LEC 1A

ANATOMY OF THE NERVOUS SYSTEM

Cogs 17 * Fall 2016
Consciousness – "The Hard Problem"
Planer Views of the Brain
Planer Views of the Brain

Coronal

Saggital

Horizontal
Lateral & Medial
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
Support Structures: The **Meninges**
Surrounds CNS under bone

Space filled with Cerebral Spinal Fluid = shock absorber
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
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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 oblongada - Primal reflexes

Figure 4.12 The human brainstem
HINDBRAIN: Pons

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!
Figure 4.12 The human brainstem
MIDBRAIN

TEGMENTUM

Motor Pathways & some Cranial Nerves

Figure 4.12 The human brainstem
MIDBRAIN MNEMONIC:

Tectum, up top, sensory colliculi
Tegmentum for motor down below
Diencephalon of Forebrain: THALAMUS

Projects to/Receives from Sensory, Motor & Arousal systems

Figure 4.12 The human brainstem
Diencephalon of Forebrain: Hypothalamus

Neuro-Endocrine (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.
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Limbic System - Motivation

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

OLFACTORY BULB
- Smell

HIPPOCAMPUS
- Memory

AMYGDALA
- Emotion

...and MORE!
Basal Ganglion

Organizing activity into TASKS

Another RE-ENTRANT System
**Parkinson's Disease:**
Compromised connections from Tegmentum to Basal Ganglia
>>Motor deficits

*Michael J. Fox is curing Parkinson's because it's there.*
Basal Forebrain

ACh arouses Cortex

GABA de-arouses Cortex

Receives from Raphe/Reticular Arousal System in Brainstem