

Gross Divisions of CNS

Principles and Practices of Osteopathic Medicine I

- *Jennifer Xie, Ph.D.*
- Associate Professor
- Biomedical and Anatomical Sciences
- Arkansas, Wilson Hall, Rm # 144J



Email: Jennifer.xie@nyit.edu

Do.
Make.
Heal.
Innovate.
Reinvent the Future.

Anatomical Organization of the Nervous System

- Central Nervous System (CNS)

- Brain

- Forebrain
 - Cerebellum
 - Brainstem

- Spinal cord

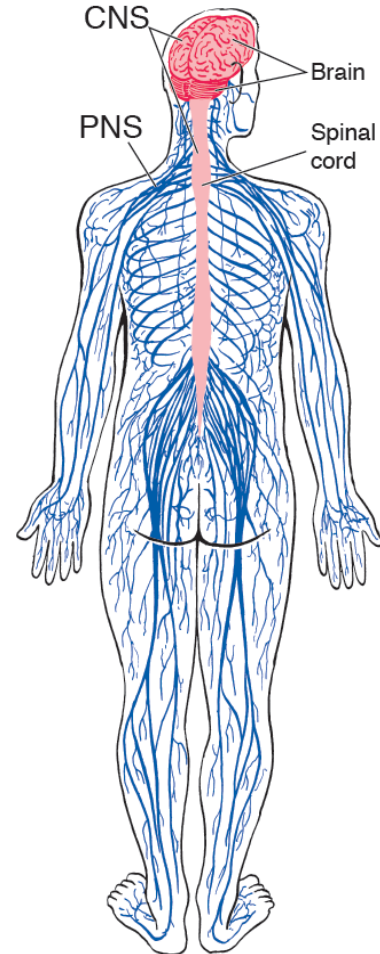
- Peripheral Nervous System (PNS)

- Nerves

- Cranial nerves
 - Spinal nerves

- Ganglia (exception: Basal ganglia)

- Sensory/motor neurons
 - Autonomic neurons
 - *Enteric nervous system
- } Parts are in the CNS

