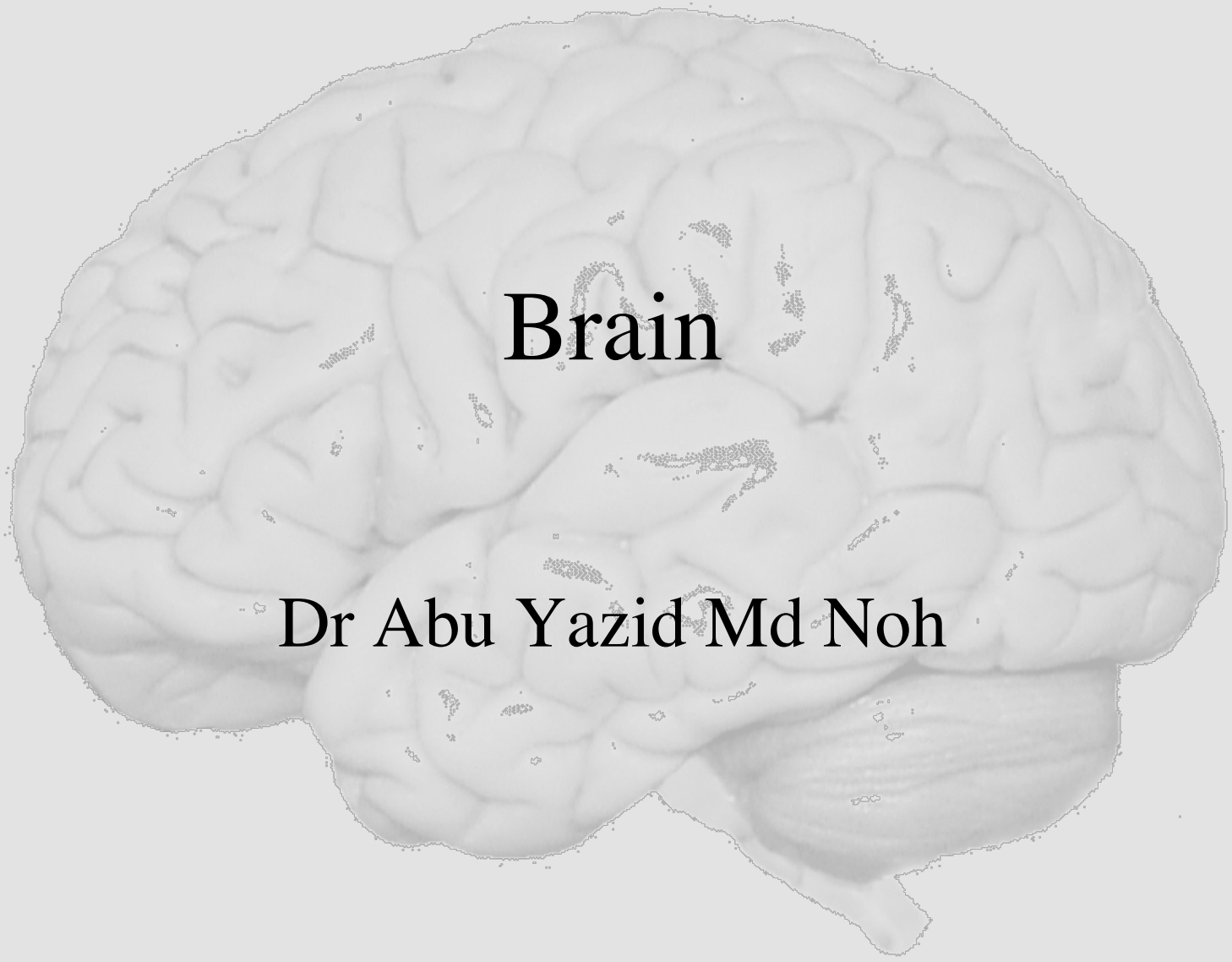
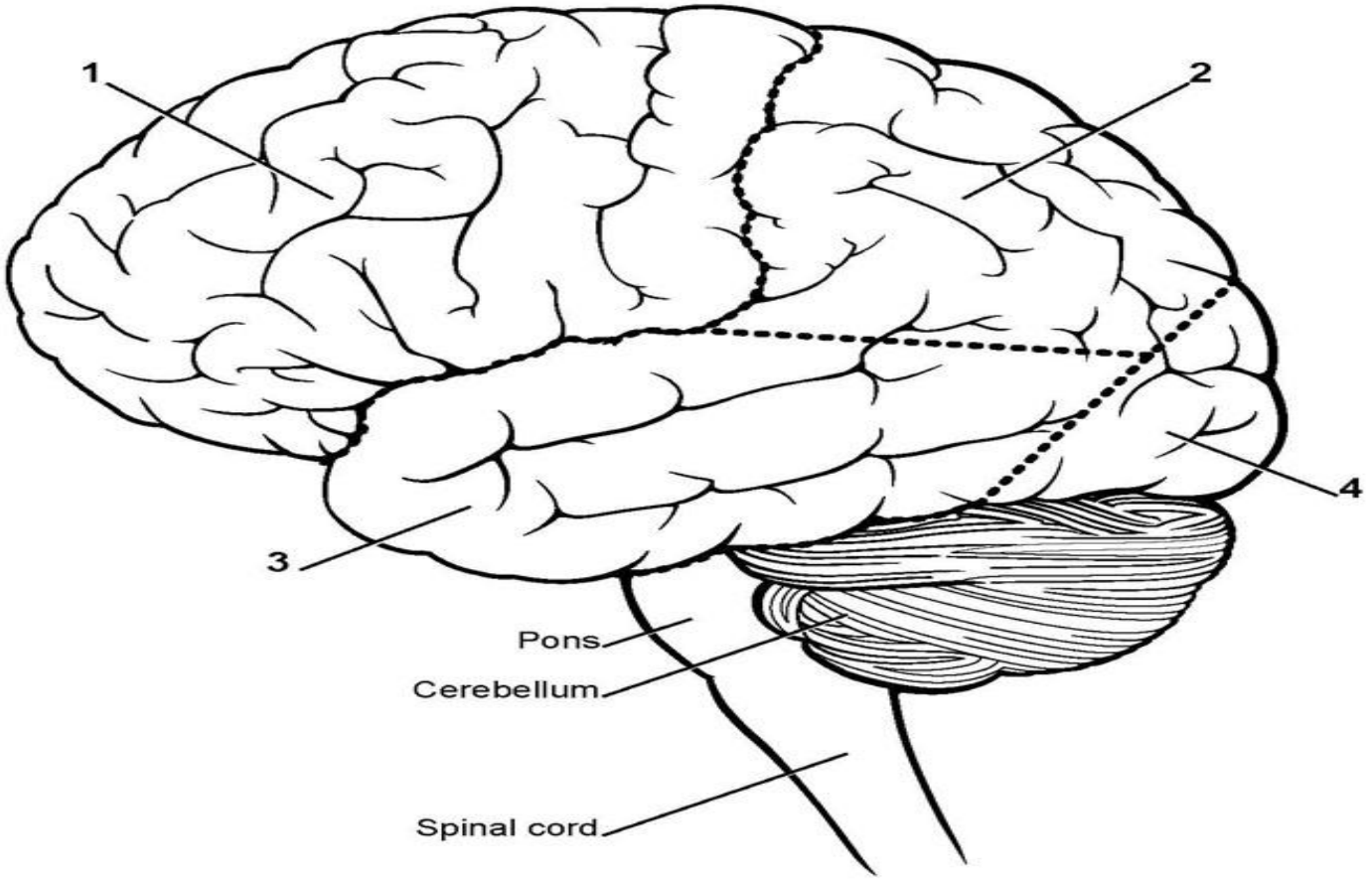


