جامعة الملك سعود
King Saud University
1957

MED437
KING SAUD UNIVERSITY

Revised By
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Color index
Important
Doctor's note
Extra explanation

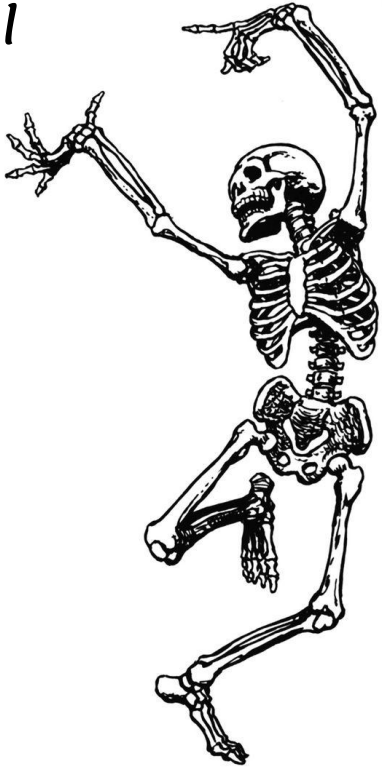
Radiology of the Cerebral Hemispheres

Third Lecture

Team 437

Radiology

Neuropsychiatry Block

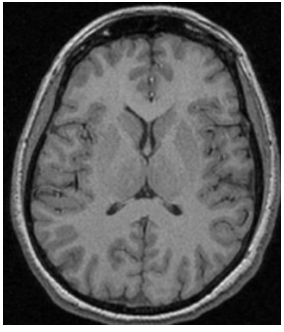


Radiology
Team 437

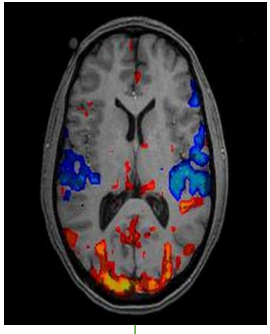
Radiology of Cerebral hemispheres

What do we image?

Morphology

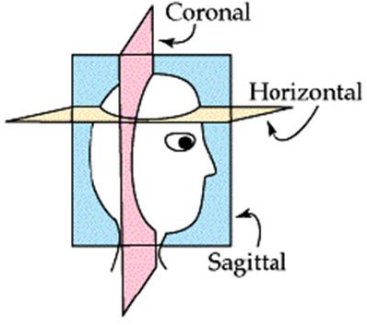


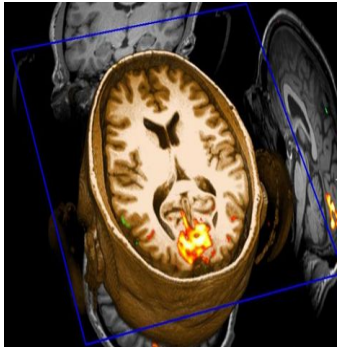
Function

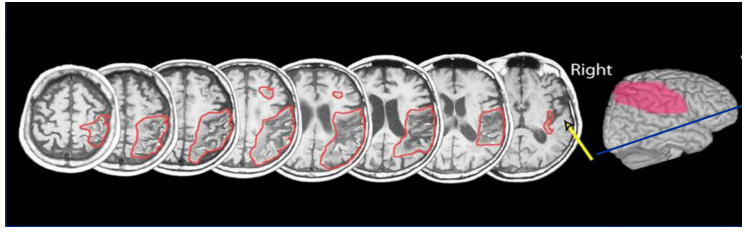


Functional MRI :
This specific type of imaging modality can access the function of certain areas of the brain

Guide







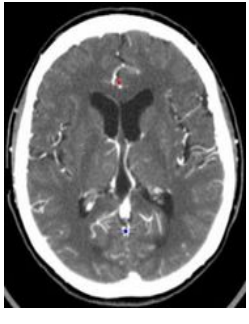
Computed Tomography (CT)	Magnetic Resonance Imaging (MRI)
Ionizing radiation	No ionizing radiation
Quick (2-3min)	Lengthy (15-20min)
Low resolution	High resolution
Single plane	Multiple planes

To differentiate:

-CT scan with contrast : we can see all blood vessels.

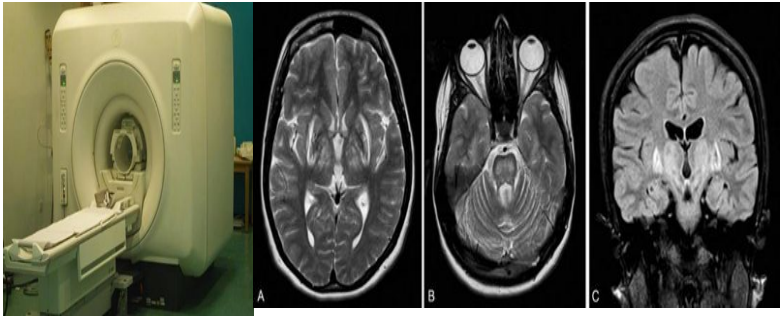
-CT scan without contrast : blood vessels are with the same density as the rest of the brain.

CT scan with contrast



Axial T2

Coronal plane flair sequence



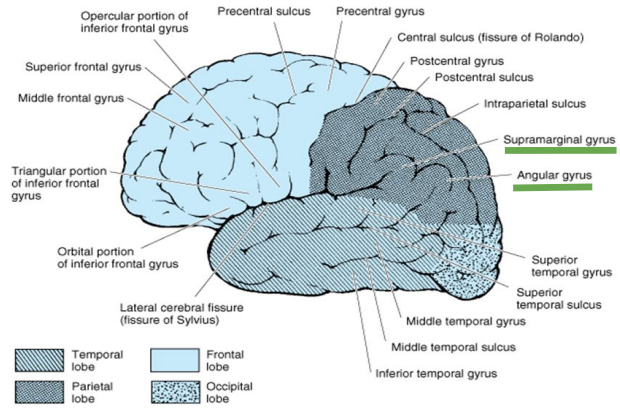
Anatomy

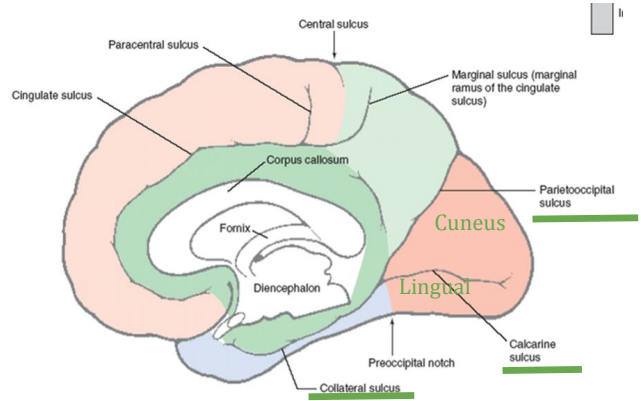
Females doctor / Anatomy notes :
Central sulcus separates frontal lobe from parietal lobe

- The **Sensory area** is posterior to the central sulcus and it is located in the **parietal lobe**
- The **Motor area** is anterior to the central sulcus and it is located in the **frontal lobe**
- **Supramarginal gyrus + Angular gyrus** are parts of the inferior parietal lobule.
- **Supramarginal gyrus** is located along the inferior border of the sylvian fissure.