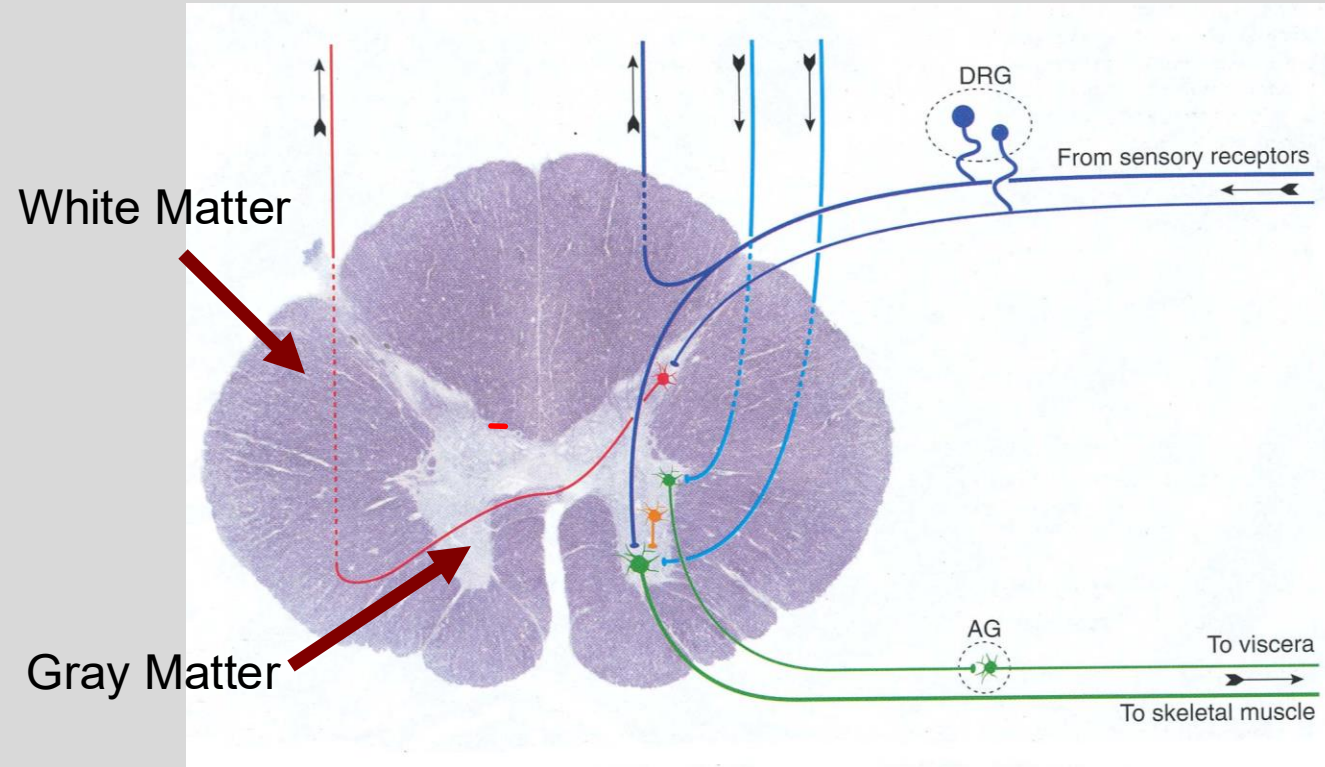


(Redrawn from Krstic RV: General histology of the mammal, Berlin, 1985, Springer-Verlag.)

Anatomical Organization of the CNS

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Directions in the CNS

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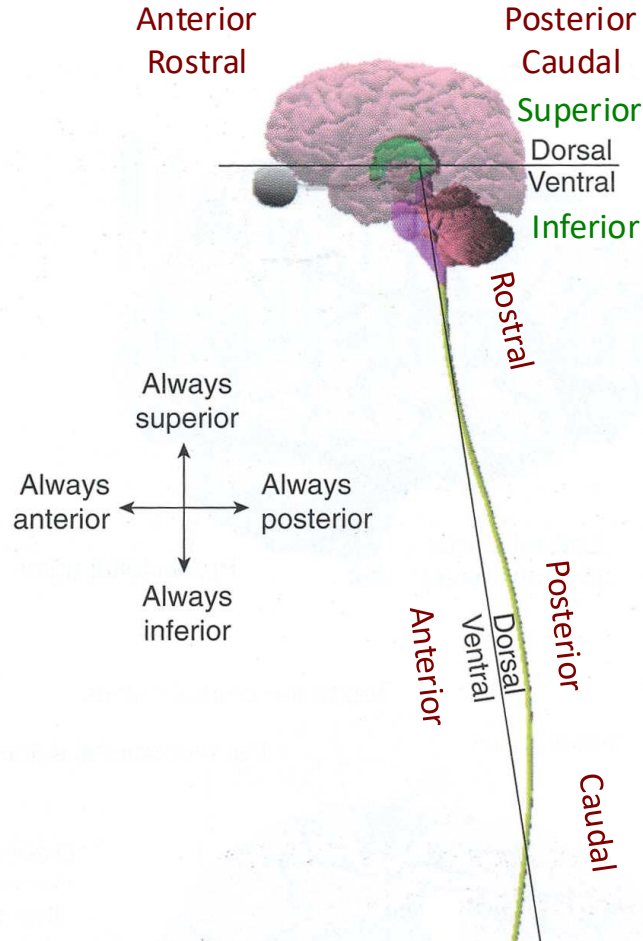
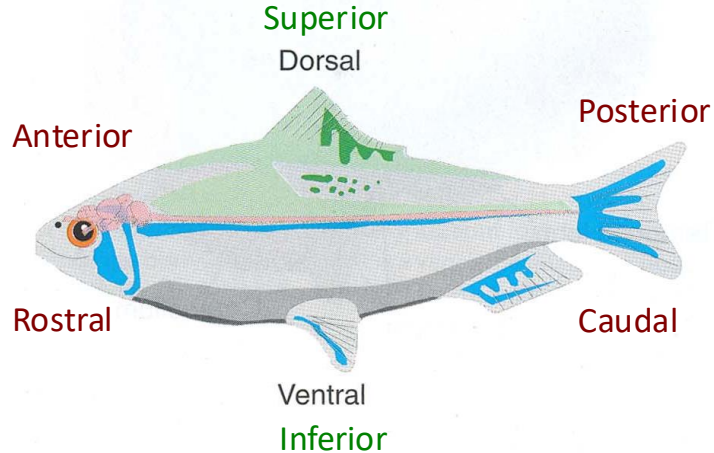
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Brain:

Dorsal = Superior

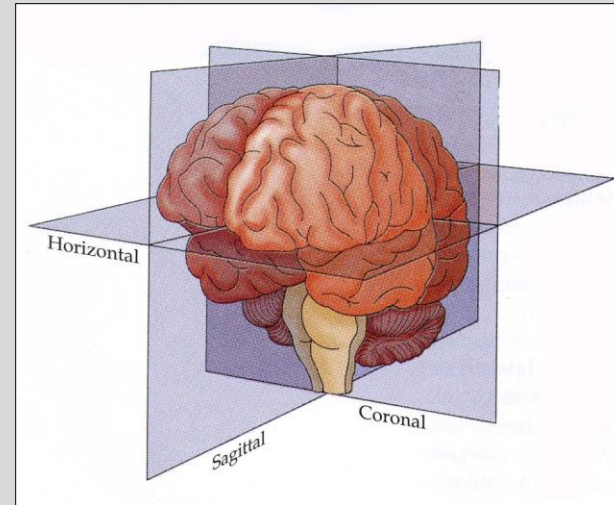
Brainstem and Spinal Cord:

Dorsal = Posterior



Orientation: Planes of Section

- **Sagittal:**
 - Midsagittal: divides structures along longitudinal axis (separates the hemispheres)
 - Parasagittal: sections that run parallel to midsagittal
- **Horizontal:** parallel to the longitudinal axis; “axial” for brainstem/spinal cord
- **Coronal:** frontal sections; perpendicular to the longitudinal axis; “transverse” or “cross” sections for brainstem/spinal cord