Brain

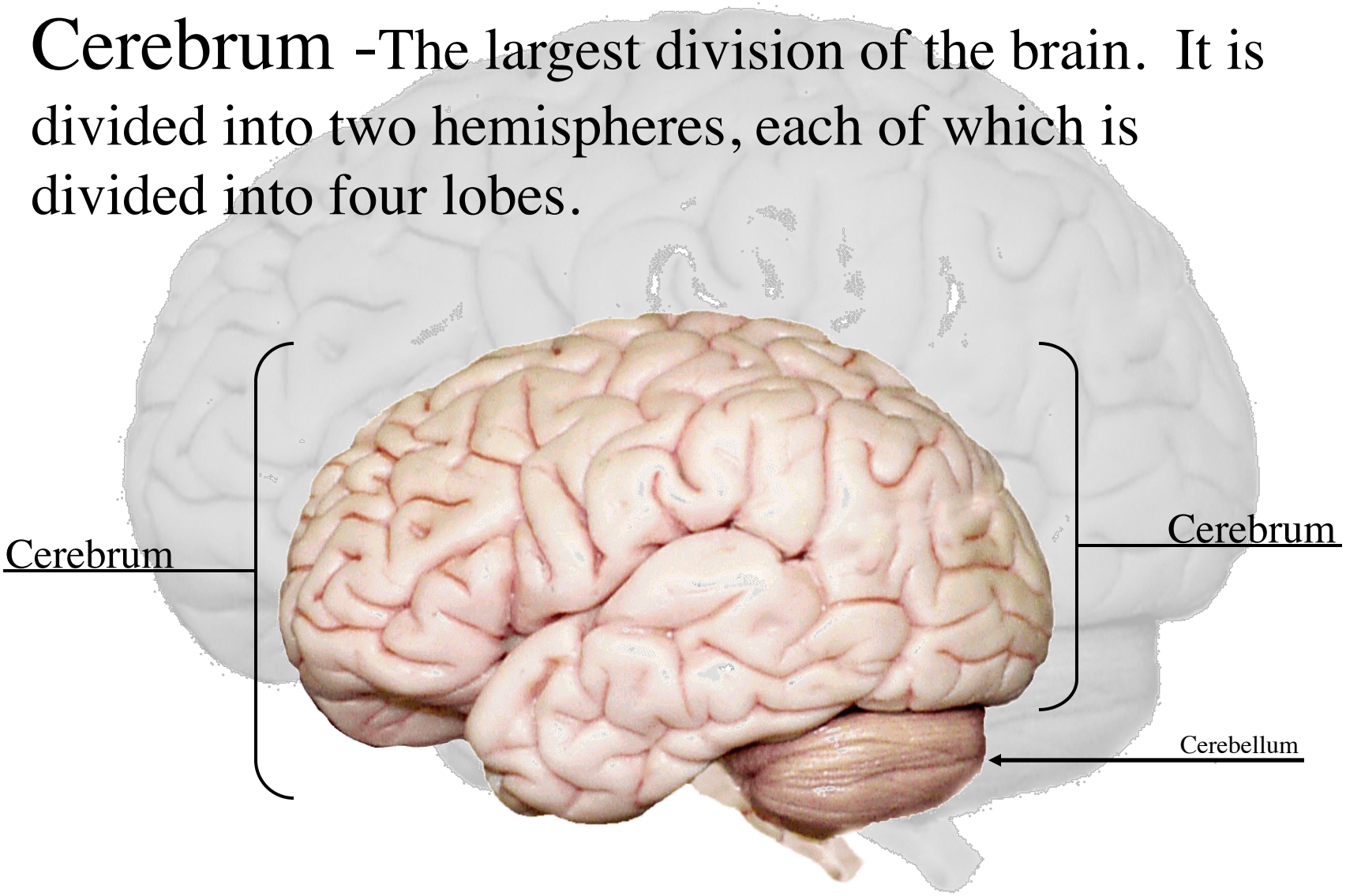
Dr Abu Yazid Md Noh

Lobes of Cerebrum

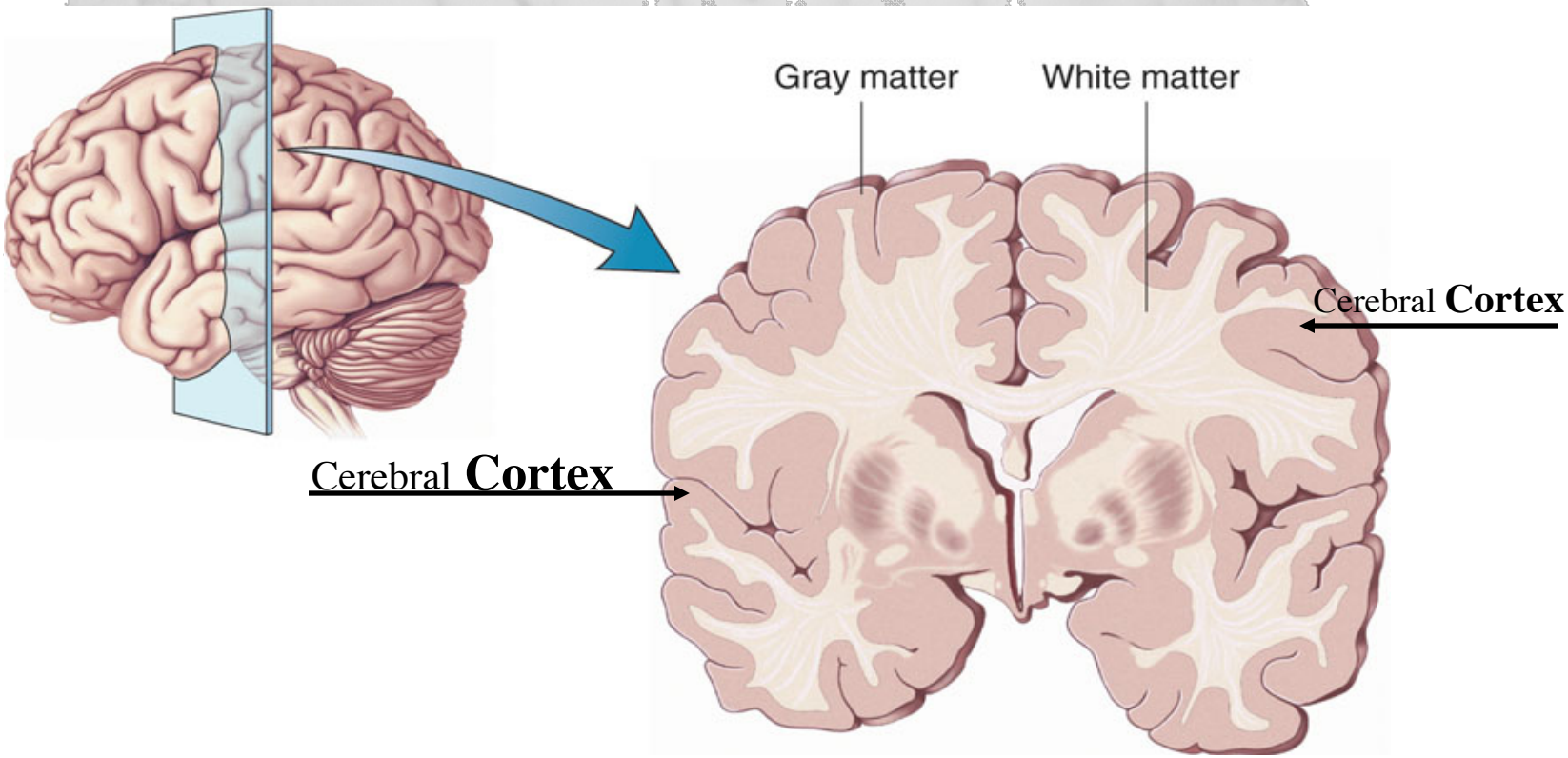
1. Frontal lobe
2. Parietal lobe
3. Temporal lobe
4. Occipital lobe



Cerebrum -The largest division of the brain. It is divided into two hemispheres, each of which is divided into four lobes.

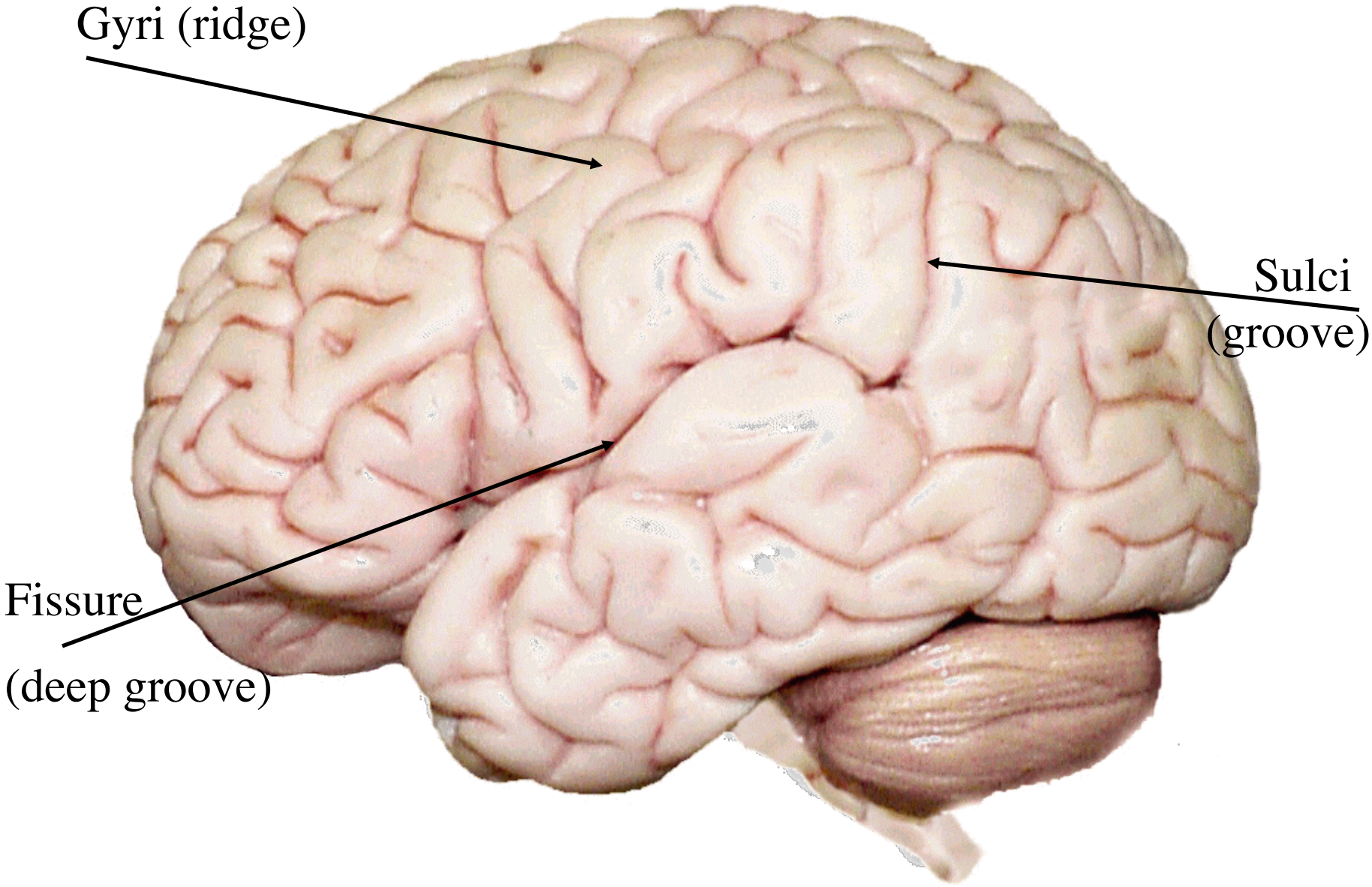


Cerebral Cortex - The outermost layer of gray matter making up the superficial aspect of the cerebrum.

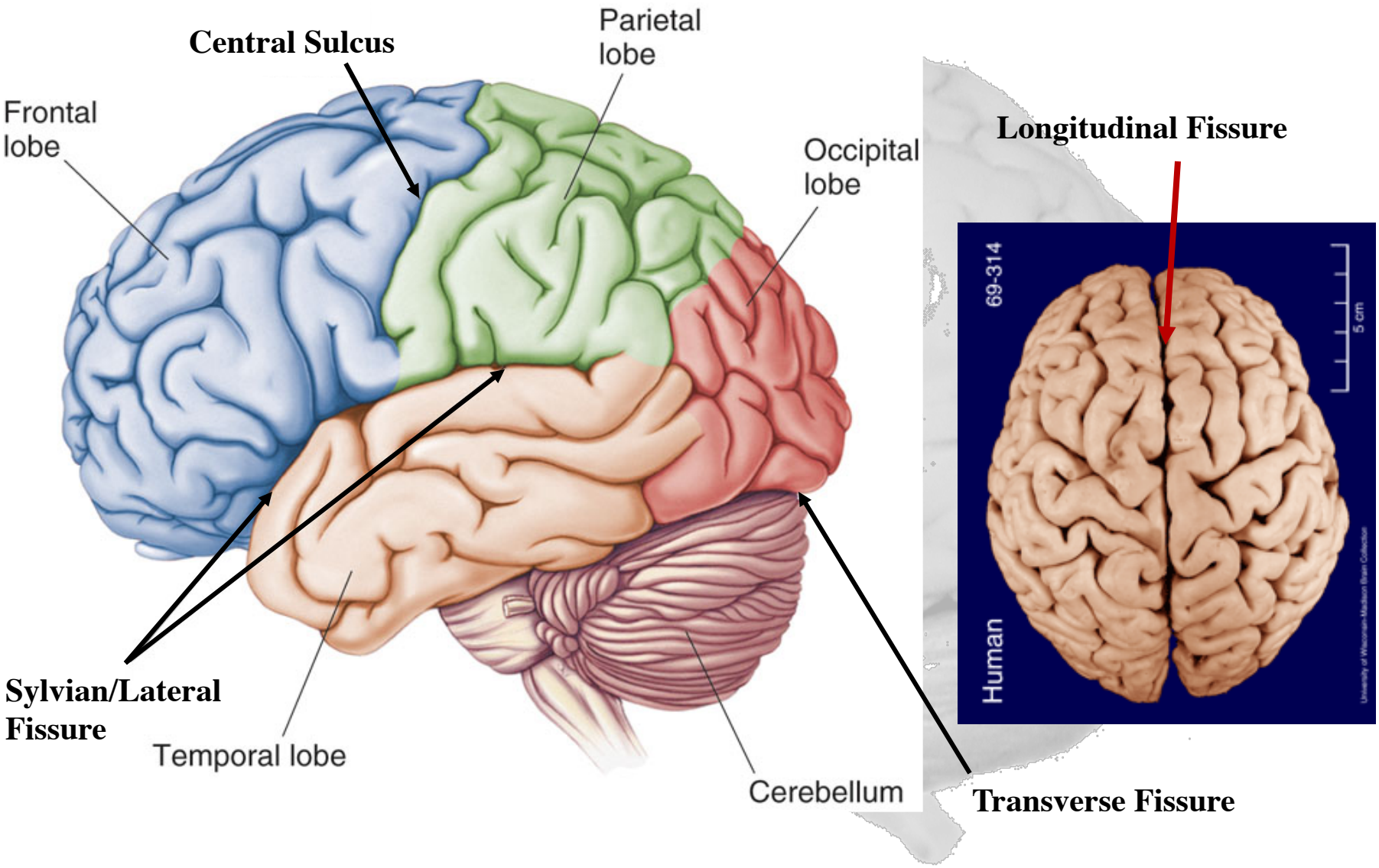


Cerebral Features:

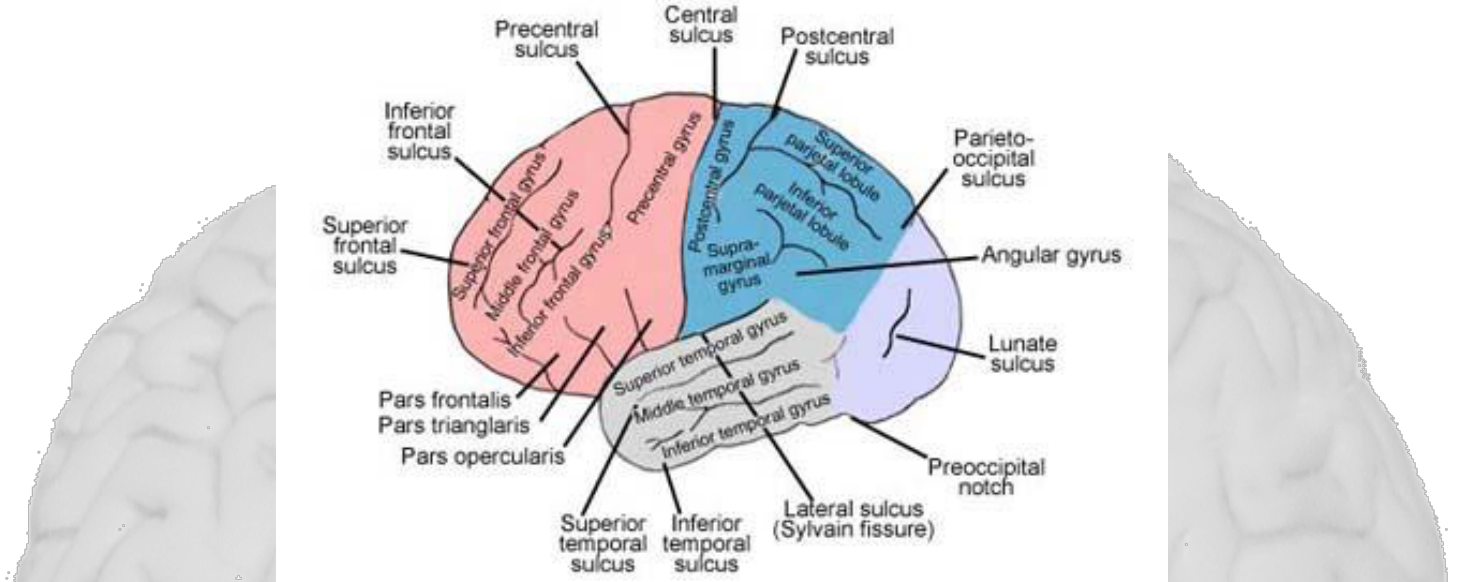
- **Gyri** – Elevated ridges "winding" around the brain.
- **Sulci** – Small grooves dividing the gyri
  - **Central Sulcus** – Divides the Frontal Lobe from the Parietal Lobe
- **Fissures** – Deep grooves, generally dividing large regions/lobes of the brain
  - **Longitudinal Fissure** – Divides the two Cerebral Hemispheres
  - **Transverse Fissure** – Separates the Cerebrum from the Cerebellum
  - **Sylvian/Lateral Fissure** – Divides the Temporal Lobe from the Frontal and Parietal Lobes

