

**Essentials in Neuro-Oncology  
for the Advanced Practice Provider  
2023**

# CT Anatomy of the Brain

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**September 18, 2023**



Memorial Sloan Kettering  
Cancer Center

# Objectives



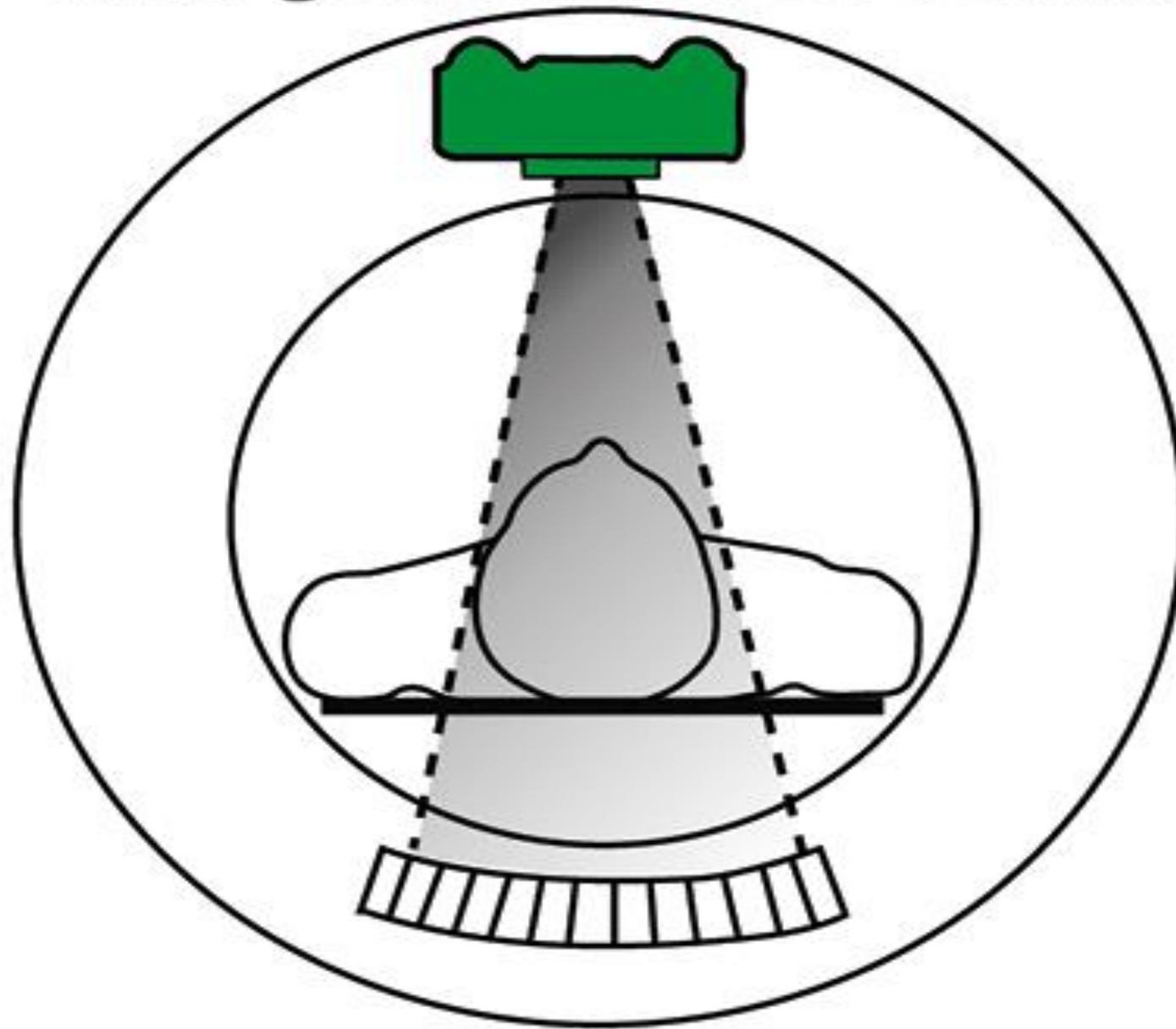
1. Review the basics of CT imaging
2. Identify the CT anatomy of the brain
3. Locate anatomical landmarks
4. Distinguish the normal variants associated with the aging brain



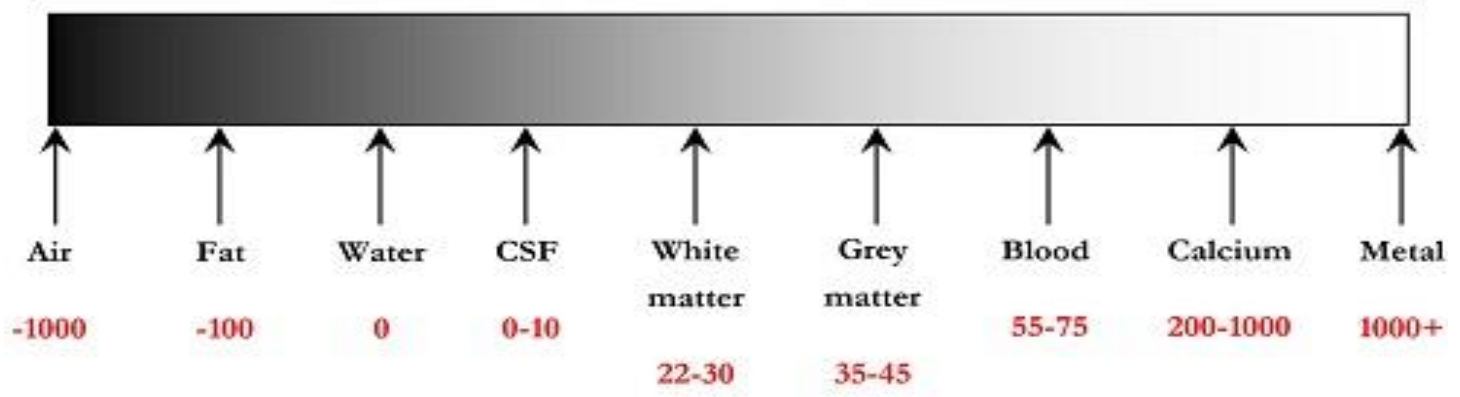
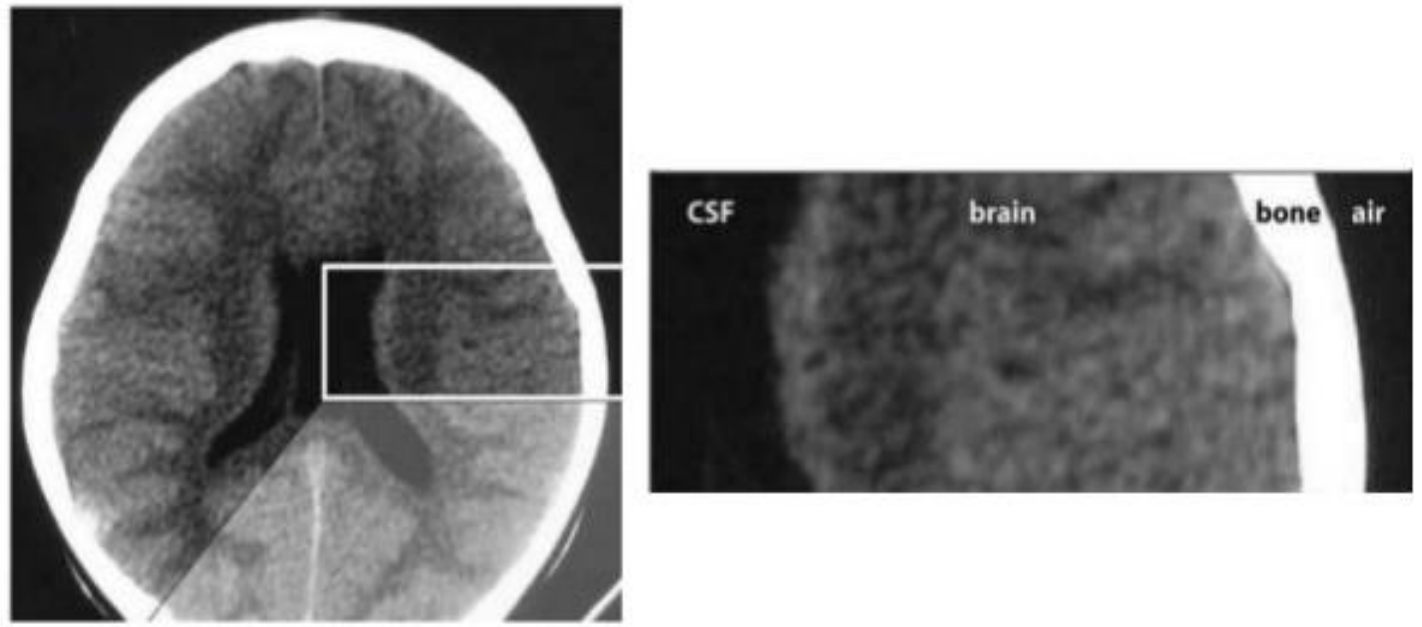
Let's Review



