

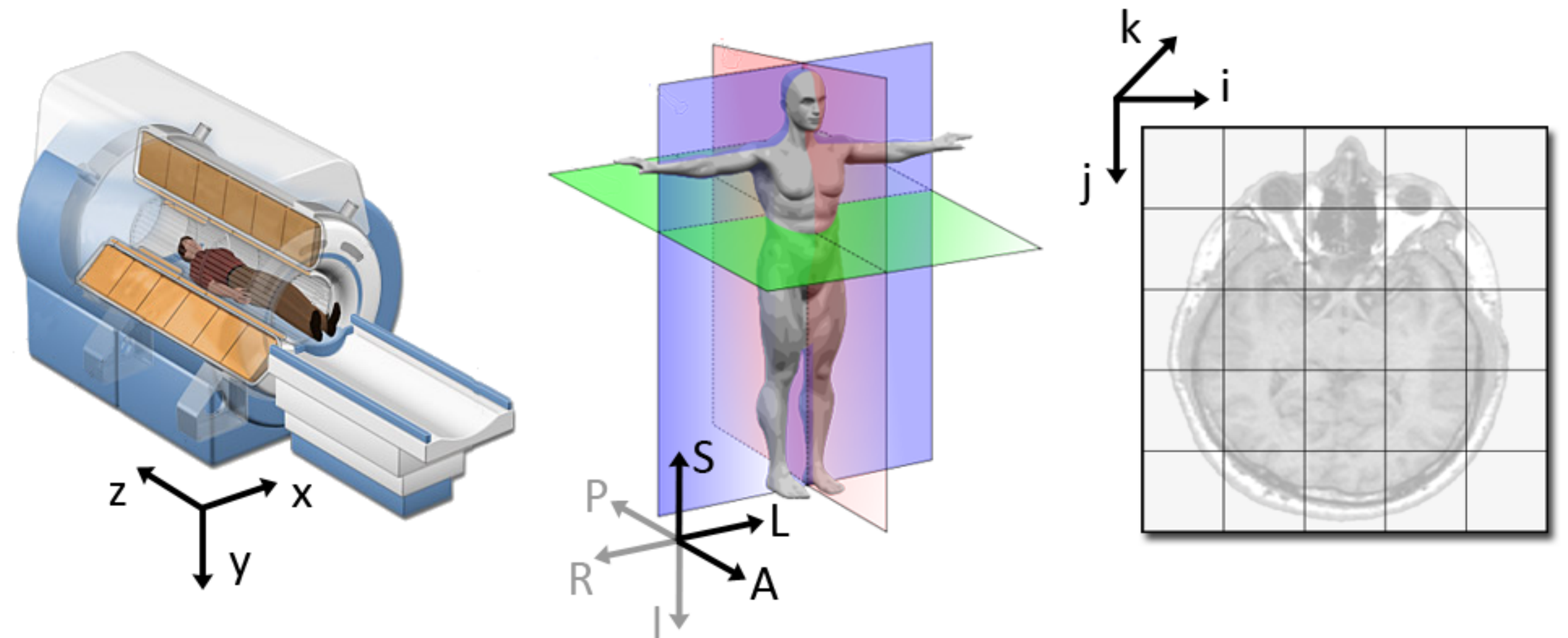
Module 4: Terminology of Brain Organization

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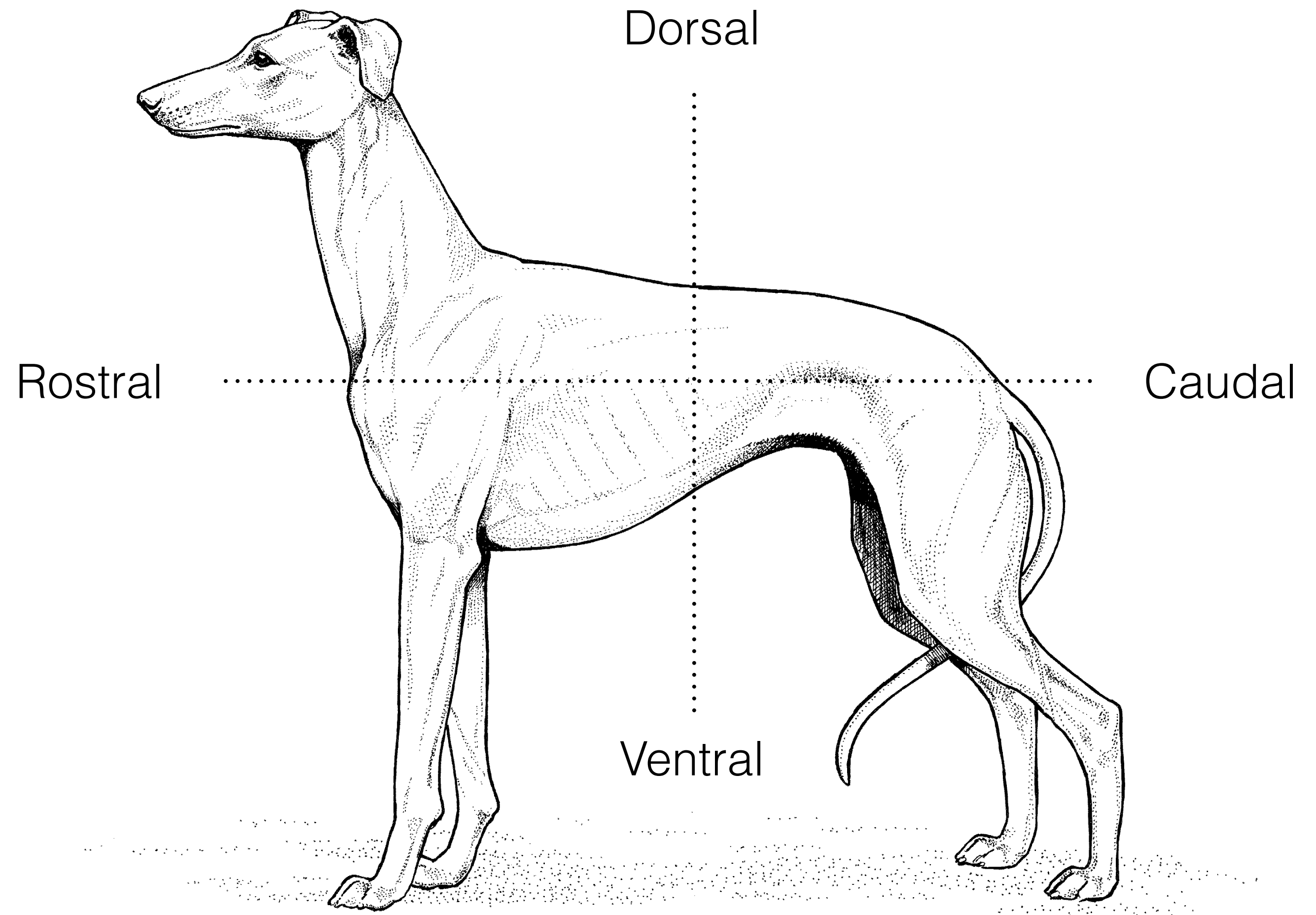
Terminology in Brain Organization

- To describe locations and physical relationships in the brain a standard nomenclature is used for the vertebrate nervous system.
- These terms are commonly used in MRI research to denote relative location of structures and activation findings.