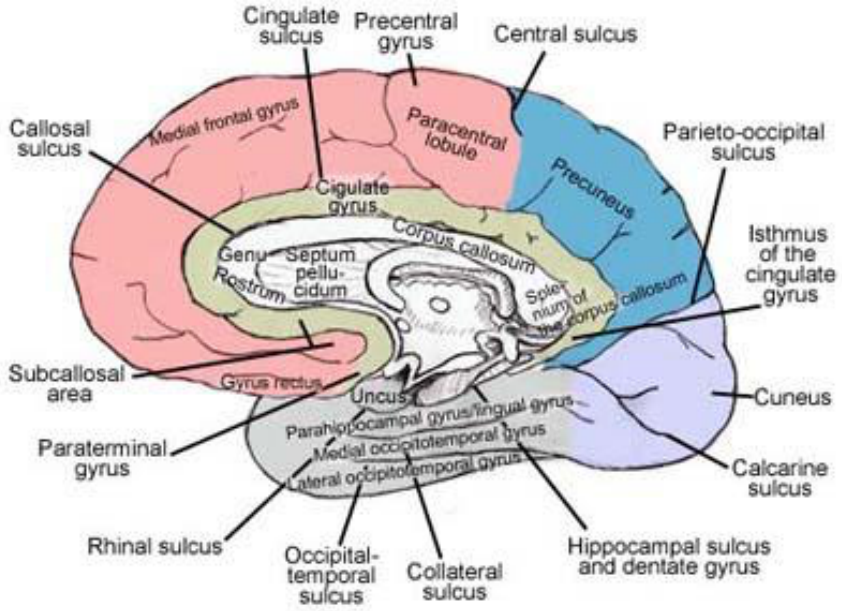

Gyri (ridge)
Sulci
(groove)
Fissure
(deep groove)

Specific Sulci/Fissures:



Cortical gyrl and sulci (lateral view)

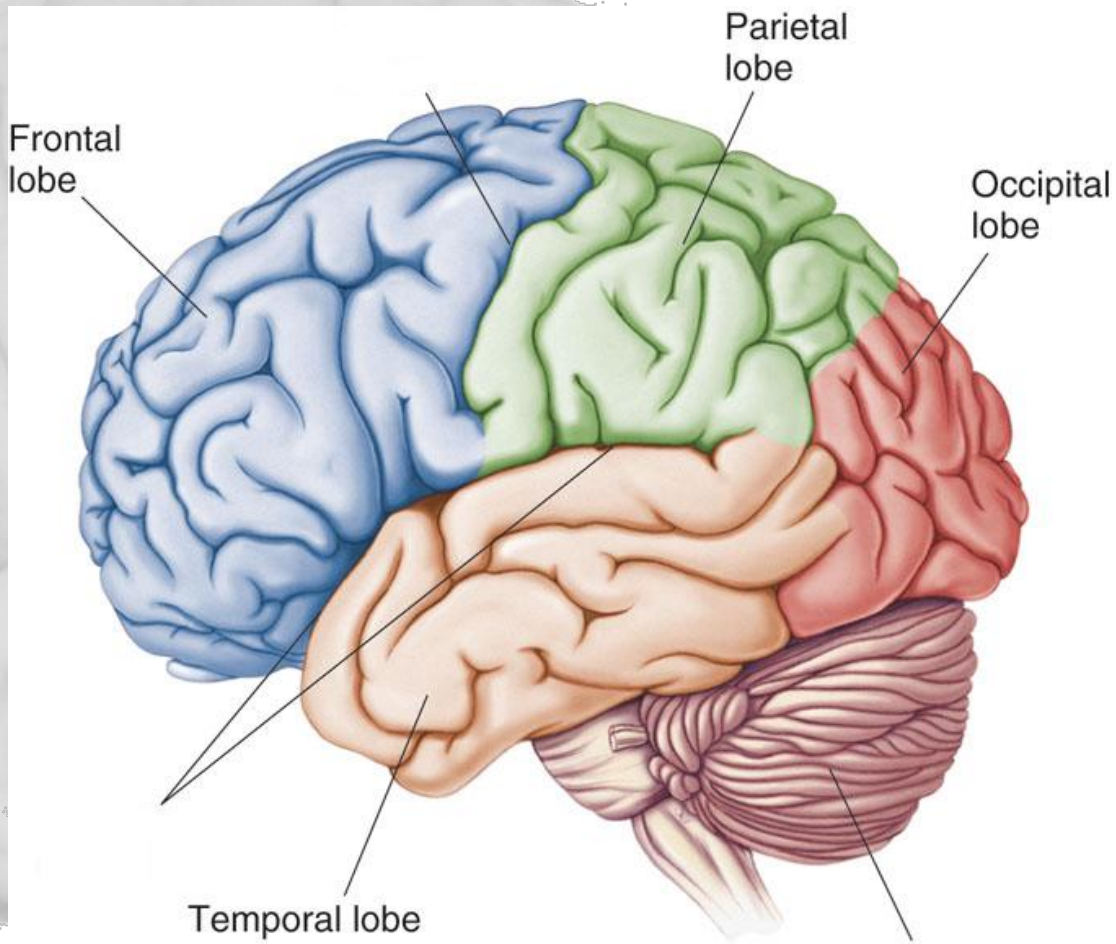




Cortical gyrl and sulci (medial view)

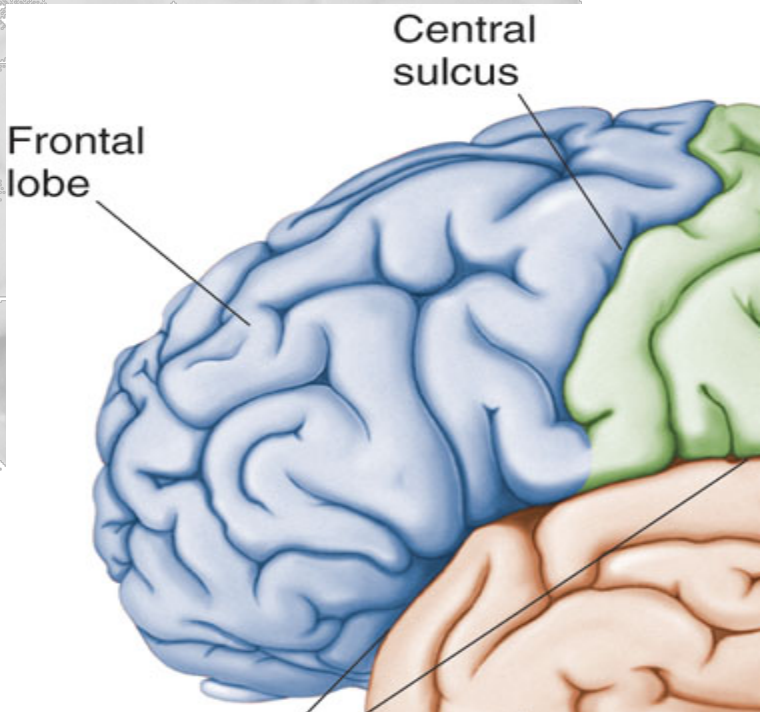
Lobes of the Brain (4)

- Frontal
- Parietal
- Occipital
- Temporal



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



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.

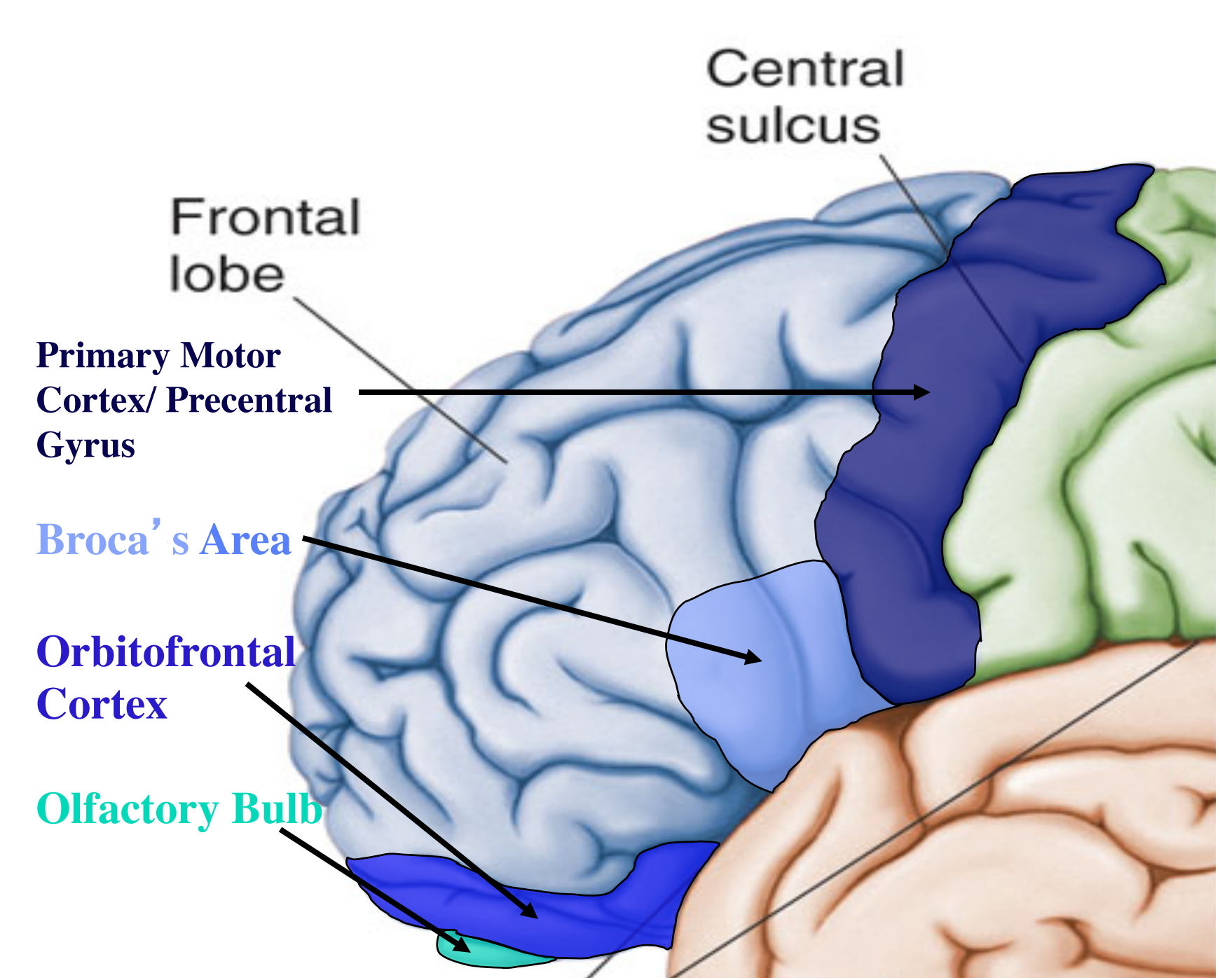
– **Broca's Aphasia** – Results in the ability to comprehend speech, but the decreased motor ability (or inability) to speak and form words.

• **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


Central sulcus
Frontal lobe
Primary Motor Cortex/ Precentral Gyrus
Broca's Area
Orbitofrontal Cortex
Olfactory Bulb

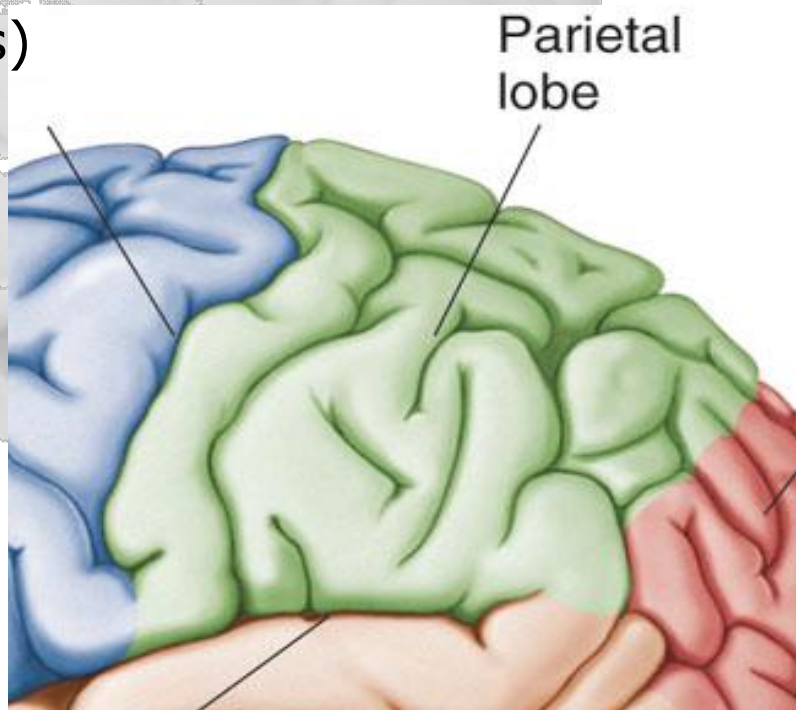
Lobes of the Brain - Parietal Lobe

- 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)

