

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

Structure and Function of the Central Peripheral System

The peripheral nervous system consists of neurons that branch out from the spinal cord and transmit information back and forth between our brain and our eyes, ears, nose, mouth, skin, muscles and internal organs.

The location where these neurons connect to the spinal cord correspond to the parts of the body they communicate with.

Nerves that exit from the segments of the spine in the neck, called the cervical region, carry signals to and from the head, neck, diaphragm, shoulders, and parts of the arms, wrist and hand. The cervical region includes the seven vertebrae from C1 through C7, and the eight nerves from C1 through C8.

Nerves that exit from the segments of the spine in the area of our ribs, called the thoracic region, carry signals to and from the hand, chest and abdomen. The thoracic region includes the twelve vertebrae and nerve roots T1 through T12

Nerves that exit from the segments of the spine in the lower back, called the lumbar region, which extends from L1 through L5, carry signals to and from the hips, thighs, groin, and lower abdomen.

Finally, nerves that exit from the segments of the spine nearest the pelvis, called the sacrum, which extends from S1 through S5, carry signals to and from the posterior thigh, most of the lower leg and foot, and part of the pelvis.

The peripheral nervous system also controls involuntary processes in the body called autonomic functions. For example, some of the autonomic nerves that exit the spine in the cervical and thoracic regions regulate body temperature and blood pressure, while autonomic nerves that exit the spine in the sacrum control bowel and bladder function.

Injury to the spinal cord generally interrupts communication between the brain and the parts of the body that are below the site of injury.

Information that researchers have learned about the ways that neurons and glial cells function in the CNS and the peripheral nervous system are guiding SCI research. The next series of videos will explain more about how these cells work.