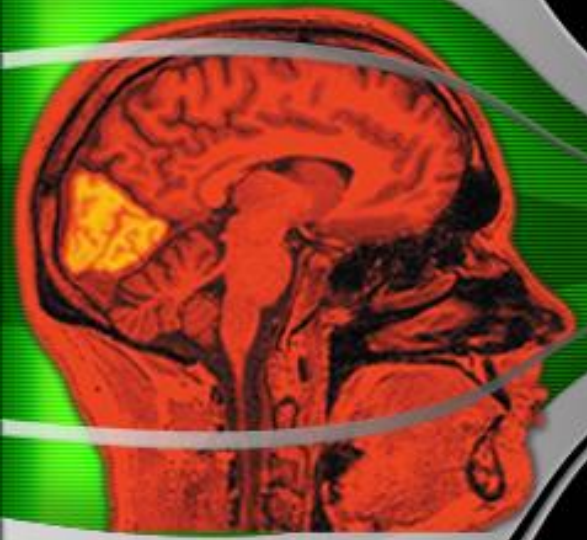
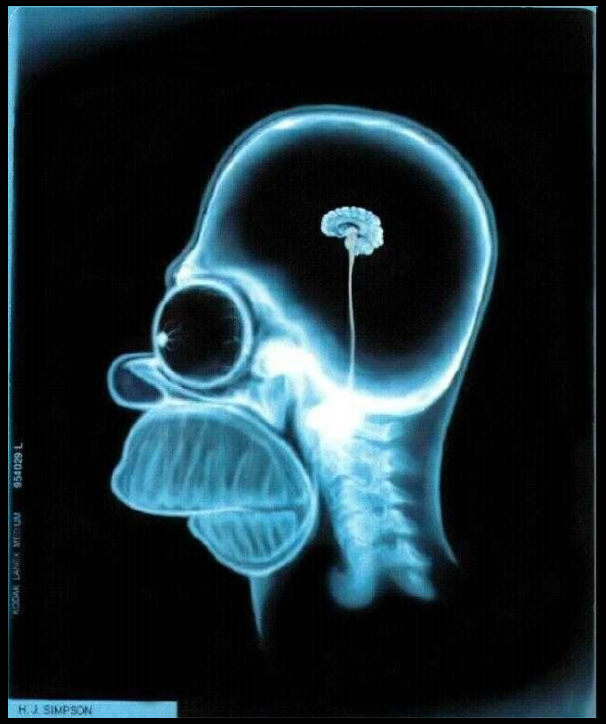
CNS Imaging



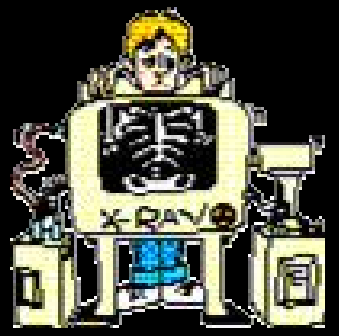
Dr Amir Monir, MD

Lecturer of radiodiagnosis

Types of radiological examinations you know



- Plain X-ray
- X-ray with contrast
  - GIT : barium (swallow, meal, follow through, enema)
  - ERCP
  - UT : IVP, cystogram
  - Genital : HSG
  - Respiratory : Bronchography
  - CNS : Myelography
  - Skeletal : Arthrography
- Ultrasonography (NOT on skull or chest)
- Doppler US
- CT
- MRI
- Isotope scan
- Interventional (Angiography)



Methods of CNS imaging

Plain X-ray

CT

MRI

Others: myelography

Methods of CNS imaging

Cx Spine

Plain X-ray.

- AP view : detection of cervical ribs .
- Lateral view shows :
  - Curve of the spine.
  - Intervertebral disc spaces.
  - Spondylotic changes.
  - Vertebral compression.

Methods of CNS imaging

Spine

MRI

- Disc prolapse.
- Bone marrow infilteration.
- Spinal cord lesions: astrocytoma, syringohydrmyelia
- Nerve sheath tumors: schwanoma.
- Spinal infection.
- Degenerative changes.

CT ... The idea

X-ray !!

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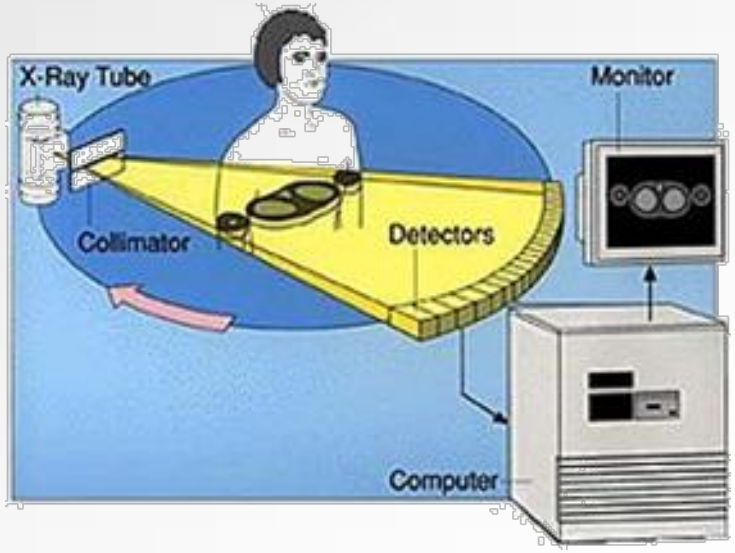
CT