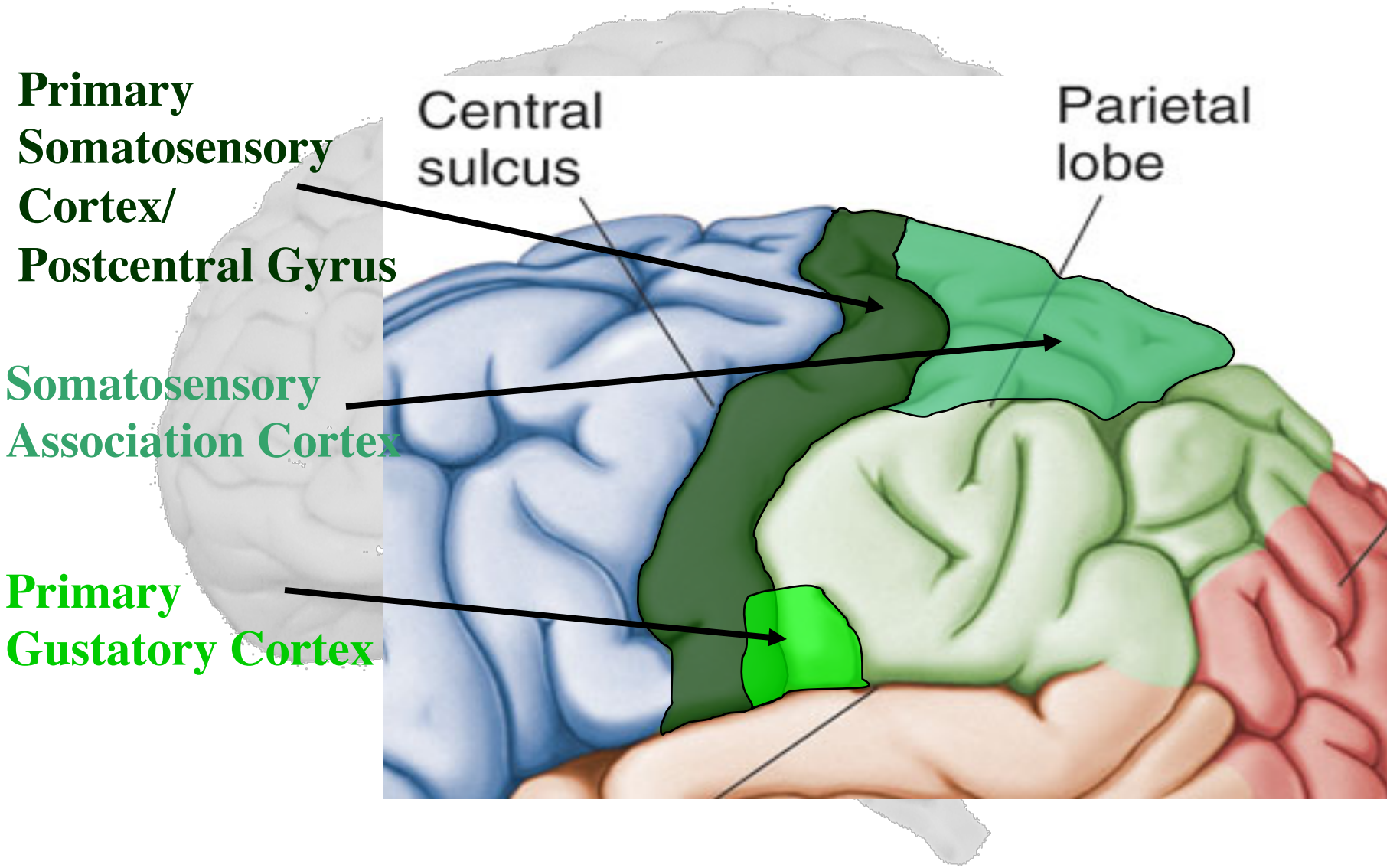


Parietal Lobe - Cortical Regions

- **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.

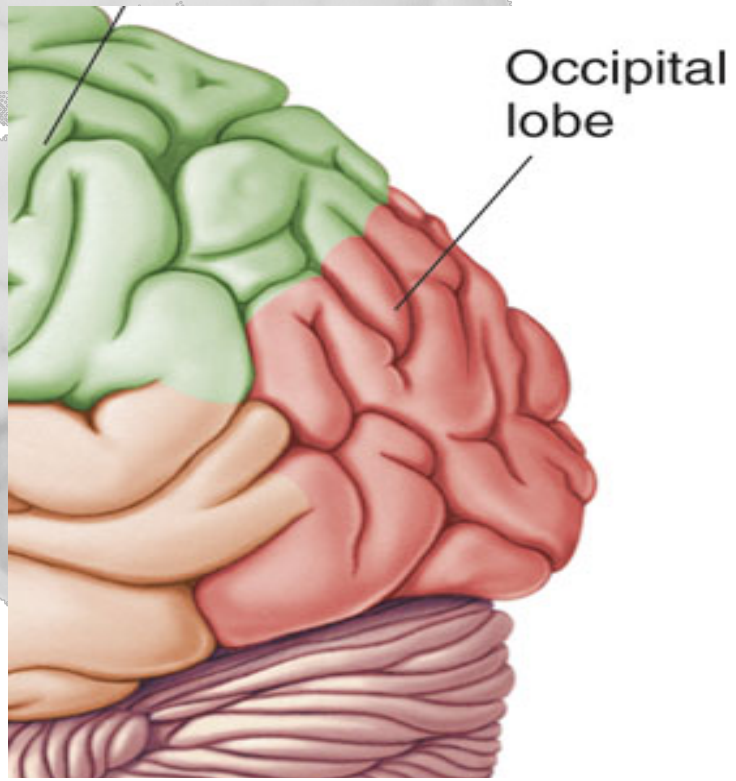
- **Primary Gustatory Cortex** – Primary site involved with the interpretation of the sensation of Taste.


Primary Somatosensory Cortex/ Postcentral Gyrus
Somatosensory Association Cortex
Primary Gustatory Cortex
Central sulcus
Parietal lobe

Lobes of the Brain – Occipital Lobe

- The Occipital Lobe of the Brain is located deep to the Occipital Bone of the Skull.

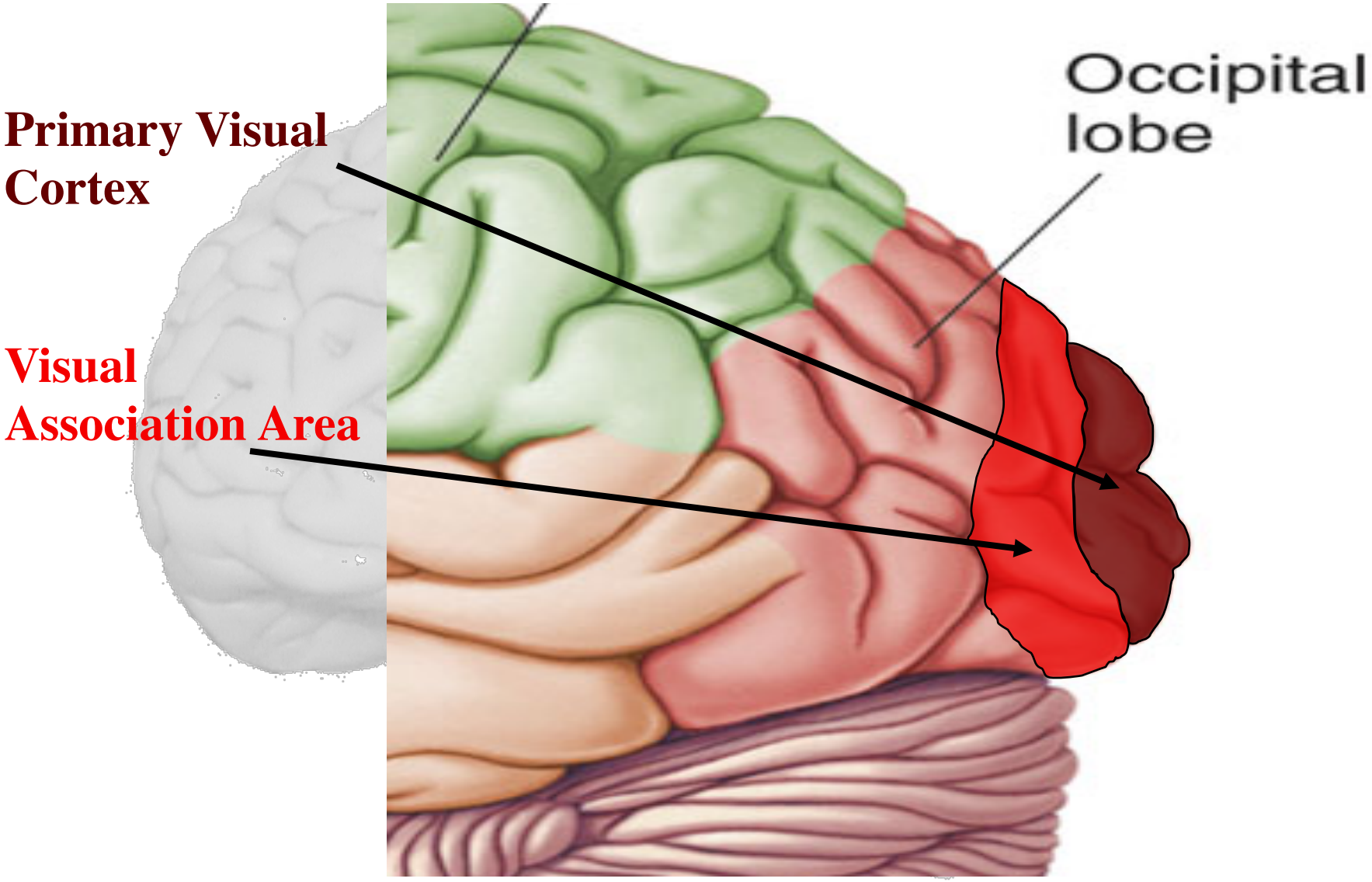
- Its primary function is the processing, integration, interpretation, etc. of VISION and visual stimuli.



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.


Primary Visual Cortex
Visual Association Area
Occipital lobe

Lobes of the Brain – Temporal Lobe

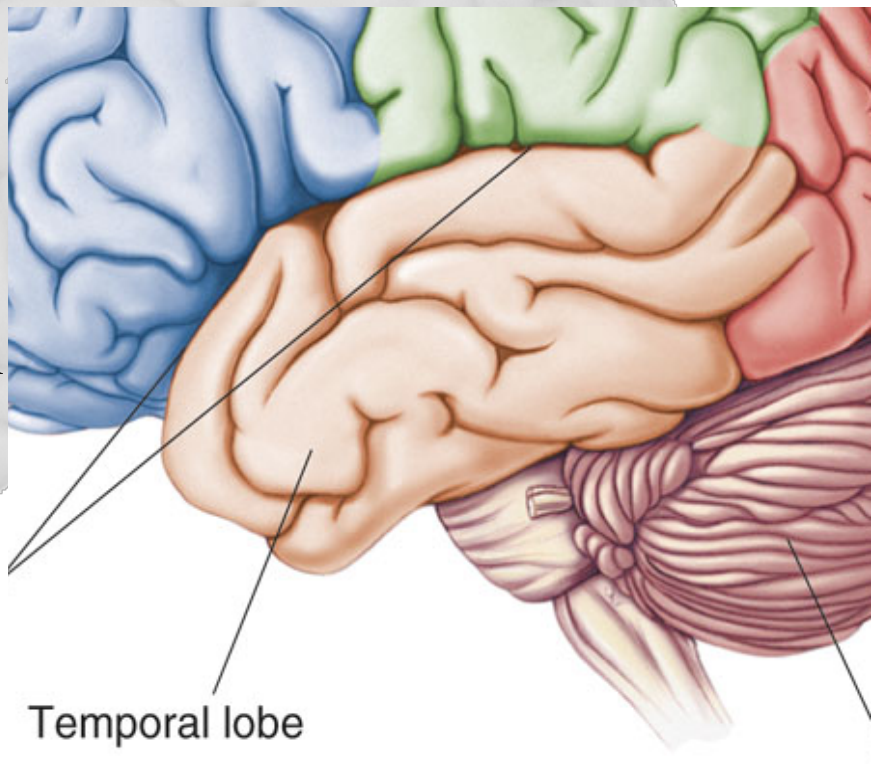
- The Temporal Lobes are located on the sides of the brain, deep to the Temporal Bones of the skull.

