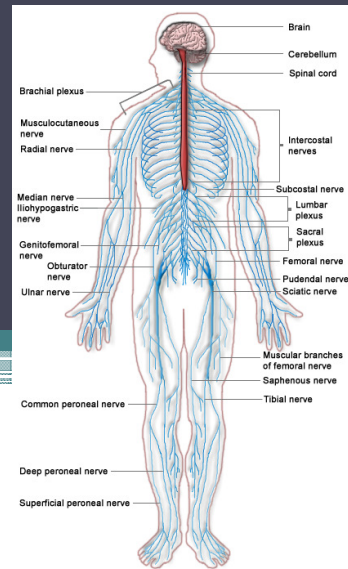


Nervous System

The Brain and Spinal Cord

Unit 7b

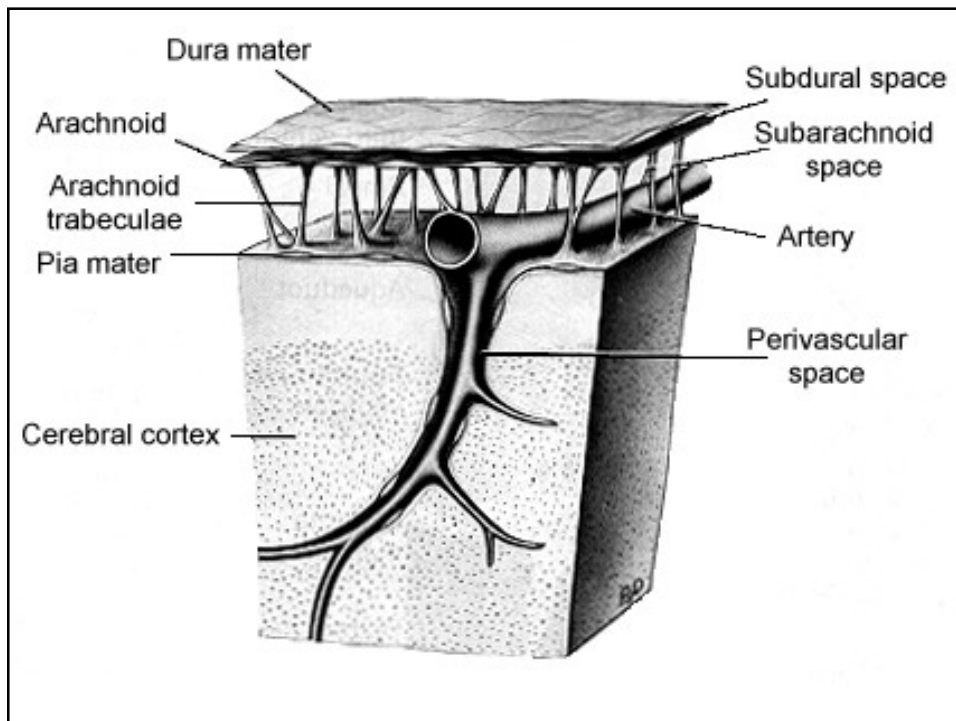
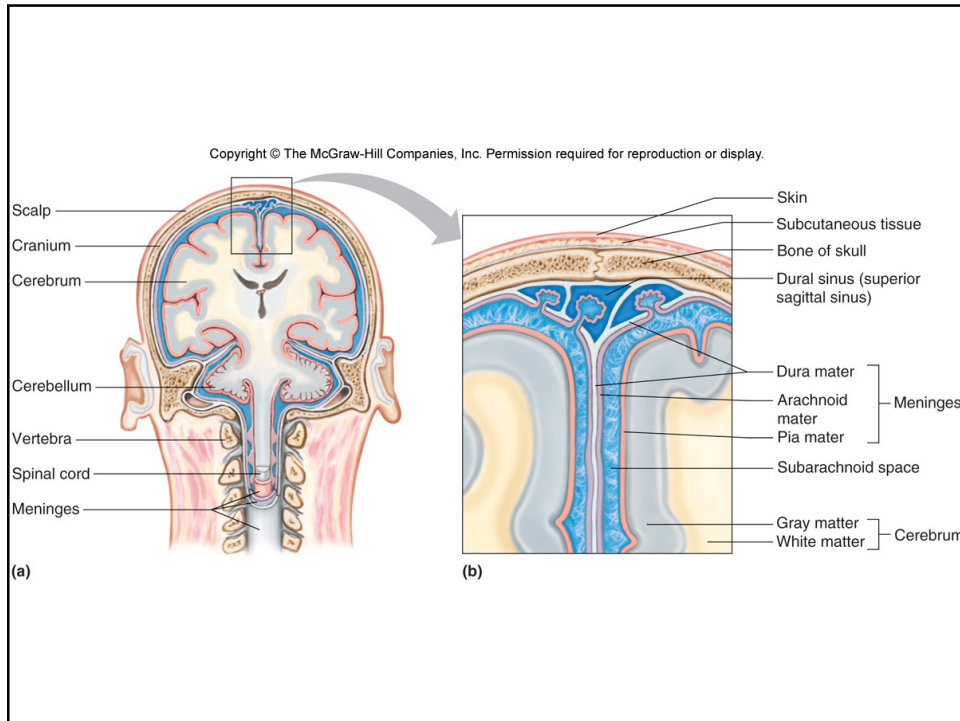
Chetek High School
Mrs. Michaelsen



9.12 Meninges

A. Meninges

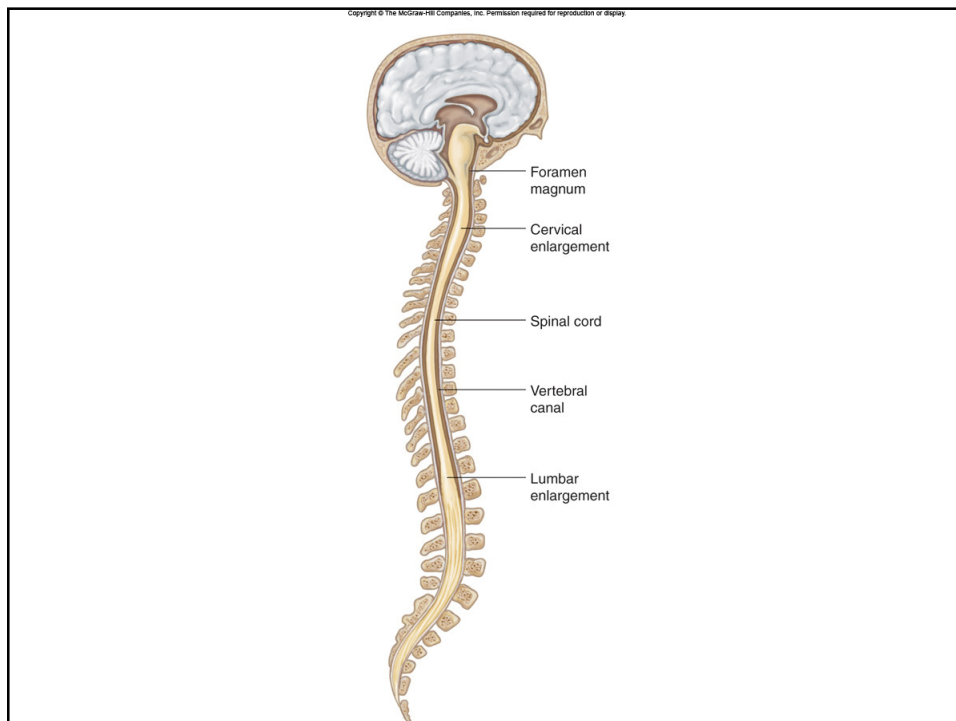
1. The organs of the CNS are covered by membranes
 - a. The meninges are divided into 3 layers:
2. Dura Mater
 - a.
 - b. Made of
3. Arachnoid Mater
 - a.
 - b.
4. Pia Mater
 - a.
 - b.
5. The subarachnoid space is between the arachnoid mater and the pia mater and it contains



