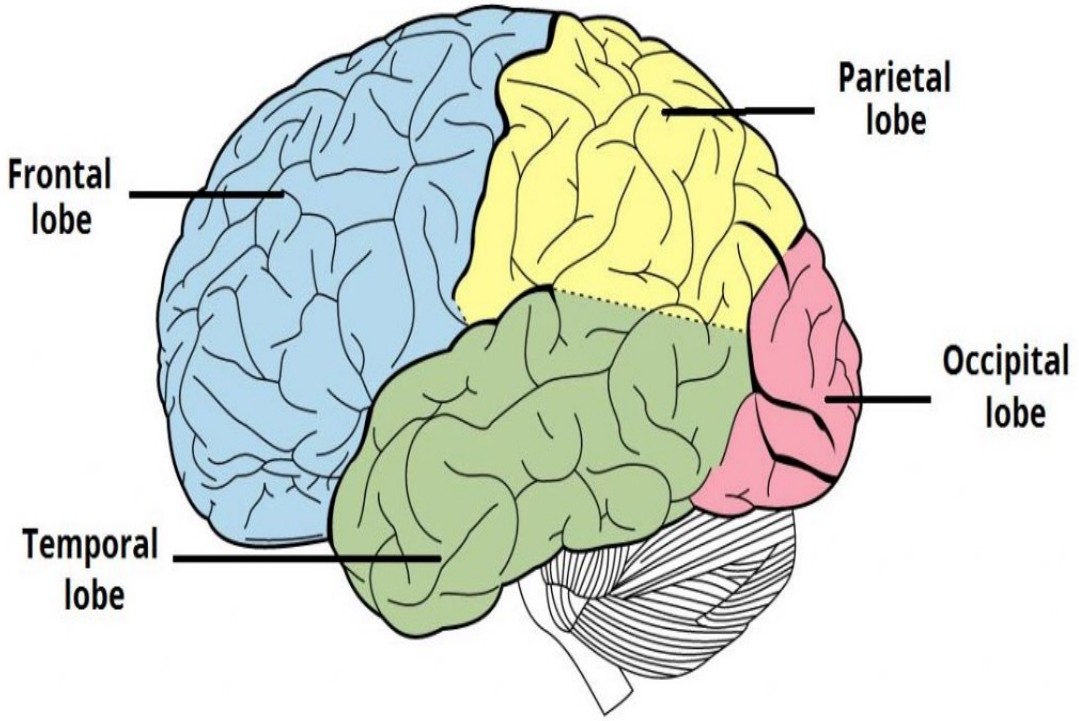
UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE

- **HUMAN ANATOMY**

Topic: Cerebrum (Telencephalon)



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- Honorary Specialist Obstetrician-Gynaecologist, UTH, Lusaka, Zambia.

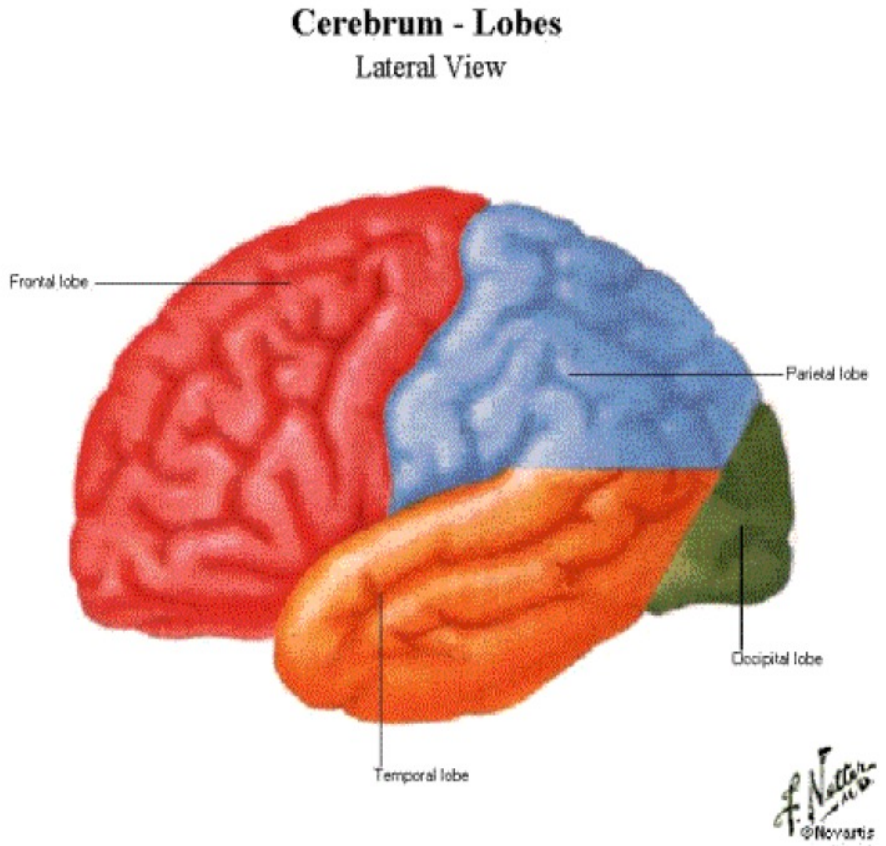
Brain

- Divided into 3 parts:

- Forebrain (prosencephalon)

- Midbrain (mesencephalon)

- Hindbrain (rhombencephalon)



Brain

Forebrain (Prosencephalon)

- **Cerebrum** (telencephalon), made of 2 cerebral hemispheres
- **Diencephalon** (thalamencephalon):

1. **Thalamus**
2. **Hypothalamus**
3. **Epithalamus**

Midbrain (Mesencephalon)

- From before cerebral aqueduct backwards

1. **Crus cerebri**
2. **Substantia nigra**
3. **Tegmentum**
4. **Tectum** (2 superior and 2 inferior colliculi, collectively called corpora quadrigemina)

Hindbrain (Rhombencephalon)

- **Pons and cerebellum** (metencephalon)
- **Medulla oblongata** (myencephalon)

Introduction

- The cerebrum is located within the bony cranium
- It extends from the **frontal bone** anteriorly to the **occipital bone** posteriorly
- Within the skull, the cerebrum fills the anterior and middle cranial fossae, and is located above the **tentorium cerebelli** inferoposteriorly
- The cerebrum is the largest part of the brain, located superiorly and anteriorly in relation to the brainstem
- Accounts for two-thirds of the total weight of the brain
- It consists of two **cerebral hemispheres** (left and right), separated by the falx cerebri of the dura mater
- The two cerebral hemispheres are connected by a white matter structure, called the **corpus callosum**
- Embryologically, the cerebrum is derived from the **prosencephalon**.
- One hemisphere, usually the left, is functionally dominant, controlling language and speech
- The other hemisphere interprets visual and spatial information

Introduction

- The cerebral hemispheres consist of an inner core of myelinated nerve fibres, the white mater, and an outer cortex of gray mater
- The cerebral cortex is responsible for integrating sensory impulses, directing motor activity, and controlling higher intellectual functions
- The human cortex is several centimetres thick and has a surface area of about 2,000 square cm (310 square inches), largely because of an elaborate series of convolutions; the extensive development of this cortex in humans is thought to distinguish the human brain from those of other animals
- Nerve fibres in the white matter primarily connect functional areas of the cerebral cortex
- The gray matter of the cerebral cortex usually is divided into four lobes, roughly defined by major surface folds
- The frontal lobe contains control centres for motor activity and speech, the parietal for somatic senses (touch and position), the temporal for auditory reception and memory, and the occipital for visual reception
- Sometimes the limbic lobe, involved with smell, taste, and emotions, is considered to be a fifth lobe.

External Structure of Cerebrum

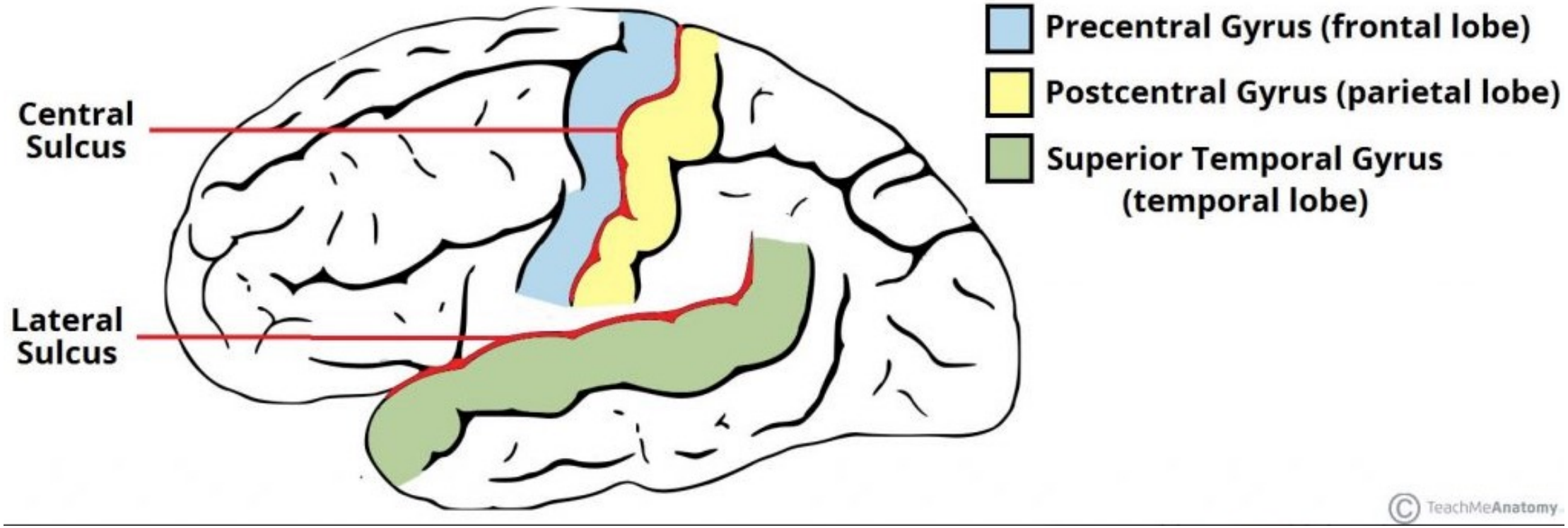
- Numerous deep grooves in the cerebral cortex, called cerebral fissures or cerebral sulci, originate in the extensive folding of the brain's surface
- The main cerebral sulci are:

- **Lateral sulcus of Sylvius**, between the frontal and temporal lobes
- **Central sulcus of Rolando**, between the frontal and parietal lobes, which separates the chief motor and sensory regions of the brain
- **Calcarine sulcus** on the occipital lobe, which contains the visual cortex
- **Parieto-occipital sulcus**, which separates the parietal and occipital lobes
- **Transverse sulcus**, which divides the cerebrum from the cerebellum
- **Lunate sulcus** – groove located in the occipital cortex
- **Longitudinal sulcus**, which divides the cerebrum into two hemispheres

External Structure of Cerebrum

- The main gyri are:
- **Precentral gyrus** – ridge directly anterior to central sulcus, location of primary motor cortex
- **Postcentral gyrus** – ridge directly posterior to central sulcus, location of primary somatosensory cortex
- **Superior temporal gyrus** – ridge located inferior to lateral sulcus, responsible for the reception and processing of sound

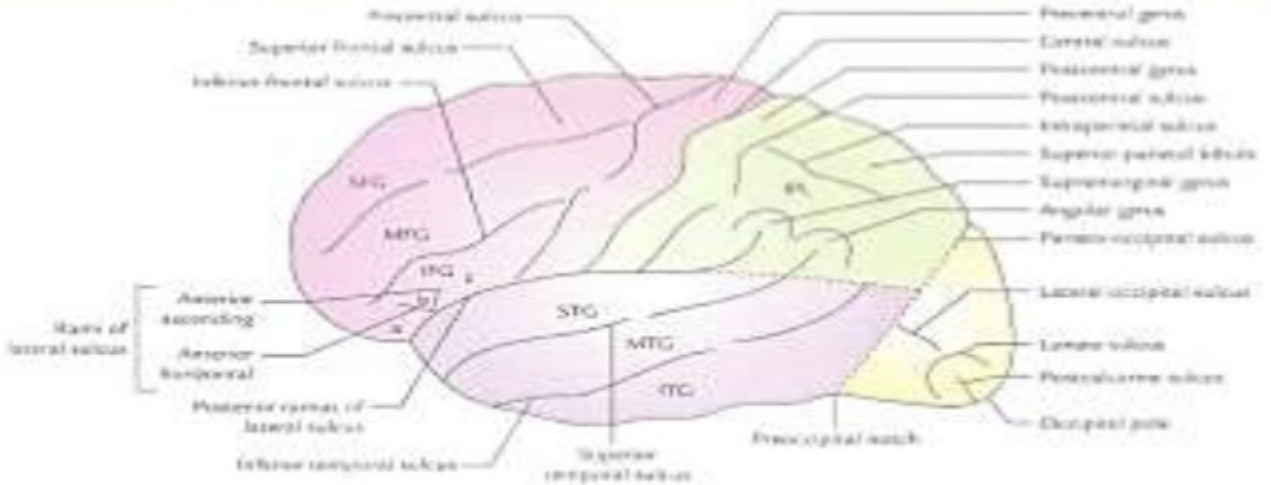
Important Gyri

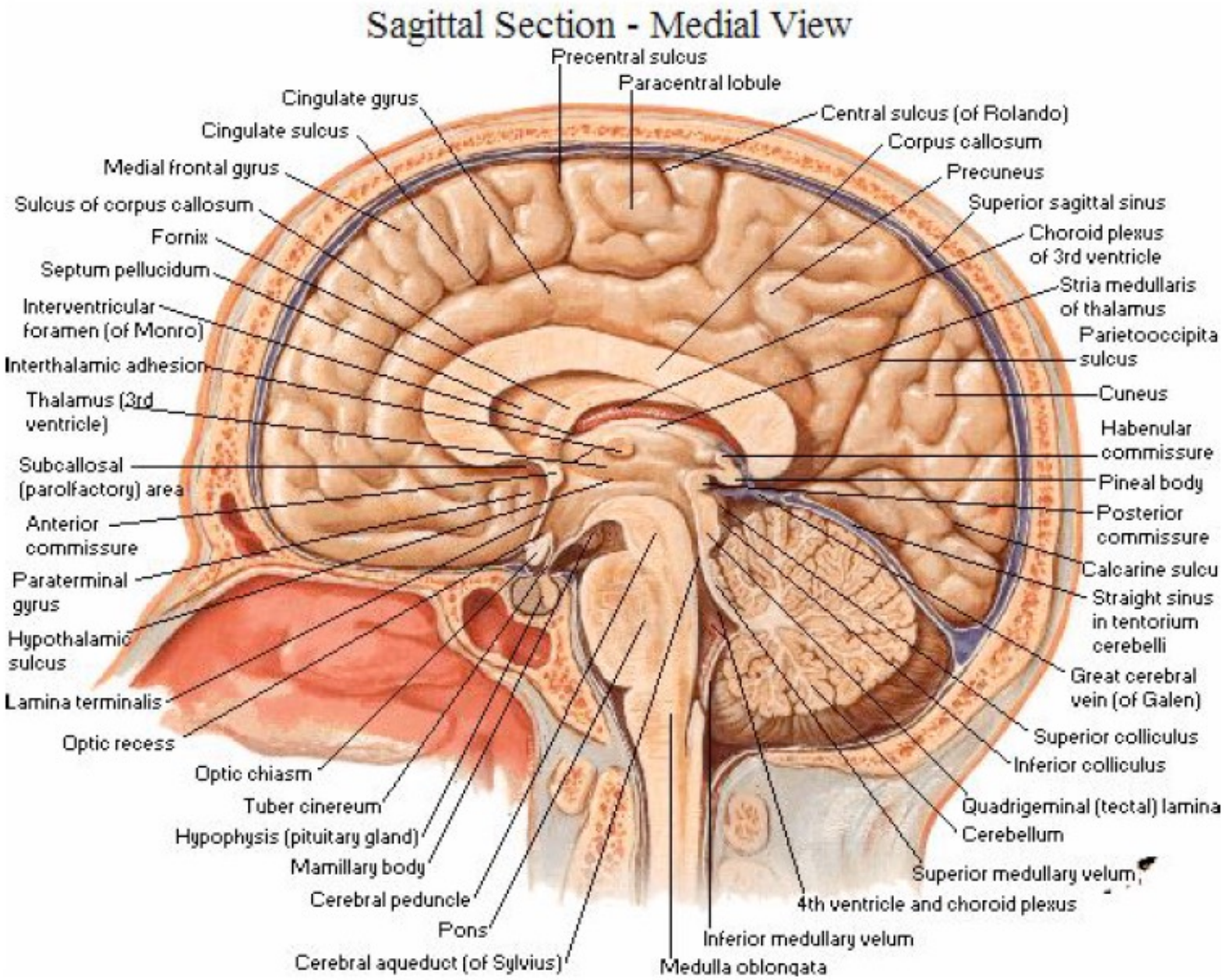


Sulci & Gyri

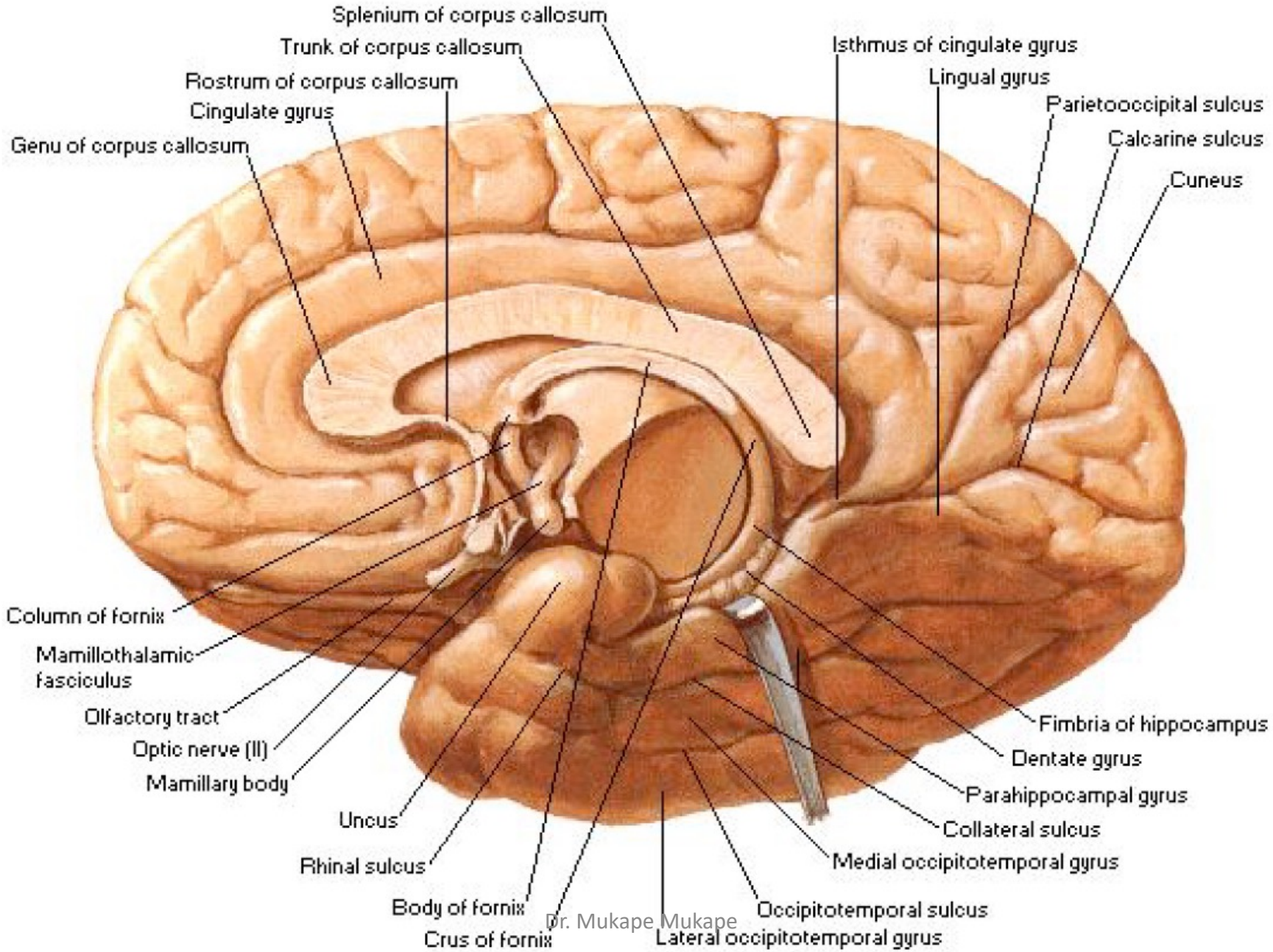
Main cerebral sulci:

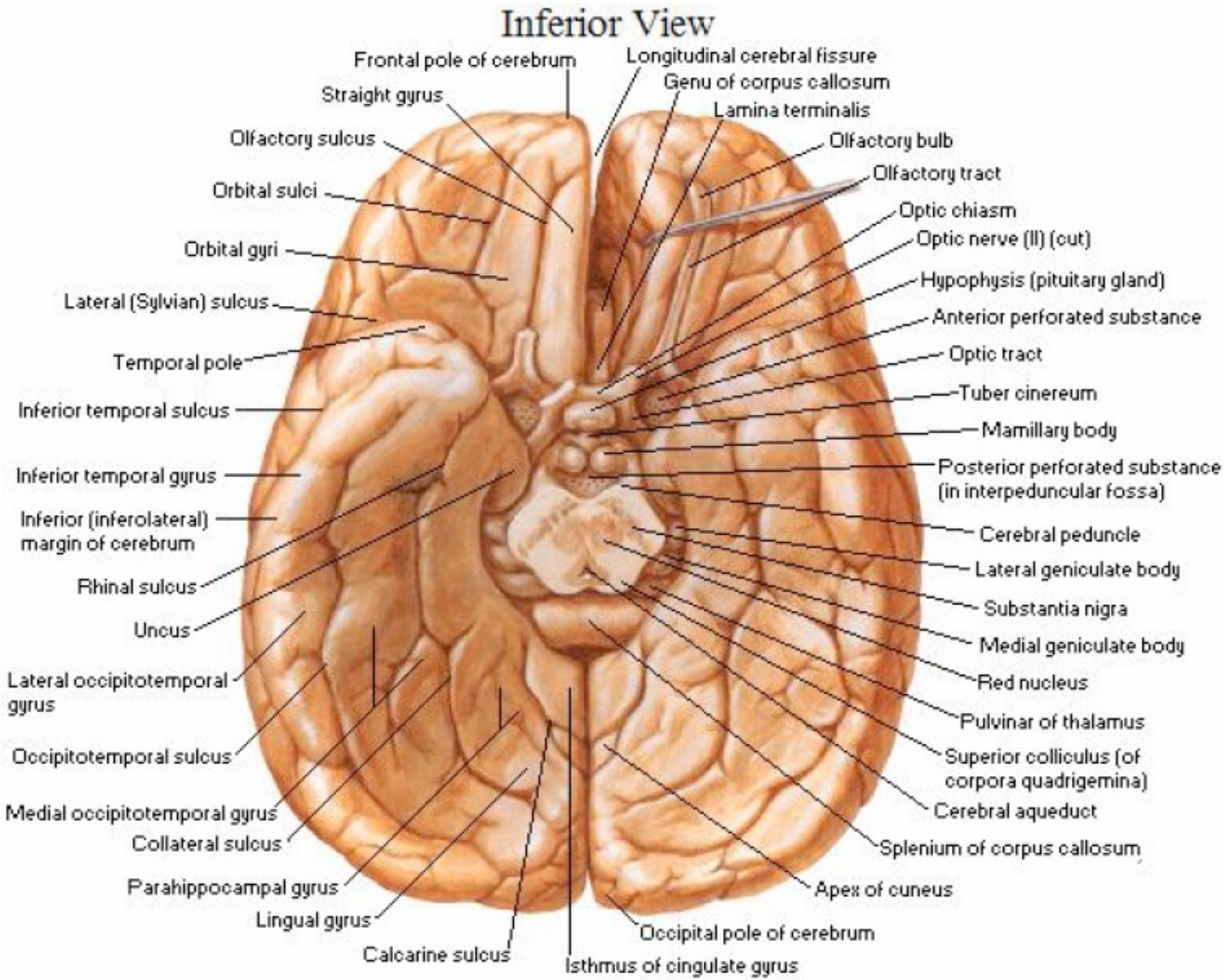
1. Lateral sulcus (Sylvius)
   - Stem & 3 rami (posterior, ascending & anterior)
2. Central sulcus (Rolando)
3. Parieto-occipital sulcus
4. Calcarine sulcus

