12.1: Introduction to the Central and Peripheral Nervous System

Chapter Learning Objectives

After studying this chapter, you will be able to:

- Describe the structures that support and protect the brain and spinal cord
- Identify the regions and anatomical landmarks of the brain and spinal cord
- Describe the functions of the regions of the cerebrum, diencephalon, brainstem, cerebellum and limbic system
- List the cranial nerves in order of anatomical location and provide the central and peripheral connections
- List the spinal nerves by vertebral region and by which nerve plexus each supplies

Fresh, unstained nervous tissue can be described as gray or white matter, and within those two types of tissue it can be very hard to see any detail. However, as specific regions and structures have been discovered, they were related to specific functions. Understanding these structures and the functions they perform requires a detailed description of the anatomy of the nervous system, delving deep into what the central and peripheral structures are. While the structures are discovered thanks to dissections of cadavers, the functions of the individual part of our nervous system are gathered by lesion case studies which are part of cognitive neuroscience. In these studies, injuries or illnesses of the nervous system are studied to understand the relationship between the injured area and the function of it. The first, and most known, lesion case is the one of Phineas Gage (Figure \(\PageIndex{1}\)), an American railroad worker. Phineas Gage was working on a railroad when an iron rod he was using exploded and went through his head, damaging the left prefrontal cortex. He survived the accident, but according to second-hand accounts, some aspects of his personality changed, suggesting that the prefrontal cortex is an area of the brain responsible for personality.

In this chapter, you will look at the structures that make the central and peripheral nervous system and correlate them with their functions. The central nervous system includes the brain and spinal cord, while the peripheral nervous system...
includes the cranial and spinal nerves, as well as the ganglia. First, you will take a look at how these structures are protected and supported.

Figure 1: Phineas Gage. Phineas Gage was a railroad constructor of the 19th century who lost part of his left frontal lobe to an explosion where an iron rod went through his brain. (Image credit: "Phineas Gage Cased Daguerreotype WilgusPhoto2008-12-19 EnhancedRetouched Color" by Jack and Beverly Wilgus, Warren Anatomical Museum is licensed under CC BY-SA 3.0)

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