

Chapter 11
Fundamentals of the Nervous System, Nervous Tissue
Neuronal Signaling

I. Functions and Divisions of the Nervous system

A. Central nervous system (CNS)

B. Peripheral nervous system (PNS)

1. sensory division

2. motor division

i. somatic nervous system

ii. autonomic nervous system

II. Histology of Nervous Tissue

A. Neuroglia

1. in CNS

a. Astrocytes

b. Microglial cells

c. Ependymal cells

d. Oligodendrocytes

2. in PNS

a. Satellite cells

b. Schwann cells

B. Neurons

1. Neuron Cell Body

2. Neuron Processes

3. Classification of Neurons

- a. Structural Classification

- i. Multipolar neurons

- ii. Bipolar neurons

- iii. Unipolar neurons

- b. Functional Classification

- i. Sensory neurons

- ii. Motor neurons

- iii. Interneurons

III. Membrane Potentials

A. The Resting Membrane Potential

- 1. Difference in Ionic Composition

- 2. Difference in Plasma Membrane Permeability

B. Membrane Potentials That Act as Signals

- a. Depolarization

- b. Hyperpolarization

- 1. Graded Potentials

- 2. Action Potentials

- a. Generation of an Action Potential

- i. Resting state

- ii. Depolarization

- iii. Repolarization

- iv. Hyperpolarization

- b. Threshold and the All-or-None Phenomenon

c. Propagation of an Action Potential

d. Refractory Periods

i. absolute refractory period

ii. relative refractory period

IV. Synapse

1. Chemical Synapses

a. chemical synapses

b. synaptic cleft

A. Information Transfer Across Chemical Synapses

1.

2.

3.

4.

5.

6.

B. Excitatory Synapses and EPSPs

C. Inhibitory Synapses and IPSPs

V. Neurotransmitters and Their Receptors

A. Classification of Neurotransmitters by Chemical Structure

1. Acetylcholine

2. Biogenic Amines

3. Gases

B. Neurotransmitter Receptors

1. Channel-Linked Receptors: Mechanism of Action
2. G Protein-Linked Receptors: Mechanism of Action