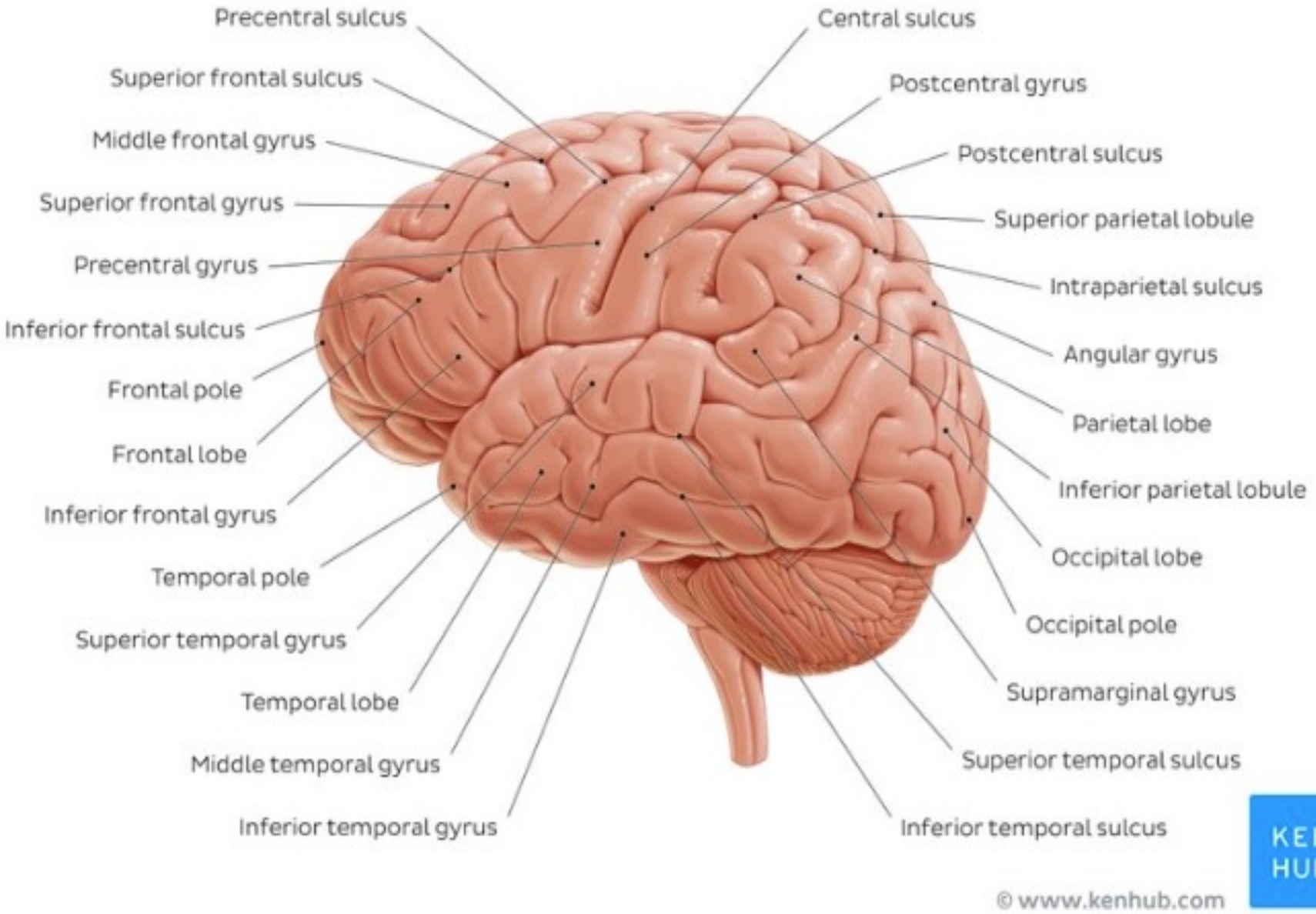



Sagittal Section - Medial View
Precentral sulcus
Paracentral lobule
Cingulate gyrus
Central sulcus (of Rolando)
Cingulate sulcus
Corpus callosum
Medial frontal gyrus
Precuneus
Sulcus of corpus callosum
Superior sagittal sinus
Fornix
Choroid plexus of 3rd ventricle
Septum pellucidum
Stria medullaris of thalamus
Interventricular foramen (of Monro)
Parietooccipita sulcus
Interthalamic adhesion
Cuneus
Thalamus (3rd ventricle)
Habenular commissure
Subcallosal (parolfactory) area
Pineal body
Anterior commissure
Posterior commissure
Paraterminal gyrus
Calcarine sulcu
Straight sinus in tentorium cerebelli
Hypothalamic sulcus
Great cerebral vein (of Galen)
Lamina terminalis
Superior colliculus
Optic recess
Inferior colliculus
Optic chiasm
Quadrigeminal (tectal) lamina
Tuber cinereum
Cerebellum
Hypophysis (pituitary gland)
Superior medullary velum
Mamillary body
4th ventricle and choroid plexus
Cerebral peduncle
Pons
Inferior medullary velum
Cerebral aqueduct (of Sylvius)
Medulla oblongata

Medial View


Splenium of corpus callosum
Trunk of corpus callosum
Rostrum of corpus callosum
Cingulate gyrus
Genu of corpus callosum
Isthmus of cingulate gyrus
Lingual gyrus
Parietooccipital sulcus
Calcarine sulcus
Cuneus
Column of fornix
Mamillothalamic fasciculus
Olfactory tract
Optic nerve (II)
Mamillary body
Uncus
Rhinal sulcus
Body of fornix
Crus of fornix
Fimbria of hippocampus
Dentate gyrus
Parahippocampal gyrus
Collateral sulcus
Medial occipitotemporal gyrus
Occipitotemporal sulcus
Lateral occipitotemporal gyrus


Inferior View
Frontal pole of cerebrum
Longitudinal cerebral fissure
Genu of corpus callosum
Straight gyrus
Lamina terminalis
Olfactory sulcus
Olfactory bulb
Olfactory tract
Orbital sulci
Optic chiasm
Optic nerve (II) (cut)
Orbital gyri
Hypophysis (pituitary gland)
Lateral (Sylvian) sulcus
Anterior perforated substance
Optic tract
Temporal pole
Tuber cinereum
Inferior temporal sulcus
Mamillary body
Posterior perforated substance
(in interpeduncular fossa)
Inferior temporal gyrus
Cerebral peduncle
Inferior (inferolateral)
margin of cerebrum
Lateral geniculate body
Substantia nigra
Rhinal sulcus
Medial geniculate body
Uncus
Red nucleus
Lateral occipitotemporal
gyrus
Pulvinar of thalamus
Superior colliculus (of
corpora quadrigemina)
Occipitotemporal sulcus
Cerebral aqueduct
Medial occipitotemporal gyrus
Splenium of corpus callosum
Collateral sulcus
Apex of cuneus
Parahippocampal gyrus
Lingual gyrus
Occipital pole of cerebrum
Calcarine sulcus
Isthmus of cingulate gyrus


Precentral sulcus
Superior frontal sulcus
Middle frontal gyrus
Superior frontal gyrus
Precentral gyrus
Inferior frontal sulcus
Frontal pole
Frontal lobe
Inferior frontal gyrus
Temporal pole
Superior temporal gyrus
Temporal lobe
Middle temporal gyrus
Inferior temporal gyrus
Central sulcus
Postcentral gyrus
Postcentral sulcus
Superior parietal lobule
Intraparietal sulcus
Angular gyrus
Parietal lobe
Inferior parietal lobule
Occipital lobe
Occipital pole
Supramarginal gyrus
Superior temporal sulcus
Inferior temporal sulcus
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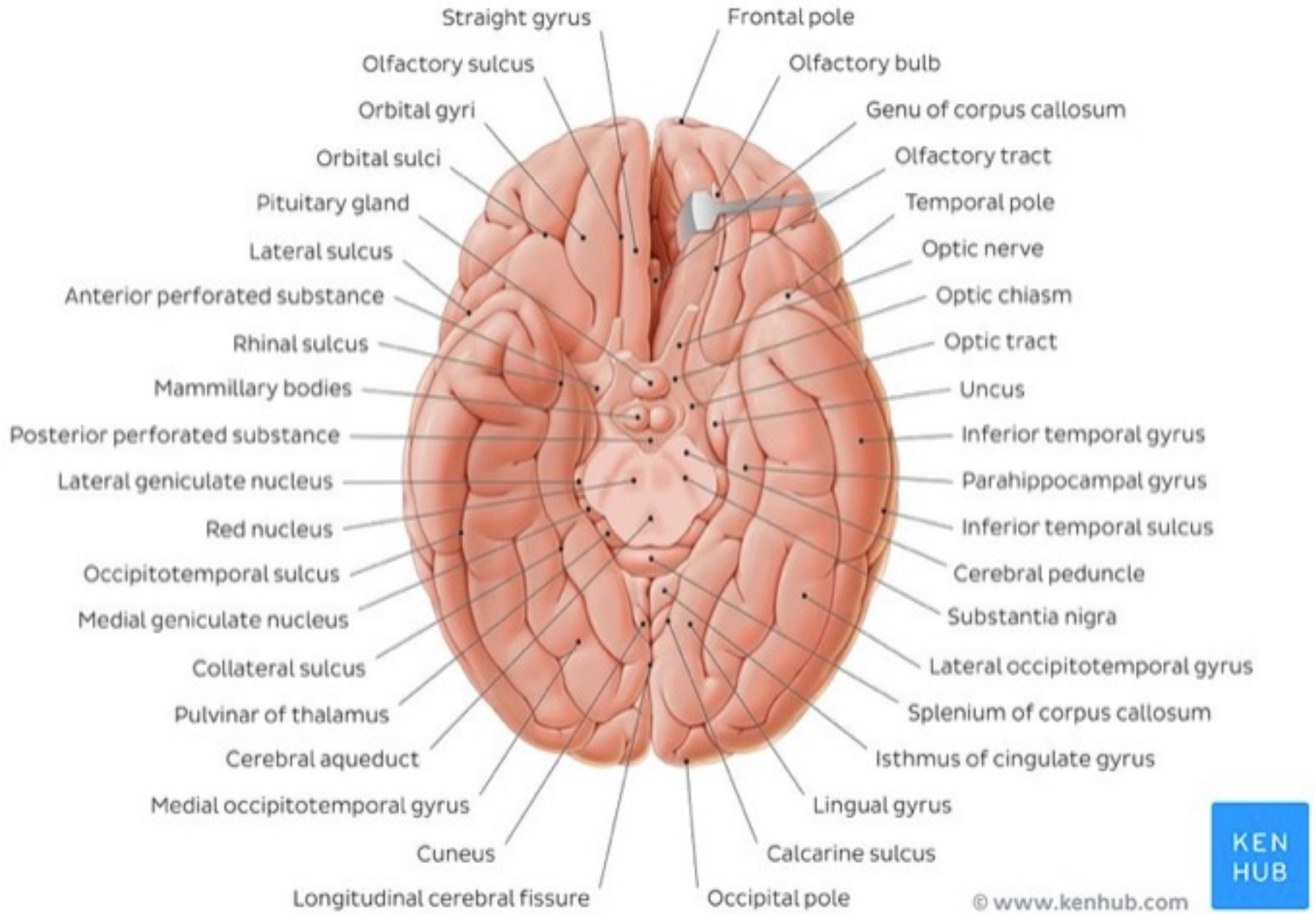
Straight gyrus
Olfactory sulcus
Orbital gyri
Orbital sulci
Pituitary gland
Lateral sulcus
Anterior perforated substance
Rhinal sulcus
Mammillary bodies
Posterior perforated substance
Lateral geniculate nucleus
Red nucleus
Occipitotemporal sulcus
Medial geniculate nucleus
Collateral sulcus
Pulvinar of thalamus
Cerebral aqueduct
Medial occipitotemporal gyrus
Cuneus
Longitudinal cerebral fissure
Frontal pole
Olfactory bulb
Genu of corpus callosum
Olfactory tract
Temporal pole
Optic nerve
Optic chiasm
Optic tract
Uncus
Inferior temporal gyrus
Parahippocampal gyrus
Inferior temporal sulcus
Cerebral peduncle
Substantia nigra
Lateral occipitotemporal gyrus
Splenium of corpus callosum
Isthmus of cingulate gyrus
Lingual gyrus
Calcarine sulcus
Occipital pole
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Internal Structure of Cerebrum

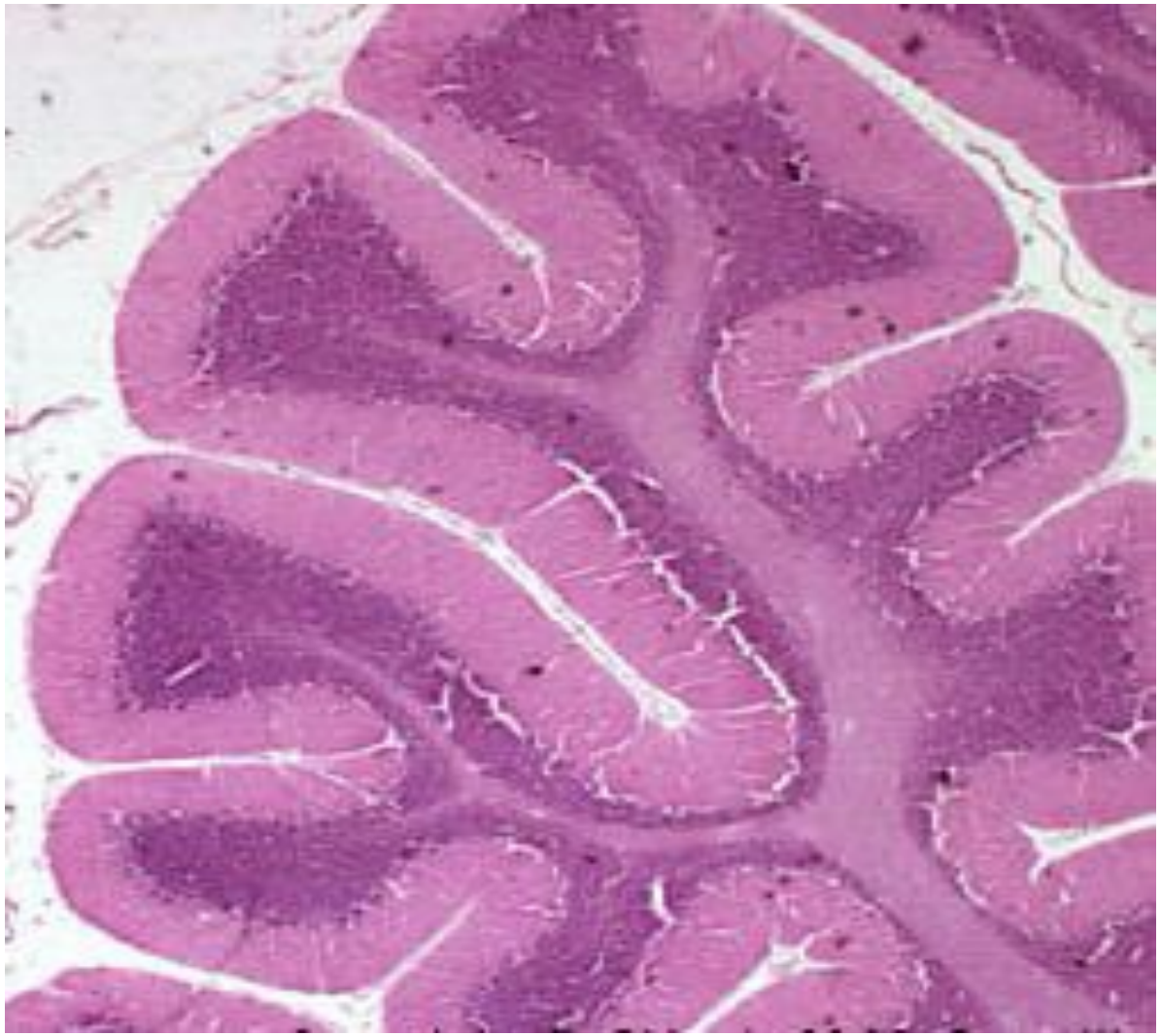
- The cerebrum is comprised of two different types of tissue – grey matter and white matter:
- **Grey matter** forms the surface of each cerebral hemisphere (known as the cerebral cortex), and is associated with processing and cognition
- **White matter** forms the bulk of the deeper parts of the brain and consists of glial cells and myelinated axons that connect the various grey matter areas

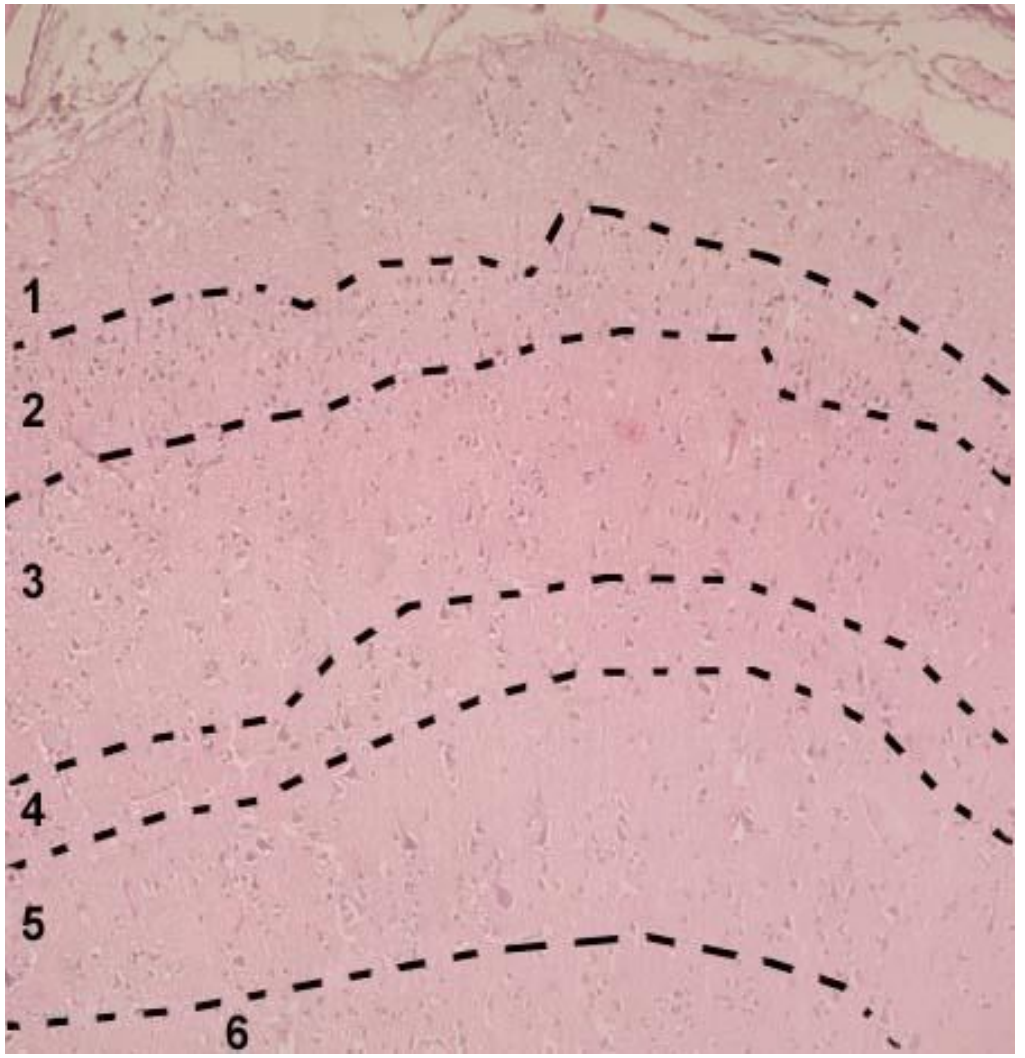
Layers of the Cerebral Cortex

- Grey matter of the cerebrum is called the neocortex
- The neocortex has six (6) layers
- From outside to inside:

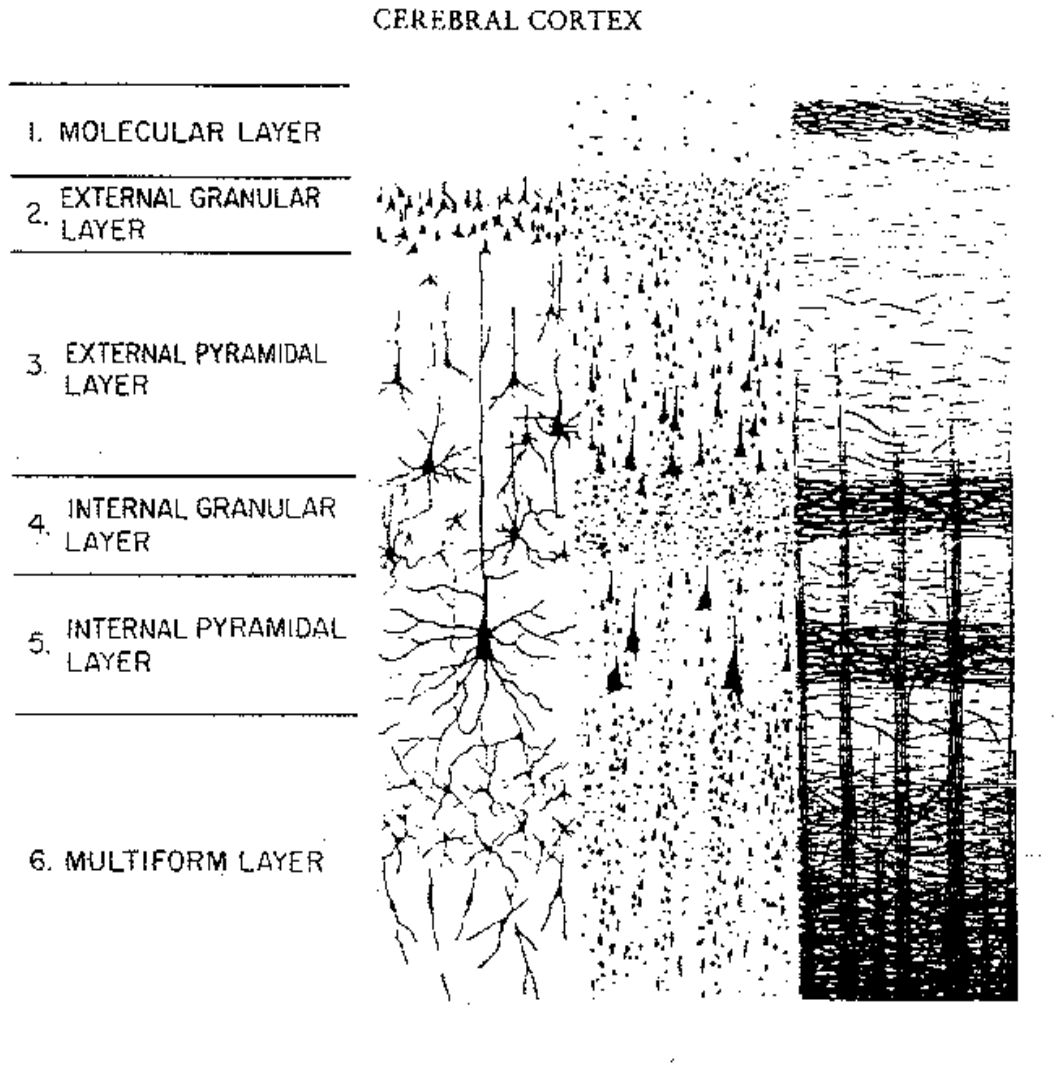
- **Layer I: Molecular layer**
- **Layer II: Outer granular layer**
- **Layer III: Outer pyramidal layer**
- **Layer IV: Inner granular layer**
- **Layer V: Inner pyramidal layer**
- **Layer VI: Pleomorphic/polymorphic/multiform/fusiform layer**

