

Class: Psych

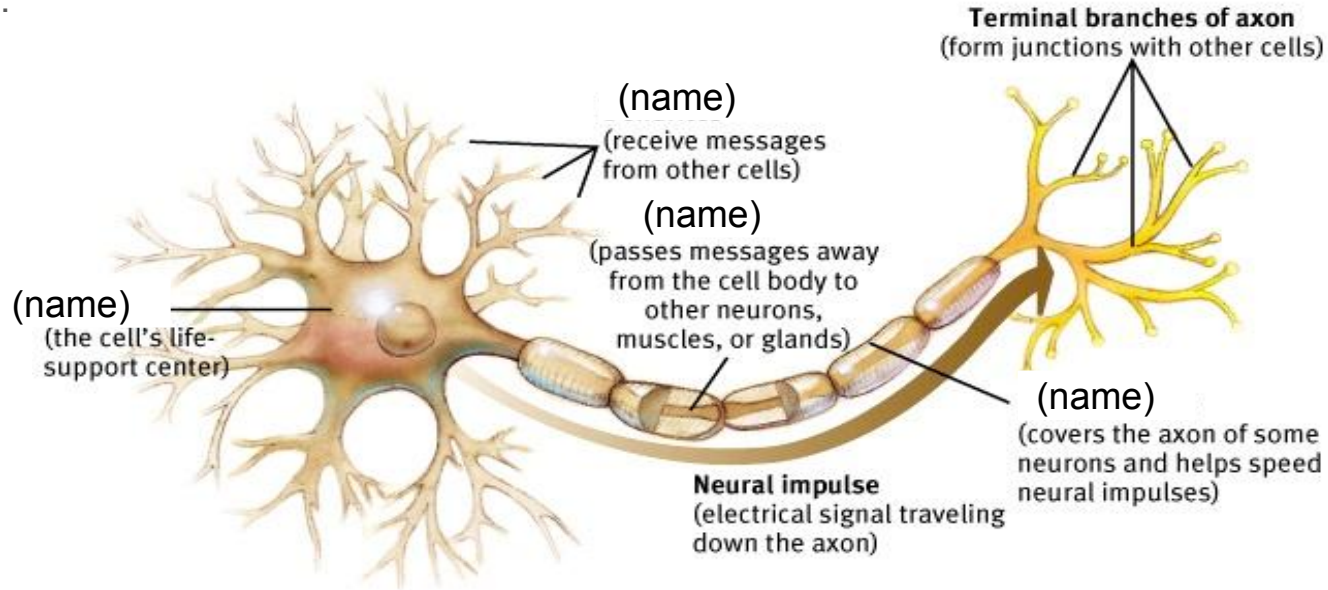
Lesson #11: Date: April 6

Learning Target: Students will identify parts and functions of neurons

Warm Up

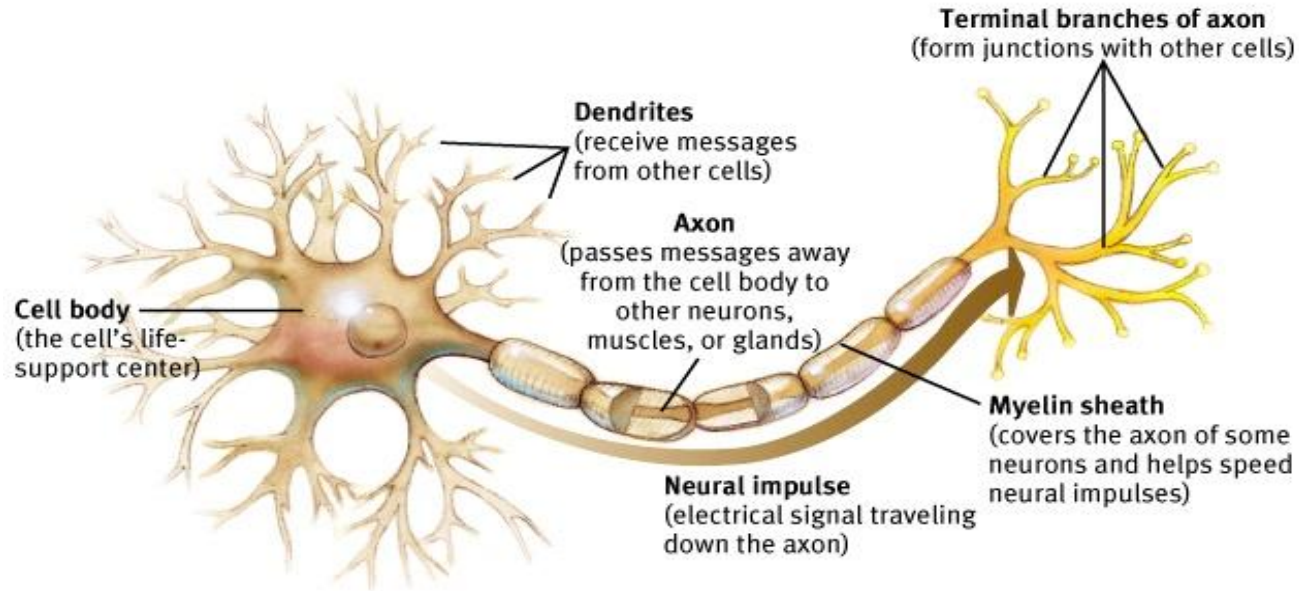
Do you remember the basic parts of a Neuron?
See if you can match the names (right) to the
function.

- Cell body
- Dendrites
- Axon
- Myelin Sheath



Warm Up

Check how you did!



