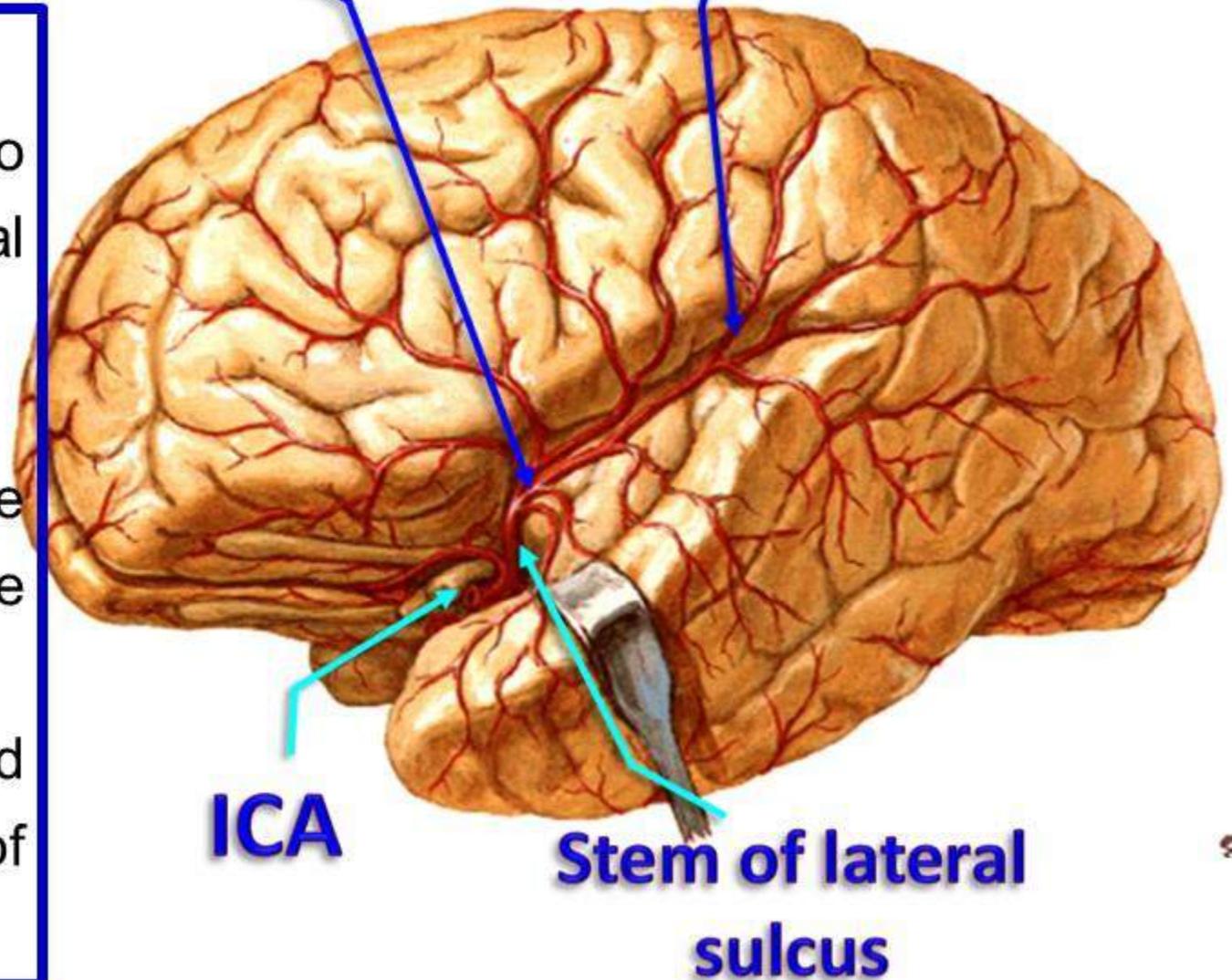
- **Middle Cerebral Artery**

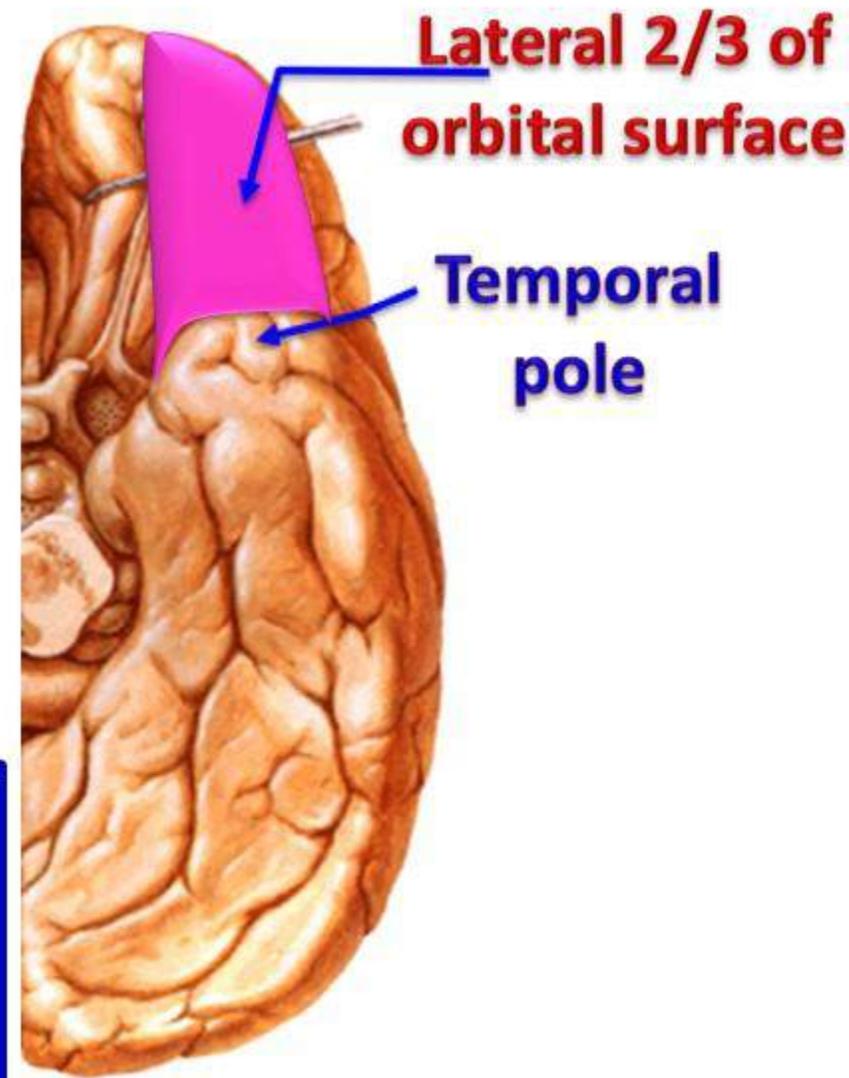