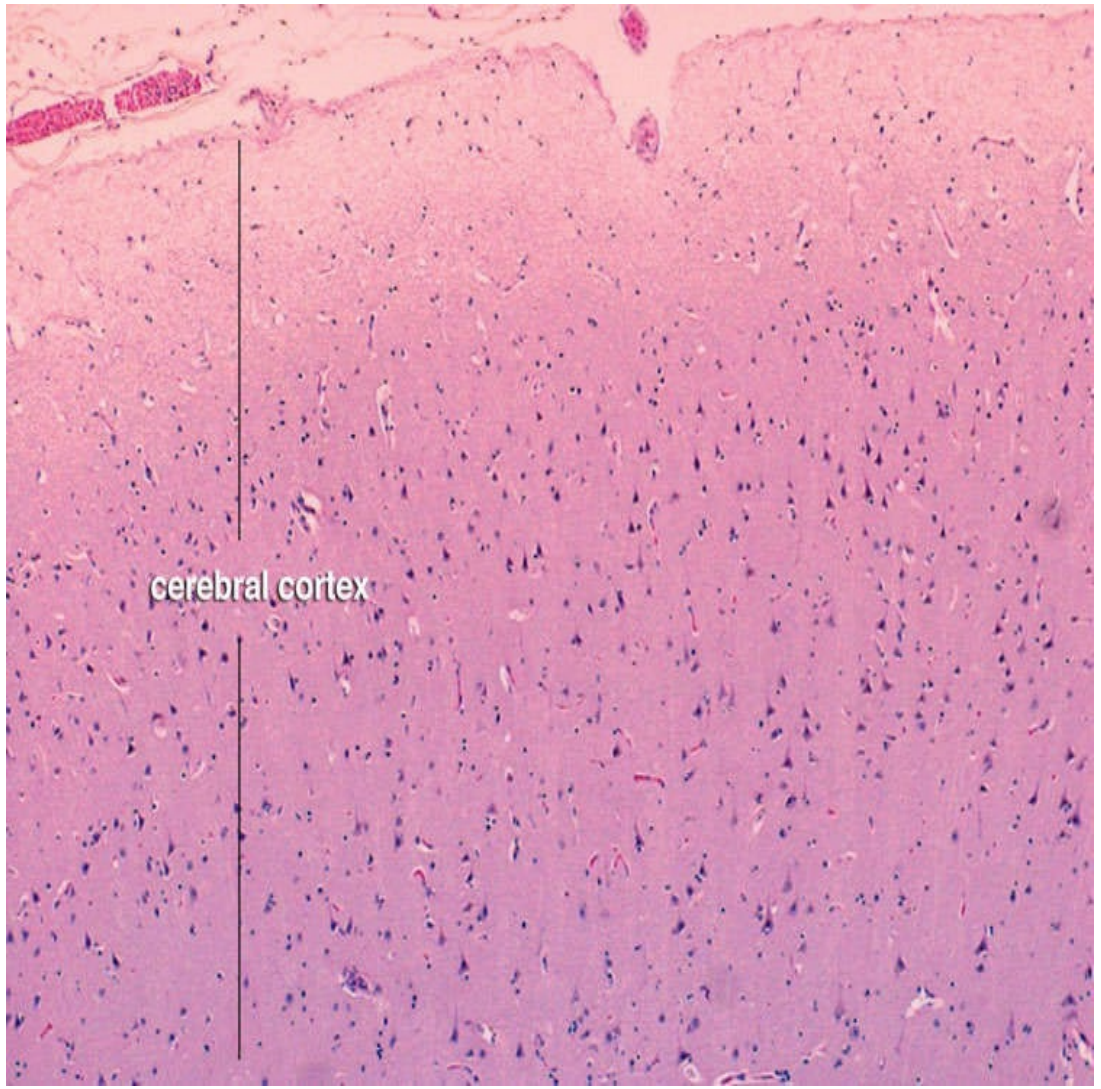
Layers of the Cerebral Cortex





Layers of the Cerebral Cortex

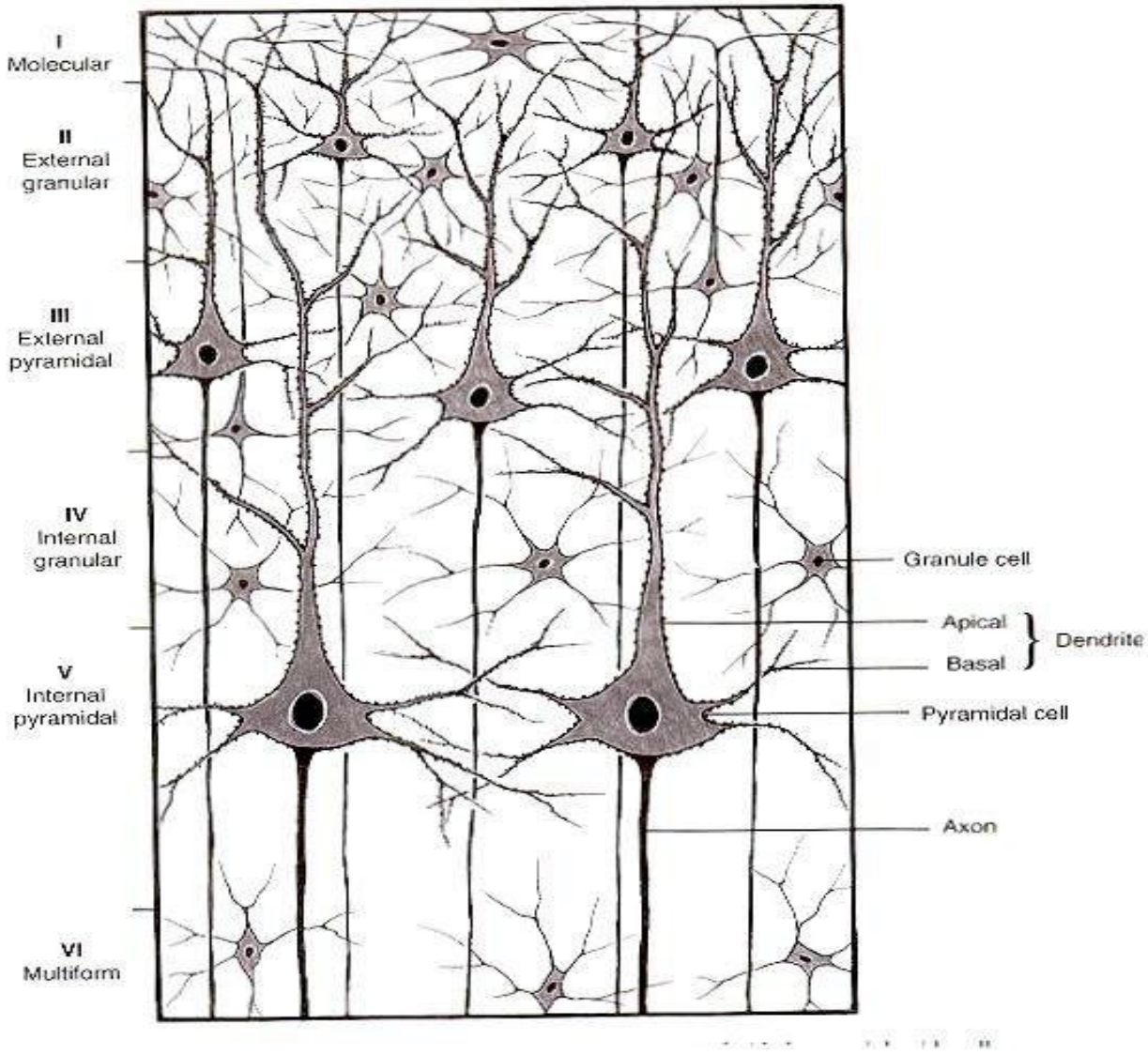




Layers of the Cerebral Cortex

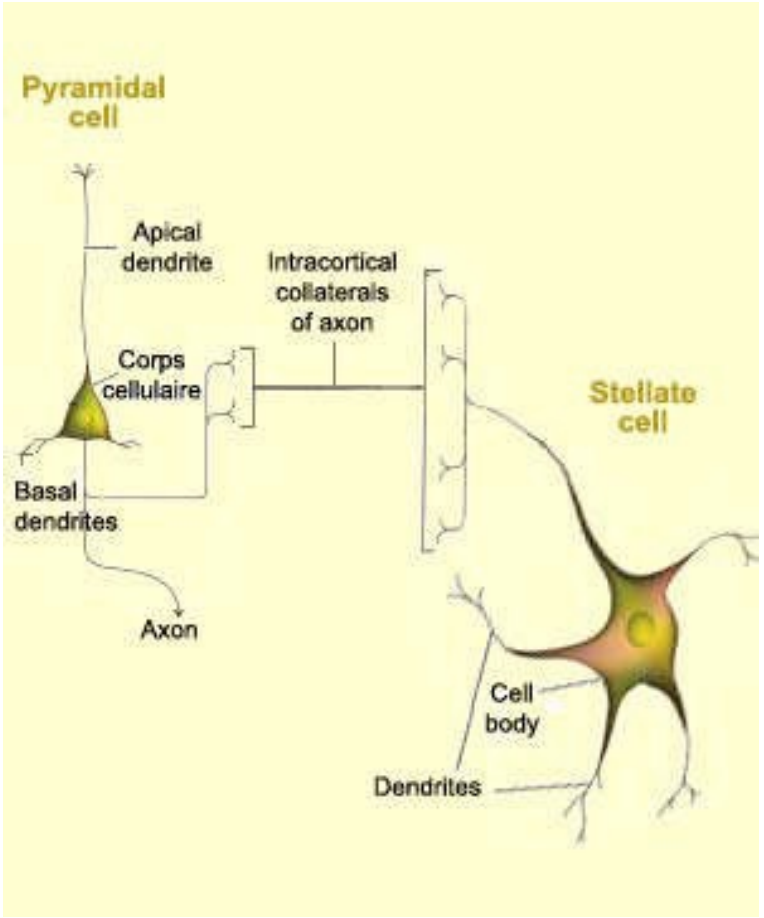
- Pyramidal cells predominate in layers III and V

- Granule cells in layers II and IV

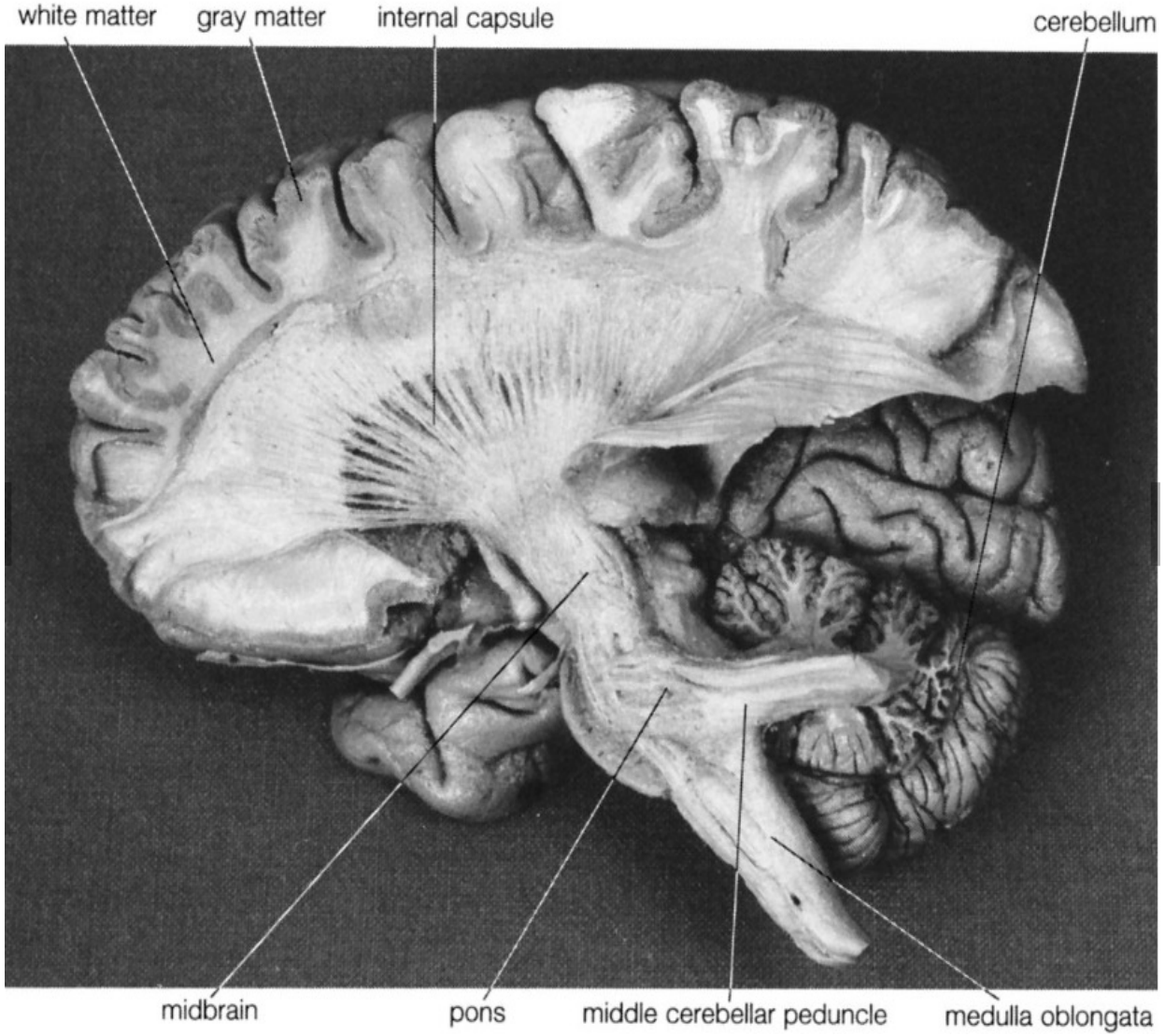


Pyramidal cells

- Pyramidal cells have large apical dendrite and basal dendrites
- Axon projects downward into subcortical white matter; may have collaterals
- Pyramidal cell is the primary output neuron



Internal Structure of Cerebrum



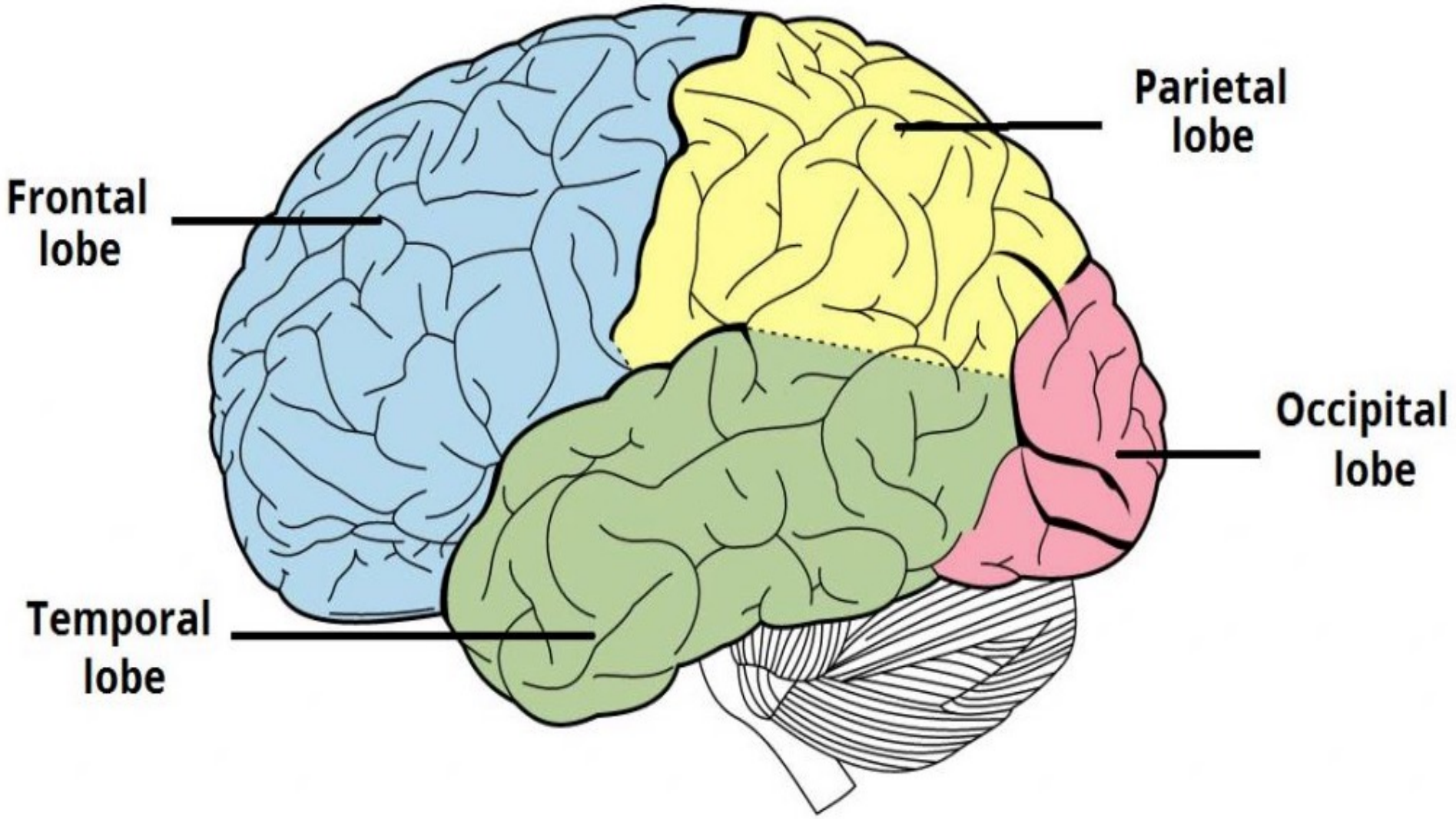
Lobes of Cerebrum

- The cerebral cortex is classified into four lobes, according to the name of the corresponding cranial bone that approximately overlies each part
- These are:

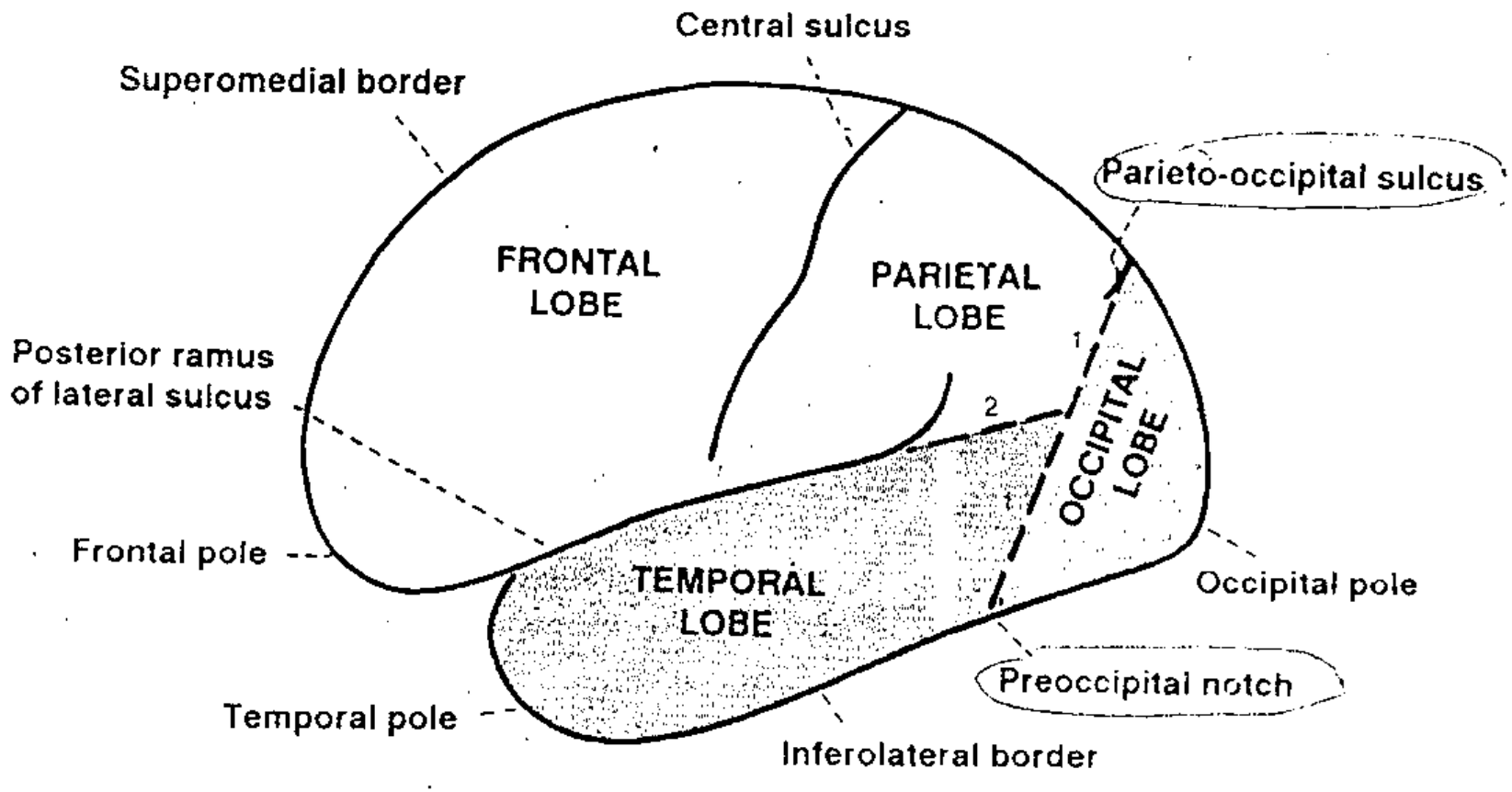
1. **Frontal lobe**
2. **Parietal lobe**
3. **Temporal lobe**
4. **Occipital lobe**

- Each lobe contains various **cortical association areas** – where information from different modalities are collated for processing
- Together, these areas function to give us a meaningful perceptual interpretation and experience of our surrounding environment

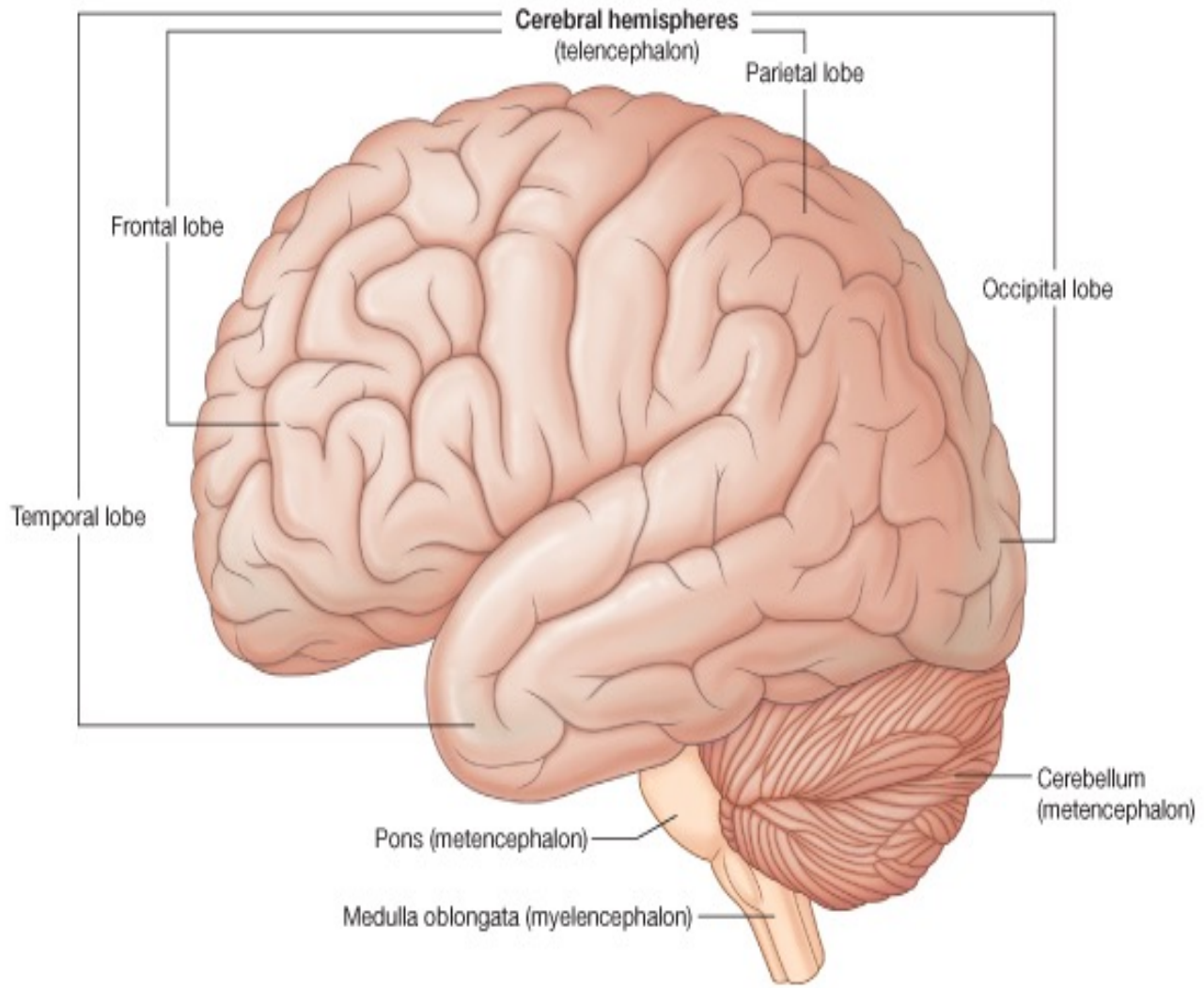
Lobes of the Cerebrum



Lobes of the Cerebrum



Brain



Front lobe

- The frontal lobe is located beneath the frontal bone of the calvaria and is the most anterior region of the cerebrum

- It is separated from the parietal lobe posteriorly by the **central sulcus** and from the temporal lobe inferoposteriorly by the **lateral sulcus**.

- The association areas of the frontal lobe are responsible for: higher intellect, personality, mood, social conduct and language (dominant hemisphere side only)

Simplified Presentation of Sulci and Gyri

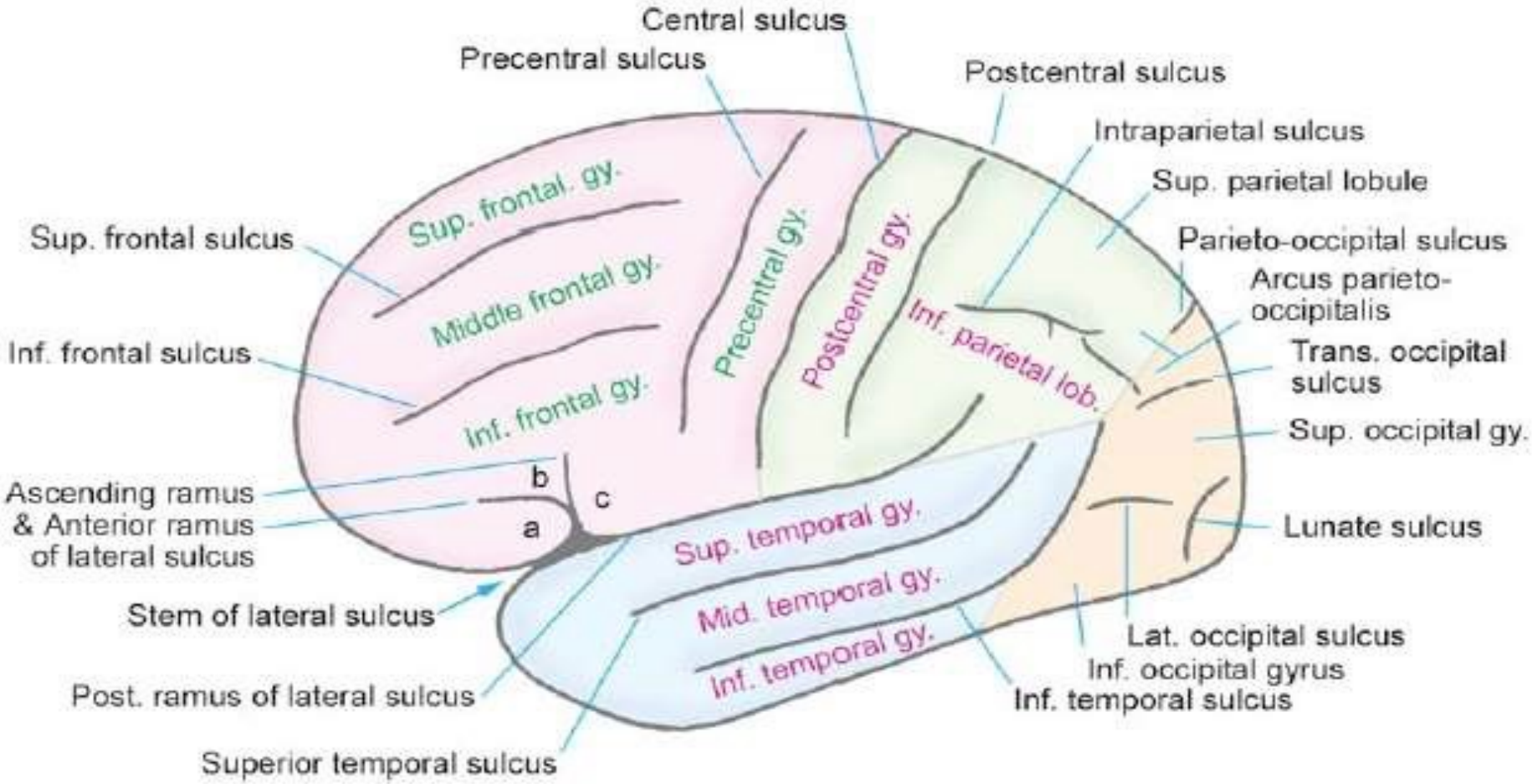


Fig. 8.4. Simplified presentation of sulci and gyri on the superolateral surface of the cerebral hemisphere. (a = pars orbitalis; b = pars triangularis; c = pars opercularis).