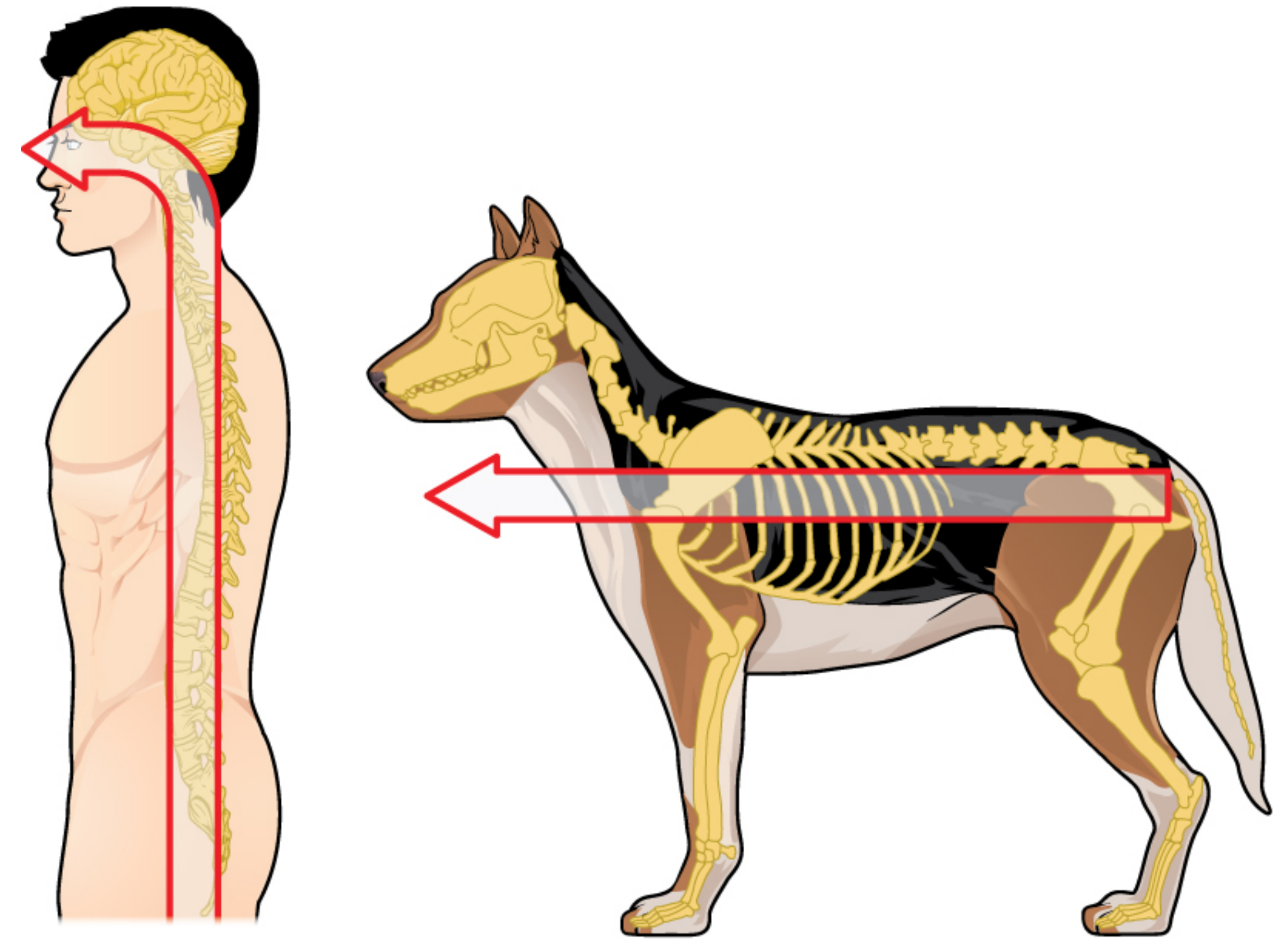
Terminology in Brain Organization

- The major axis of the body is the rostral-caudal axis:
 - Rostrum (beak)
 - Cauda (tail)
- The vertical axis of the body is the dorso-ventral axis:
 - Dorsum (back)
 - Ventrum (belly)