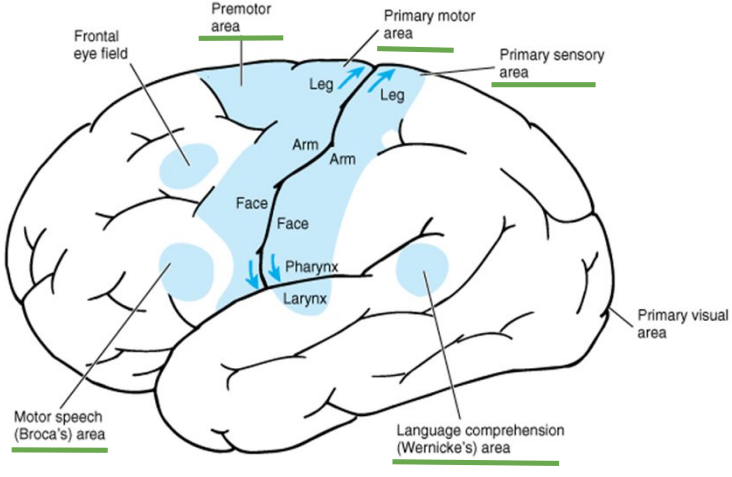
On the medial side of the brain :

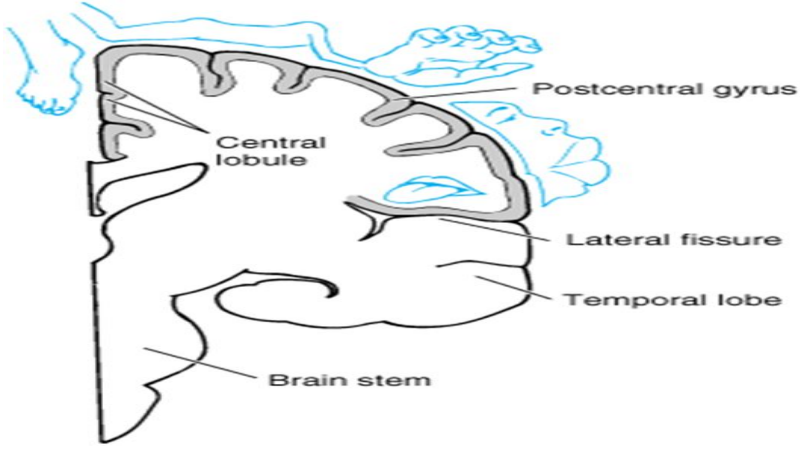
- Parieto-occipital sulcus which divides the occipital lobe from the parietal lobe
- Calcarine sulcus : located within the occipital lobe divides the occipital lobe into cuneus and lingual





Anatomy



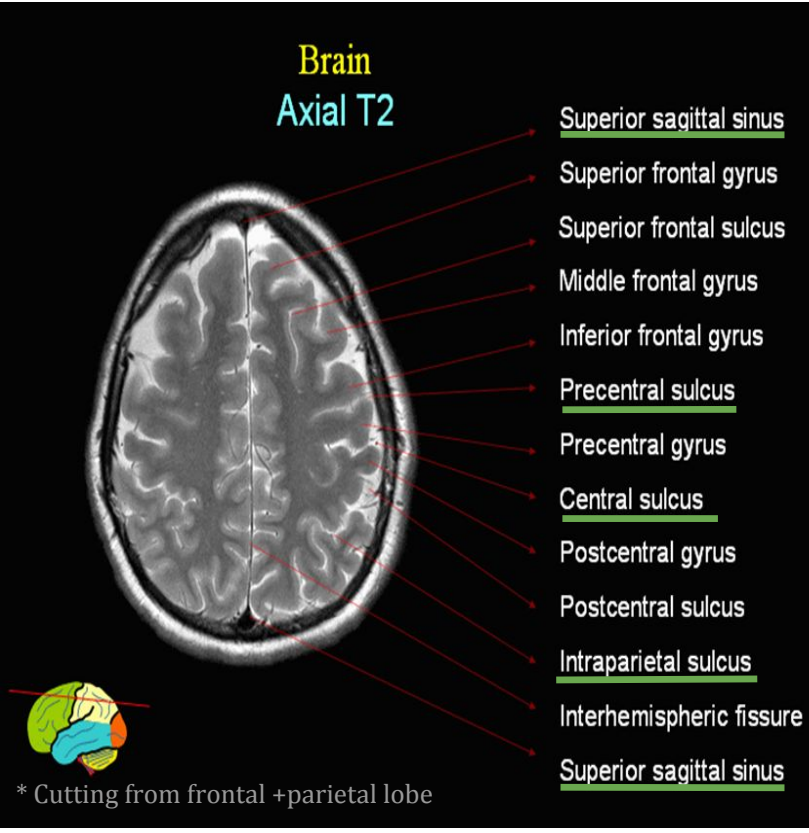


Structures underlined with green are what the doctor mentioned on the lecture.
Name of the structure and on which lobe?

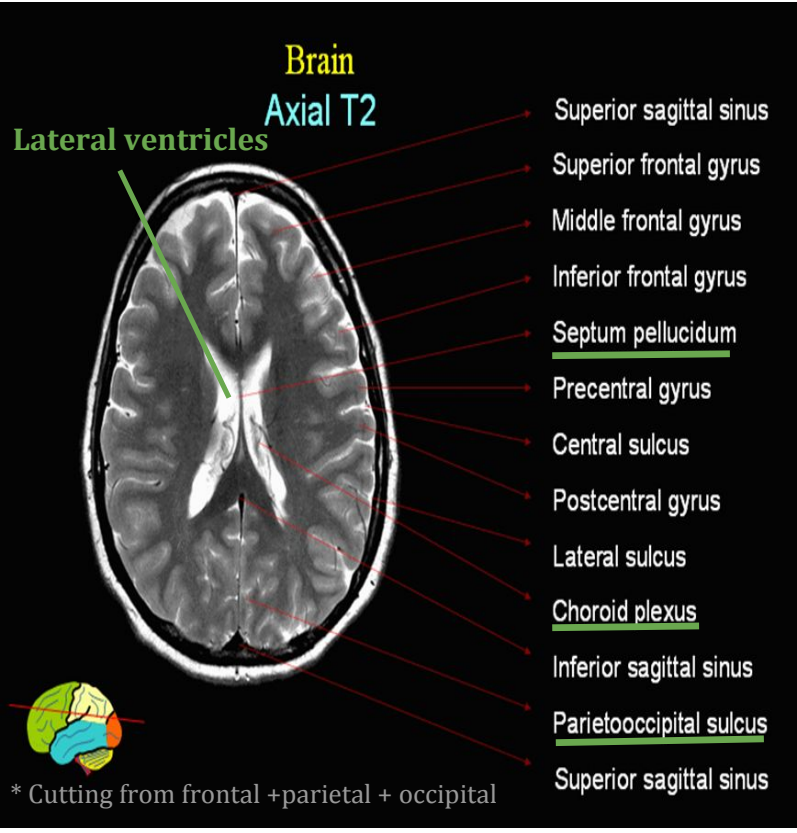
The following slides will show a lot of pictures with a lot of labeling.Our team underlined the things our doctors mentioned/focused on during their lecture.

