

Neurons: The Basics

by Sophia Tutorial



WHAT'S COVERED

This tutorial will focus on the biological aspects of psychology, exploring how the brain and nervous system work to create our minds and behavior. Our discussion breaks down as follows:

1. Neurons
2. Structure of a Neuron
 - a. Soma
 - b. Dendrites
 - c. Axons

1. Neurons

A neuron is the basic cellular building block of the brain and nervous system. It is the thing within your body that acts as the messenger and sends information to and from the brain and other parts of the body. It allows certain messages to be sent, so that you can move and act in the ways that you intend.

A neuron is different from a **nerve**, which may be a more recognizable term. Nerves are actually groups of neurons that transmit information throughout the rest of the body. Everyone has nerves, in their arms, legs, etc., which are simply bundles of neurons.



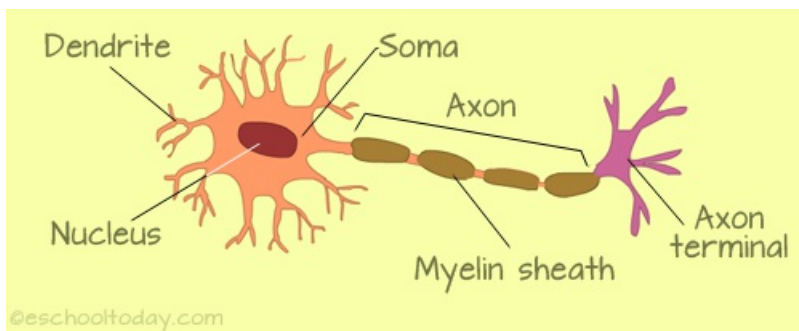
TERM TO KNOW

Nerves

Cord or cable-like bundles of axons which carry messages to and from the body and brain

2. Structure of a Neuron

A neuron has certain special structures that make it different from other cells, but allow it to function as this messenger within your body.



2a. Soma

First, there is the **soma**, or the cell body. This is the central area of the neuron that makes it just like other cells. It contains all the different structures that different cells in your body contain, such as the nucleus containing DNA, the mitochondria, etc. The important thing to remember is that the soma is your cell body, or the center of the neuron.



TERM TO KNOW

Soma

The central part of the neuron, which contains all the basic parts of a cell (nucleus, mitochondria, etc.); the cell body

2b. Dendrites

Outside of the soma are these little branching, tree-like structures, called **dendrites**.



DID YOU KNOW

The term "dendrite" actually comes from the Greek word, "dendri," for tree. Therefore, an easy way to remember the term "dendrite" is that it looks like a tree, and comes from the word for tree.

These aspects of the neuron, that branch off into lots of smaller parts, receive information from other neurons. This is the receiving section of the neuron. It takes in messages that other cells and neurons send to it, and then transmits it to other cells.



TERM TO KNOW

Dendrites

The part of the neuron that branches out into many smaller parts, which receive signals from other neurons

2c. Axons

Extending out from the cell body is a long tail-like structure, called the **axon** of the cell. While the dendrite's job is to receive information from other neurons, the axon's job is to transmit that information to other neurons that would be attached to this neuron.

The axon starts at the cell body, in the area called the axon hillock, and extends all the way to a button-like structure at the end, which is called the axon terminal.



DID YOU KNOW

The length of an axon can vary wildly. Some axons can be only 1/10 of a millimeter long, but some of them can extend up to a meter long, especially in other parts of the body.

Now, the axon essentially transmits an electrical impulse from within the cell, starting at the dendrites and the cell body, all the way across the tail and out to other neurons that might be attached to it. It's sort of like an electrical wire, and just like with an electrical wire, the transmission of that electrical signal can be improved by insulating it, or putting something around that axon to make the message transmit faster.

This is true in certain neurons within the brain itself; they have what is called **myelin sheath**. The myelin sheath is an insulating layer of fat, called glial cells, which wraps around the axon and makes that electrical impulse shoot faster through the axon, down to other neurons that might be attached.



DID YOU KNOW

Because the myelin sheath is made of fat, it actually makes the neuron look like it's white, which is why we say there is white matter in the brain. It is the myelinated neurons within the brain, versus gray matter, which comprises the non-myelinated ones.



TERMS TO KNOW

Axon

The long tail-like structure that comes off of the cell body and sends signals along the cell and out to other cells

Myelin Sheath

A layer of fatty cells that covers some neurons' axons and allows them to transmit information faster in the brain



SUMMARY

This tutorial discussed how the brain and nervous system work to create our minds and behavior, specifically focusing on neurons. A **neuron** is the basic cellular building block of the brain and nervous system. A neuron has certain special structures that make it different from other cells, but allow it to function as a messenger within the body. Key components within the **structure of a neuron** include the soma, or cell body, dendrites, the axon, and the myelin sheath.

Good luck!

Source: This work is adapted from Sophia author Erick Taggart.



TERMS TO KNOW

Axon

The long tail-like structure that comes off of the cell body and sends signals along the cell and out to other cells.

Dendrites

The part of the neuron that branches out into many smaller parts, which receive signals from other neurons.

Myelin Sheath

A layer of fatty cells that covers some neurons' axons and allows them to transmit information faster in the brain.

Nerves

Cord or cable-like bundles of axons which carry messages to and from the body and brain.

Soma

The central part of the neuron, which contains all the basic parts of a cell (nucleus, mitochondria, etc.); the cell body.