Parietal lobe

- The parietal lobe is found below the parietal bone of the calvaria, between the frontal lobe anteriorly and the occipital lobe posteriorly, from which it is separated by the central sulcus and **parieto-occipital sulcus**, respectively
- It sits superiorly in relation to the temporal lobe, being separated by the lateral sulcus
- Its cortical association areas contribute to the control of: language and calculation on the dominant hemisphere side, and **visuospatial functions** (e.g. 2-point discrimination) on the non-dominant hemisphere side

PARIETAL LOBE

SULCI

- Postcentral
- Intraparietal

GYRI

- Postcentral
- Superior parietal lobule
- Inferior parietal lobule – which is divided into 3 parts
  - i). The anterior --- supramarginal
  - ii). The middle --- angular
  - iii). The posterior --- over the upturned end of inferior temporal

Temporal lobe

- The temporal lobe sits beneath the temporal bone of the calvaria, inferior to the frontal and parietal lobes, from which it is separated by the **lateral sulcus**

- The cortical association areas of the temporal lobe are accountable for memory and language – this includes hearing as it is the location of the **primary auditory cortex**

TEMPORAL LOBE

Sulci:

- Superior temporal sulcus (parallel sulcus).
- Inferior temporal sulcus.

Gyri:

- Superior temporal gyrus.
- Middle temporal gyrus.
- Inferior temporal gyrus.

Occipital lobe

- The occipital lobe is the most posterior part of the cerebrum situated below the occipital bone of the calvaria
- Its inferior aspect rests upon the **tentorium cerebelli**, which segregates the cerebrum from the cerebellum
- The **parieto-occipital sulcus** separates the occipital lobe from the parietal and temporal lobes anteriorly.
- The primary visual cortex (V1) is located within the occipital lobe and hence its cortical association area is responsible for vision

OCCIPITAL LOBE

SULCI

- A) Transverse occipital occipitalis
- B) Lateral occipital
- C). Lunate
- D). Superior and Inferior polar
- E). Calcarine

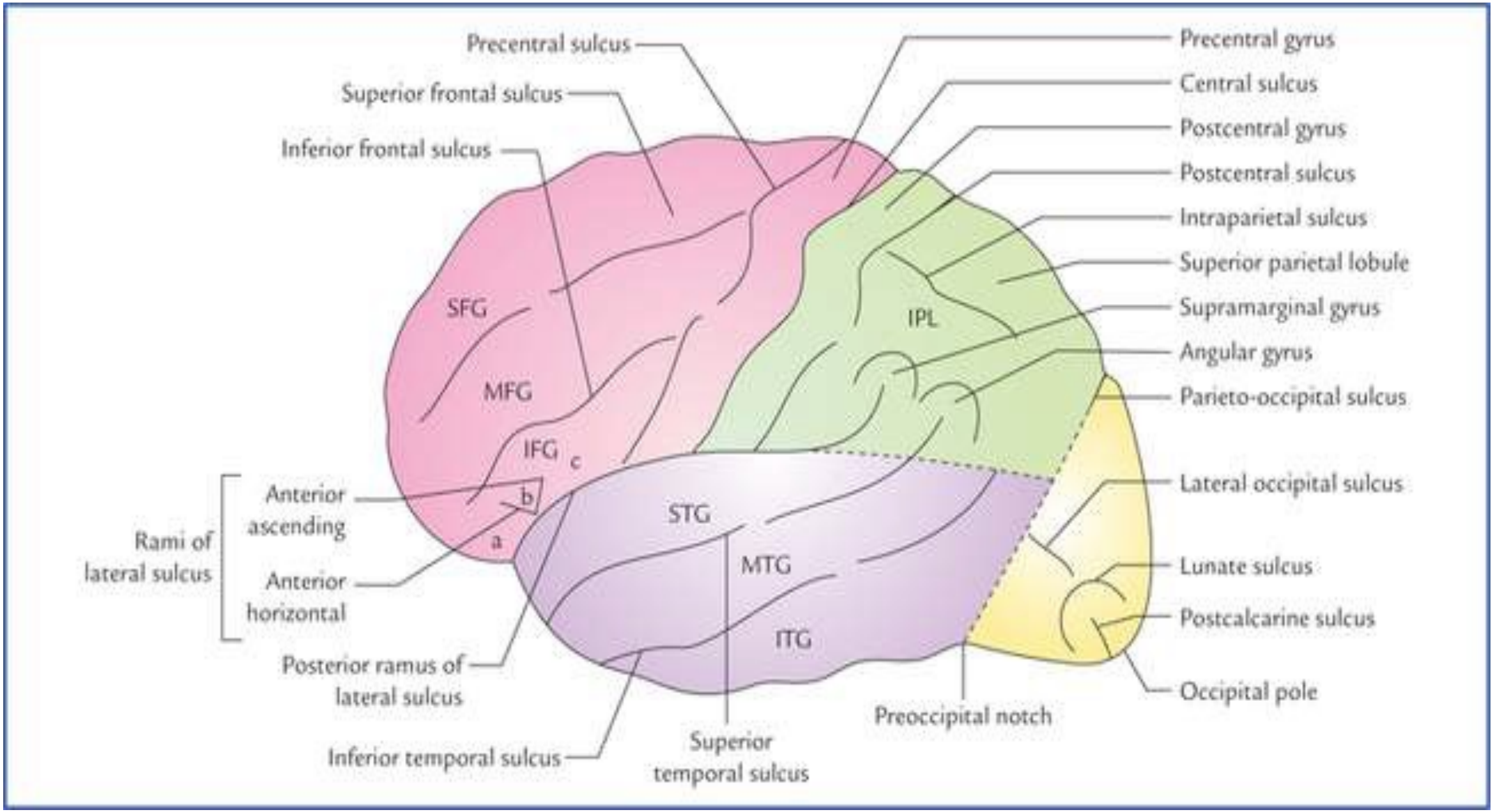
GYRI

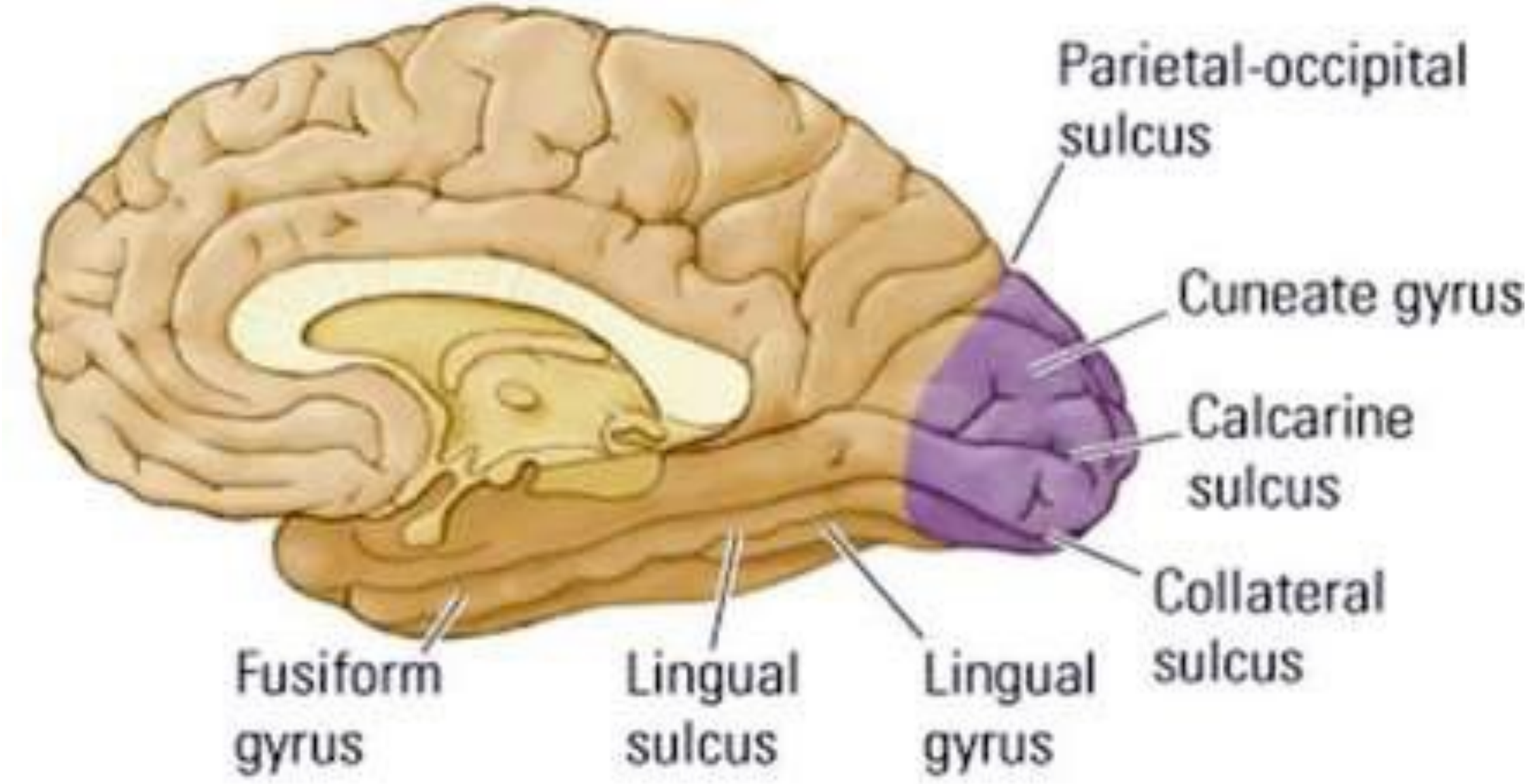
a). Arcus parieto - occipitalis

b). Superior occipital

c). Inferior occipital

d). Gyrus desendence


Precentral sulcus
Superior frontal sulcus
Inferior frontal sulcus
SFG
MFG
IFG
c
b
a
Anterior ascending
Anterior horizontal
Rami of lateral sulcus
Posterior ramus of lateral sulcus
Inferior temporal sulcus
STG
MTG
ITG
Superior temporal sulcus
IPL
Preoccipital notch
Precentral gyrus
Central sulcus
Postcentral gyrus
Postcentral sulcus
Intraparietal sulcus
Superior parietal lobule
Supramarginal gyrus
Angular gyrus
Parieto-occipital sulcus
Lateral occipital sulcus
Lunate sulcus
Postcalcarine sulcus
Occipital pole


Parietal-occipital sulcus
Cuneate gyrus
Calcarine sulcus
Collateral sulcus
Fusiform gyrus
Lingual sulcus
Lingual gyrus

Insula lobe

- Also called island of **Reil**
- Present within the lateral sulcus of Silvius between temporal and frontal lobes
- The overlying cortical areas are called opercula formed from the parts of frontal, temporal and parietal lobe
- Functions linked to emotion and body's homeostasis
- These functions include compassion, empathy, taste, perception, motor control, self-awareness, cognitive functioning and interpersonal experience
- In relation to these, it is involved in psychopathology
- The lobe is divided into two parts:

- Larger anterior insula which is subdivided into there short gyri
- Smaller posterior insula

INSULAR LOBE

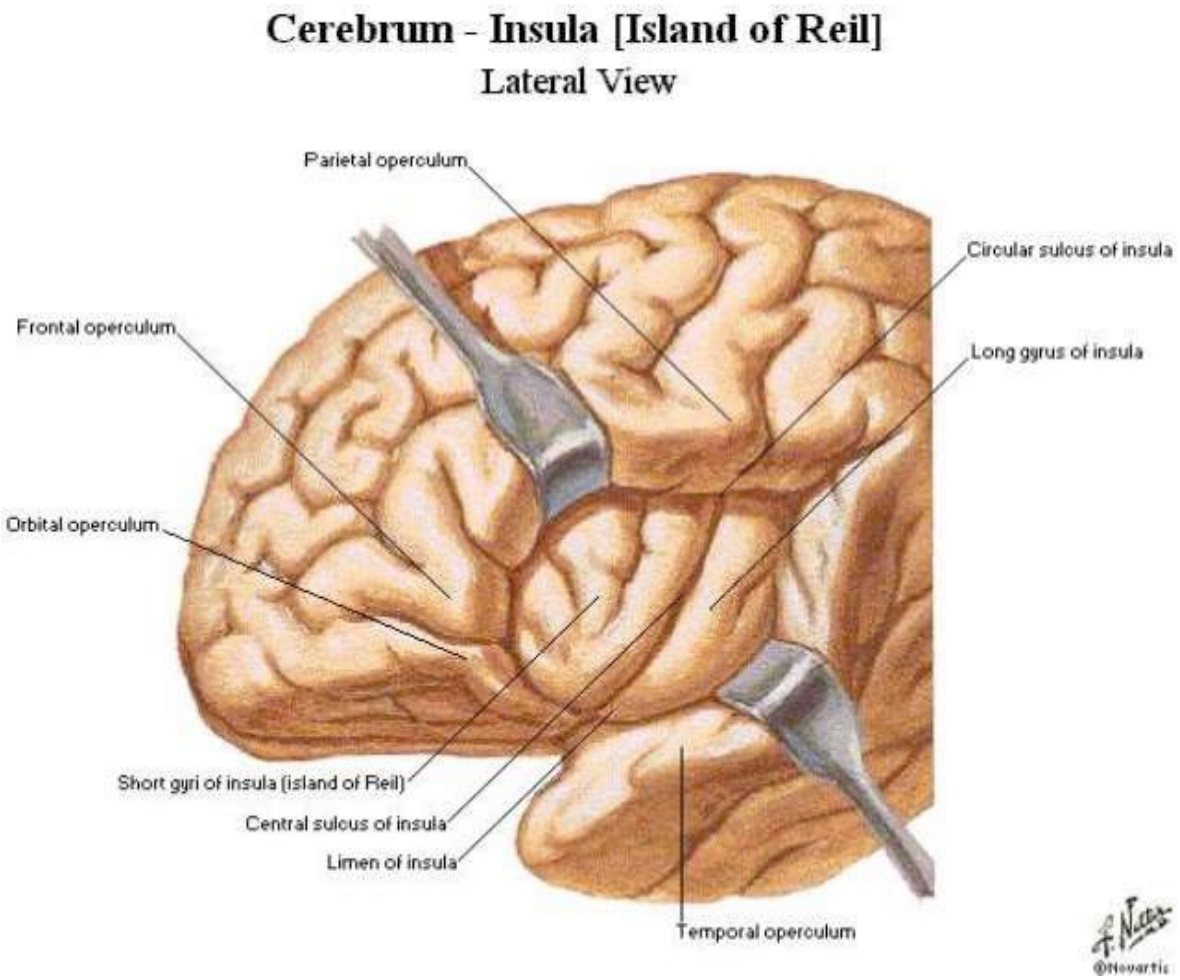
Anterior insular lobule (short insular gyri):

- Anterior short insular gyrus.
- Middle short insular gyrus.
- Posterior short insular gyrus.

Posterior insular lobule (long insular gyri):

- Anterior long insular gyrus.
- Posterior long insular gyrus.

Insula lobe


Cerebrum - Insula [Island of Reil]
Lateral View
Parietal operculum
Circular sulcus of insula
Frontal operculum
Long gyrus of insula
Orbital operculum
Short gyri of insula (island of Reil)
Central sulcus of insula
Limen of insula
Temporal operculum
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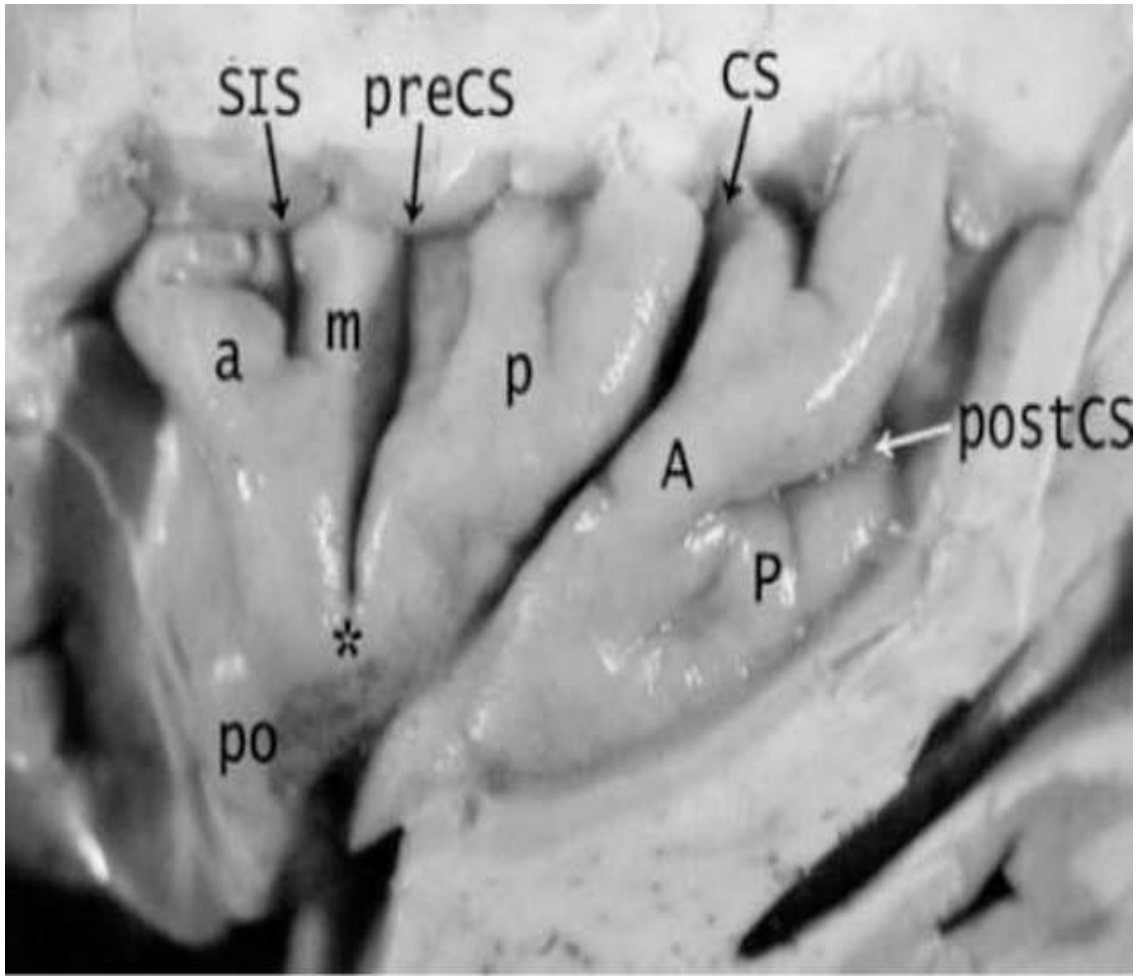
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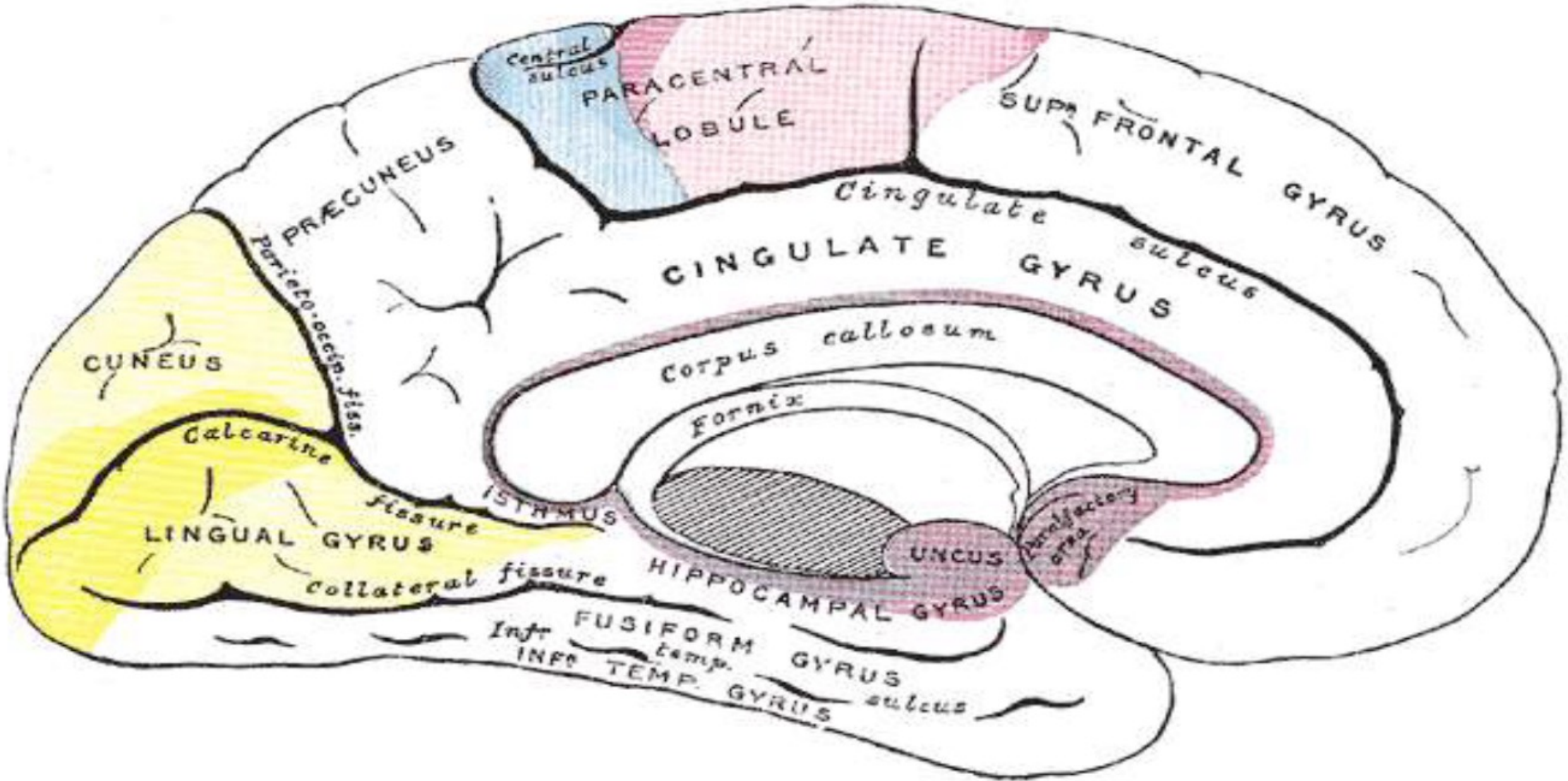
2).SULCI AND GYRI OF MEDIAL SURFACE



MEDIAL SURFACE

- SULCI
- A. Anterior paraolfactory
- B. Posterior paraolfactory area)
- C. Cingulate
- D. Callosal
- E. Suprasplenial or supraparieta
- F. Parieto-occipital
- G. Calcarine