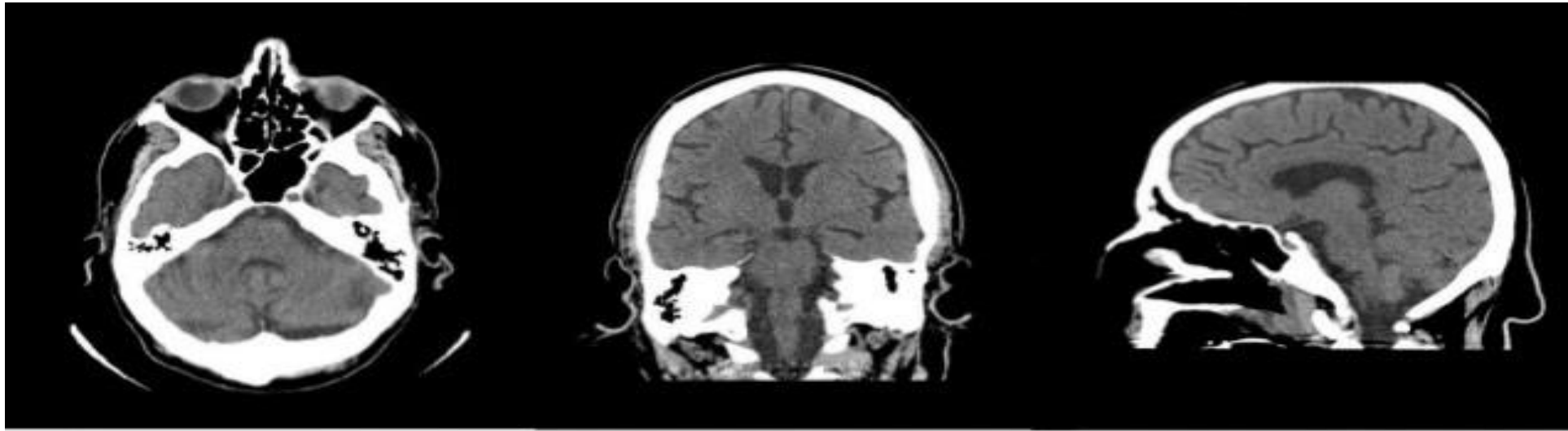
# third generation CT scanner



# Density = Brightness



# The Three Planes



Axial plane

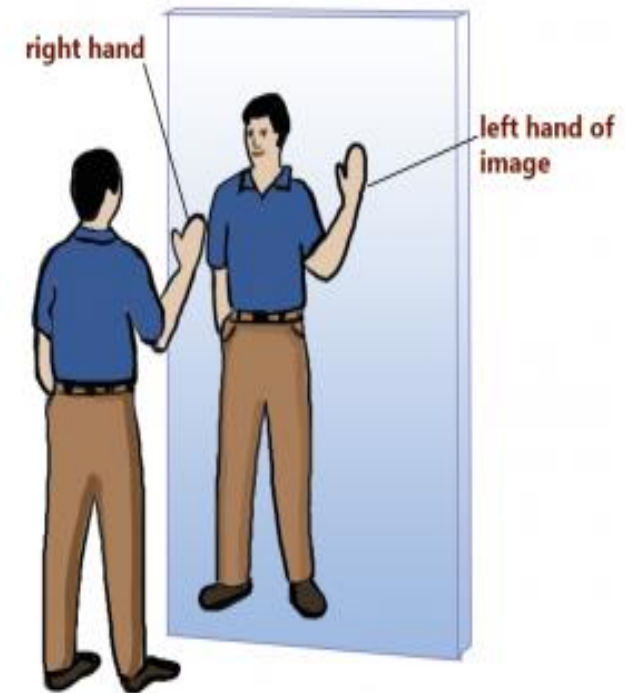
Coronal plane

Sagittal plane

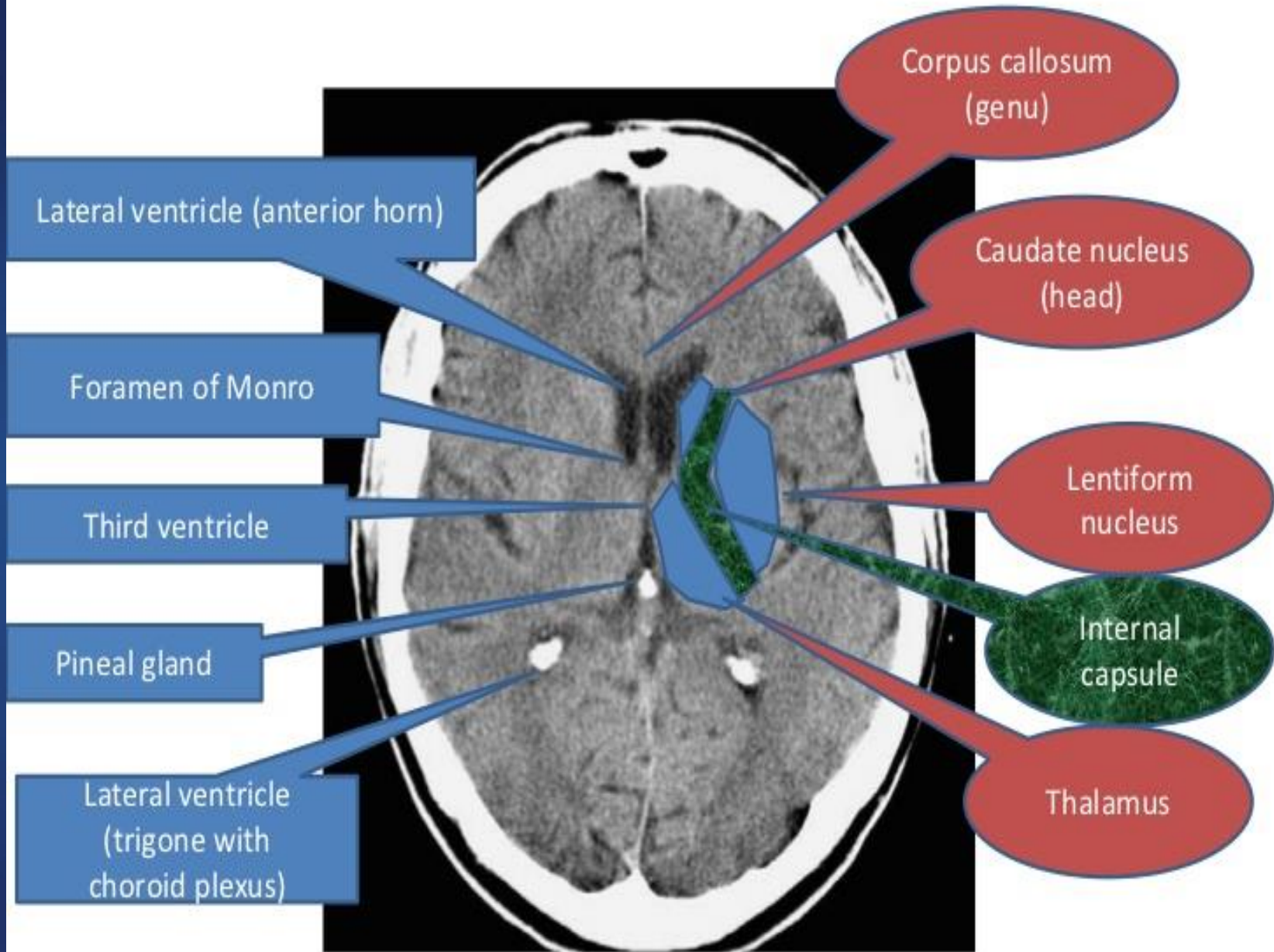
- The **axial (standard) plane**: top to bottom
- The **coronal plane**: front to back
- The **sagittal plane**: ear to ear

# Orientation

- Remember, it's a mirror image.....
- The right side of your body will be on the left side of the image and the left side of your body will be on right



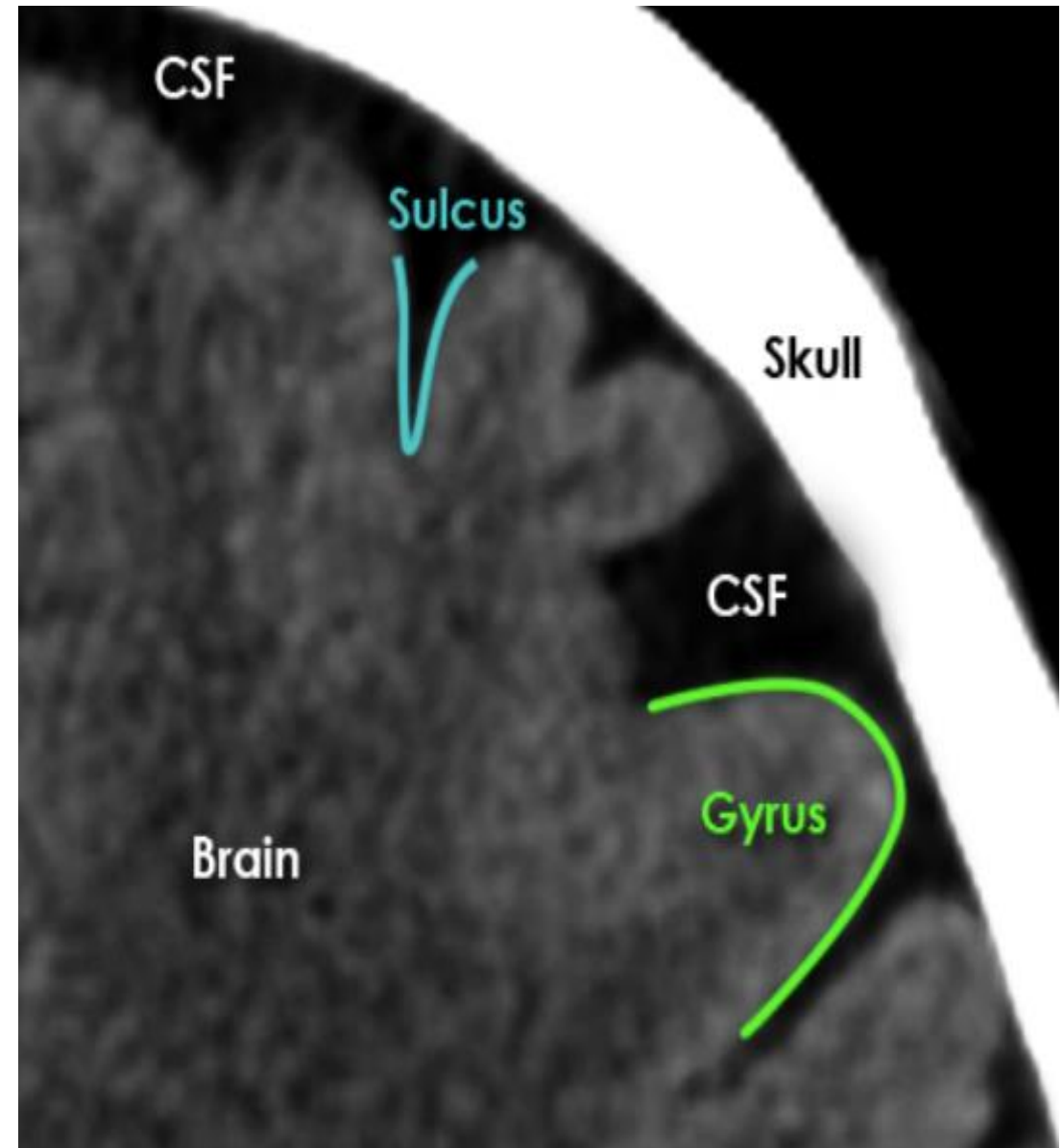
# Axial CT Anatomy



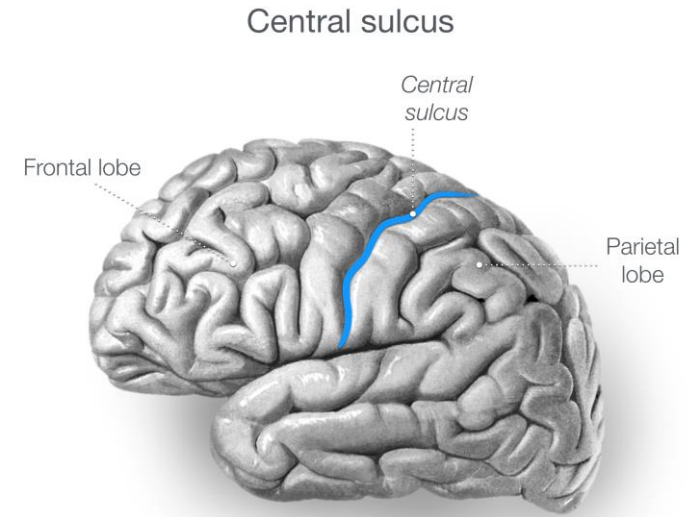
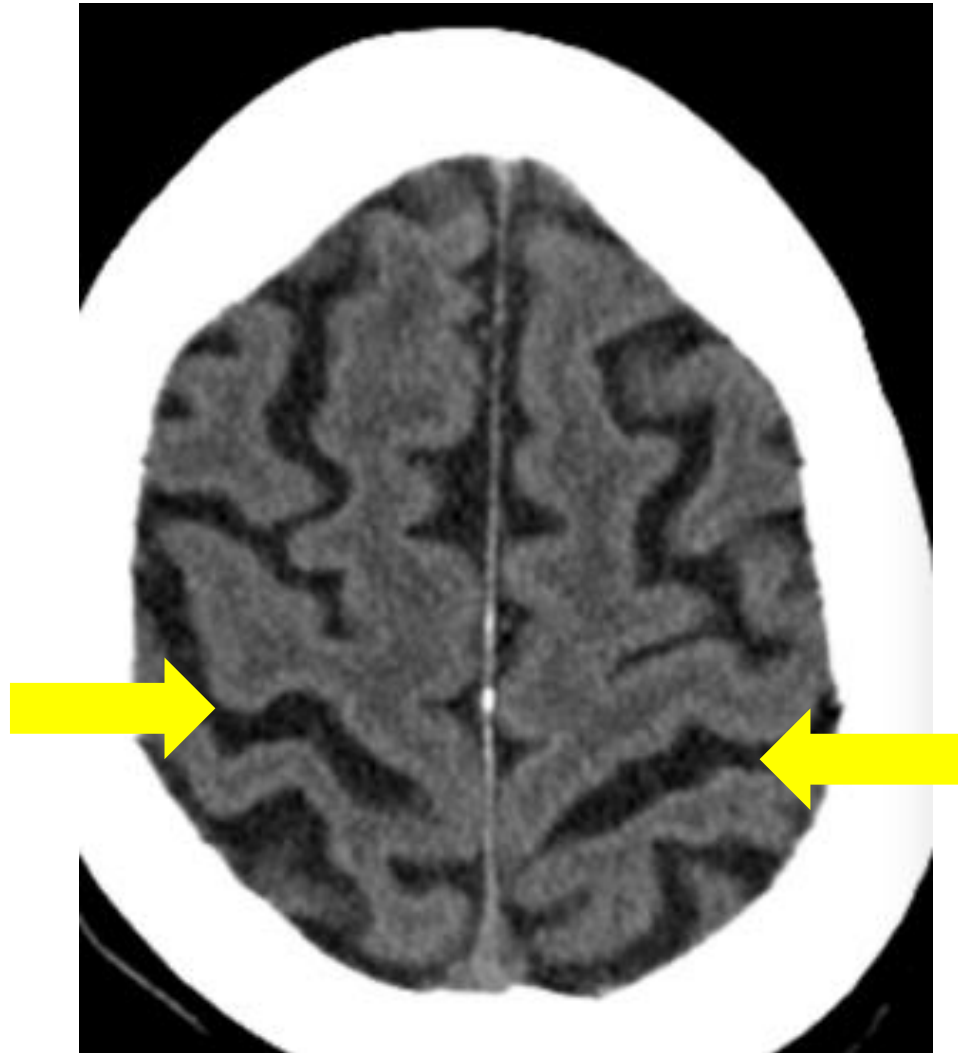


# The Sulci and Gyri

- “Mountains” and “Valleys”
- Convoluted and folded appearance of the brain
- Certain sulci create boundaries between the lobes and hemispheres
  - Central sulcus (fissure of Rolando)
  - Lateral sulcus (Sylvian fissure)
  - Inter-hemispheric (longitudinal) fissure

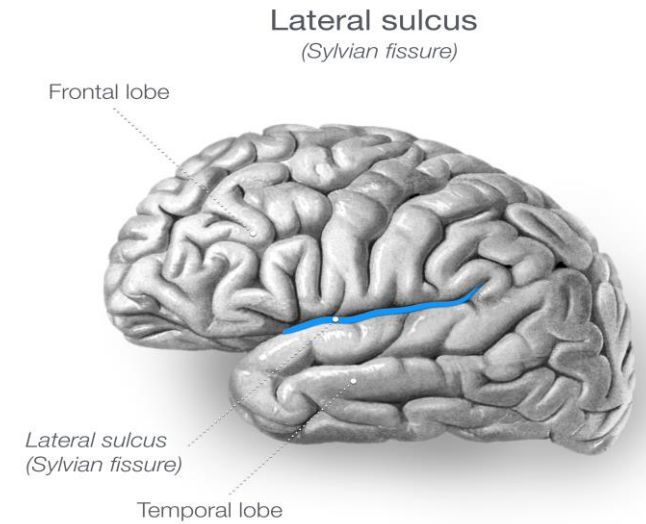
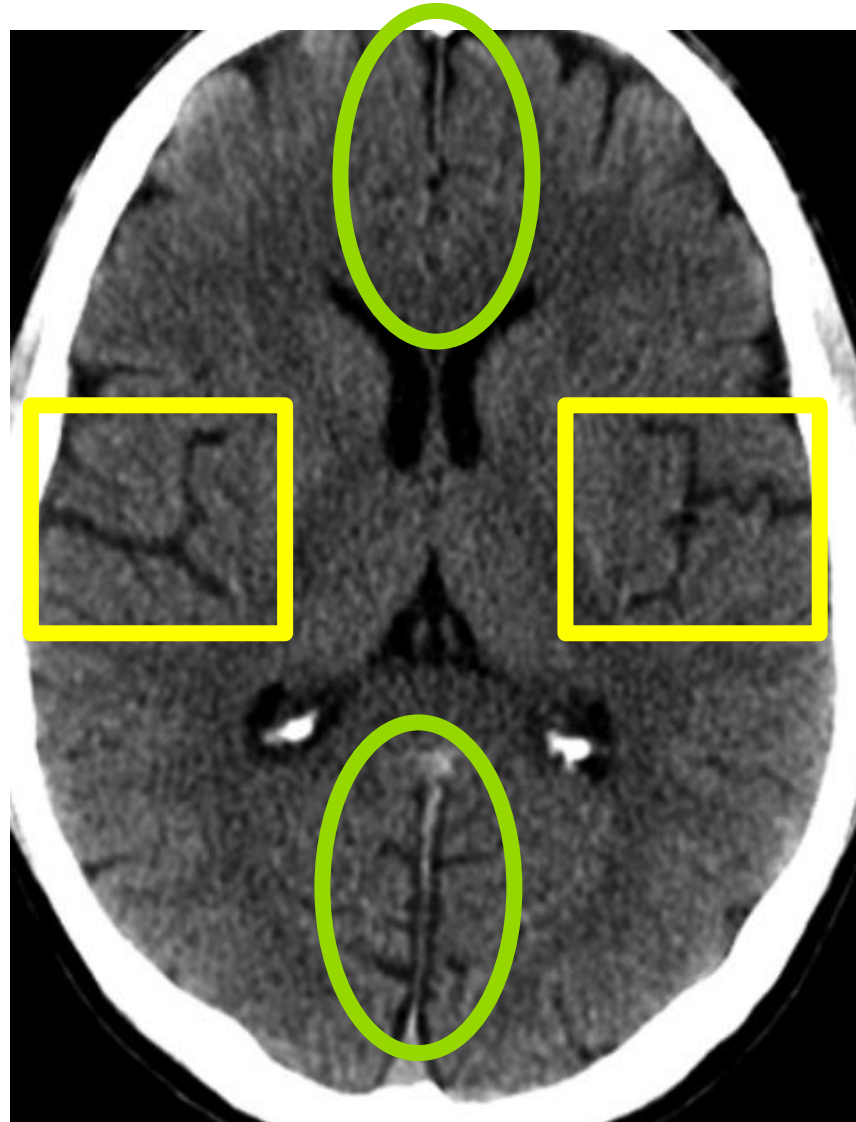


