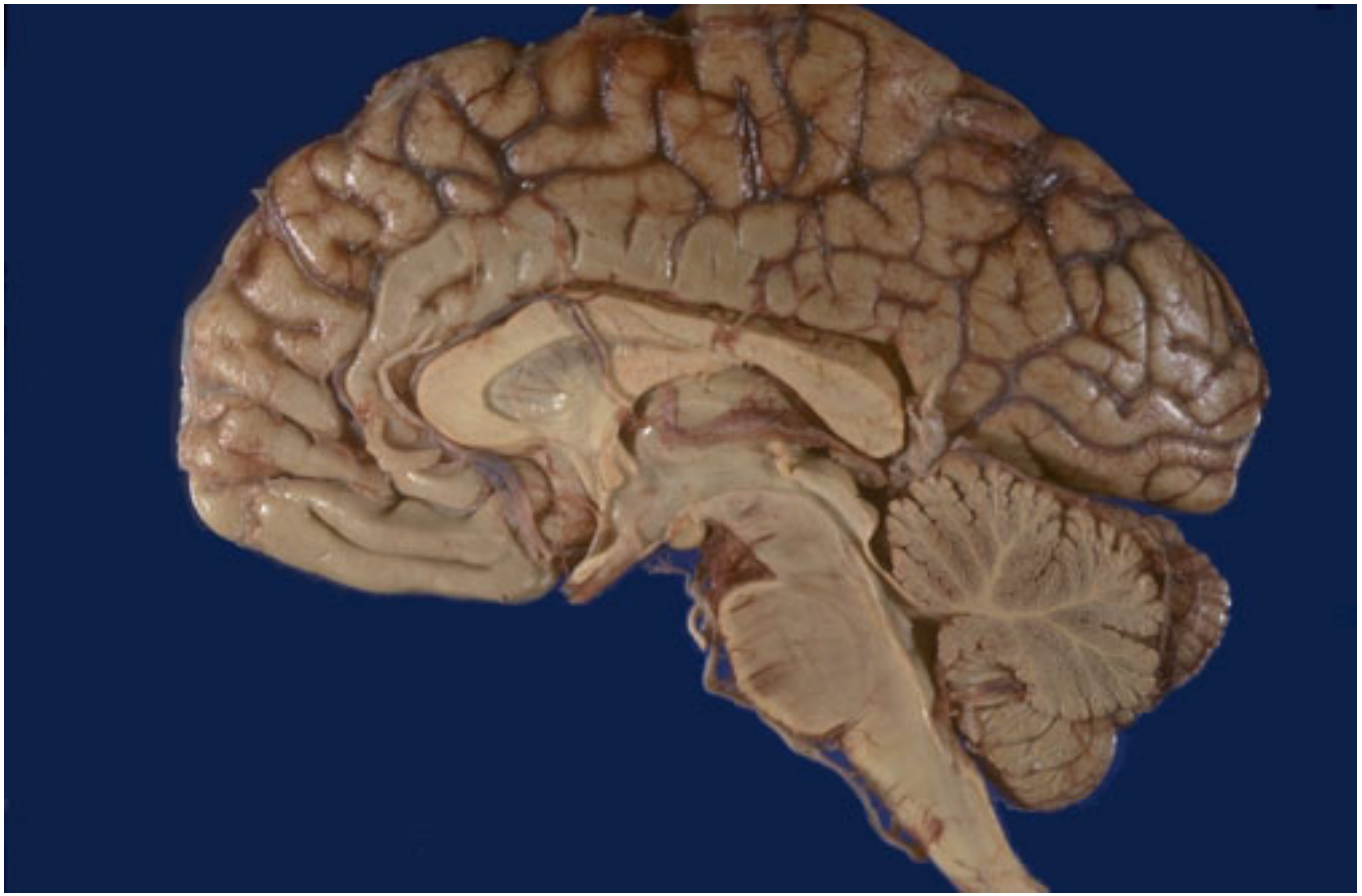
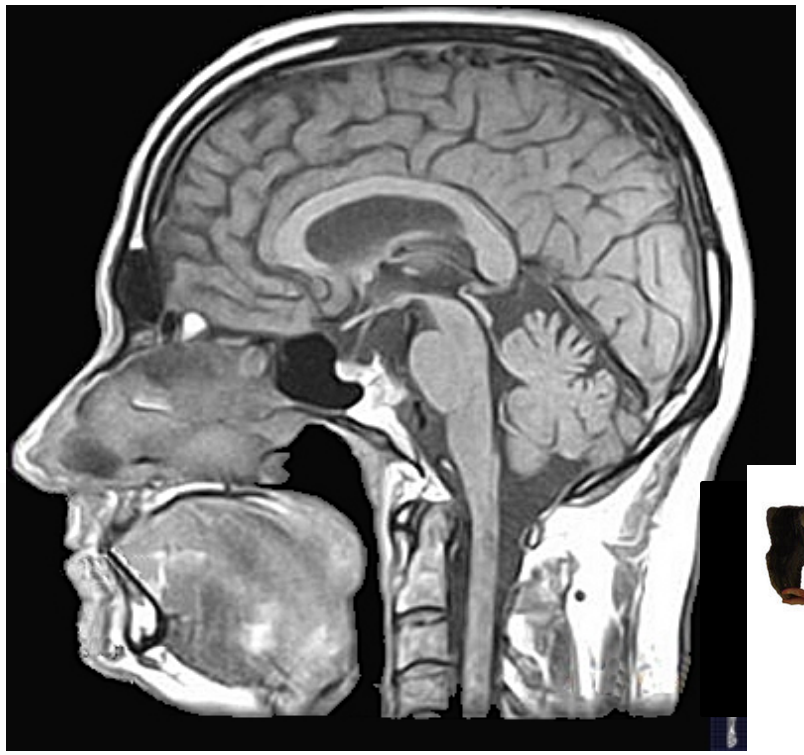
LEC 1A

ANATOMY OF THE NERVOUS SYSTEM

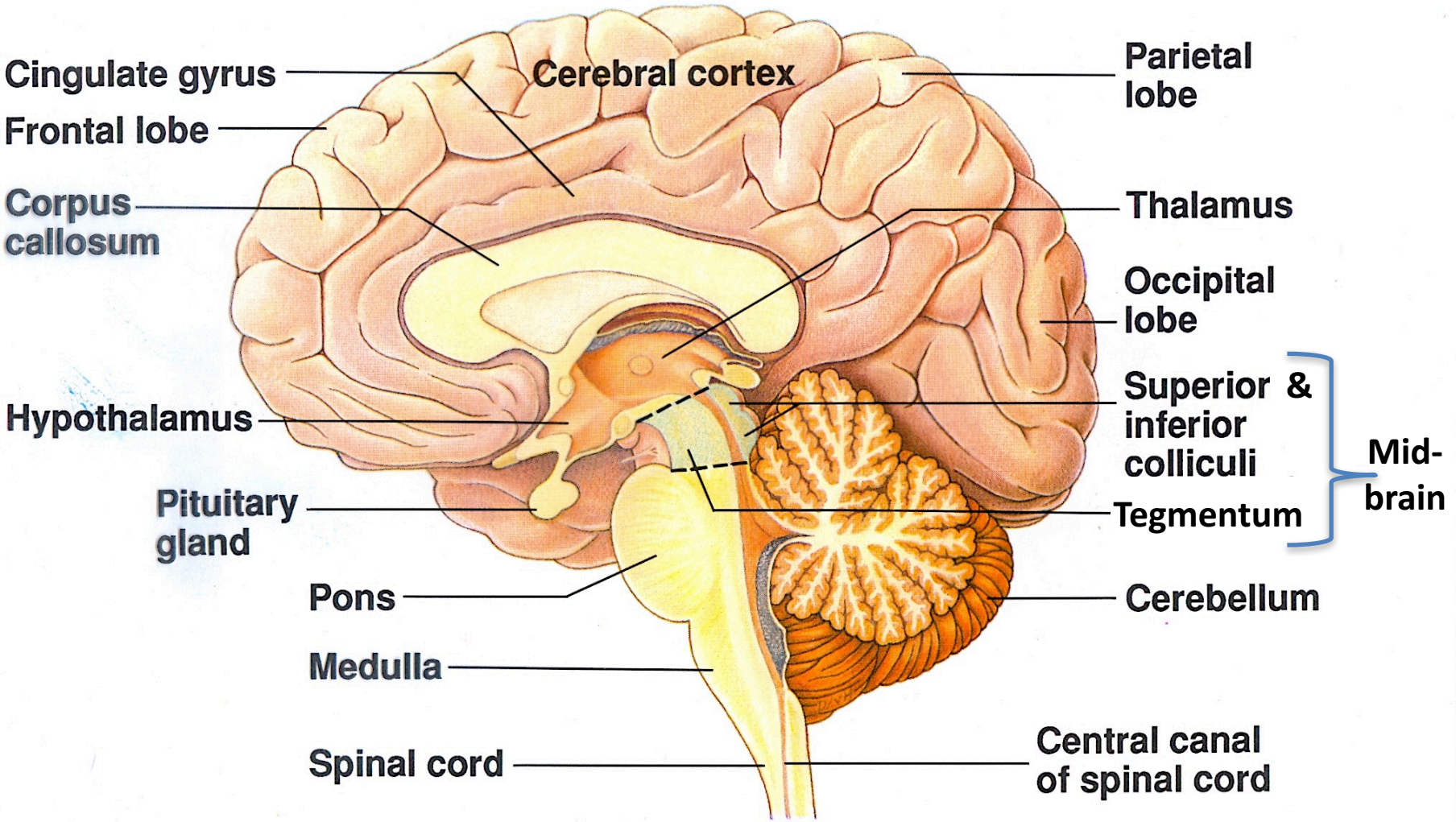


Cogs 17 * UCSD

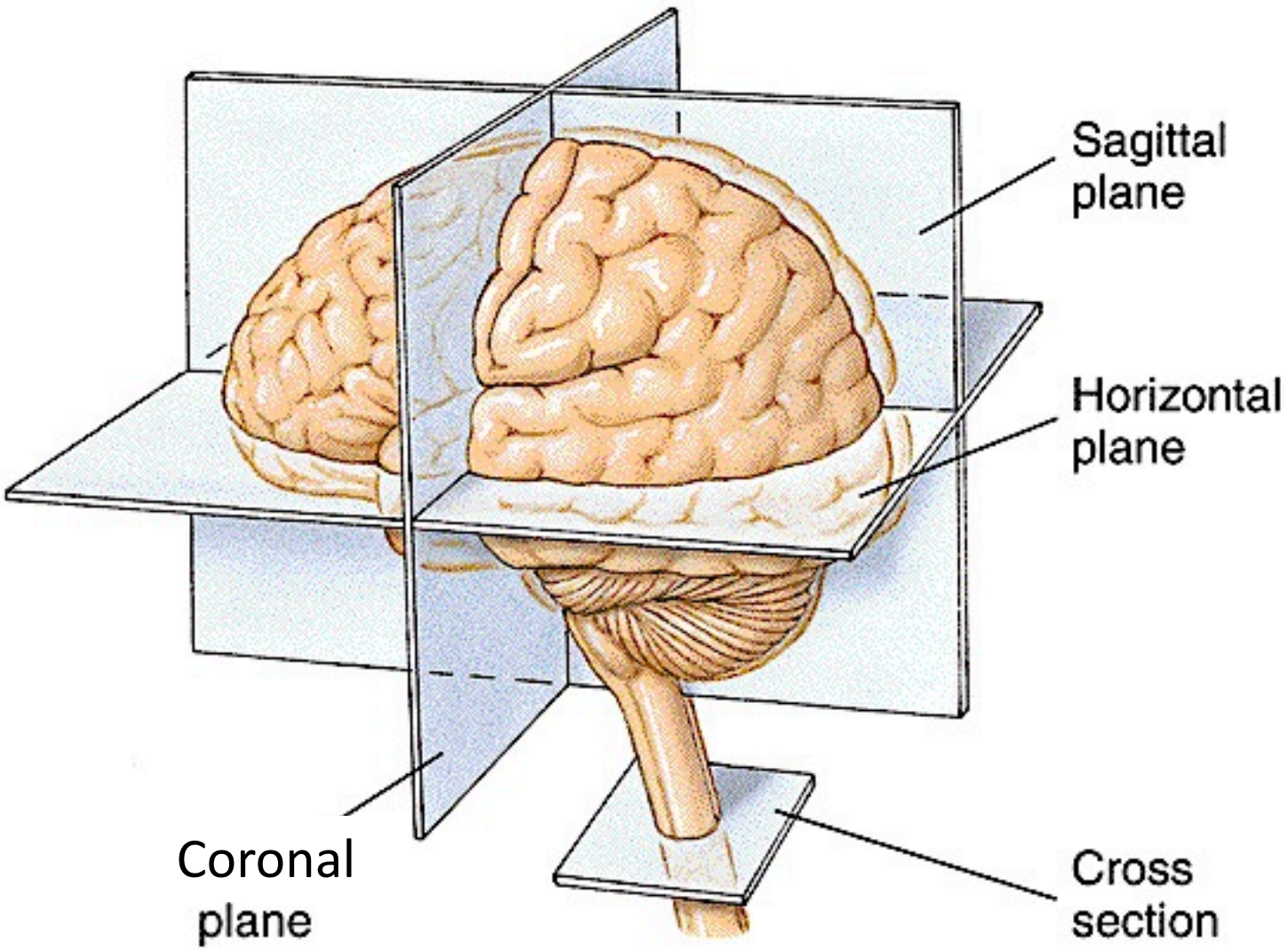
Consciousness –
"The Hard Problem"