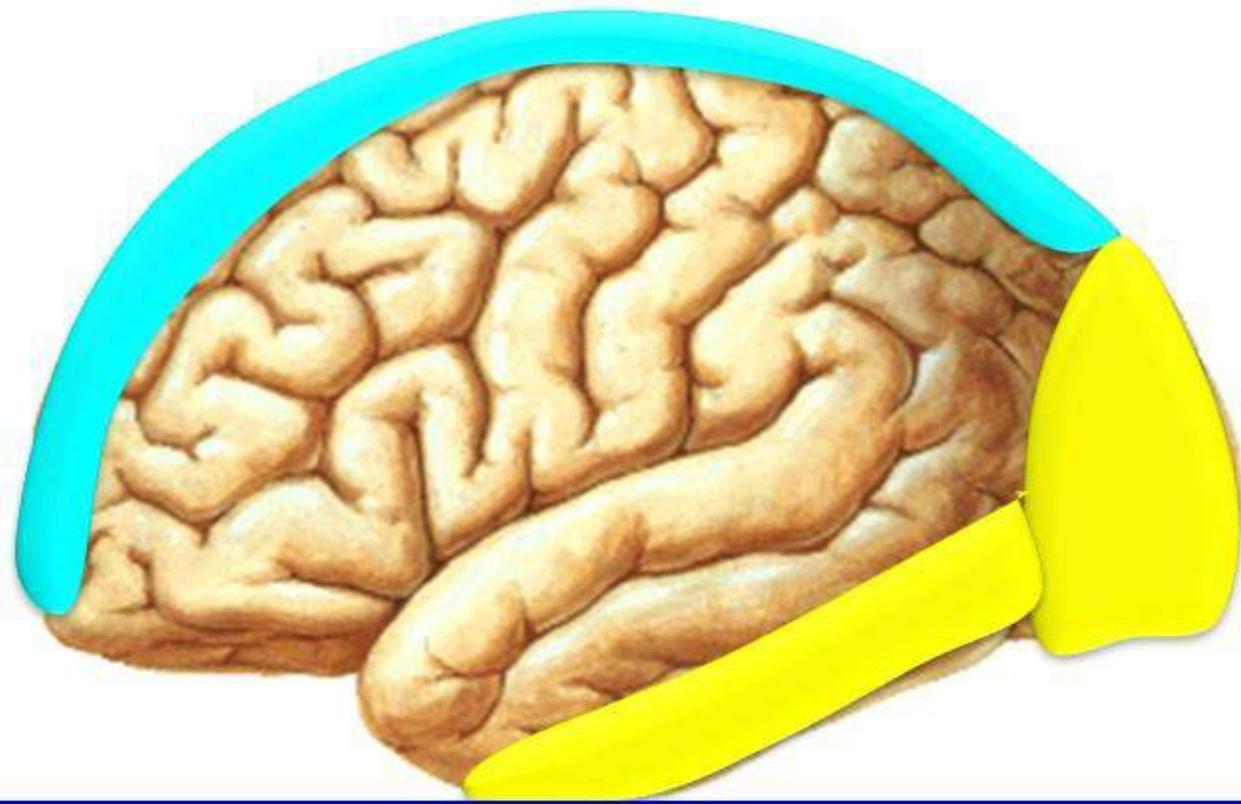
**** Origin:** is the larger of the two terminal branches of the internal carotid artery.