# The Central Sulcus

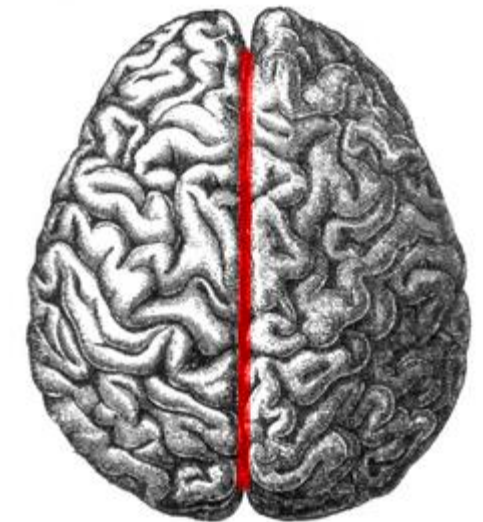


Case courtesy of Frank Gaillard, Radiopaedia.org, rID: 46670

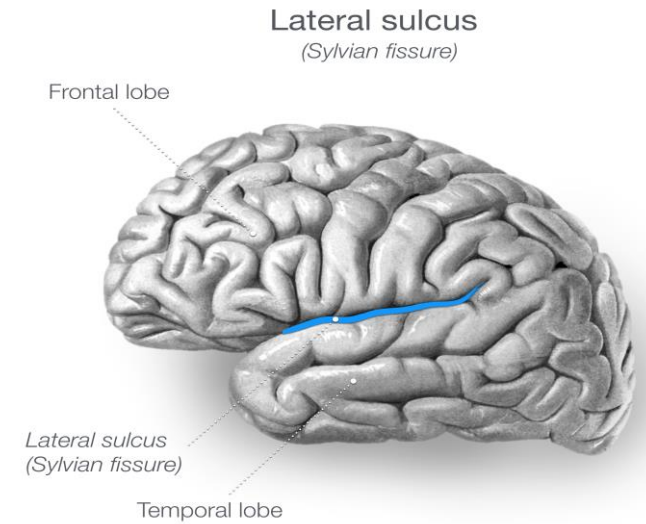
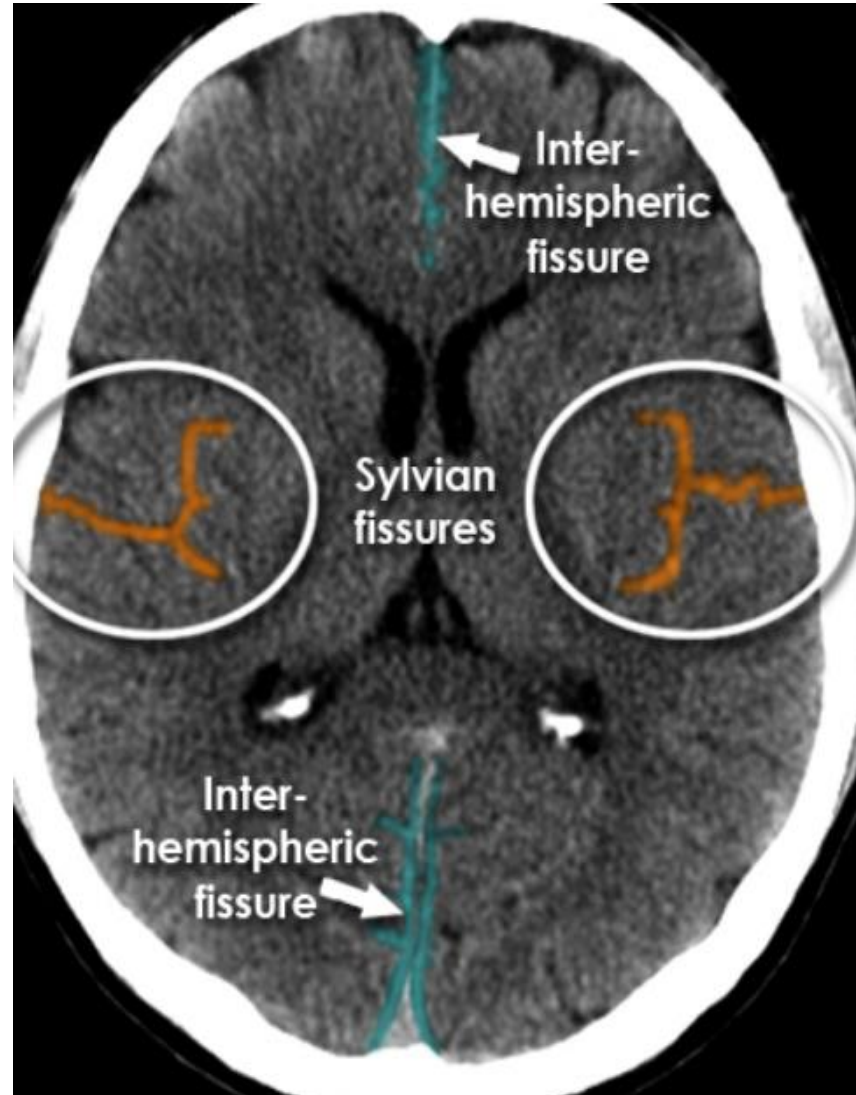
# The Sylvian Fissure and Inter-hemispheric Fissure



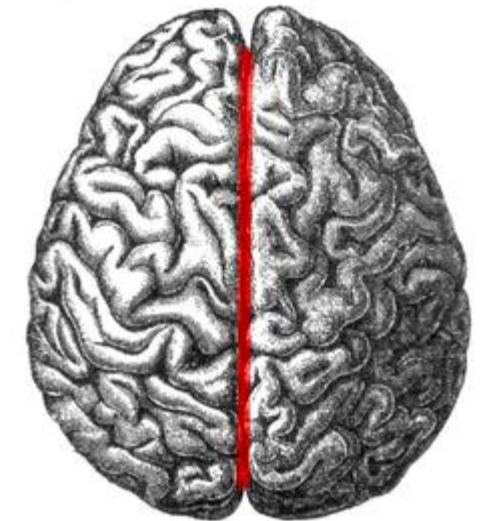
Case courtesy of Frank Gaillard, Radiopaedia.org, rID: 46670



# The Sylvian Fissure and Inter-hemispheric Fissure

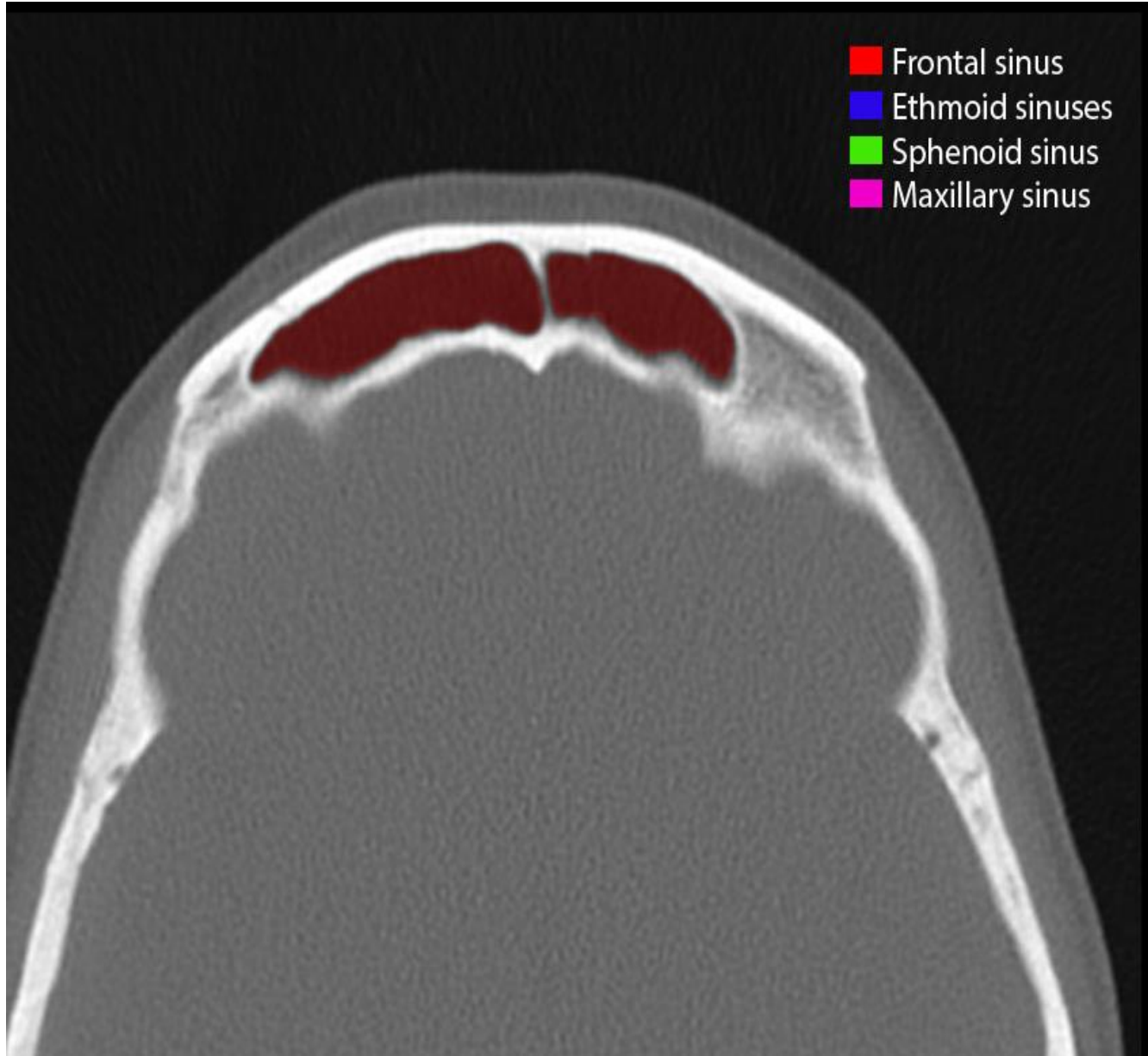


Case courtesy of Frank Gaillard, Radiopaedia.org, rID: 46670



# The Paranasal Sinuses

- Seen on the axial bone window
- Four paired air-filled spaces
  - Frontal
  - Ethmoid
  - Sphenoid
  - Maxillary
- Reduce the weight of the head
- Humidification and voice resonance