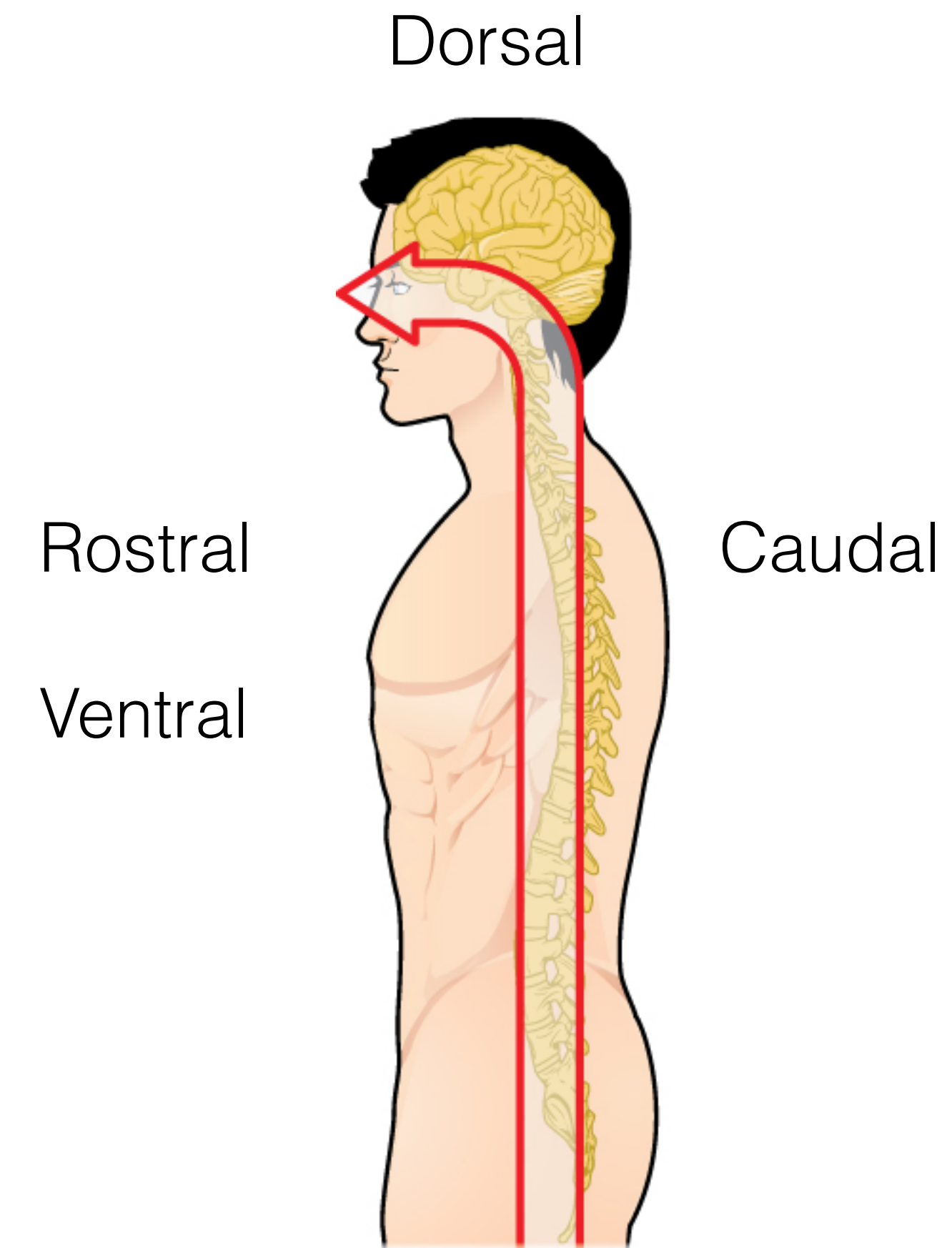
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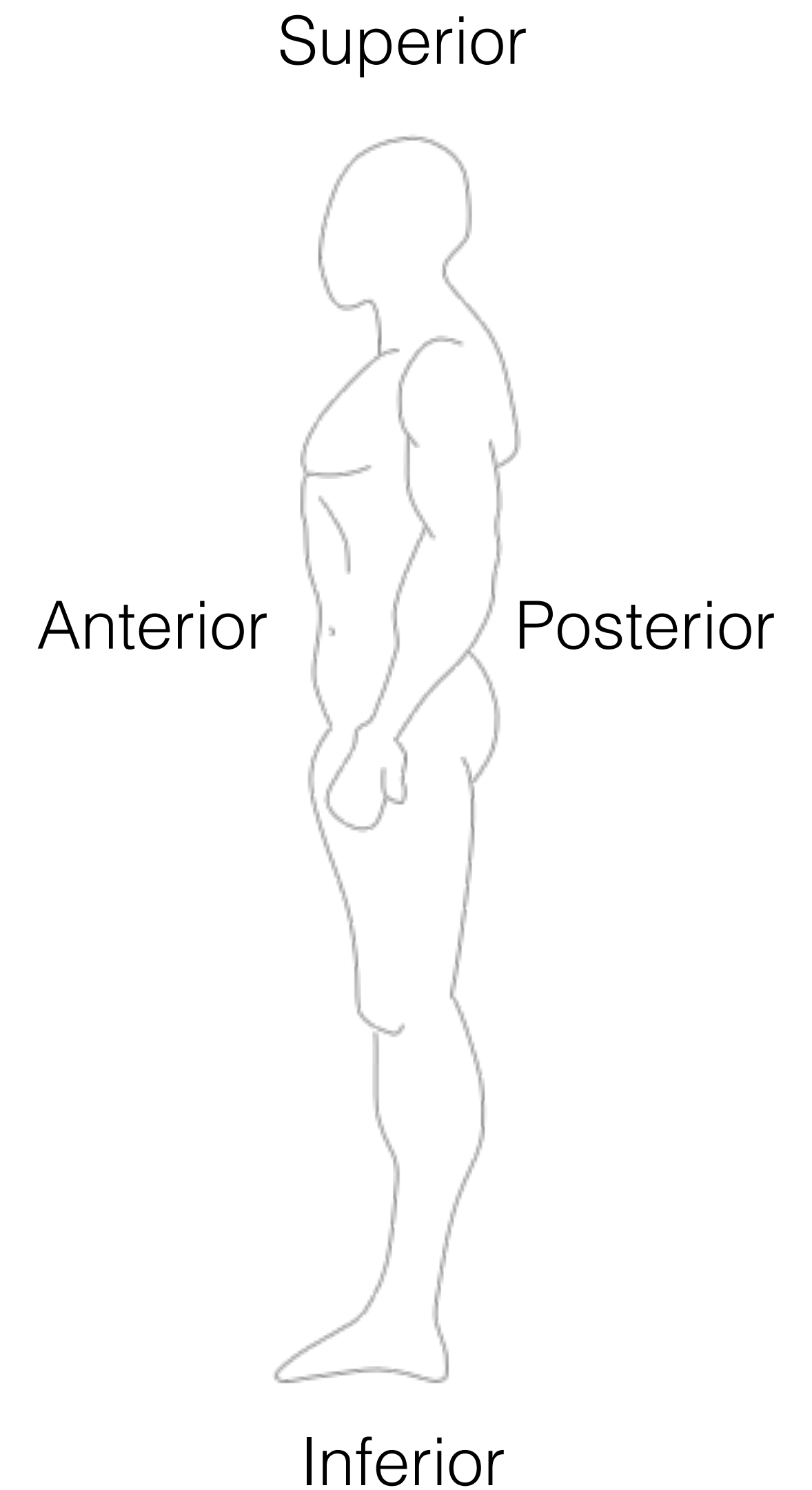