GYRI

a. Paraterminal

b.Paraolfactory(subcallosal

c. Medial frontal

d. Paracentral lobule

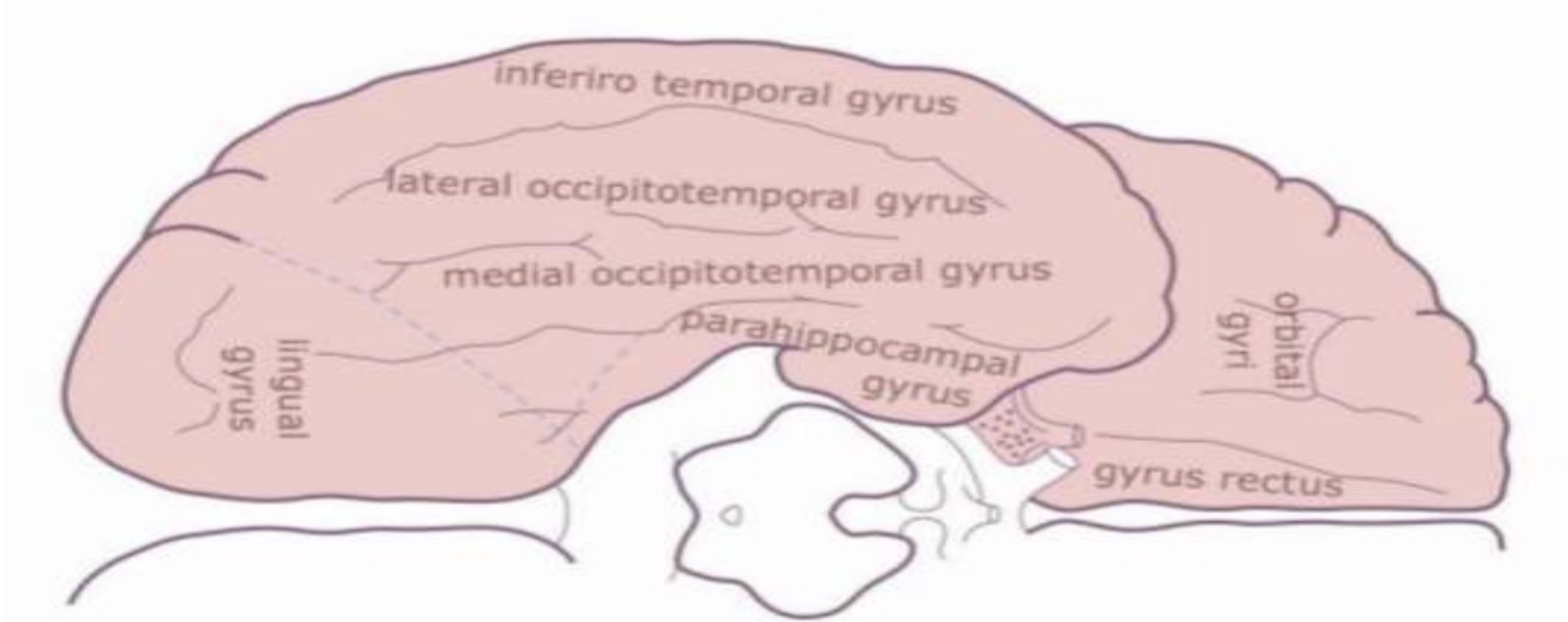
e. Cingulate

f. Cuneus

g. Precuneus

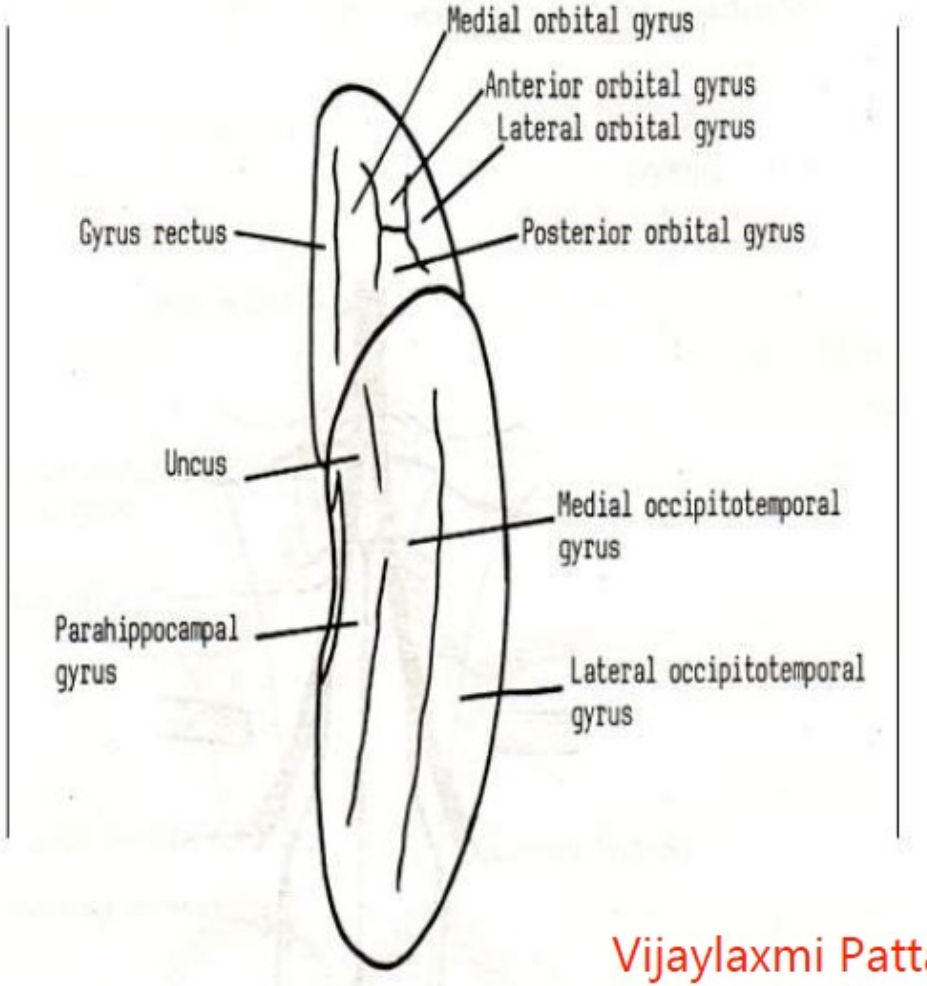
3.GYRUS OF

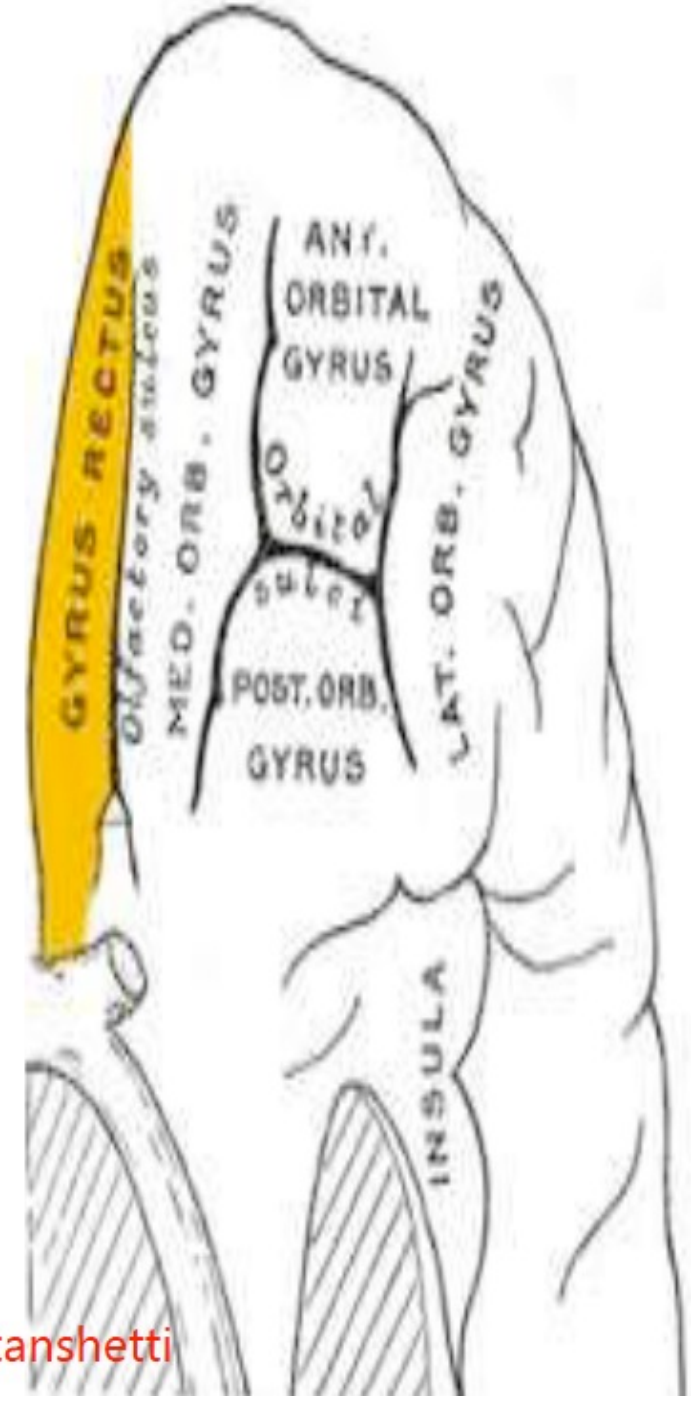
BASAL SURFACE OF BRAIN



- **Gyrus rectus**:
- Medial to the olfactory sulcus.
- **Orbital gyri;**
- Anterior, posterior, medial and lateral, orbital gyri.
- **Lateral occipitotemporal gyrus**: Lateral to occipitotemporal sulcus.
- **Medial occipitotemporal gyrus**: Medial to occipitotemporal sulcus.
- **Parahippocampal gyrus:**
- Medial to collateral sulcus.
- **Lingual gyrus**:
- Between collateral & calcarine sulci.
- **Uncus:** Anterior end of the Parahippocampal gyrus
- It is the smell center.

GYRI
ON THE INFERIOR SURFACE





Sulci and gyri of inferior surface

- Olfactory bulb 嗅球
- Olfactory tract 嗅束
- Olfactory trigone 嗅三角
- Anterior perforated substance 前穿质
- Collateral sulcus 侧副沟
- Occipitotemporal sulcus 枕颞沟
- Medial occipitotemporal gyrus 枕颞内侧回
- Lateral occipitotemporal gyrus 枕颞外侧回
- Hippocampal sulcus 海马沟
- Parahippocampal gyrus 海马旁回
- Uncus 钩
- Hippocampus 海马
- Dentate gyrus 齿状回

} Hippocampal formation 海马结构

Korbinian Brodmann Areas

- Originally defined and numbered into 52 regions by the German anatomist Korbinian Brodmann in the early 1900's
- Brodmann areas of the cerebral cortex are defined by its cytoarchitecture (histological structure and cellular organization)
- It is important to remember that the same Brodmann area numbers in humans and primates often do not translate to other species
- In addition, these Brodmann areas have been widely redefined, discussed, debated, and refined exhaustively based on cytoarchitecture, cortical functions, and brain plasticity

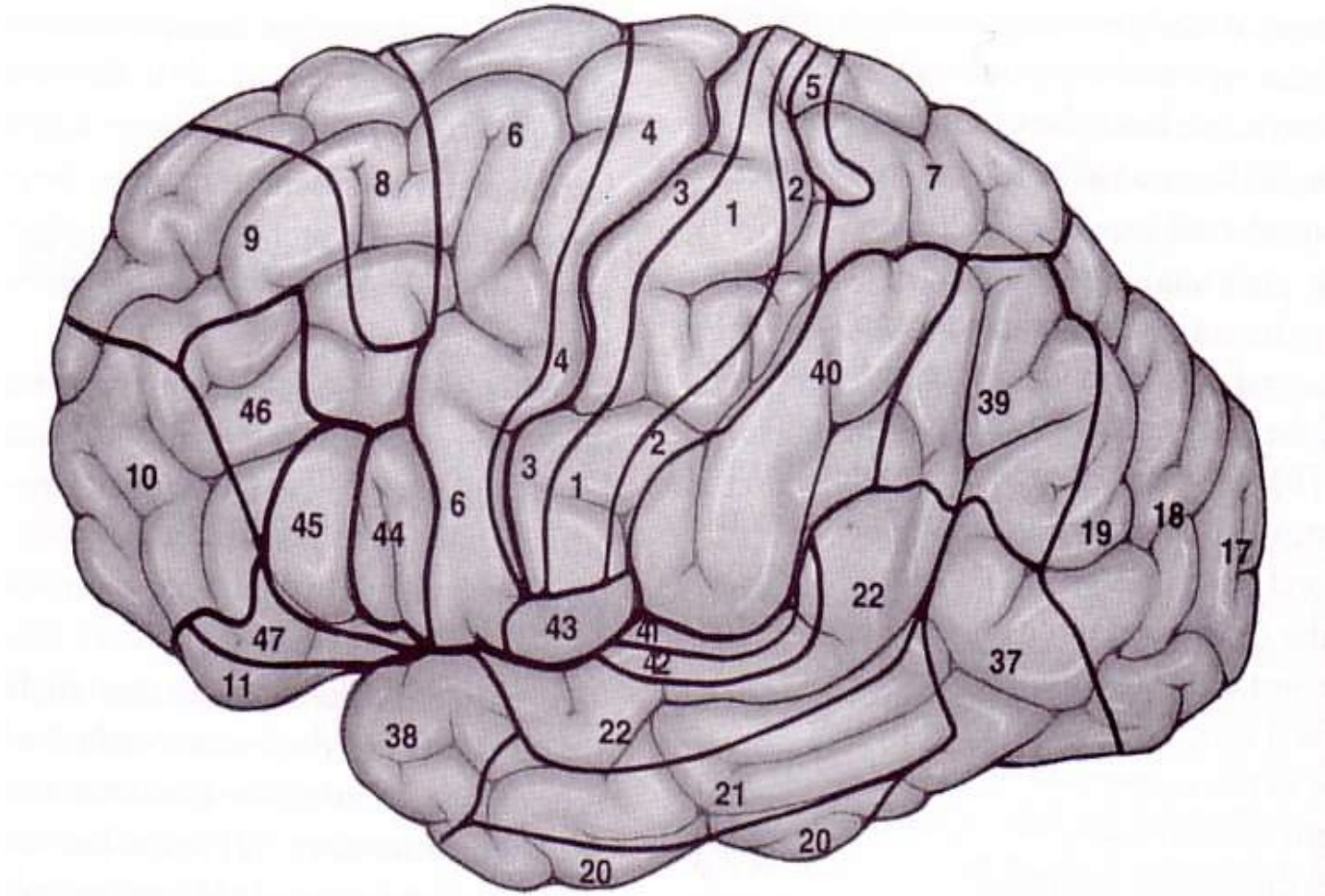
Korbinian Brodmann Areas

- The Brodmann areas were initially based on the cytoarchitectural organization of neurons in the cerebral cortex

- Specifically, it was observed that they were organized in distinct groups once the cells were stained using the Nissl method (which consists of basic dyes, notably staining the rough endoplasmic reticulum—also known as Nissl substance—dark blue)

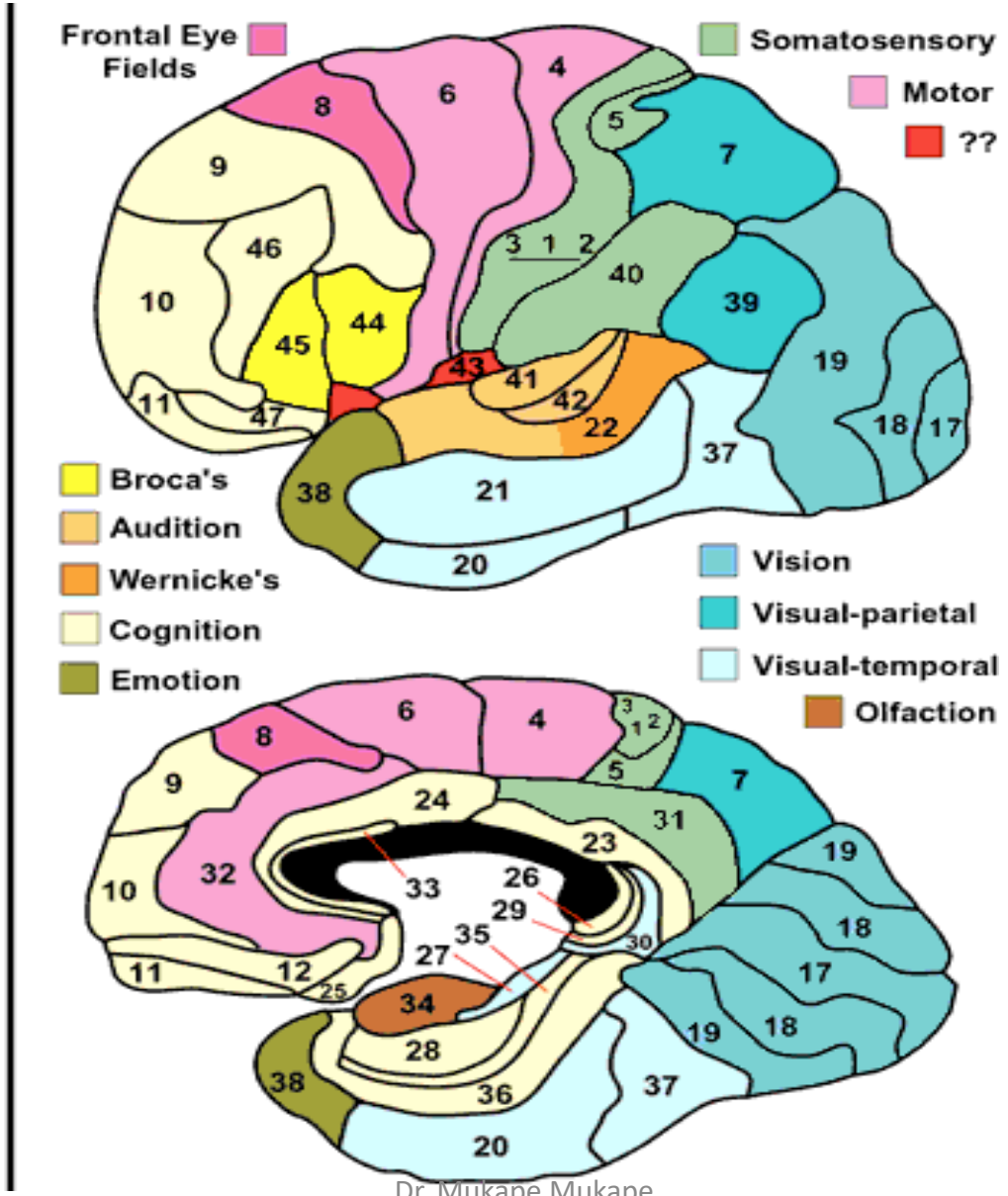
- Many of these areas of distinct neuronal organization have since been correlated to various cortical functions

Korbinian Brodmann areas



B. Brodmann areas

Korbinian Brodmann's areas



Important Brodmann Areas

Cerebral cortex and Brodmann areas
Frontal lobe Primary motor cortex (Area 4), premotor cortex and supplementary motor cortex (Area 6), frontal eye field (Area 8), prefrontal cortex (Areas 9, 10)
Parietal lobe Primary somatosensory cortex (Areas 1, 2, 3), somatosensory association cortex (Areas 5, 7), angular and supramarginal gyri (Areas 39, 40)
Temporal lobe Primary auditory cortex (Areas 41, 42), secondary auditory cortex (Area 22)
Occipital lobe Primary visual cortex (Area 17), secondary visual cortex (Area 18), associative visual cortex (Area 19)
Special Brodmann areas **Wernicke's area** (22, 39, 40) - speech fluency **Broca's area** (44, 45) - motor speech

Korbinian Brodmann's areas

Key facts about Brodmann areas	Table quiz
Areas 1, 2, 3	Primary somatosensory cortex (postcentral gyrus)
Area 4	Primary motor cortex (precentral gyrus)
Area 5	Somatosensory association cortex
Area 6	Premotor and supplementary motor cortex
Area 9	Dorsolateral/anterior prefrontal cortex (motor planning, and organization)
Area 10	Anterior prefrontal cortex (memory retrieval)
Area 17	Primary visual cortex
Area 22	Primary auditory cortex
Area 37	Occipitotemporal (fusiform) gyrus
Areas 22, 39, 40	Wernicke's area (language comprehension)
Areas 44, 45	Broca's area (motor speech programming)

Korbinian Brodmann's areas

- **Areas 3, 1 & 2** – Primary Somatosensory Cortex (frequently referred to as Areas 3, 1, 2 by convention)
- **Area 4** – Primary Motor Cortex
- **Area 5** – Somatosensory Association Cortex
- **Area 6** – Premotor cortex and Supplementary Motor Cortex (Secondary Motor Cortex) (Supplementary motor area)
- **Area 7** – Somatosensory Association Cortex
- **Area 8** – Includes Frontal eye fields
- **Area 9** – Dorsolateral prefrontal cortex
- **Area 10** – Anterior prefrontal cortex (most rostral part of superior and middle frontal gyri)
- **Area 11** – Orbitofrontal area (orbital and rectus gyri, plus part of the rostral part of the superior frontal gyrus)
- **Area 12** – Orbitofrontal area (used to be part of BA11, refers to the area between the superior frontal gyrus and the inferior rostral sulcus)
- **Area 13 and Area 14*** – Insular cortex
- **Area 15*** – Anterior Temporal Lobe
- **Area 16** – Insular cortex

Korbinian Brodmann's areas

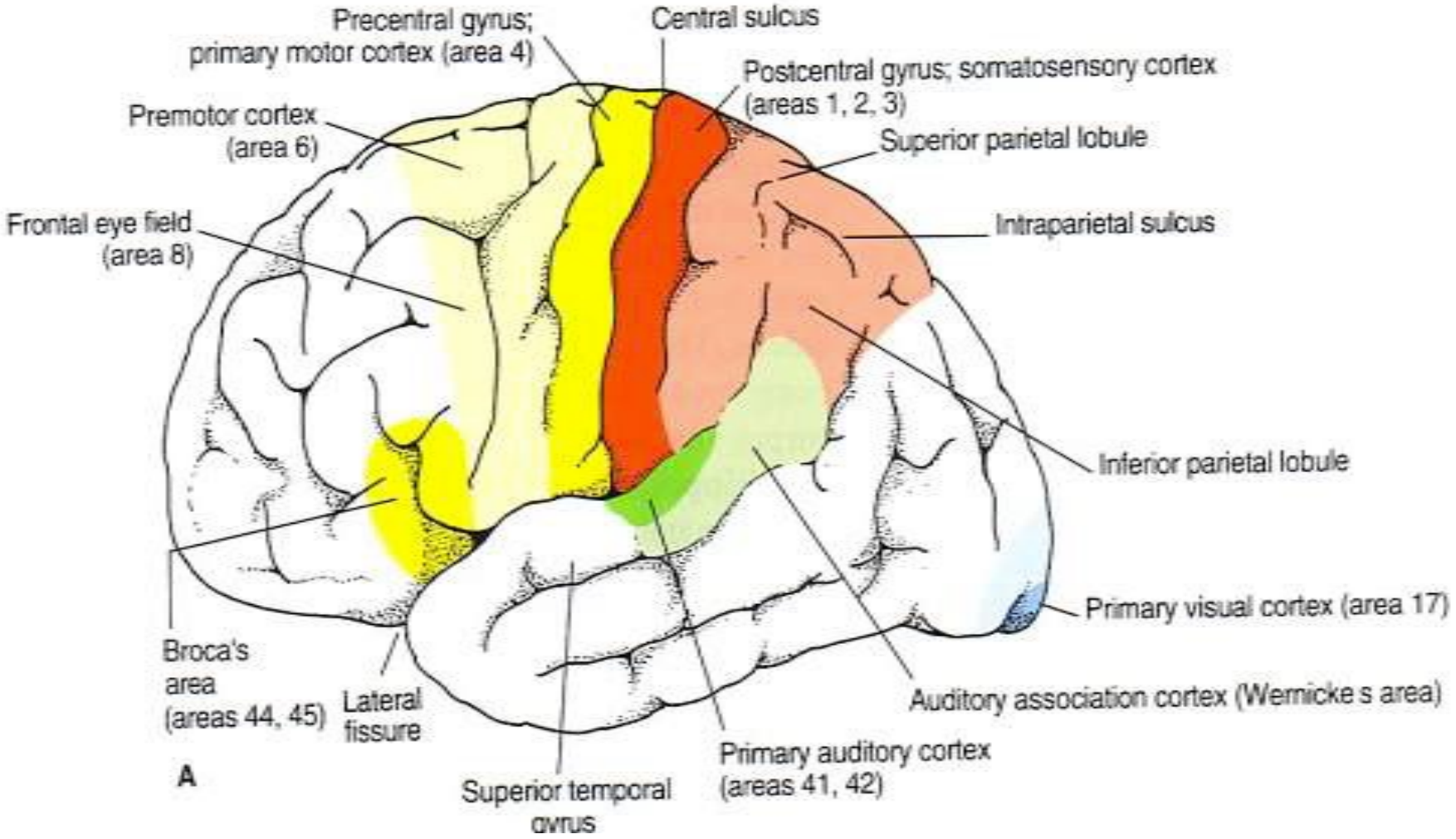
- **Area 16** – Insular cortex
- **Area 17** – Primary visual cortex (V1)
- **Area 18** – Secondary visual cortex (V2)
- **Area 19** – Associative visual cortex (V3,V4,V5)
- **Area 20** – Inferior temporal gyrus
- **Area 21** – Middle temporal gyrus
- **Area 22** – Superior temporal gyrus, of which the caudal part is usually considered to contain the Wernicke's area
- **Area 23** – Ventral posterior cingulate cortex
- **Area 24** – Ventral anterior cingulate cortex.
- **Area 25** – Subgenual area (part of the Ventromedial prefrontal cortex)[4]
- **Area 26** – Ectosplenial portion of the retrosplenial region of the cerebral cortex
- **Area 27** – Piriform cortex
- **Area 28** – Ventral entorhinal cortex
- **Area 29** – Retrosplenial cingulate cortex
- **Area 30** – Part of cingulate cortex
- **Area 31** – Dorsal Posterior cingulate cortex
- **Area 32** – Dorsal anterior cingulate cortex
- **Area 33** – Part of anterior cingulate cortex
- **Area 34** – Dorsal entorhinal cortex (on the Parahippocampal gyrus)

Korbinian Brodmann's areas

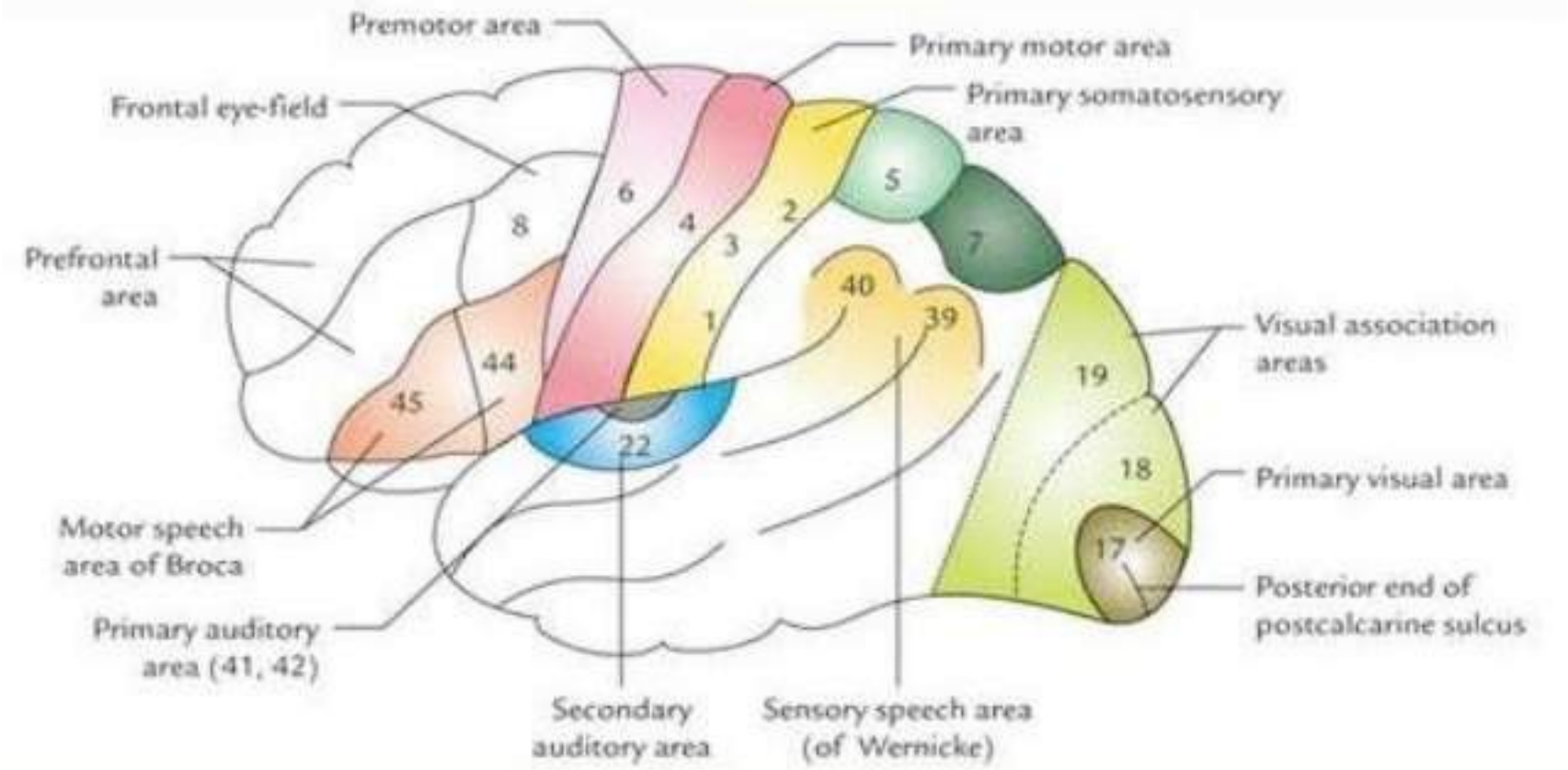
- **Area 34** – Dorsal entorhinal cortex (on the Parahippocampal gyrus)
- **Area 35** – Perirhinal cortex (in the rhinal sulcus)
- **Area 36** – Ectorhinal area, now part of the perirhinal cortex (in the rhinal sulcus)
- **Area 37** – Fusiform gyrus
- **Area 38** – Temporopolar area (most rostral part of the superior and middle temporal gyri)
- **Area 39** – Angular gyrus, considered by some to be part of Wernicke's area
- **Area 40** – Supramarginal gyrus considered by some to be part of Wernicke's area
- **Areas 41 and 42** – Auditory cortex
- **Area 43** – Primary gustatory cortex
- **Area 44** – Pars opercularis, part of the inferior frontal gyrus and part of Broca's area
- **Area 45** – Pars triangularis, part of the inferior frontal gyrus and part of Broca's area
- **Area 46** – Dorsolateral prefrontal cortex
- **Area 47** – Pars orbitalis, part of the inferior frontal gyrus
- **Area 48** – Retrosubicular area (a small part of the medial surface of the temporal lobe)
- **Area 49** – Parasubicular area in a rodent
- **Area 52** – Parainsular area (at the junction of the temporal lobe and the insula)

(*) Area only found in non-human primates.