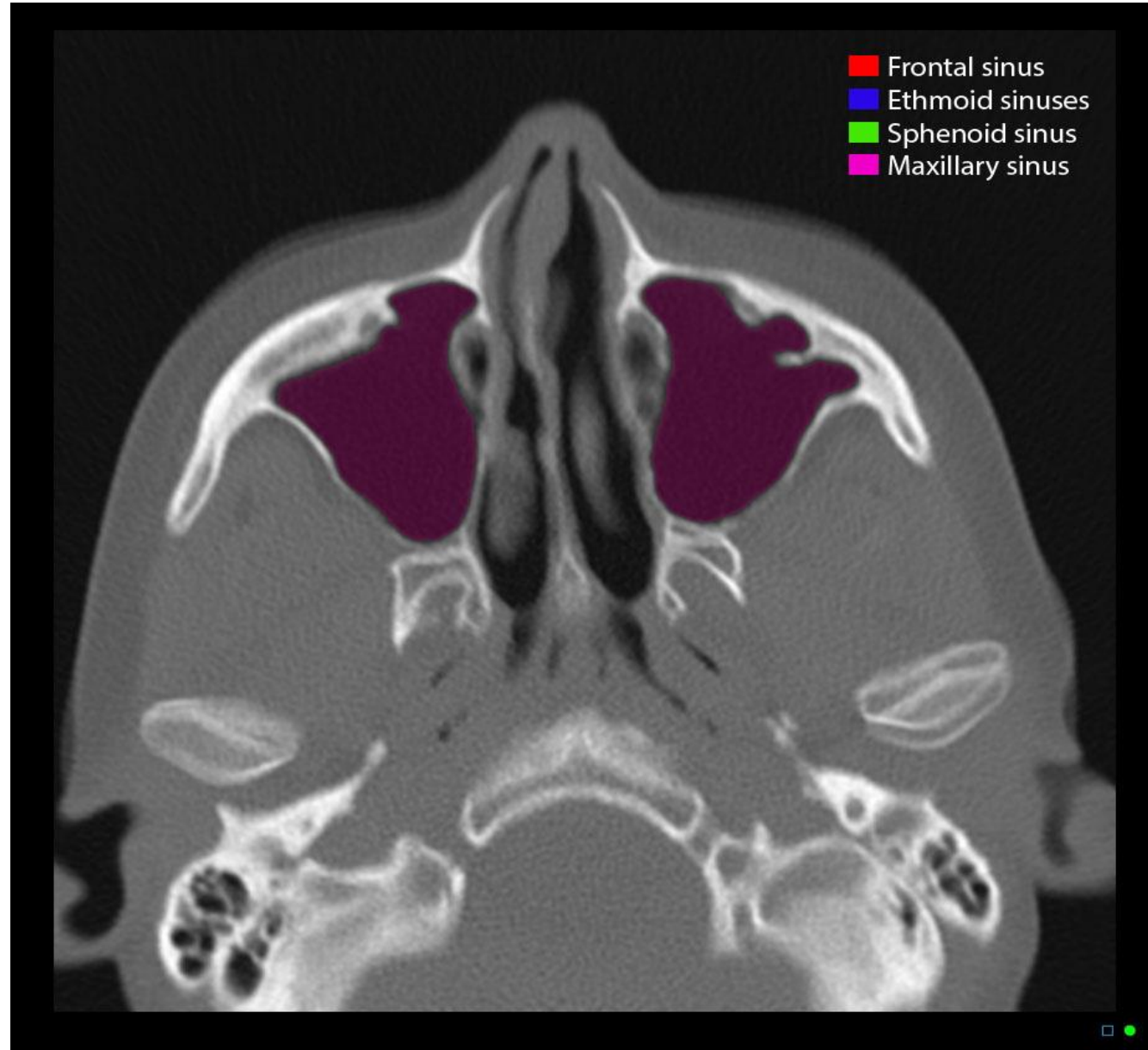
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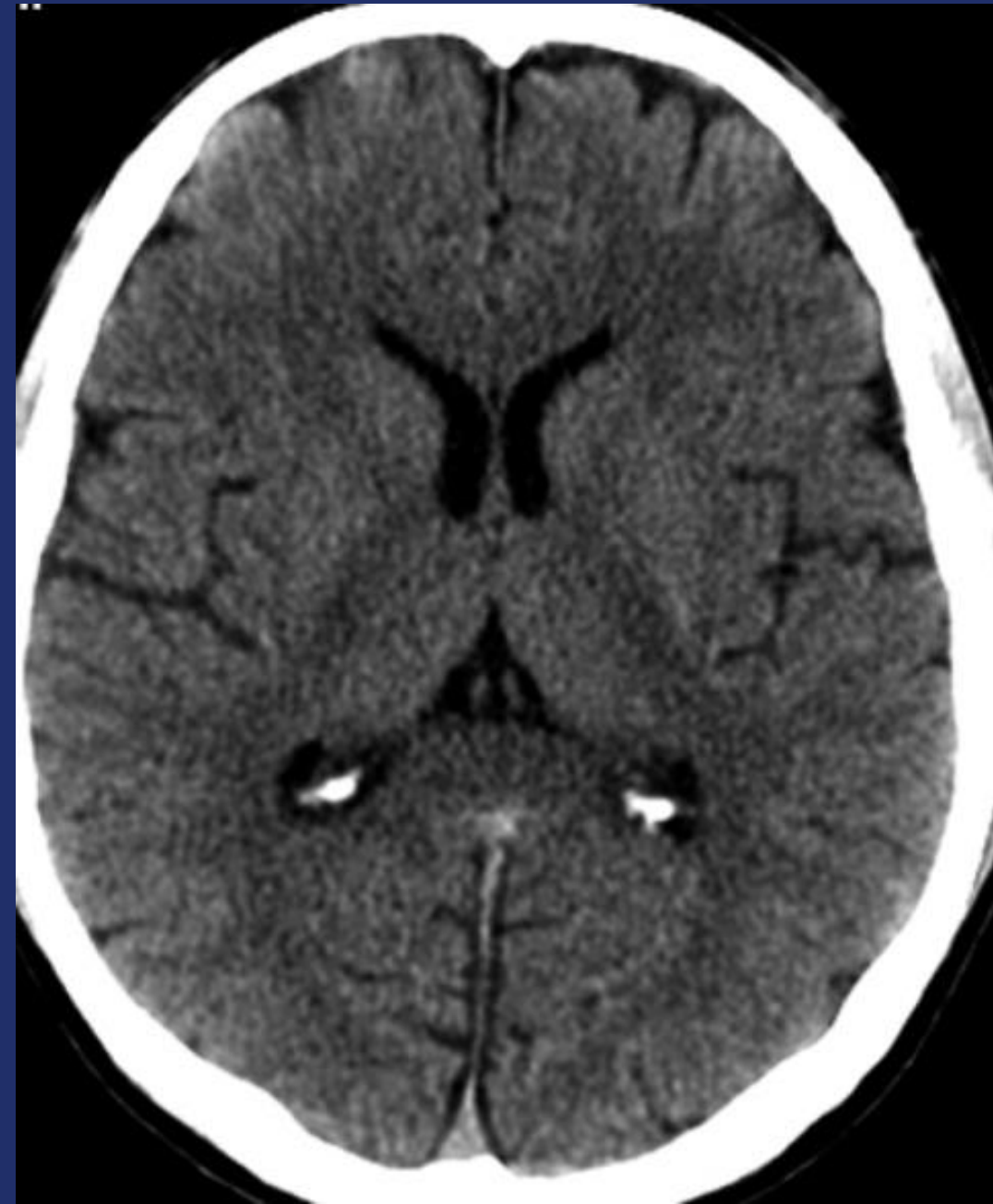
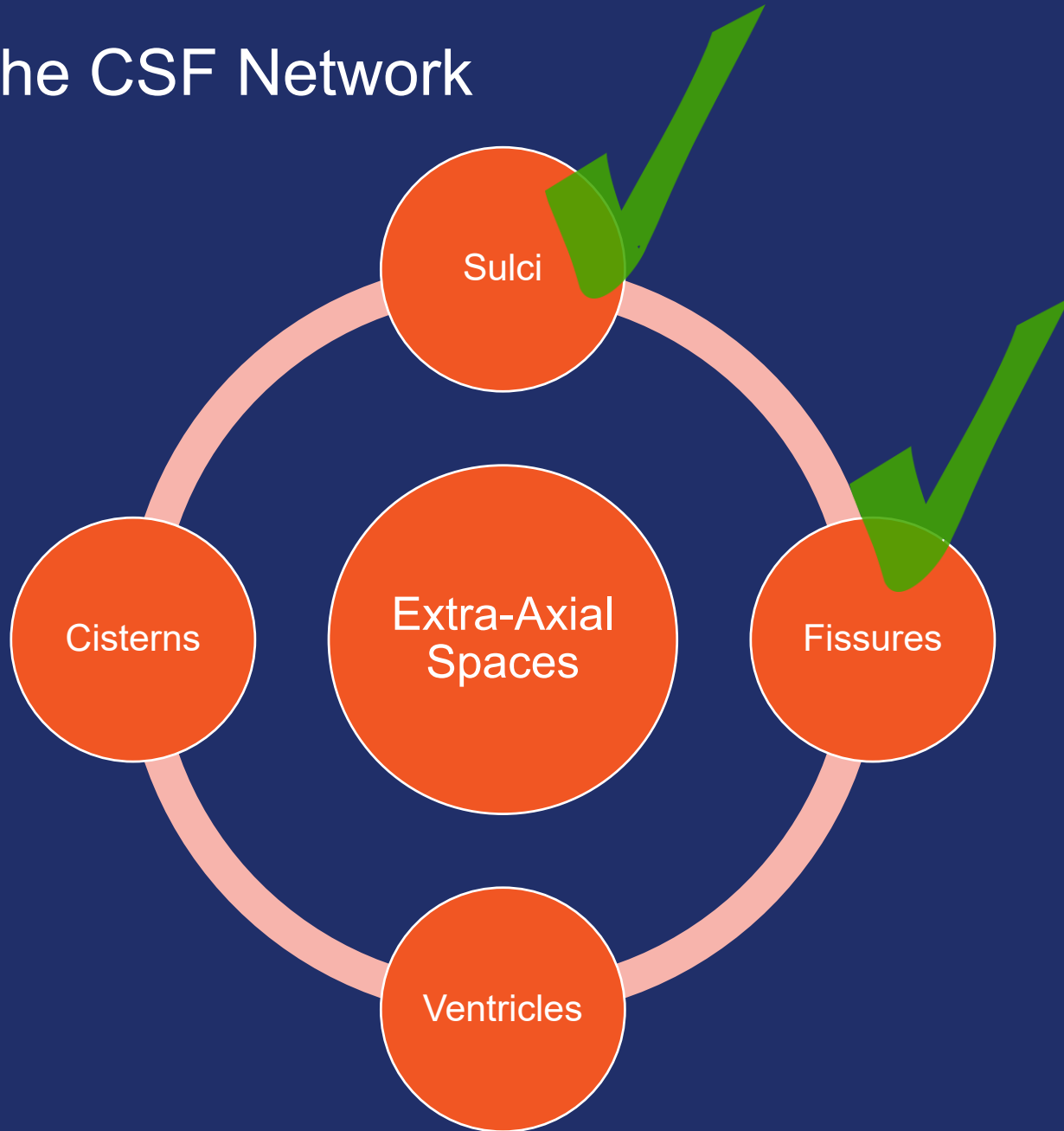


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# The CSF Network



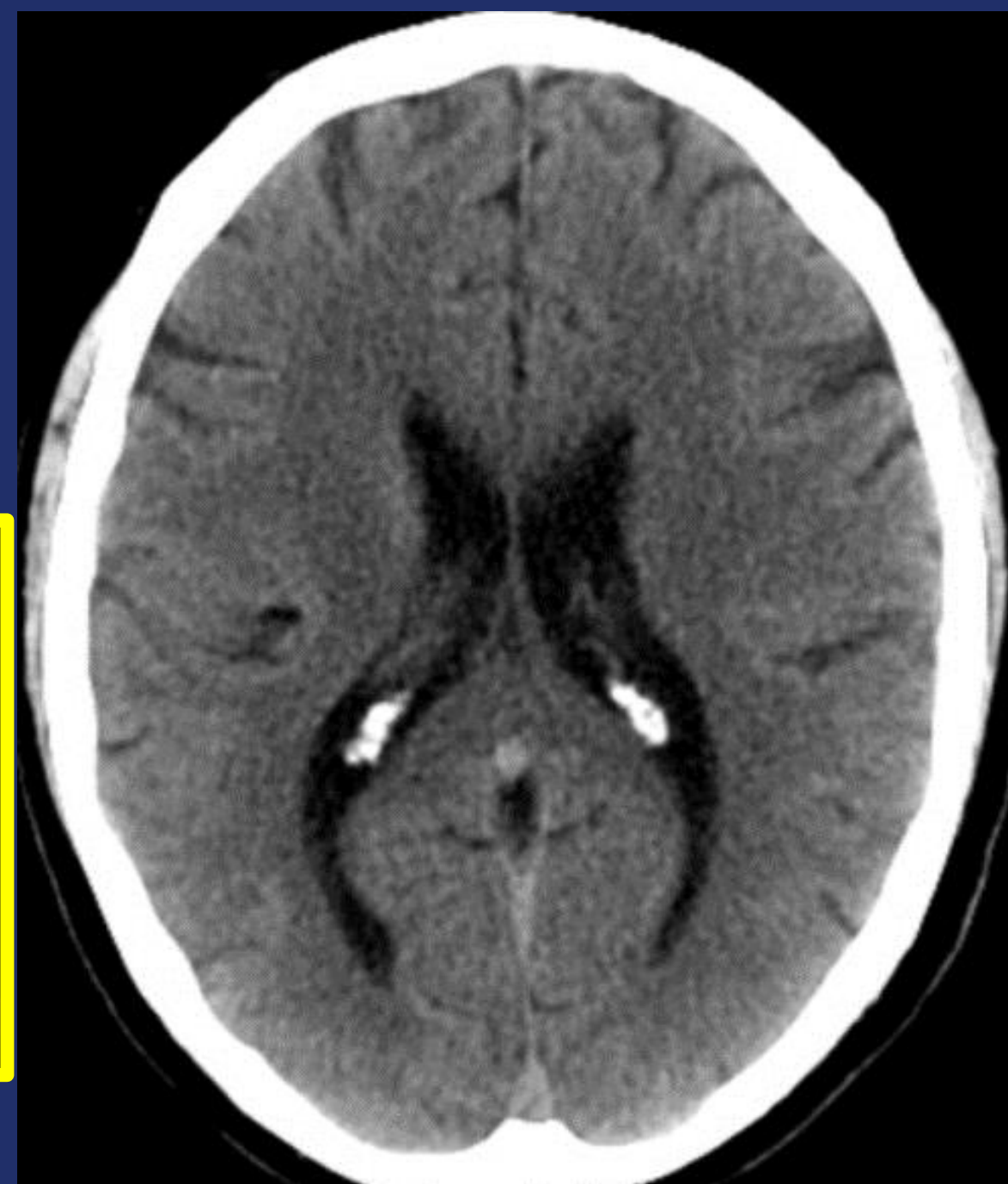


# The Ventricles



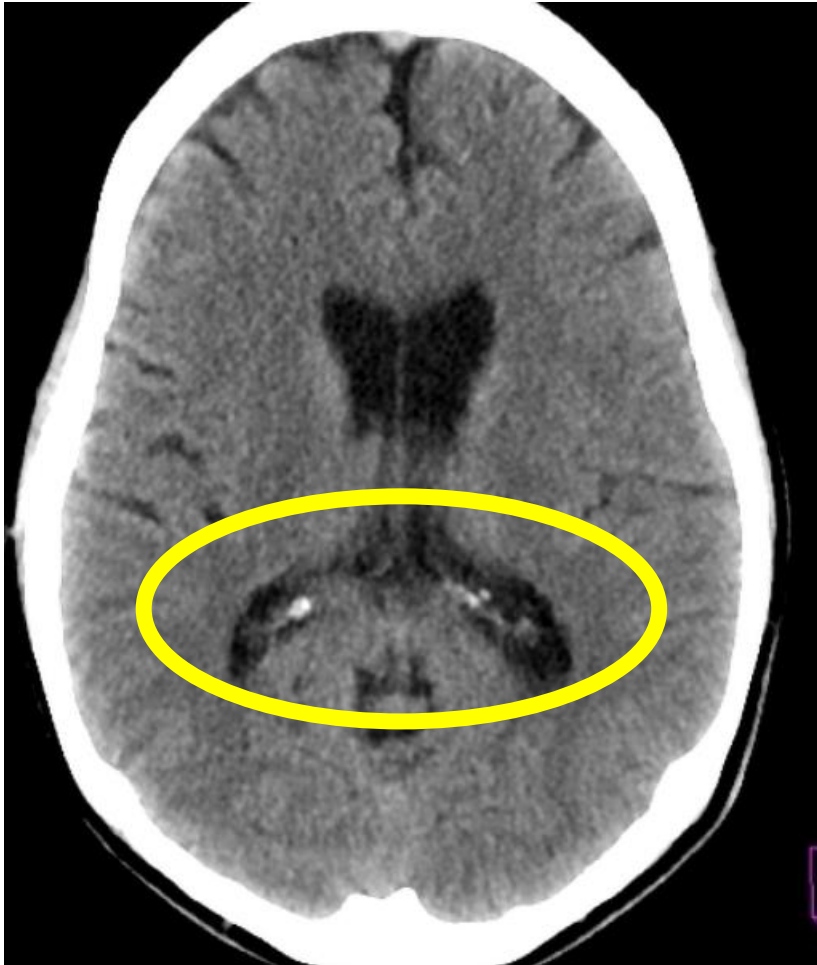
# Lateral Ventricles

- Located in bilateral hemispheres
- Paired
- Asymmetrical
- Contain the choroid plexus
- May become enlarged
  - Age
  - Schizophrenia
  - Hydrocephalus



