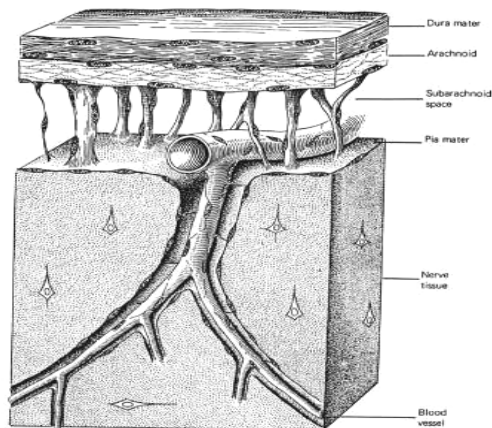


D. The Brain

1. Protection

The meninges (What do the layers do? How far do they go? Meningitis & concussions.)



b) 3 membranes and a fluid space

- 1) Dura mater - Tough outermost layer (DR)
- 2) Arachnoid - outer waterproof memb. (Serous)
- 3) Sub arachnoid space - space filled w/ cerebrospinal fluid.
- 4) Pia mater - inner waterproof layer (Serous)

✓ **What is a subdural hematoma and why is it life threatening?**

2. Divisions (just a list of what is to come.)

- a. Cerebral Hemispheres (left & Rt.)
- b. Brainstem
midbrain, pons, medulla oblongata
- c. Cerebellum

✓ **Why would the "Waterboy" NOT have anger management issues?**

d. Ventricular system - (just a list of what is to come.)

network of cerebrospinal fluid filled passages. Cushioning, transport, lubrication.

✓ **Trace the pathway of cerebrospinal fluid through the ventricular system. Begin with where it is created and end with where it finally ends up.**

3. Cerebrum (maximizing surface area)

a. Cerebral Hemispheres

1) Independent of each other Corpus callosum connects them

2) Grey matter outside - processing
white matter inside - com. lines

3) Surface

a) Convolutions - Inc surf. area

1)) Sulci - grooves

2)) gyri - ridges

b) Fissures - (deep grooves) see diagrams

✓ **Explain the reason that the brain is covered with sulci and gyri.**

c. Cortex (All covered on function diagram)

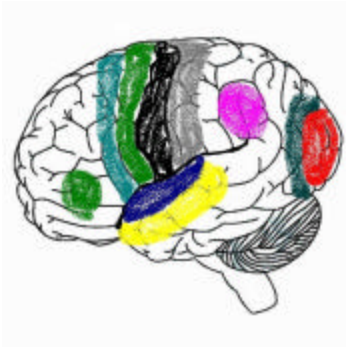
1) Grey matter - non-my, highly interconnected, 2mm
 $\times 1/2m^2$

2) Functions

a) non-localized (no specific spot)

Thinking, memory, emotion, reasoning etc

b) Localized (location determined before birth)



Refer to Labeled Diagram for Details

- 1)) Motor
 - a)) *Primary motor / Premotor cortex*
- 2)) Somatic
 - a)) *Prim somatic / Som. Interpretation*
- b)) Visual
 - a)) *Prim visual / Visual Interpretation*
- c)) Auditory
 - a)) *Prim Auditory / Aud. Interpretation*
- d)) General Interpretation area - draws on all 5 senses to paint an overall picture of world

✓ ***Explain the difference between the Primary sensory areas (primary somatic, primary visual) and the sensory interpretation (association) areas (somatic interpretation, visual interpretation. Explain why one is useless without the other.***

- e)) Broca's region - coordination of speech specific motor func (lip/tongue/vocal coordination)
- f)) Werneke's Area - processing of verbal information when speaking or writing.

d. Limbic system

1) *Diencephalon*

- a. Thalamus - Sensory switchboard. Sends incoming info to the proper brain region. Selects focus of your sensory attention.

b. Hypothalamus - master sensor. Monitors and adjusts almost all vitals. (sugar, CO₂, temp, water levels)

2) *Olfaction and taste - receives and identifies taste and smell.*

3) *Reticular formation - sensory evaluation, attention, focus. Dictates what "gets your attention" based on incoming stimuli. Differences attract.*

4) *Pineal gland - circadian rhythm*

5) *Mammillary body - Spatial processing and memory*

Hippocampus - Converts short term into long term memory and stores it in the cerebral cortex.

Short Term - 7 - 11 bits of information in conscious working memory

Long Term Memory - Limitless storage, limited recall.

The amygdala - Processing of terrifying situations and immediate storage in memory w/o repetition.

Autonomic response to fear (fight or flight) based on memories

✓ ***Explain the difference between the three memory related structures.***

c. White matter

3 types carry info between two different locations

a. Association fibers - between two points in 1 hemisphere

b. Commissural fibers - between points in different hemispheres (corpus callosum)

c. Projection fibers - between brain and peripheral NS

✓ **Explain the difference between the three types of White Matter in the brain.**

4. Brainstem

a. Midbrain

Func. - Motor coordination, visual & auditory reflexes, 4 cranial nerves (nose/eyes)

b. Pons

Func. - Respiratory control, 4 cranial nerves (mouth/face/ears)

c. Medulla Oblongata

Func. - Cardiac control, Digestive func, Vasoconstriction, 4 cranial nerves (heart/dig. Organs,)

5. Cerebellum

a. Location - below occipital lobe, posterior to pons

b. Structure

1) 2 hemispheres

a) Grey matter outside

b) White matter inside - arbor vitae

c) Vermis - corpus callosum of cerebellum

Function

1) Fine motor control/ coordination

2) Balance

3) Muscle Tone

4) Posture

6. Cranial Nerves

a. 12 pair - from brainstem. Exit skull through foramen on inferior surface

b. All involuntary control of body functions

Cranial Nerves: Distribution of Motor and Sensory Fibers