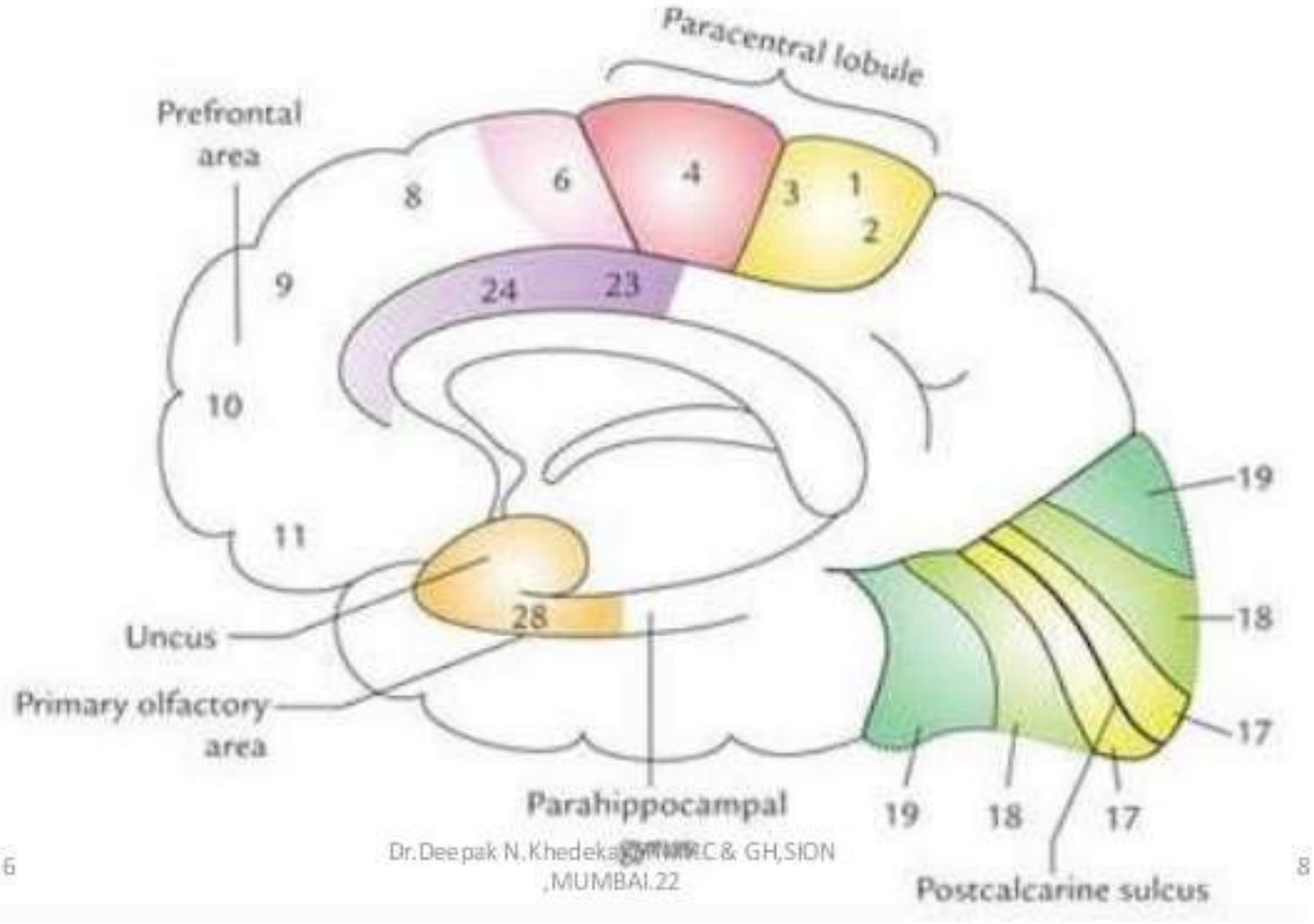
Cerebrum


Precentral gyrus;
primary motor cortex (area 4)
Central sulcus
Postcentral gyrus; somatosensory cortex
(areas 1, 2, 3)
Premotor cortex
(area 6)
Superior parietal lobule
Frontal eye field
(area 8)
Intraparietal sulcus
Inferior parietal lobule
Primary visual cortex (area 17)
Broca's
area
(areas 44, 45)
Lateral
fissure
Auditory association cortex (Wernicke s area)
Primary auditory cortex
(areas 41, 42)
Superior temporal
gyrus
A

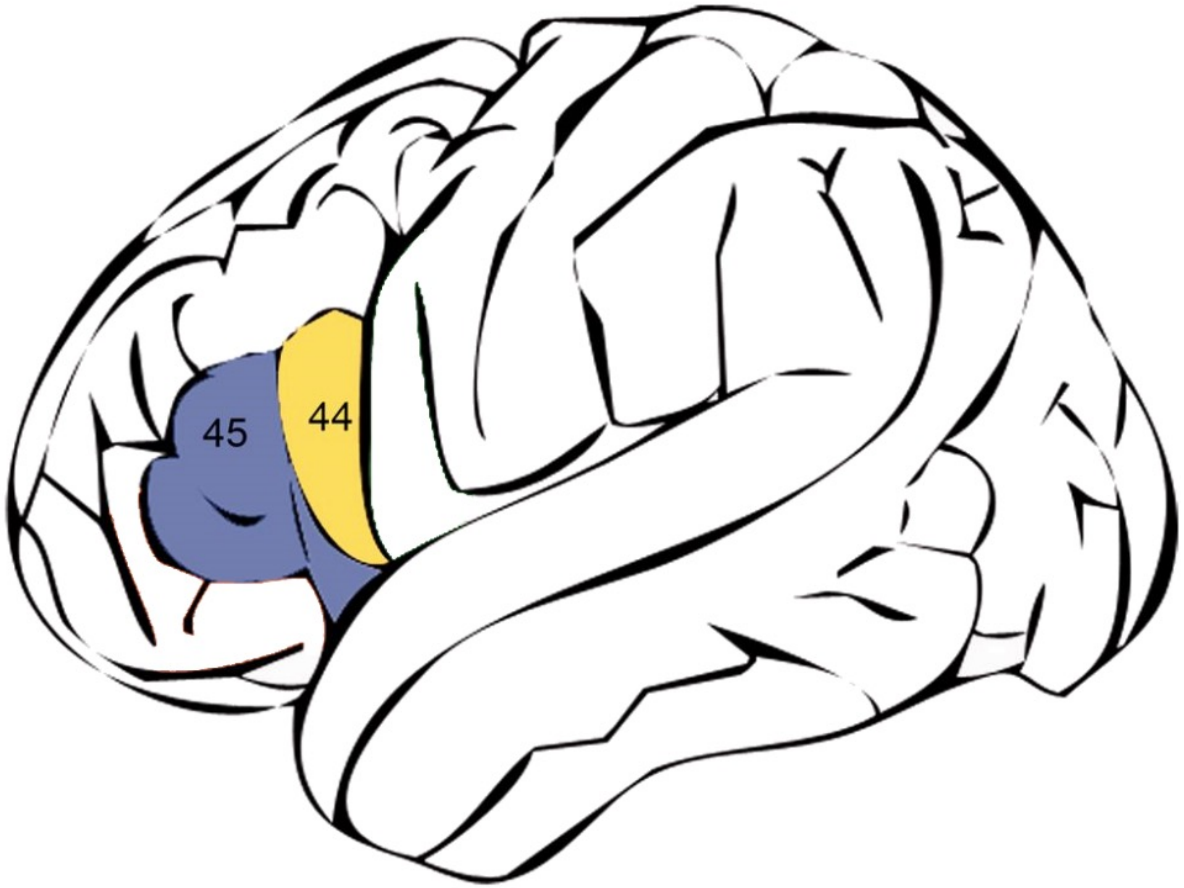
Brodmanns functional areas on supero-lateral surface



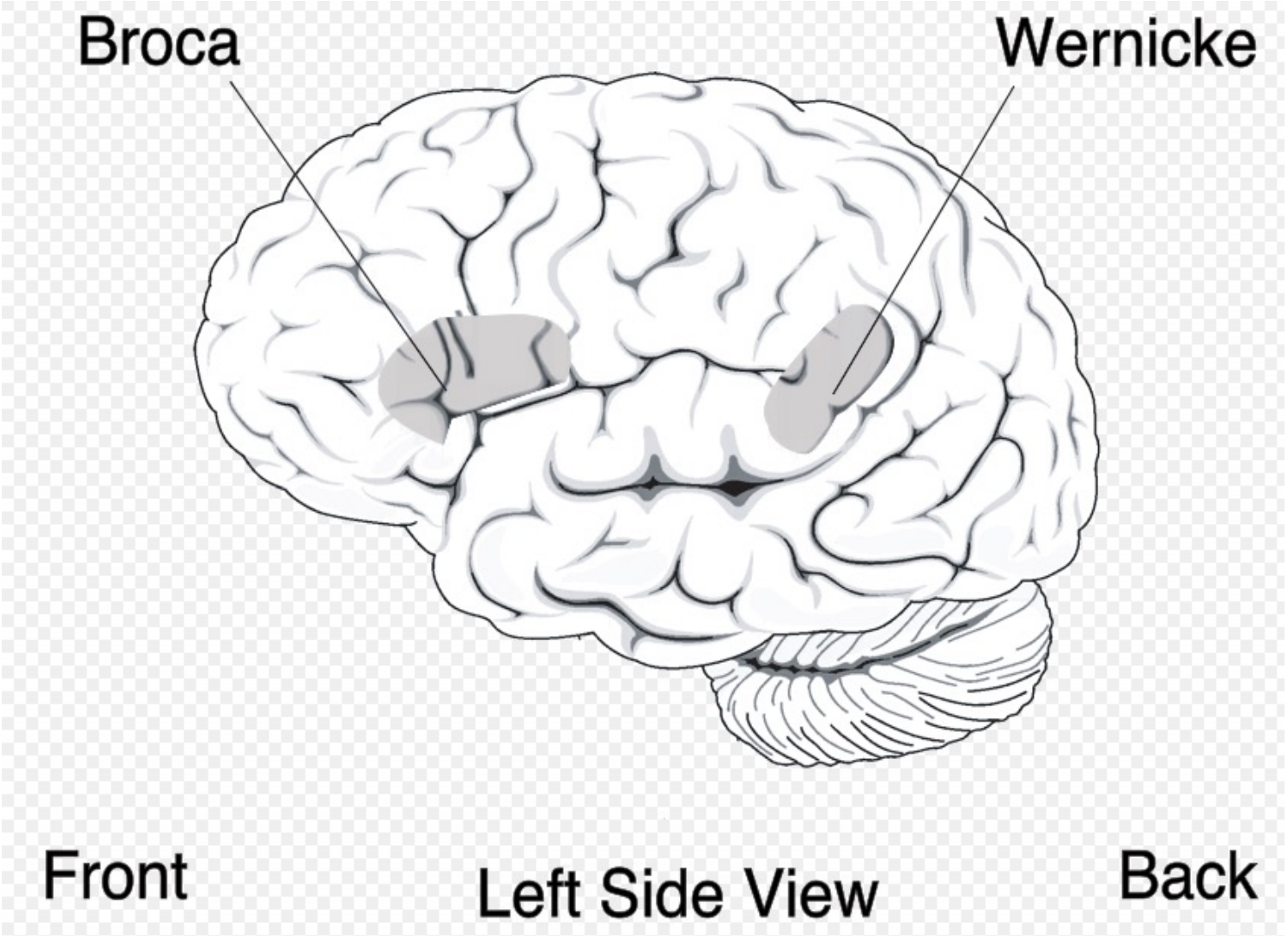
Brodmanns functional areas medial surface Brain



Broca’s area: pars opercularis (area 44) and pars triangularis (area 45) of inferior frontal gyrus



Wernicke's area (area 22, 39, 40)



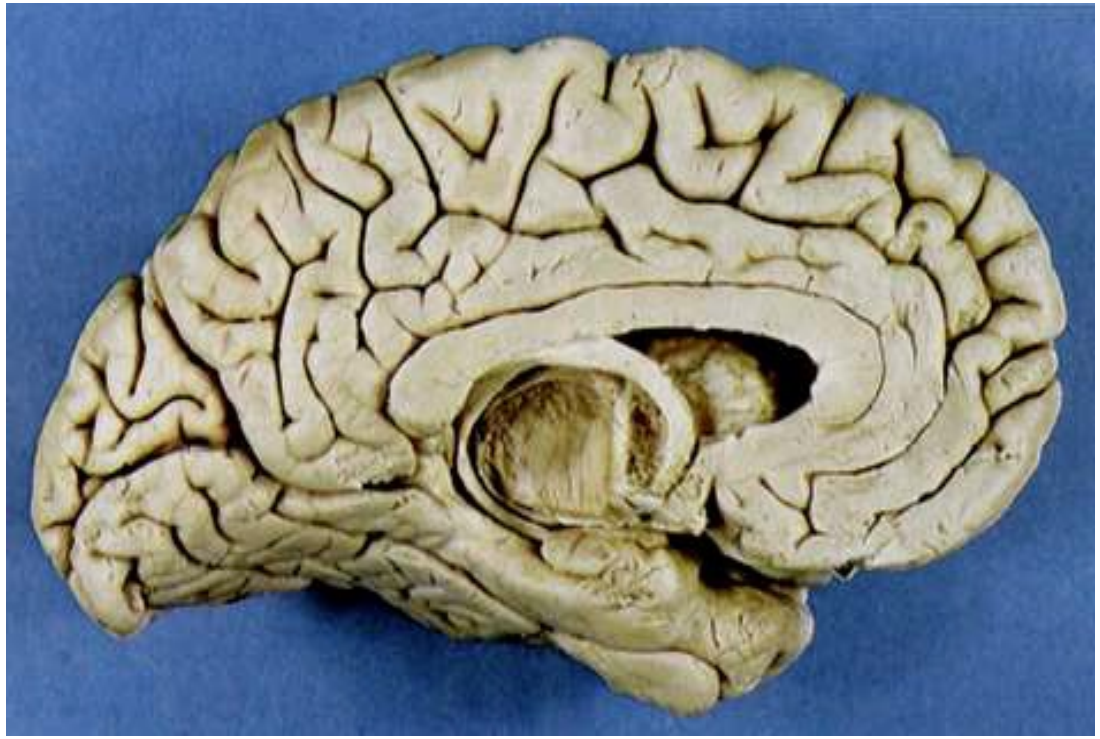
Corpus callosum

- Is only found in placental mammals
- Largest band of commissural fibres which connects wide areas of neocortex except lower and ant parts of temporal lobe
- Enables communication between the two cerebral hemispheres
- Well developed in man

- 300 million finely myelinated fibres
- 10 cm long

- Location :

- Anterior end : 4cm behind frontal pole
- Posterior end : 6cm in front of occipital pole

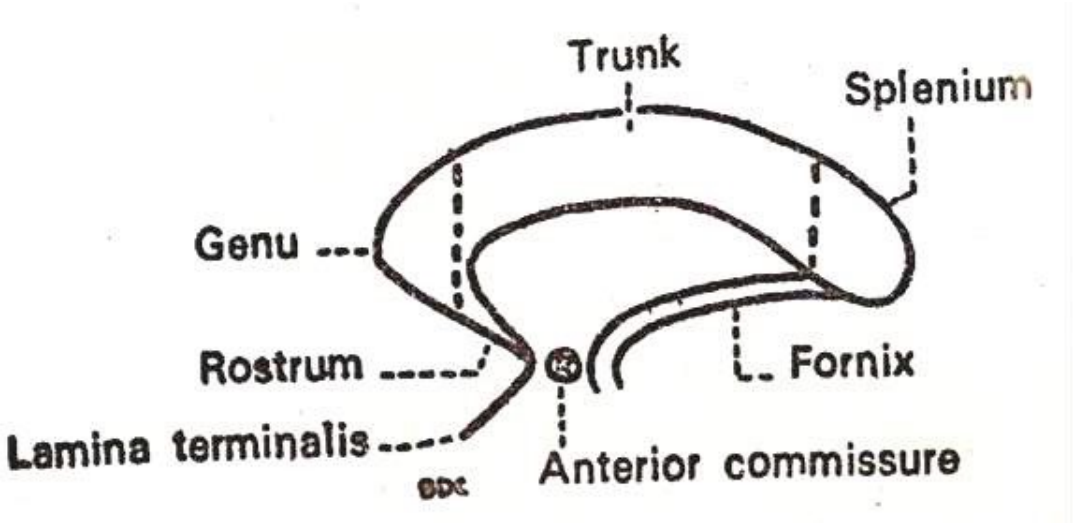


Corpus callosum

Parts:

1. **Rostrum**
2. **Genu**
3. **Body (trunk)**
4. **Splenium**

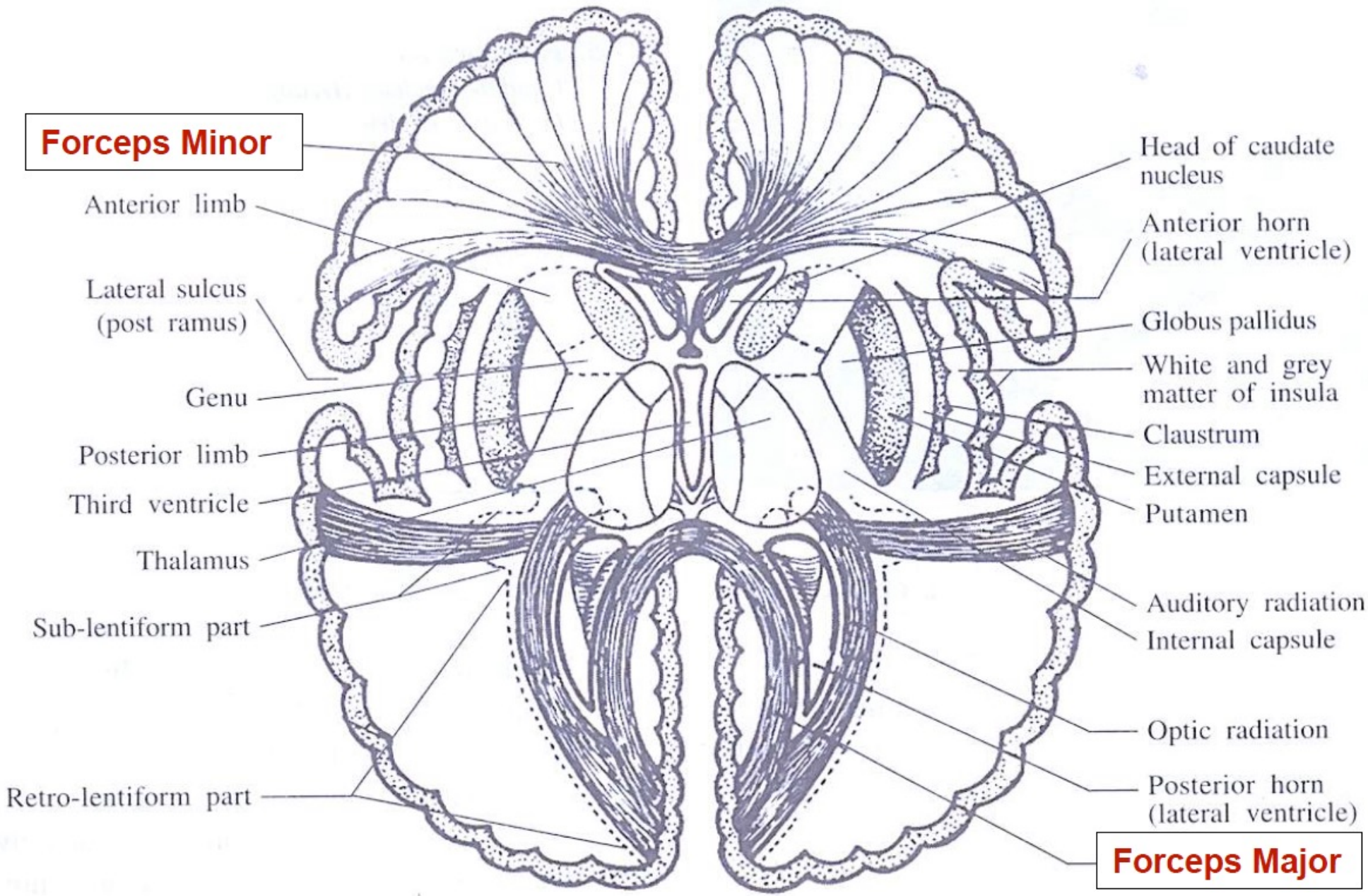
- Rostrum is continuous below with the lamina terminalis, named so because it resembles a bird's beak
- Isthmus is the narrow part between body and splenium
- Splenium is the thickest part, means bandage in Greek



Relations of corpus callosum

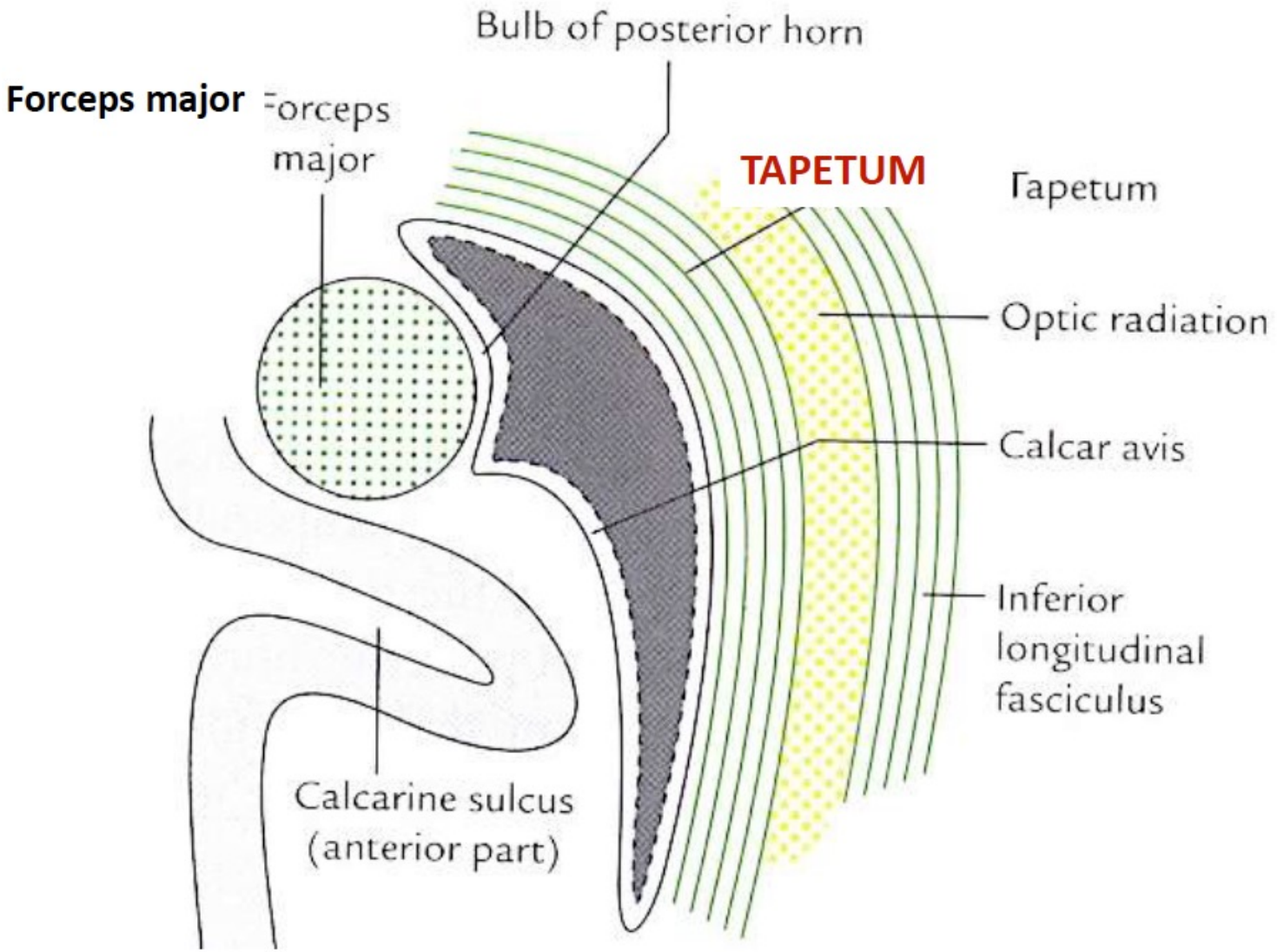
- On either side of fibers radiate in the white matter and pass to the various parts of the cerebral cortex
- Those curving forward from the genu into the frontal lobe constitute the **forceps minor (also forceps anterior)**
- Those curving backward from the splenium into the occipital lobes, form the **forceps major (also forceps posterior)**
- Between these two parts is the main body of the fibers which constitute the **tapetum** and extend laterally on either side into the temporal lobe, and cover in the central part of the lateral ventricle
- The tapetum and anterior commissure share the function of connecting left and right temporal lobes
- The anterior cerebral arteries are in contact with the under surface of the rostrum, they arch over the front of the genu and are carried along the trunk, supplying the front four-fifths of the corpus callosum