Major Structures of the CNS

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Forebrain

- 2 cerebral hemispheres (cerebrum)
- diencephalon

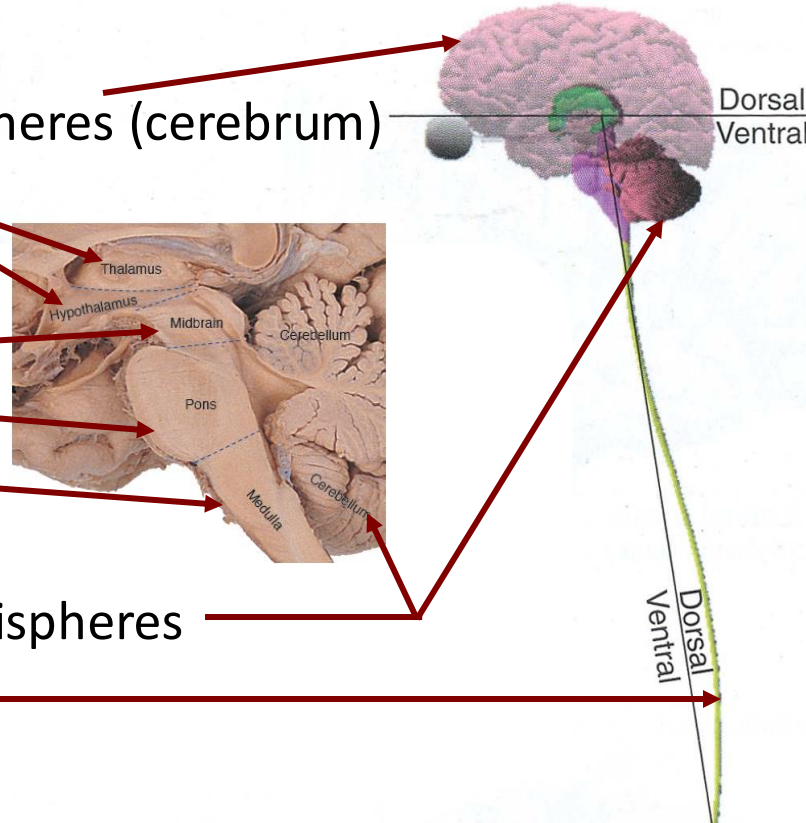
Brainstem

- midbrain
- pons
- medulla

Cerebellum

- 2 cerebellar hemispheres

Spinal Cord



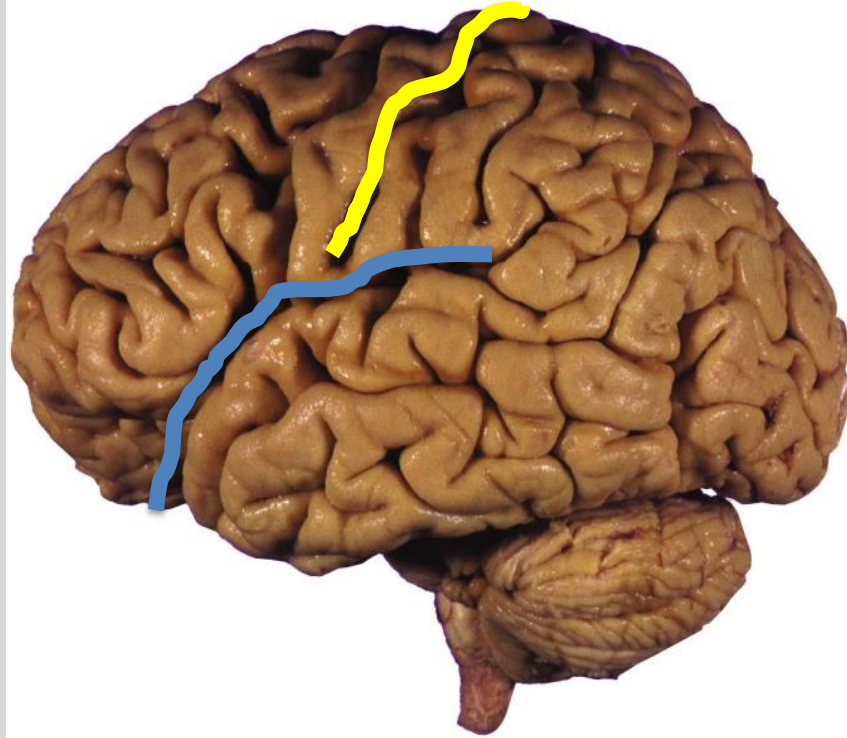
What's Where in the Cerebral Hemispheres

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Sulci & Gyri

- **central sulcus**
(aka Rolando fissure or central fissure)
- **lateral sulcus**
(aka Sylvian fissure or lateral fissure)



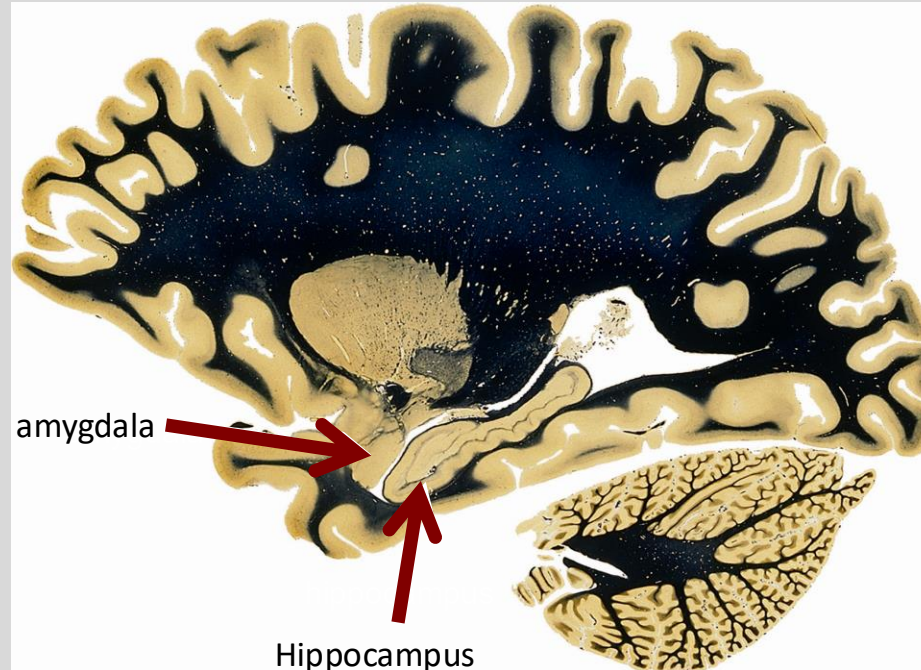
Major Functions of the Cerebral Hemispheres