- They play an integral role in the following functions:

  - Hearing

  - Organization/Comprehension of language

  - Information Retrieval
    (Memory and Memory Formation)



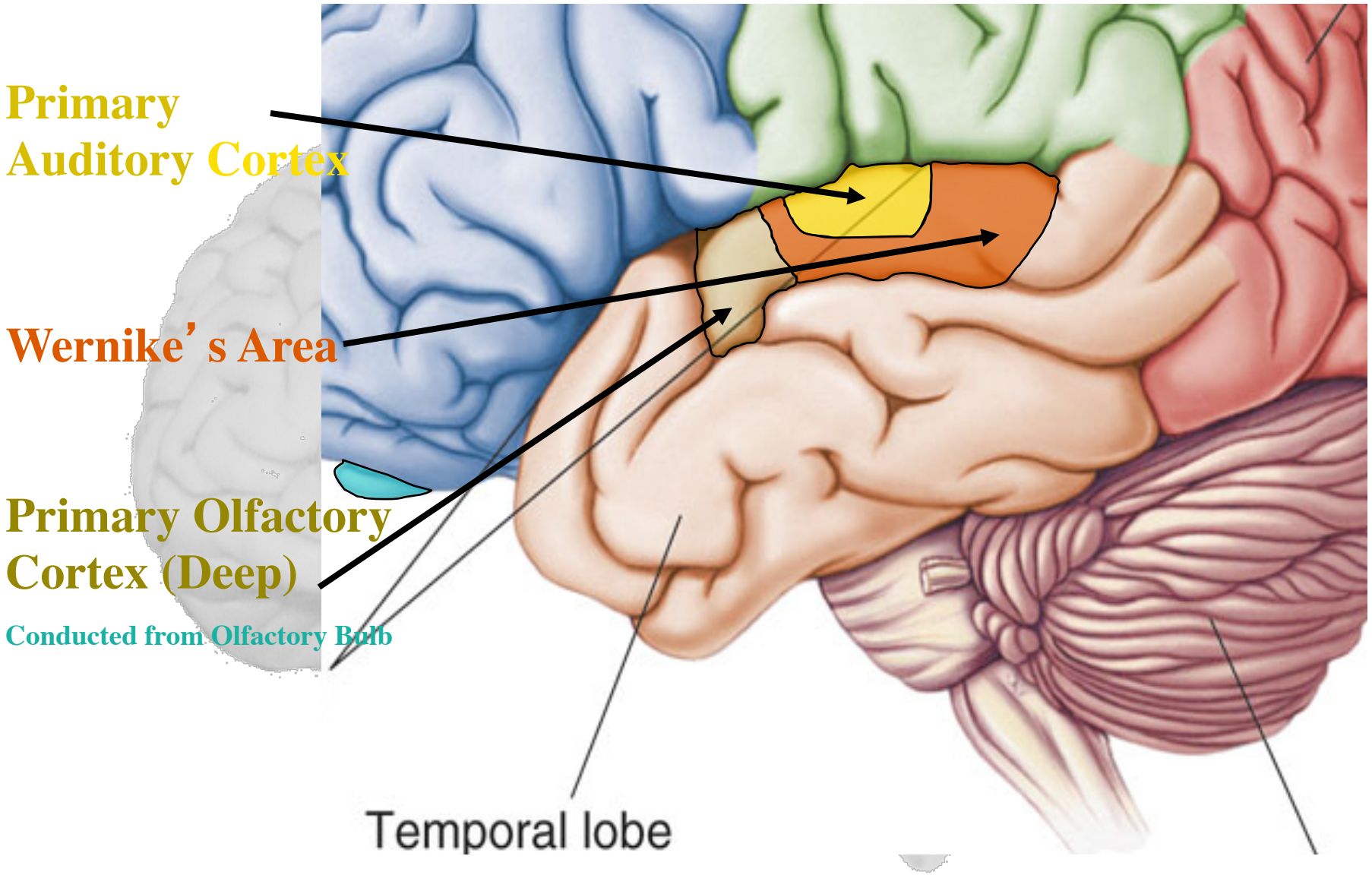
Temporal Lobe – Cortical Regions

- **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)

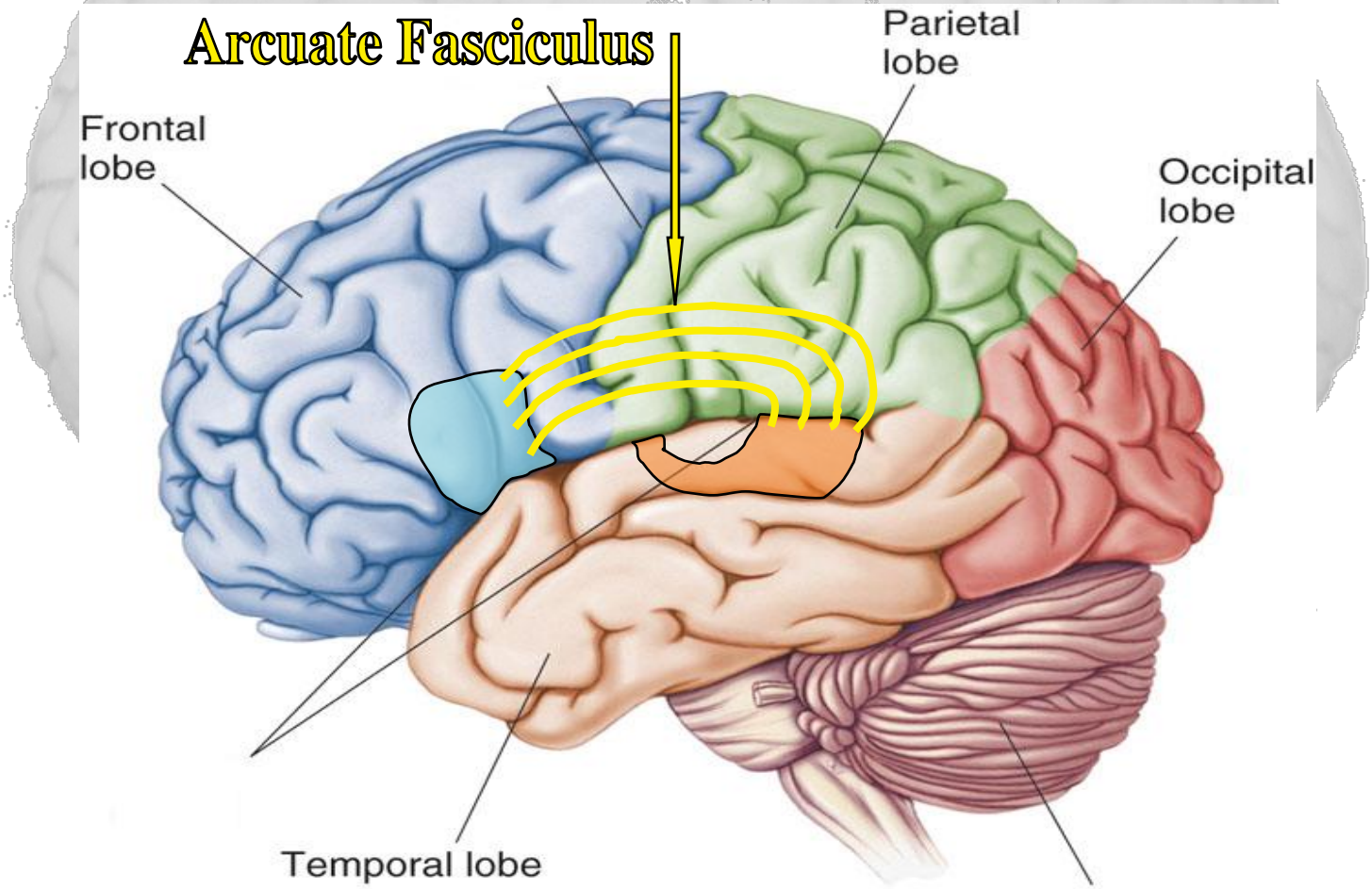
- **Wernicke's Area** – Language comprehension. Located on the ***Left*** Temporal Lobe.

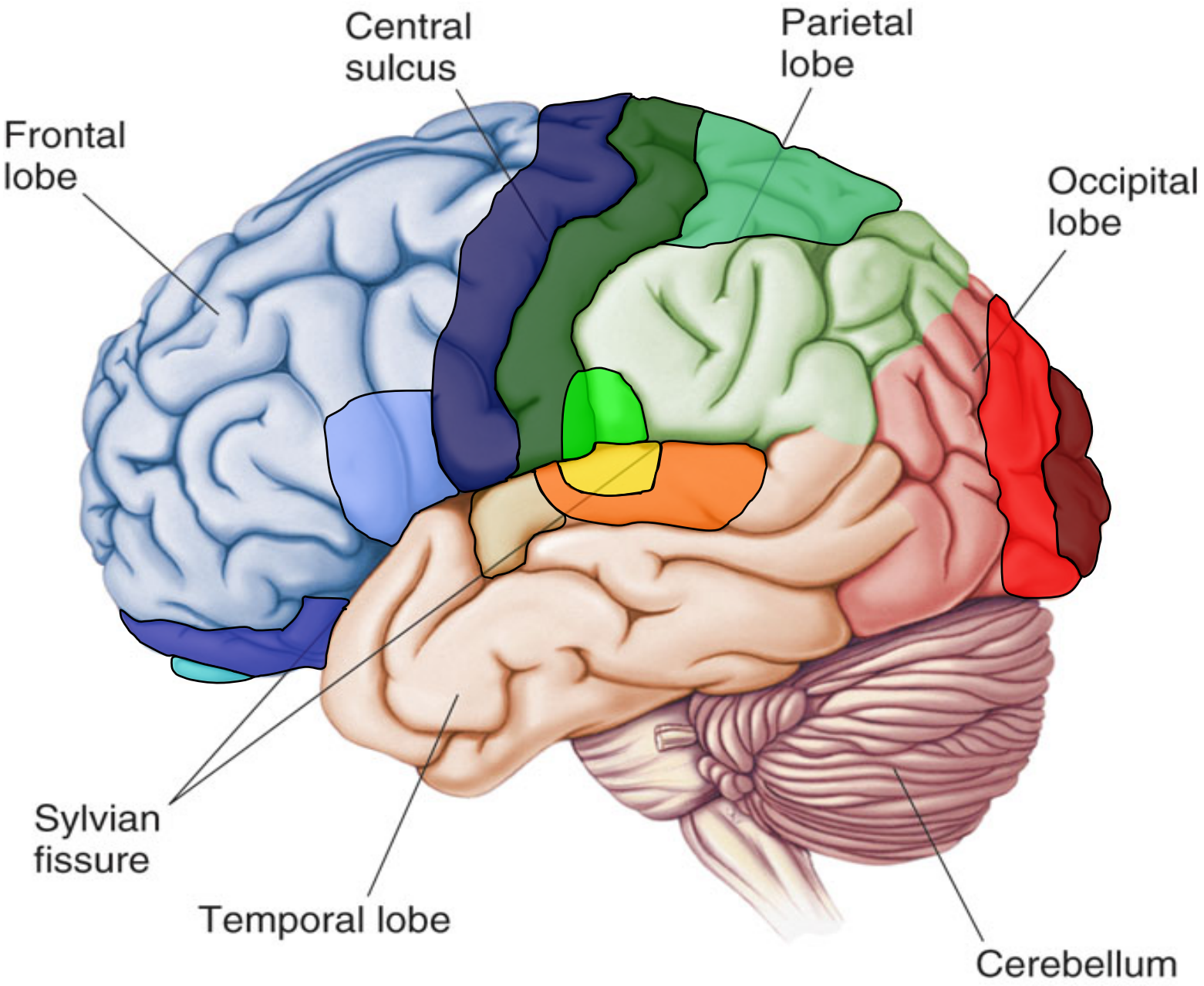
  - Wernicke's Aphasia – Language comprehension is inhibited. Words and sentences are not clearly understood, and sentence formation may be inhibited or non-sensical.


Primary
Auditory Cortex
Wernike's Area
Primary Olfactory
Cortex (Deep)
Conducted from Olfactory Bulb
Temporal lobe