CORPUS CALLOSUM

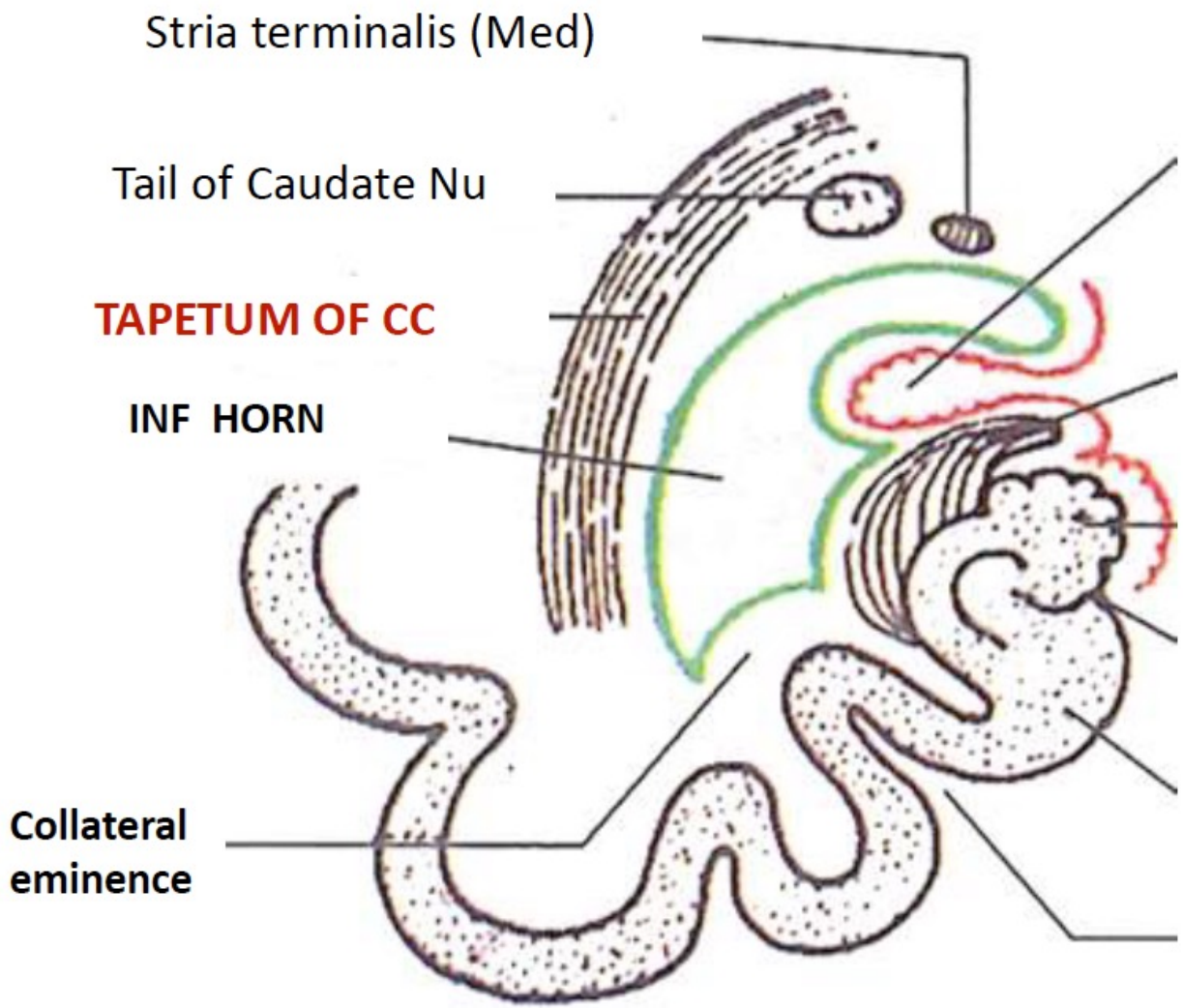


LAT VENTRICLE : POSTERIOR HORN

CORPUS CALLOSUM : TAPETUM



LAT VENTRICLE : INFERIOR HORN



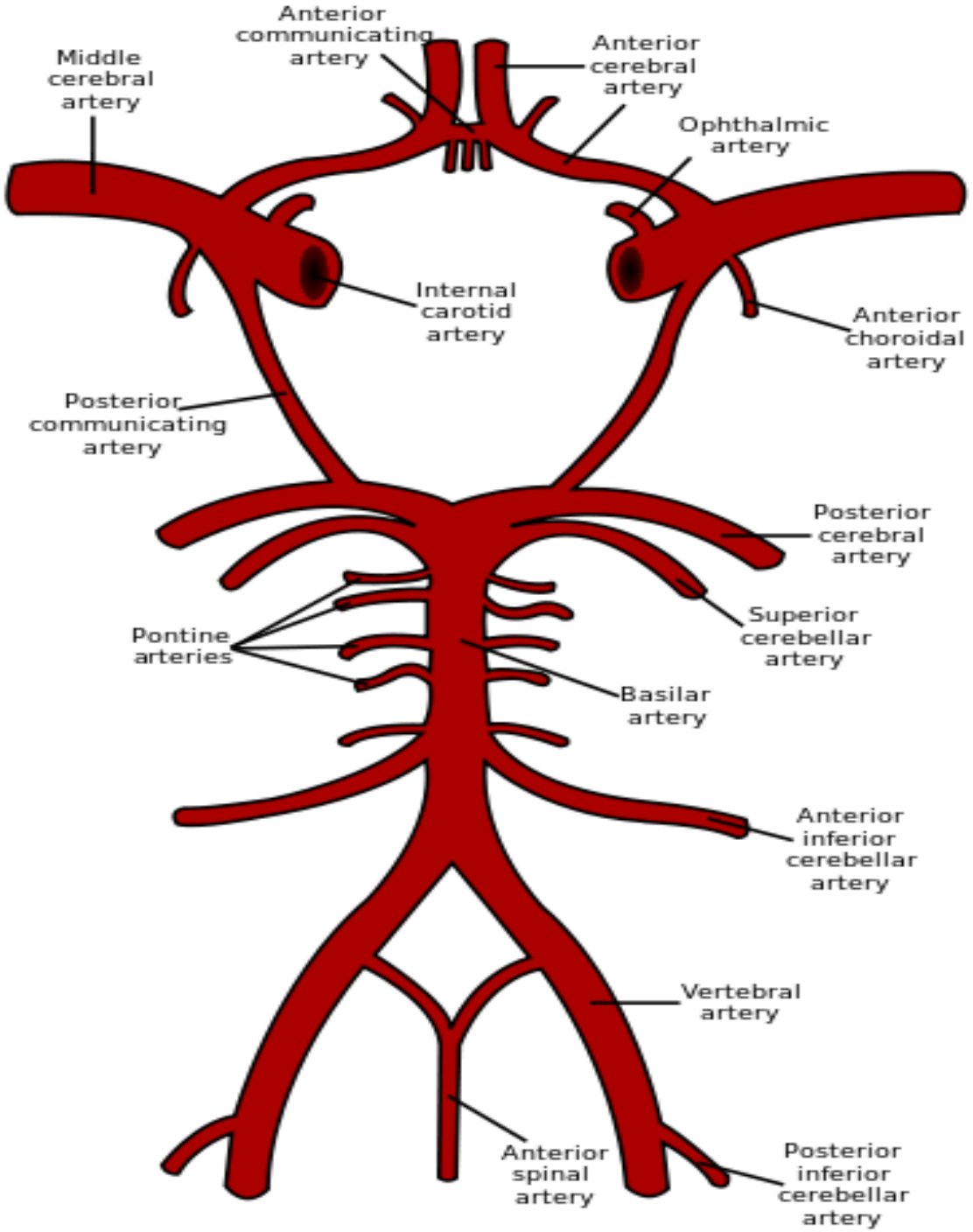
Summary of blood Supply to Cerebrum

- The blood supply to the cerebrum can be simply classified into 3 distinct paired arterial branches:

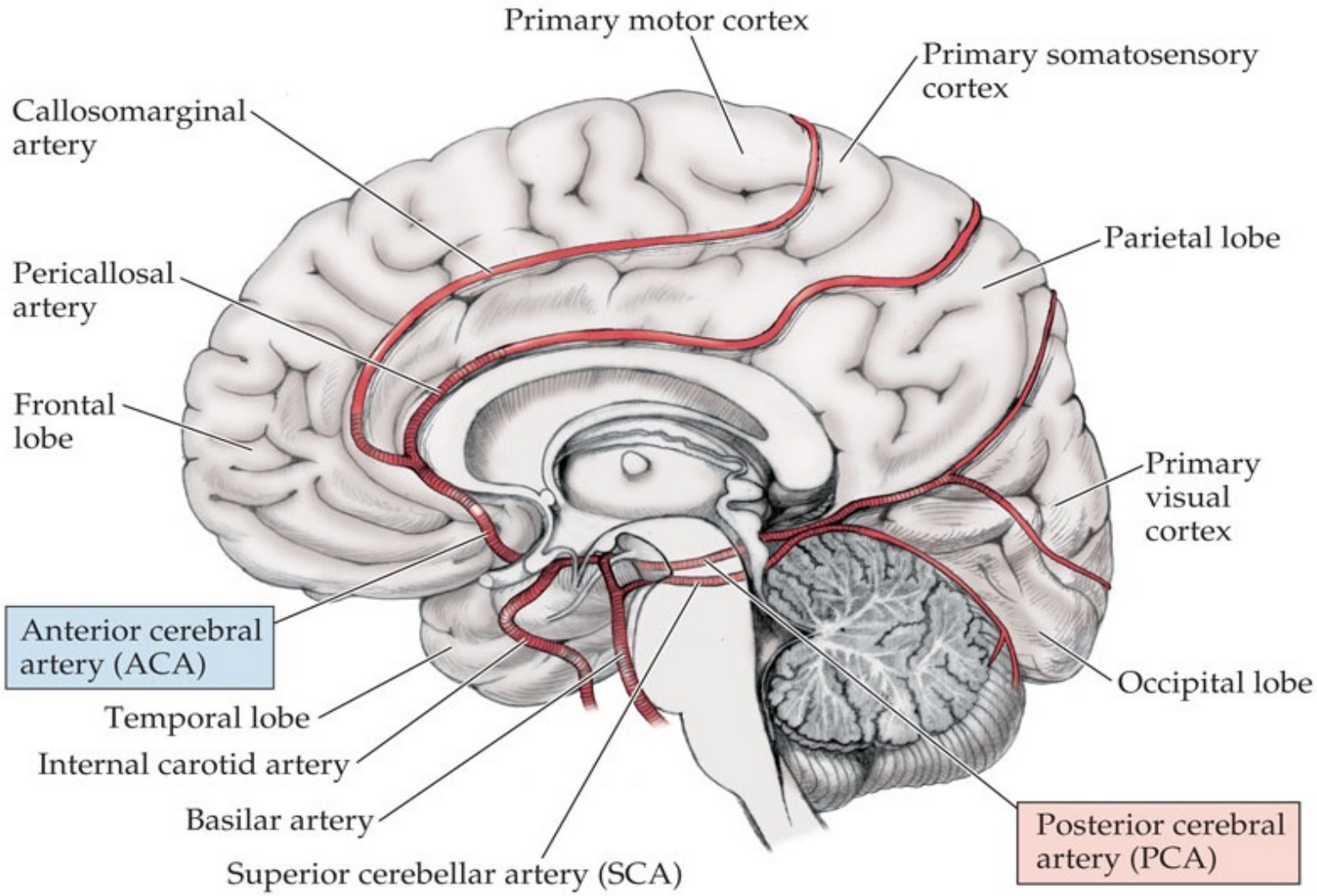
- **Anterior Cerebral Arteries** – branches of internal carotid arteries, supplying the anteromedial aspect of the cerebrum
- **Middle Cerebral Arteries** – continuation of internal carotid arteries, supplying most of the lateral portions of the cerebrum
- **Posterior Cerebral Arteries** – branches of the basilar arteries, supplying both the medial and lateral sides of the cerebrum posteriorly.

- Venous drainage

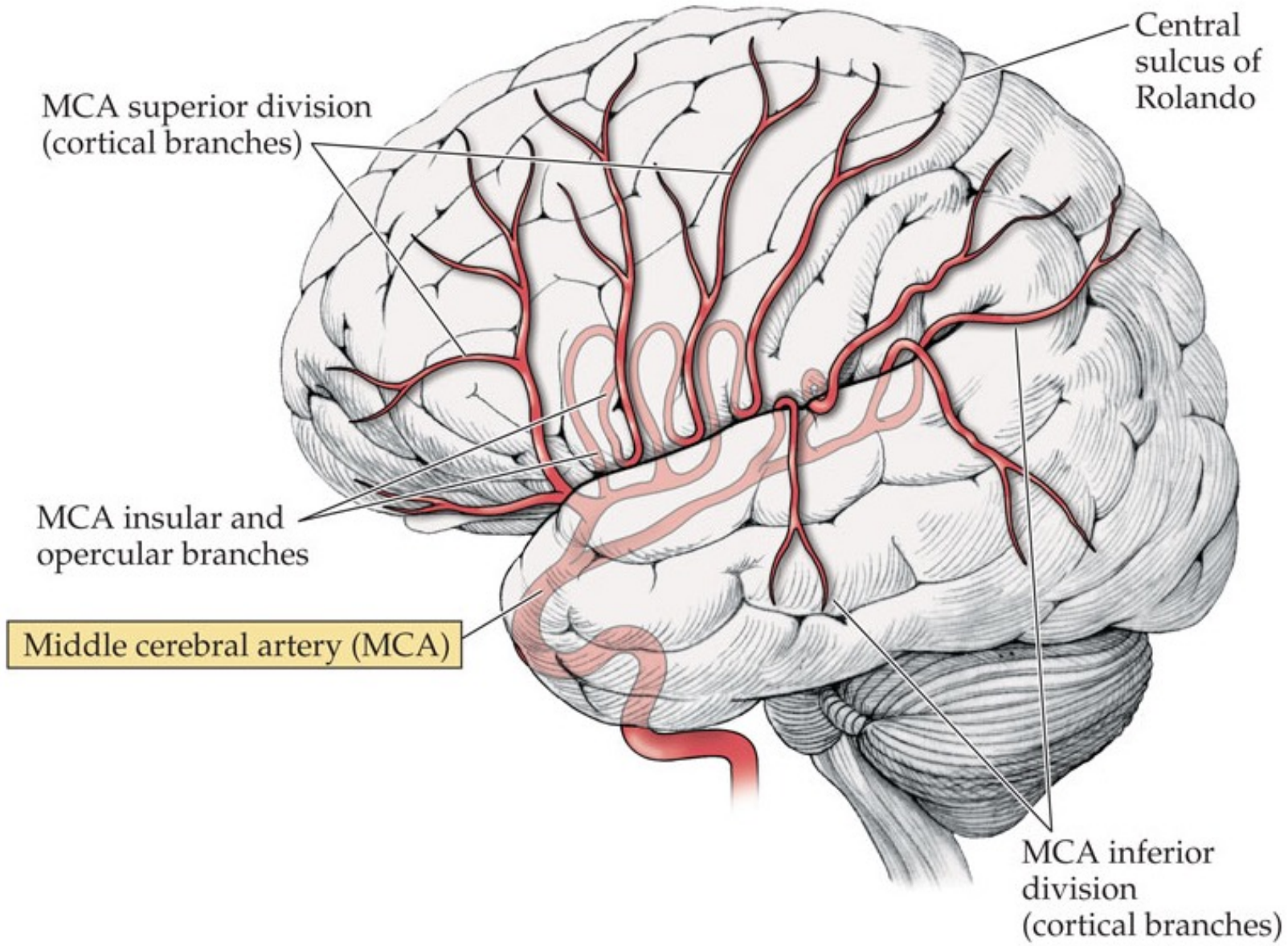
- Via a network of small **cerebral veins**
- These vessels empty into the **dural venous sinuses** – endothelial lined spaces between the outer and inner layers of dura mater