superior sagittal sinus runs from anterior to posterior

Septum pellucidum divides the two ventricles

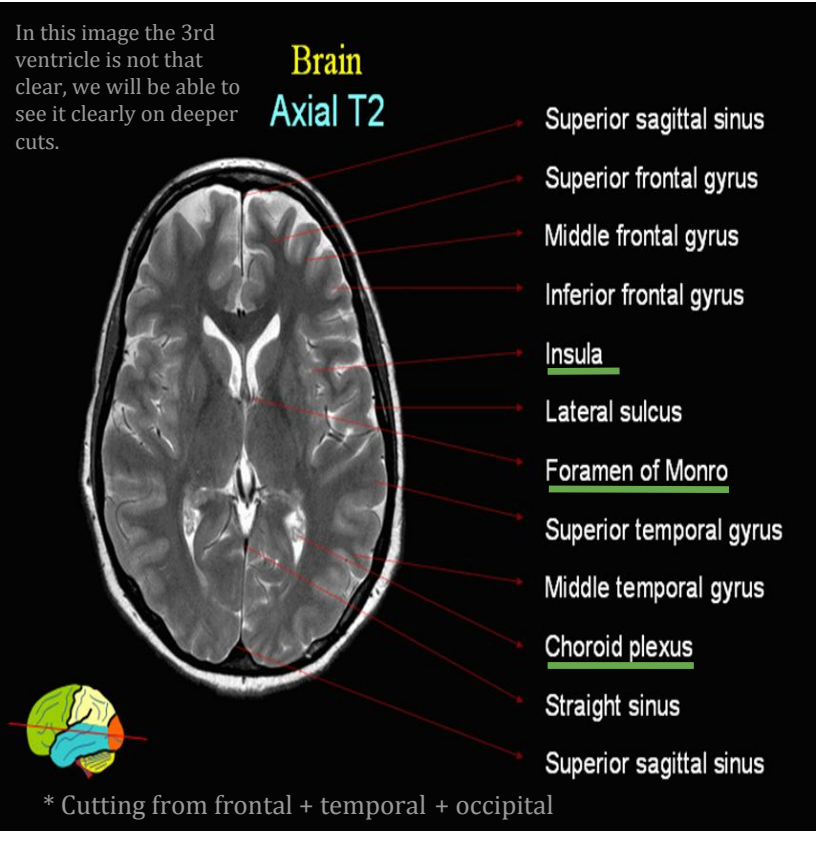


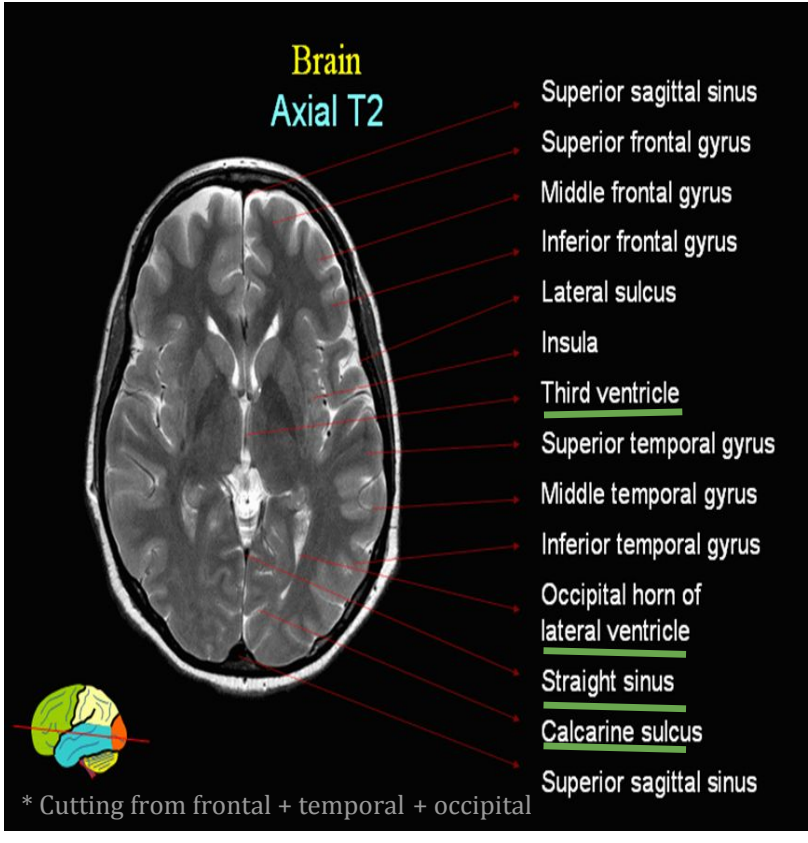
* Cutting from frontal +parietal lobe



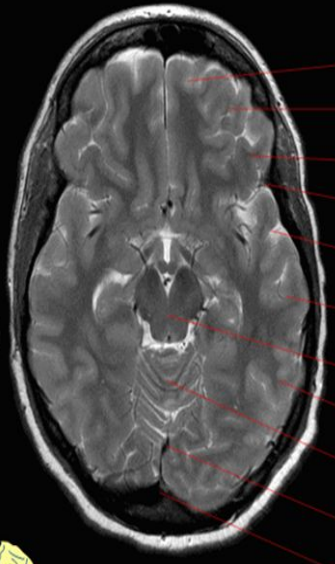
* Cutting from frontal +parietal + occipital

-Foramen of monro connect the 3rd ventricle with the lateral ventricle





Brain
Axial T2

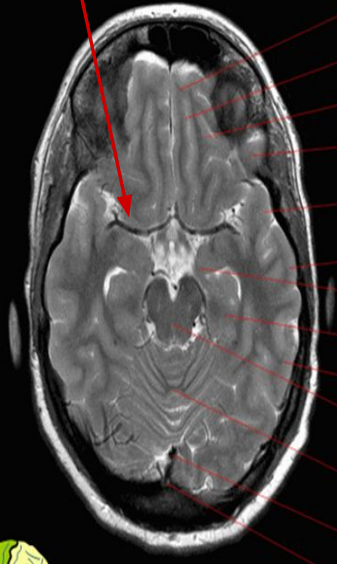


- Superior frontal gyrus
- Middle frontal gyrus
- Inferior frontal gyrus
- Lateral sulcus
- Superior temporal gyrus
- Middle temporal gyrus
- Midbrain
- Inferior temporal gyrus
- Vermis
- Straight sinus
- Superior sagittal sinus

* Cutting from frontal + temporal + occipital

Middle cerebral artery runs with in the sylvian fissure (lateral fissure)

Brain
Axial T2



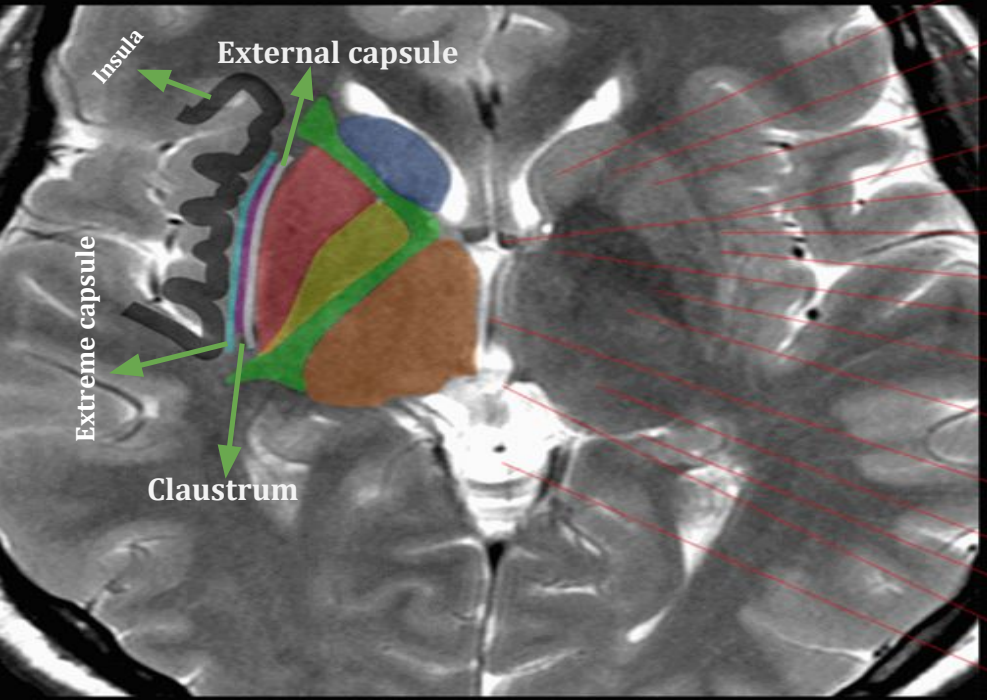
- Gyrus rectus most medial
- Olfactory sulcus
- Orbital gyrus
- Inferior frontal gyrus
- Superior temporal gyrus
- Middle temporal gyrus
- Uncus
- Parahippocampal gyrus
- Inferior temporal gyrus
- Midbrain
- Vermis
- Straight sinus
- Superior sagittal sinus

On this image we see the basal part of the frontal lobe, we can see here different gyri of the inferior part of frontal lobe.