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Temporal Lobe

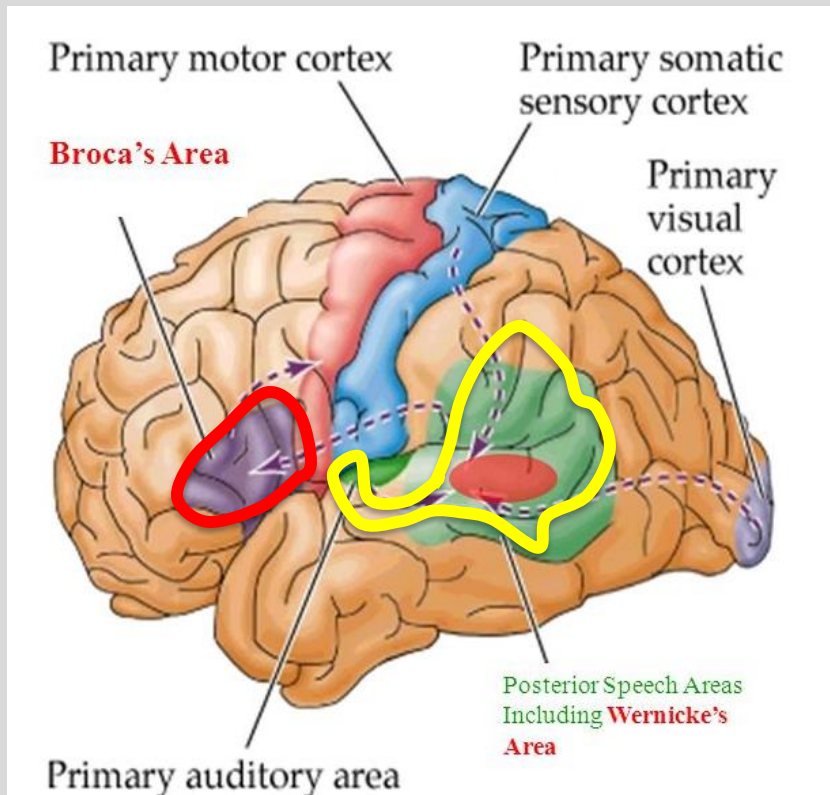
- auditory cortex
- hippocampus
 - Learning and memory
- amygdala
 - Emotions (fear, anger, etc.)



Major Functions of the Cerebral Hemispheres

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Language areas

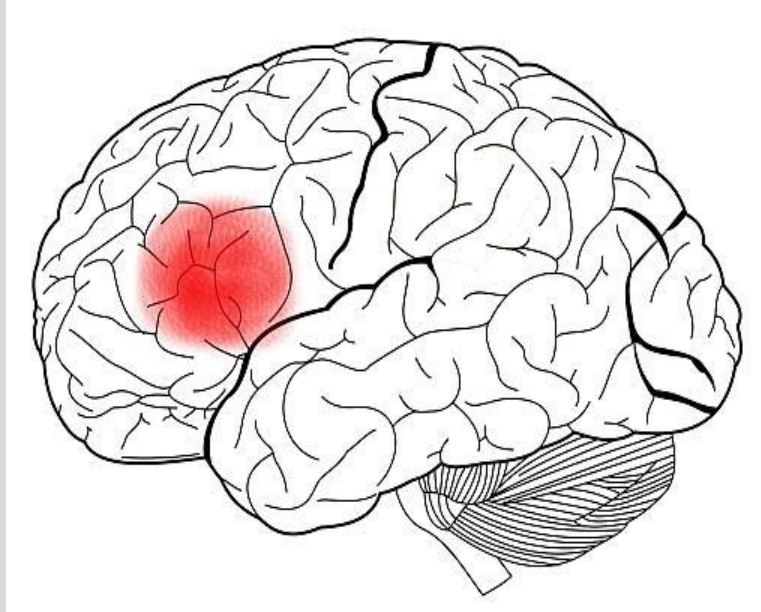
- bordering **lateral sulcus**
 - Broca's area
 - Wernicke's area

Clinical Correlation: Broca's Aphasia

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- Broca's Aphasia
- Lesion in Broca's area
 - Causes difficulty with **production** of spoken language
 - Can understand but cannot speak!
 - Knows what they want to say but cannot form words
- “**Expressive Aphasia**”