# Horns of the Lateral Ventricles

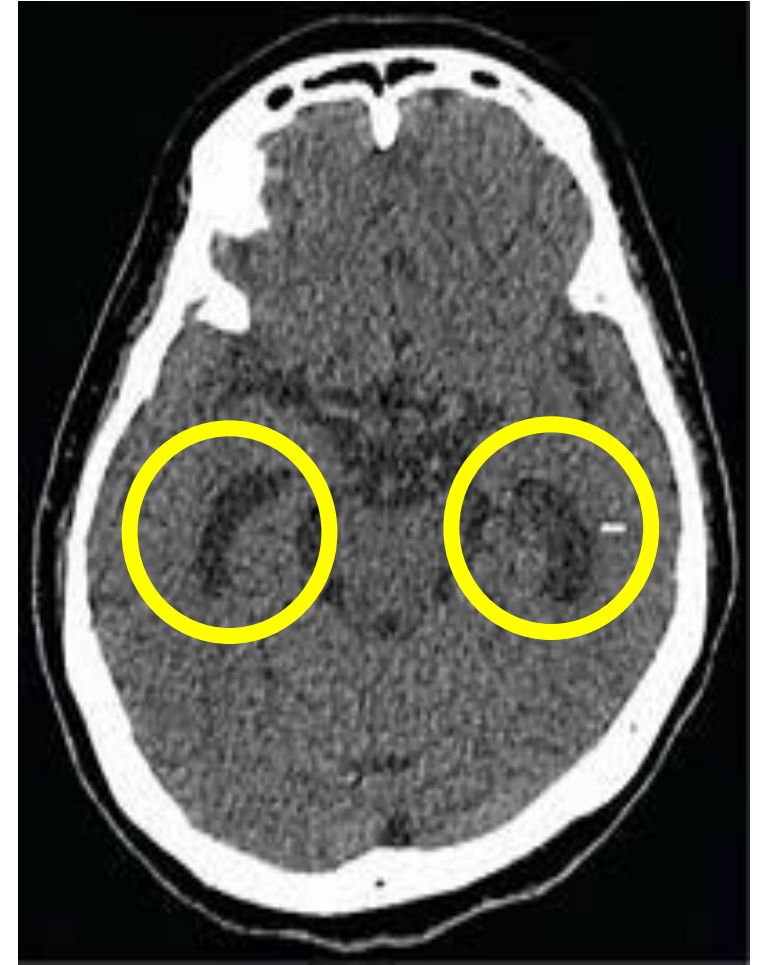
Occipital (Posterior)



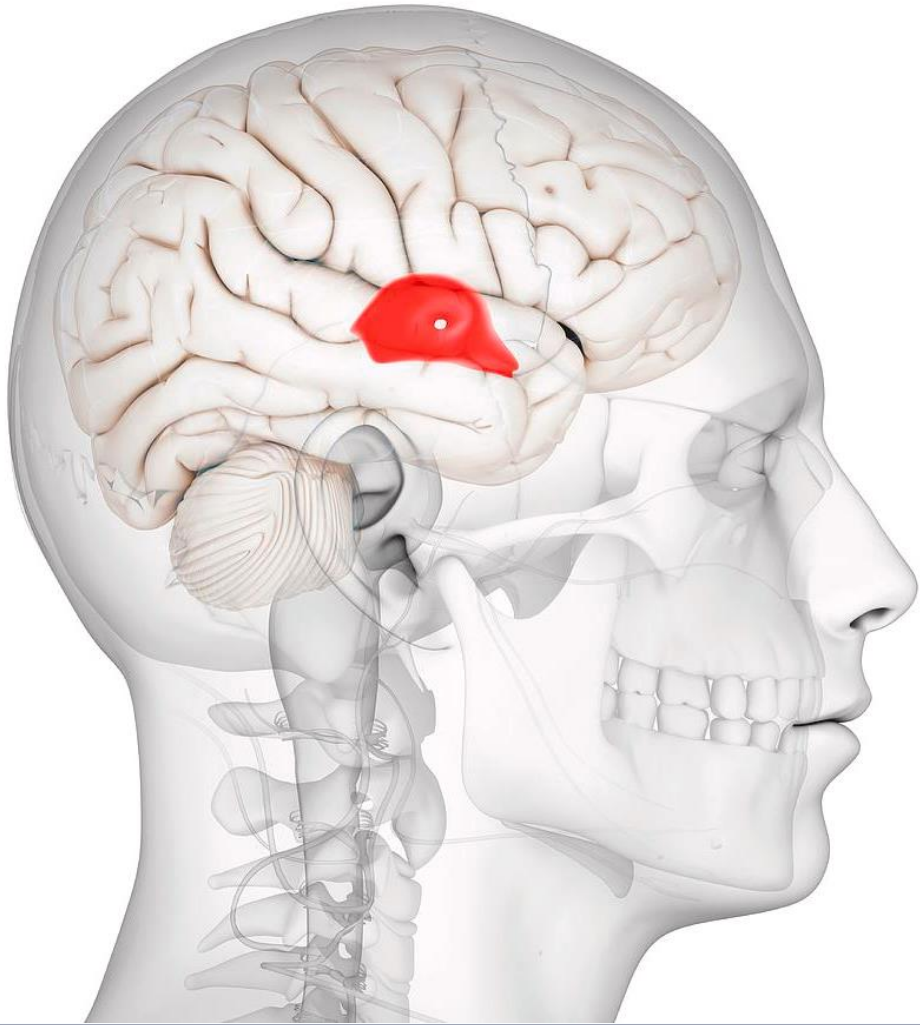
Frontal (Anterior)



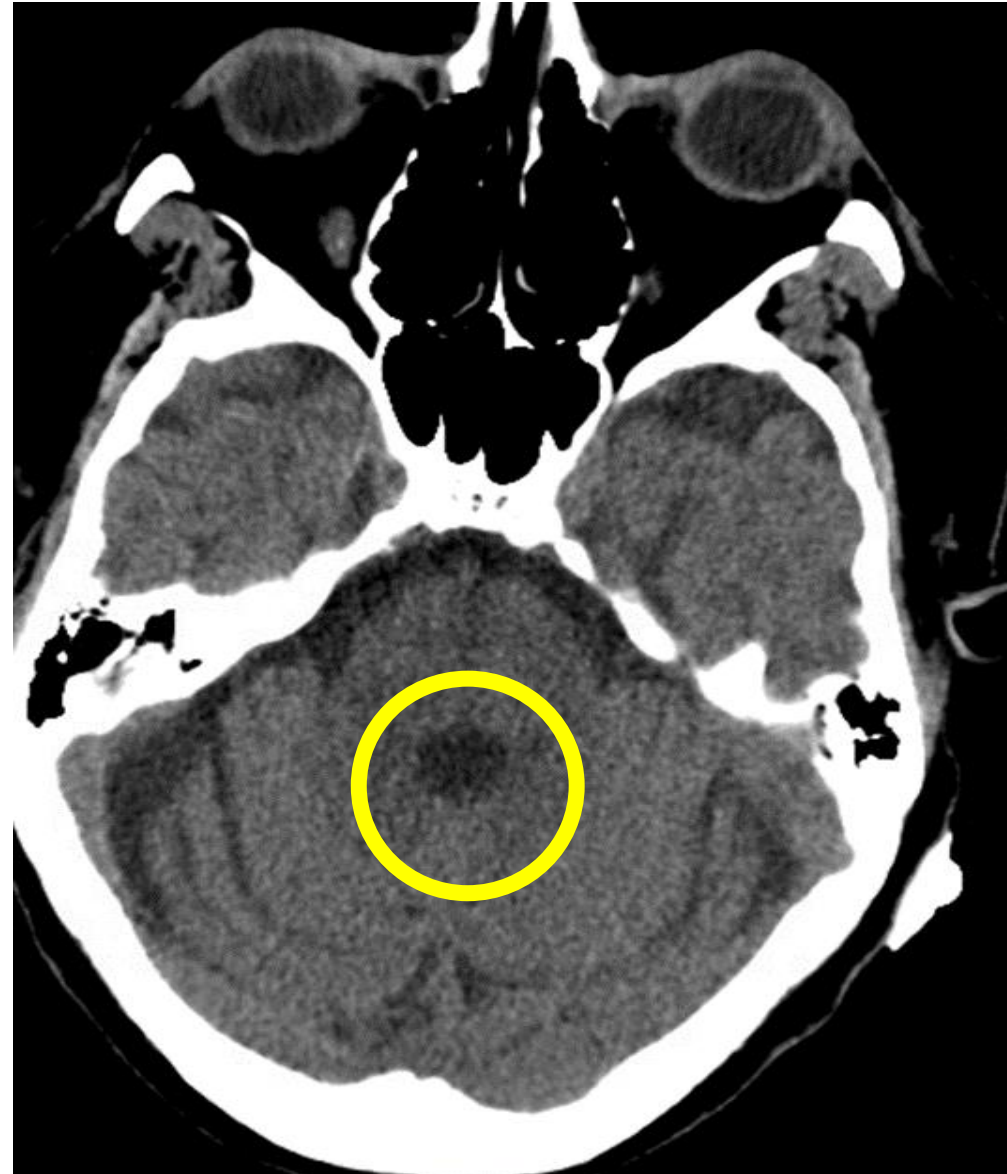
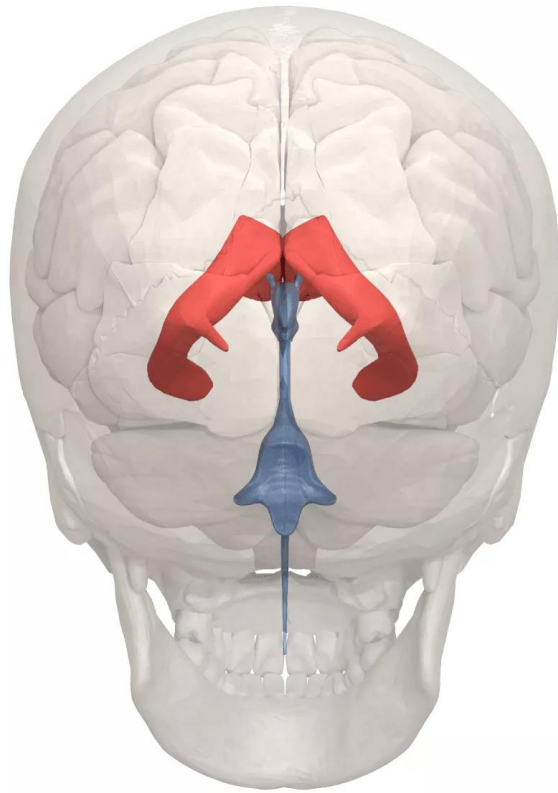
Temporal (Inferior)