Computerized = we use computer to produce images

Tomography = we "slice" the patient



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Some funny stuff

CT....the mummy

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CT ...basic concepts

It uses X-rays to produce cross sectional images

Types : 1 - Conventional

2 - Contrast enhanced : - evaluation of vessels (normal / abnormal).
- evaluation of lesions (inflammatory / neoplastic)

3 - Spiral , Helical CT : - very fast
- 3D applications

4 - Multislice CT : uses multiple rows of detectors

5 - SPECT (Single Photon Emission CT) : uses isotopes

6 - Electron beam

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CT ...basic concepts

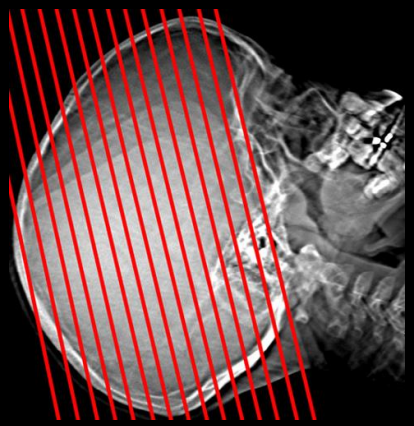
Techniques :

1 - CT angiography

2 - CT Urography

3 - CT virtual colonoscopy

4 - CT virtual bronchoccopy



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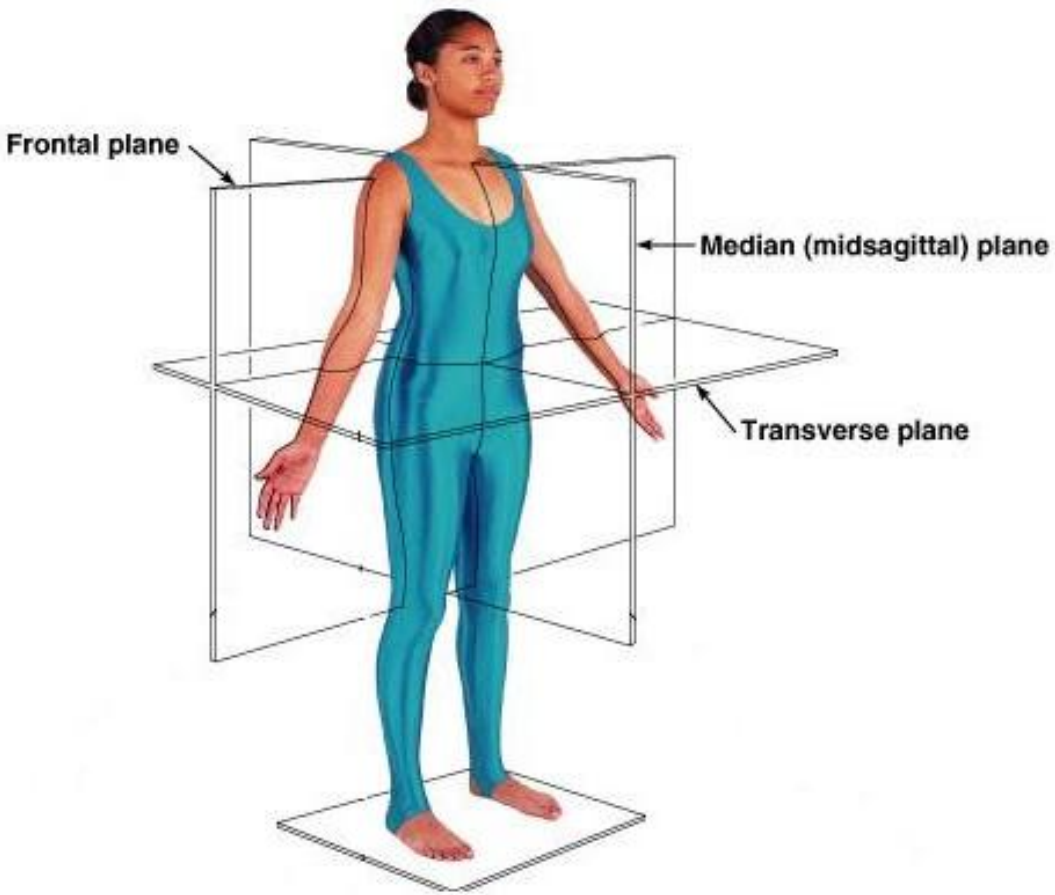
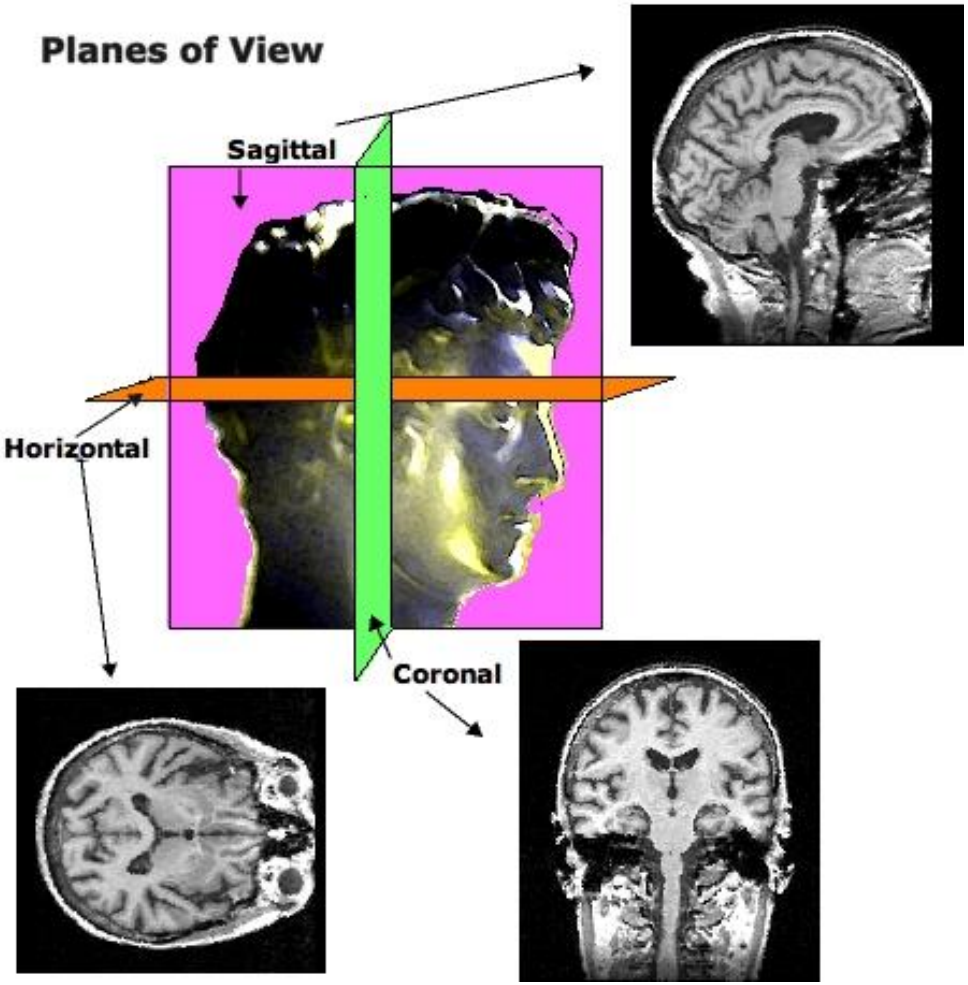
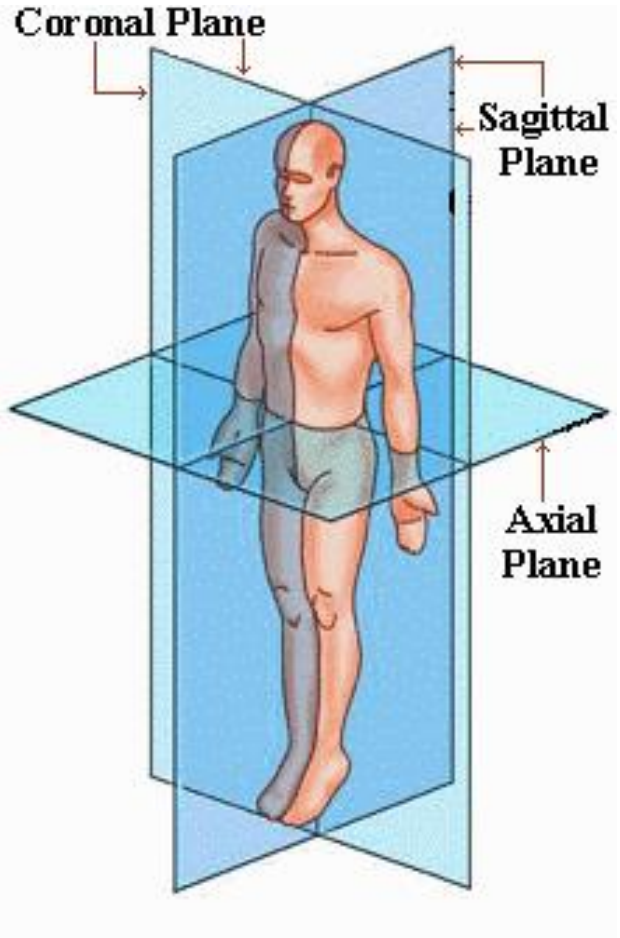
CT …Terms