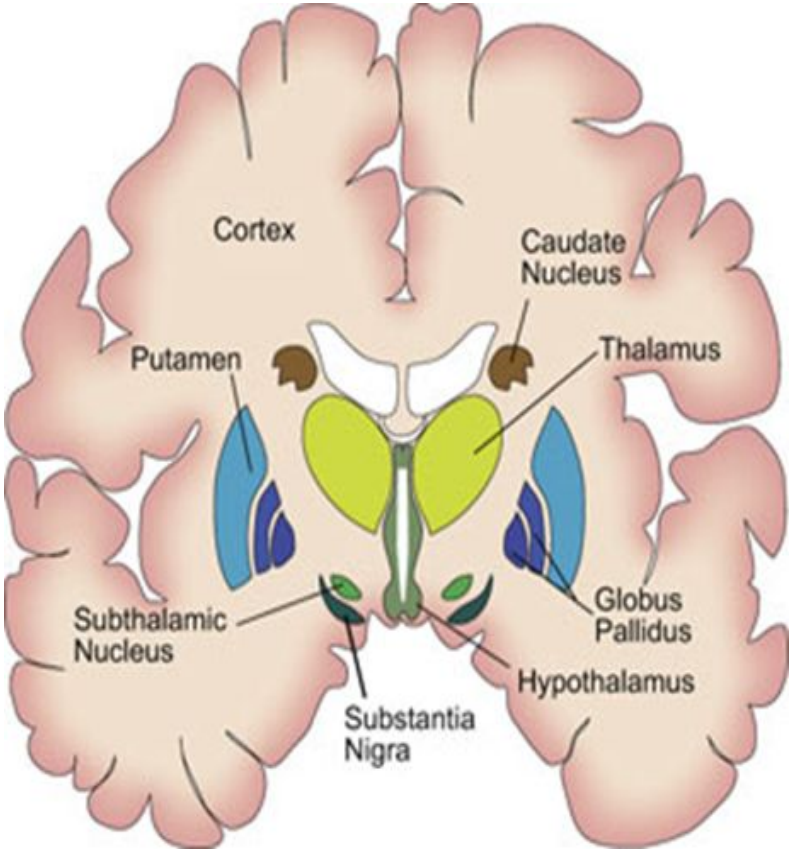
More close up image at the level of the basal ganglia

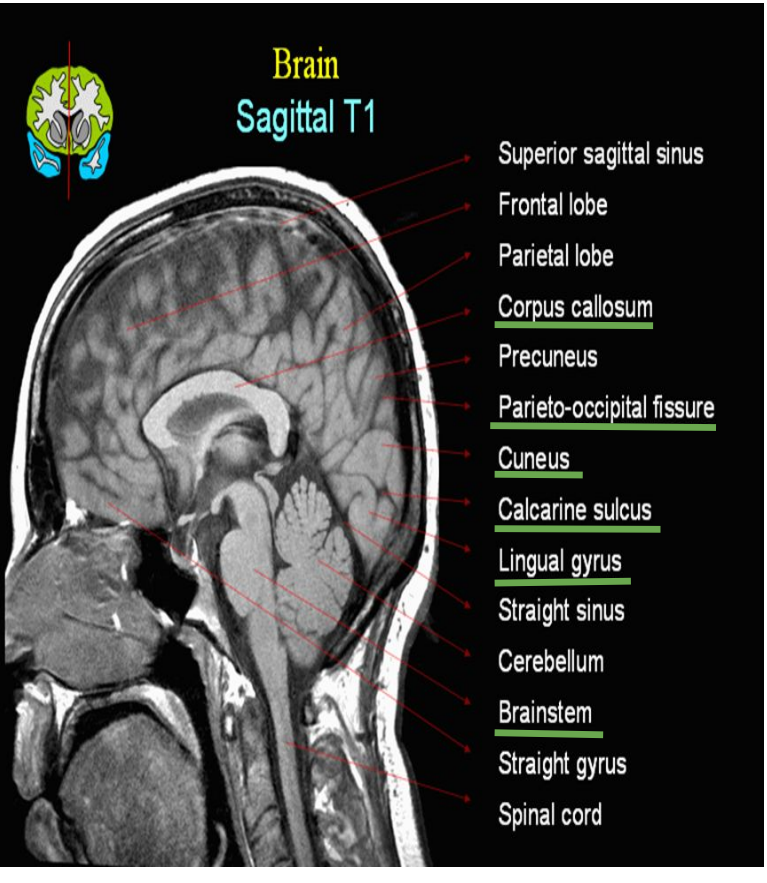
Brain

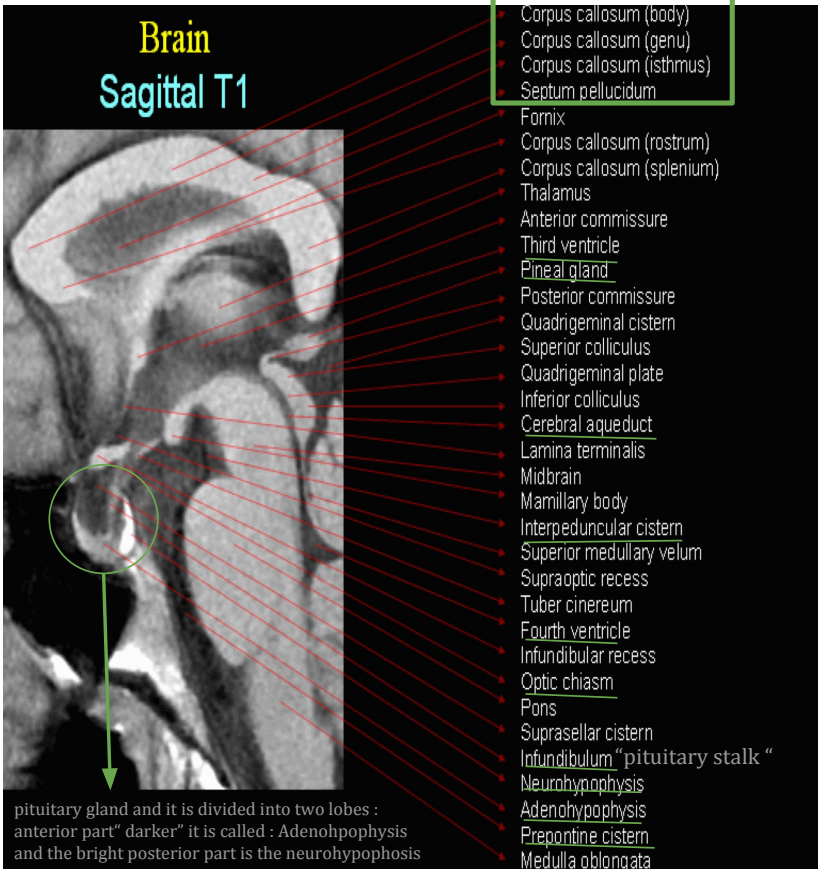
Axial T2



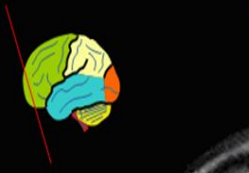
- Caudate nucleus
- Internal capsule (anterior limb)
- Putamen
- Extreme capsule
- Column of fornix
- Claustrum
- External capsule
- Internal capsule (genu)
- Globus pallidus
- Internal capsule (posterior limb)
- Third ventricle
- Thalamus
- Retropulvinar cistern
- Posterior commissure
- Quadrigeminal cistern

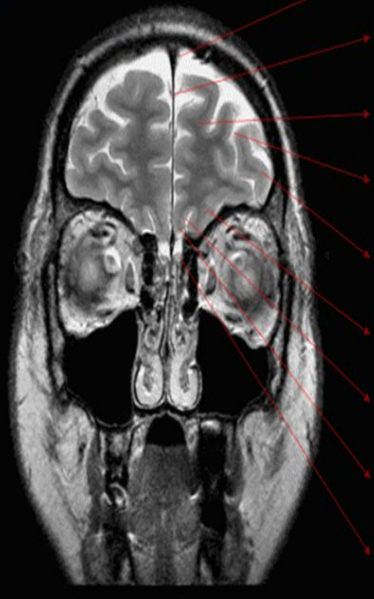

Cortex
Caudate Nucleus
Putamen
Thalamus
Subthalamic Nucleus
Globus Pallidus
Hypothalamus
Substantia Nigra


Brain
Sagittal T1
Superior sagittal sinus
Frontal lobe
Parietal lobe
Corpus callosum
Precuneus
Parieto-occipital fissure
Cuneus
Calcarine sulcus
Lingual gyrus
Straight sinus
Cerebellum
Brainstem
Straight gyrus
Spinal cord


Brain
Sagittal T1
Corpus callosum (body)
Corpus callosum (genu)
Corpus callosum (isthmus)
Septum pellucidum
Fornix
Corpus callosum (rostrum)
Corpus callosum (splenium)
Thalamus
Anterior commissure
Third ventricle
Pineal gland
Posterior commissure
Quadrigeminal cistern
Superior colliculus
Quadrigeminal plate
Inferior colliculus
Cerebral aqueduct
Lamina terminalis
Midbrain
Mamillary body
Interpeduncular cistern
Superior medullary velum
Supraoptic recess
Tuber cinereum
Fourth ventricle
Infundibular recess
Optic chiasm
Pons
Suprasellar cistern
Infundibulum "pituitary stalk "
Neurohypophysis
Adenohypophysis
Prepontine cistern
Medulla oblongata
pituitary gland and it is divided into two lobes :
anterior part" darker" it is called : Adenohpophysis
and the bright posterior part is the neurohypophosis