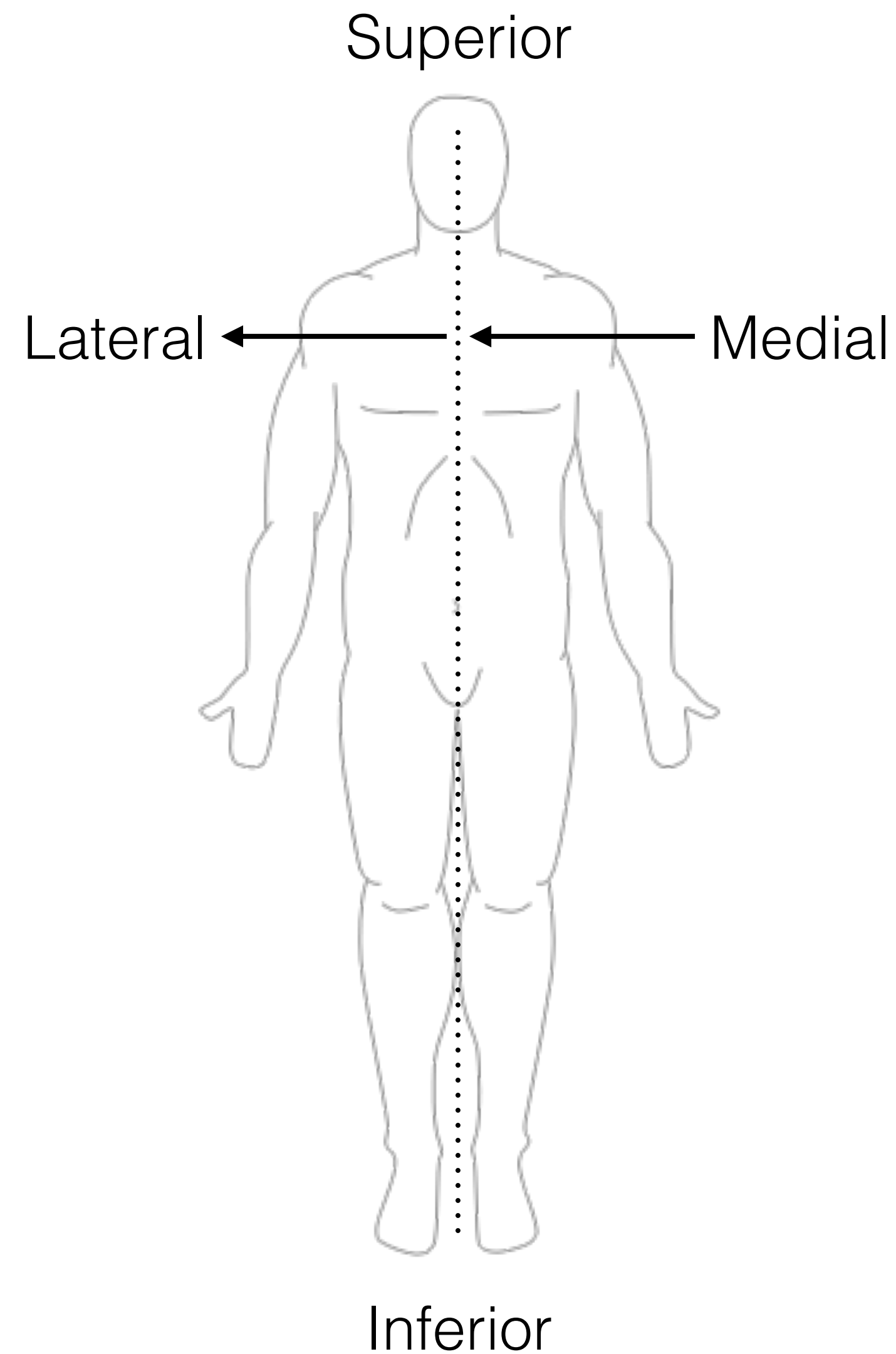
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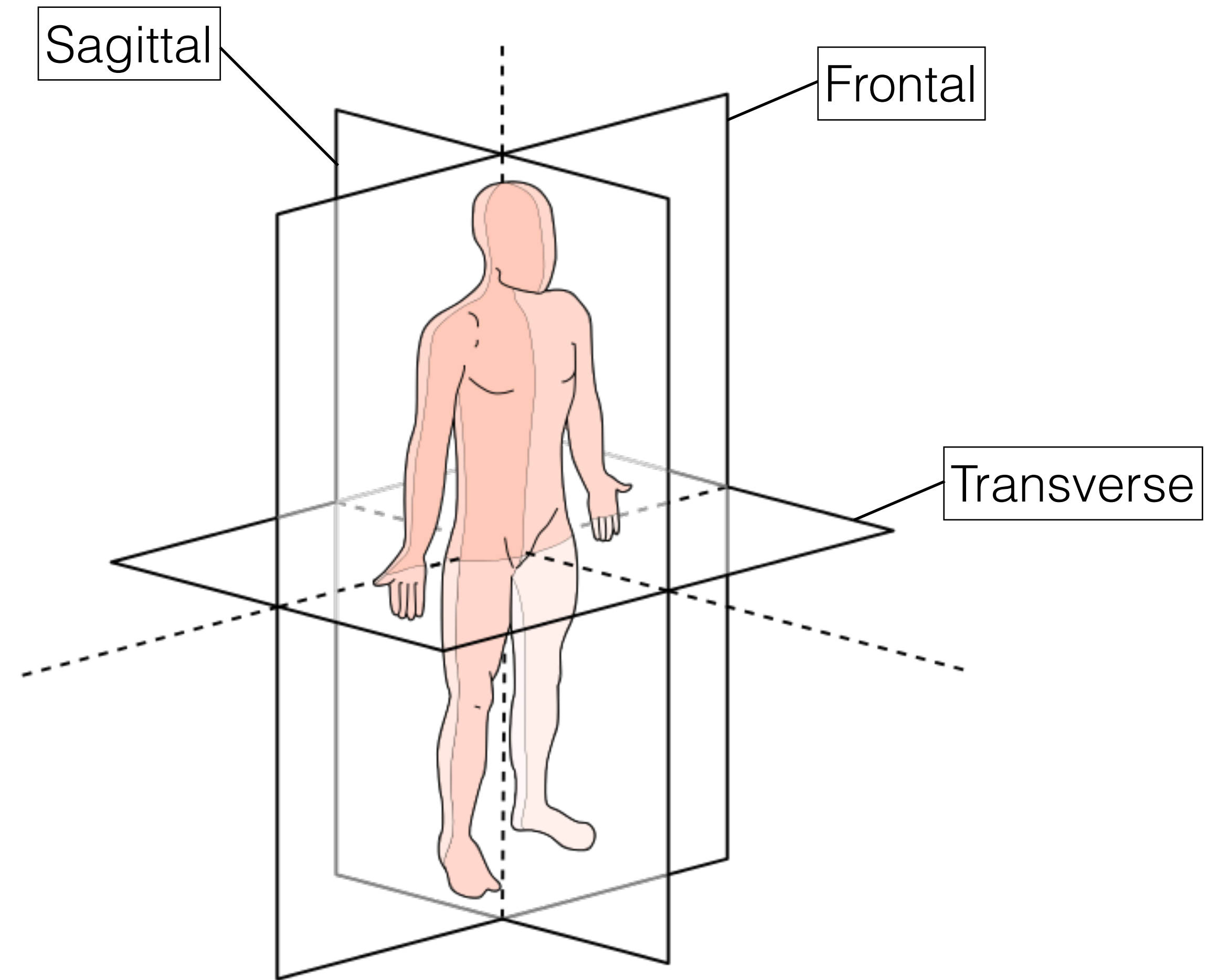
Terminology in Brain Organization