<https://www.youtube.com/watch?v=6zNKz7YoUao>

<https://www.lifepersona.com/broca-s-area-functions-anatomy-and-diseases>

What's Where in the Cerebral Hemispheres

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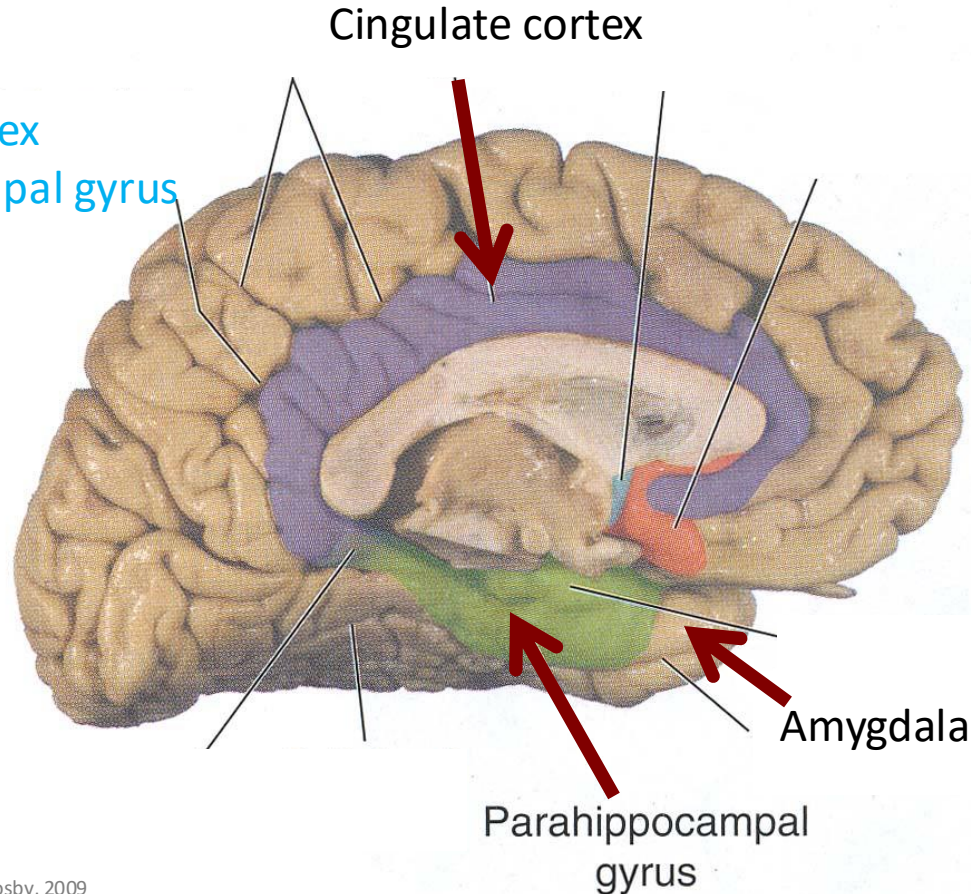
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Limbic Lobe

- Cingulate cortex
- Parahippocampal gyrus
- Amygdala

■ Five F's:

- Feeling
- Feeding
- Fleeing
- Fighting
- "Sex"



