The Nervous System (p.73)

* Acts as the body’s central command center
* 2 basic functions

1. Gathers and interprets information
2. Responds to that information, as needed

* Has 2 parts

1. Central Nervous Systems (CNS) – which processes and responds to all messages coming from the Peripheral Nervous System
2. Brain
3. Spinal cord
4. Peripheral Nervous System (PNS) – which connects all parts of the body to the CNS
5. All parts of the nervous system except for the brain and the spinal cord
6. Nerves carry information between your body and your CNS

Peripheral Nervous System

1. Messages travel along neurons
2. Neuron – a nerve cell that is specialized to transfer messages in the form of fast-moving electrical energy
3. Electrical messages are called impulses. They may travel as fast as 150 m/s or as slowly as 0.2 m/s
4. Neuron structure
5. Cell body – large central region in its center and has cell nucleus and organelles
6. Dendrite – short branched extensions of the cell. This is where the neurons receive information from other cells. Many dendrites allow neurons to receive impulses from thousands of cells
7. Axon – elongated extension of a neuron. Allows impulses to be carried away from the cell body and passed to other cells. Axons can be very short or very long (1 m). The end often has branches to pass on info to other cells. The tip of each branch is called an axon terminal
8. Types of neurons
9. Sensory neuron – gather info about what is happening in or around the body using receptors = specialized nerve endings that detect changes inside and outside of the body and send the info to the CNS
10. Motor neuron – send impulses from the CNS to other systems. When muscles get impulses from motor neurons, they contract. When sweat glands receive impulses, they produce sweat.

Nerves – a collection of axons bundled together with blood vessels and connective tissue

1. They are everywhere in your body
2. Most nerves have axons of both sensory neurons and receptor neurons

Within the motor part of the PNS are two systems

1. Somatic Nervous System
2. Most neurons are under your conscious control. Voluntary control, such as walking, smiling
3. Autonomic Nervous System
4. Neurons do not need your conscious control. Involuntary control of functions that you do not think about, like breathing or digestion. It has 2 divisions
5. Sympathetic nervous system
6. Parasympathetic nervous system
7. They work together to maintain homeostasis

Central Nervous System

Receives info from sensory neurons and responds through motor neurons

1. Brain – largest organ in the nervous system and controls involuntary and voluntary. Has 3 main parts
2. Cerebrum – largest part of the brain
3. Dome-shaped
4. Where you think and where your memories are stored
5. Controls voluntary movements and allows you to sense touch, light, sound, odors, taste, pain, heat, and cold
6. Has 2 halves called hemispheres

a. left hemisphere controls right side of the body and activities such as speaking, reading, writings, and solving problems

b. right hemisphere controls left side of the body and activities such as spatial thinking, processing music, and interpreting emotions.

1. Cerebellum – second-largest part of the brain

1. beneath the back of the cerebrum

2. Processes sensory information from your body which allows the brain to keep track of your body’s position. If you begin to lose your balance, the cerebellum sends impulses telling different skeletal muscles to contract and keep you from losing your balance

1. Medulla – about 3 cm long; connects to your spinal cord. You can’t live without it.

1. Controls involuntary processes such as blood pressure, body temperature, heart rate, and involuntary breathing

2) Spinal cord – about as big around as your thumb. Made of neurons and bundles of axons that pass impulses to and from the brain

A) Surrounded by protective bones called vertebrae

B) Nerve fibers in spinal cord allow your brain to communicate with your peripheral nervous system

C) A spinal cord injury may block all information to and from the brain