9.13 Spinal Cord

- A. The spinal cord is continuous with the brain but its designated beginning is where it leaves the

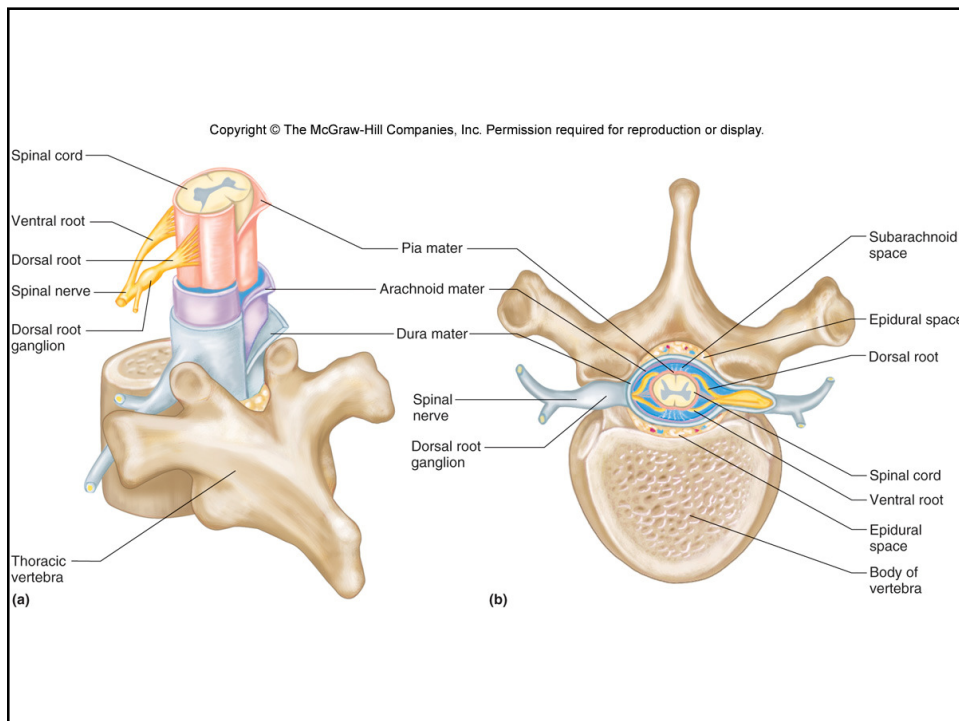
- B. The spinal cord has
 - 1. Each gives rise to a
- C. Most of the cells in the spinal cord are