- In humans a different set of terms is commonly used:
 - Anterior (front)
 - Posterior (back)
 - Superior (top)
 - Inferior (bottom)
 - Medial (towards center)
 - Lateral (away from center)



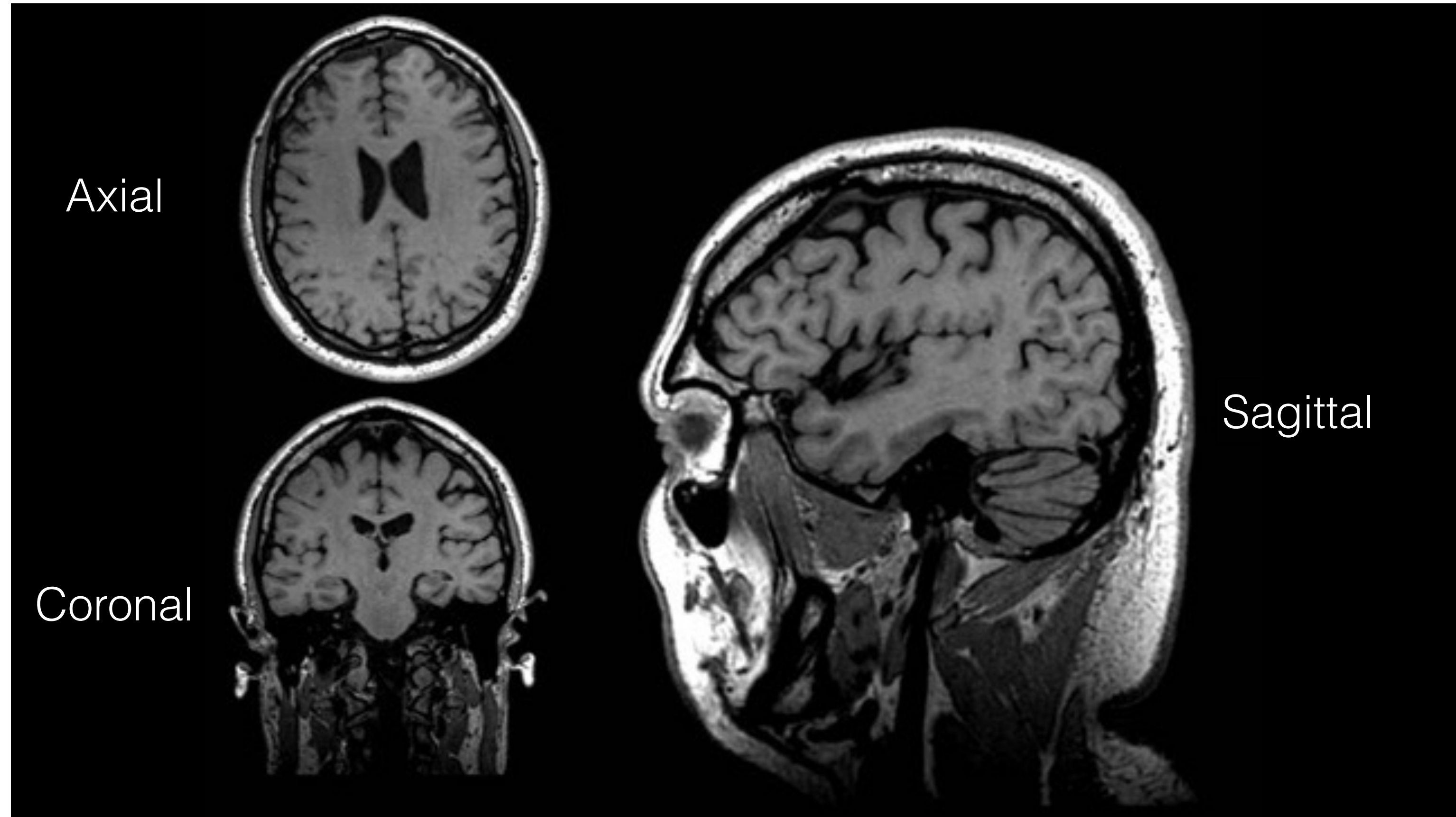
Terminology in Brain Organization

- Planes of orientation:
 - Frontal plane
 - Transverse plane
 - Sagittal plane



Terminology in Brain Organization