Mid-Saggittal Section

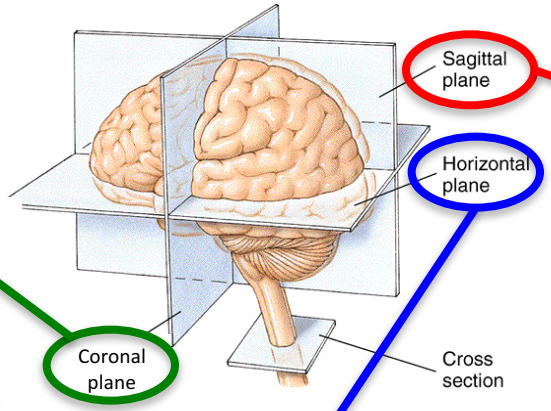


Planer Views of the Brain



Planer Views of the Brain

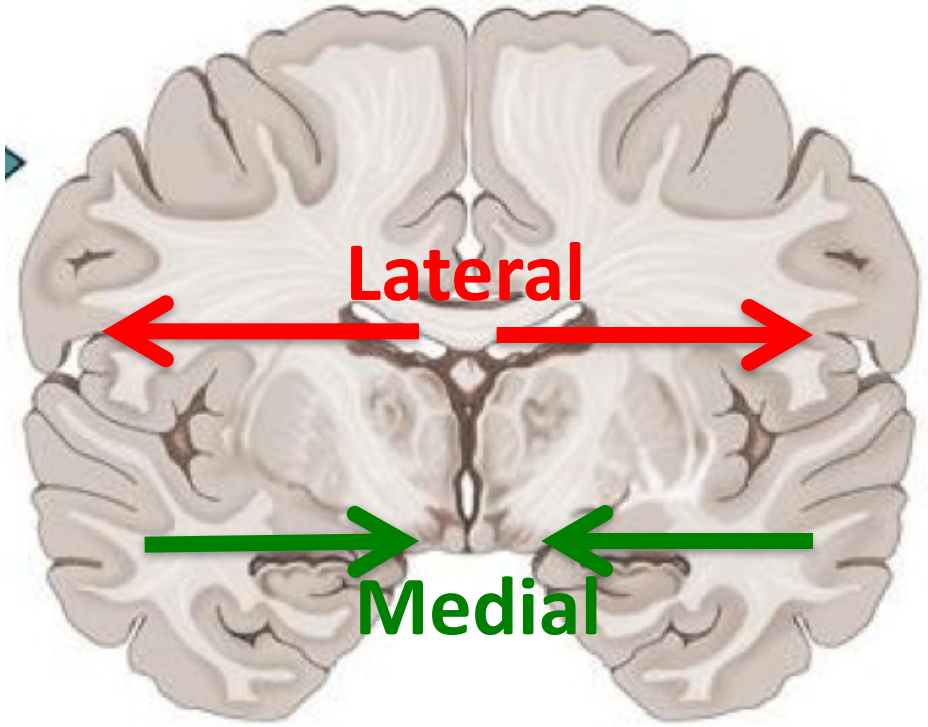
Coronal



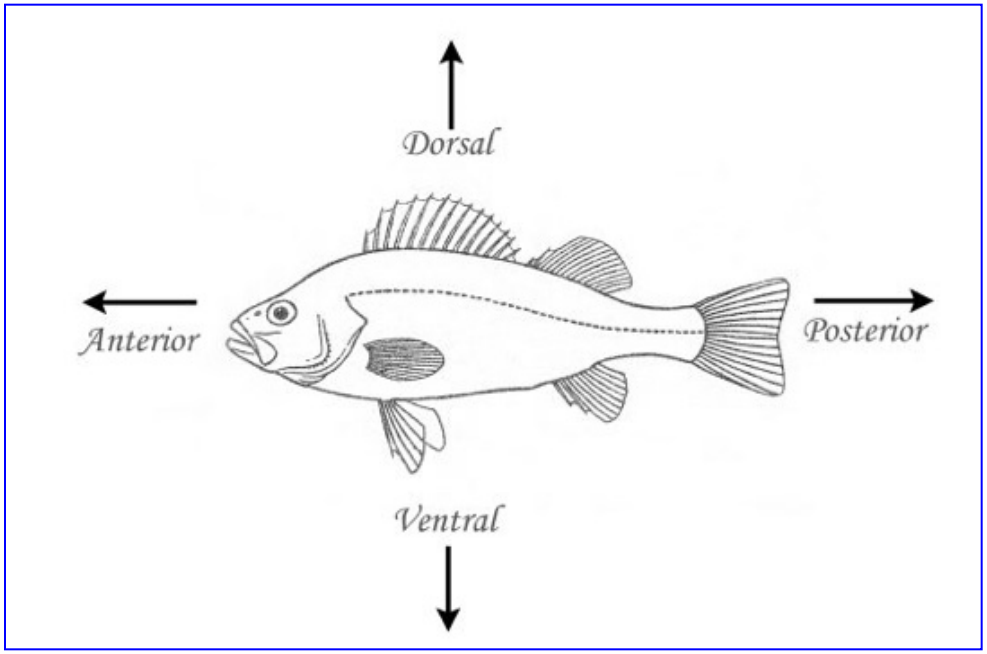
Saggital

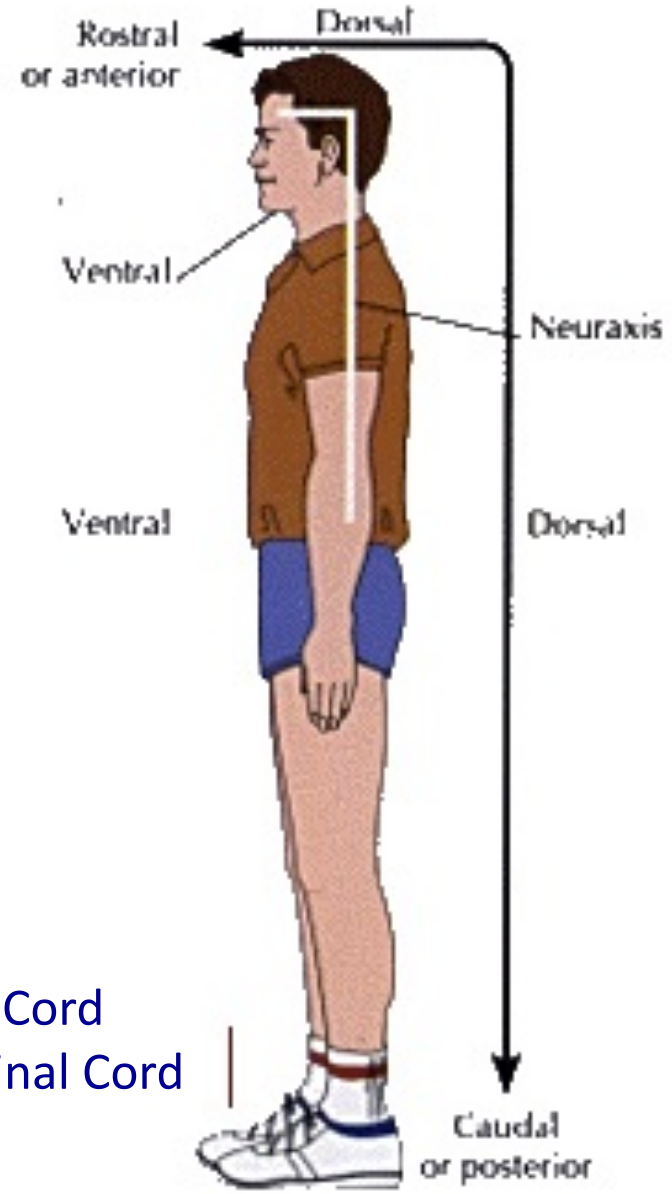
Horizontal

Lateral & Medial



Dorsal & Ventral



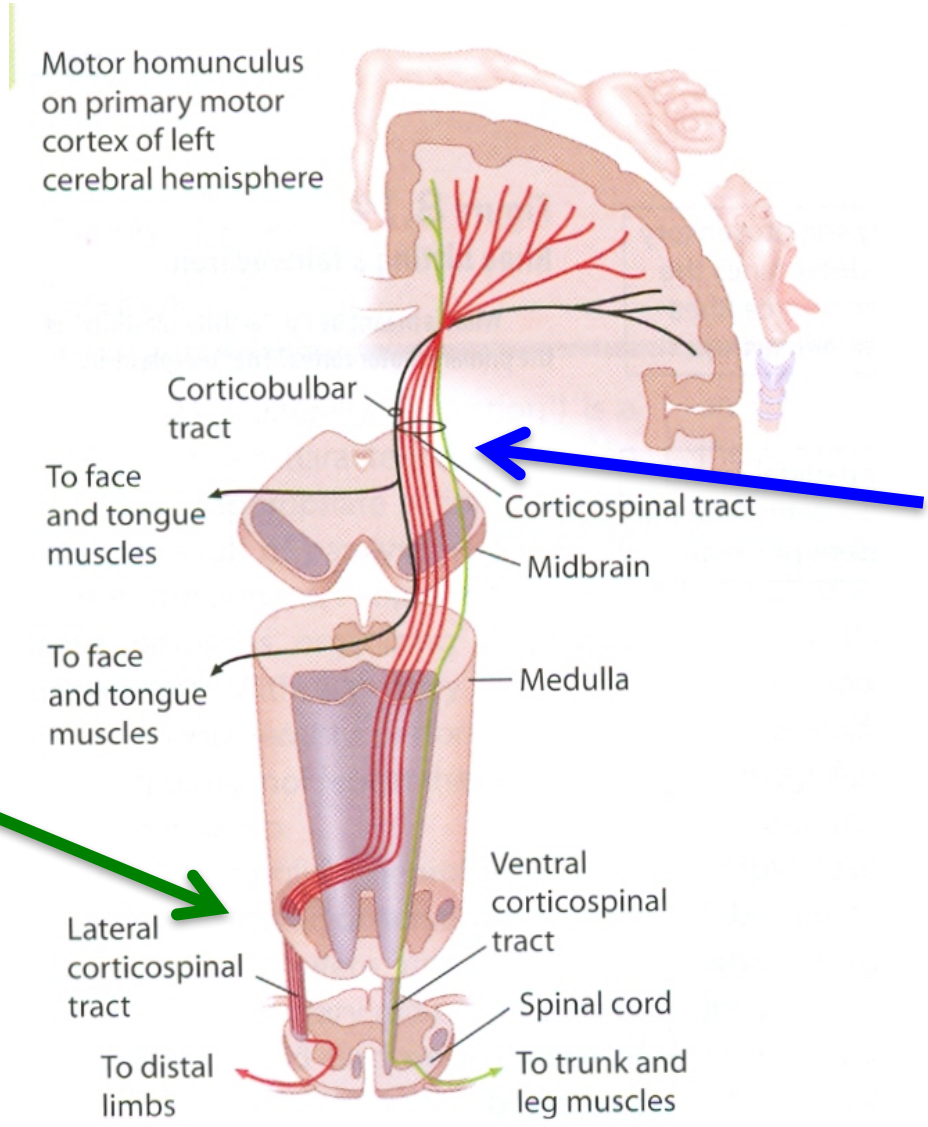


In Humans,
"Dorsal" = TOP of Brain & REAR of Spinal Cord
"Ventral" = BOTTOM of Brain & FRONT of Spinal Cord