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

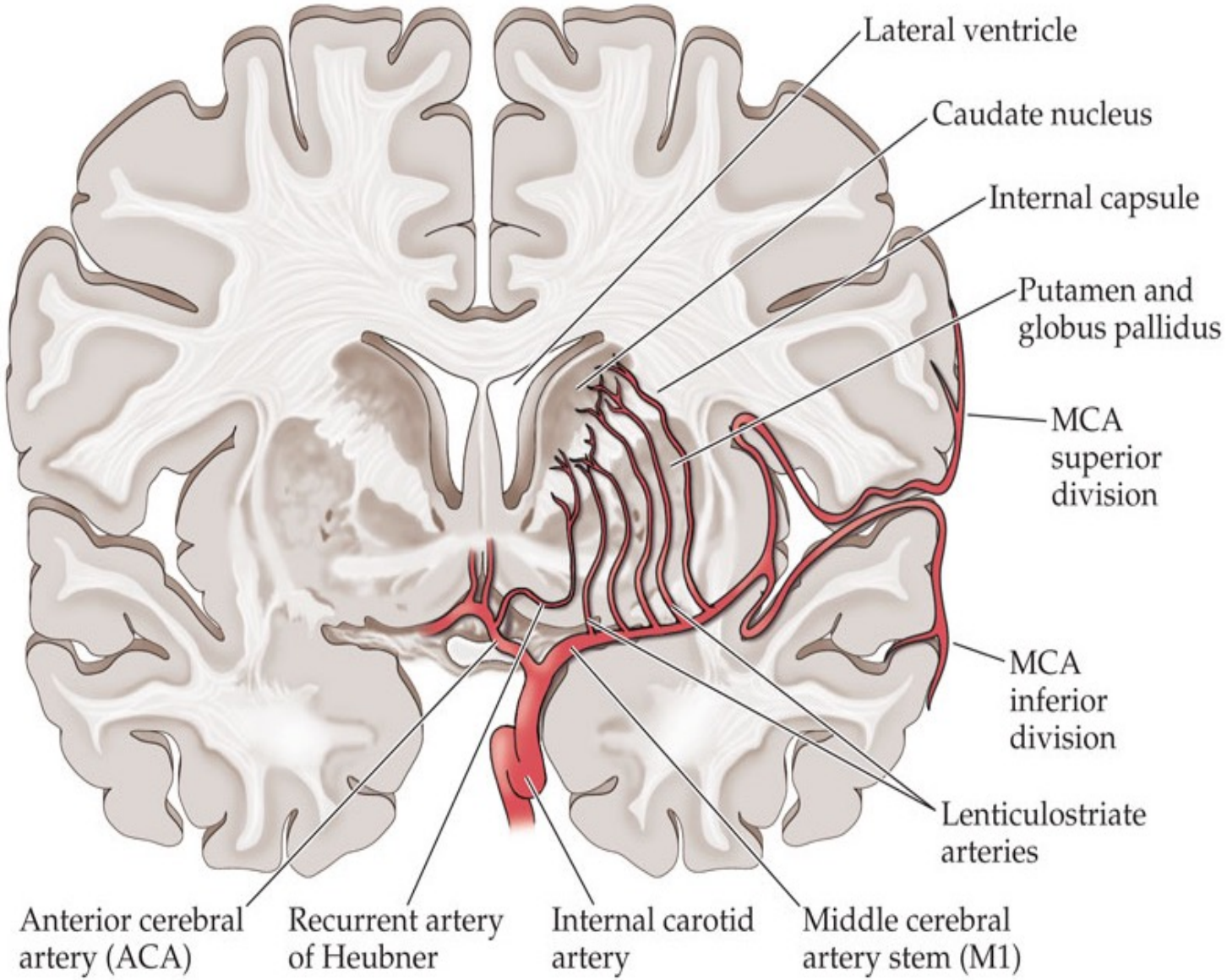
Simplified Course of ACA/PCA



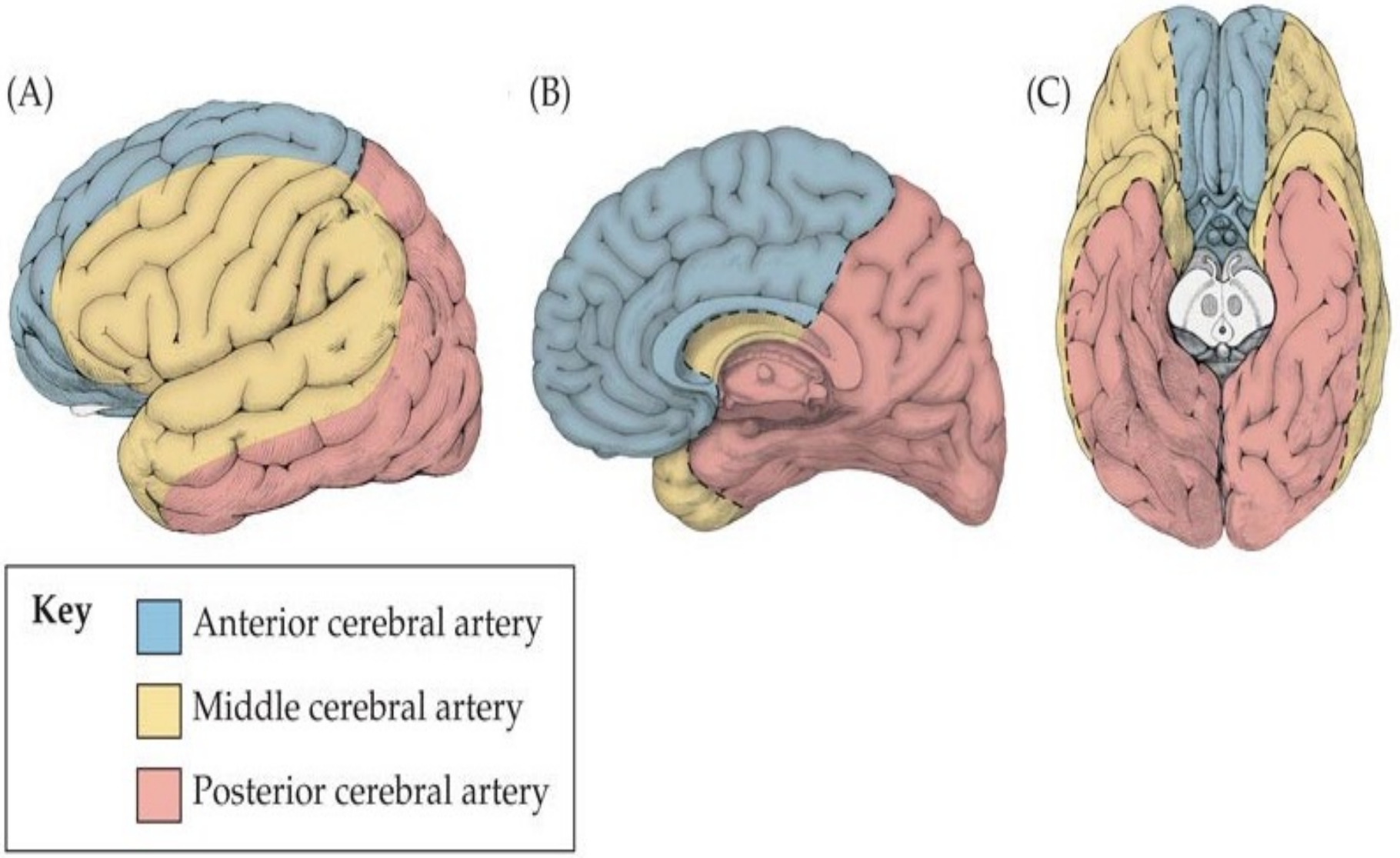
Superior/Inferior Divisions of MCA



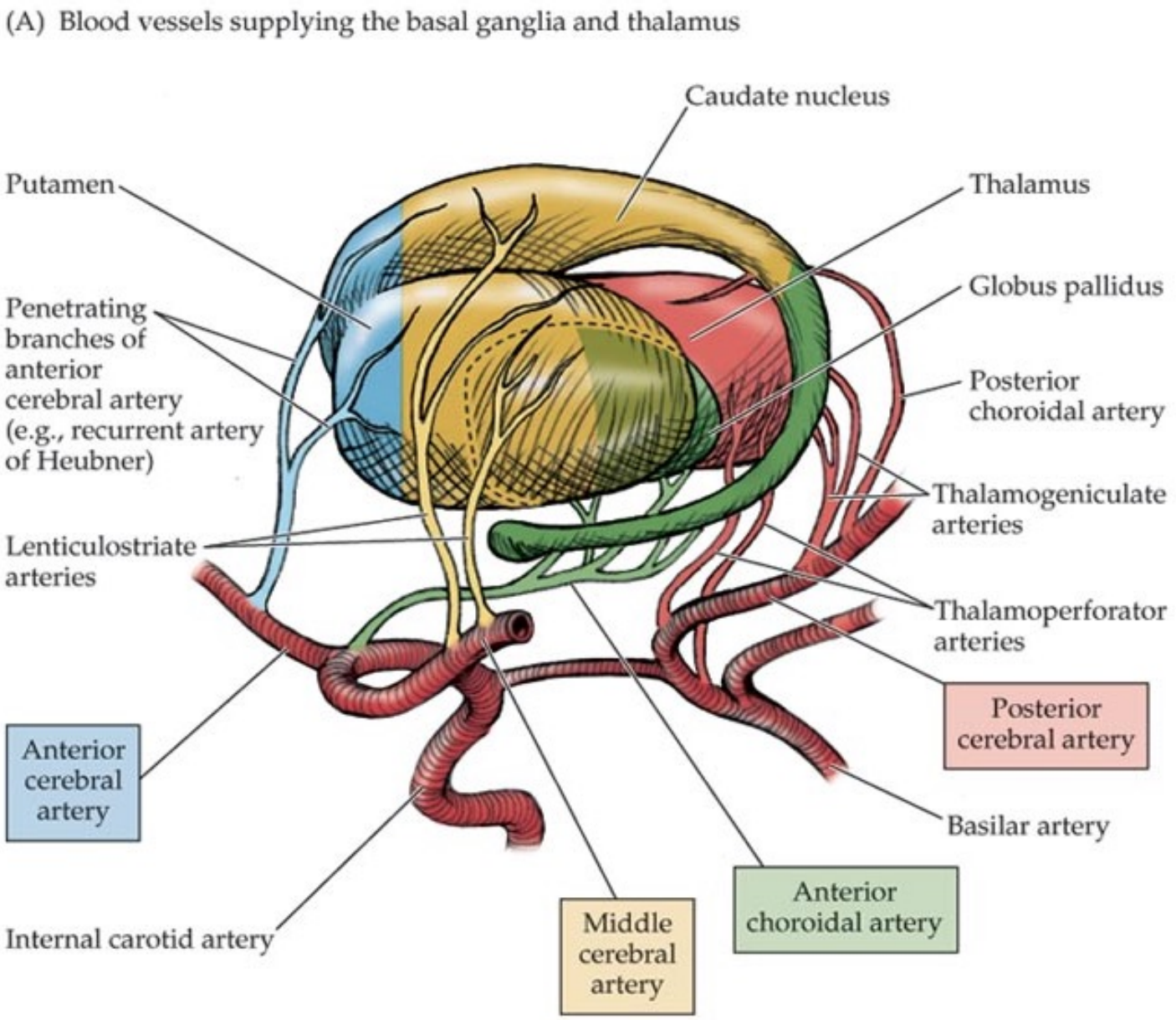
Lenticulostriate Arteries



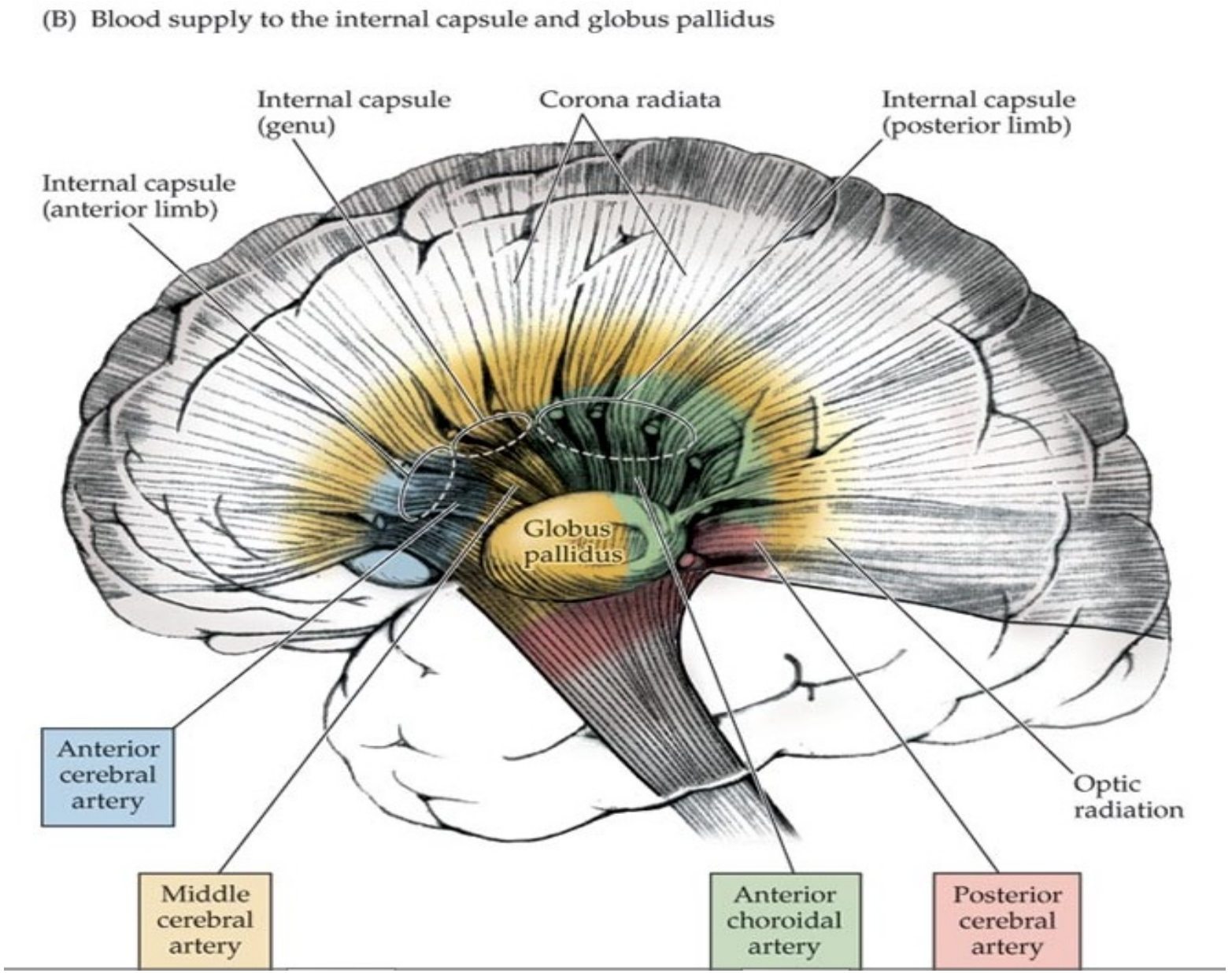
Superficial Territories of Major Cerebral Arteries



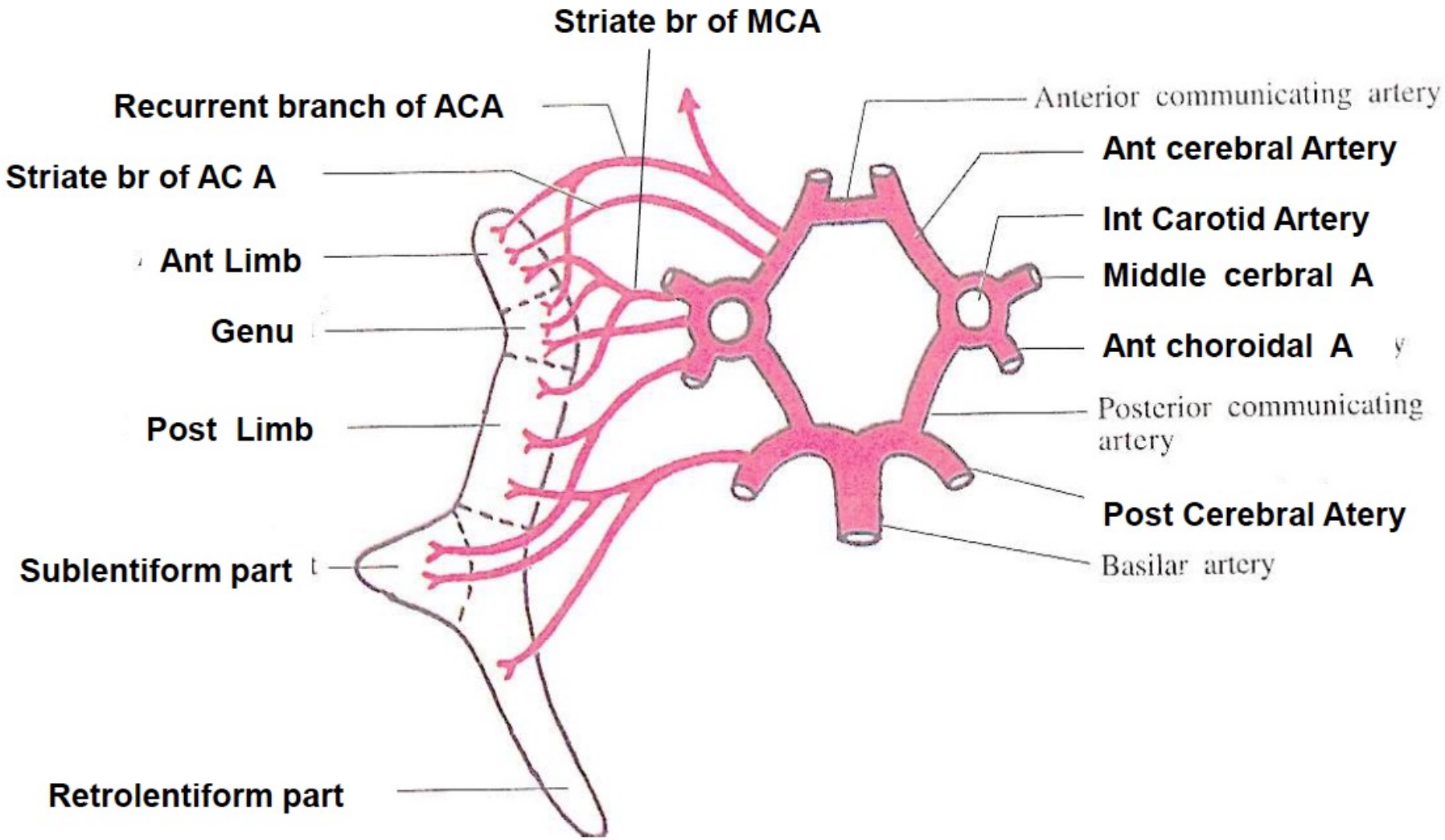
Blood Supply to Basal Ganglia/Thalamus



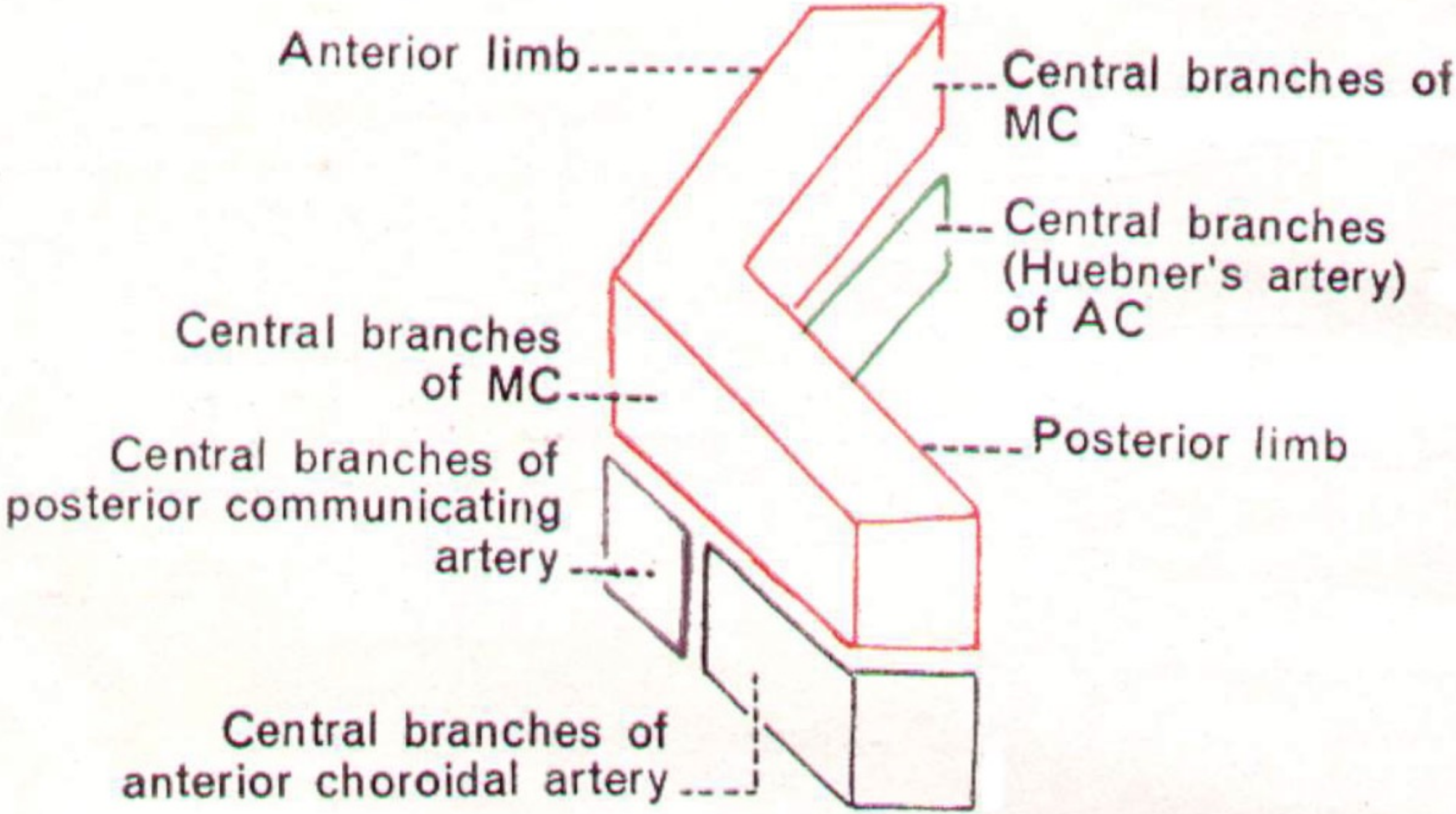
Blood Supply to Internal Capsule/Globus Pallidus



ARTERIAL SUPPLY OF I C



By central branches of cerebral arteries - End arteries

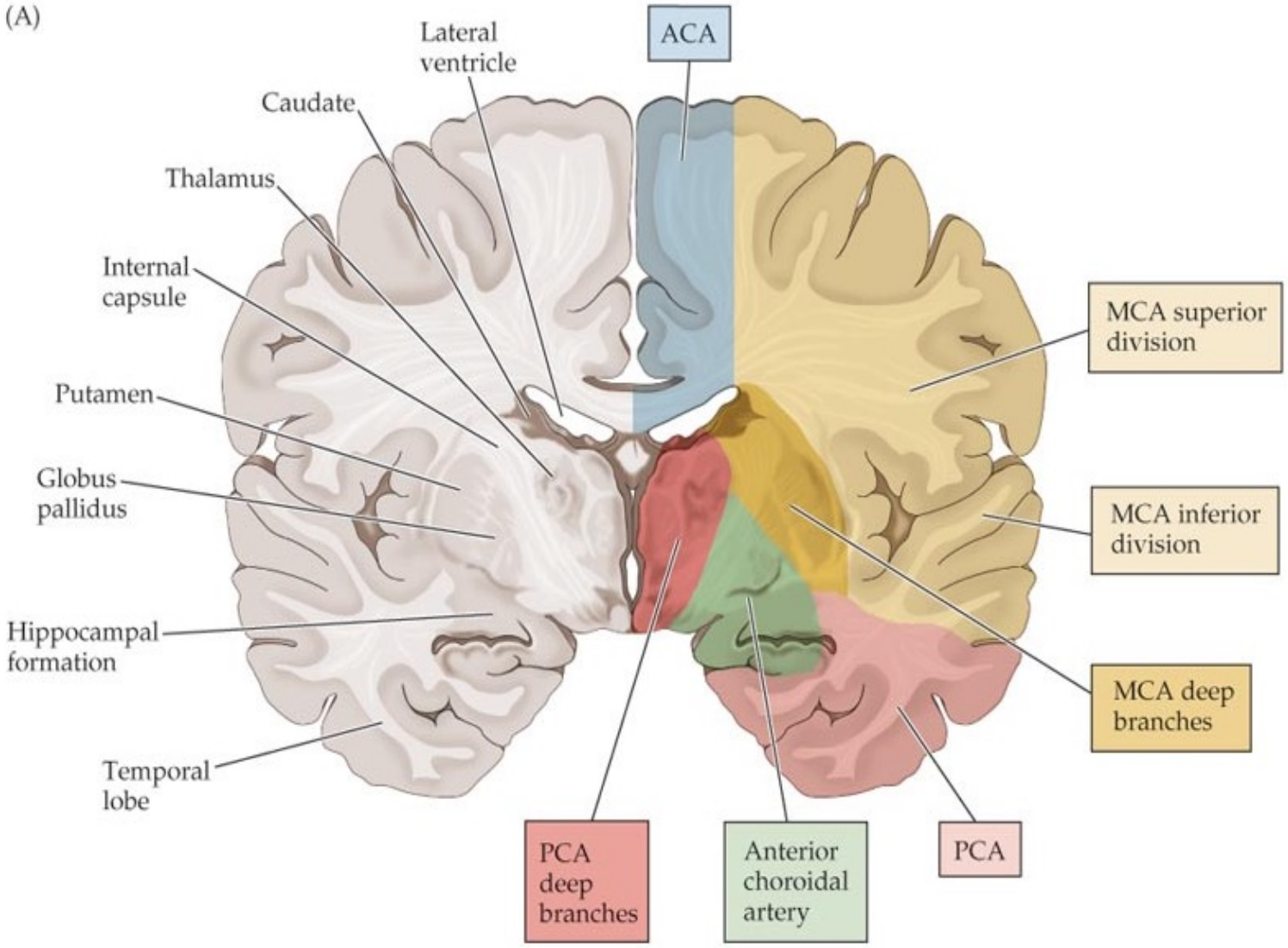

Anterior limb
Central branches of MC
Central branches (Huebner's artery) of AC
Central branches of MC
Posterior limb
Central branches of posterior communicating artery
Central branches of anterior choroidal artery

INT CAPSULE : BLOOD SUPPLY

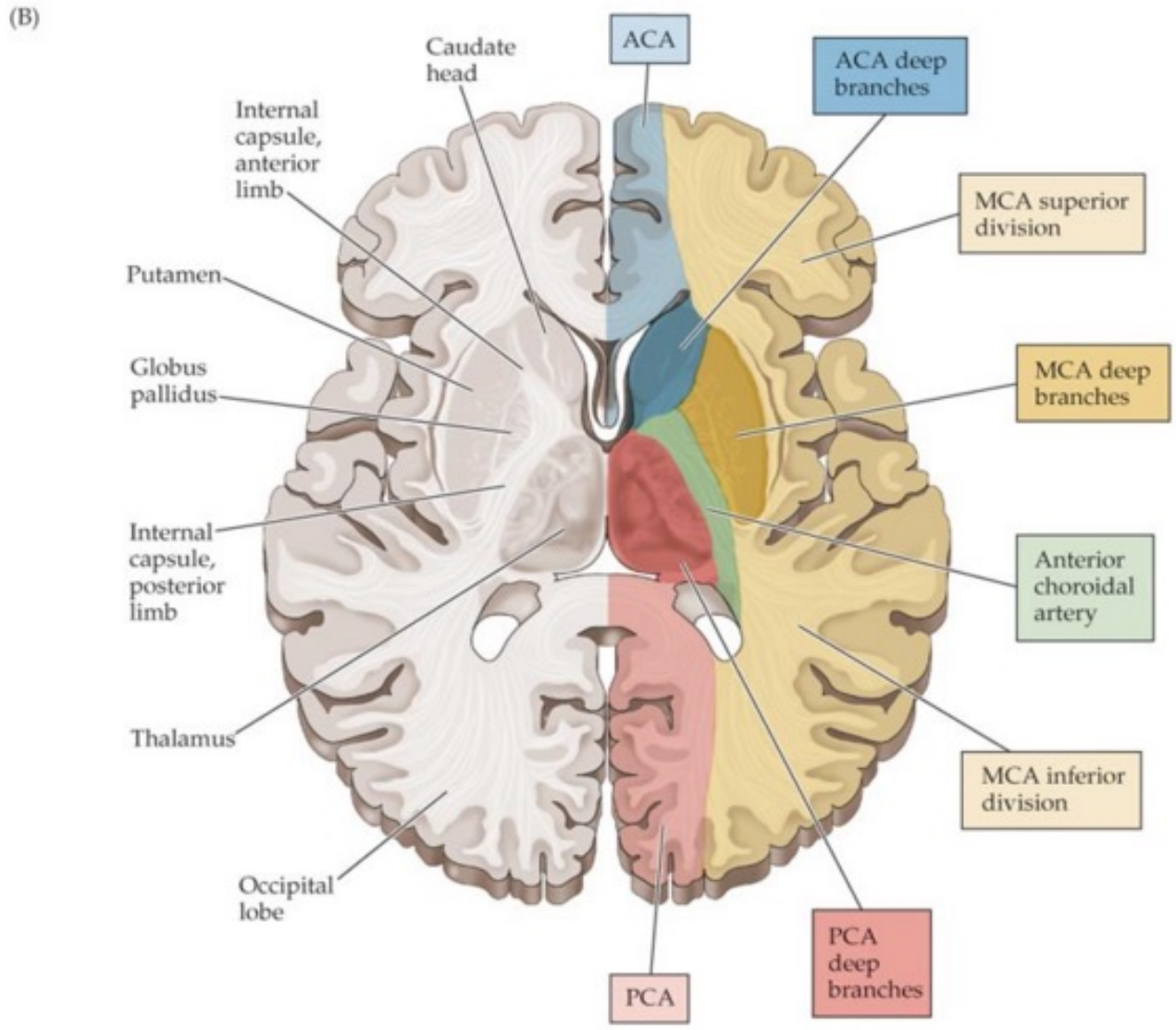
By **central branches** of cerebral arteries - End arteries

ARTERY / PART OF IC	Striate Br of ACA	Rec Br of ACA	Striate Br of MCA (Charcot's artery)	Direct Br from ICA	Ant Choroidal A	P CA
Ant Limb						
Genu						
Post Limb						
S L Part						
RL Part						

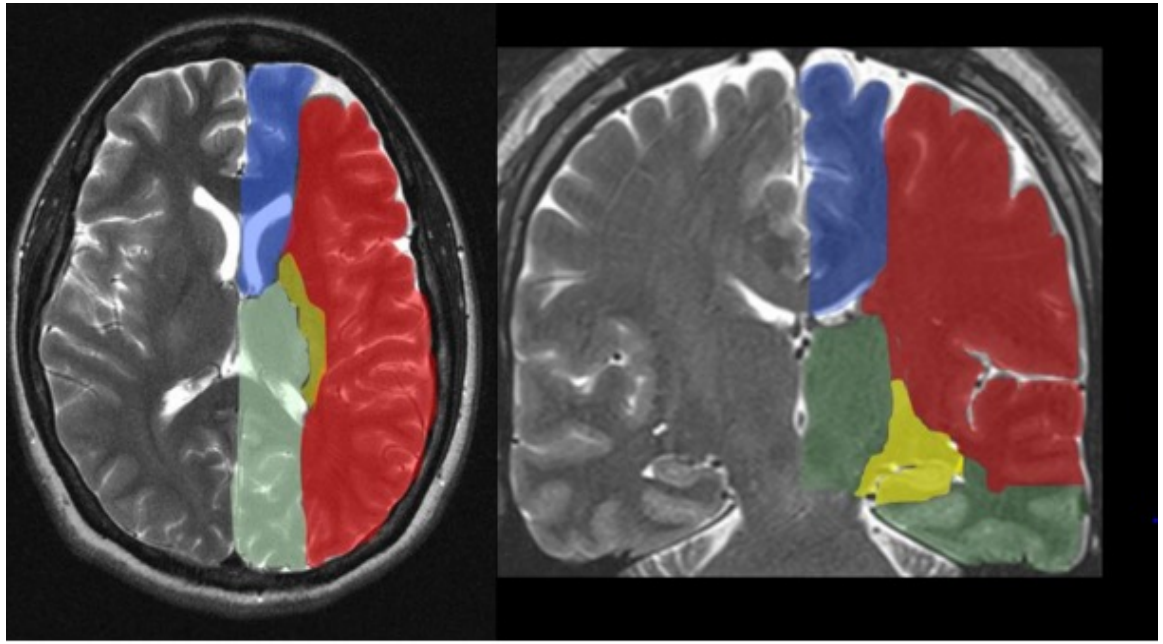
Summary of Superficial/Deep Blood Supply to Cerebral Hemispheres (Coronal View)



Summary of Superficial/Deep Blood Supply to Cerebral Hemispheres (Axial View)



Supratentorial Vascular Territories of the Major Cerebral Arteries via the level of the Basal Ganglia and Thalami



Left: axial view
Right: coronal view

- **Red: MCA**
- Lateral aspects of the hemispheres, including the lateral frontal, parietal, and anterior temporal lobes; insula; and basal ganglia

- **Blue: ACA**
- Medial frontal and parietal lobes

- **Green: PCA**
- Thalami and occipital and inferior temporal lobes

- **Yellow: anterior choroidal artery:**
- Posterior limb of the internal capsule and part of the hippocampus extending to the anterior and superior surface of the occipital horn of the lateral ventricle

END