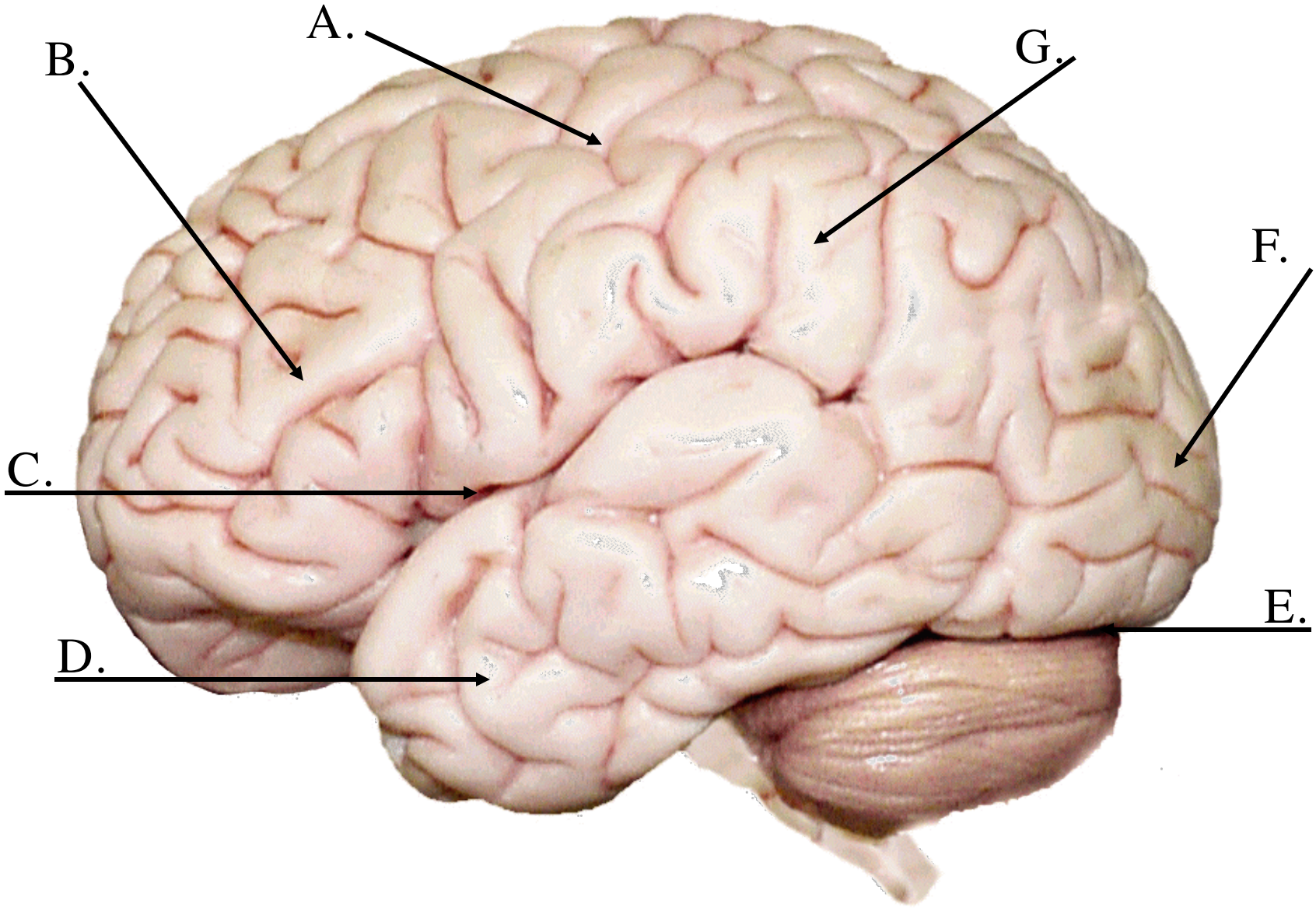
• **Arcuate Fasciculus** - A white matter tract that connects Broca's Area and Wernicke's Area through the Temporal, Parietal and Frontal Lobes. Allows for coordinated, comprehensible speech. Damage may result in:

- **Conduction Aphasia** - Where auditory comprehension and speech articulation are preserved, but people find it difficult to repeat heard speech.




Central sulcus
Parietal lobe
Frontal lobe
Occipital lobe
Sylvian fissure
Temporal lobe
Cerebellum