Bilateral Structure

Nervous System duplicated on right & left

Ipsi-lateral (same side) and Contra-lateral (opposite side) Connections



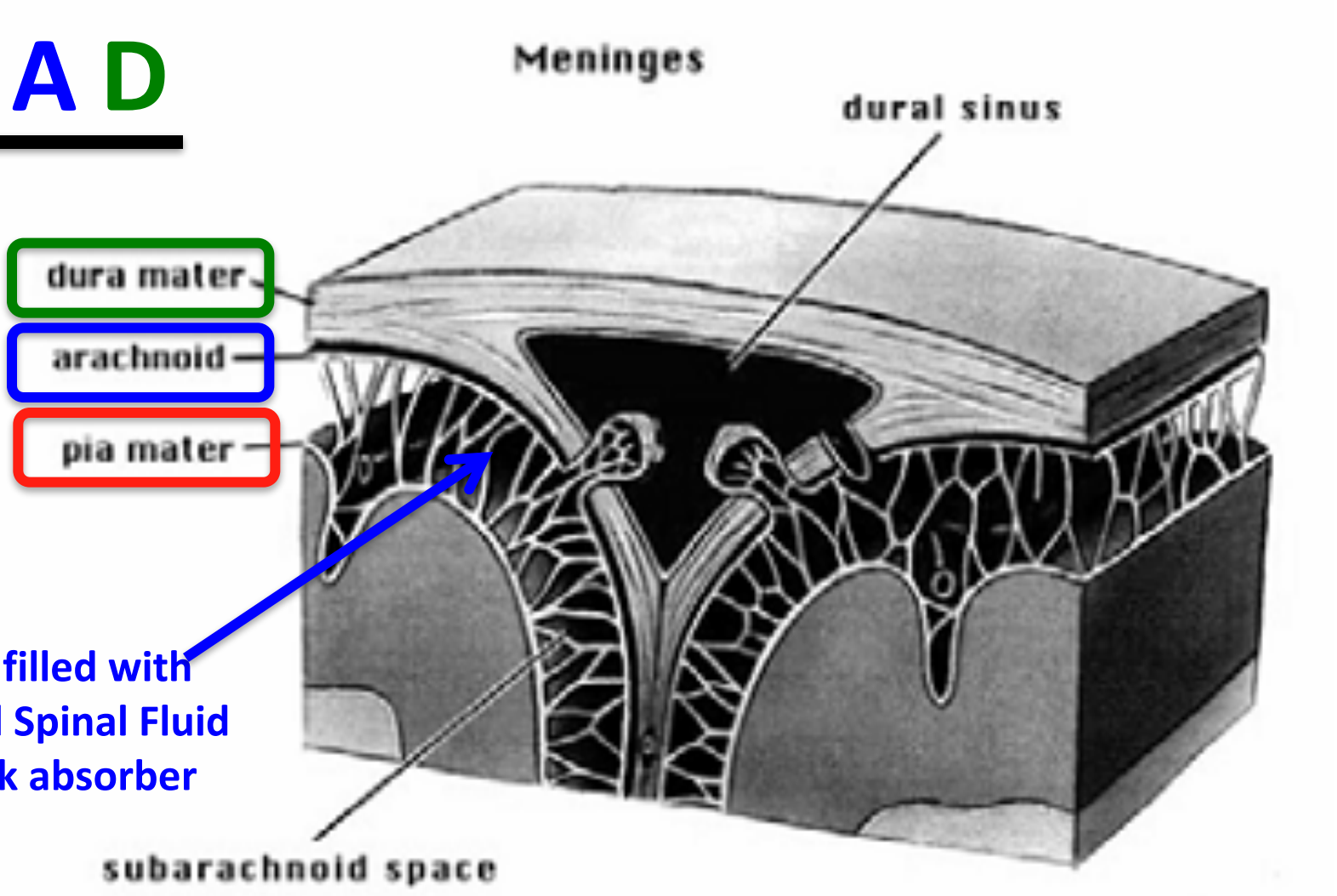
Ipsi-lateral connections

Contra-lateral connections

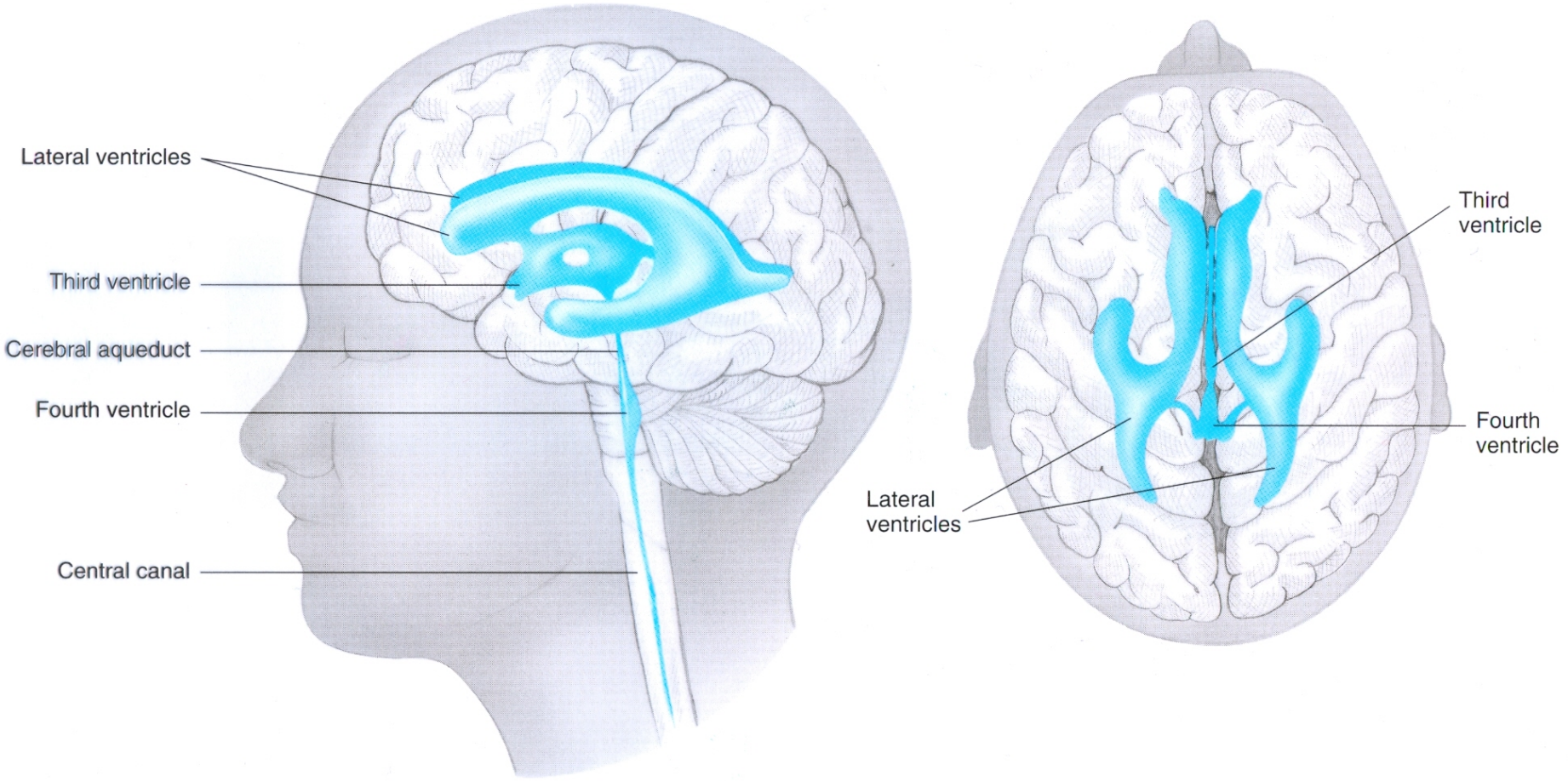
Support Structures: The **Meninges**

Surrounds CNS under bone

P A D

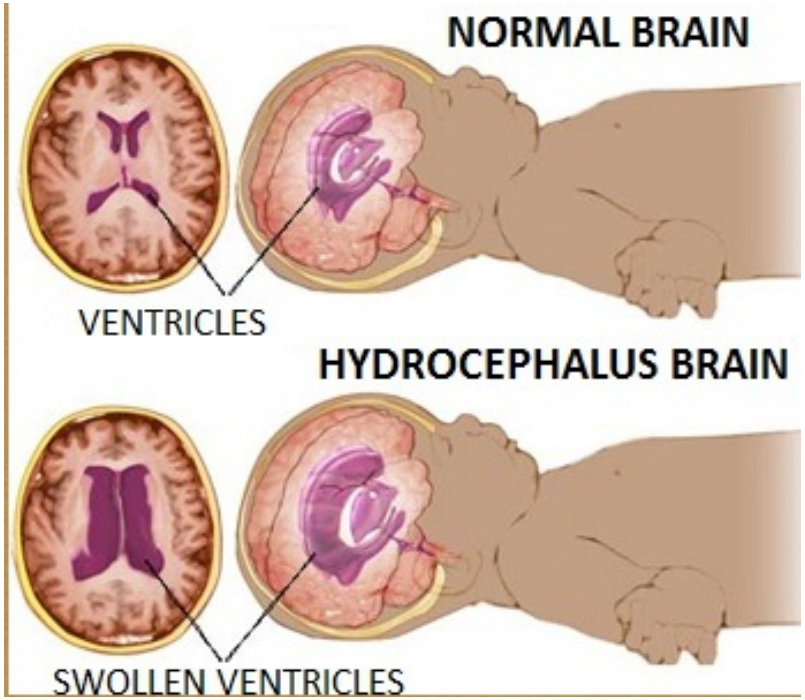


Ventricles

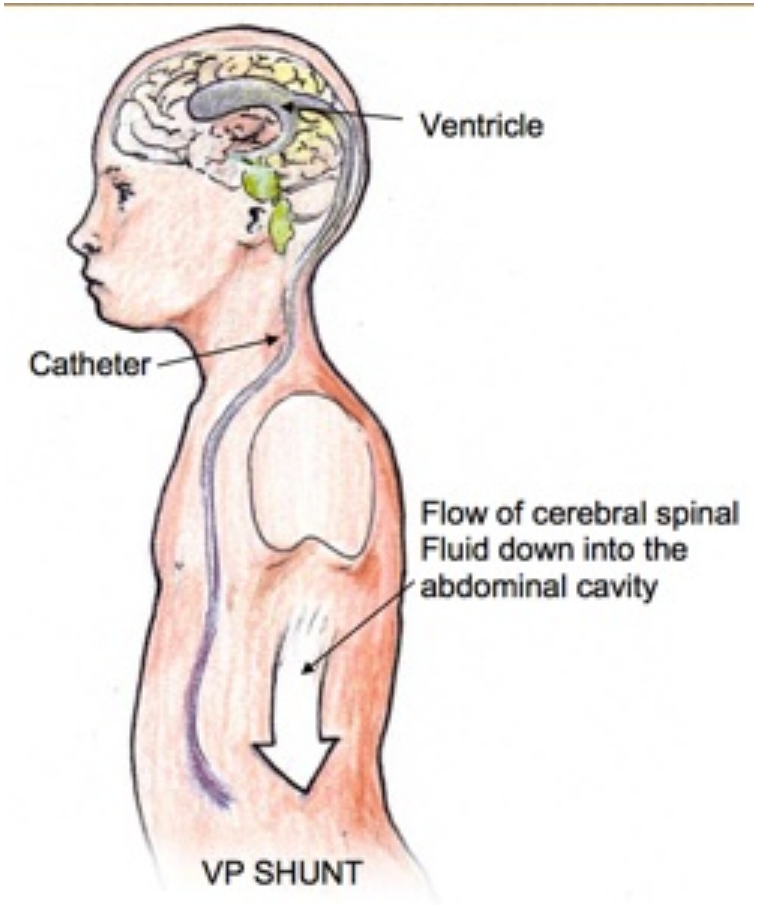


Produce, and filled with, Cerebral Spinal Fluid (CSF)

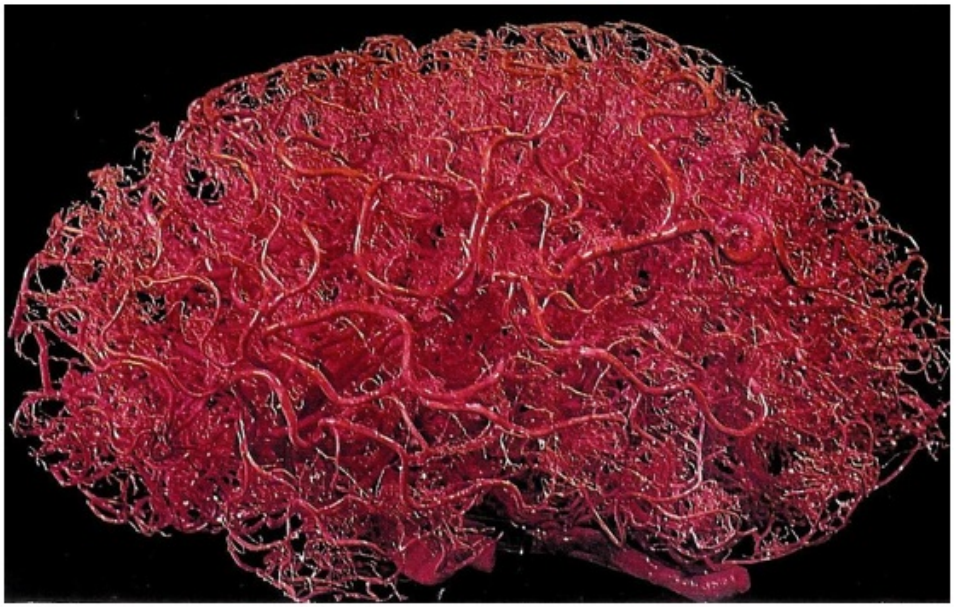
Hydrocephalus



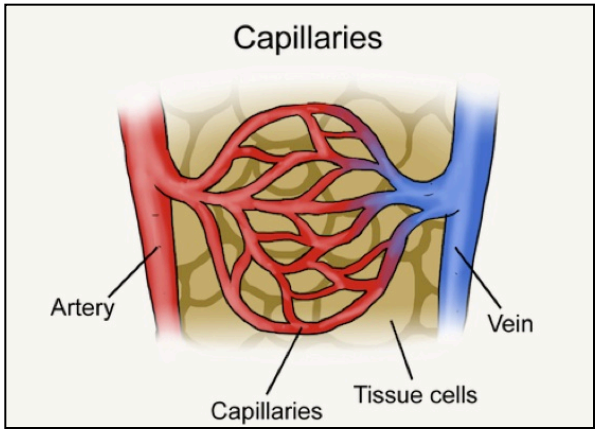
If CSF does not drain properly, can build up in Ventricles



Blood Vessels in Brain

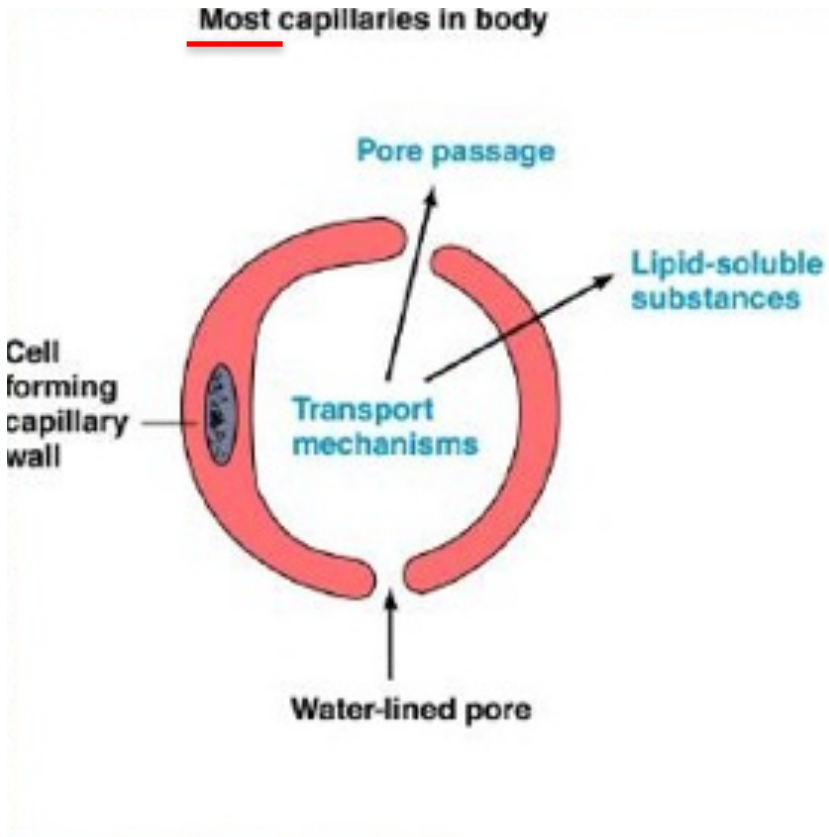


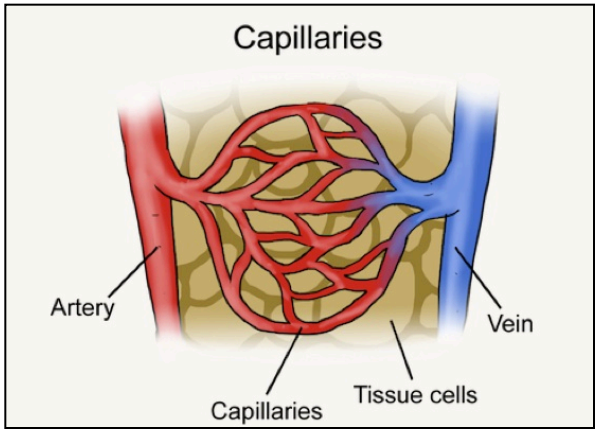
Brain = 2% of body weight,
uses 20% of blood supply!