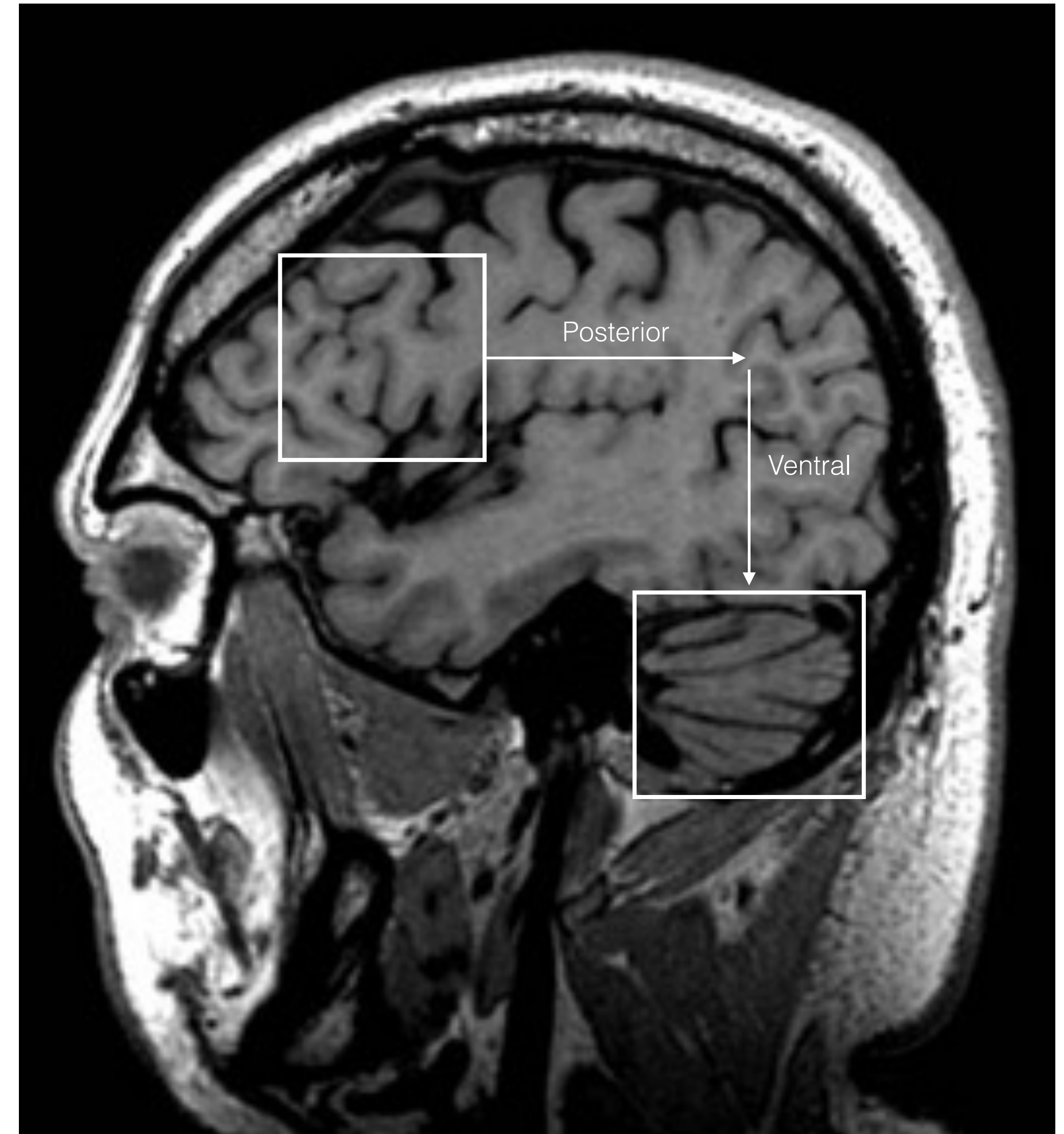
- In human MRI images the planes of orientation are commonly labeled:
 - Coronal (Frontal plane)
 - Axial (Transverse plane)
 - Sagittal plane



Terminology in Brain Organization

Relative locations of brain structures:

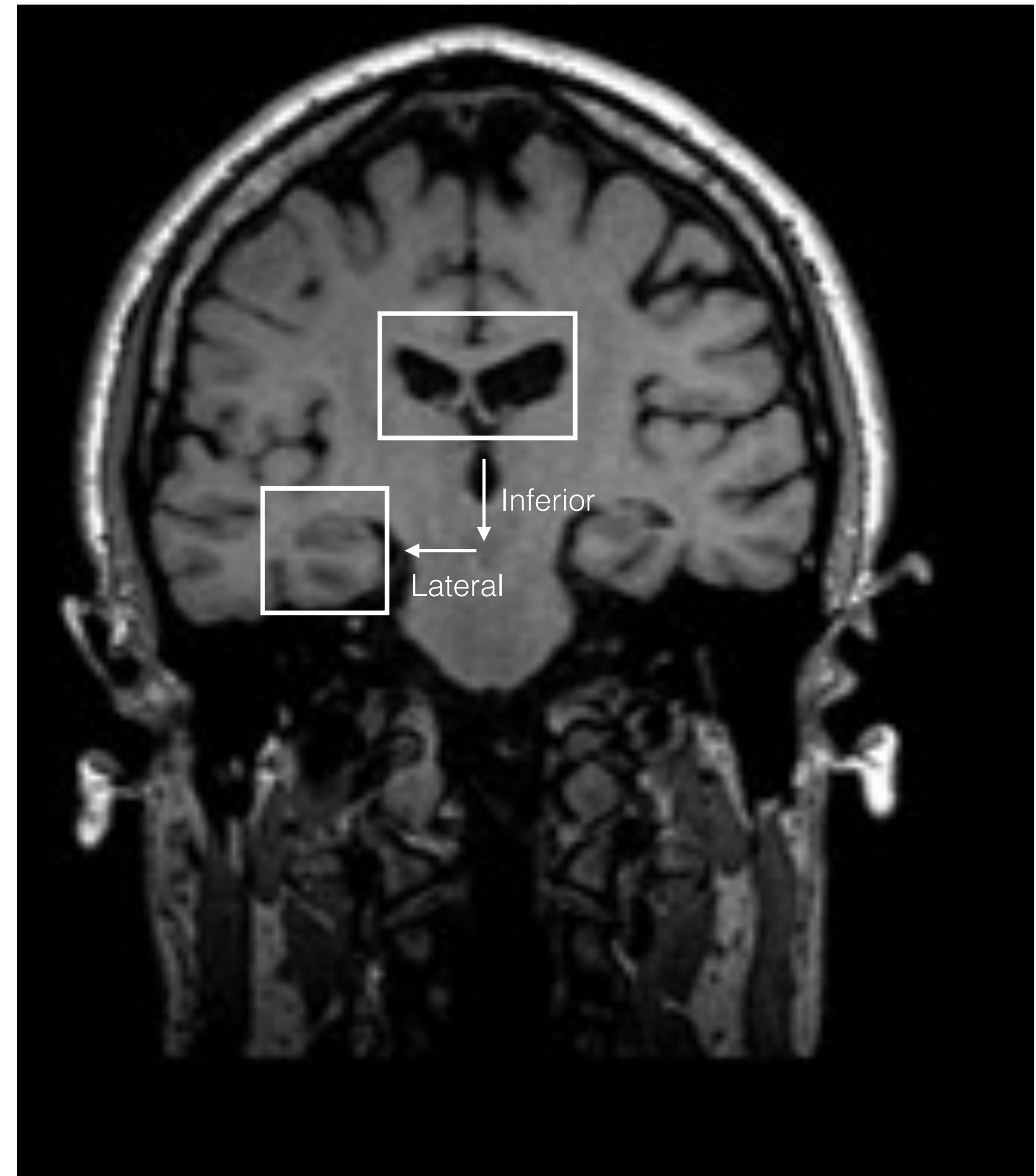
- This sagittal view shows the cerebellum which is posterior and ventral to the frontal cortex.