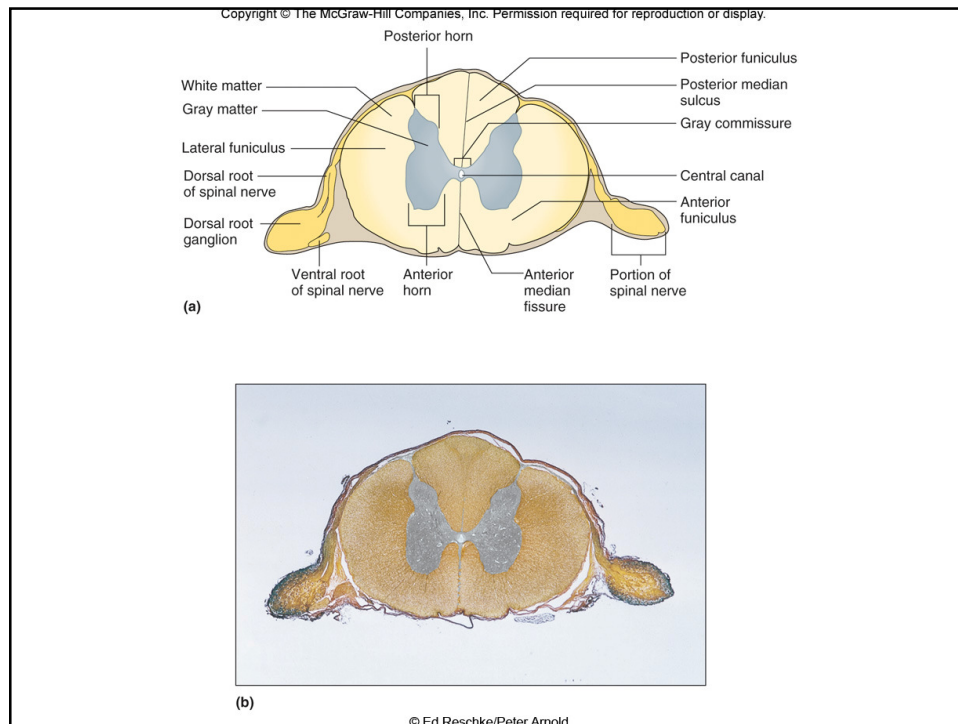


9.13 Spinal Cord

D. Consists of

1. The gray matter is on the
2. It is surrounded by a

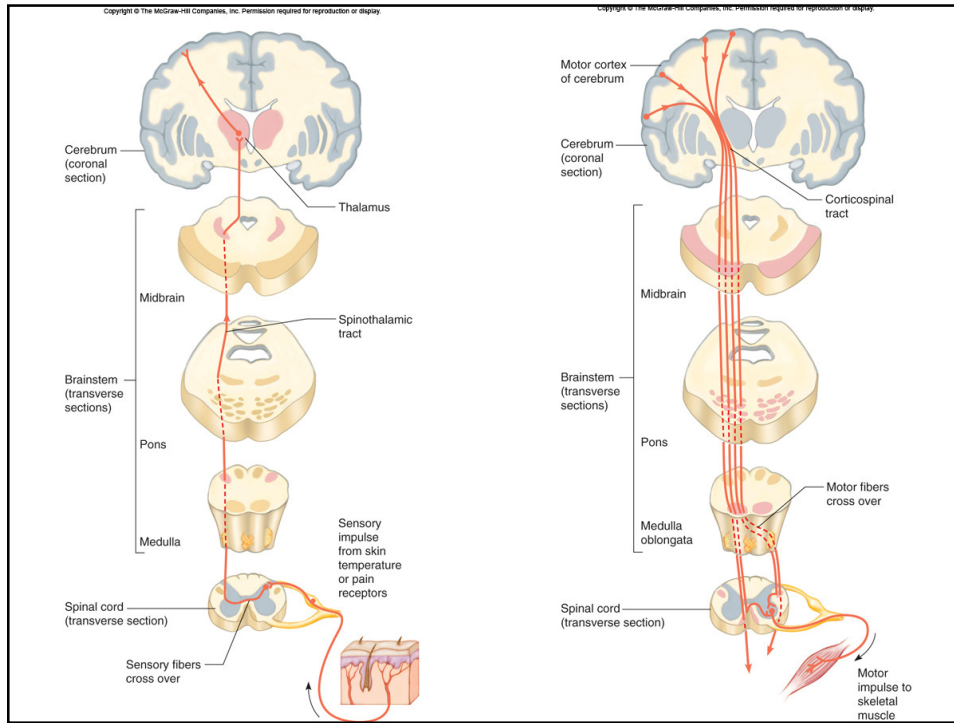




9.13 Spinal Cord

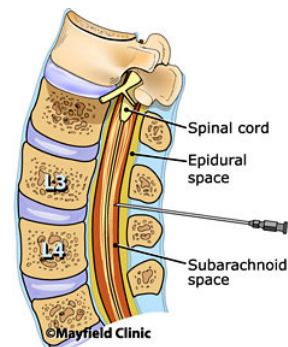
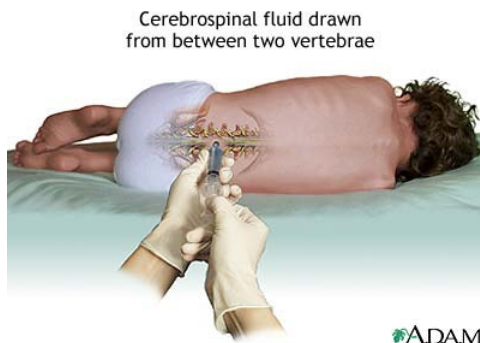
E. Functions of the Spinal Cord

1. Conducting nerve impulses
 - a.
 - b.
2. Spinal reflexes
 - a. 1



Lumbar Puncture

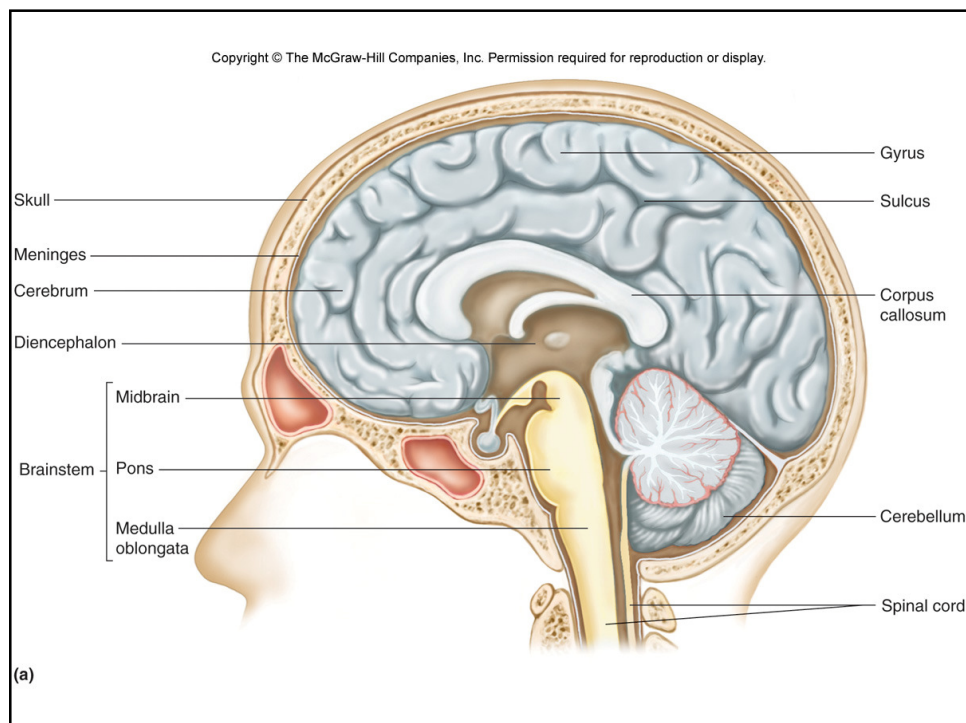
A withdrawal of some CSF from the subarachnoid space in the lumbar region of the spinal cord. Usually between the third and four lumbar vertebrae.

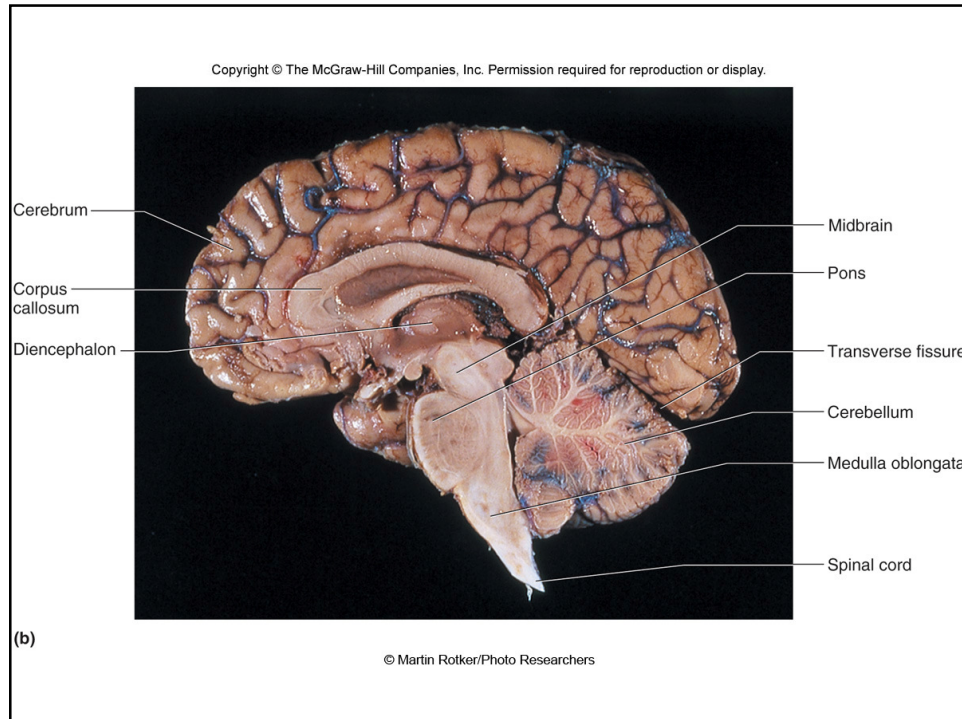


9.14 The Brain

A. Structure of the Cerebrum

1. Composed of 2
2. Connected by the
 - a. Consists of a deep bridge of
 - b. Separated by
3. The surface of the cerebrum has many ridges called
 - a. A shallow groove is called a
 - b. A deep groove is called a





9.14 The Brain

B. Has 5 lobes (1-4 named for the bones of the skull).

1.
 - a. Frontal association area
 - i.
 - b.
 - i.
 - c. Primary motor area
 - i. Controls

