

The Nervous System

Overview & CNS

The Nervous System

General Overview

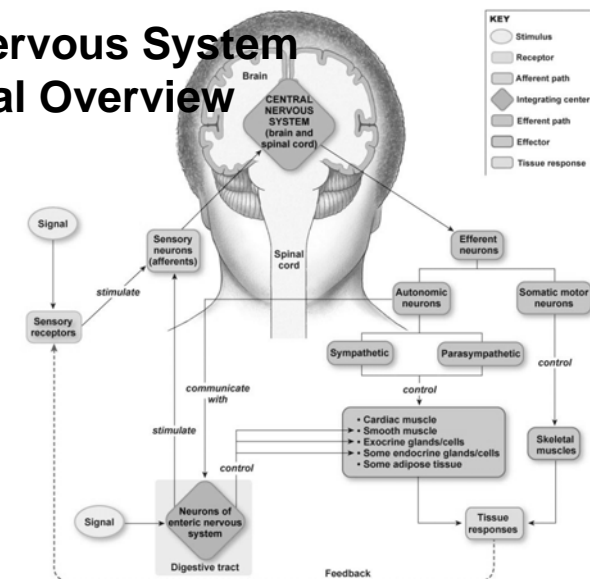
1. Sensory
2. Integration
3. Motor

Lecture Outline

- General Overview of Nervous System Function
- Cells of the Nervous System
- CNS
 - Functional components
 - Neural networks
 - Organization of the CNS

The Nervous System General Overview

The integration of all three major functions



The Nervous System

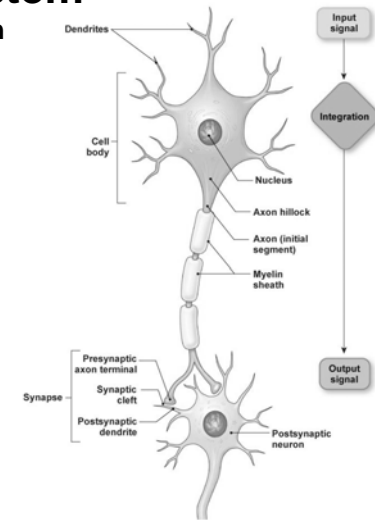
Cells of the Nervous System

- Cells are grouped into two functional categories
 - Neurons
 - Do all of the major functions on their own, are
 - Afferent
 - Interneurons
 - Efferent
 - Neuroglia
 - Play a supporting role to the neurons
 - Divided into CNS and PNS Neuroglia
 - CNS
 - Astrocytes
 - Oligodendrocytes
 - Microglia
 - Ependymal cells
 - PNS
 - Neurolemmocytes
 - Satellite cells

The Nervous System

Cells of the Nervous System

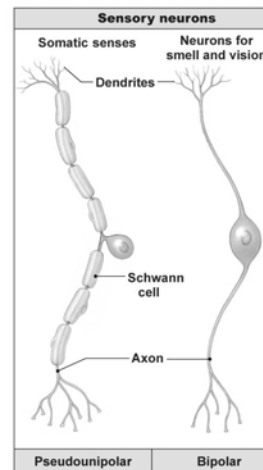
- The general neuron & it's function



The Nervous System

Cells of the Nervous System

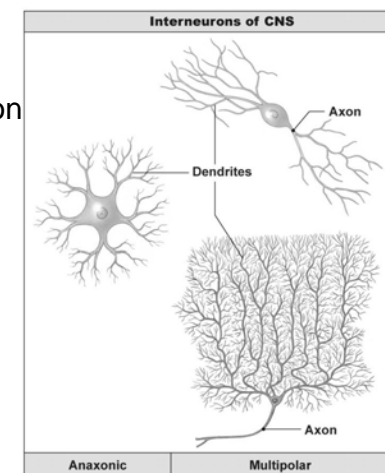
- Neurons
 - Functional Classification
 - Afferent
 - Conduct APs to the CNS



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Cells of the Nervous System

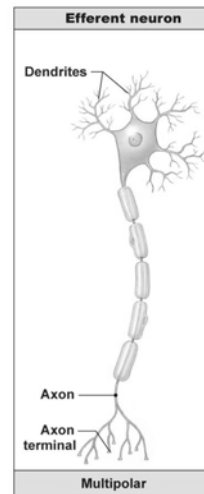
- Neurons
 - Functional Classification
 - Interneurons
 - Conduct APs within the CNS