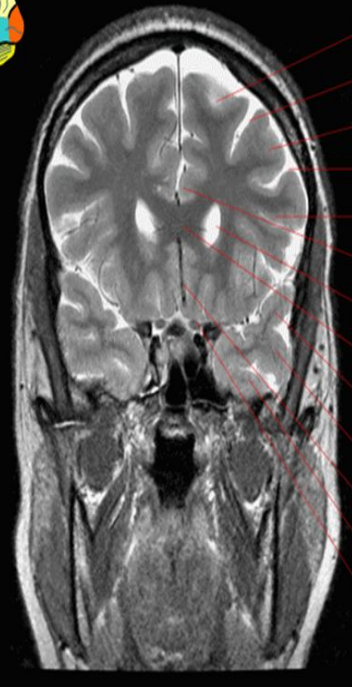
Brain
Coronal T2



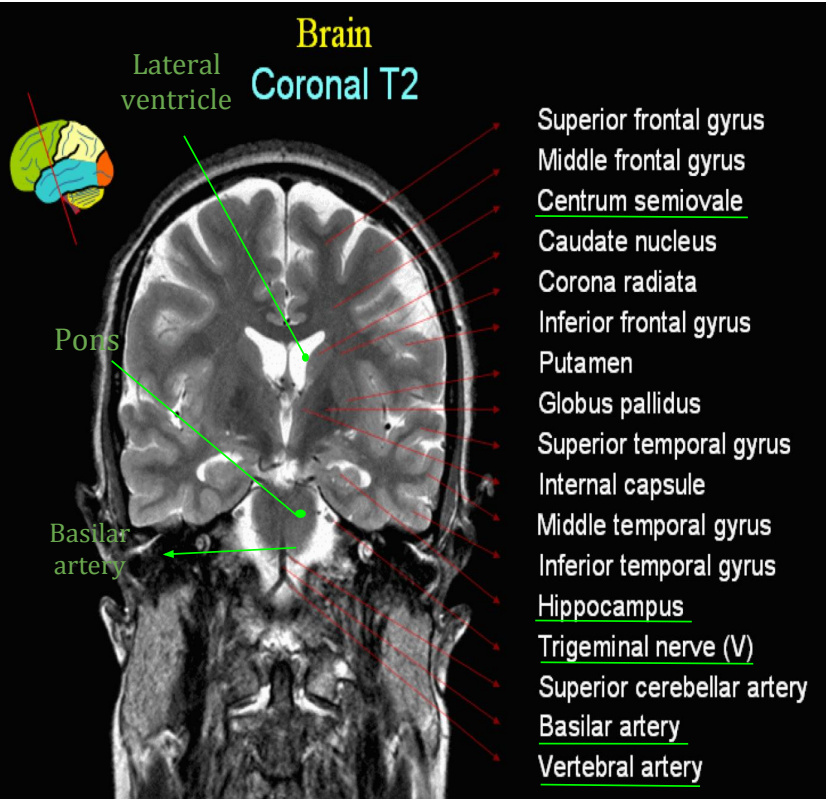


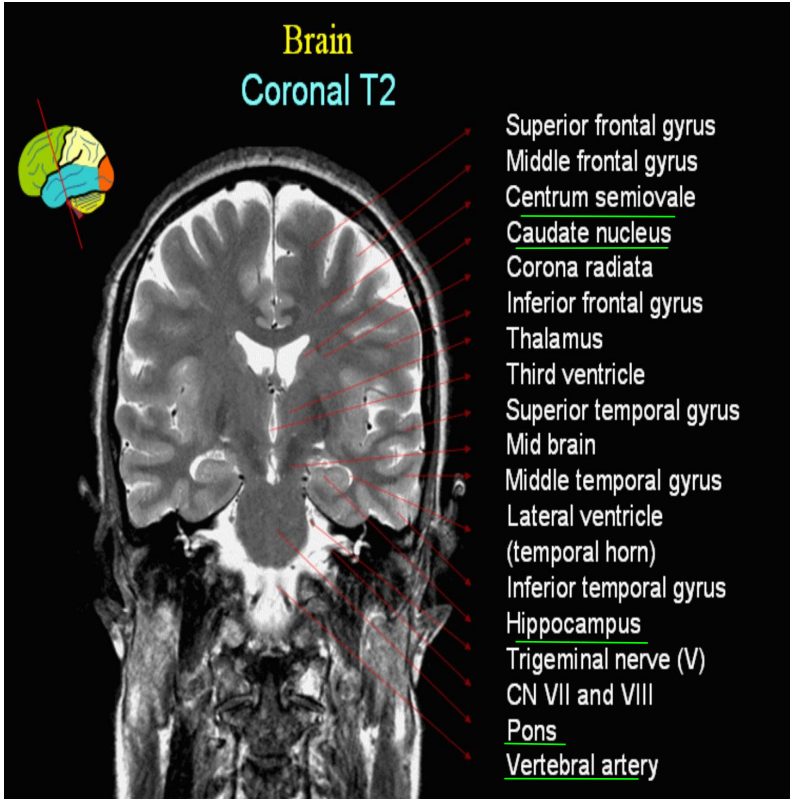
Superior sagittal sinus
Interhemispheric fissure
Superior frontal gyrus
Superior frontal sulcus
Middle frontal gyrus
Medial orbital gyrus
Olfactory sulcus
Gyrus rectus
Olfactory bulb

Brain
Coronal T2

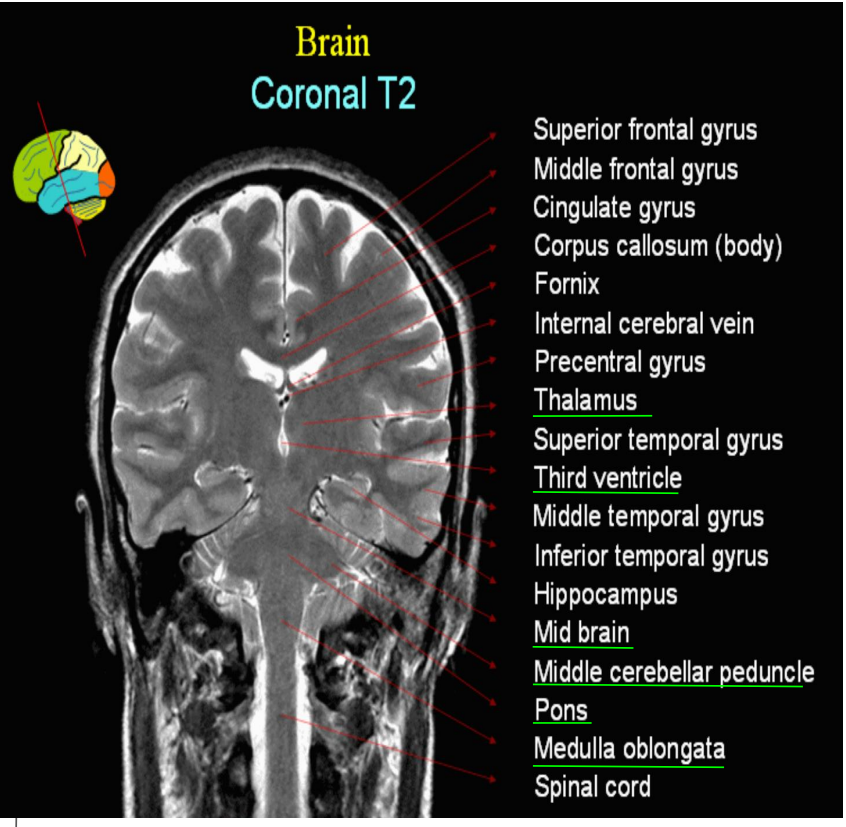


Superior frontal gyrus
Superior frontal sulcus
Middle frontal gyrus
Inferior frontal sulcus
Inferior frontal gyrus
Cingulate gyrus
Lateral ventricle (frontal horn)
Corpus callosum (genu)
Superior temporal gyrus
Middle temporal gyrus
Anterior cerebral artery
Inferior temporal gyrus
Pre-chiasmatic optic nerve