**** Course:**

- It passes laterally in stem of the **lateral sulcus** (opposite to the pterion).

- Then it turns upward and backward in the posterior ramus of the lateral sulcus.





- **Cortical branches of middle cerebral artery**

- 1- **Superolateral surface** including the insula **except**:
 - a- Upper one inch (by anterior cerebral artery).
 - b- Lower part (by posterior cerebral artery).
 - c- Occipital lobe {supplied by the posterior cerebral artery}.
- 2- Lateral part (2/3) of the orbital surface of the **inferior surface**.
- 3- **Temporal pole**.

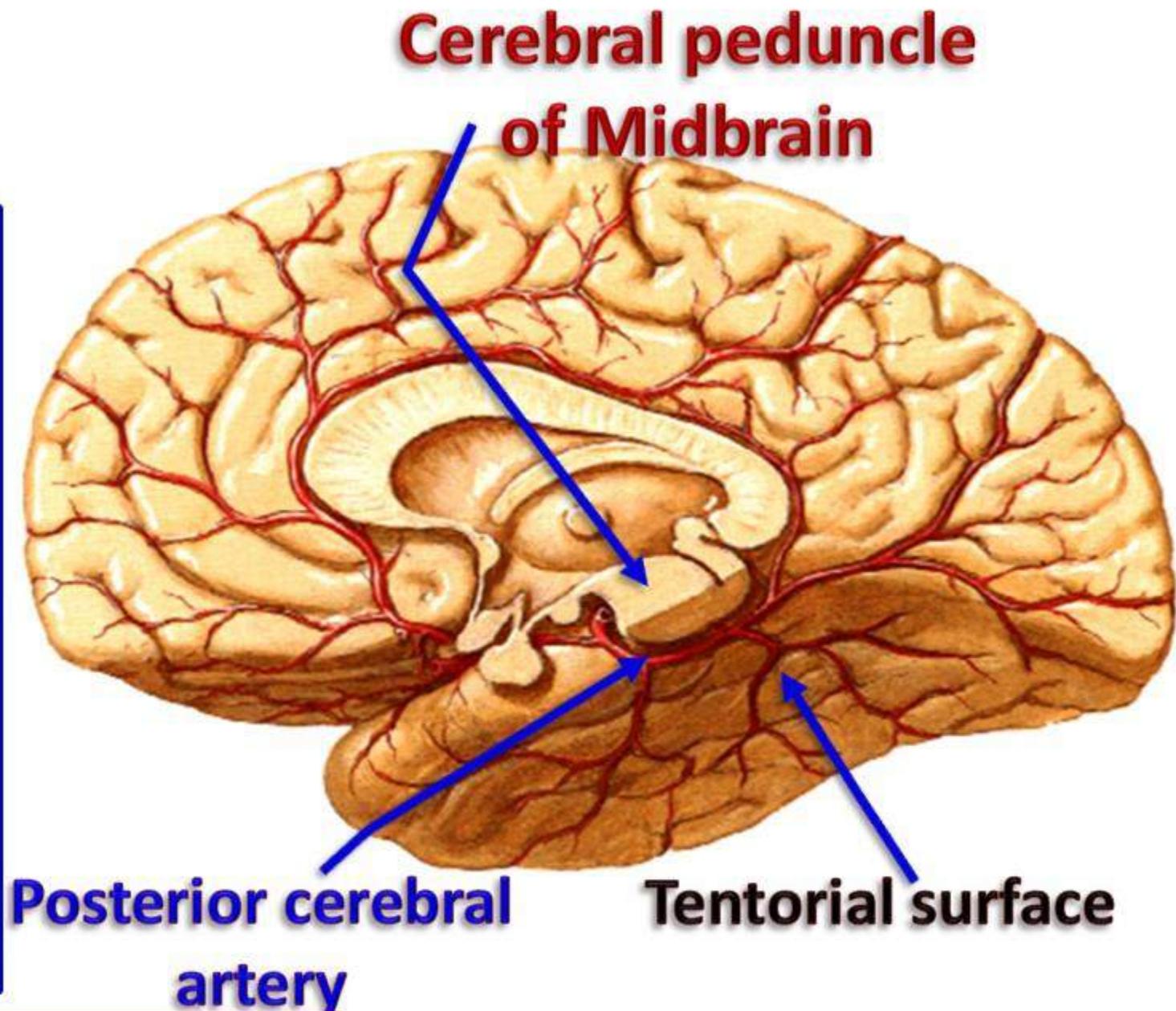
- **Posterior Cerebral Artery**

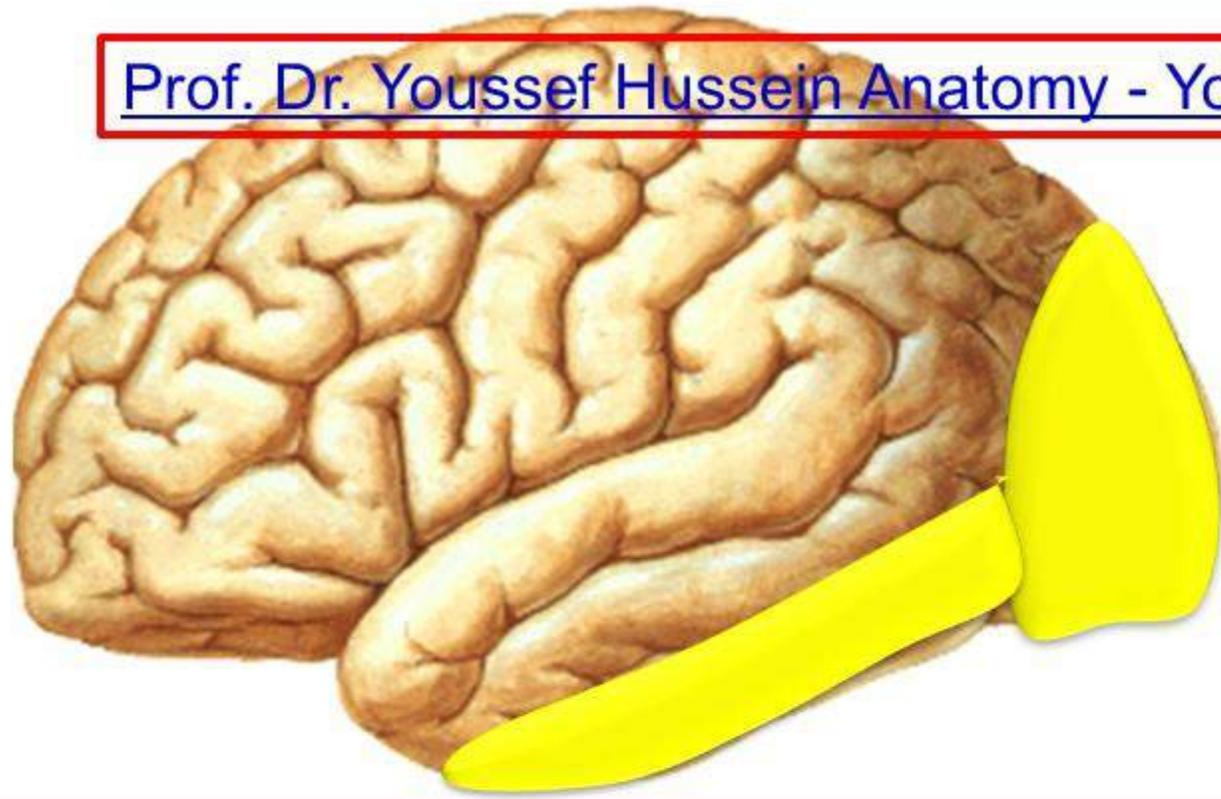
** **Origin:** one of the two terminal branches of the basilar artery.