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Cells of the Nervous System

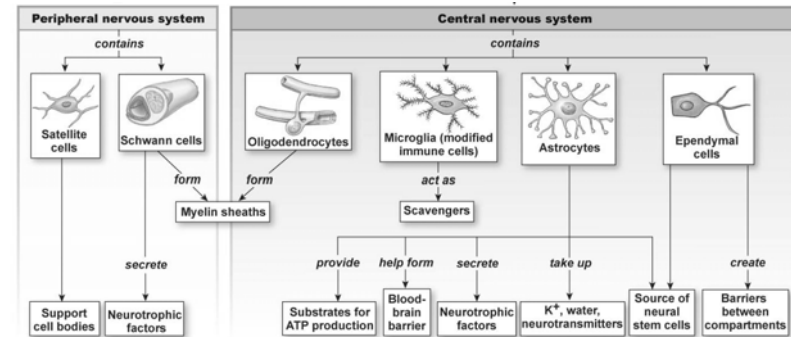
- Neurons
 - Functional Classification
 - 3. Efferent
 - Conduct APs to the PNS



The Nervous System

Cells of the Nervous System

- Neuroglia
 - Functional Classification



The Nervous System

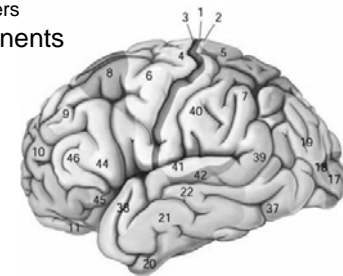
Functional Components

- What are the major functional components of the Nervous System?
 - Brain } Central Nervous System
 - Spinal Cord } Central Nervous System
 - Afferent Tracts } Peripheral Nervous System
 - Efferent Tracts } Peripheral Nervous System
 - Ganglia } Peripheral Nervous System

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Functional Components

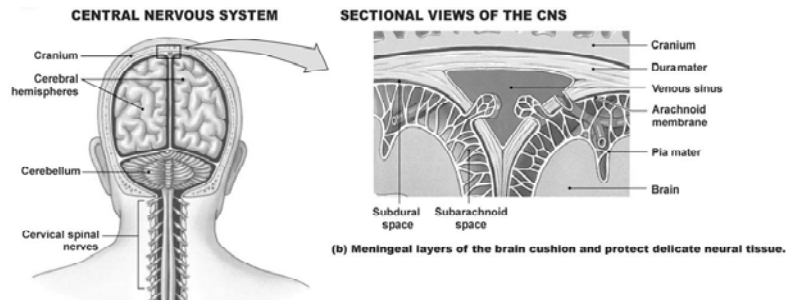
- How do the structural components allow the nervous system to function correctly?
 - Provides protected environment
 - Bony protection
 - Meninges
 - Blood brain barrier
 - Maintain correct ECF parameters
- How do the functional components allow the nervous system to function correctly?
 - Creates and modifies neuronal circuits organized into
 - afferent & efferent tracts
 - Functional areas in the CNS
 - Gray & white matter
 - Reflex pathways