9.14 The Brain

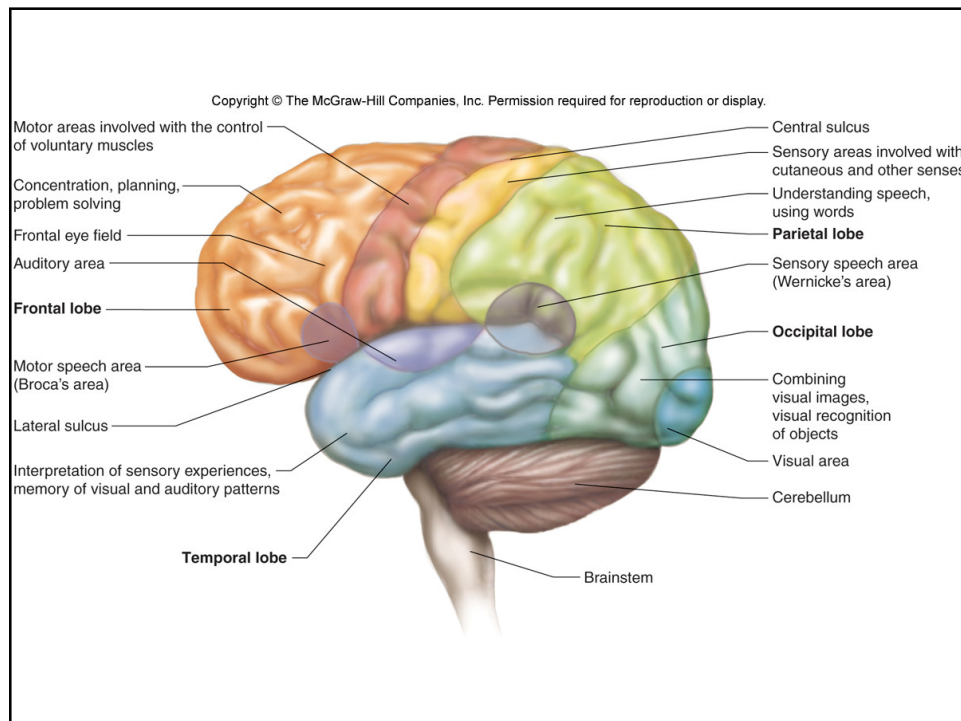
2.
 - a. Primary
 - i. Receives information about
 - b. Somatic
 - i. Interprets information from the

9.14 The Brain

3.
 - a. Primary
 - i.
 - b. Auditory association area
 - i.
 - c. Primary
 - d. Olfactory association area

9.14 The Brain

4.
 - a. Primary
 - i. Allows you to see
 - b. Visual association area
 - i. Remembers
5.
 - a. Covered by
 - b. Contains
 - i. Controls involuntary muscle movements (subconscious movement).
 - ii. Controls
 - iii. Prevents



9.14 The Brain

6. Thin, outer layer of gray matter
 - a. Contains
7. White matter (myelinated) under the cerebral cortex makes up most of the
 - a. Composed of primarily

9.14 The Brain

- C. Functions of the cerebrum
 - 1.
 2. Can be divided into overlapping functional regions (areas).
 - a. These are

9.14 The Brain

3. Typically, one side of the cerebrum is the

4. In over 90% of the population, the
 - a.
 - i.
 - b. Complex
 - i.

9.14 The Brain

5. In these same people, the
 - a. Nonverbal functions
 - i. Motor
 - ii. Understanding and interpreting
 - iii. Nonverbal
 - b. .
6. In some people, the right hemisphere is

9.14 The Brain

7. Nerve fibers in the
 - a. The dominant hemisphere controls the
 - b. Sensory information from the non dominant hemisphere is transferred to the dominant hemisphere to be used in

9.14 The Brain

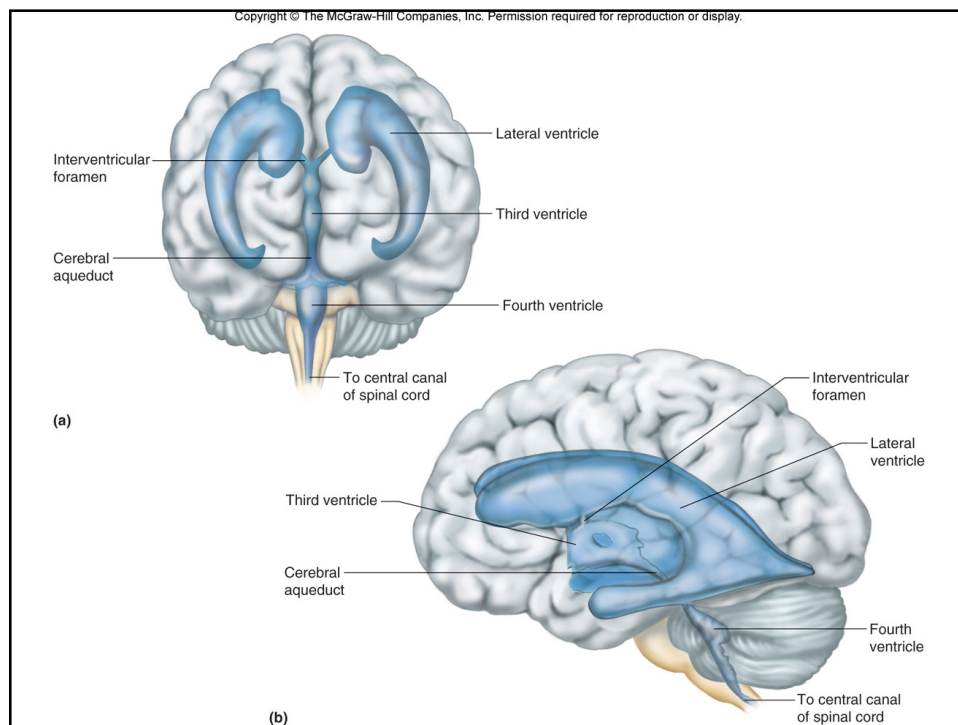
8. Most incoming and outgoing signals in the brain
 - a. The left hemisphere sends motor signals to the
 - b. The right hemisphere sends motor signals to the

9.14 The Brain

D. Ventricles and Cerebrospinal Fluid

1. In the cerebrum, there are.

- a.
- b.
- c.