Terminology in Brain Organization

Relative locations of brain structures:

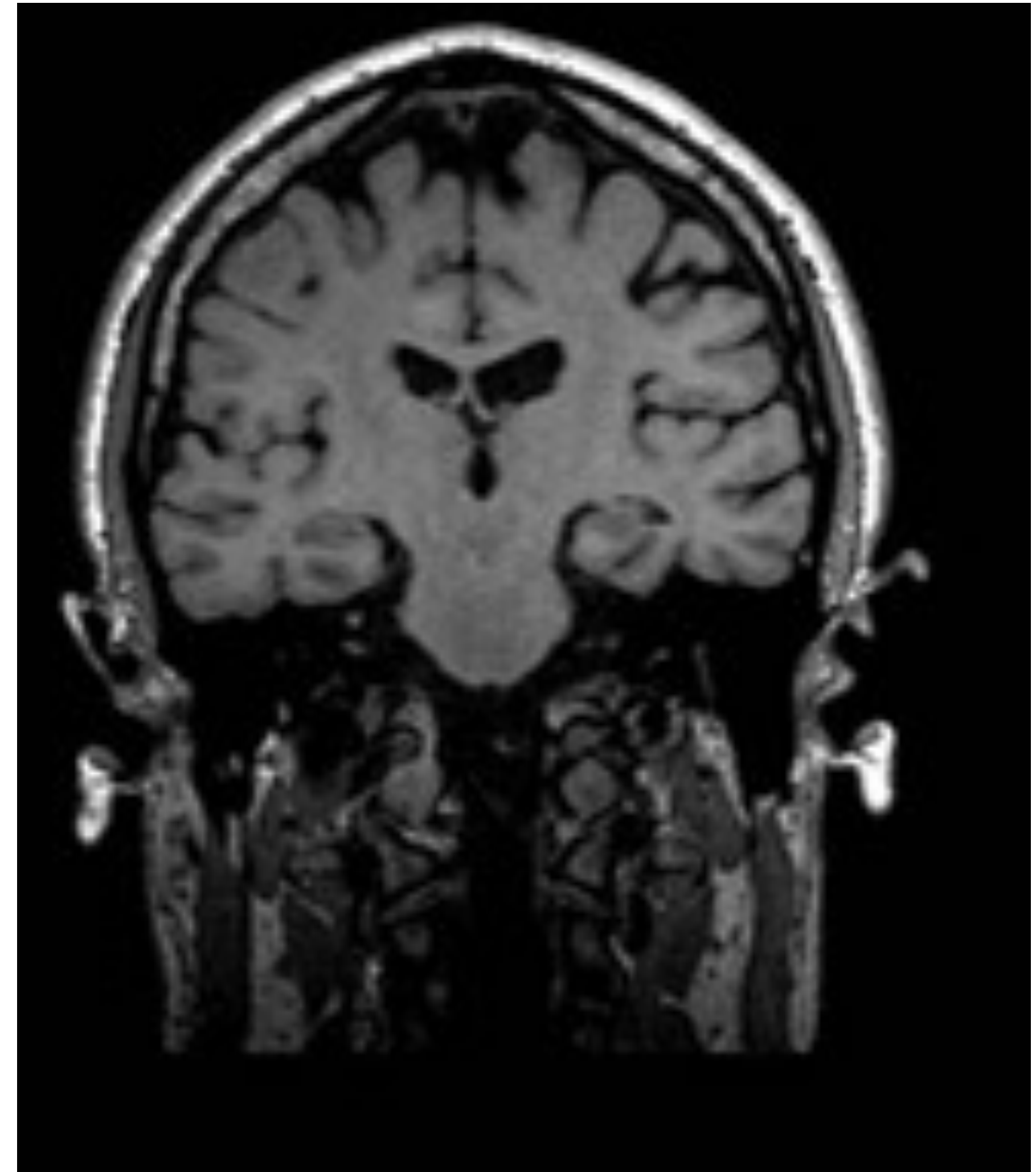
- The hippocampus is inferior and lateral to the third ventricles



Terminology in Brain Organization

Left versus right is an important issue in MRI studies:

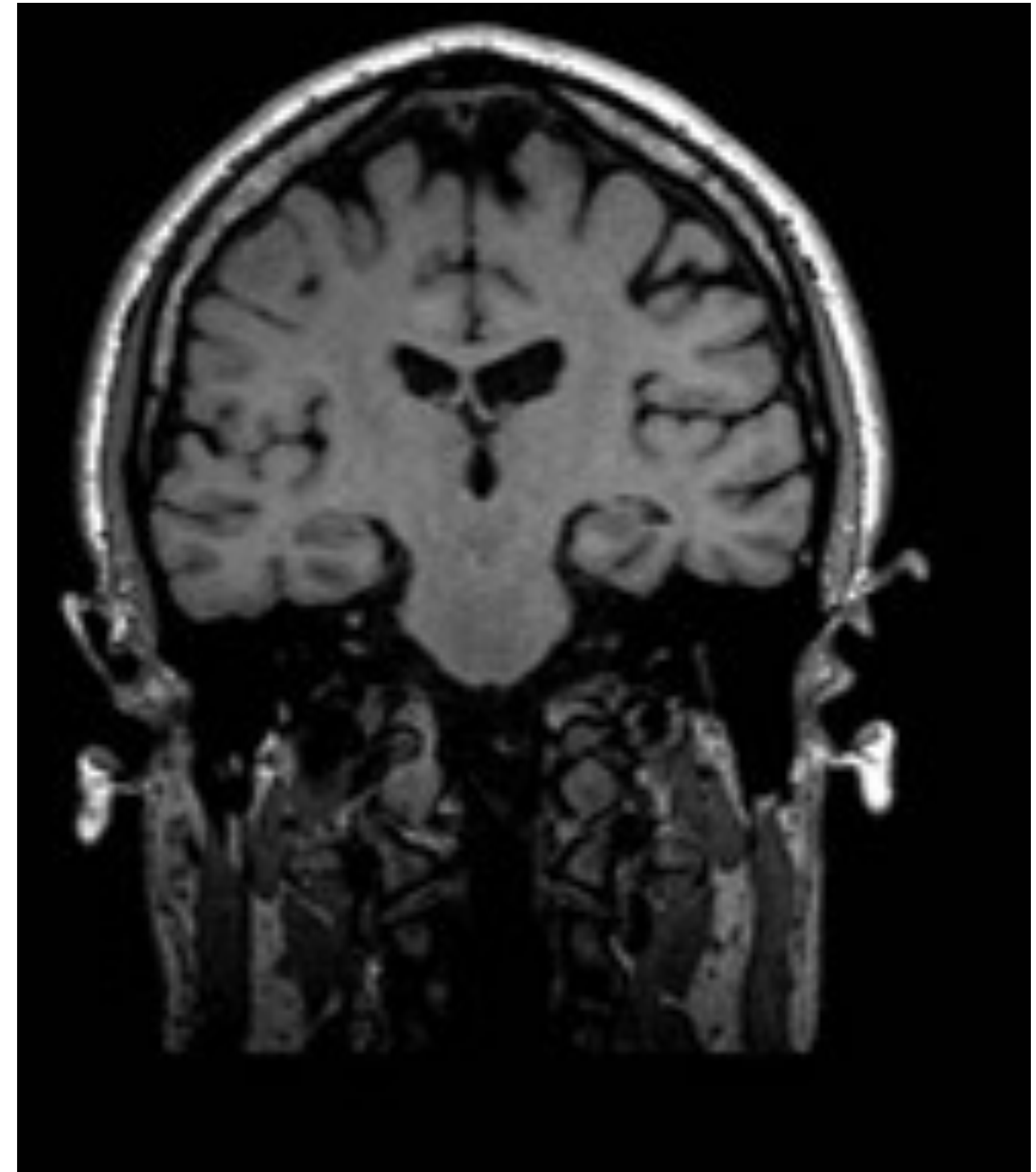
- It's impossible to see which side of the coronal image here is left
- The same image could be seen facing the subject or by standing behind the person



