

Module 4 – SCI Biology Part I: How an SCI Causes Loss of Function

The Parts of a Neuron

The human brain and spinal cord contain over 100 billion neurons. These specialized cells transmit information between the brain and body by passing chemical and electrical signals to each other in a chain. It's similar to a relay race, except that each neuron can have thousands of relay partners, as we will discuss in the next video.

Neurons can be classified by their function. Sensory neurons send information about sensations toward the CNS. Motor neurons send instructions to move from the CNS toward muscles and organs.

Neurons have specialized structures that enable them to receive and send information quickly. At one end are tree-like structures called dendrites, which receive chemical signals and transmit them toward the cell body, or "soma," which is the neuron's headquarters.

The signal travels away from the soma in the form of an electrical signal, called an impulse, through a fiber called the axon. At its other end, the axon branches into the axon terminals, which transmit the signal to the dendrites of the next neuron in the relay.

In the spinal cord, the gray matter contains the majority of neuron somas, while the axons are found in the white matter. Depending on the type of neuron, axons vary in length. Some are very short, but axons that run from the brain to the lower part of the spinal cord can be a meter long.

When there is an injury to a neuron with a long axon that is responsible for carrying information a long distance through spinal cord, it is especially challenging to repair the damage and restore function. We will talk more about that in the Neurorepair Module, which focuses on a type of research that seeks to repair damaged axons.

Next, let's talk in more detail about how neurons transmit signals.