Lesson Activity

As you read, answer the questions on a separate google doc titled: Lesson #11 April 6 Neurons

1. What are the 3 basic parts of every neuron?
2. What is the difference between afferent and efferent neurons?
3. What is an interneuron?
4. Explain how neurons are involved in the process of raising your hand to answer a questions.

Lesson Activity

Neurons

Messages to and from the brain travel along the nerves, which are strings of long, thin cells called **neurons** (see Figure 6.2). Chemical-electrical signals travel down the neurons much as flame travels along a firecracker fuse. The main difference is that the neuron can fire (burn) over and over again, hundreds of times a minute.

Transmission between neurons, or nerve cells, occurs whenever the cells are stimulated past a minimum point and emit a signal. The neuron is said to fire in accord with the all-or-none principle, which states that when a neuron fires, it does so at full strength. If a neuron is not stimulated past the minimum, or threshold, level, it does not fire at all.

neurons: the long, thin cells of nerve tissue along which messages travel to and from the brain

Lesson Activity

Basic Parts of a Neuron Neurons have three basic parts: the cell body, dendrites, and the axon (see Figure 6.2). The cell body contains the nucleus and produces the energy needed to fuel neuron activity. The *dendrites* are short, thin fibers that stick out from the cell body. Dendrites receive impulses, or messages, from other neurons and send them to the cell body. The *axon* is a long fiber that carries the impulses away from the cell body toward the dendrites of the next neuron. Axons can be very short or several feet in length.

A white, fatty substance called the *myelin sheath* insulates and protects the axon for some neurons. In cases of multiple sclerosis, the myelin sheath is destroyed, and as a result, the behavior of the person is erratic and uncoordinated. The myelin sheath also speeds the transmission of impulses. Small fibers, called *axon terminals*, branch out at the end of the axon. Axon terminals are positioned opposite the dendrite of another neuron.

The Neuron Connection If you look closely at Figure 6.2, you can see that there is a space between the axon terminals of one neuron and the dendrites of another neuron. This space between neurons is called the **synapse**. The synapse is a junction or connection between the neurons (see Figure 6.3). A neuron transmits its impulses or message to another neuron across the



Reading Check

What are the three basic parts of a neuron?

synapse: the gap that exists between individual nerve cells

Lesson Activity

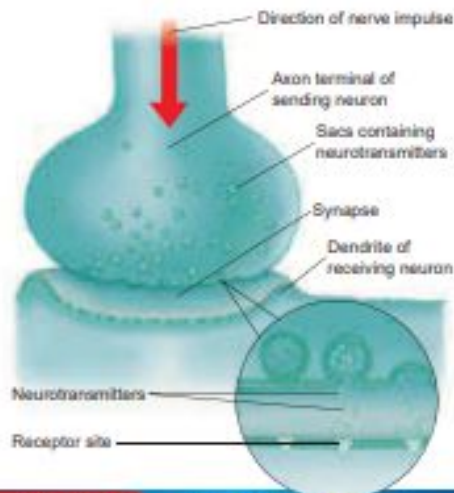


Figure 6.3 The Synapse

Neurons do not touch one another. Instead, a neuron sends its messages across a gap called a synapse by releasing neurotransmitters. These neurotransmitters are received by the dendrite of another neuron. **How are neurons involved in sending a message to the brain to raise your arm to answer a question?**

neurotransmitters: the chemicals released by neurons, which determine the rate at which other neurons fire

synapse by releasing chemicals called **neurotransmitters**. These neurotransmitters open chemical locks or excite the receptors. The neurotransmitters can excite the next neuron or stop it from transmitting (inhibition). The neurotransmitters are like the valves in a water system that allow flow in only one direction. There are many different neurotransmitters; for example, *norepinephrine* is involved with memory and learning, and *endorphin* inhibits pain. The oversupply or undersupply of certain neurotransmitters has been linked to certain diseases. For instance, an undersupply of *acetylcholine*, a neurotransmitter involved in movement and memory, is associated with paralysis and Alzheimer's disease. An oversupply of *dopamine*, involved in learning, emotional arousal, and movement, is linked to schizophrenia, while an undersupply is linked to Parkinson's disease. An undersupply of norepinephrine and *serotonin* may result in depression.

Neuron Activity The intensity of activity in each neuron depends on how many other neurons are acting on it. Each individual neuron is either ON or OFF, depending on whether most of the neurons acting on it are exciting it or inhibiting it. The actual destination of nerve impulses produced by an excited neuron, as they travel from one neuron to another, is limited by what tract in the nervous system they are on. Ascending tracts carry sensory impulses to the brain, and descending tracts carry motor impulses from the brain. There are different types of neurons. The *afferent* neurons, or sensory neurons, relay messages from the sense organs (including eye, ear, nose, and skin) to the brain. The *efferent* neurons, or motor neurons, send signals from the brain to the glands and muscles. The *interneurons* carry impulses between neurons in the body.

Lesson Activity (Answer Key)

Read the images on the previous page and answer the questions on a separate google doc titled: Lesson #11 April 6 Neurons

4. Your sensory organ collects the information and afferent neurons send the message to the brain where it is processed. The brain then sends messages through efferent neurons to your arm to raise your hand.

1. What are the 3 basic parts of every neuron? **Cell Body, Axon, Dendrites**
2. What is the difference between afferent and efferent neurons?**Afferent-sensory neurons;relay messages from sense organs to brain**
Efferent-motor neurons; send signals from brain to glands and muscles
3. What is an interneuron? **The place messages are carried between neurons**
4. Explain how neurons are involved in the process of raising your hand to answer a questions.

Reflection

All neurons are made up of the same basic parts, yet have specific functions. Think of why this is important, and why certain areas might have more neurons (such as the brain) compared to other areas (like your elbow).

Additional Resources

[Crash Course Psychology: The Chemical Mind](#)