Terminology in Brain Organization

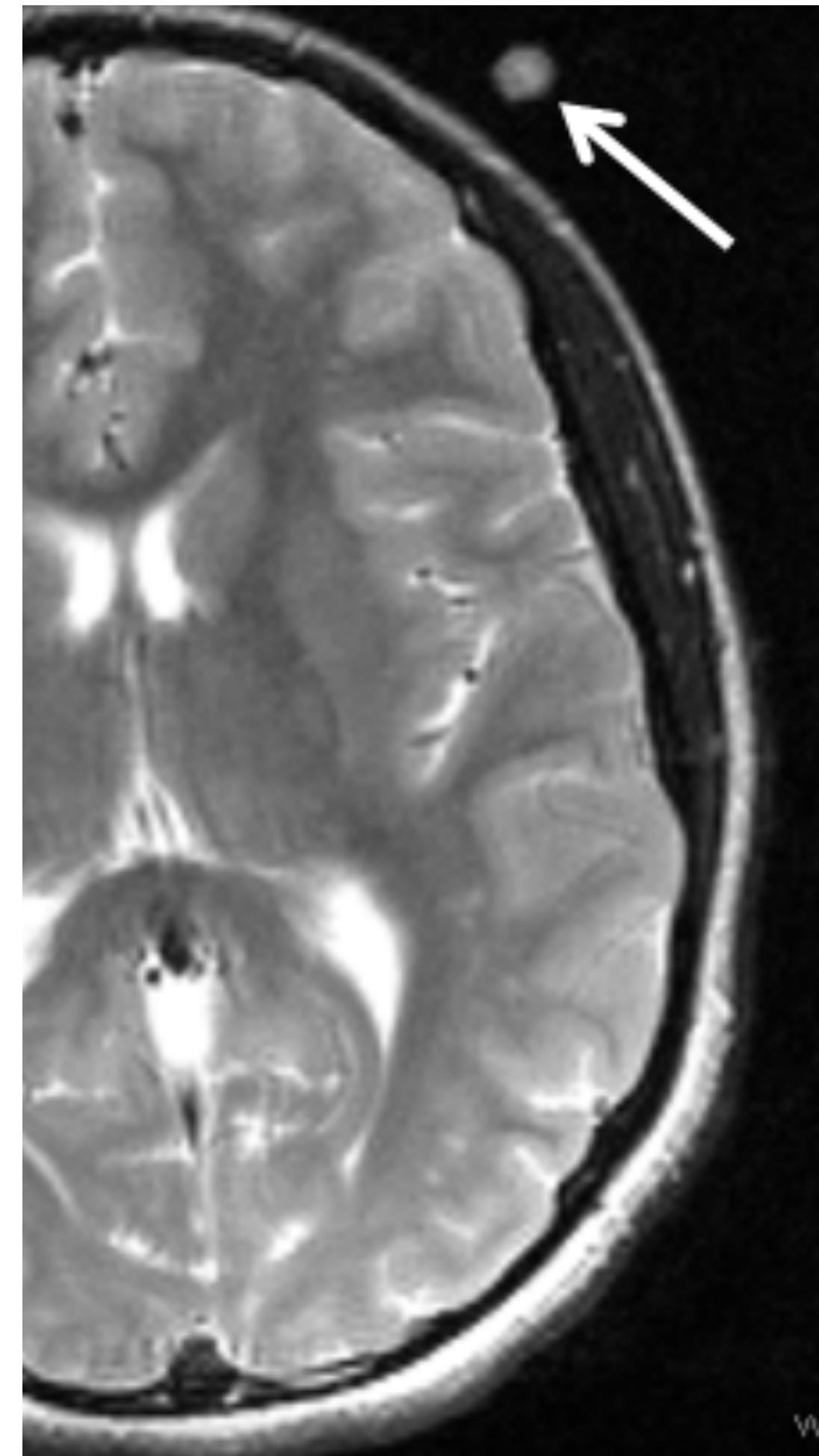
Two conventions to determine left versus right:

- Radiological convention shows the left side of the patient on the right side of the image
- Neurological convention shows the left side of the patient on the left side of the image



Terminology in Brain Organization

- In research both conventions are used and is usually defined in software packages used to process MRI data.
- Care must be taken to consistently apply these preferences to accurately report results
- To make sure a fiducial marker is used during scanning to ensure correct left versus right labeling



Terminology in Brain Organization

Other commonly used terms in brain organization include:

- Proximal (closer to point of attachment)
- Distal (further point of attachment)
- Ipsilateral (same side of brain)
- Contralateral (other side of brain)
- Oblique plane (angled plane)