Axial (whole body), Coronal (brain, PNSs), NO Sagittal CT



Terms…Planes





CT ...Terms

Density : hypodense (dark), hyperdense (bright)

Window: Bone window
Pulmonary window
Mediastinal window

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MRI

NO X-rays

Use magnetic fields to produce images

Many advantages

- Highest quality ever
- Multiplanar
- No radiation
- Many applications

Few disadvantages

- cost
- availability
- certain precautions

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MRI

Open MRI

MRI ...basic concepts

Many similarities with CT

Techniques : 1 - MR Angiography

2 - MR Urography

3 - MRCP (Cholangio-pancreatography)

4 - MR Myelography

5 - Functional imaging : - Spectroscopy
- Diffusion
- Perfusion
- BOLD (Blood Oxygen Level Dependent)

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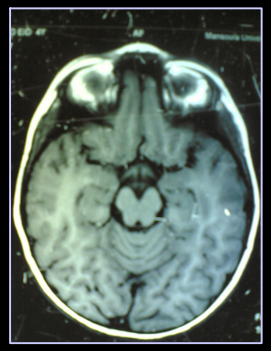
MRI ...basic concepts

Differs from CT

Intensity : hypointense (dark), hyperintense (bright)

Sequence :	Fluid	Fat
T1	hypo	hyper
T2	hyper	hypo



T1

T2

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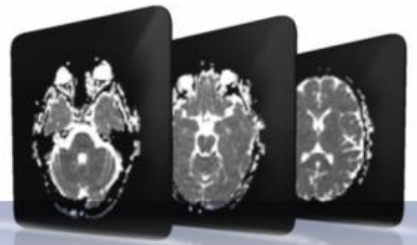
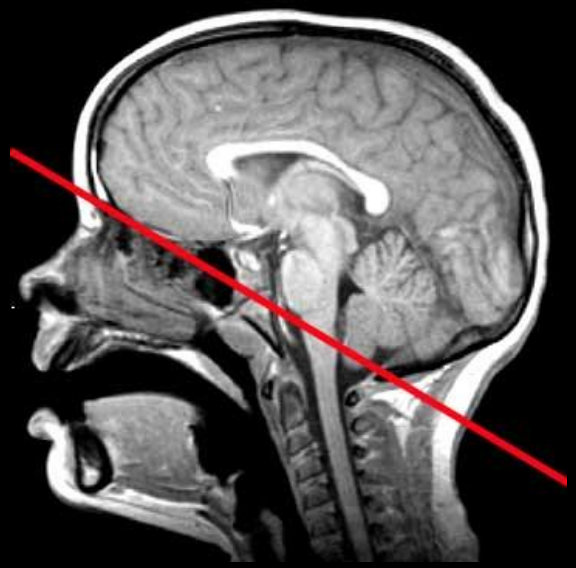
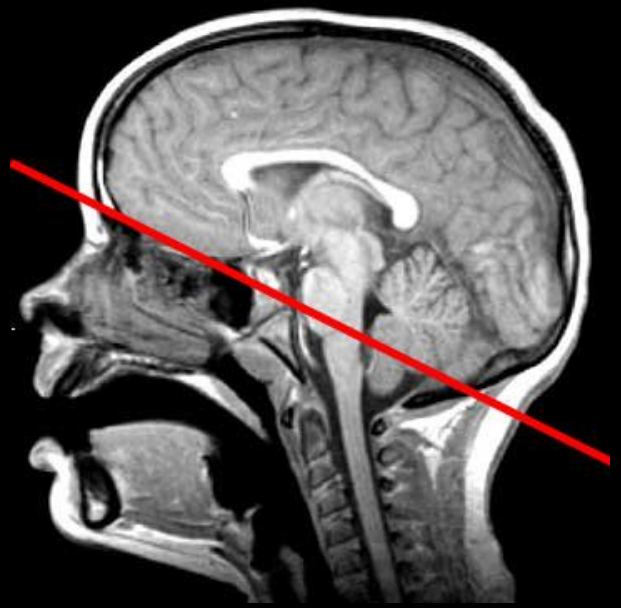
Brain anatomy

