**Functions of the Nervous System**

- Sensory
  - External environment
  - Internal environment
- Integration
  - Analysis and decision making
- Motor
  - Stimulates effectors to create a response
    - Muscular contraction
    - Glandular secretion

**Organization of the Nervous System**

- SENSORY COMPONENTS OF THE PNS
  - Somatic and special sensory receptors and somatic neurons
  - Autonomic sensory receptors and autonomic sensory neurons
  - Entero-sensory receptors and enteric sensory neurons in the gastrointestinal tracts of the GI tract

- MOTONEURONS OF THE PNS
  - Somatic motor neurons (sensory, motor, and autonomic)
  - Autonomic motor neurons (sympathetic and parasympathetic divisions)
  - Entero-motor neurons (enteric) in the wall of the GI tract

- EFFECTORS
  - Skeletal muscles
  - Smooth muscle, cardiac muscle, and glands
  - Intestinal fluids, and endocrine cells of the GI tract

**Cell Types**

- Neurons
- Glial (Neuroglial) Cells
  - Schwann Cells – myelin sheath in the PNS
  - Satellite Cells – support ganglia
  - Oligodendrocytes – myelin sheath in the CNS
  - Microglia – phagocytosis
  - Astrocytes – BBB
  - Ependymal Cells – produce CSF
**Glial Cells of the PNS**

- Schwann Cells and Oligodendrocytes
- Provides electrical insulation
- Increases the speed of electrical conduction
- Nodes of Ranvier
- Diseases of the myelin sheath
  - Multiple sclerosis
  - Tay-Sachs disease

**Myelination**

- Schwann Cells and Oligodendrocytes
- Provides electrical insulation
- Increases the speed of electrical conduction
- Nodes of Ranvier
- Diseases of the myelin sheath
  - Multiple sclerosis
  - Tay-Sachs disease

**Neurons**

- Nerve Cells are electrically excitable & conduct nerve impulses or action potentials.
- Anatomy of a neuron:
  - Cell body
    - Contains most organelles & nucleus
  - Nerve Fibers (processes)
    - Dendrites
    - Axons
Structural Classes of Neurons

**NS Terminology**
- Neuron = single nerve cell
- Nerve = bundle of axons

Structure of a Nerve

**NS Terminology**
- Ganglia = cluster of nerve cell bodies outside the CNS
- Nucleus = cluster of nerve cell bodies inside the CNS

**NS Terminology**
- White matter = bundles of myelinated axons
- Gray matter = aggregations of cell bodies, dendrites, axon terminals, unmyelinated axons & glial cells

White & Gray Matter in the CNS
Learning Objectives

- Understand the divisions of the nervous system - their roles and functions
- Discuss the organization of the nervous system
- Nerve tissue terminology: efferent, afferent, ganglia, nucleus, nerve, neuron, gray matter, white matter
- Discuss the 6 types of glial cells and their main functions and locations