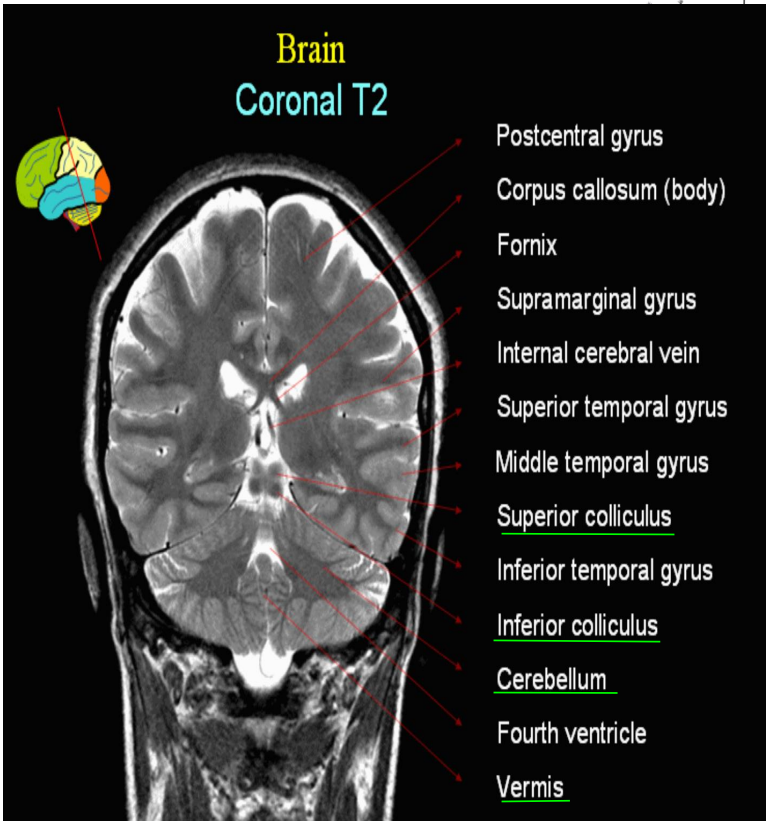

Brain
Coronal T2
Lateral ventricle
Pons
Basilar artery
Superior frontal gyrus
Middle frontal gyrus
Centrum semiovale
Caudate nucleus
Corona radiata
Inferior frontal gyrus
Putamen
Globus pallidus
Superior temporal gyrus
Internal capsule
Middle temporal gyrus
Inferior temporal gyrus
Hippocampus
Trigeminal nerve (V)
Superior cerebellar artery
Basilar artery
Vertebral artery

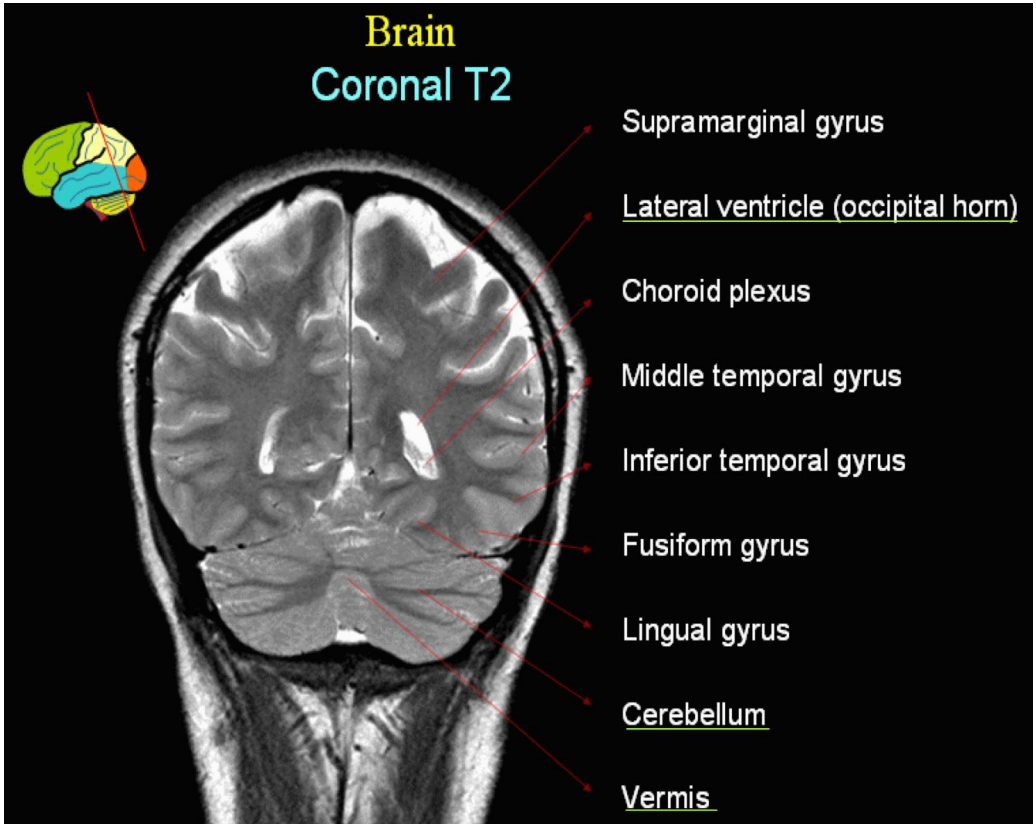

Brain
Coronal T2
Superior frontal gyrus
Middle frontal gyrus
Centrum semiovale
Caudate nucleus
Corona radiata
Inferior frontal gyrus
Thalamus
Third ventricle
Superior temporal gyrus
Mid brain
Middle temporal gyrus
Lateral ventricle
(temporal horn)
Inferior temporal gyrus
Hippocampus
Trigeminal nerve (V)
CN VII and VIII
Pons
Vertebral artery

Brain
Coronal T2



Brain
Coronal T2



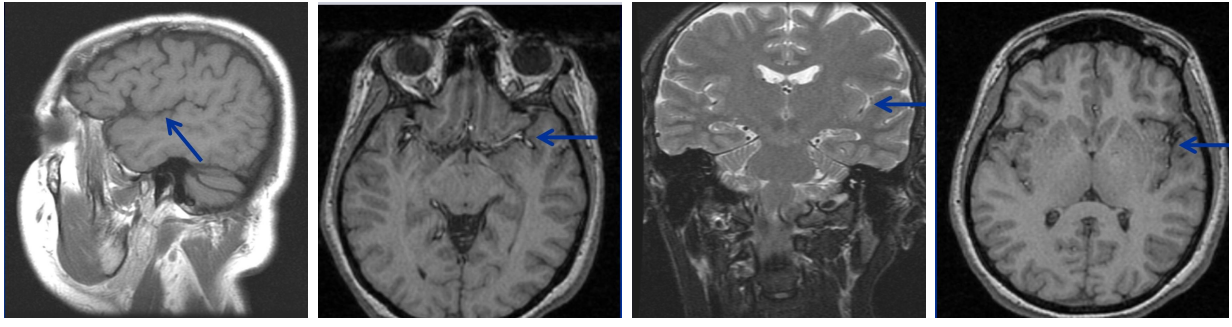

Brain
Coronal T2
Supramarginal gyrus
Lateral ventricle (occipital horn)
Choroid plexus
Middle temporal gyrus
Inferior temporal gyrus
Fusiform gyrus
Lingual gyrus
Cerebellum
Vermis

Multiplane Correlation

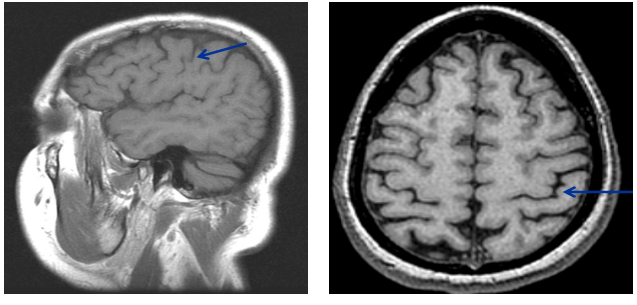
Radiology Team 437

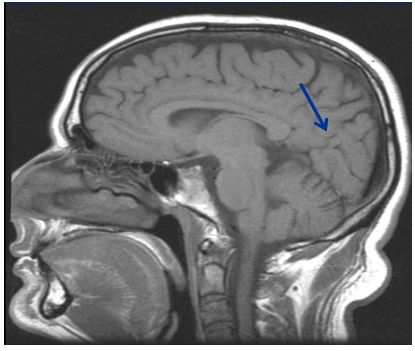
Sylvian fissure

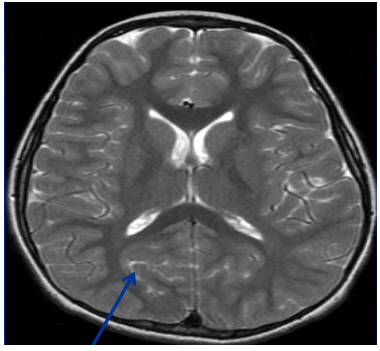
-What structure runs within the sylvian fissure ? **Middle cerebral artery**