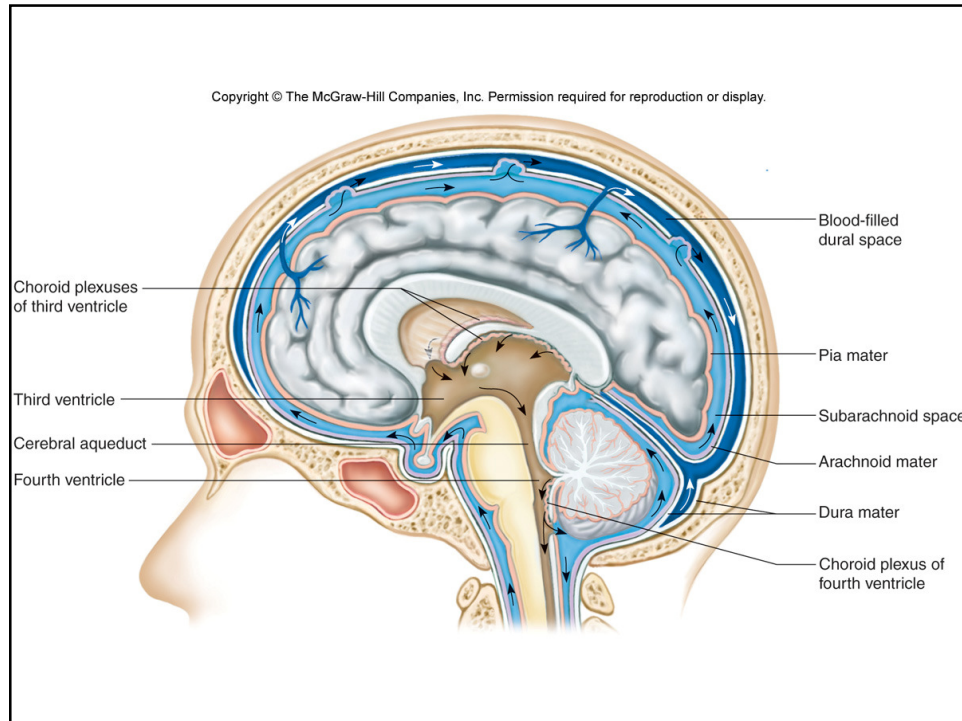


9.14 The Brain

- d. Cerebral
 - i. Connects to the central canal and has openings to the subarachnoid space of the
 - ii. The choroid plexuses of the pia mater secrete the cerebrospinal fluid and it
 - iii. CSF completely surrounds the brain and spinal cord (subarachnoid space) and acts as a



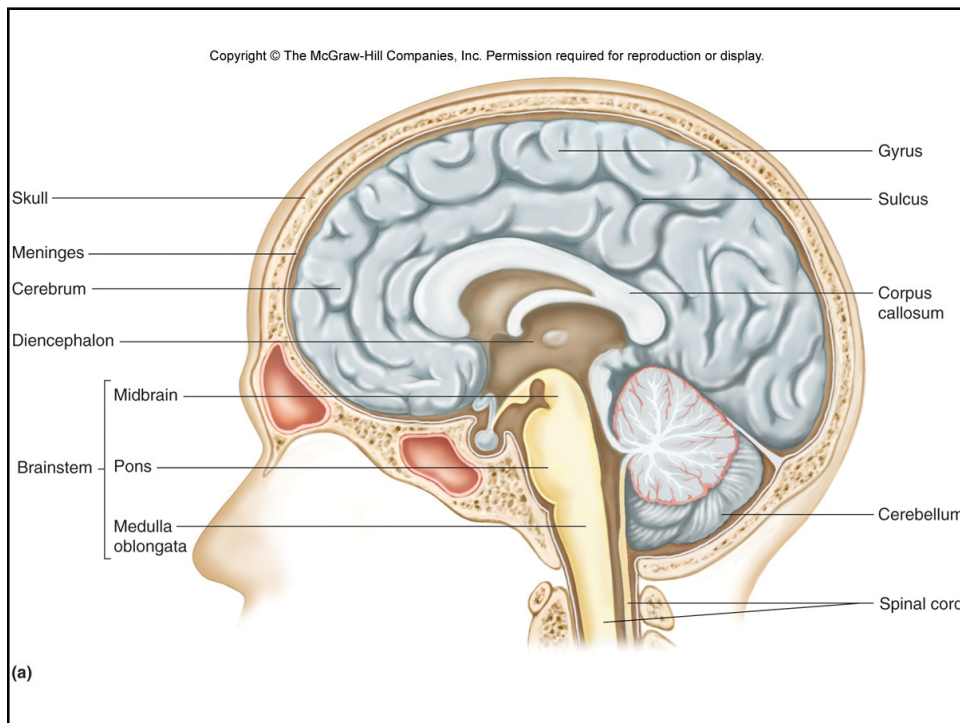
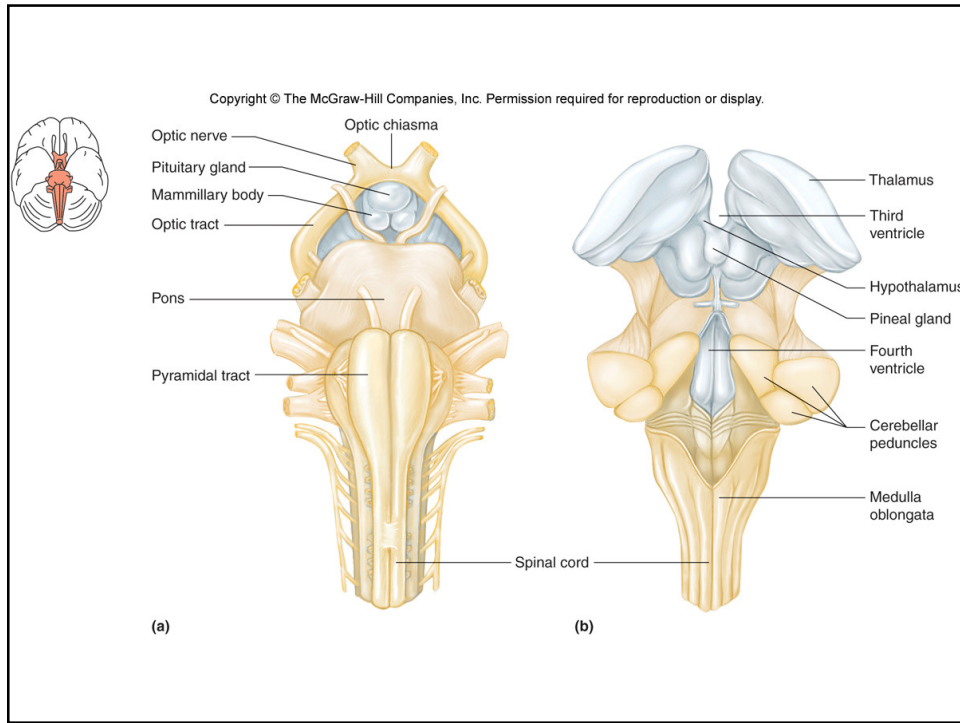
- Hydrocephalus:
“Water on the brain.”
- A blockage causes cerebrospinal fluid to form, but cannot drain away causing it to accumulate in the ventricles of the brain.



9.14 The Brain

E. The Diencephalon

1. Found between the
2. Surrounds
3. Composed of almost completely
 - a. Includes the thalamus, hypothalamus, optic chiasma (optic nerve crossover), infundibulum, posterior pituitary glad, mammillary bodies, and the pineal gland.



9.14 The Brain

- b. The thalamus is the region that receives all of the
 - i. The thalamus also produces awareness of

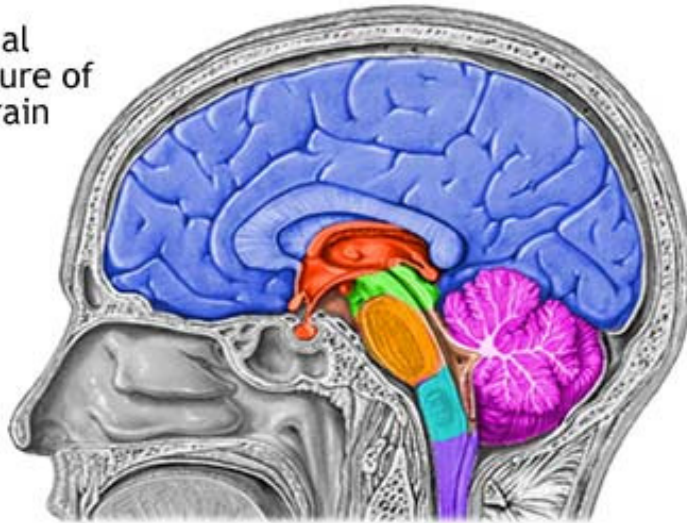
9.14 The Brain








- c. The hypothalamus links the nervous and endocrine systems to
 - i.
 - ii.
 - iii.
 - iv.
 - v.
 - vi. Stimulation of the
 - vii.