Lobes and Structures of the Brain



Lobes and Structures of the Brain

A. Central Sulcus

B. Frontal Lobe

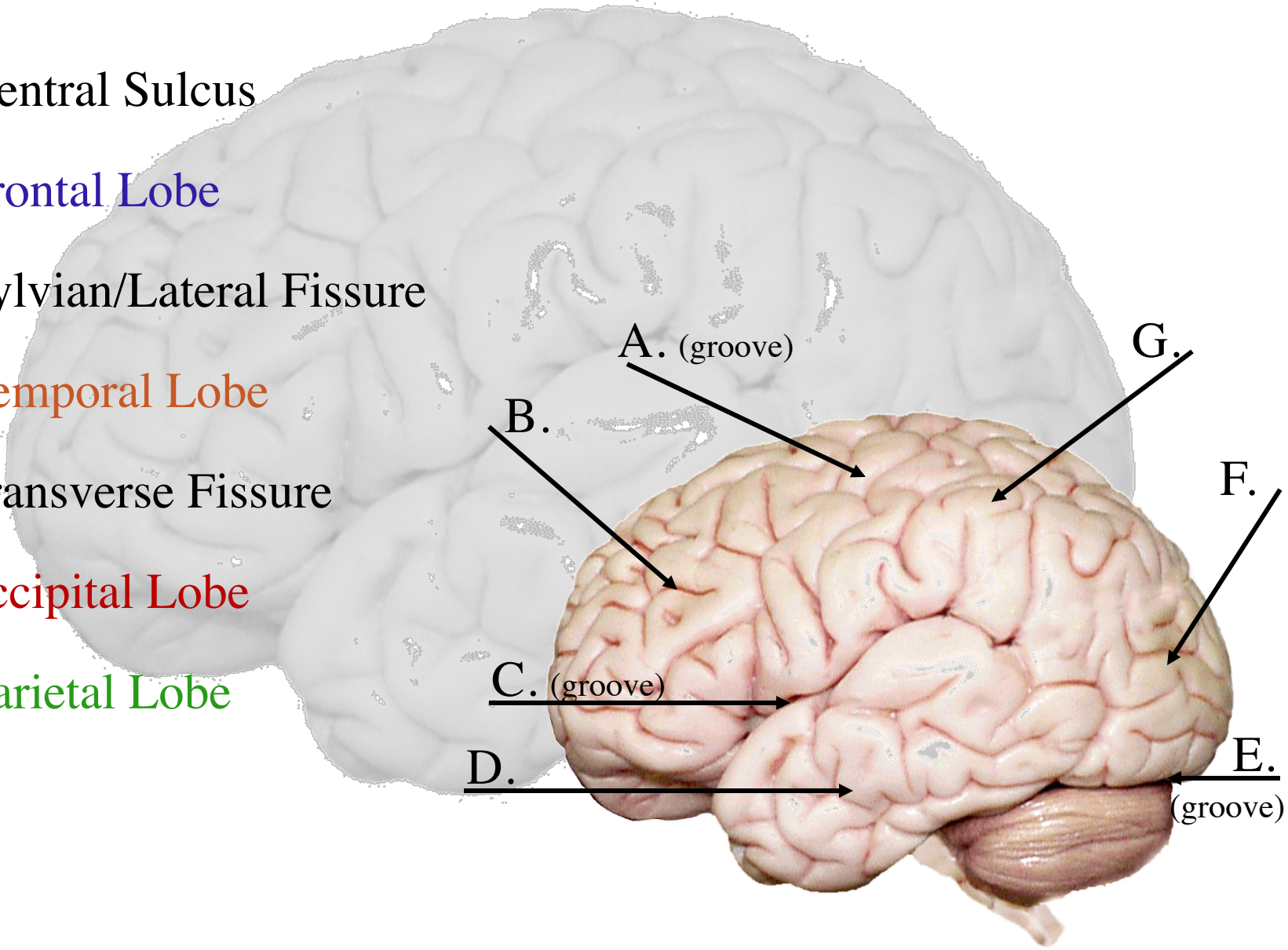
C. Sylvian/Lateral Fissure

D. Temporal Lobe

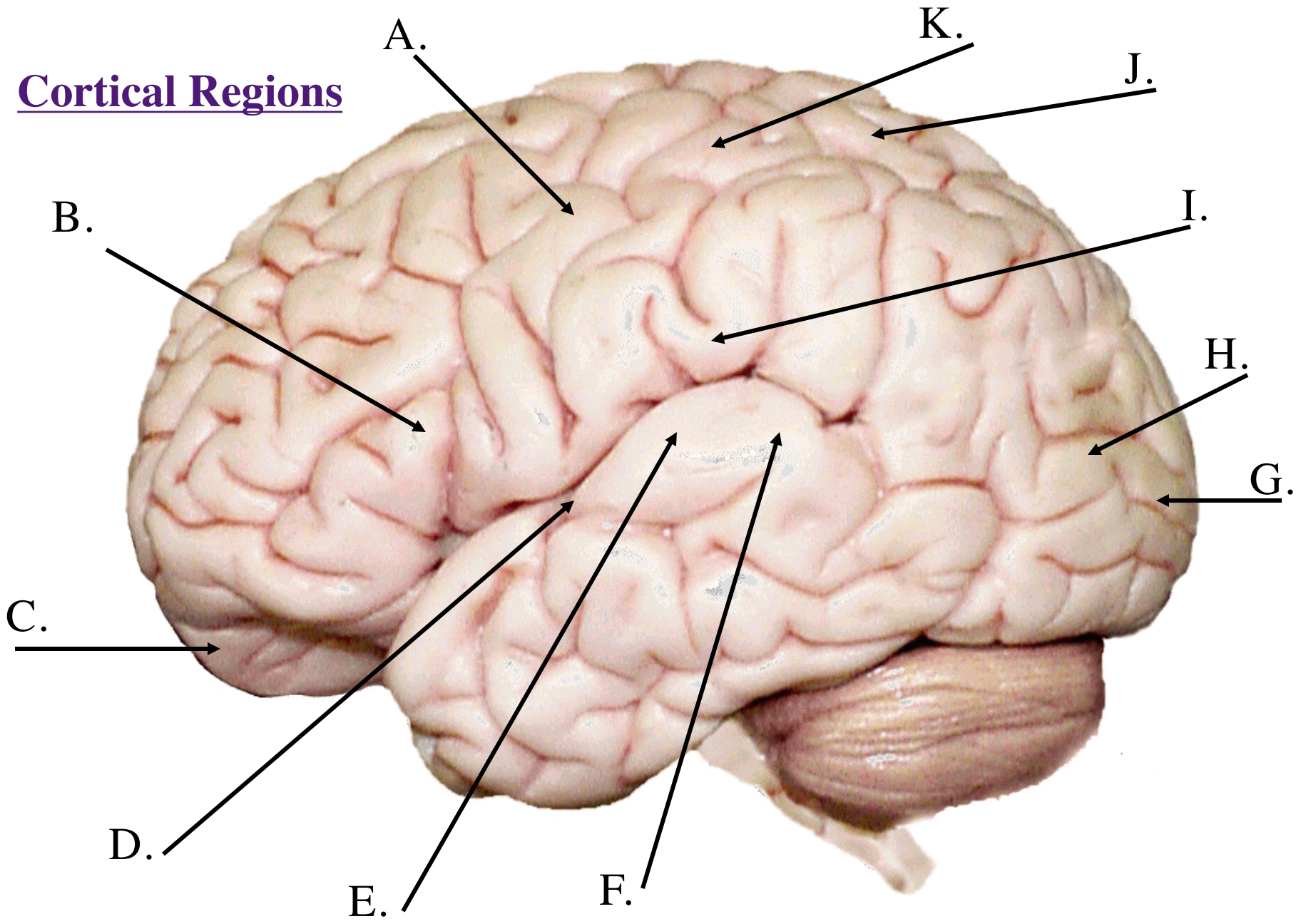
E. Transverse Fissure

F. Occipital Lobe

G. Parietal Lobe



Cortical Regions



Cortical Regions

A. Primary Motor Cortex/ Precentral Gyrus

B. Broca's Area

C. Orbitofrontal Cortex

D. Primary Olfactory Cortex (Deep)

E. Primary Auditory Cortex

F. Wernike's Area

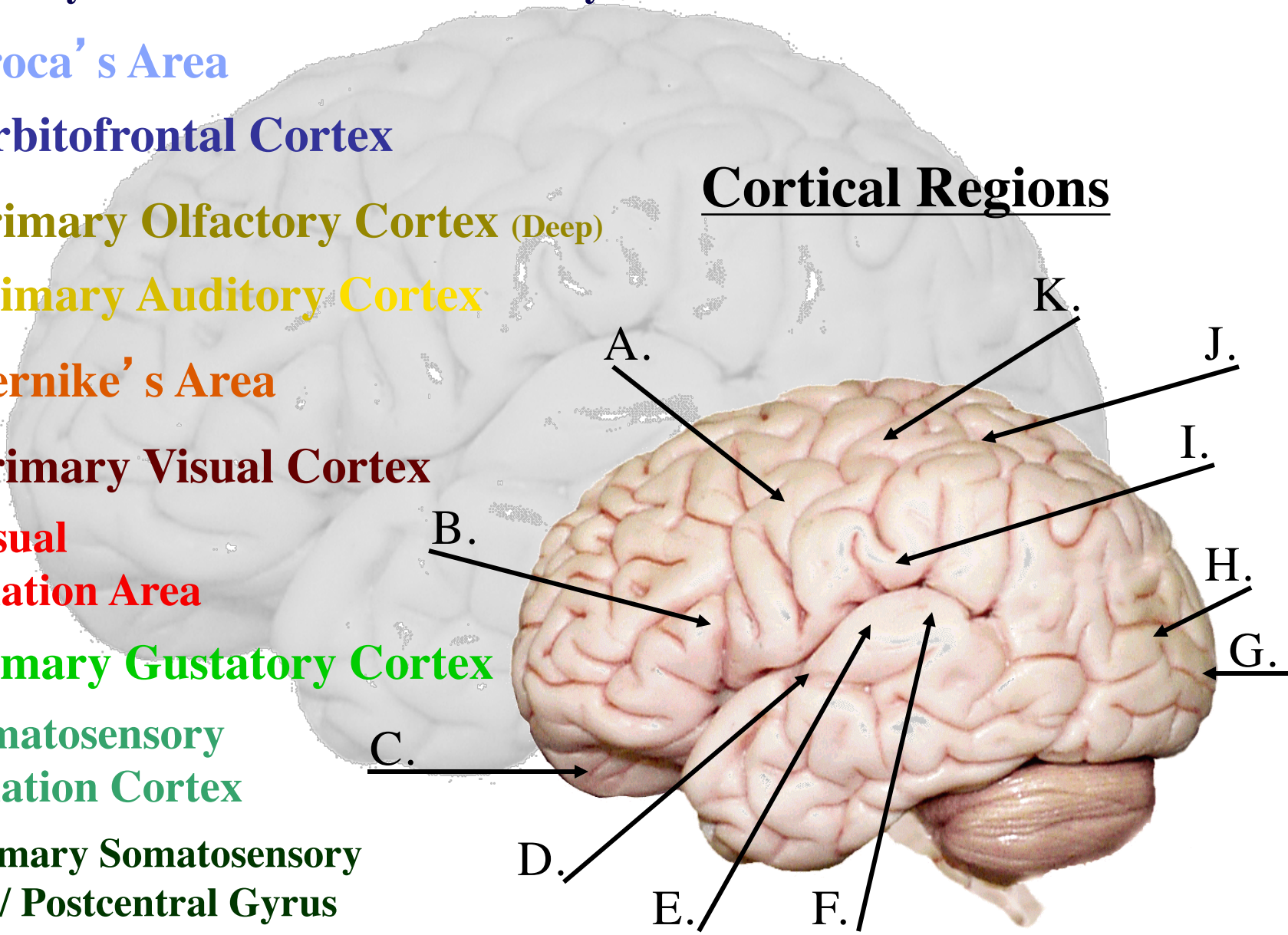
G. Primary Visual Cortex

H. Visual Association Area

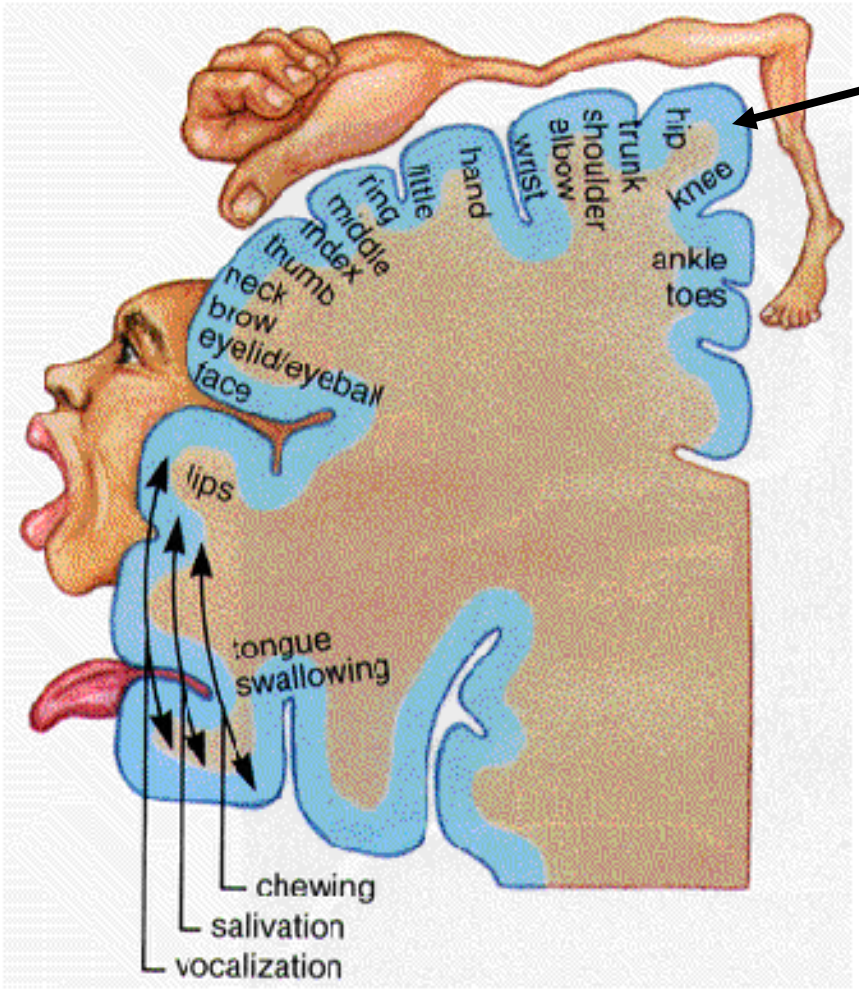
I. Primary Gustatory Cortex

J. Somatosensory Association Cortex

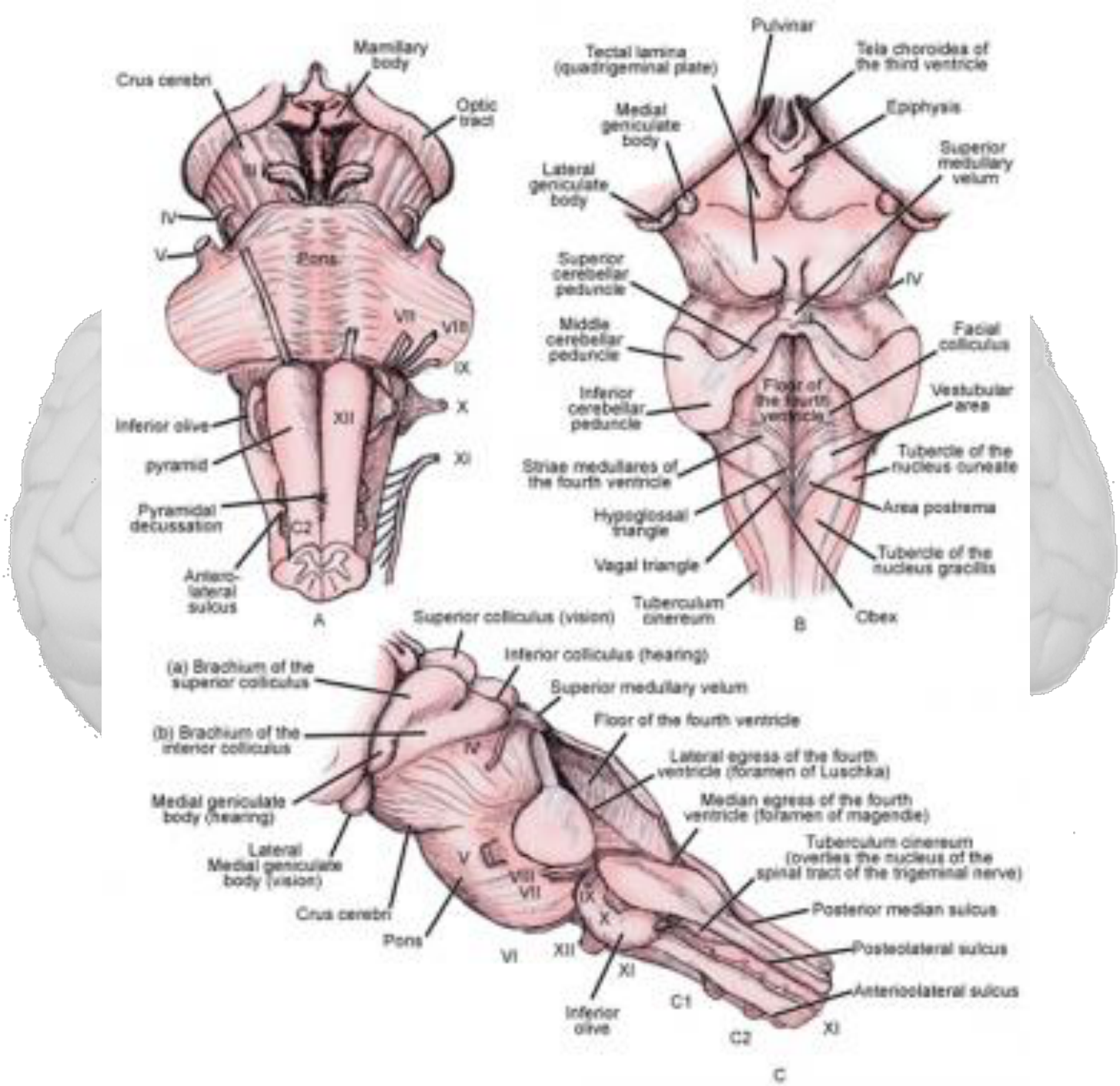
K. Primary Somatosensory Cortex/ Postcentral Gyrus

