IPHY 3410, Section 100 VOCABULARY LOWRY
Spring, 2009

Lecture	Date	Topic	Reading in Marieb, Mallatt, and Wilhelm
L19	Tues 3/31	Central nervous system I Anatomy of the brain	Ch. 13, pp. 378-380, 382-405

Embryonic development of the brain
- **Primary brain vesicles (week 4)**
  - *prosencephalon (forebrain)*
  - *mesencephalon (midbrain)*
  - *rhombencephalon (hindbrain)*
- **Secondary brain vesicles (week 5)**
  - *telencephalon*
  - *diencephalon*
  - *mesencephalon*
  - *metencephalon*
  - *myelencephalon*
- **Adult brain structures**
  - *telencephalon*
    - *cerebral hemispheres*
    - *cerebrum*
  - *diencephalon*
    - *thalamus*
    - *hypothalamus*
    - *epithalamus*
  - *mesencephalon*
    - *midbrain*
  - *metencephalon*
    - *pons*
    - *cerebellum*
  - *myelencephalon*
    - *medulla oblongata*
  - *ventricles*

Basic parts and organization of the brain
- *(1) brain stem (medulla, pons, and midbrain)*
- *(2) cerebellum*
- *(3) diencephalon (thalamus, hypothalamus, epithalamus)*
- *(4) cerebrum*

- *cortex*
  - *cerebellar cortex*
  - *cerebral cortex*
- *brain nuclei—clusters of neuron cell bodies*

The brain stem

structures

medulla oblongata

pons

midbrain

functions

(1) rigidly programmed, automatic behaviors necessary for survival (e.g. breathing)

(2) passageway for all fiber tracts from cerebrum to spinal cord

(3) innervations of the face and head (10 of 12 cranial nerves)

The medulla oblongata (medulla)

pyramids—ventral midline, formed by the pyramidal tracts, fiber tracts descending through the brain stem and spinal cord carrying voluntary motor output from the cerebrum to the spinal cord

decussation of the pyramids—crossover point of pyramidal fibers (consequently, each cerebral hemisphere controls voluntary movement on the other side of the body

reticular formation

stimulates cerebral alertness; regulate skeletal and visceral muscle activity

Pons

relay nerve impulses between cerebrum and cerebellum, to coordinate voluntary movement

Midbrain

corpora quadrigemina

superior colliculi (visual reflexes)

inferior colliculi (auditory reflexes)

substantia nigra (nigra = black)

dopamine synthesizing neurons

degeneration is the cause of Parkinson's disease

The cerebellum

smooths and coordinates body movements

helps maintain posture and equilibrium

lesion leads to disorders of coordination, leading to slow or jerky movements that tend to overreach their targets

The diencephalon

Thalamus

processes and relays sensory information (excluding olfactory information) to the sensory areas of the cerebral cortex

every part of the brain that communicates with the cerebral cortex must relay its signals through a nucleus of the thalamus

The hypothalamus

the main visceral control center of the body

(1) control of the autonomic nervous system

(2) control of emotional responses

(3) regulation of body temperature

(4) regulation of hunger and thirst sensations

(5) control of motivational behavior (feeding, sexual behavior)

(6) regulation of sleep-wake cycles

(7) control of the endocrine system
(8) formation of memory

The epithalamus
contains pineal gland
secretes hormone melatonin (prepares the body to prepare for the nighttime stage of the sleep-wake cycle)

The cerebrum
cerebral cortex of gray matter
function—self awareness, initiation and control of movements, communication, memory, cognitive function
frontal lobes
parietal lobes
primary sensory cortex
occipital lobes
primary visual cortex
temporal lobes
primary auditory cortex
insula
visceral sensory area

cerebral white matter
commissural fibers
association fibers
projection fibers

deep gray matter of the cerebrum
basal ganglia, involved in motor control
corpus striatum
caudate nucleus
putamen
globus pallidus
function
cooperate with cerebral cortex in coordinating movement
start, stop, and coordinate voluntary movement
basal forebrain nuclei, associated with memory
septum
diagonal band of Broca
horizontal band of Broca
basal nucleus of Meynert
part of basal forebrain cholinergic system (synthesize and release acetylcholine)
function
arousal, learning, memory, motor control
degeneration associated with Alzheimer's disease
claustrum, a structure with unknown function