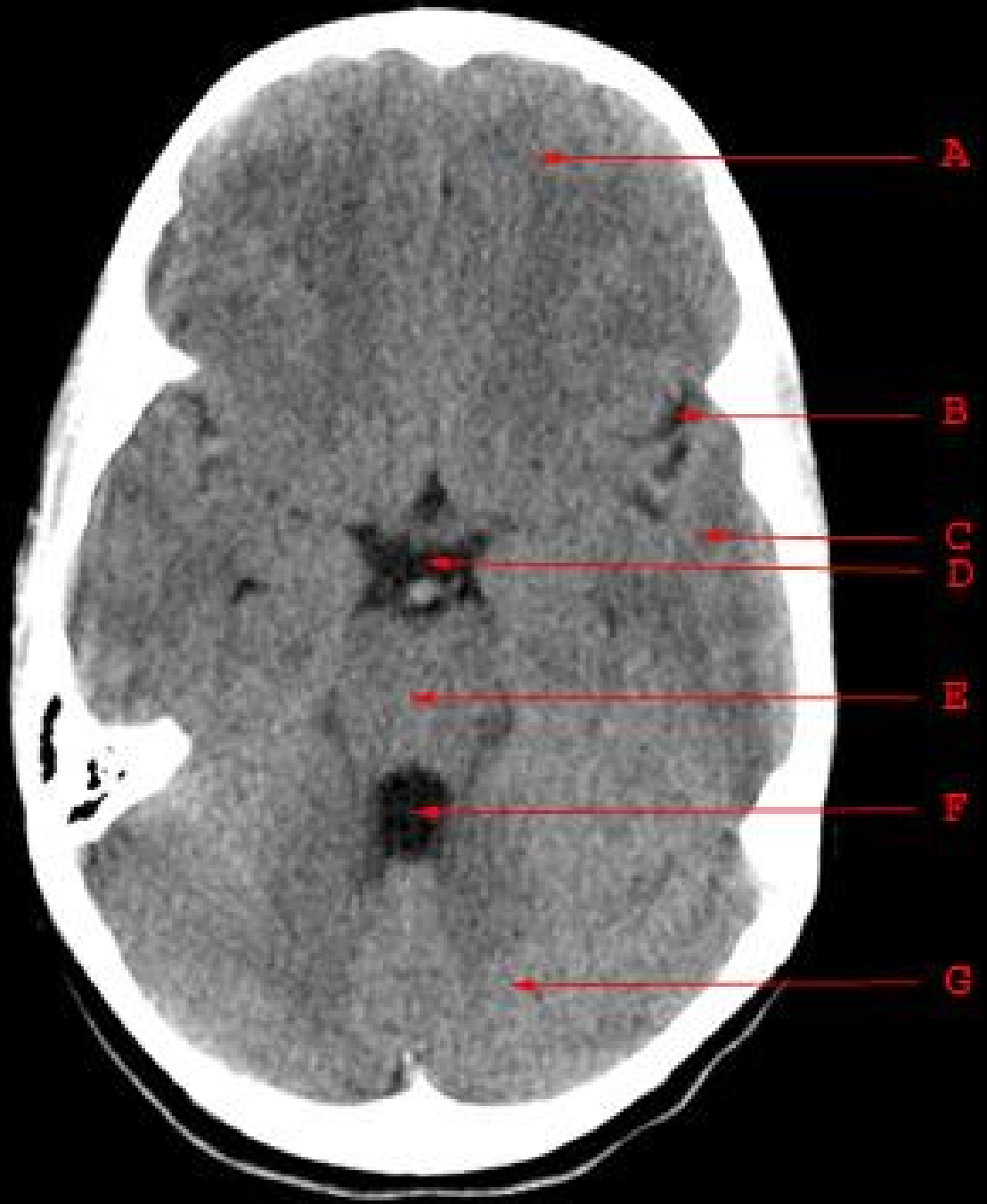


A. Orbit
B. Sphenoid Sinus
C. Temporal Lobe
D. External Auditory Canal
E. Mastoid Air Cells
F. Cerebellar Hemisphere

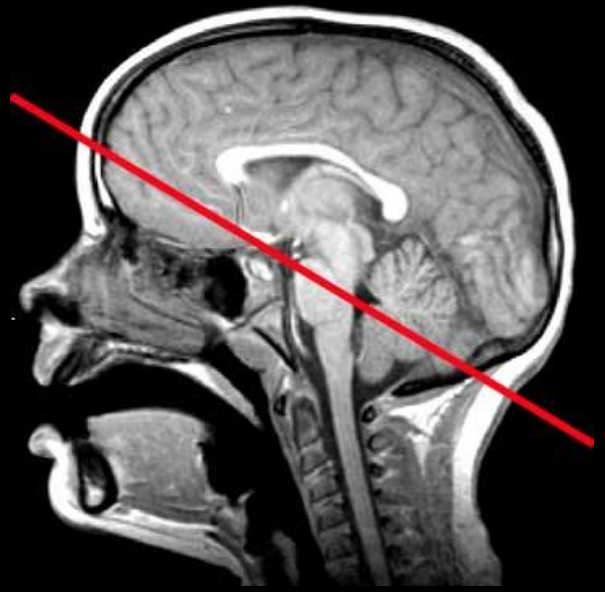


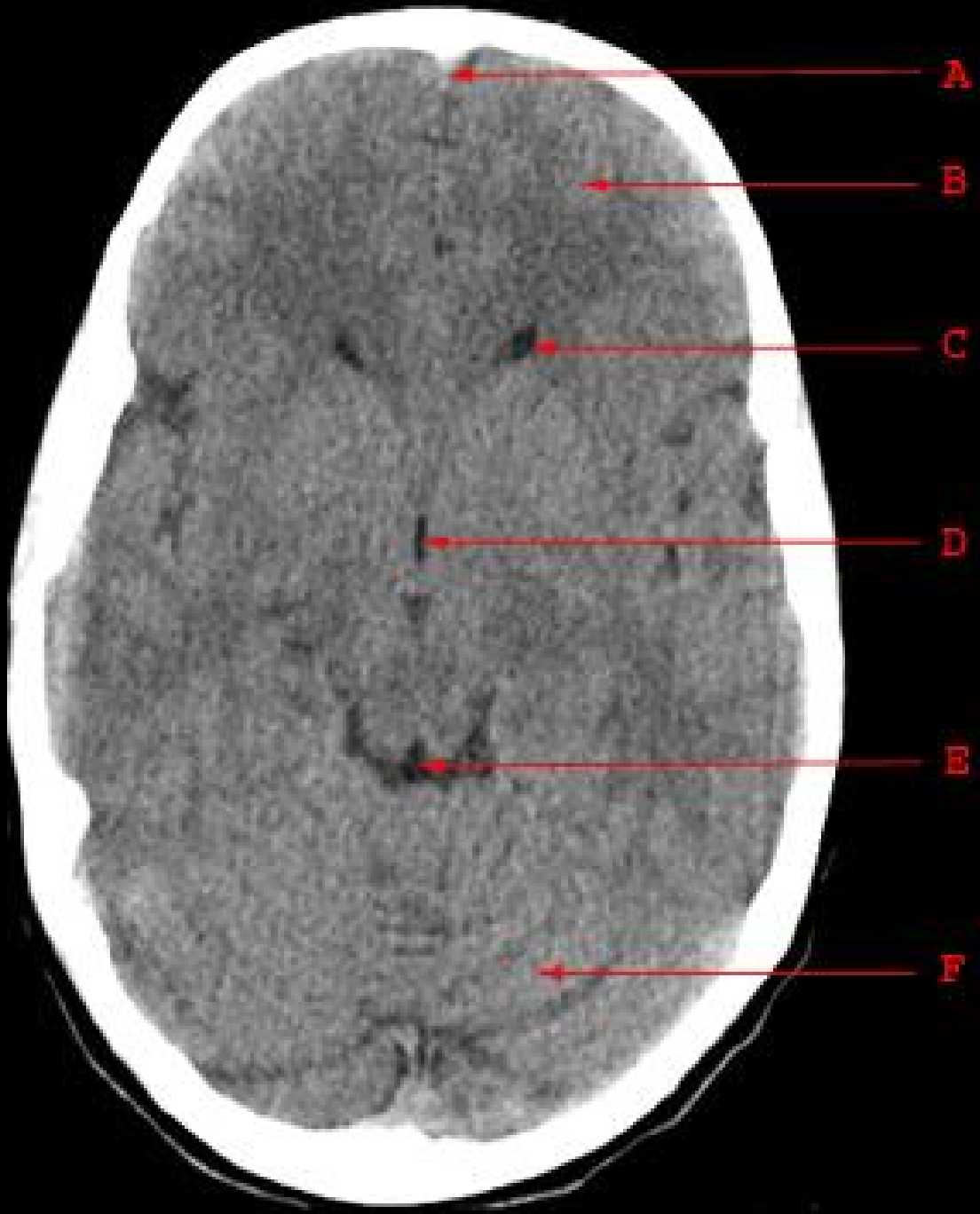
A. Frontal Lobe
B. Frontal Bone (Superior Surface of Orbital Part)
C. Dorsum Sellae
D. Basilar Artery
E. Temporal Lobe
F. Mastoid Air Cells
G. Cerebellar Hemisphere