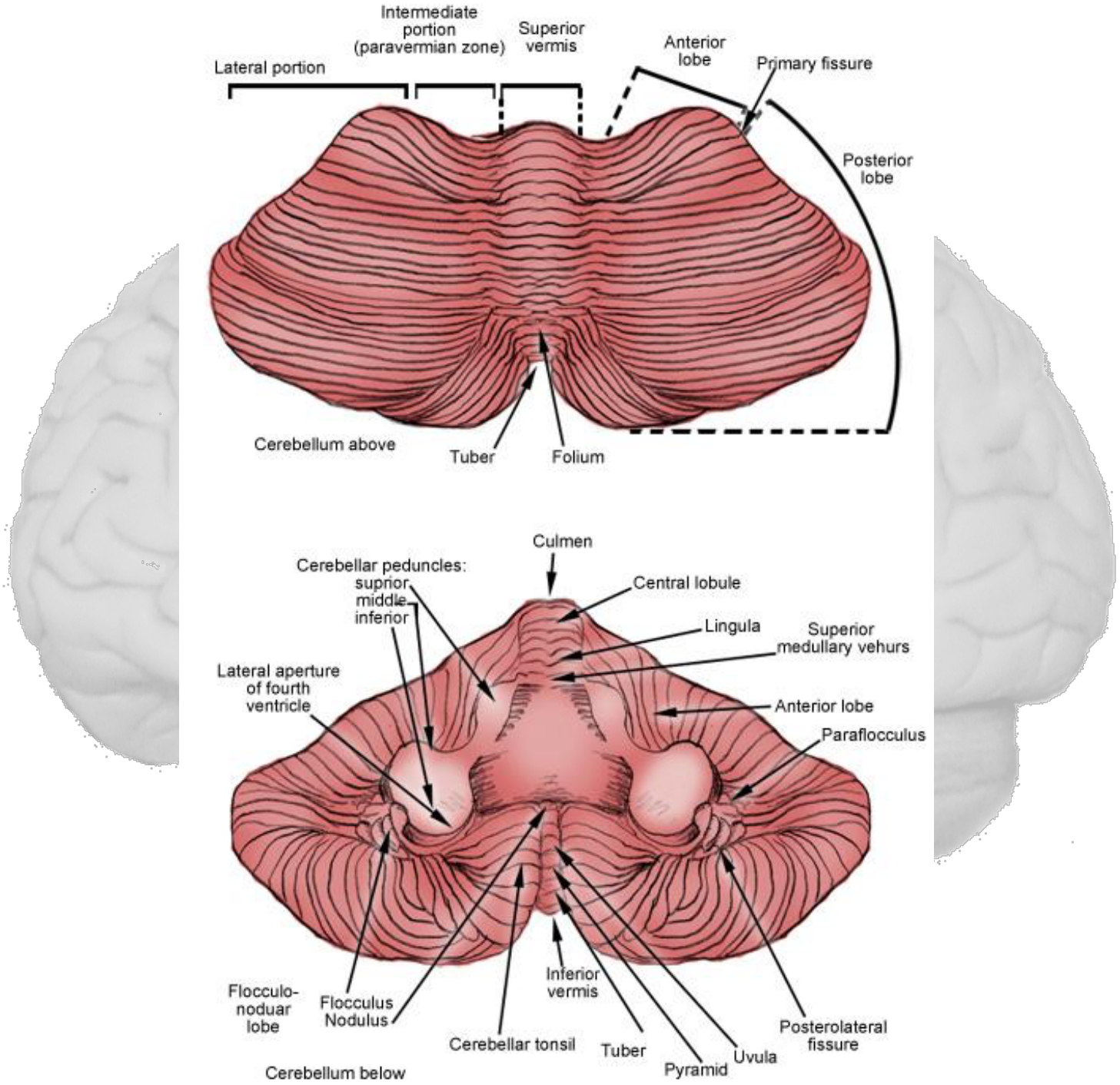


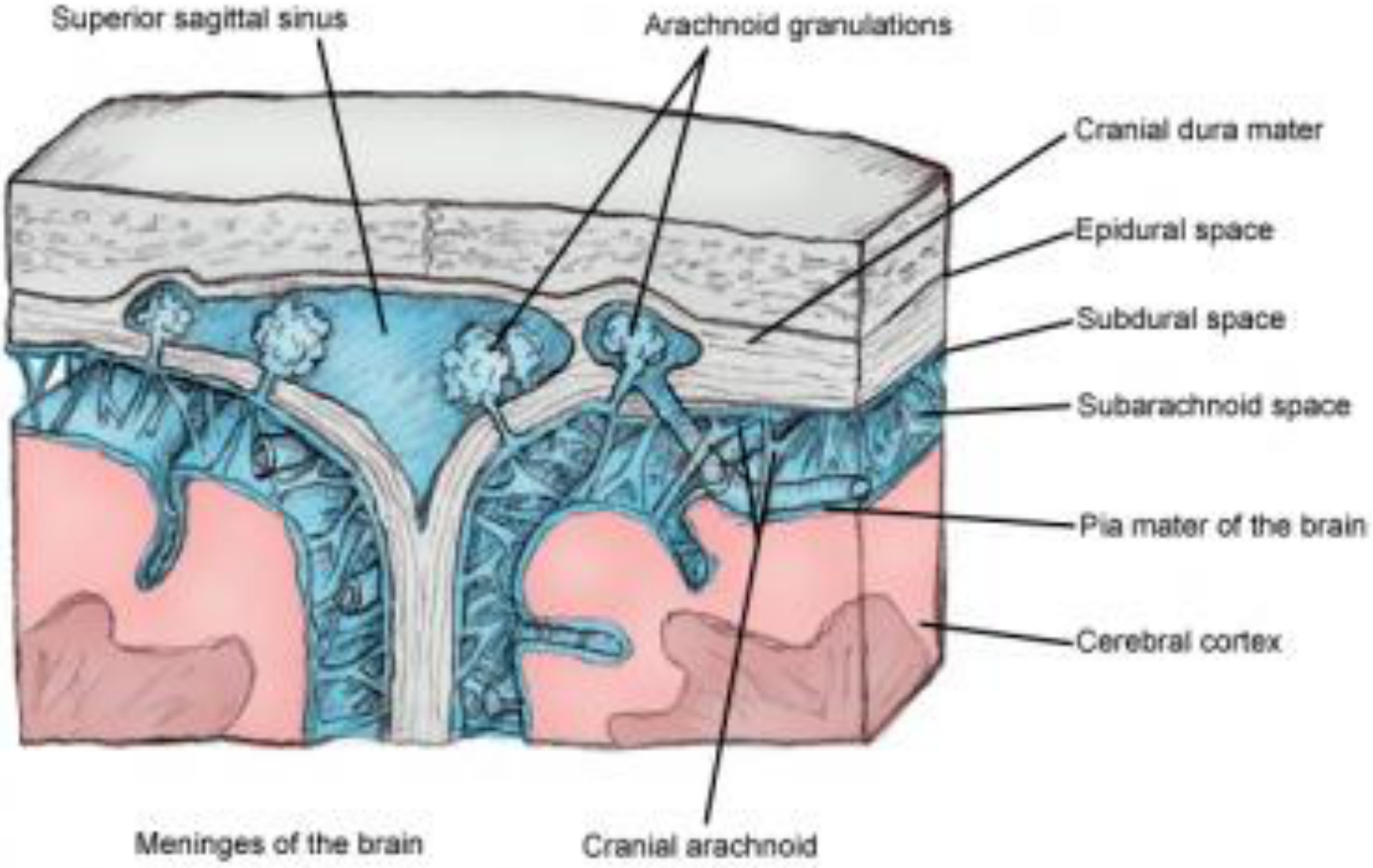
A: Primary Motor Cortex

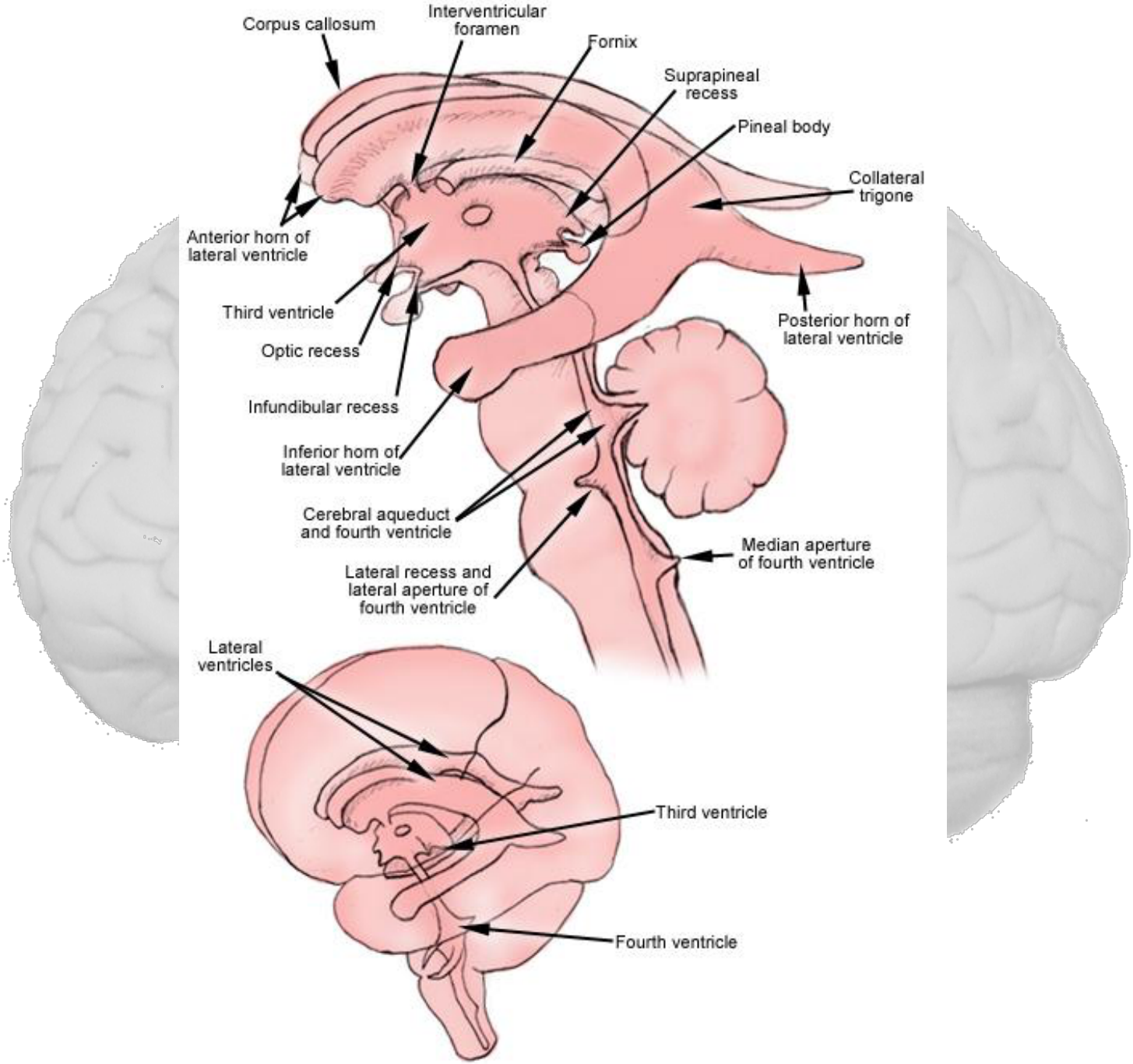


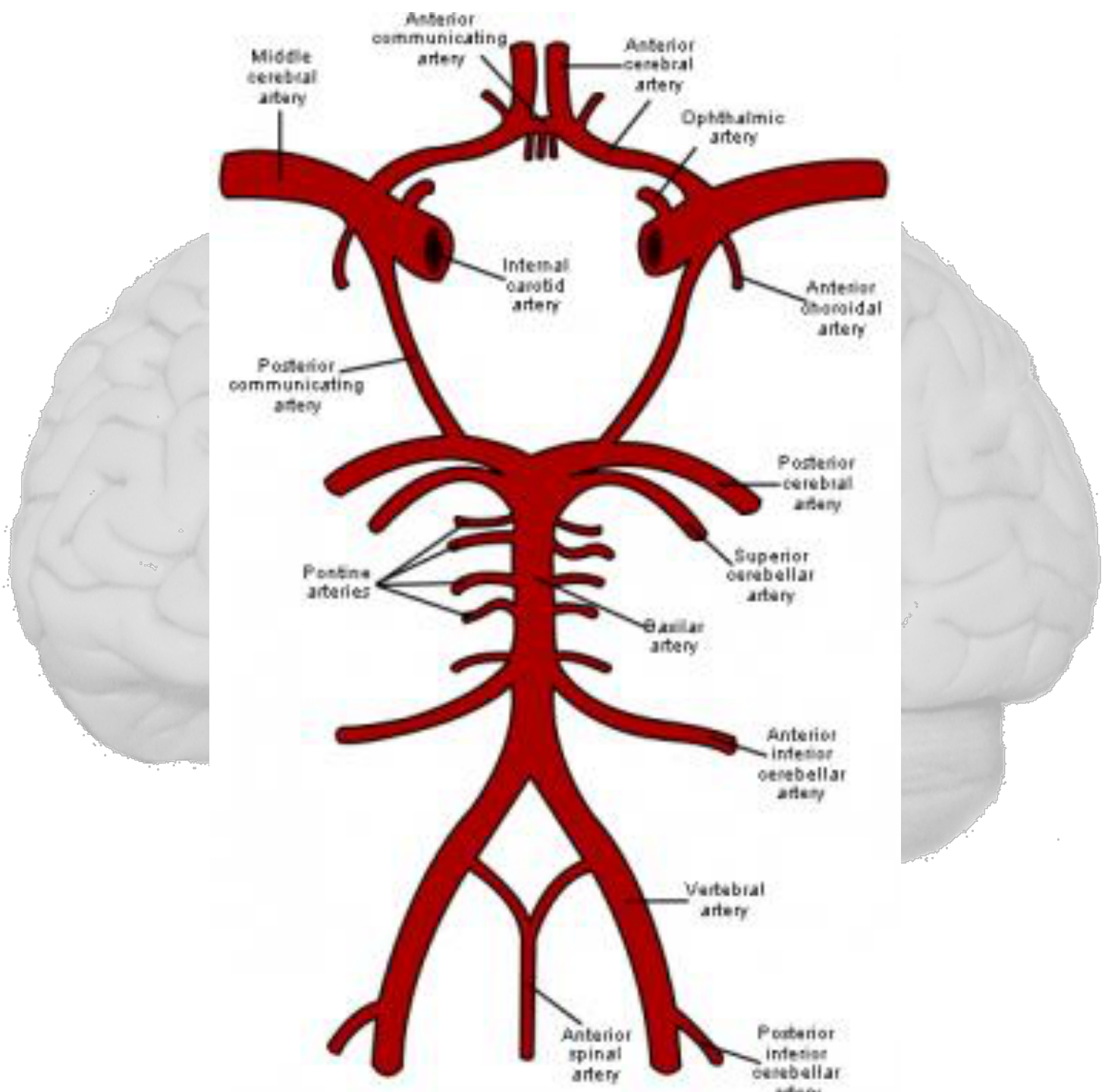
* This graphic representation of the regions of the Primary Motor Cortex and Primary Sensory Cortex is one example of a HOMUNCULUS:


Crus cerebri
Mamillary body
Optic tract
II
IV
V
Pons
VII
VIII
IX
X
XII
XI
Inferior olive
pyramid
Pyramidal decussation
C2
Antero-lateral sulcus
A
Pulvinar
Tectal lamina (quadrigeminal plate)
Tela choroidea of the third ventricle
Epiphysis
Medial geniculate body
Superior medullary velum
Lateral geniculate body
Superior cerebellar peduncle
IV
Middle cerebellar peduncle
Facial colliculus
Inferior cerebellar peduncle
Floor of the fourth ventricle
Vestubular area
Striae medullares of the fourth ventricle
Tubercle of the nucleus cuneate
Area postrema
Hypoglossal triangle
Tubercle of the nucleus gracilis
Vagal triangle
Tuberculum cinereum
Obex
B
Superior colliculus (vision)
Inferior colliculus (hearing)
(a) Brachium of the superior colliculus
Superior medullary velum
Floor of the fourth ventricle
(b) Brachium of the inferior colliculus
IV
Lateral egress of the fourth ventricle (foramen of Luschka)
Medial geniculate body (hearing)
Median egress of the fourth ventricle (foramen of magendie)
Lateral Medial geniculate body (vision)
V
VIII
VII
IX
X
Tuberculum cinereum (overlies the nucleus of the spinal tract of the trigeminal nerve)
Crus cerebri
Posterior median sulcus
Pons
VI
XII
XI
Posteolateral sulcus
Anterioolateral sulcus
C1
Inferior olive
C2
XI
C


Intermediate portion (paravermian zone)
Superior vermis
Lateral portion
Anterior lobe
Primary fissure
Posterior lobe
Cerebellum above
Tuber
Folium
Culmen
Cerebellar peduncles: suprior middle inferior
Central lobule
Lingula
Superior medullary vehurs
Lateral aperture of fourth ventricle
Anterior lobe
Paraflocculus
Flocculo-noduar lobe
Flocculus
Nodulus
Inferior vermis
Cerebellar tonsil
Tuber
Pyramid
Uvula
Posterolateral fissure
Cerebellum below


Superior sagittal sinus
Arachnoid granulations
Cranial dura mater
Epidural space
Subdural space
Subarachnoid space
Pia mater of the brain
Cerebral cortex
Meninges of the brain
Cranial arachnoid


Corpus callosum
Interventricular foramen
Fornix
Suprapineal recess
Pineal body
Collateral trigone
Anterior horn of lateral ventricle
Third ventricle
Optic recess
Infundibular recess
Inferior horn of lateral ventricle
Cerebral aqueduct and fourth ventricle
Lateral recess and lateral aperture of fourth ventricle
Posterior horn of lateral ventricle
Median aperture of fourth ventricle
Lateral ventricles
Third ventricle
Fourth ventricle


Anterior communicating artery
Middle cerebral artery
Anterior cerebral artery
Ophthalmic artery
Internal carotid artery
Anterior choroidal artery
Posterior communicating artery
Posterior cerebral artery
Pontine arteries
Superior cerebellar artery
Basilar artery
Anterior inferior cerebellar artery
Vertebral artery
Anterior spinal artery
Posterior inferior cerebellar