Blood-Brain Barrier

Exercising tight controls over what enters brain from bloodstream





Blood-Brain Barrier

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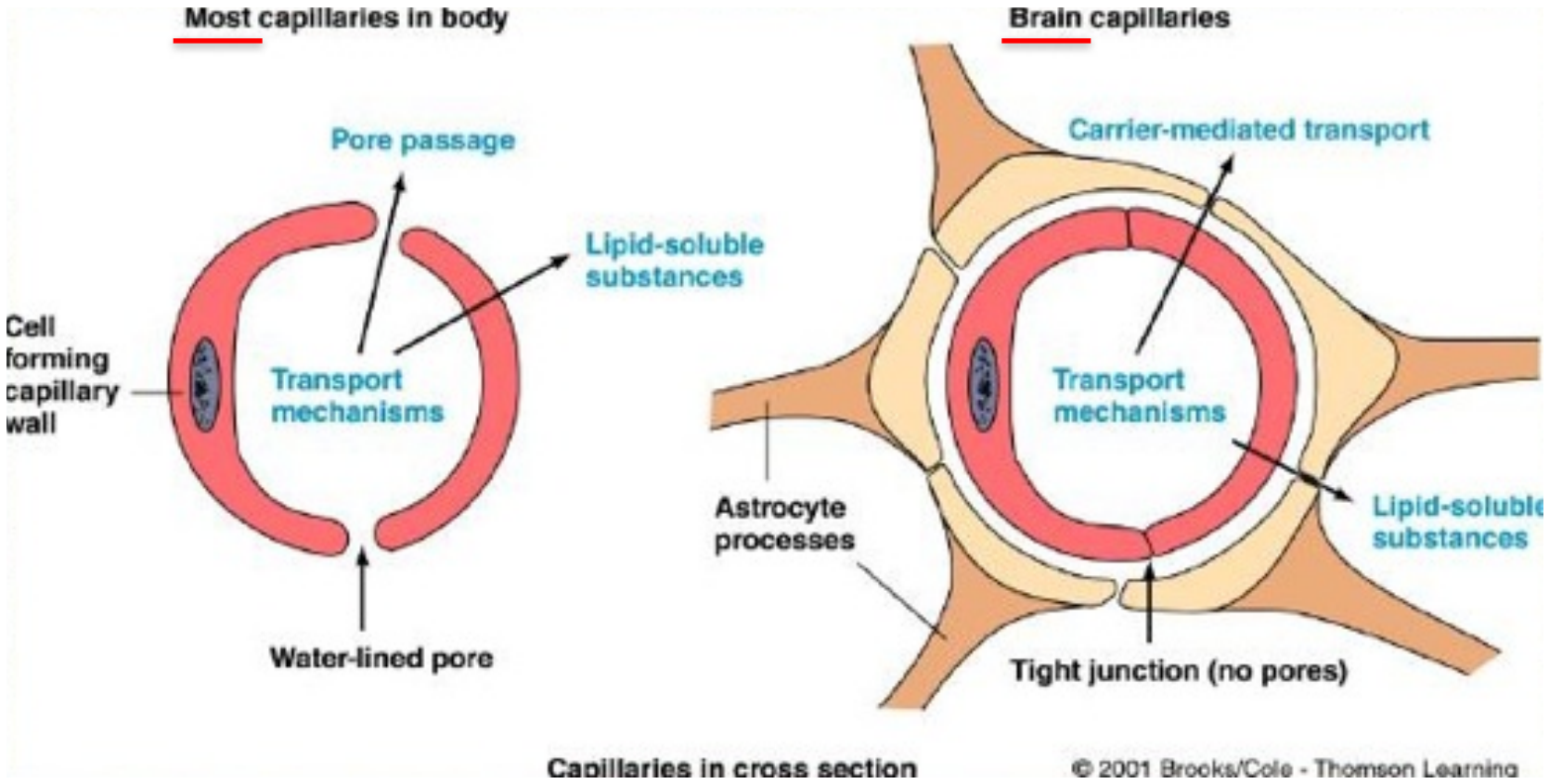
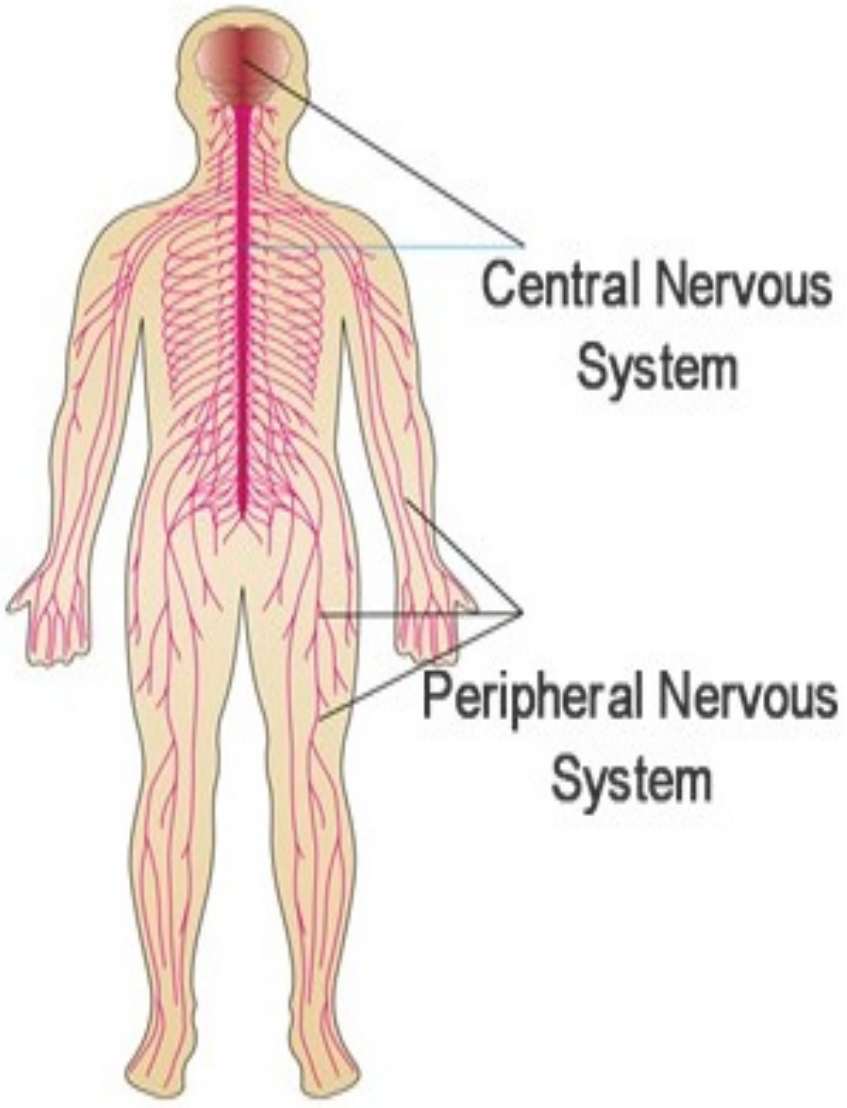


CNS & PNS



CNS

Central Nervous System

= Brain & Spinal Cord

Surrounded by bone and meninges

PNS

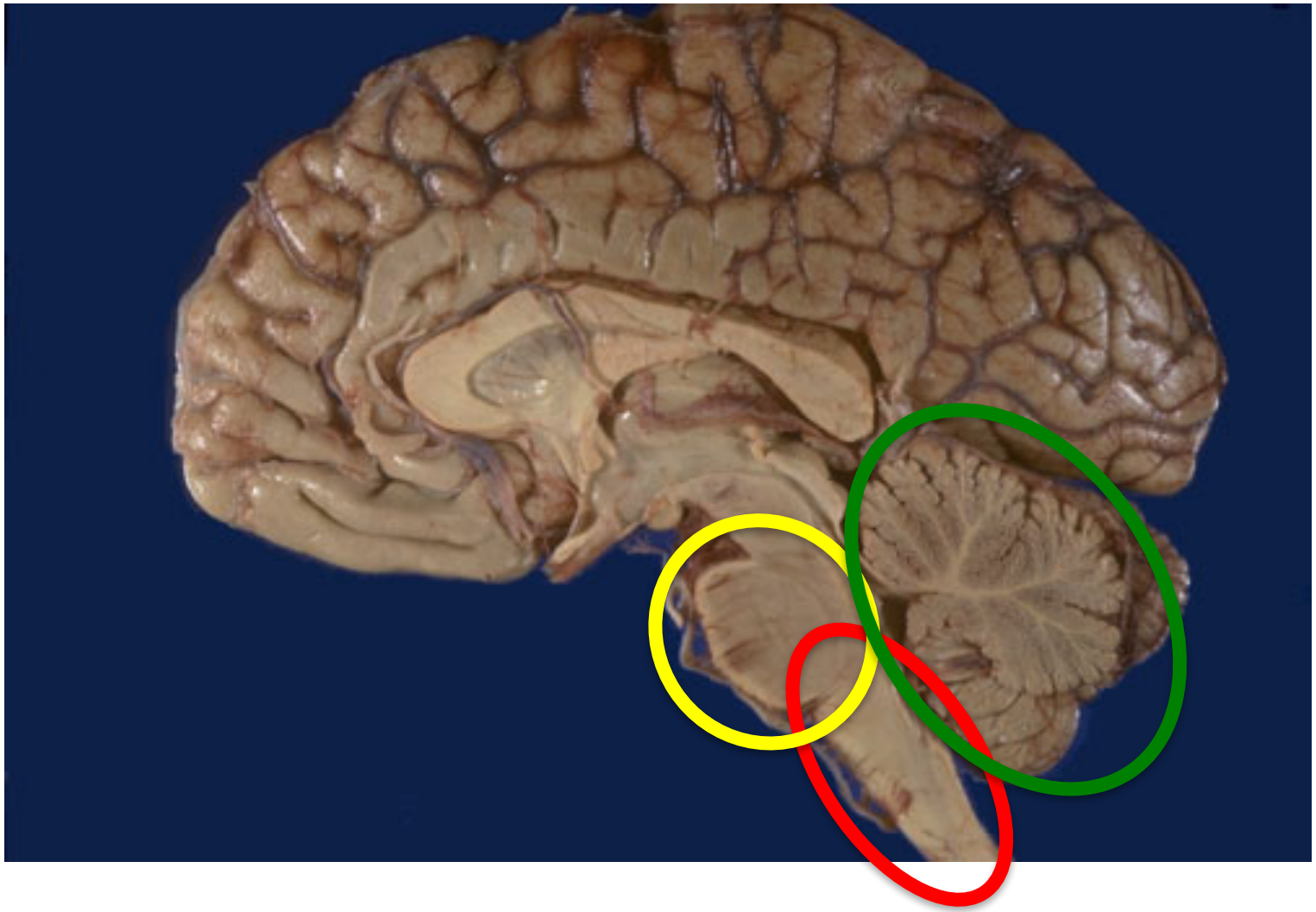
Peripheral Nervous System

SOMATIC System
= Interaction w/external env.

AUTONOMIC System
= Regulates internal env.