9.14 The Brain

- d. The thalamus, hypothalamus, basal ganglia, and gray matter masses make up the
 - i. Creates feelings of

Internal structure of the brain



- | | | | |
|---|--|---|--|
|  Spinal cord |  Cerebellum |  Diencephalon |  Pons |
|  Medulla Oblongata |  Midbrain |  Cerebral hemisphere | |

<http://www.nlm.nih.gov/medlineplus/ency/images/ency/fullsize/19236.jpg>

 ADAM.

9.14 The Brain

E. The Brain Stem

1. Bundle of nerve fibers that connects the

a. Midbrain:

i. Consists of

ii. Includes several

9.14 The Brain

b. Pons: Between the

i. Transmits messages from the

ii. Relays

iii. Helps regulate

9.14 The Brain

- c. Medulla Oblongata: From the
 - i. Controls
 - 1. Cardiac center –
 - 2. Vasomotor center –

 - 3. Respiratory center –

9.14 The Brain

- 2. Scattered throughout the midbrain is a network of nerve fibers associated with tiny islands of gray matter called the
 - a. Joins fibers from the

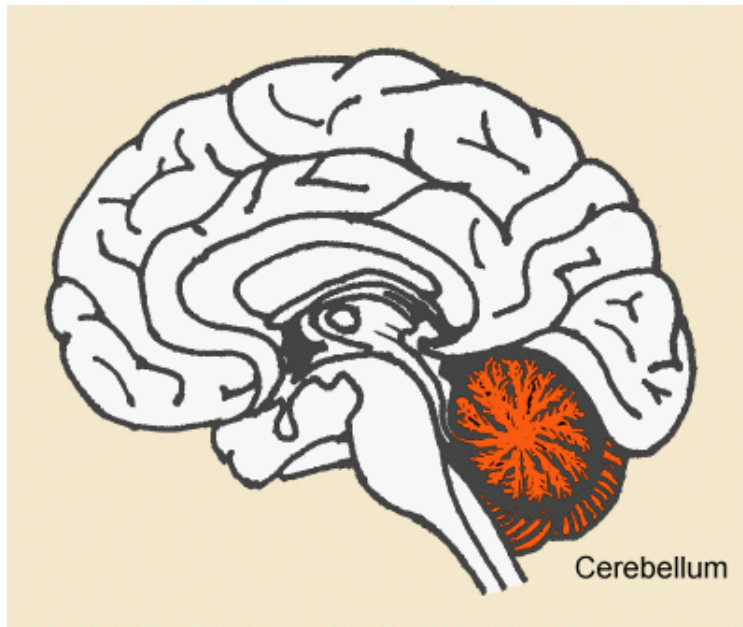
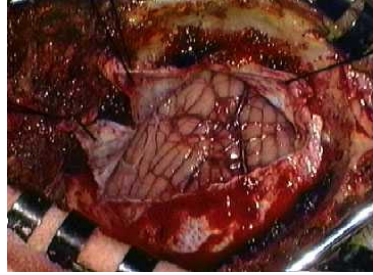
 - b. Activates the cerebral cortex when

 - c. Injury or damage leads to

9.14 The Brain

F. The Cerebellum

1. Found below the.
2. Composed primarily of
3. Regulates the position of the



Brain Disorders

A. Destruction of Brain Tissue

1. Cerebrovascular accident (CVA):
2. Cerebral Palsy
 - a. Spastic paralysis:
 - b. Hemiplegia:
 - c. Paraplegia:
 - d. Triplegia:
 - e. Quadriplegia:

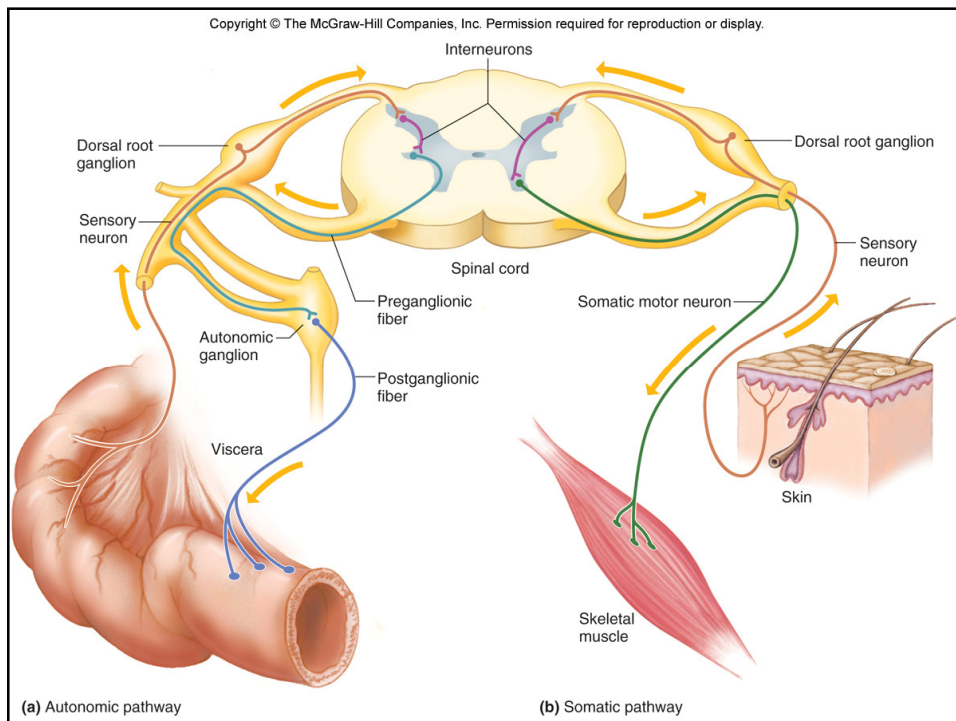
Brain Disorders

B. Disorders characterized by

1. Degeneration of the brain that can progress to adversely affect
 - a. Alzheimer Disease: Lesions develop in the
 - b. Huntington Disease: Inherited disease characterized by chorea (involuntary, purposeless movements).
 - c. Acquired Immunodeficiency Syndrome (AIDS):
Can cause dementia.