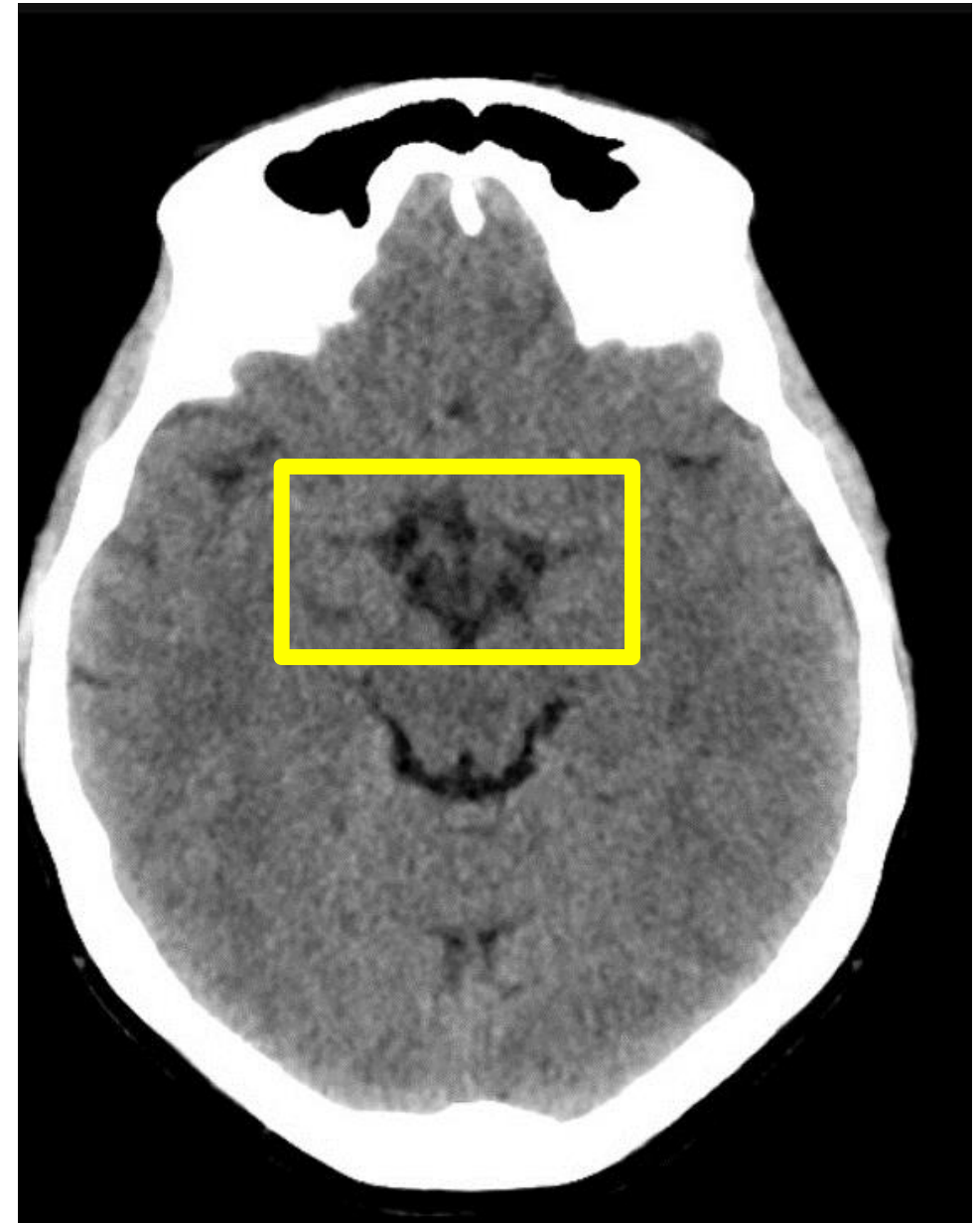
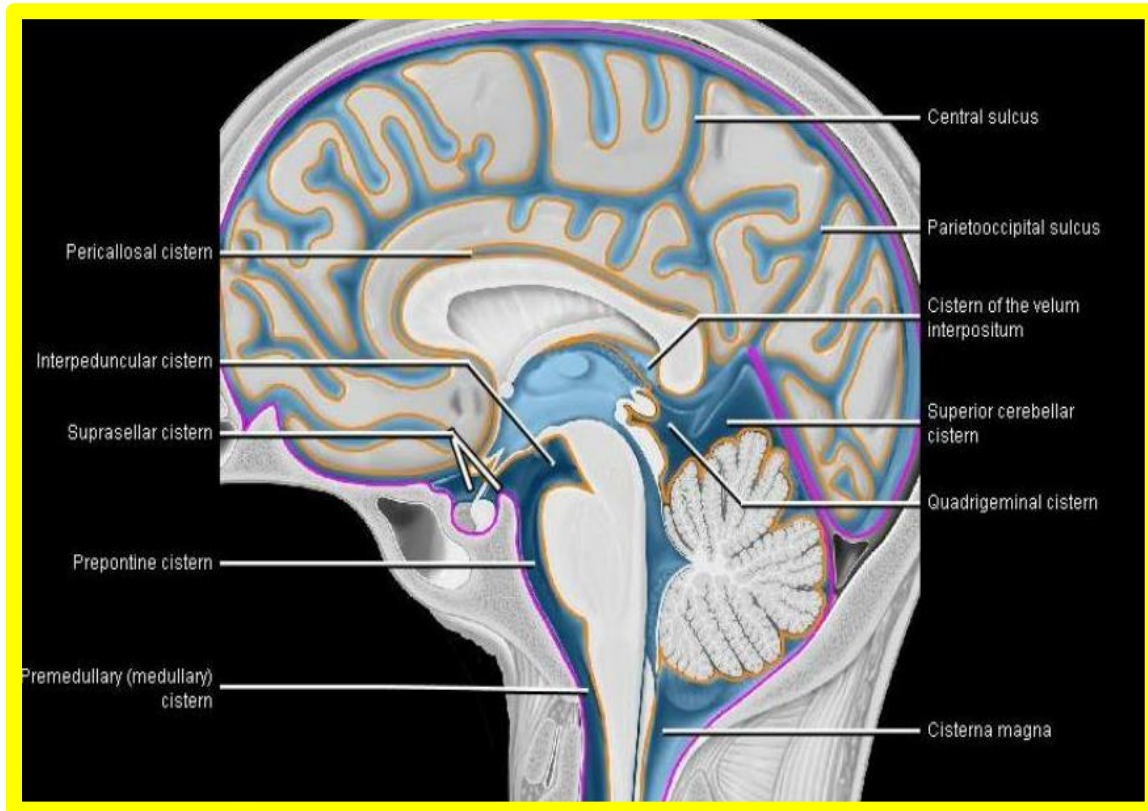
# 3<sup>rd</sup> Ventricle



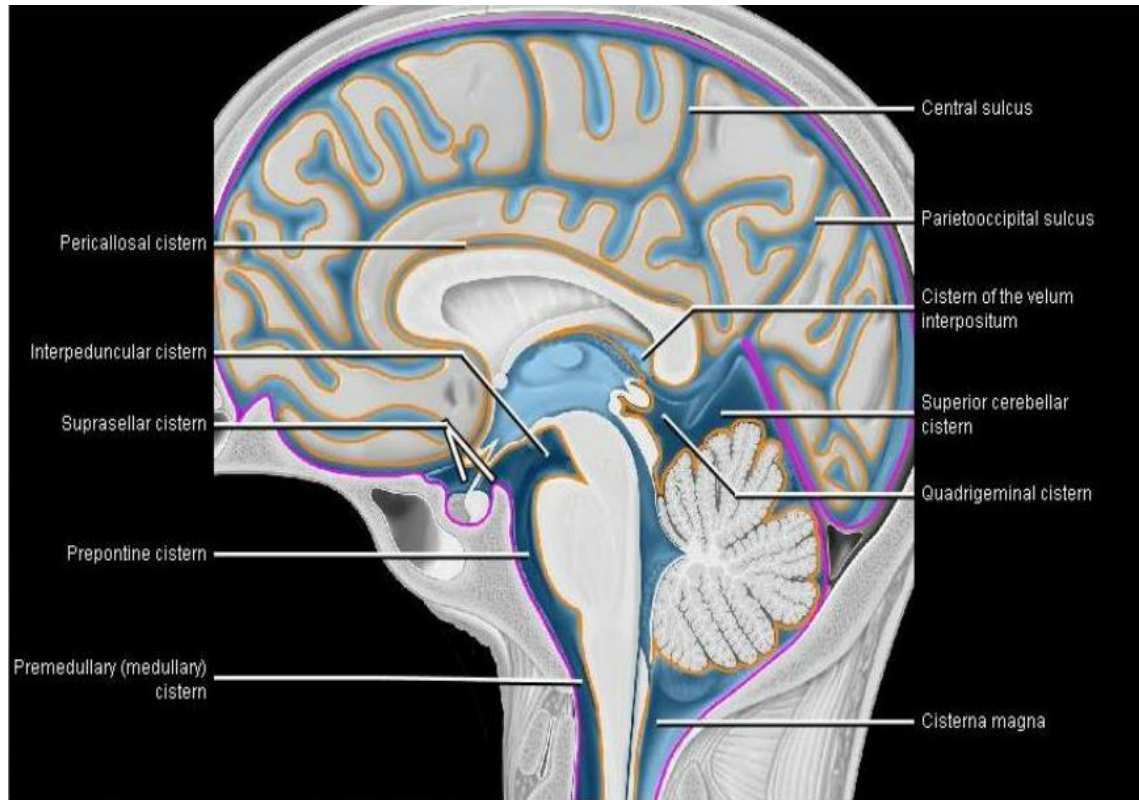
# 4<sup>th</sup> Ventricle



# The Cisterns



# The Cisterns



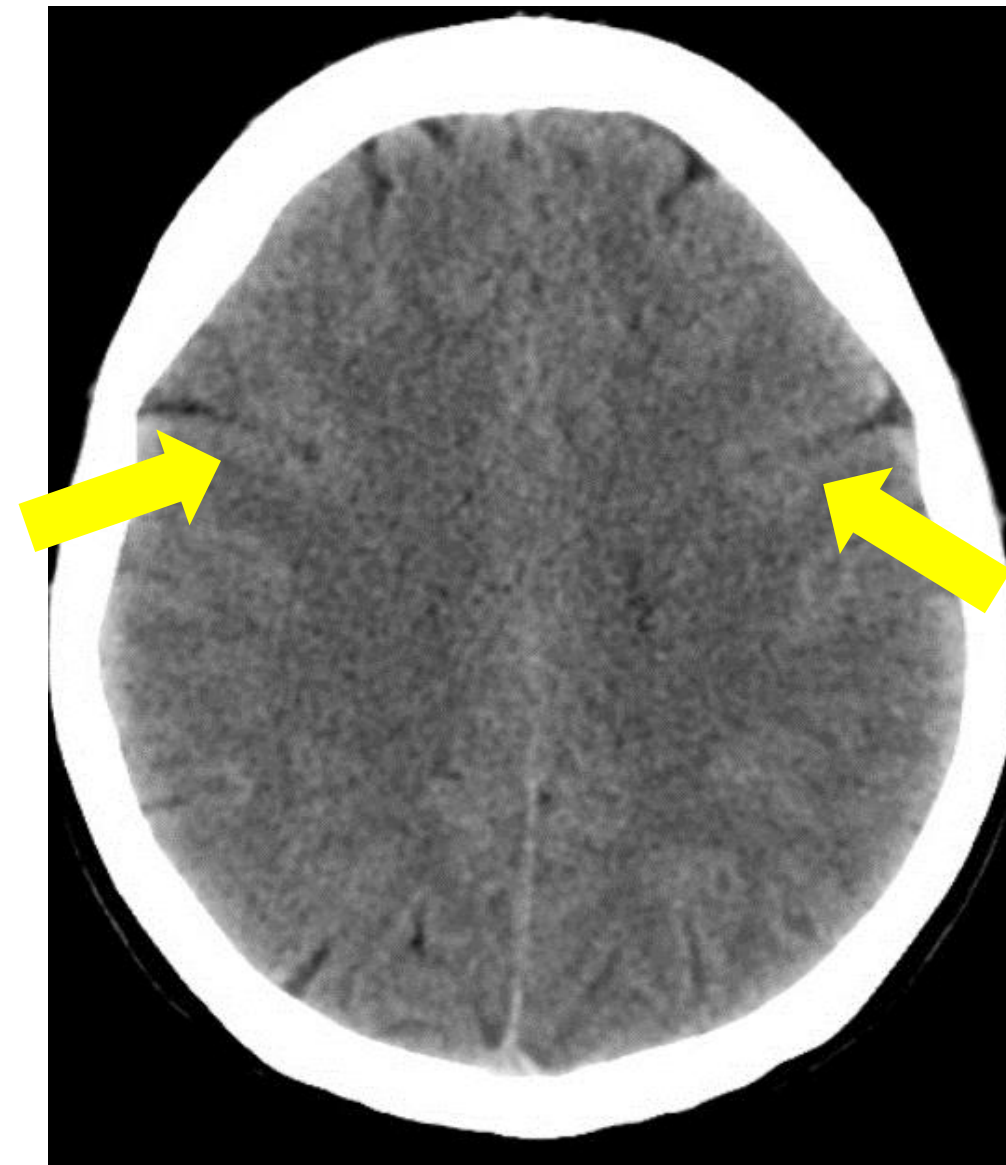
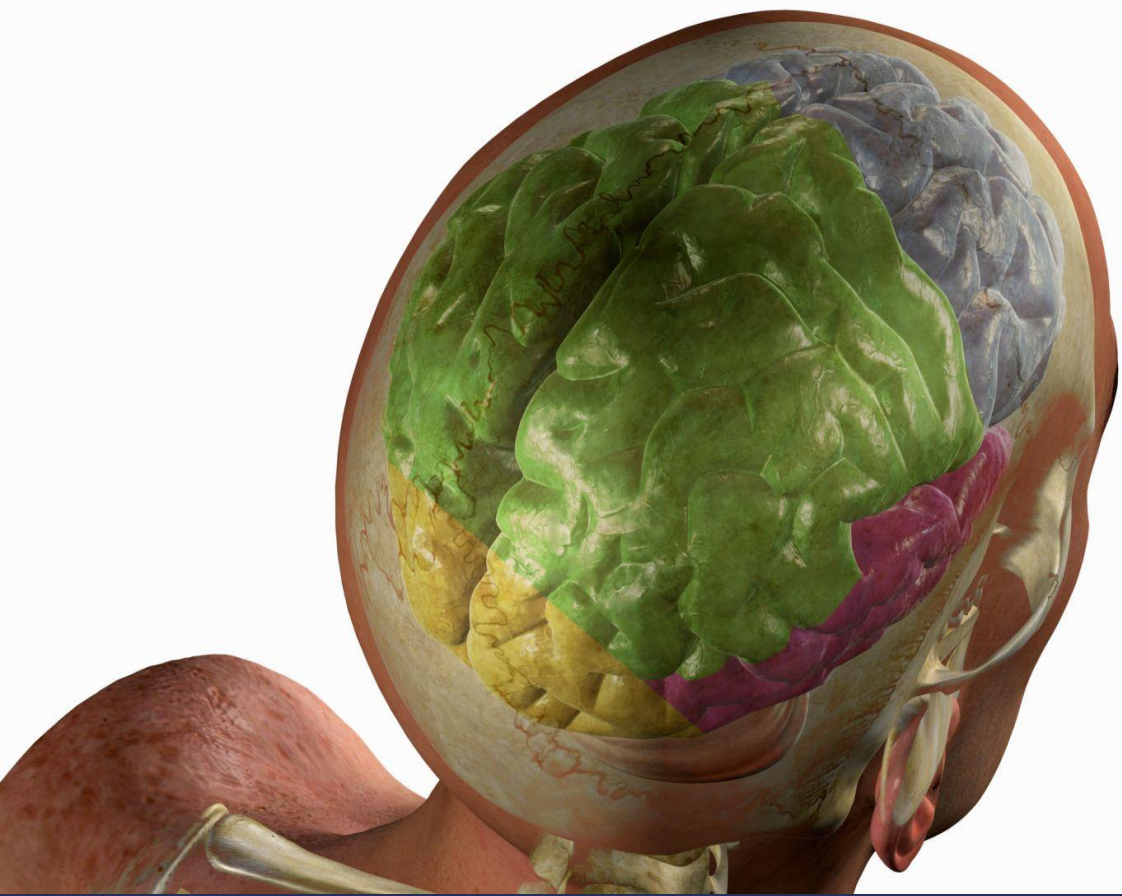
# Gray and White Matter