Mid-Saggital Section

including.... **HINDBRAIN**



Medulla oblongada **Pons** **Cerebellum**

Brainstem

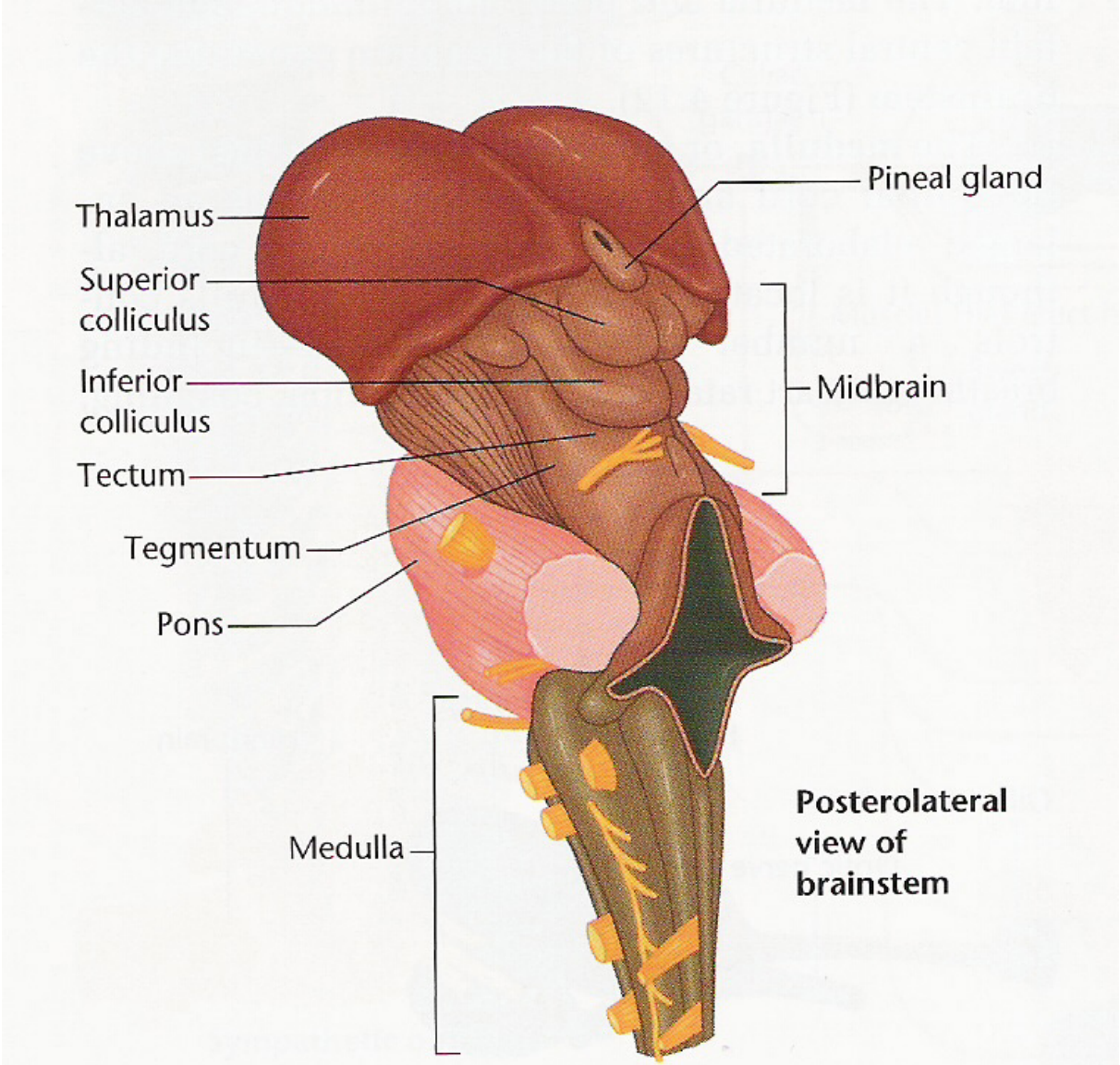


Figure 4.12 The human brainstem

HINDBRAIN: Medulla

Medulla oblongada

- Primal reflexes

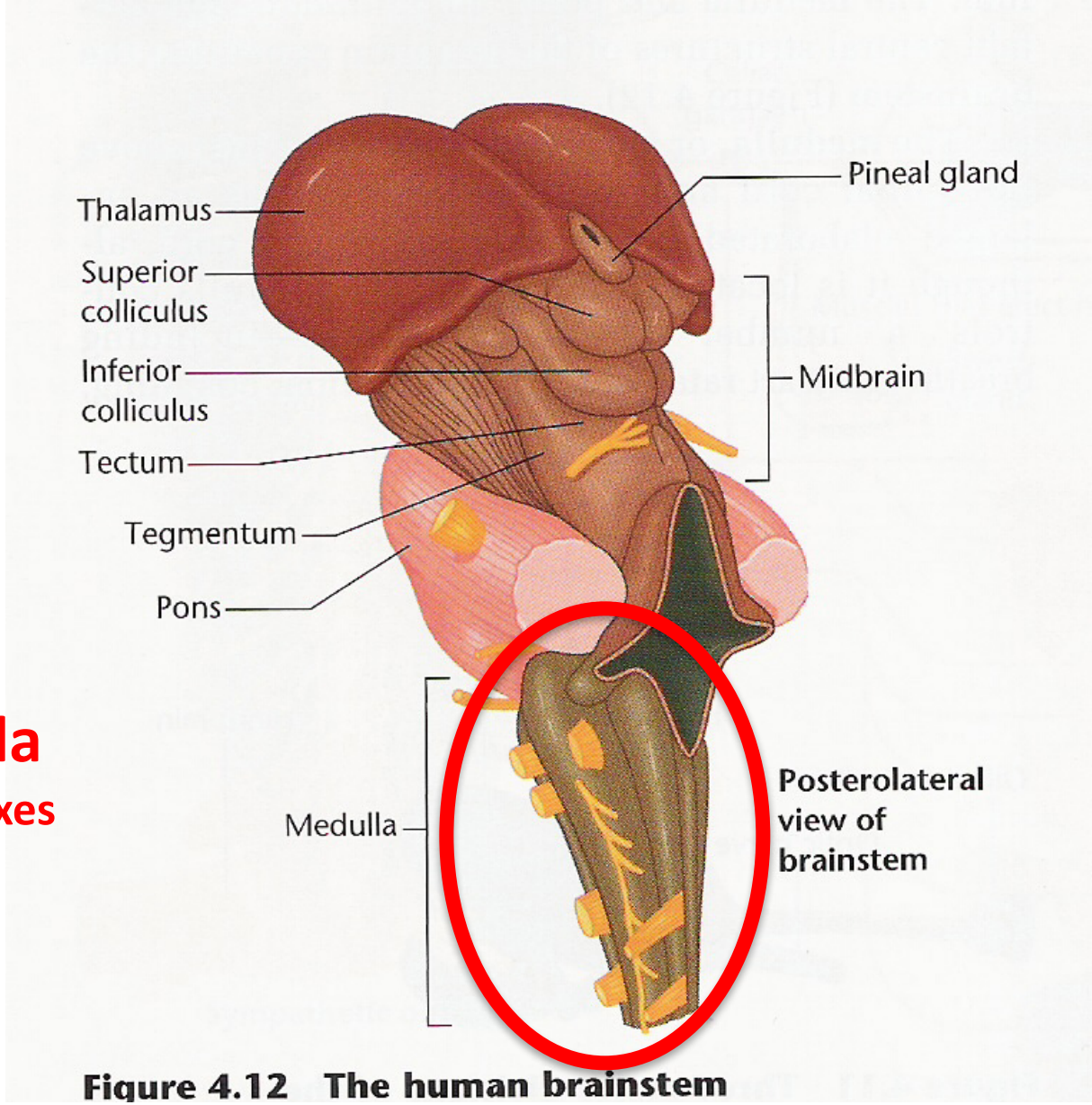


Figure 4.12 The human brainstem

HINDBRAIN: Pons

Pons

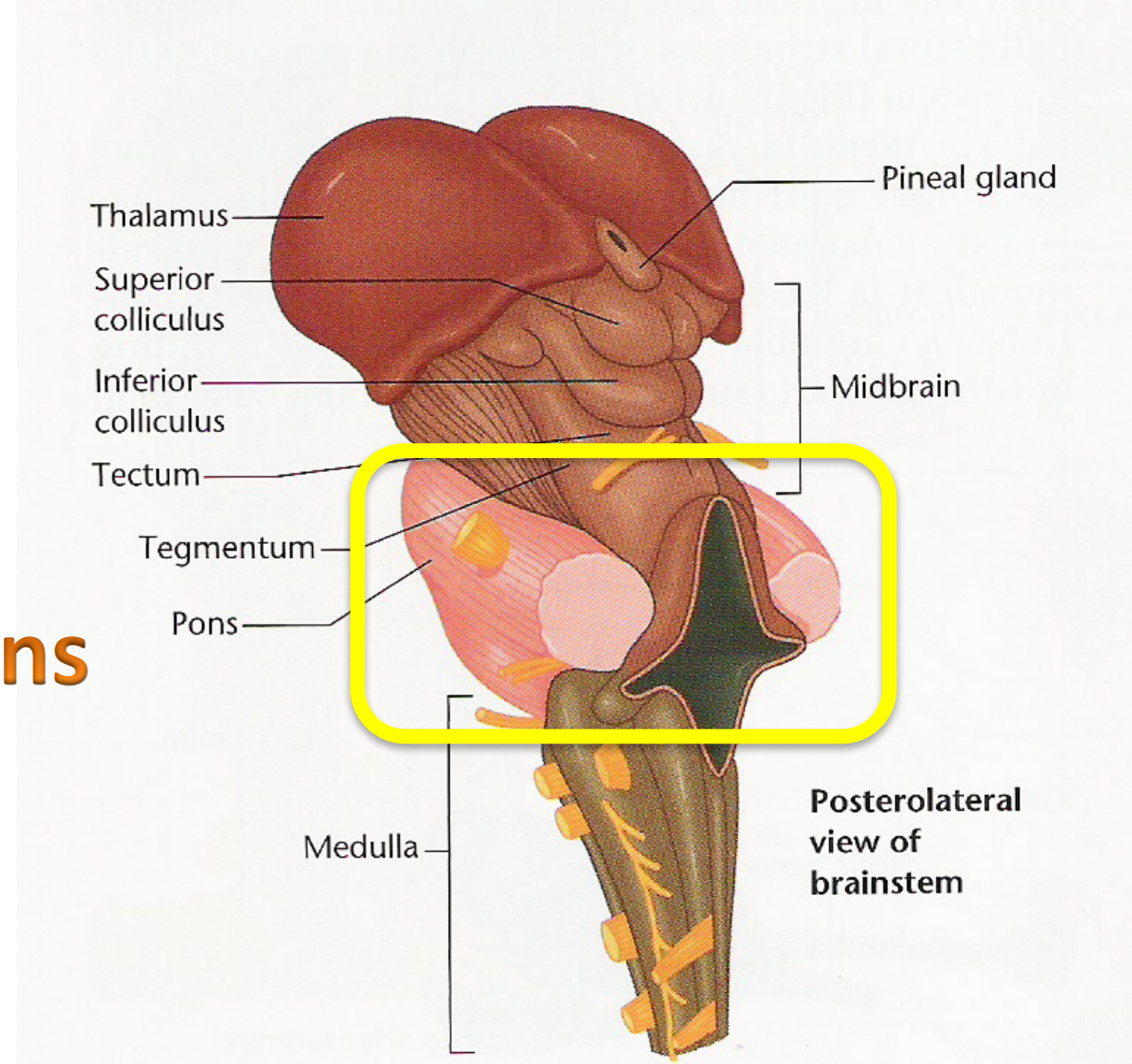


Figure 4.12 The human brainstem

Cranial Nerves

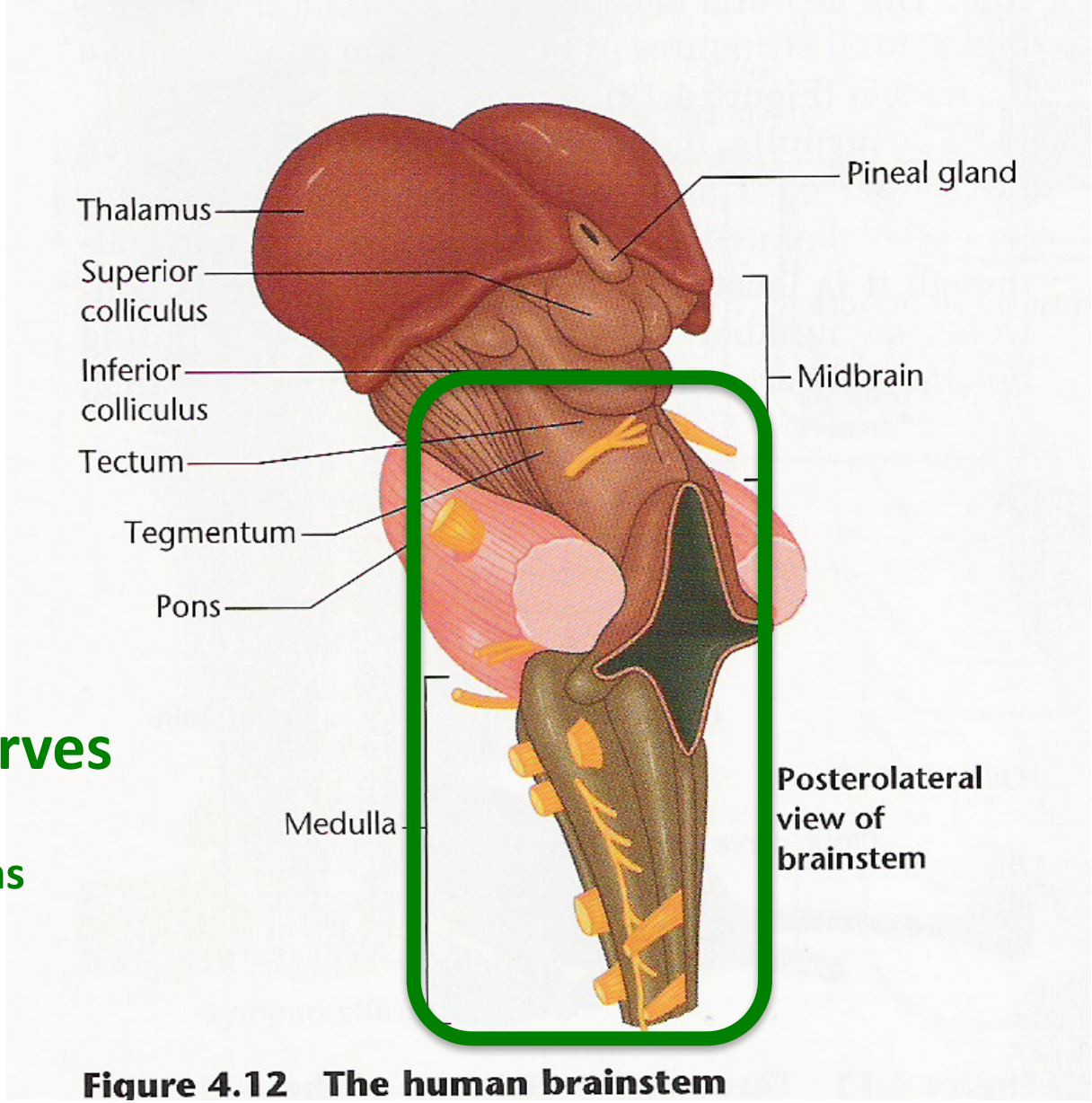


Figure 4.12 The human brainstem

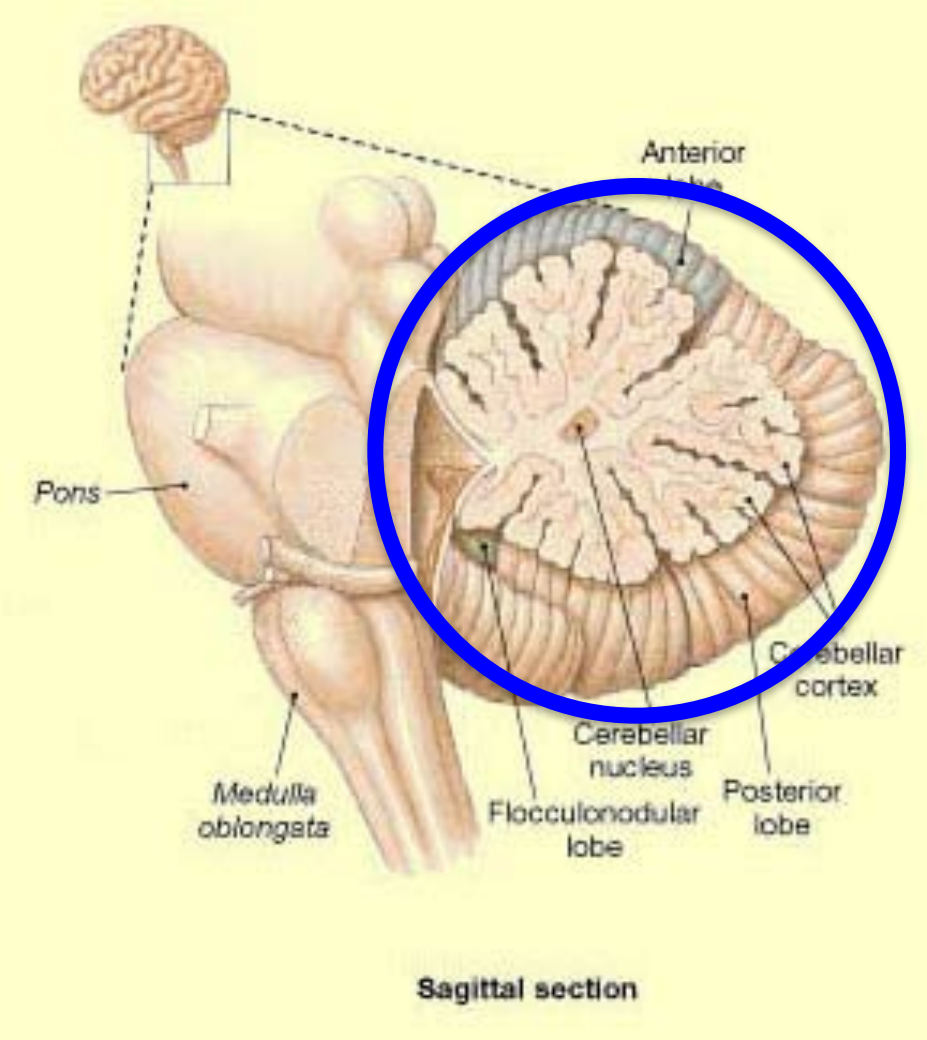
Most

Cranial Nerves

also enter/exit

Medulla & Pons

HINDBRAIN: Cerebellum



Motor Programs
w/realtime sensory coordination

HINDBRAIN: Cerebellum

MNEMONIC:

Sarah the ballerina
has a hell of a cerebellum!