Central (Rolandic) fissure

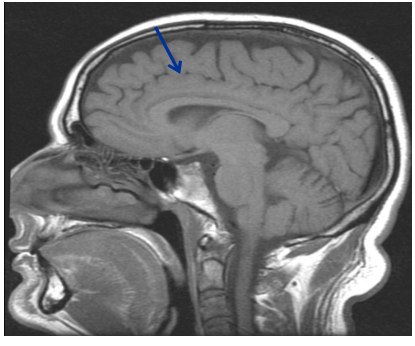


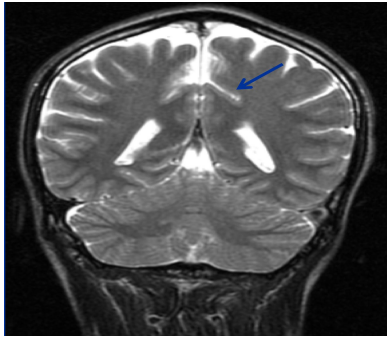




Parieto-occipital fissure

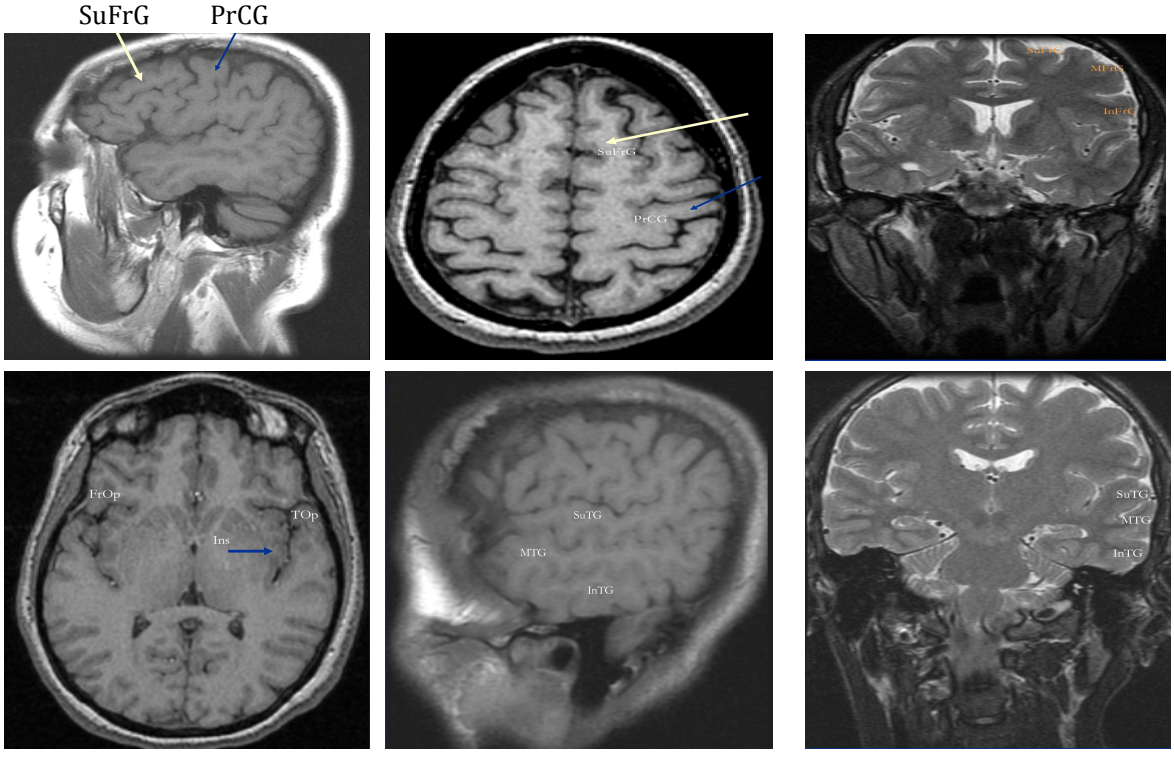
Cingulate sulcus





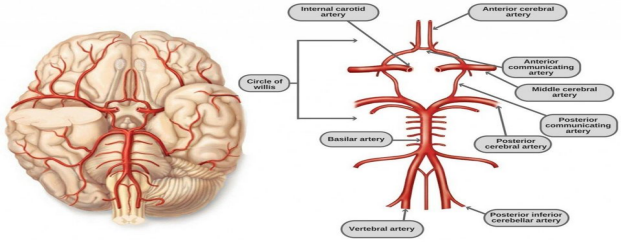
Shortcuts:

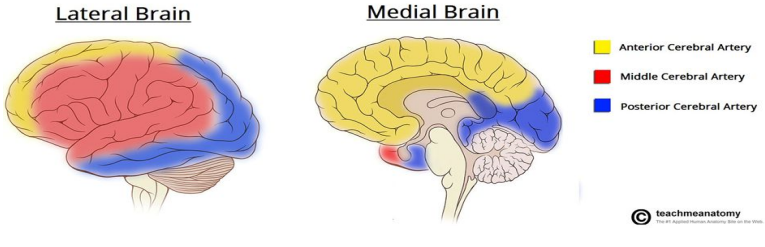
SuFrG: Superior frontal gyri
PrCG: Precentral gyri
InFrG: Inferior frontal gyri
MFrG: Middle frontal gyri
Ins: Insula
TOp: Temporal Lobe
SuTG: Superior temporal gyri
MTG: Middle temporal gyri
InTG: Inferior temporal gyri



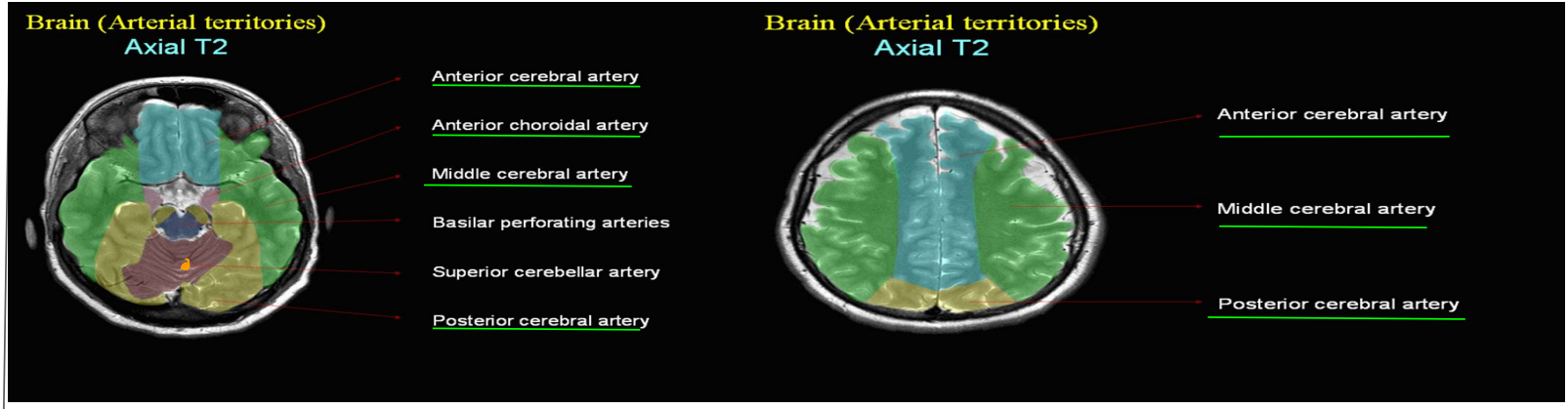
Radiology Team 437

Cerebral blood supply:

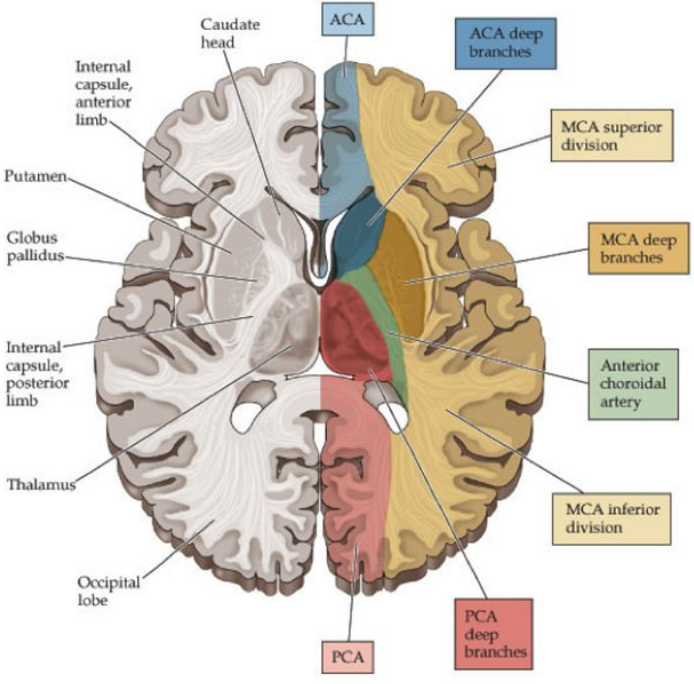


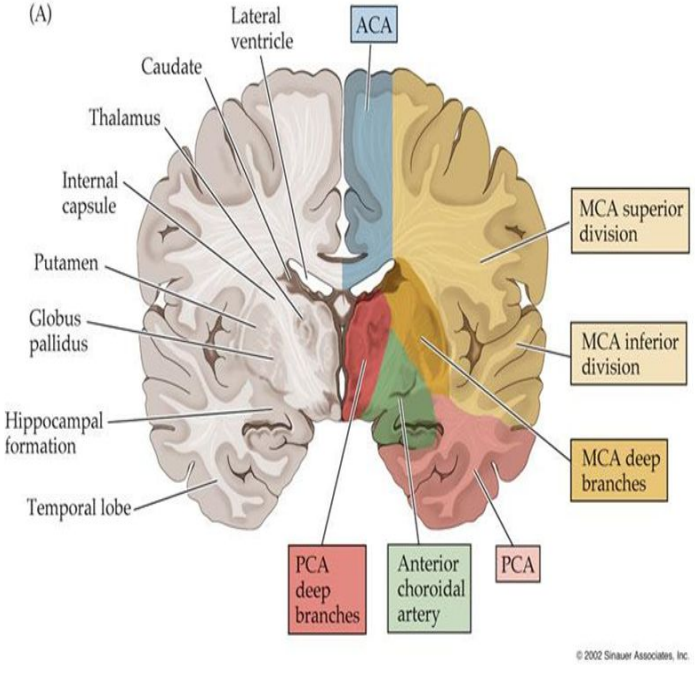


-It's very important to know the supply of the arteries of each part of the cerebral hemisphere



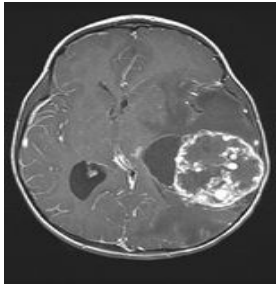
-Posterior limb of the internal capsule and the **hippocampus** are supplied by the **anterior choroidal artery**



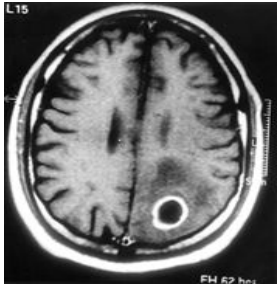


Pathological radiograph of cerebral hemispheres :

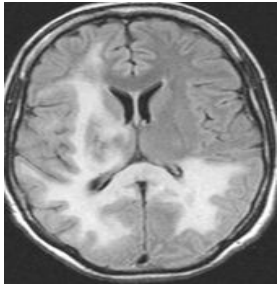
"Extra not Related to the lecture "



Tumor

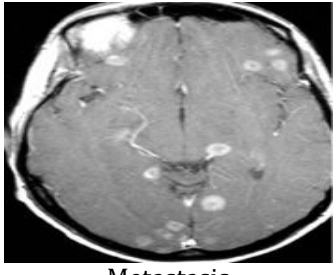


Abscess

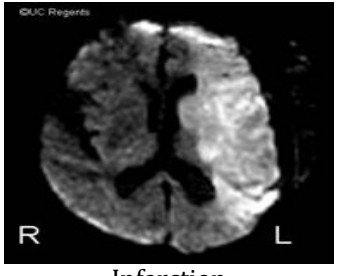


Infection

Malformation



Metastasis



Infarction

Quiz: "from the doctor's slides"

Radiology Team 437

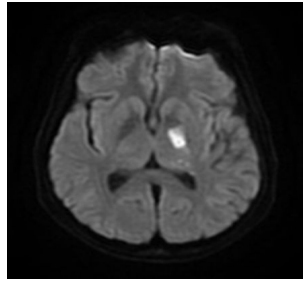
This MRI image shows acute infarction. What is the artery involved?

A.Anterior cerebral

B.Anterior choroidal

C.Posterior cerebral

D.Middle cerebral



Axial MRI Diffusion weighted image

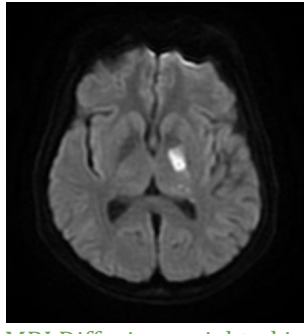
This MRI image shows acute infarction. What is the expected neurological deficit?

A.Right leg weakness

B.Right arm weakness

C.Right body side weakness

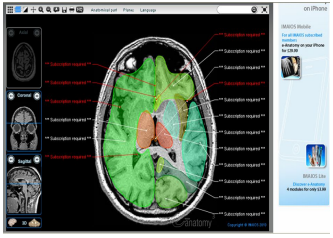
D.Left leg weakness

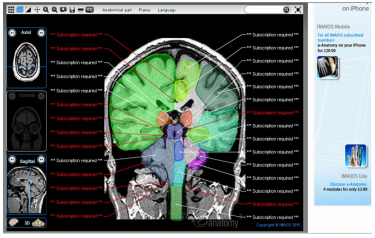


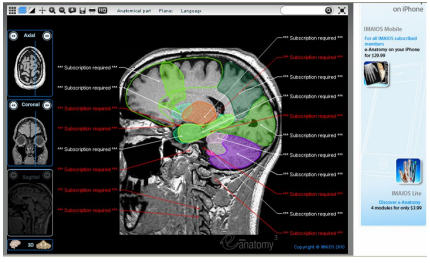
Axial MRI Diffusion weighted image

Answers: 1- B , 2- C

Useful Application to learn radiology :

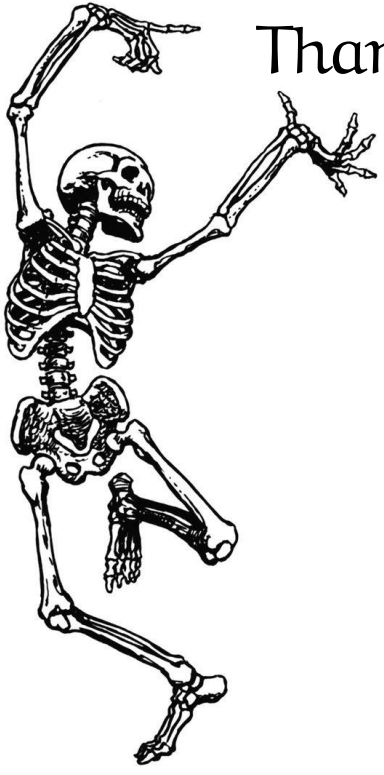






Useful e-Resources:

- The whole brain atlas, Harvard University.
- Radiologic Anatomy, Wayne State University.
- E-anatomy, www.imaios.com
- Visible body, www.visiblebody.com
- Radiology assistant, www.radiologyassistant.nl



Thank you for checking our work

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