9.15 Peripheral Nervous System

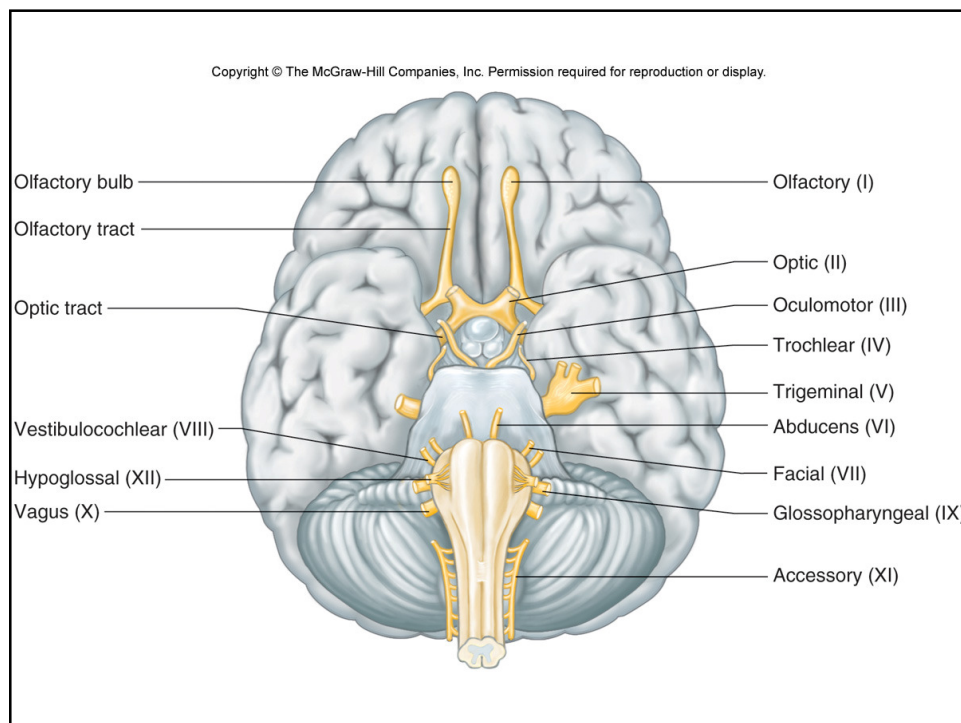
- A. Composed of
- B. Broken down into (skin and muscles) and (visceral organs – heart, stomach, intestines, glands).



9.15 Peripheral Nervous System

C. Cranial Nerves

1. Arise from the brain stem
2. Most are mixed nerves
 - a. Sensory fiber cell bodies
 - b. Motor fiber cell bodies are in the



9.15 Peripheral Nervous System

C. Twelve different cranial nerves (named with a number and a name).

- I.
- II.
- III.
- IV.
- V.
- VI.
- VII.

9.15 Peripheral Nervous System

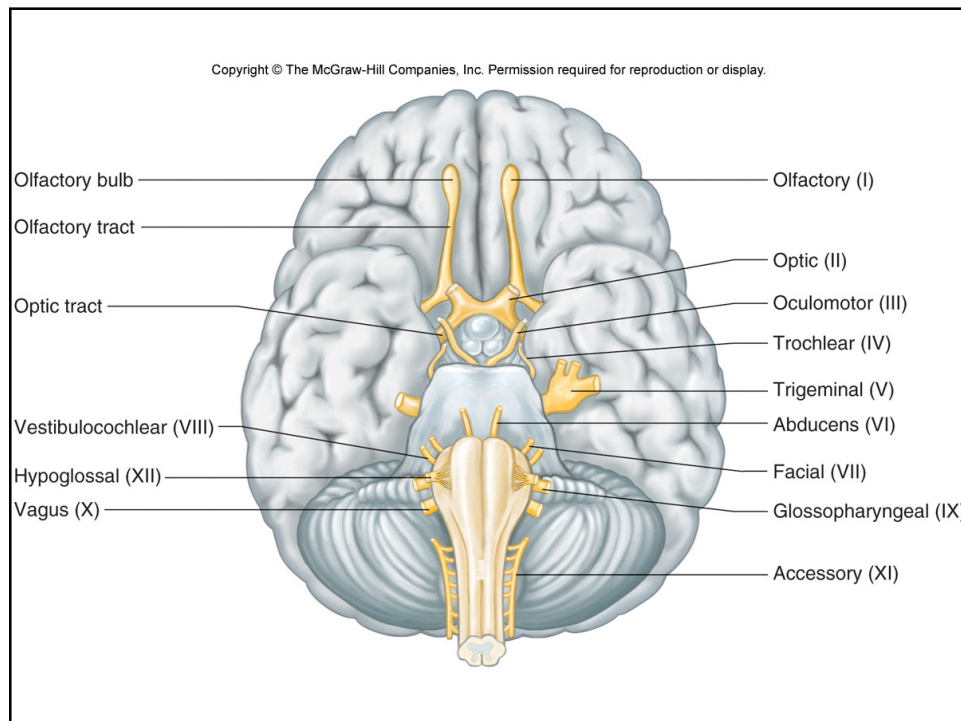
- VIII.
- IX.

- X.

- XI.
- XII.

Cranial Nerves

On	- Olfactory
Old	- Optic
Olympus	- Oculomotor
Towering	- Trochlear
Top	- Trigeminal
A	- Abducens
Finn	- Facial
And	- Vestibulocochlear (Auditory)
German	- Glossopharyngeal
Viewed	- Vagus
Some	- Accessory (Spinal)
Hops	- Hypoglossal



9.15 Peripheral Nervous System

D. Spinal Nerves

- 1.
2. Two-way communication between the spinal cord and the neck, upper and lower limbs, and the trunk.
3. Types of spinal nerves
 - a. Cervical (C1-C8)
 - b. Thoracic (T1 –T12)
 - c. Lumbar (L1-L5)
 - d. Sacral (S1 –S5)
 - e. Coccygeal (Co)