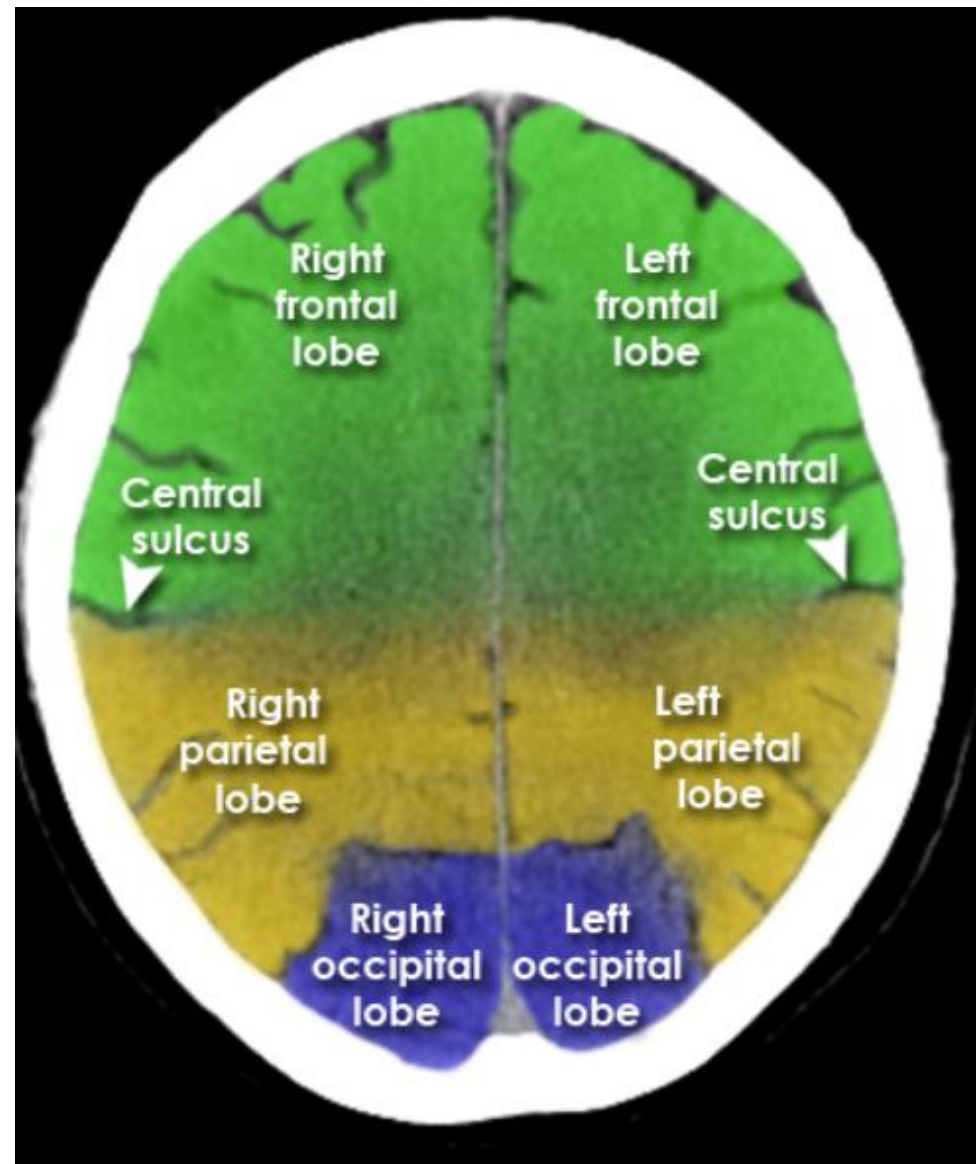
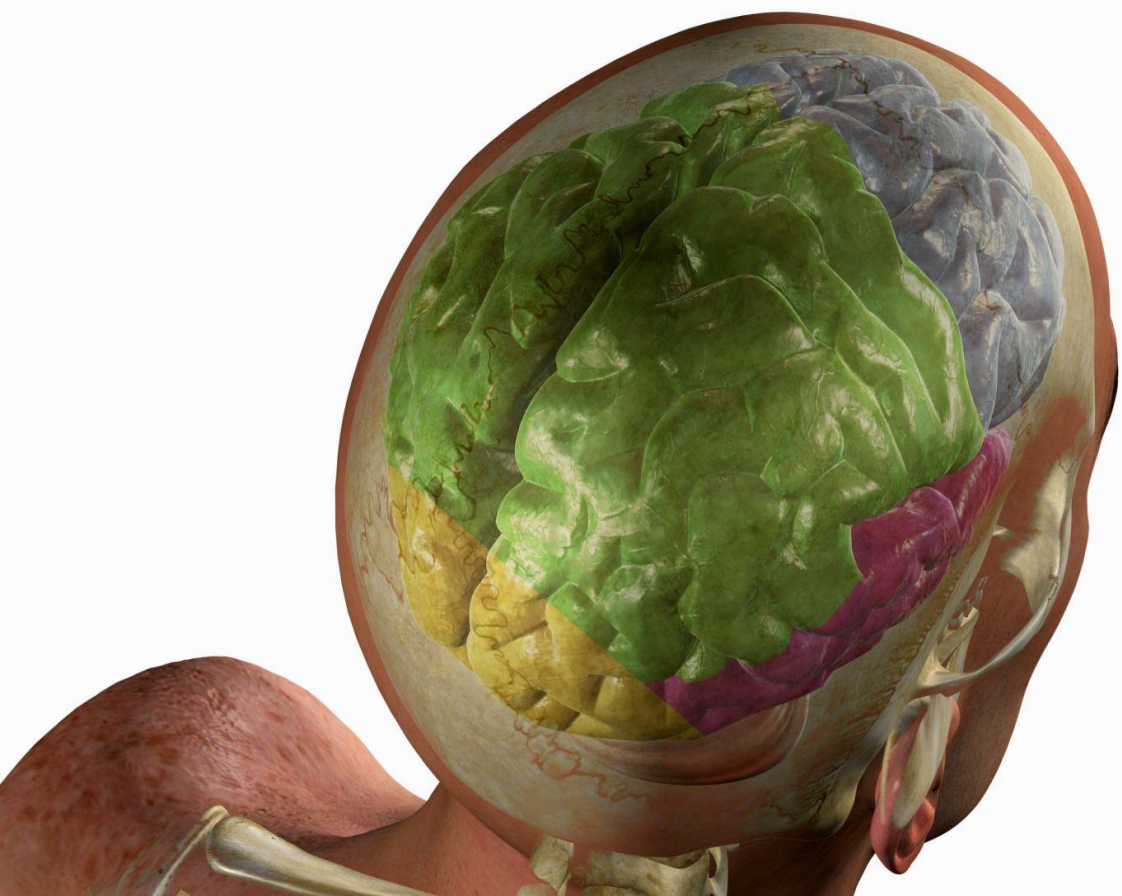
The “Processor” and “Communicator”



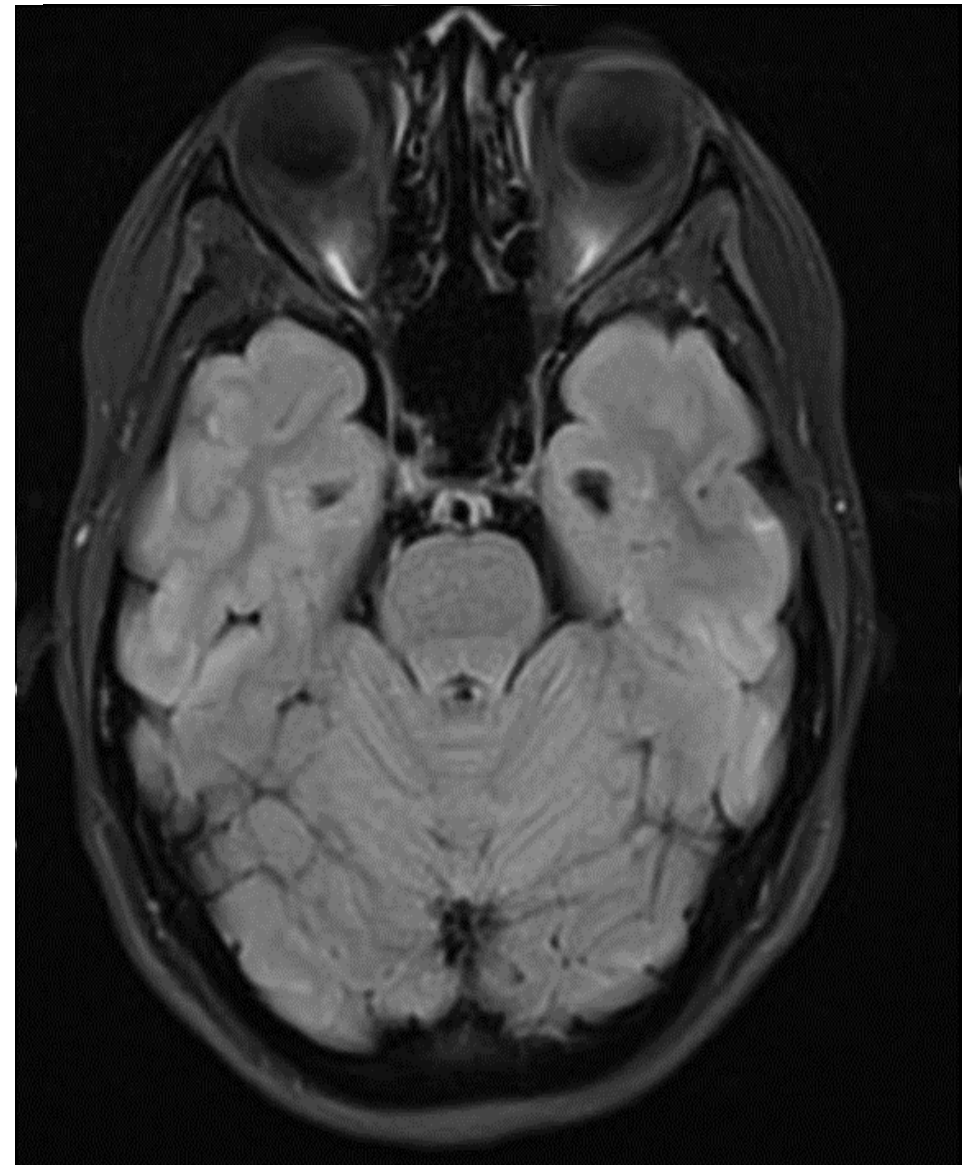
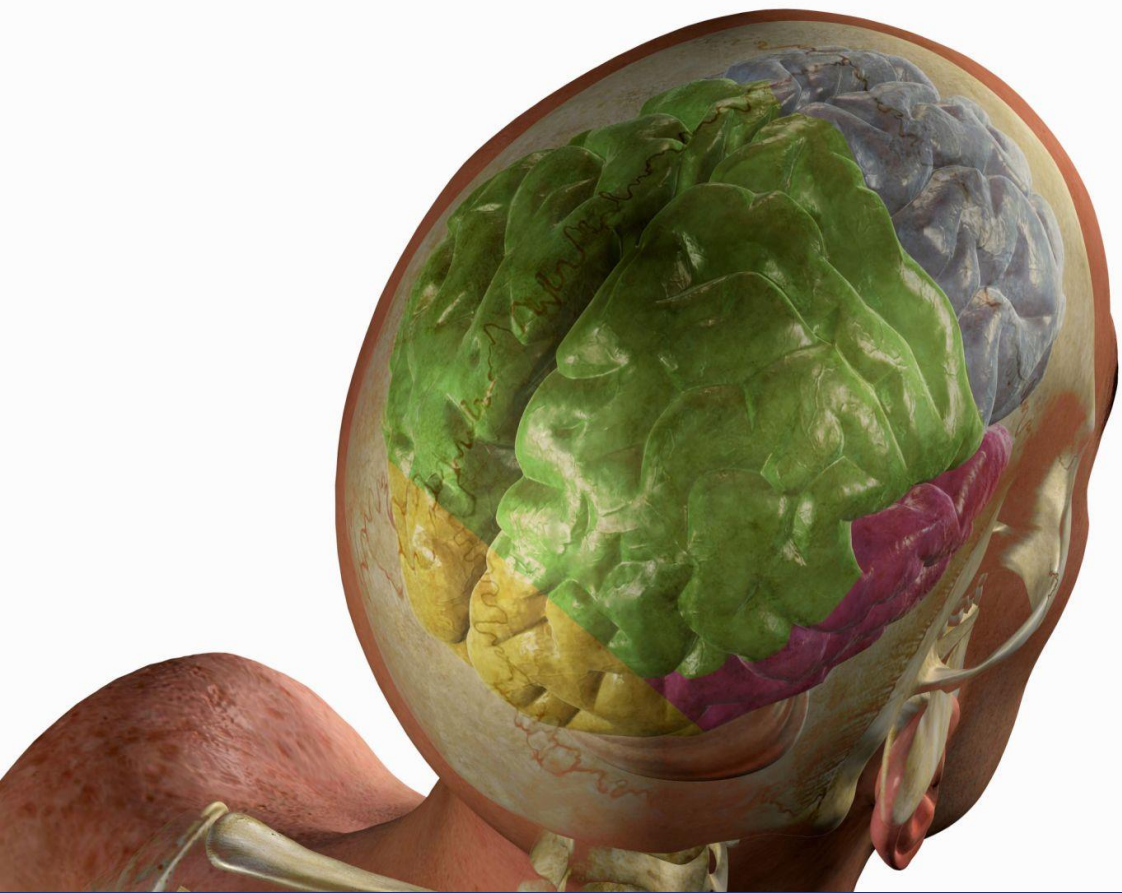
# The Four Lobes