MIDBRAIN

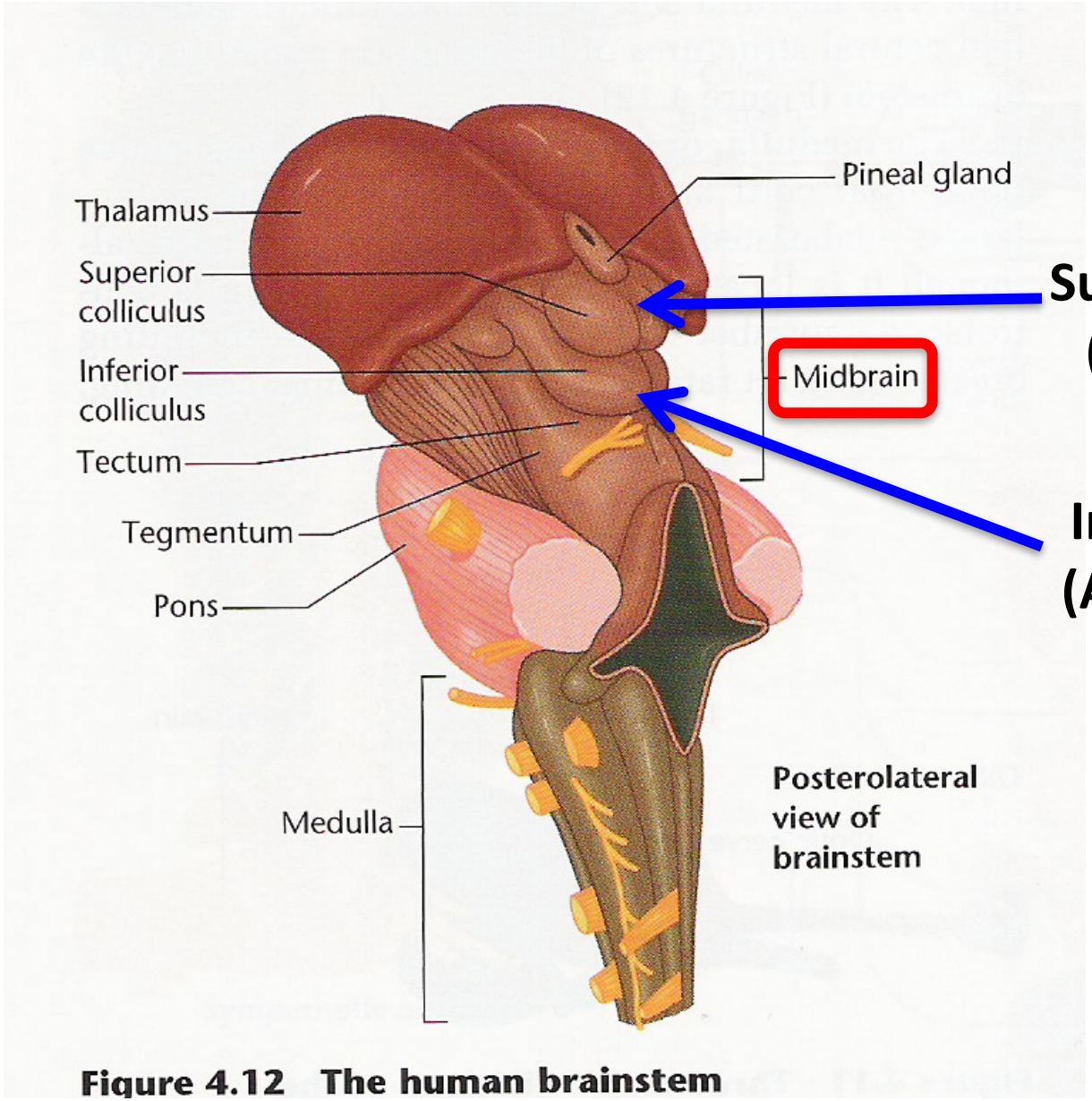


Figure 4.12 The human brainstem

TECTUM

Superior Colliculus (Visual Motion)

Inferior Colliculus (Auditory Motion)

MIDBRAIN

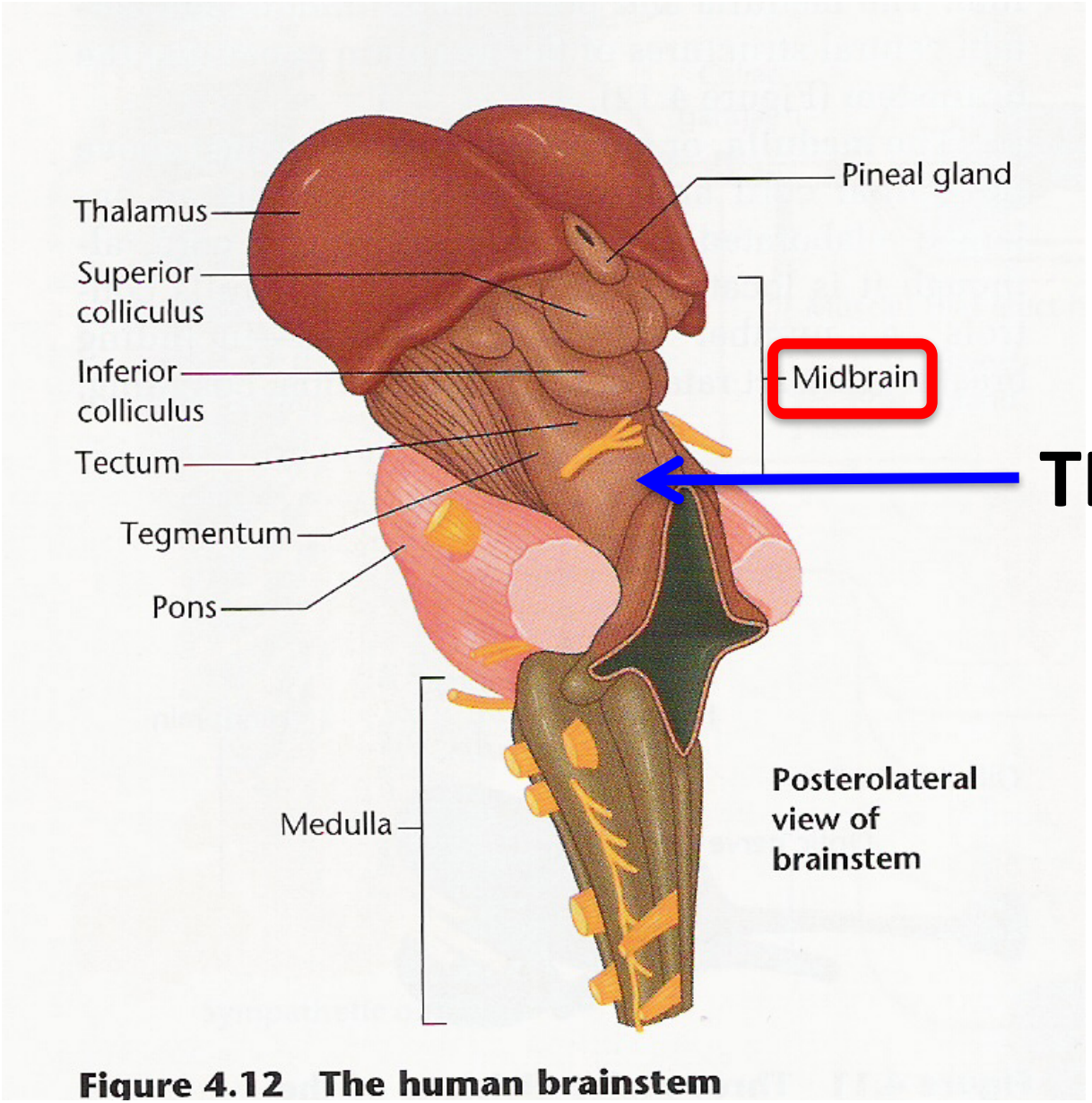


Figure 4.12 The human brainstem

TEGMENTUM

Motor Pathways & some Cranial Nerves

MIDBRAIN

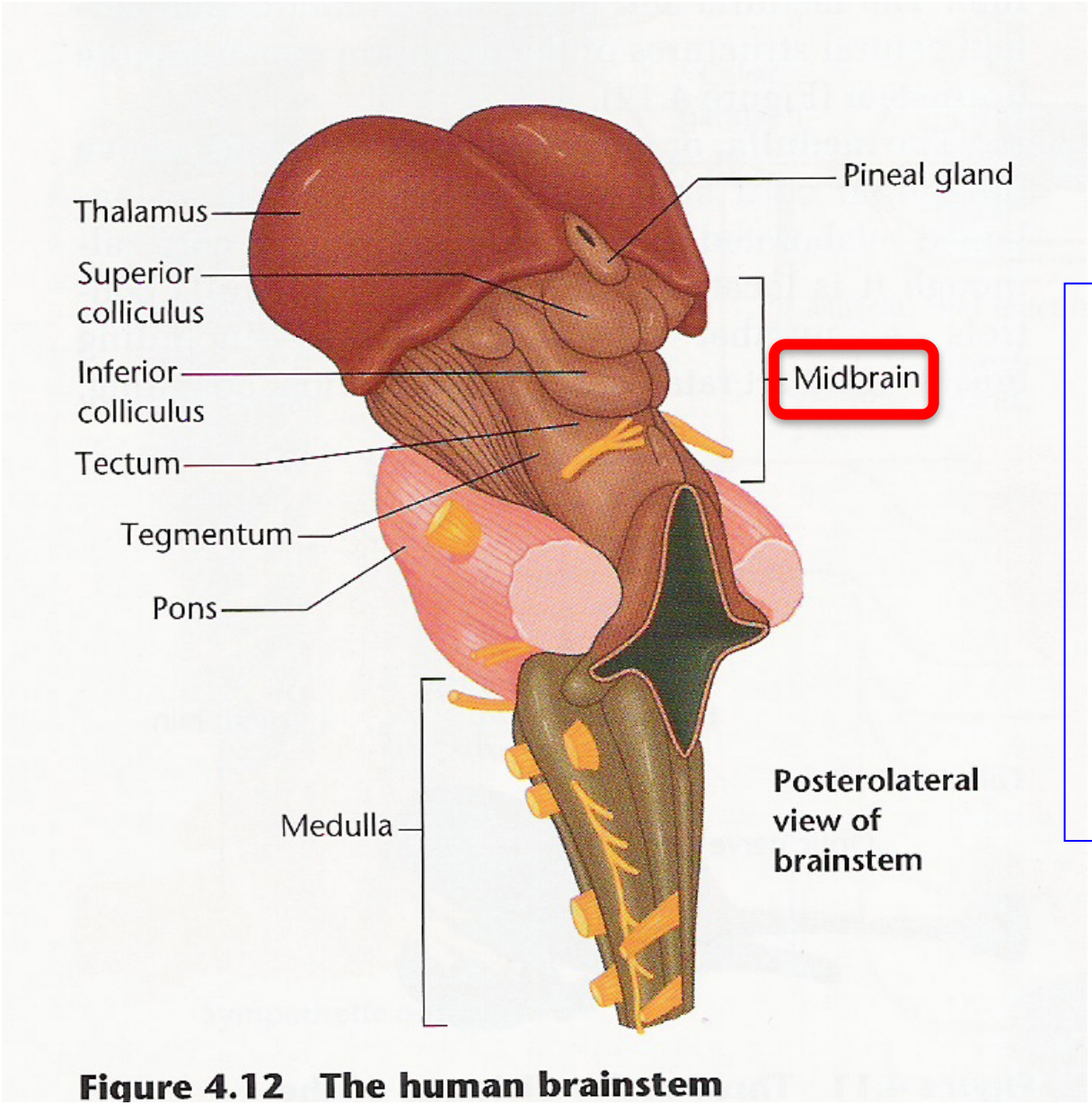


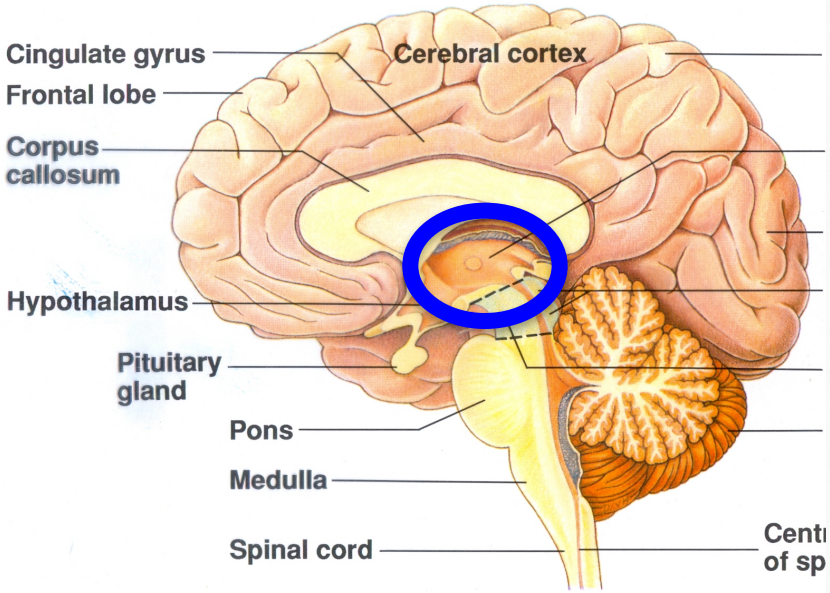
Figure 4.12 The human brainstem

MIDBRAIN MNEMONIC:

Tectum
to detect 'em,
Tegmentum
for momentum

Diencephalon of Forebrain:

THALAMUS



Projects to/Receives from
Sensory, Motor & Arousal systems

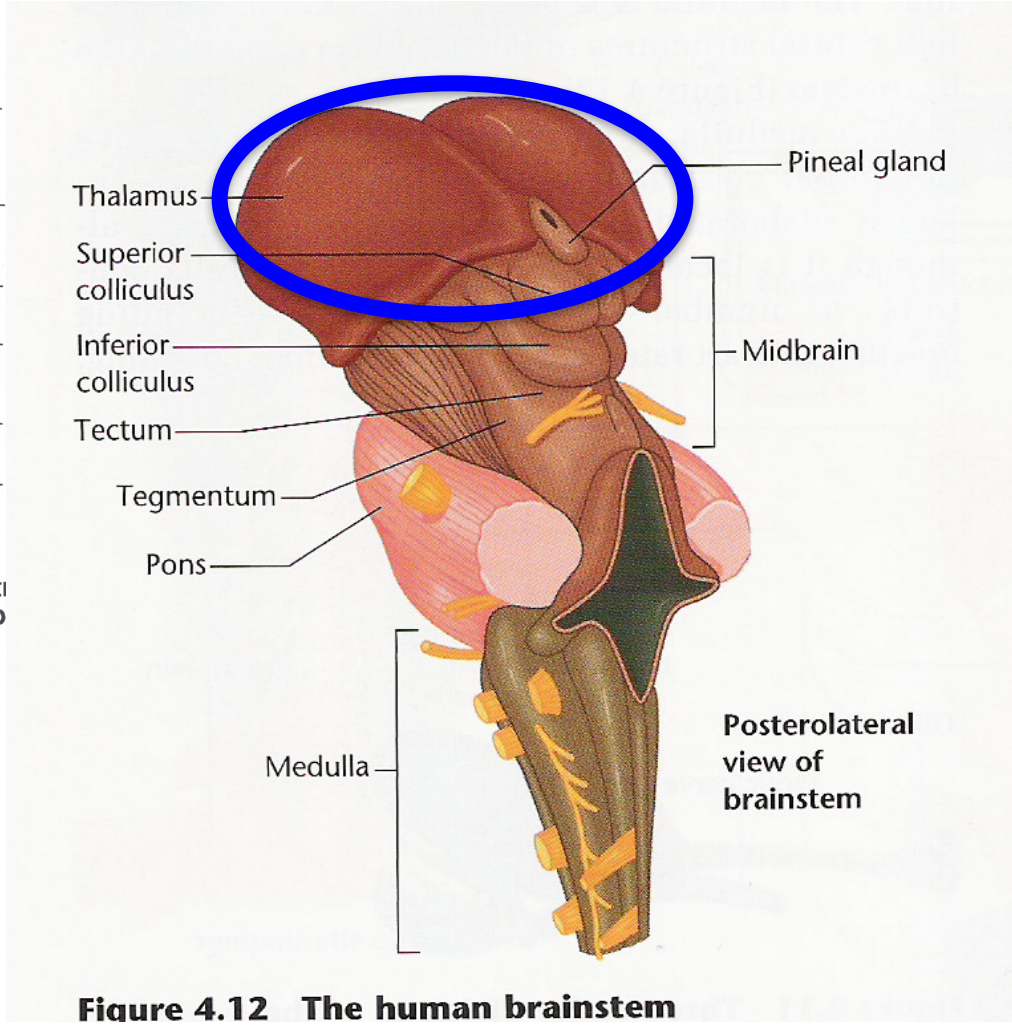
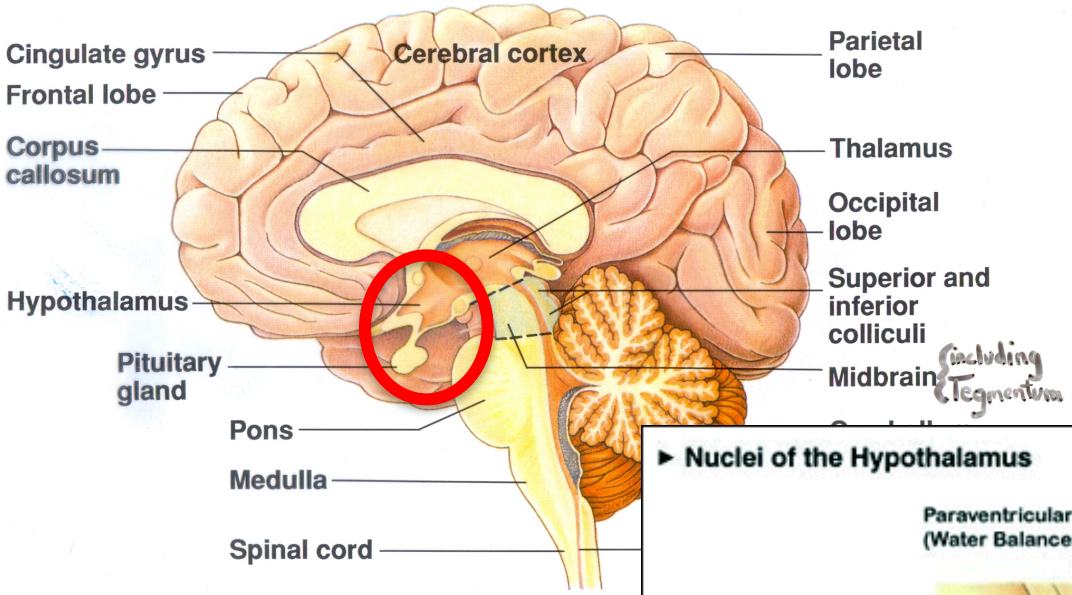
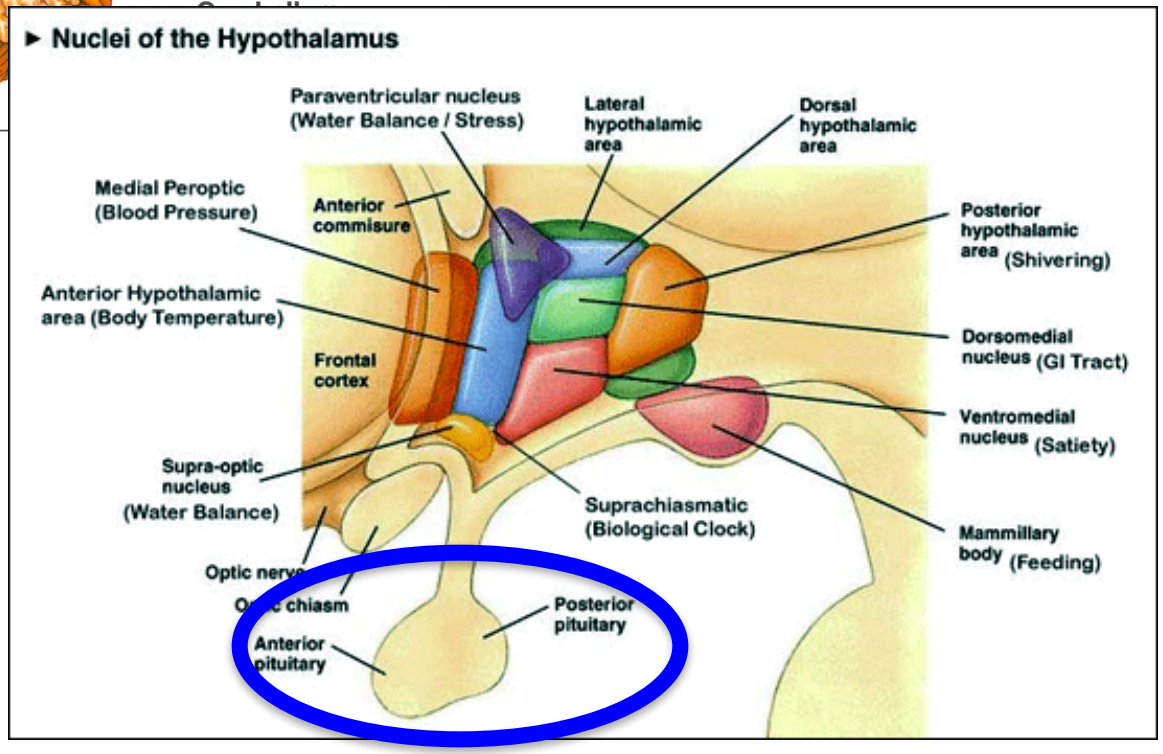


Figure 4.12 The human brainstem

Diencephalon of Forebrain: **Hypothalamus**



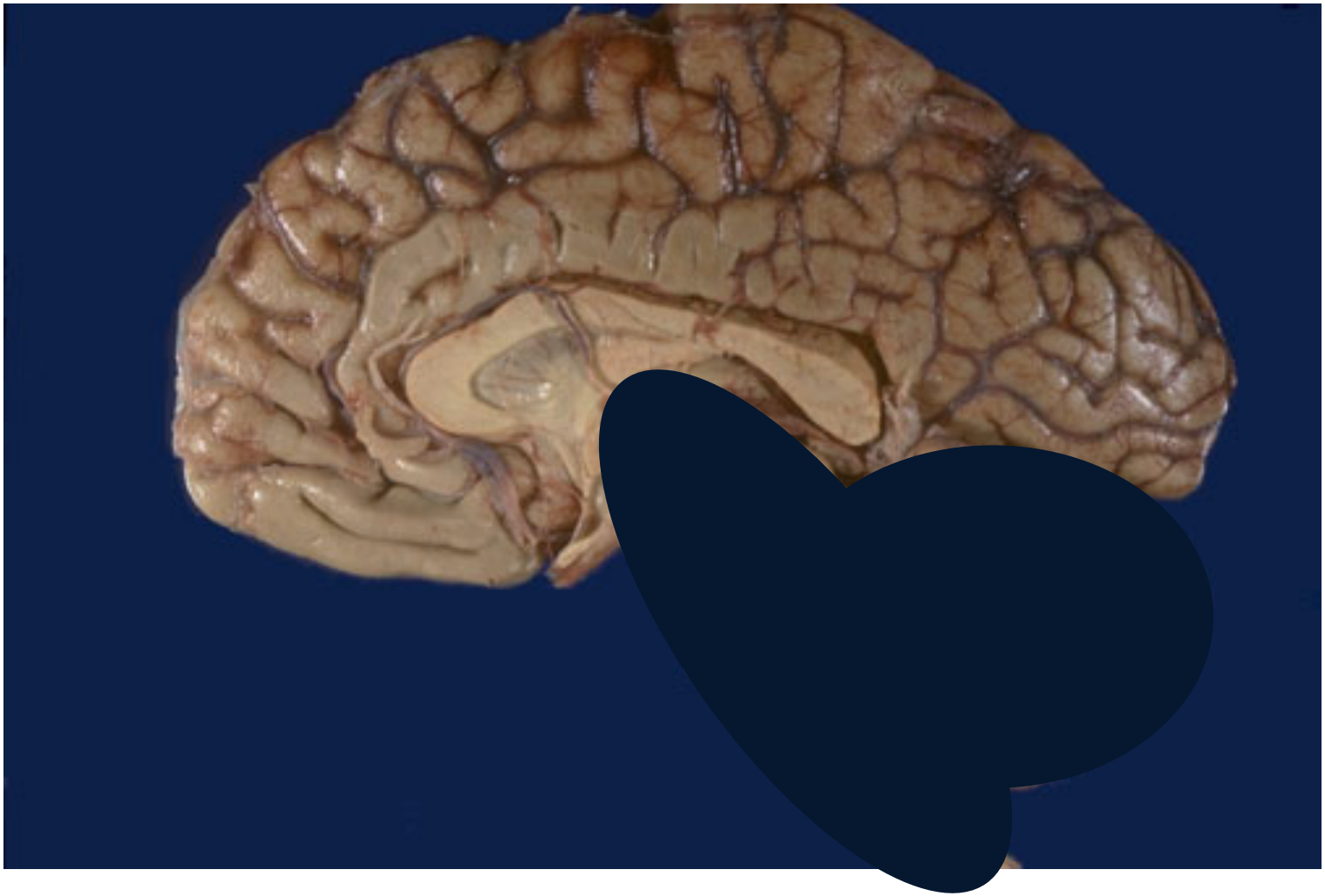


Neuro-Endrocrine
(Brain+Hormone)
System

Oversees
4Fs + Temp + Clock

Communicates to PITUITARY GLAND (the "master" gland)

Telencephalon: All other Forebrain Structures



Limbic System - Motivation

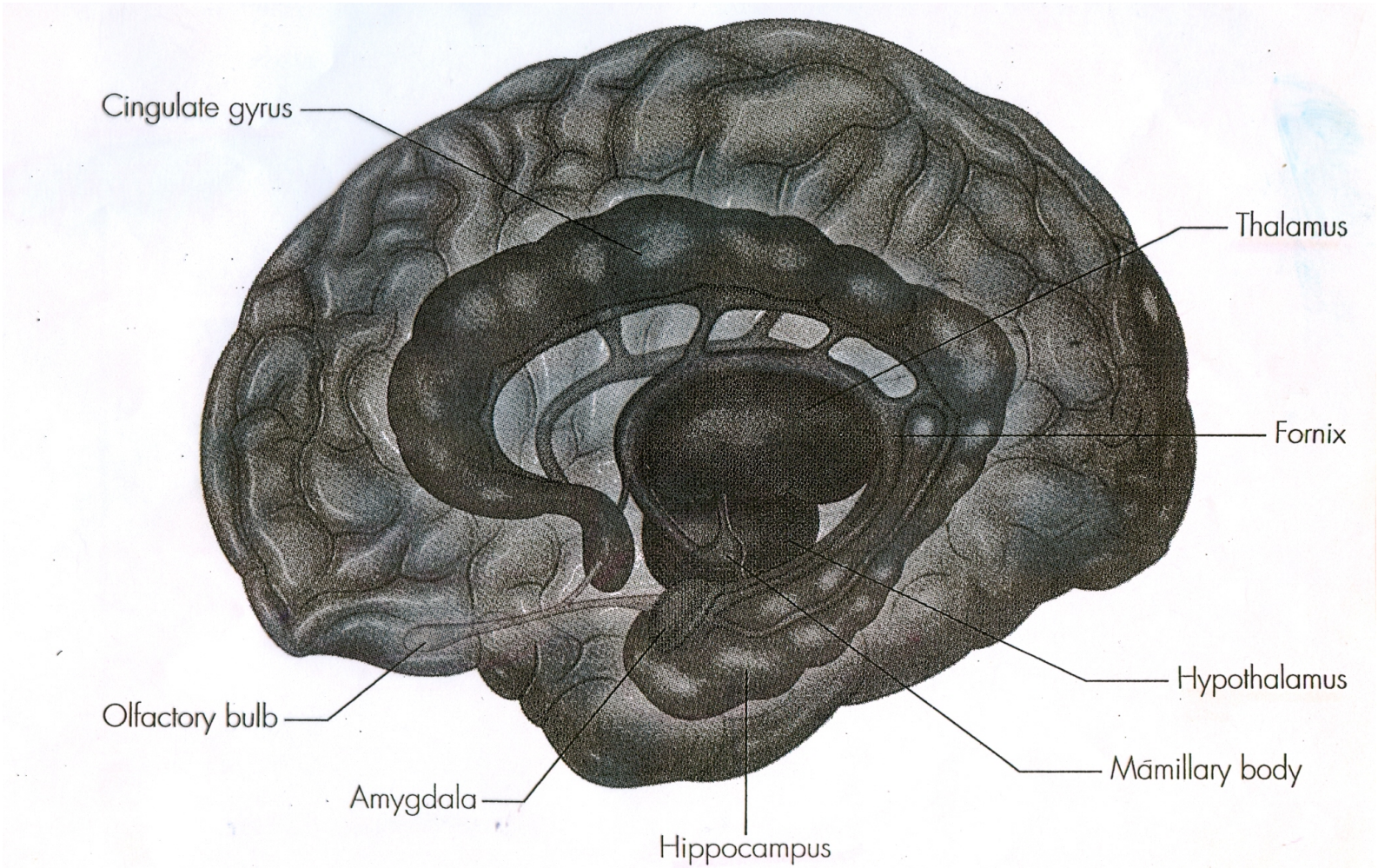


Figure 4.10 The limbic system is a set of subcortical structures that form a border (or limbus) around the brain stem

Limbic System - Motivation

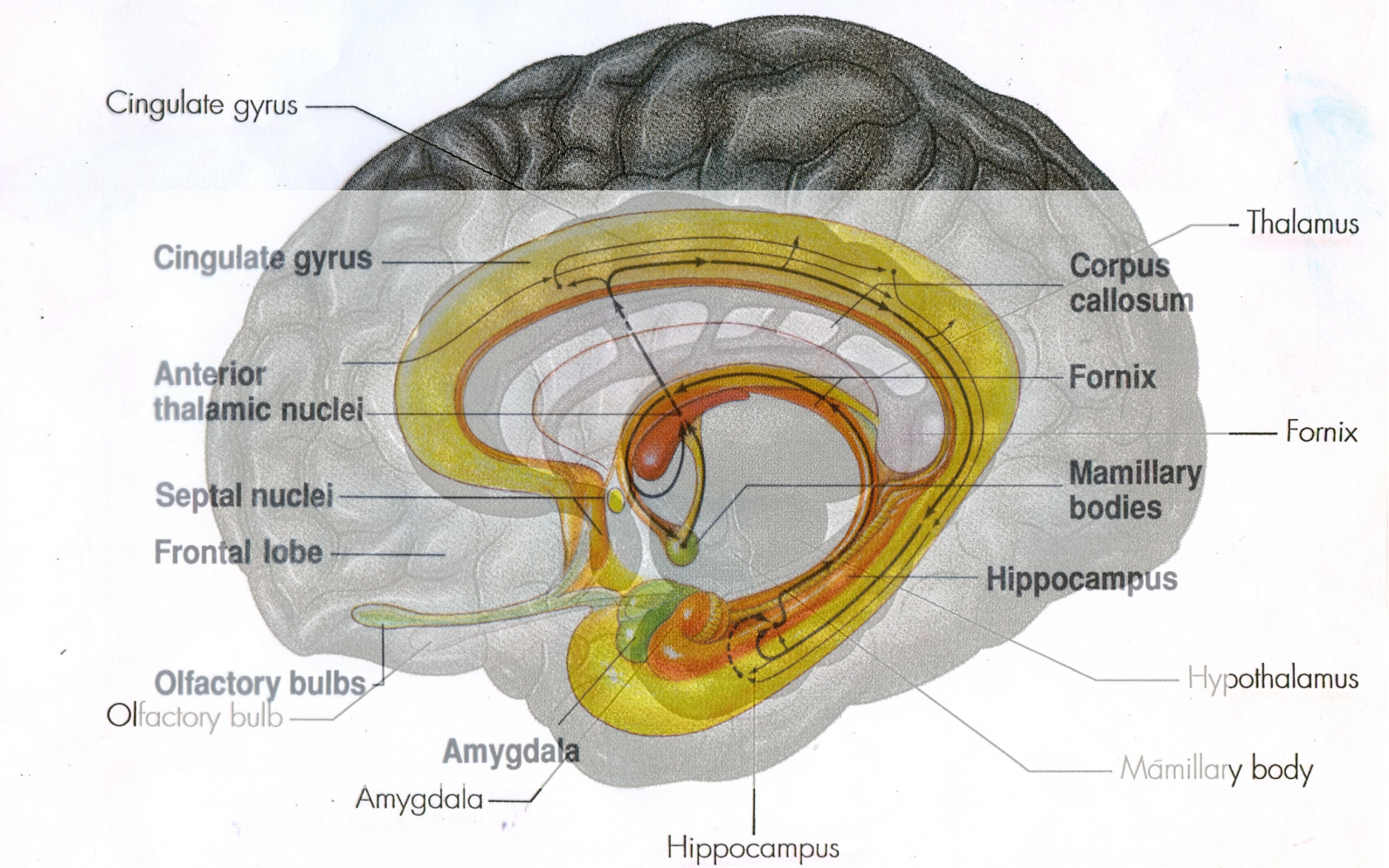
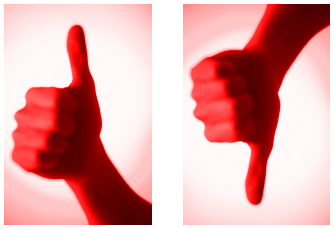