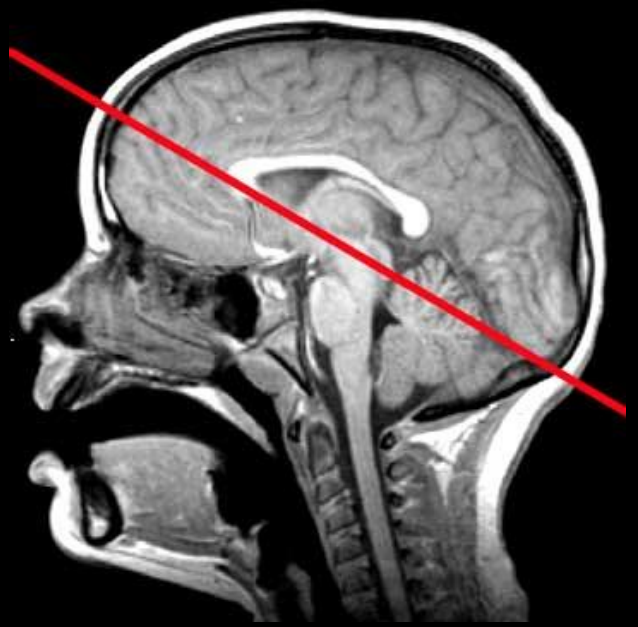


A. Frontal Lobe
B. Sylvian Fissure
C. Temporal Lobe
D. Suprasellar Cistern
E. Midbrain
F. Fourth Ventricle
G. Cerebellar Hemisphere

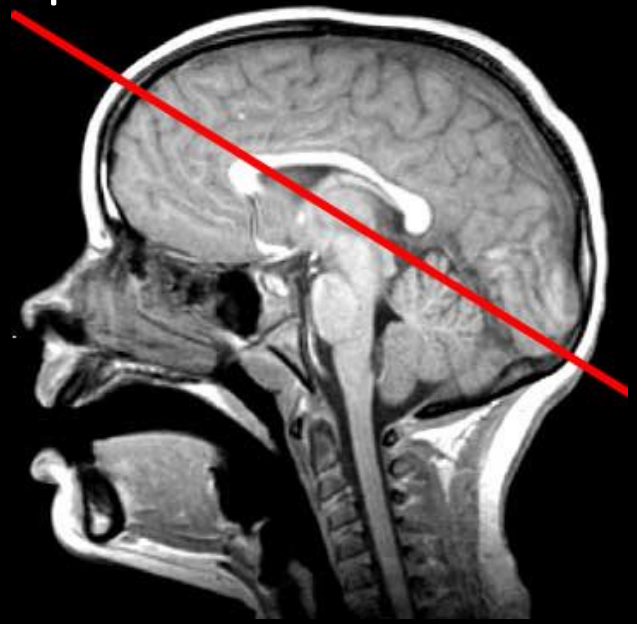




A. Falx Cerebri
B. Frontal Lobe
C. Anterior Horn of Lateral Ventricle
D. Third Ventricle
E. Quadrigeminal Cistern
F. Cerebellum



A. Anterior Horn of the Lateral Ventricle
B. Caudate Nucleus
C. Anterior Limb of the Internal Capsule
D. Putamen and Globus Pallidus
E. Posterior Limb of the Internal Capsule
F. Third Ventricle
G. Quadrigeminal Plate Cistern
H. Cerebellar Vermis
I. Occipital Lobe