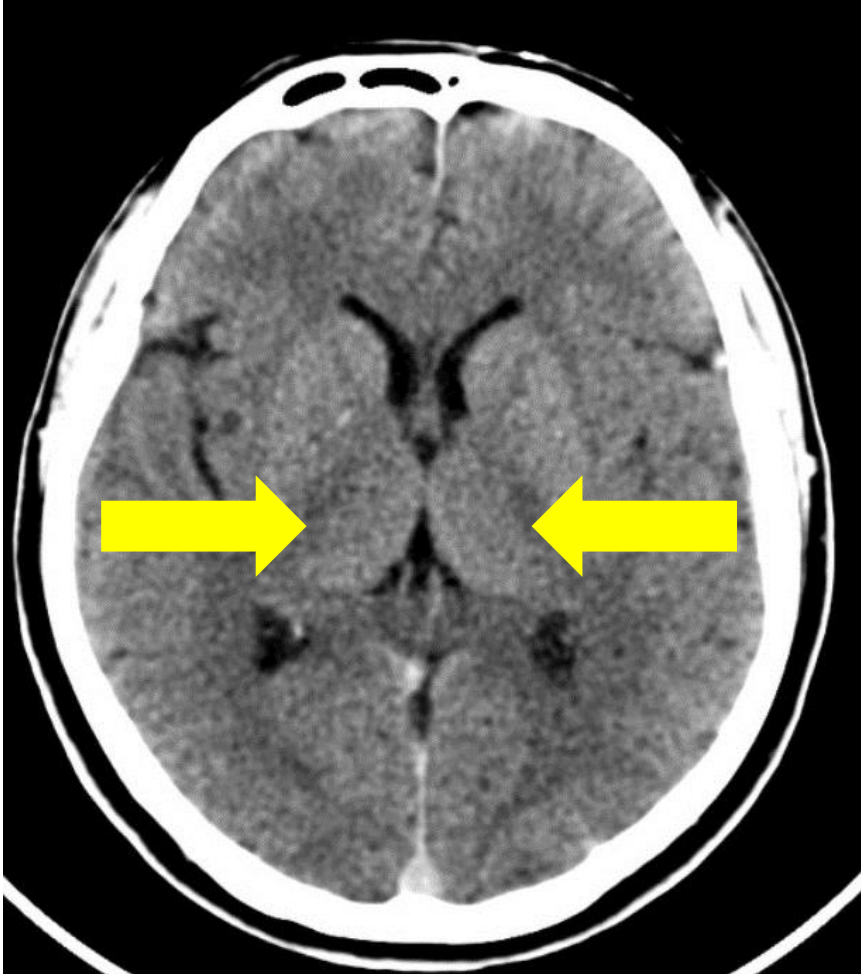
# The Four Lobes



# The Four Lobes



# The Thalamus



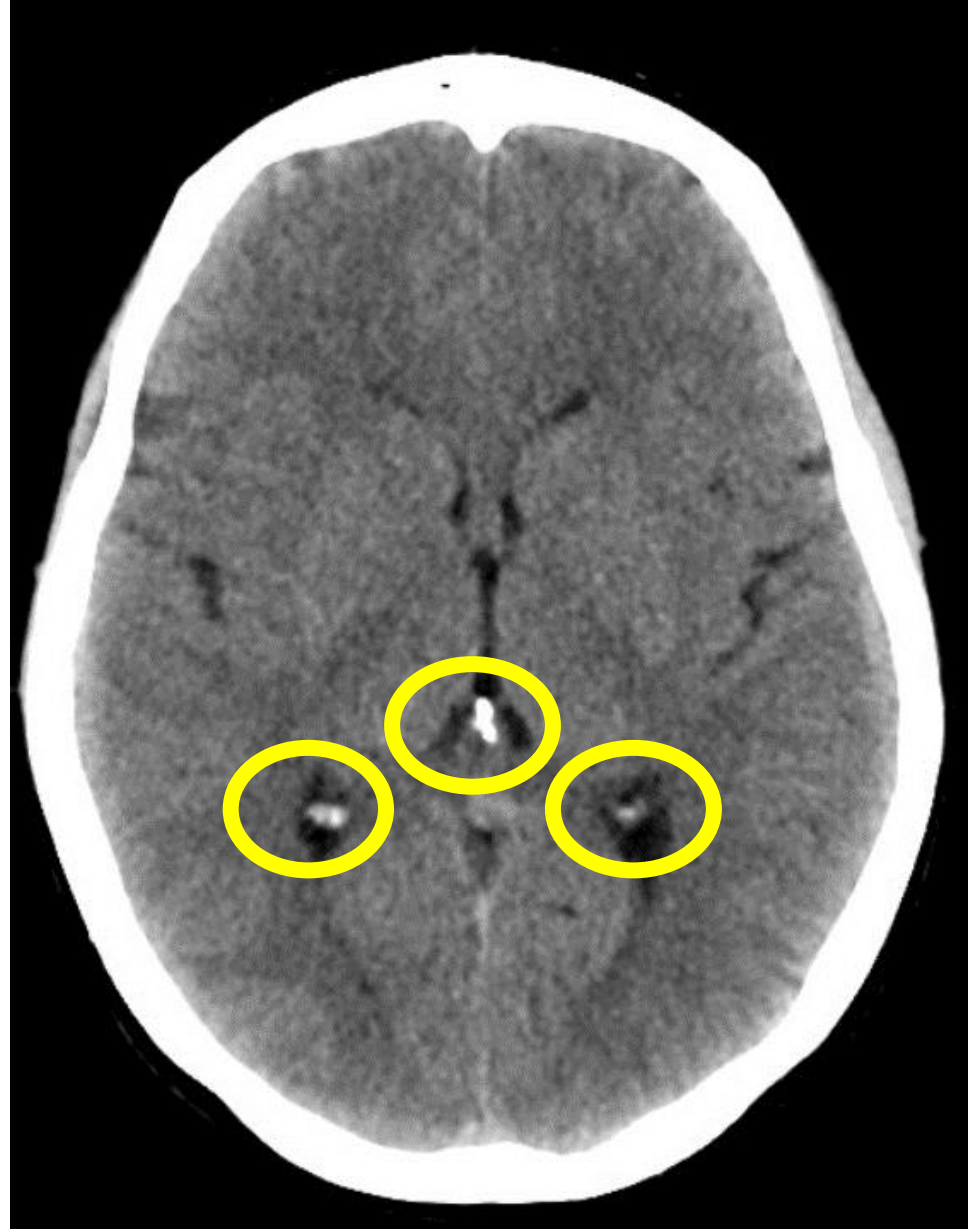
# Calcified Landmarks



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# The Calcified Structures

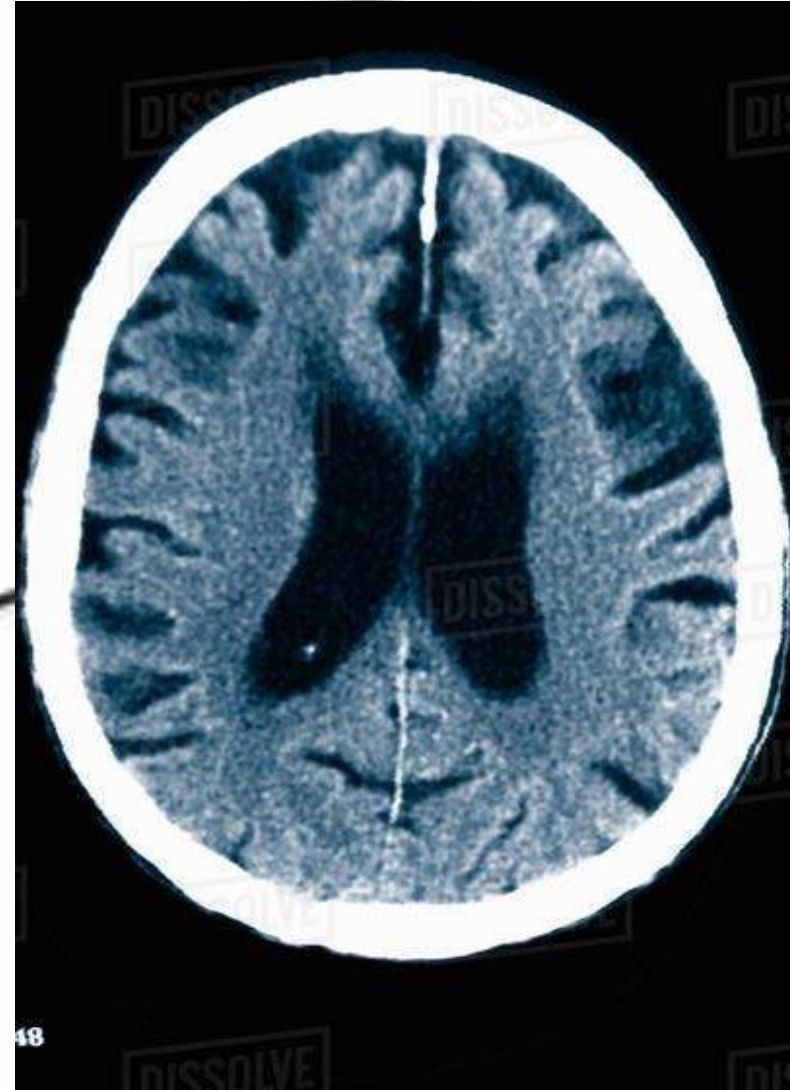
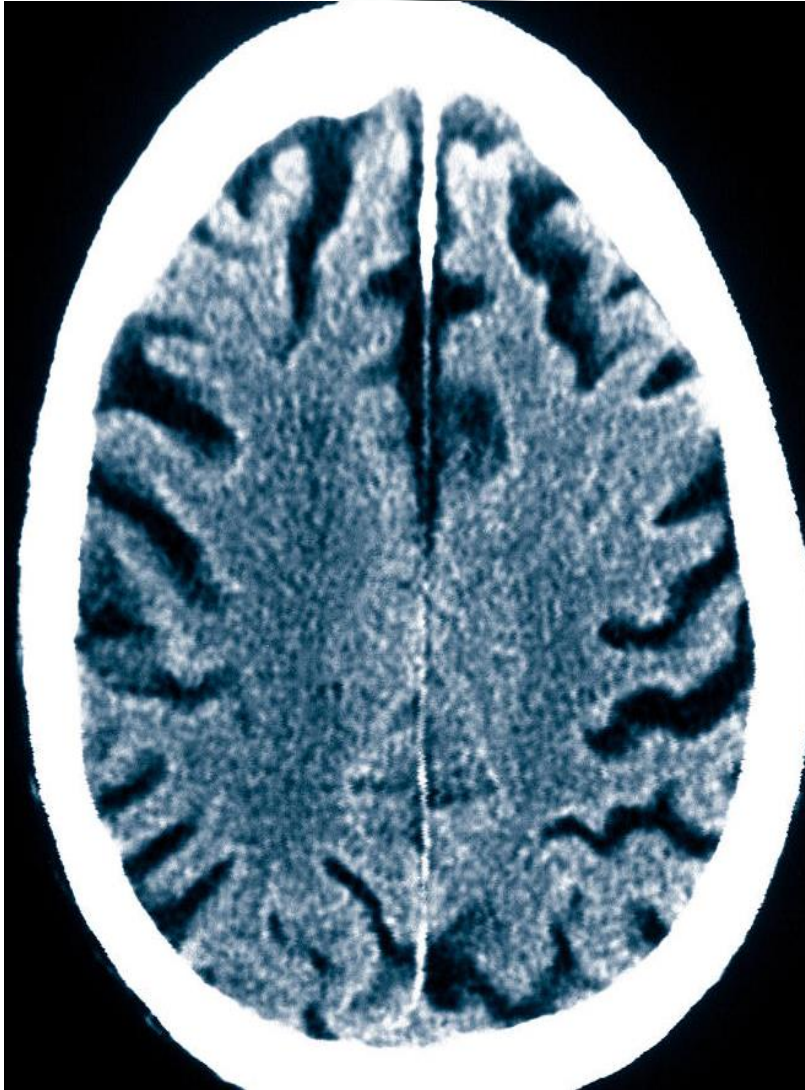
1. Pineal Gland
2. Choroid Plexus



# Anatomical Variations with Age



## Loss of Gray-White





# Thank You!

## References:

1. Lloyd-Jones G. CT anatomy. Radiology Masterclass.org. Retrieved on August 2, 2023 from [https://www.radiologymasterclass.co.uk/tutorials/ct/ct\\_brain\\_anatomy/ct\\_brain\\_anatomy\\_start](https://www.radiologymasterclass.co.uk/tutorials/ct/ct_brain_anatomy/ct_brain_anatomy_start).
2. Jones J, Deng F, Knipe H, et al. Subarachnoid cisterns. Reference article, Radiopaedia.org . Retrieved on August 5, 2023 from <https://doi.org/10.53347/rID-5859>
3. Jones J, Sriselvakumar S, Chan B, et al. Ventricular system. Reference article, Radiopaedia.org. Retrieved August 5, 2023 from <https://doi.org/10.53347/rID-5846>
4. "How to Read a Head CT." Retrieved August 2, 2023 from [www.nyp.org/professionals/emergency-medicine/how-to-read-emergency-images/how-to-read-a-head-ct](http://www.nyp.org/professionals/emergency-medicine/how-to-read-emergency-images/how-to-read-a-head-ct).
5. Macori F, Murphy A, Yap J, et al. CT paranasal sinus (protocol). Reference article, Radiopaedia.org. Retrieved August 5, 2023 from <https://doi.org/10.53347/rID-92692>
6. Jones J, Chieng R, Worsley C, et al. Lateral ventricle. Radiopaedia.org . Retrieved August 2, 2023 from <https://doi.org/10.53347/rID-5838>

## Images courtesy of :

1. Radiology Masterclass - [www.radiologymasterclass.co.uk](http://www.radiologymasterclass.co.uk)
2. Radiopedia - <https://radiopaedia.org/?lang=us>