The Nervous System

Functional Anatomy Review

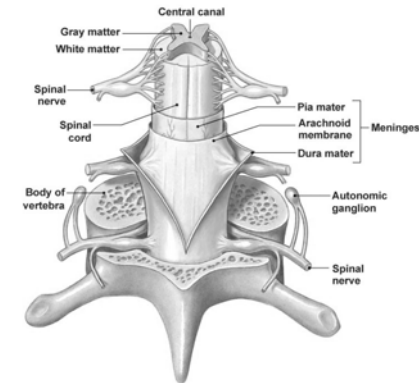
Quick Review of Functional Anatomy



The Nervous System

Functional Anatomy Review

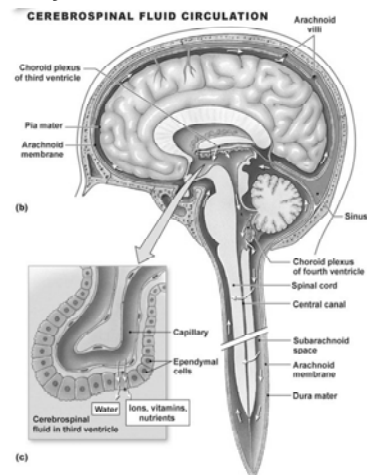
Quick Review of Functional Anatomy



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Functional Anatomy Review

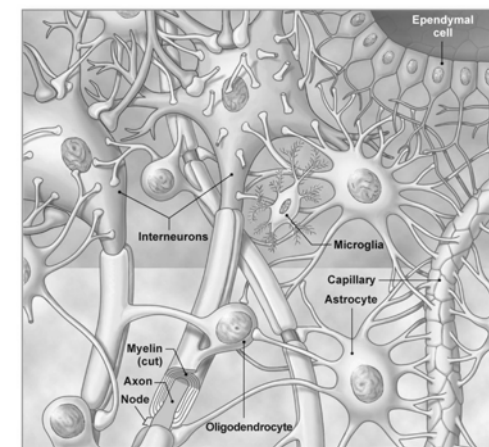
Quick Review of Functional Anatomy



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Functional Anatomy Review

Quick Review of Functional Anatomy



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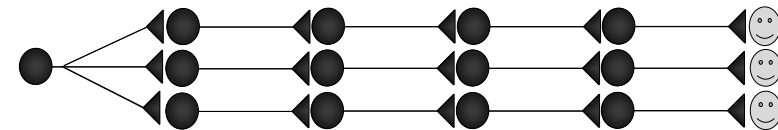
Functional Components

- Neuronal Circuits
 - The design of the circuit (arrangement of neurons) determines
 - Level of divergence or convergence
 - Spread or shrinkage of information
 - Speed
 - If a circuit will be autorhythmic
 - There is plasticity to neuronal circuits

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Functional Components

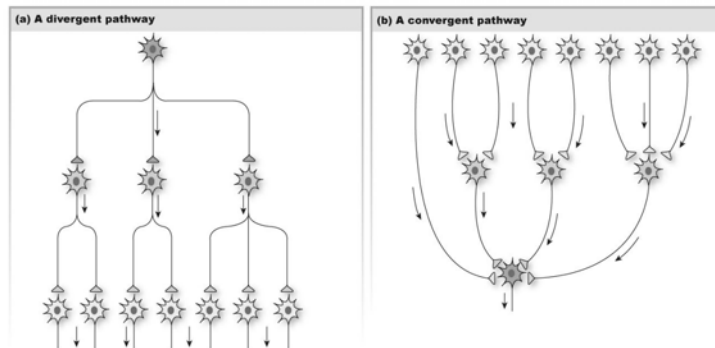
- Serial & Parallel Circuits



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Functional Components

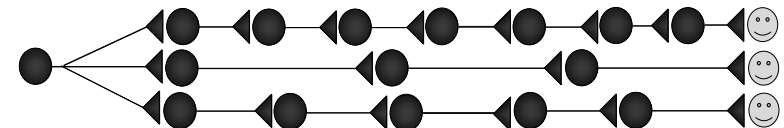
- Converging vs. Diverging Circuits



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Functional Components

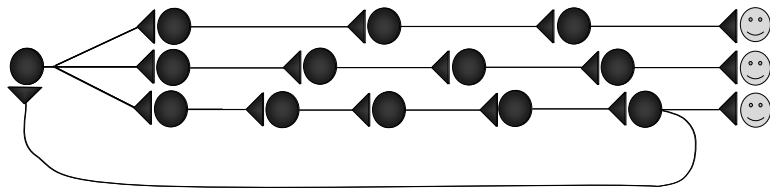
- Parallel After Discharge Circuit



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Functional Components

- Reverberating (Oscillating) Circuits



The Nervous System

Organization of the CNS

- Central Nervous System is divided into two functional groups
 - The brain
 - The spinal cord
- What goes on in these two different areas?
 - Sensory aspect
 - Integrative aspect
 - Motor aspect

The Nervous System

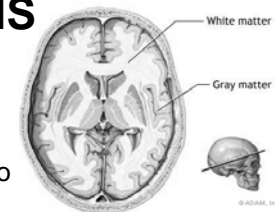
Reflex Pathways

- What are reflexes?
- Types
 - Monosynaptic vs. polysynaptic
 - Contralateral, bilateral, ipsilateral
- Lab Session on Reflexes...

The Nervous System

Organization of the CNS

- The Brain
 - Functional organization
 - Neuronal circuits organized into
 - Gray matter & White Matter



<u>Gray Matter</u>	<u>White Matter</u>
Consists of <ul style="list-style-type: none"> – Non myelinated axon terminals – Dendrites – Cell Bodies 	Consists of <ul style="list-style-type: none"> – Myelinated axons
Functions in <ul style="list-style-type: none"> – signal processing (integration) – Neurocrine / neurohormone secretion 	Functions in <ul style="list-style-type: none"> – Formation of tracts <ul style="list-style-type: none"> • ascending or descending (SC) • commissural, association, projection (B)