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Quick Study Guide

Topic: Neuroscience and Behavior

Related Course(s): Psych 1100, 2800, 3000, 3200

Structures of the Neuron – Key Terms

Neurons or nerve cells, are the basic elements of the nervous system that carry messages which enable us to think, remember, and experience emotion. These specialized cells are the information-processing units of the brain responsible for receiving and transmitting information.

3 parts of a Neuron:

Cell body (soma): the part of the cell that contains the nucleus and determines if the cell will "fire", thus transmitting the message to the next cell.

Dendrites: "branch-like" fibers that receive messages from other neurons, or the external world and "delivers" that message to the cell body. The dendrite delivers.

Axon: a long, tube-like structure that carries messages "away" from the cell body and transmits that message to other cells.

> **Terminal buttons:** small bulges at the end of the axon which releases the message into the synapse

> **Myelin sheath**: a protective coating of fat and protein that wraps around the axon. The myelin sheath also serves to increase the velocity with which electrical impulses travel through axons.

How Information Travels: Dendrite > Cell Body > Axon to be released into the Synapse

Dendrites receive stimulation from the external world, which are then converted into electrical impulses that are transmitted toward the **Cell Body**. If the electrical impulses are strong enough the cell body will "fire", resulting in the signal being transmitted down the **Axon**, to be released into the **Synapse** to be picked up by adjacent neurons.

Synapse: the spatial junction between two neurons. The neurotransmitter is released into the synapse to be picked up by the dendrite of a receiving neuron.

Neurotransmitters: are chemicals that carry messages across the synapse to a dendrite of a receiving neuron

All-or-None Law: Neurons either fire or they don't. They are either on or off. If they electrical impulse is strong enough, the neuron will fire.

Resting State: Before a neuron is triggered - that is, when it is in a resting state - it has a negative electrical charge of about -70 millivolts (a millivolt is one 1⁄1,000 of a volt).

Action Potential: When a message arrives at a neuron, gates along the cell membrane open briefly to allow positively charged ions to rush in at rates as high as 100 million ions per second. When the positive charge reaches a critical level, an electrical impulse, known as an action potential, travels along the axon of the neuron. The action potential moves from one end of the axon to the other like a flame moving along a fuse.