

INTEGRATING BIOLOGY**● The Brain's Signals**

Human beings send signals to each other in a variety of ways. With today's technology, electricity is commonly used to send signals, as with telephones and e-mail. Interestingly, signals inside our body are sent through electric impulses, which are tiny jolts of electricity.

Signals Travel Constantly to and from the Brain

Your brain is constantly sending and receiving signals from the rest of your body. These signals control voluntary and involuntary muscle movement, chemical production, and much more. At the same time, your brain is constantly receiving signals, such as visual and auditory stimuli, and information about what your body is doing. Within the brain, billions of cells send signals to each other. Without these signals you would not be able to think at all.

Neurons are one of the major types of cells in the brain. Their function is to gather and communicate information to the nervous system. There are several types of neurons, but they all have some features in common. All of them consist of a main body containing the nucleus and one or more branches called axons that extend from the body. The axons carry electric impulses.

Electrifying Neurons

In fact, one neuron can be connected to over 15,000 others! Neurons have a voltage across their membranes, which allows them to transmit electrical signals to other neurons. These signals can travel along the brain's passages at speeds up to 100 meters per second. And many neurons fire—send signals—at the rate of about 100 signals per second.

The body also contains receptor cells, which gather different types of external information from the surroundings. Photoreceptors, for instance, gather light. The receptors then pass that information to the neurons, which carry it to the nervous system.

Your Turn to Think

1. What is the function of neurons?
2. Name the part of the neuron that is connected to other neurons.
3. Name a type of information that is gathered by receptors in the skin.