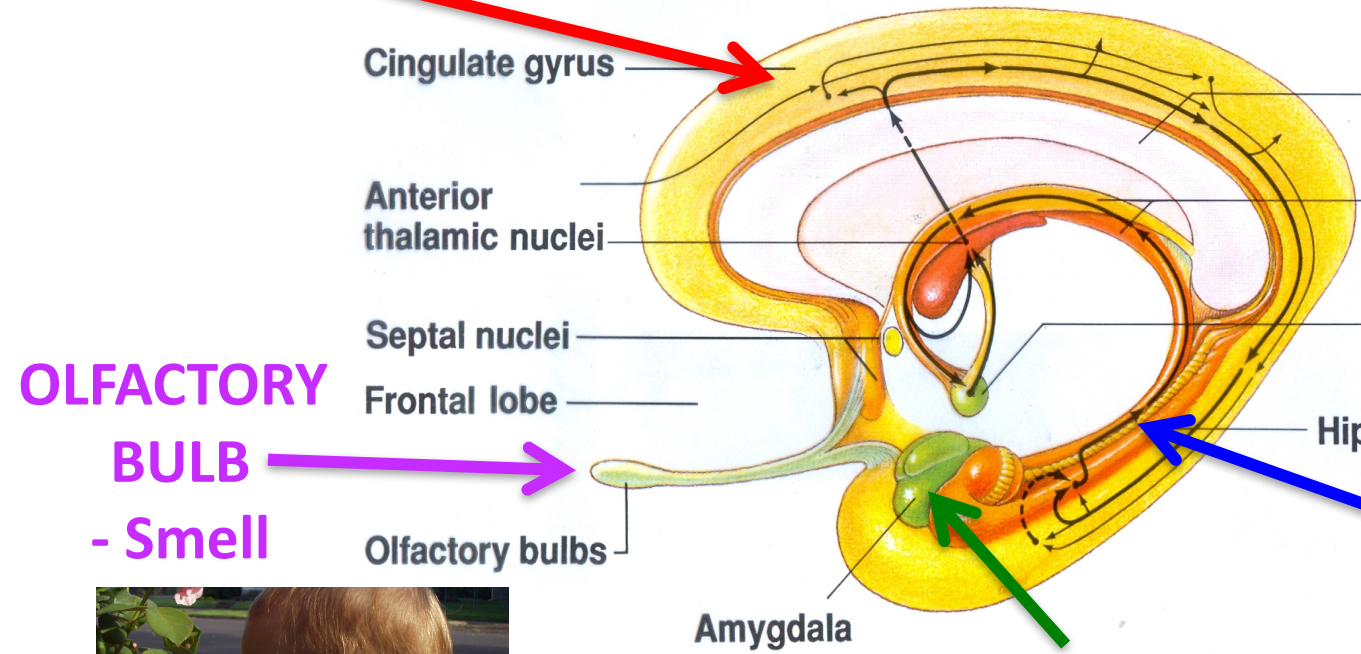
Figure 4.10 The limbic system is a set of subcortical structures that form a border (or limbus) around the brain stem

Limbic System - Motivation

CINGULATE GYRUS
+/- Evaluator
A "Re-Entrant" System



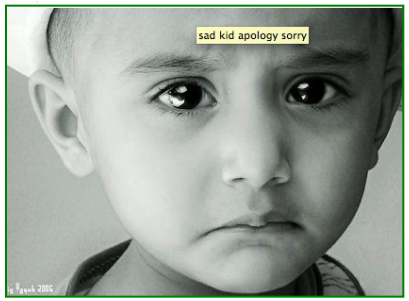
...and MORE!



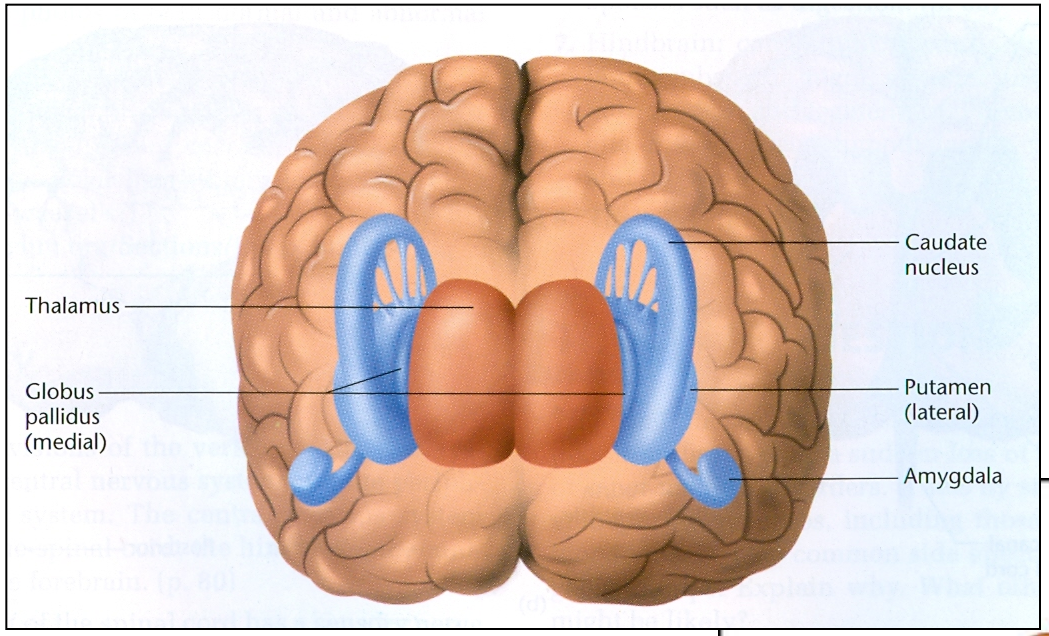
OLFACTORY BULB
- Smell

HIPPOCAMPUS
- Memory

AMYGDALA
- Emotion

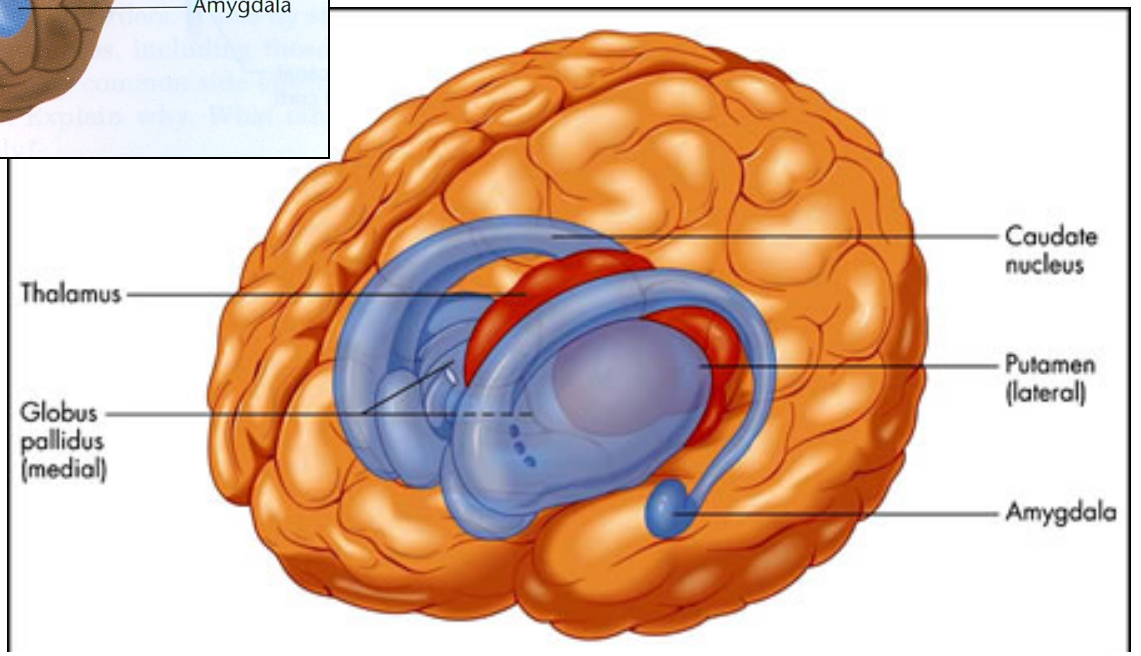


Basal Ganglion

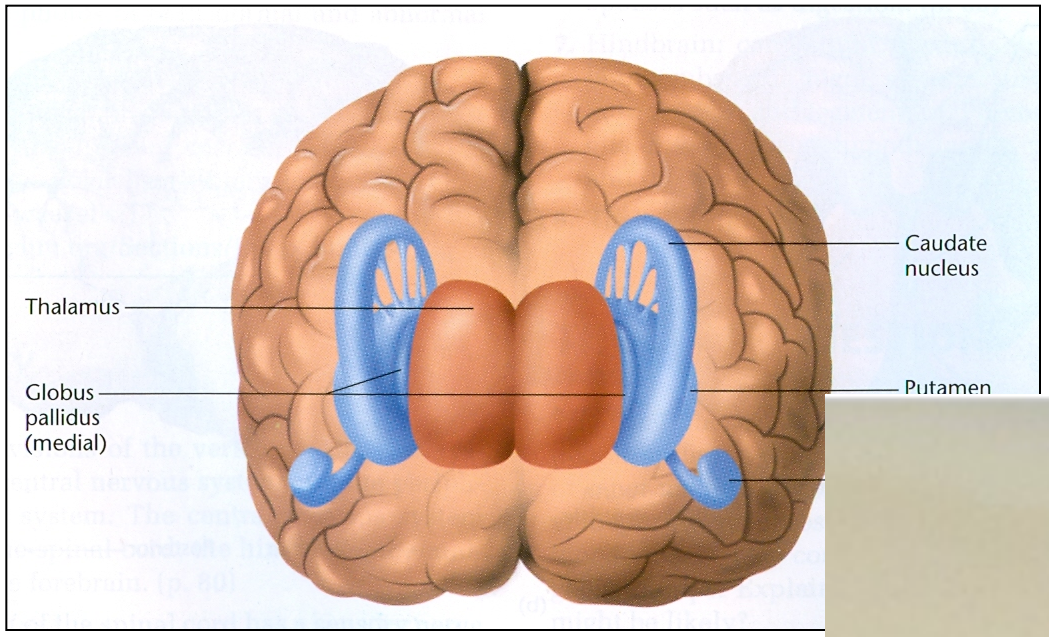


Organizing activity into TASKS

Another RE-ENTRANT System

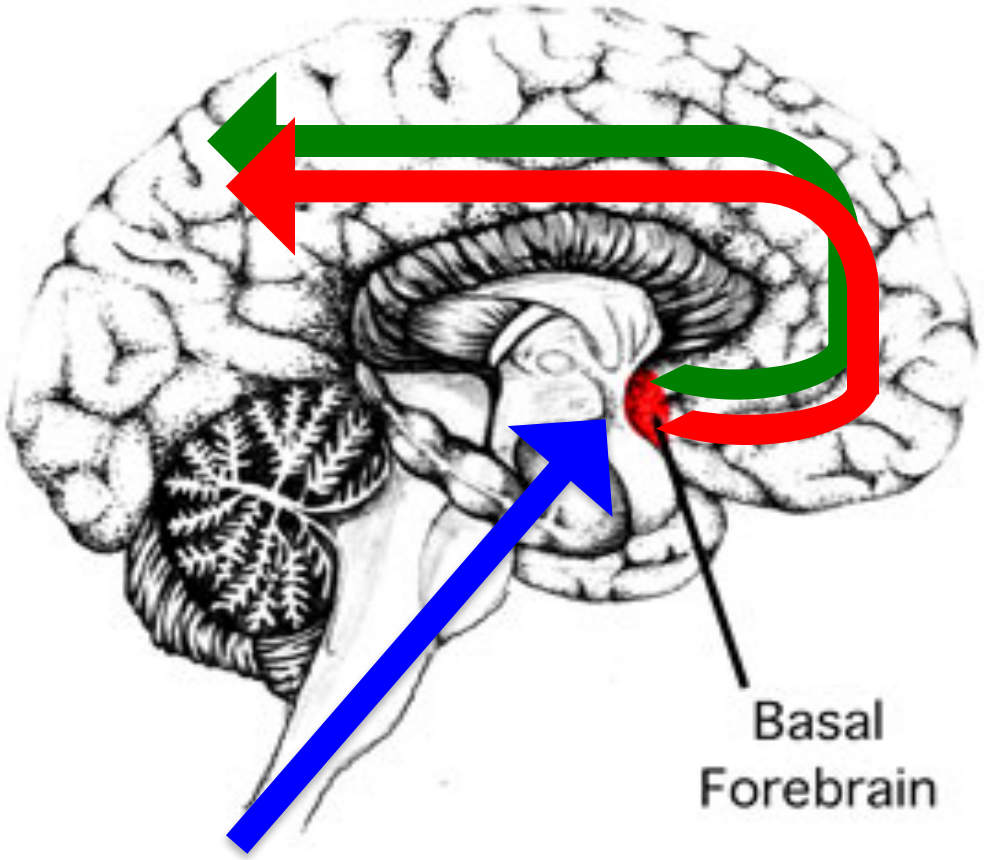


Basal Ganglion



Parkinsons Disease:
Compromised connections
from Tegmentum to Basal Ganglia
>>Motor deficits

Basal Forebrain



ACh arouses Cortex

GABA de-arouses Cortex

Receives from Raphe/Reticular Arousal System in Brainstem