Major Functions of the Diencephalon

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Thalamus

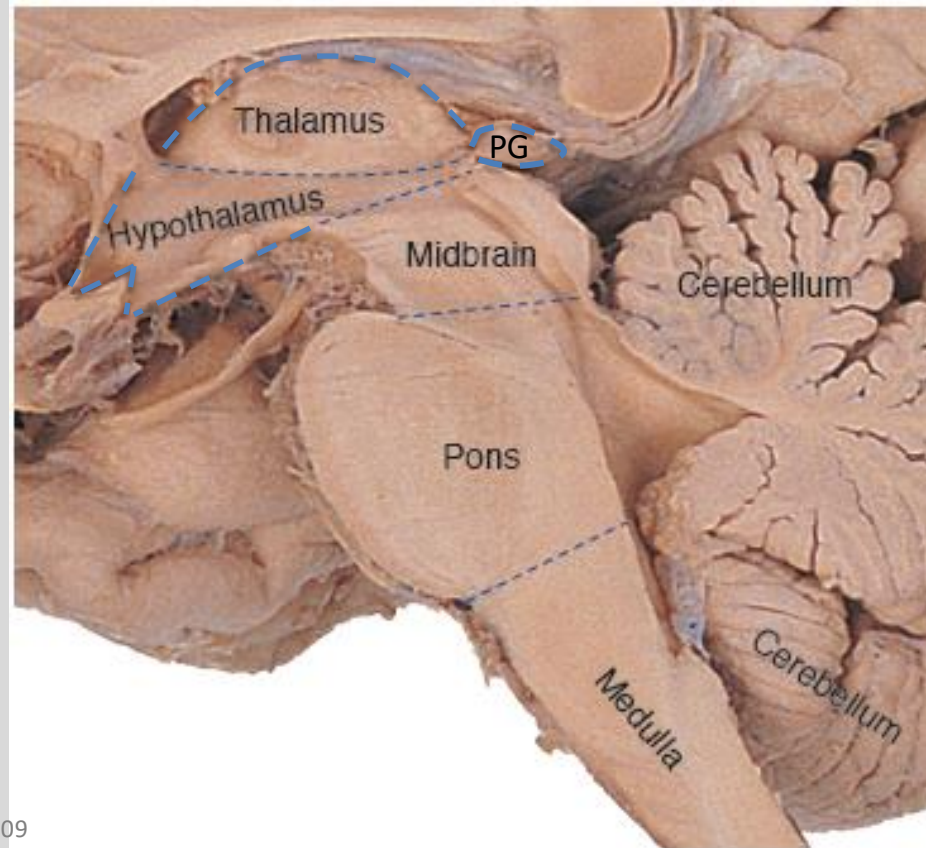
- “Relay Centers” to cortex for sensory and motor info

Hypothalamus

- maintain homeostasis
- autonomic control

Pineal Gland

- circadian rhythms



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Major Functions of the Brainstem

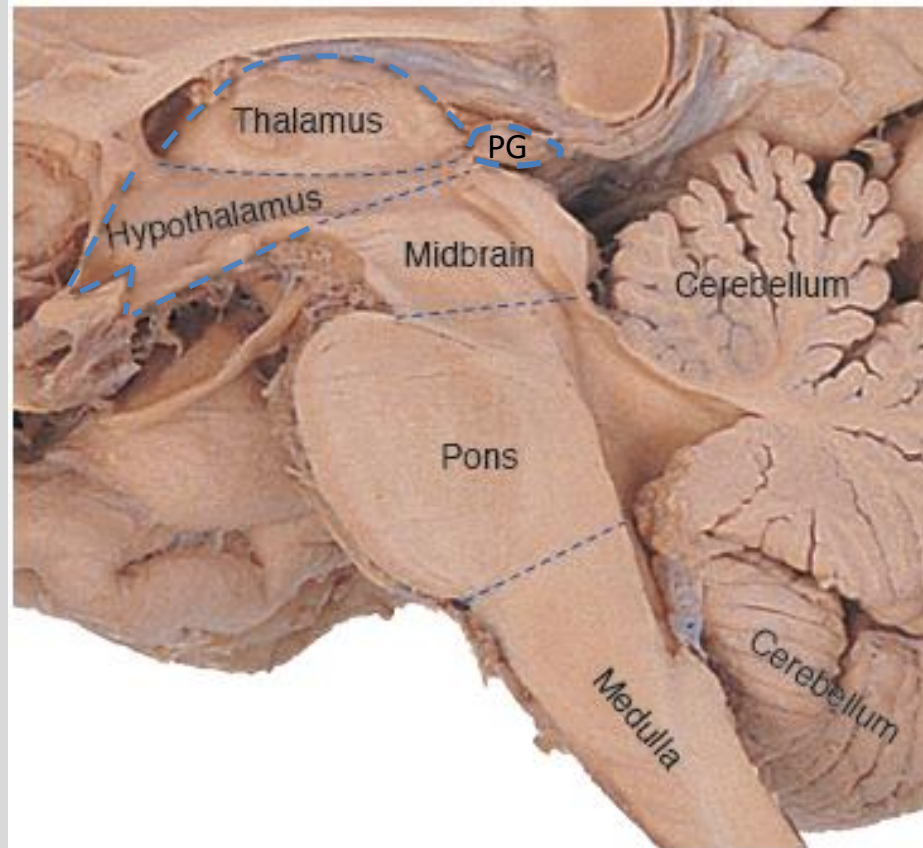
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Midbrain

