# The Brain





14.01a



#### SUPERIOR



INFERIOR

(b) Sagittal section, medial view



Frontal section through skull showing the cranial meninges

14.02





Right lateral view of brain

14.03





(b) Frontal section of brain and spinal cord



(c) Summary of the formation, circulation, and absorption of cerebrospinal fluid (CSF)

## Medulla Oblongata

- Regulates heartbeat and respirations
- Blood vessel diameter
- Decussation
- Reflexes:
  - Swallowing
  - Vomiting
  - Coughing
  - Sneezing
  - Hiccuping



14.T01a

# The Pons

- Relays impulses
- Pneumotaxic area
- Apneustic area



14.T01b

#### Reticular Activating System (RAS)

- Extends from the upper spinal cord up to the lower diencephalon.
- Helps maintain consciousness.
- Arouses the cerebral cortex to wake us up.
- Aids in muscle tone.
- Acts as a filter for extraneous sights and sounds.

# Midbrain

- Movements of the eyeballs
- Visual reflex
- Auditory reflex



14.T01c

# Thalamus

- Sensory relay system
- Interprets pain, temperature, light touch and pressure sensations.
- Some function in emotions and memory.



14.T01e



### Functions of the Hypothalamus

- Controls autonomic system smooth muscles, cardiac muscle, glands.
- Visceral sensory impulses
- Controls pituitary
- Mind over body phenomena
- Feelings of rage and aggression
- Controls body temperature
- Regulates food intake satiety center
- Thirst center control of kidneys
- Maintains waking state
- Biological rhythms / circadian rhythms



14.13b



Sagittal section of brain showing hypothalamic nuclei

14.10

#### **Regions of the Thalamus**

- Epithalamus consists of the pineal gland and the habenular nuclei. Pineal secretes melatonin. Nuclei have emotional responses to odors.
- Subthalamus help to control body movements.
- Circumventricular organs monitor chemical changes in the blood. Coordinate homeostatic activities.



14.06





(a) Posterior view of midbrain in relation to brain stem







(c) Midsagittal section of cerebellum and brain stem

## Functions of the Cerebellum

- Muscle Tone
- Posture
- Equilibrium
- Smooth
  coordinated
  movements
- Predicting a future body position







(c) Midsagittal section of cerebellum and brain stem

14.08c







(b) Right lateral view

# Lobes of the Cerebrum

- Frontal
- Parietal
- Temporal
- Occipital
- Limbic
- Insula



INFERIOR

Medial view of tracts revealed by removing gray matter from a midsagittal section

14.12





14.13a



14.13b

# **Basal Ganglia**

- Includes globus pallidus, putamen and cuadate nuclei.
- Help to regulate initiation and termination of movements.
- Control subconscious movements of skeletal movements.
- Laughing.
- Area is affected by Parkinson's disease and may play a role in obsessive compulsive disorders anxiety and schizophrenia.

### The Limbic System



14.14

## Functions of the Limbic System

- Short term memory
- Emotions: pleasure and pain rage, tameness, affection, docility, anger, fear, sorrow, and sexual feelings.
- Hippocampus plays a role in depression and is the major section to move memories from short term to long term.

### **Brodemann's Classification**



Lateral view of right cerebral hemisphere

#### The Insula

- A triangular brain area of the cerebrum beneath the other major lobes.
- Integrates cerebral activities
- Some function in memory

#### Brodemann's sites to learn

- Primary visual area
- Visual association
- Somatosensory area
- Primary sensory area
- Primary motor area
- Wernicke's area
- Broca's area

#### More on Brodemann's

- Gustatory area
- Primary auditory area
- Auditory association area
- Prefrontal lobe



(a) Frontal section of primary somatosensory area in right cerebral hemisphere



(b) Frontal section of primary motor area in right cerebral hemisphere



Transverse section through head

# The EEG

- Alpha = relaxing
- Beta = thinking
- Theta = stress
- Delta = deep sleep

Alpha	www.www.www.
Beta	www.www.www.www.www.www.www.
Theta	mmmmmhhhhh
Delta	m
	1 sec
	14.17



POSTERIOR

Inferior aspect of brain







# www.fisiokinesiterapia.biz



14.21





14.23



14.24

#### Terms

- Concussion
- Contusion
- Aphasia
- CVA (cerebrovascular accident)
- TIA (transient ischemic attack)
- Alzheimer's disease
- Agnosia
- Apraxia

### More Terms

- Delirium
- Dementia
- Senility
- Encephalitis
- Lethargy
- Stupor
- Ataxia