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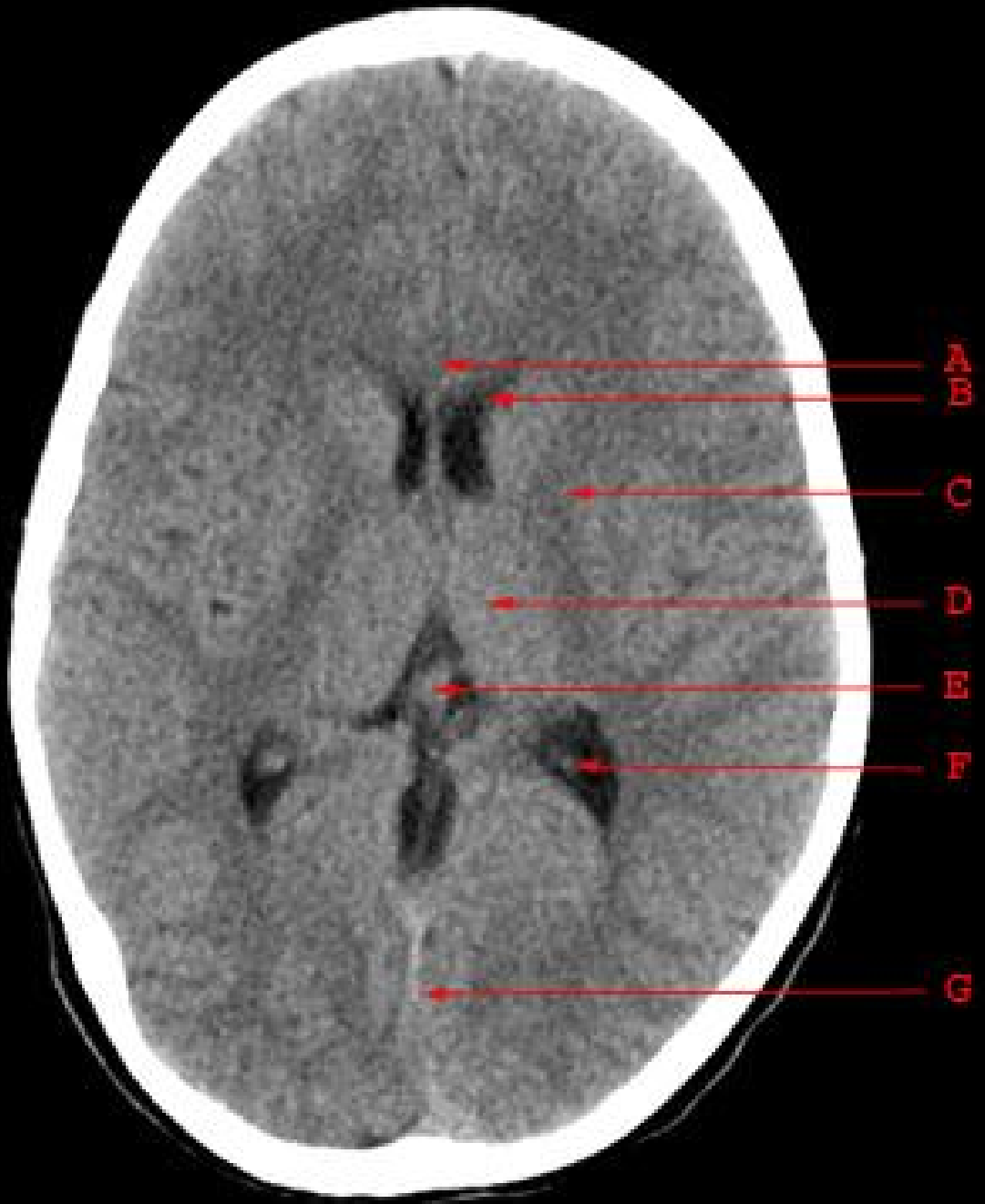
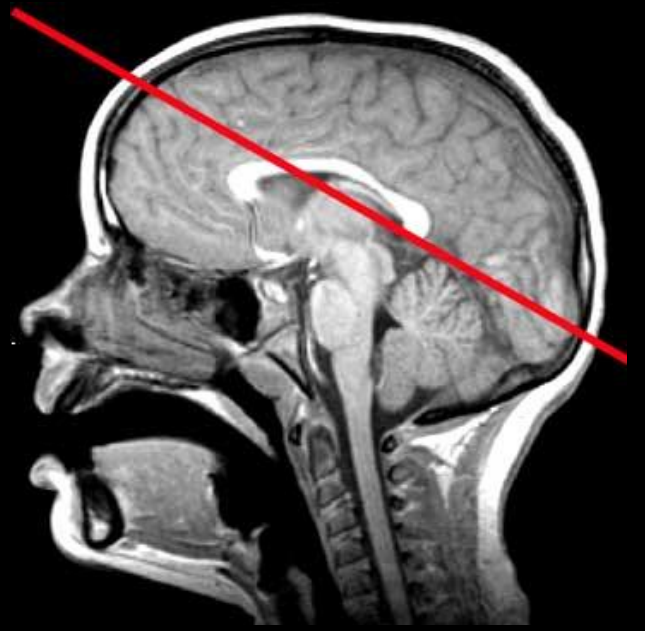


A. Genu of the Corpus Callosum
B. Anterior Horn of the Lateral Ventricle
C. Internal Capsule
D. Thalamus
E. Pineal Gland
F. Choroid Plexus
G. Straight Sinus



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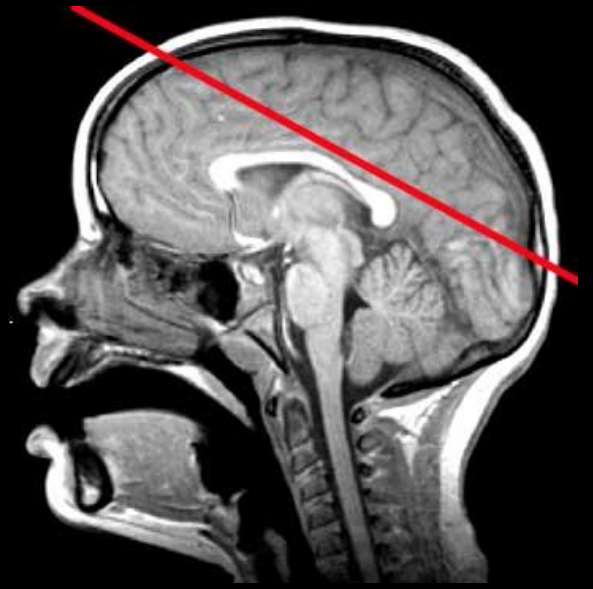
A. Falx Cerebri
B. Frontal Lobe
C. Body of the Lateral Ventricle
D. Splenium of the Corpus Callosum
E. Parietal Lobe
F. Occipital Lobe
G. Superior Sagittal Sinus