** **Course;**

- It winds round the cerebral peduncle to reach the **tentorial surface** of the cerebral hemisphere.

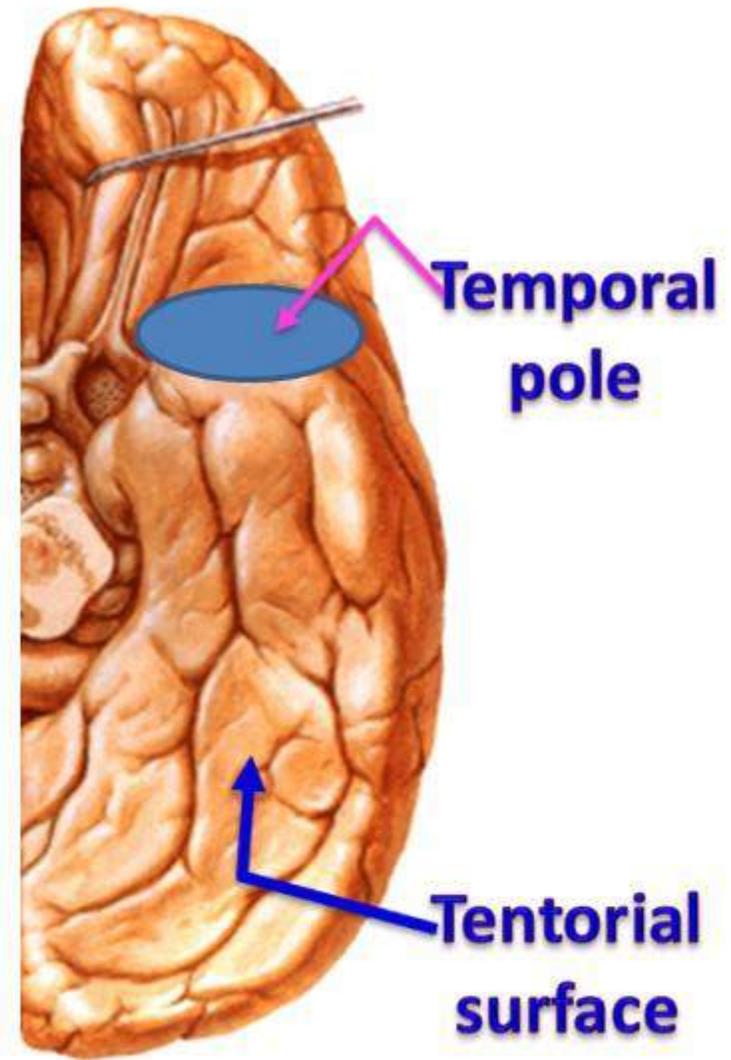
- It runs backward to reach the occipital pole.





- **Cortical branches of Posterior cerebral artery**

- 1- All surfaces of the occipital lobe (**visual center**)
- 2- One finger breadth on the superolateral surface along the inferior border.
- 3- **Tentorial surface** of the cerebral hemisphere **except** temporal pole.



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Thank You

Questions

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