Pons

Medulla

- Autonomic control
(breathing,
cardiovascular
function, etc.)
- VITAL TO LIFE



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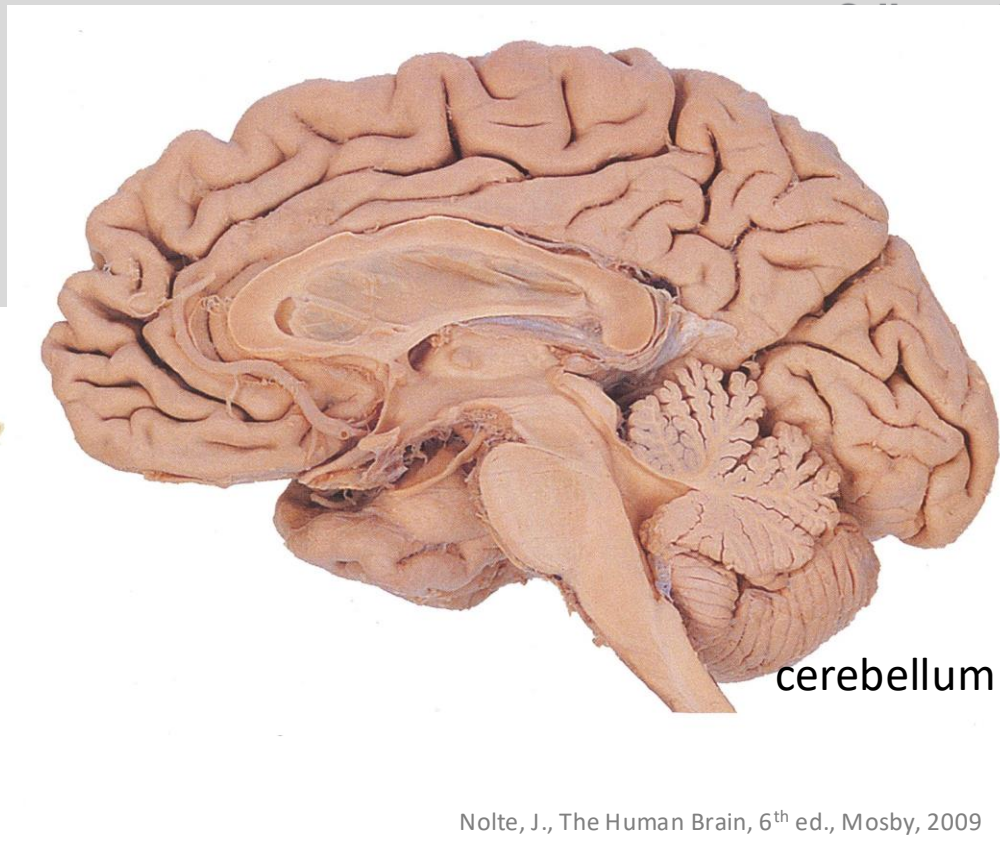
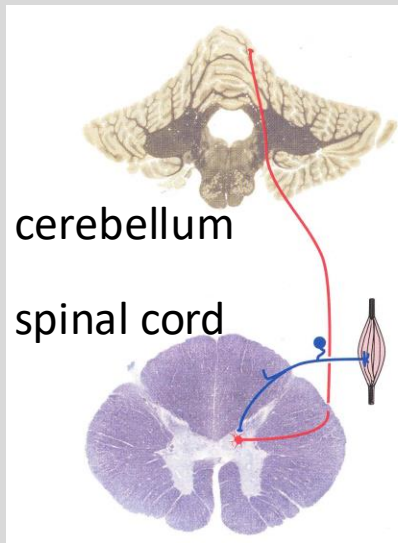
Major Functions of the Cerebellum

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Cerebellum

- Motor coordination
- Limited sensory function

Osteopathic



Lecture and Lab Feedback Form_

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<https://comresearchdata.nyit.edu/redcap/surveys/?s=HRCY448FWYXREL4R>

Nolte's Essentials of the Human Brain, 2nd edition

Chapter 3. "Gross Anatomy and General Organization of the Central Nervous System"

Available at ClinicalKey:

<https://www-clinicalkey-com.arktos.nyit.edu#!/content/book/3-s2.0-B9780323529310000080>

Email: jennifer.xie@nyit.edu