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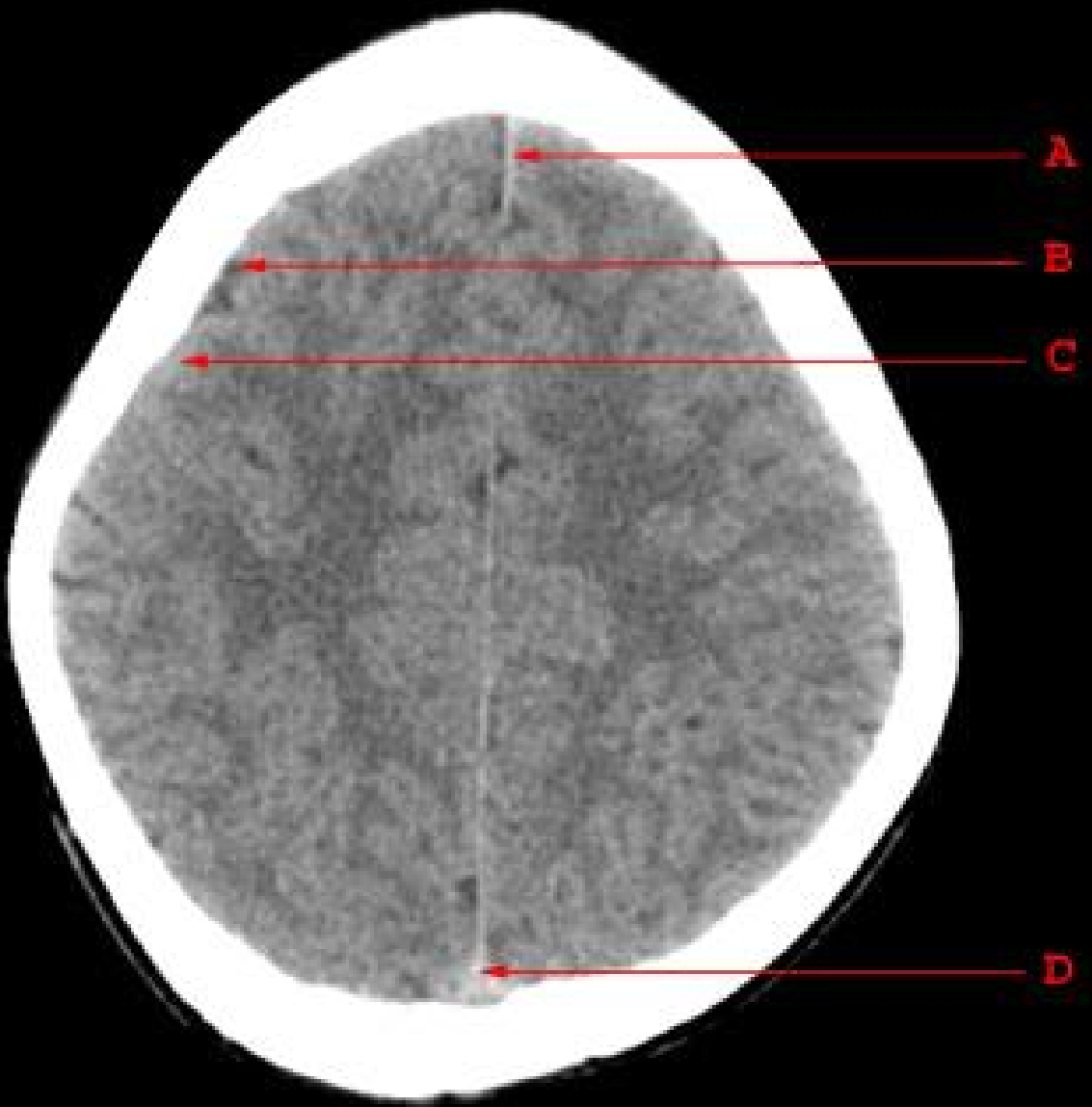
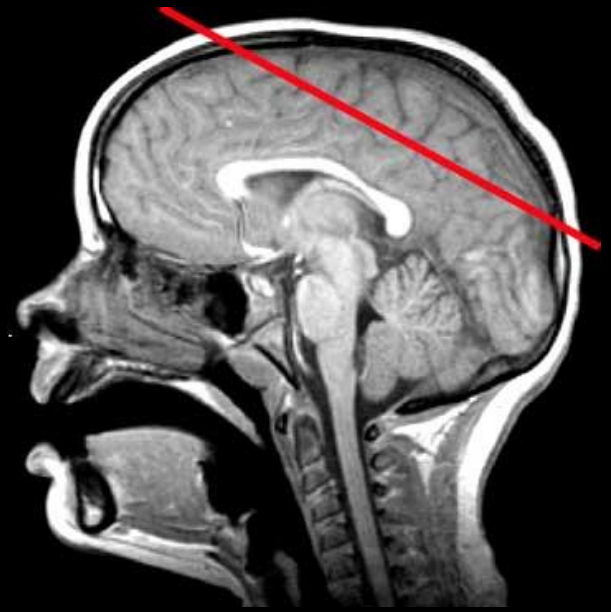
A. Falx Cerebri
B. Sulcus
C. Gyrus
D. Superior Sagittal Sinus





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