BIO 102 General Biology
Lecture Outline

Nervous System

I. Introduction
- General pathways of information
- Primary functions
  - Monitor changes
  - Integrate information
  - Initiate response

II. Neurons: Structure (Anatomy)
- A. Cells of the nervous system
  - Neurons
  - Neuroglia
- B. Neuron structure
  - Cell body
  - Dendrites
  - Axons
  - Axon terminal
  - Myelin sheath (only on some neurons)
- C. Types of neurons
  - Sensory
  - Interneuron
  - Motor
- D. Nerves

III. Neurons: Function (Physiology)
- A. Nerve impulses (i.e., action potentials)
  - Electrical potential based on ion concentration gradients
  - Leak channels
  - Na^+/K^+ pumps
  - Voltage-gated channels
  - Analogy – "ideal toilet"
  - Stages
    - 1 – Resting potential
    - 2 – Action potential initiated
    - 3 – Repolarization
    - 4 – Return to resting state
- B. Synapse: transfer of message from one cell to another
  - Neuromuscular junction (an example of a synapse)
  - Synaptic cleft

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III. Organization of Nervous Systems
- A. Diverse organization
  - Nerve net vs. bilateral nervous systems
- B. Vertebrate nervous system organization
  - Functional divisions
    - Central nervous system
    - Peripheral nervous system
      - Afferent (sensory) vs. efferent (motor) divisions
      - Somatic vs. autonomic divisions of efferent division
      - Sympathetic vs. parasympathetic divisions of autonomic division
- C. Vertebrate brain
  - Hindbrain
    - Pons
    - Medulla oblongata
    - Cerebellum
  - Midbrain
    - Part of brainstem
  - Forebrain
    - Diencephalon
    - Cerebrum
      - Cerebral cortex
        - Lobes: Frontal
          - Parietal
          - Temporal
          - Occipital
      - Motor & sensory cortex
        - Primary somatosensory cortex
        - Primary motor cortex
- D. Spinal cord
  - Structure
  - Gray and white matter
  - Sensory & motor neurons
  - Spinal reflexes
- E. Peripheral nerves
  - Cranial & spinal nerves
  - Sympathetic
  - Parasympathetic