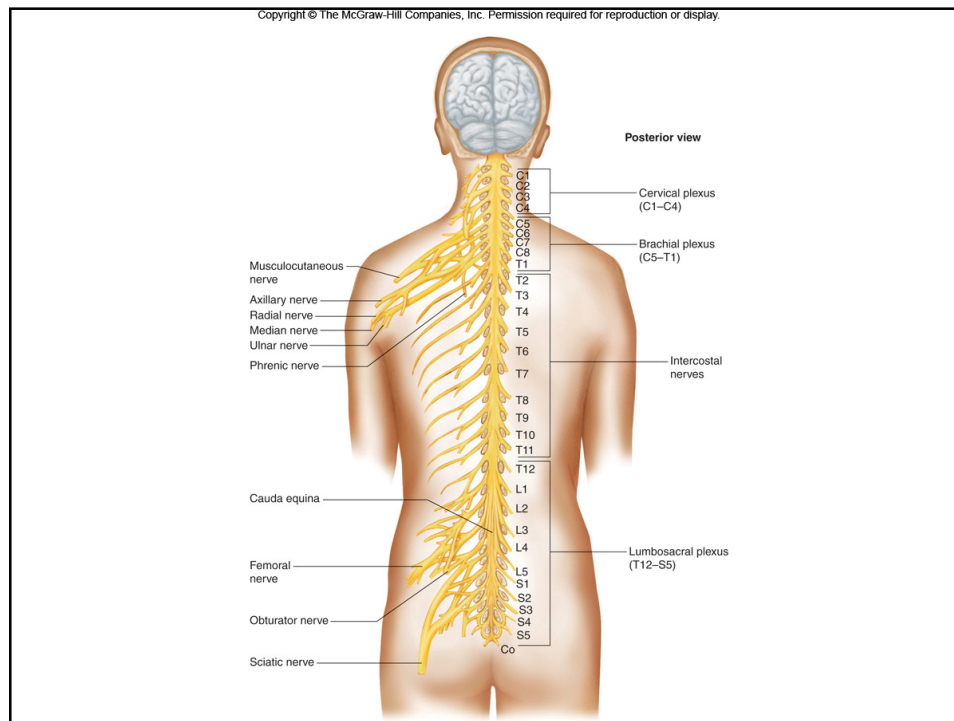
9.15 Peripheral Nervous System

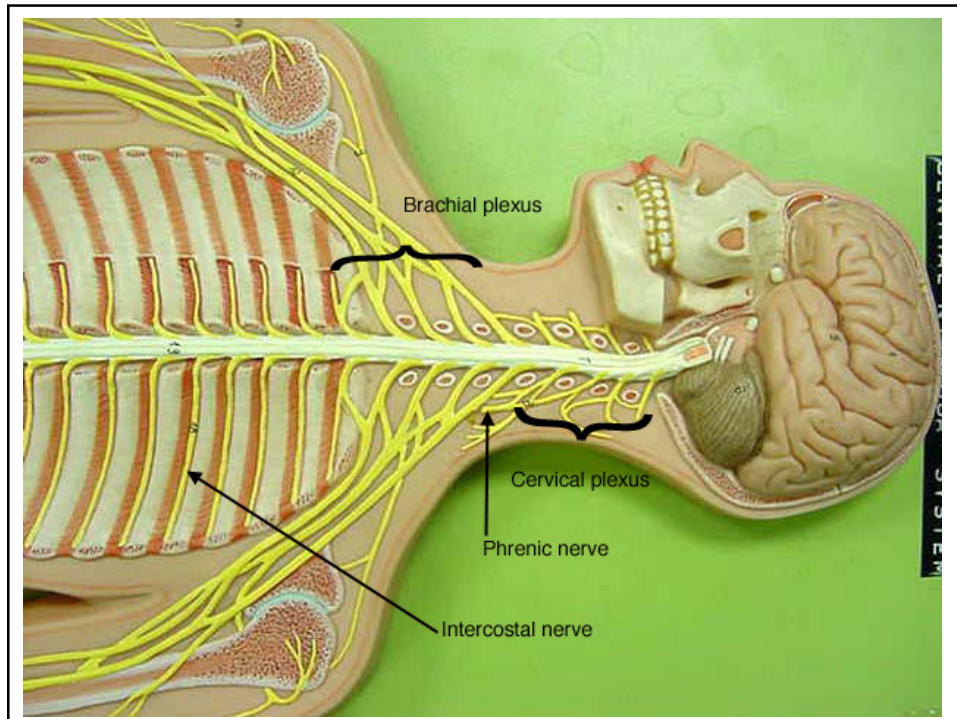
4. Spinal nerves combine into
 - a. Fibers are reorganized into new nerves so impulses to the same place arrive in the same nerve.
 - b.
 - i. Includes the fibers of the
 - c.
 - i. Includes the fibers of the

9.15 Peripheral Nervous System

- d. Lumbosacral Plexus (lumbar region to pelvis)
 - i. Includes the fibers from the

- e. The rest of the thoracic nerves do not enter a plexus, but become the





Disorders of the Peripheral NS

A. Herpes zoster or shingles:

1. 3% of population will have in their lifetime.
2. Results in painful eruption of red, swollen vesicles that eventually rupture and crust before clearing in 2-3 weeks.
3. Usually accompanied by
4. Treatment can help, but

Shingles

- This photograph shows clusters of blisters (vesicles) and redness (erythema) caused by herpes zoster (shingles). The pattern follows a "dermatome" The area may burn or sting before the appearance of these vesicles.



Shingles

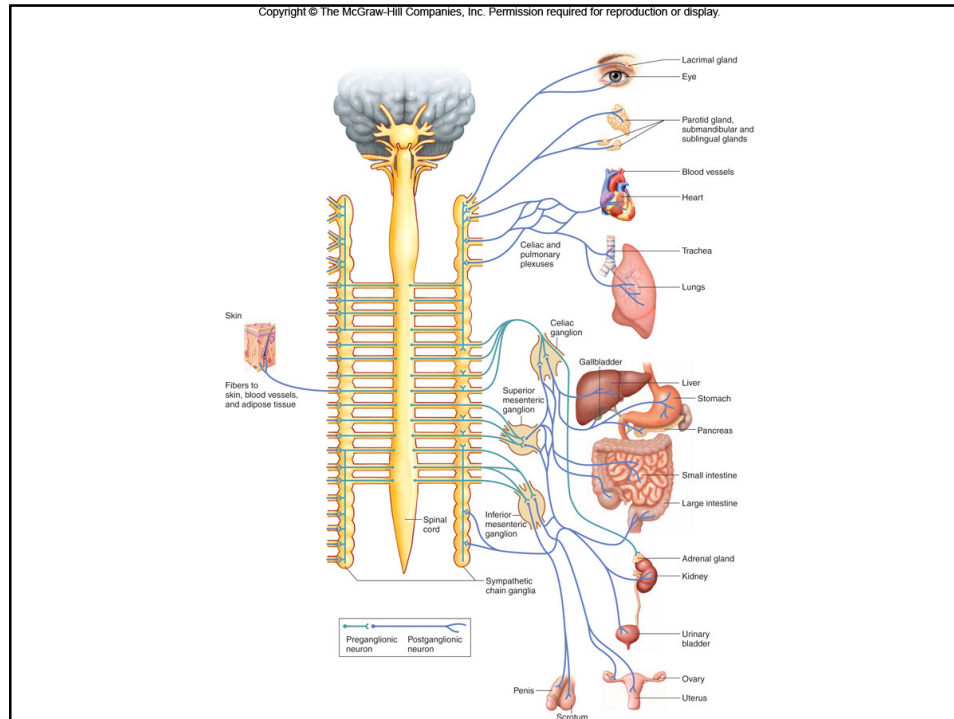


9.16 Autonomic Nervous System

- A. Functions
- B. Controls
- C. Divided into the

9.16 Autonomic Nervous System

1. Sympathetic Division
 - a. Prepares body for energy expending, stressful, or emergency situations.
 - b. Stimulates heartbeat
 - c. Raises blood pressure
 - d. Dilates the pupils
 - e. Dilates the trachea and bronchi
 - f. Stimulates the conversion of liver glycogen into glucose.
 - g. Shunts blood away from the skin and viscera to the skeletal muscles, brain, and heart
 - h. Inhibits peristalsis in the gastrointestinal (GI) tract
 - i. Inhibits contraction of the bladder and rectum



9.16 Autonomic Nervous System

2. Parasympathetic Division

- a. Most active during normal conditions
- b. Slowing down of heartbeat
- c. Lowering of blood pressure
- d. Constriction of the pupils
- e. Increased blood flow to the skin and viscera
- f. Peristalsis of the GI tract

9.16 Autonomic Nervous System

- D. Has some independence because of ganglia which have some integrative function, but the brain and the spinal cord still have the ultimate control (brain stem, hypothalamus, limbic system).

