



THE NERVOUS SYSTEMS

MIDDLE SCHOOL SCIENCE

LEARNING OBJECTIVES

- Understand and Identify main parts of the nervous system.
- Explain areas of the nervous system and the differences within it connection
- Understand how neurons transmit signals.
- Understanding the Chemicals in the brain and how they interact with the Nervous System
- How to regulate the nervous system
- How certain thoughts and feelings impact our emotions within the body via the nervous system
- And so much more!

- The nervous system functions by using neurons, which are specialised cells that carry messages throughout the body.
- Neurons communicate using electrical and chemical signals. These signals travel along the neuron until they reach a synapse, which is a small gap between neurons.
- When the signal reaches the synapse, neurotransmitters or chemical messengers are released to carry the signal across the gap to the next neuron or muscle, allowing communication to continue.

The Autonomic Nervous System is divided into two parts:

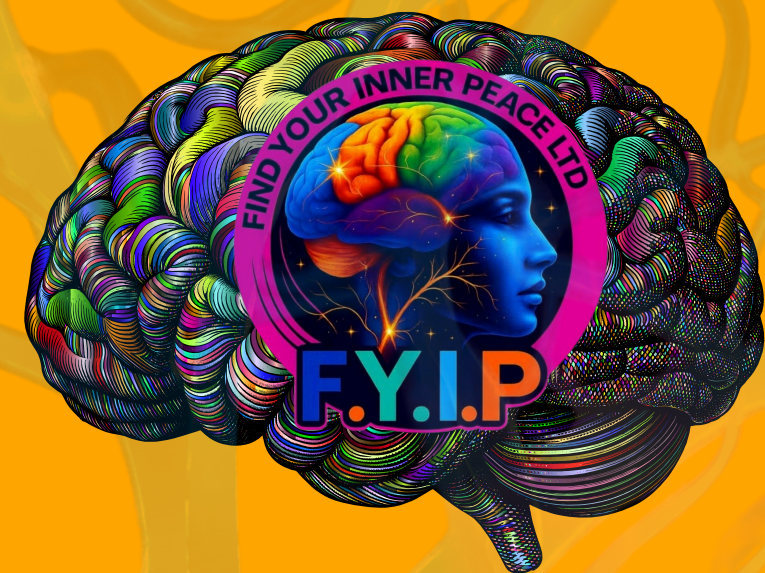
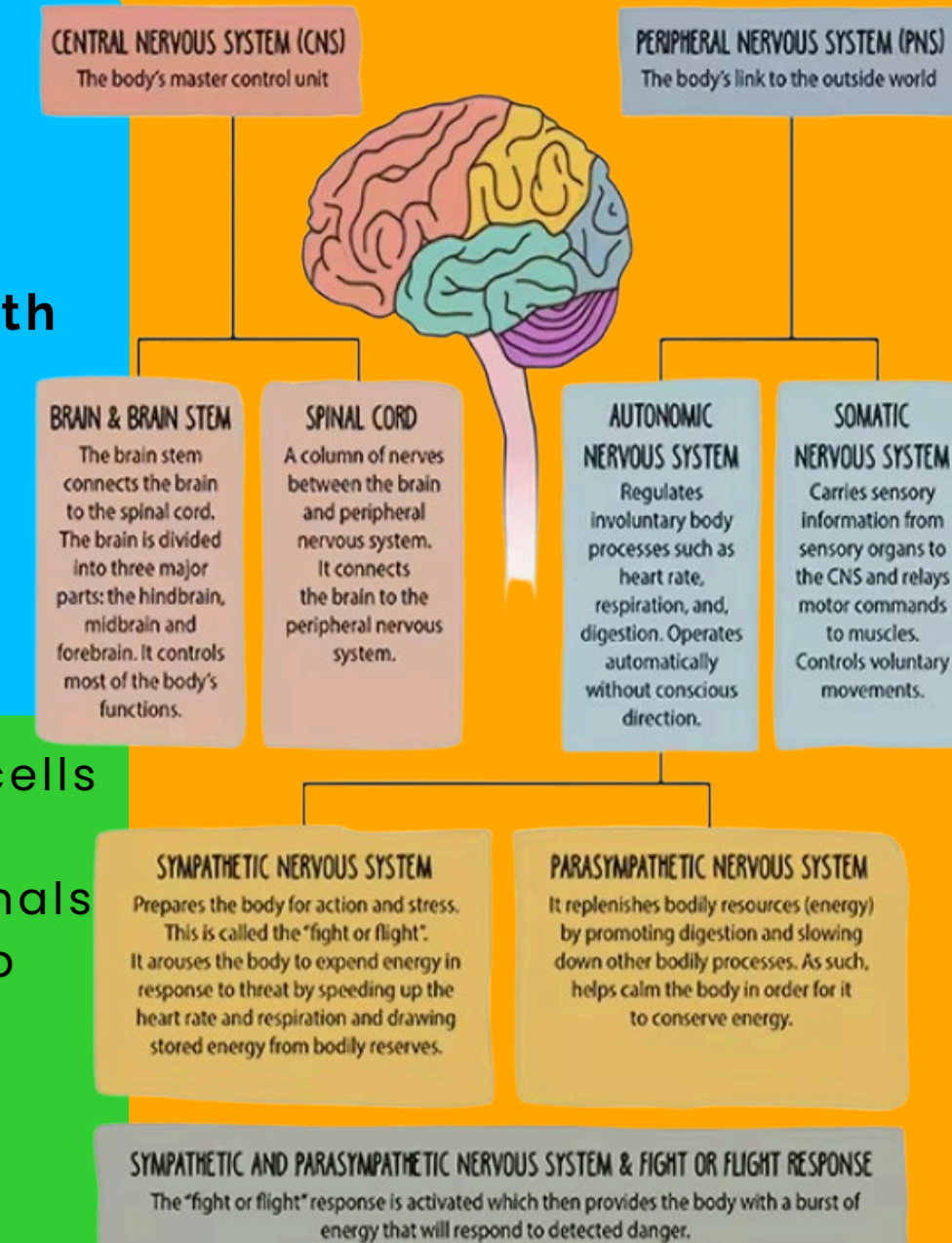
Sympathetic Nervous System:

- Prepares the body for stressful or emergency situations, also known as the "fight or flight" response.
- It increases heart rate, widens airways, and slows down digestion to give the body more energy and focus in dangerous or stressful moments.

Parasympathetic Nervous System:

- Helps the body relax and recover after stress. This is called the "rest and digest" response.
- It slows the heart rate, promotes digestion, and helps the body conserve energy.

HUMAN NERVOUS SYSTEM



WHAT IS THE NERVOUS SYSTEM?

The nervous system is one of the most important systems in your body because it acts as the control center and communication network. It allows you to interact with the world around you and keeps your internal body functions working smoothly.

Control Center

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Transmits Signals

Neurons carry electrical signals to and from your brain and spinal cord. These signals tell your muscles to move, let your brain know when you feel something (like hot or cold), and keep all your organs running properly.

Coordinates Actions

The nervous system helps different parts of your body work together by sending messages through specialized cells called neurons. These messages travel quickly, like signals moving through wires, allowing your body to respond immediately to changes around you.



TWO MAIN PARTS OF THE NERVOUS SYSTEM

The Central Nervous System CNS is like the command center of the body. It processes information and controls all the activities in your body, both voluntary like moving your hand and involuntary like breathing. The CNS is made up of two main parts the brain and the spinal cord.

The Peripheral Nervous System PNS is made up of all the nerves that are outside the CNS. These nerves branch out from the brain and spinal cord and reach all parts of your body like a network of telephone lines connecting every area to the main control center. The PNS connects your body to the CNS and plays a crucial role in sending and receiving signals



CENTRAL NERVOUS SYSTEM (CNS)

The CNS is made up of the brain and spinal cord

Brain:

- The brain is the control center for the entire body. It processes sensory information, thoughts, emotions, and controls body functions like movement.
- The brain is divided into different regions that handle specific tasks.

Spinal Cord:

- The spinal cord acts as a highway for information traveling between the brain and the body. It sends instructions from the brain to the body and carries sensory information back to the brain.
- It also coordinates reflexes, which are fast, automatic responses to stimuli.



PERIPHERAL NERVOUS SYSTEM (PNS)

The PNS is made up of all the nerves that branch out from the brain and spinal cord and extend to other parts of the body, like the arms, legs, and organs.

The PNS has two main divisions:

- **Somatic Nervous System:** Controls voluntary movements of the muscles and sends sensory information to the CNS.
- **Autonomic Nervous System:** Regulates involuntary functions like heart rate, digestion, and breathing.



AUTONOMIC SYSTEM: SYMPATHETIC & PARASYMPATHETIC

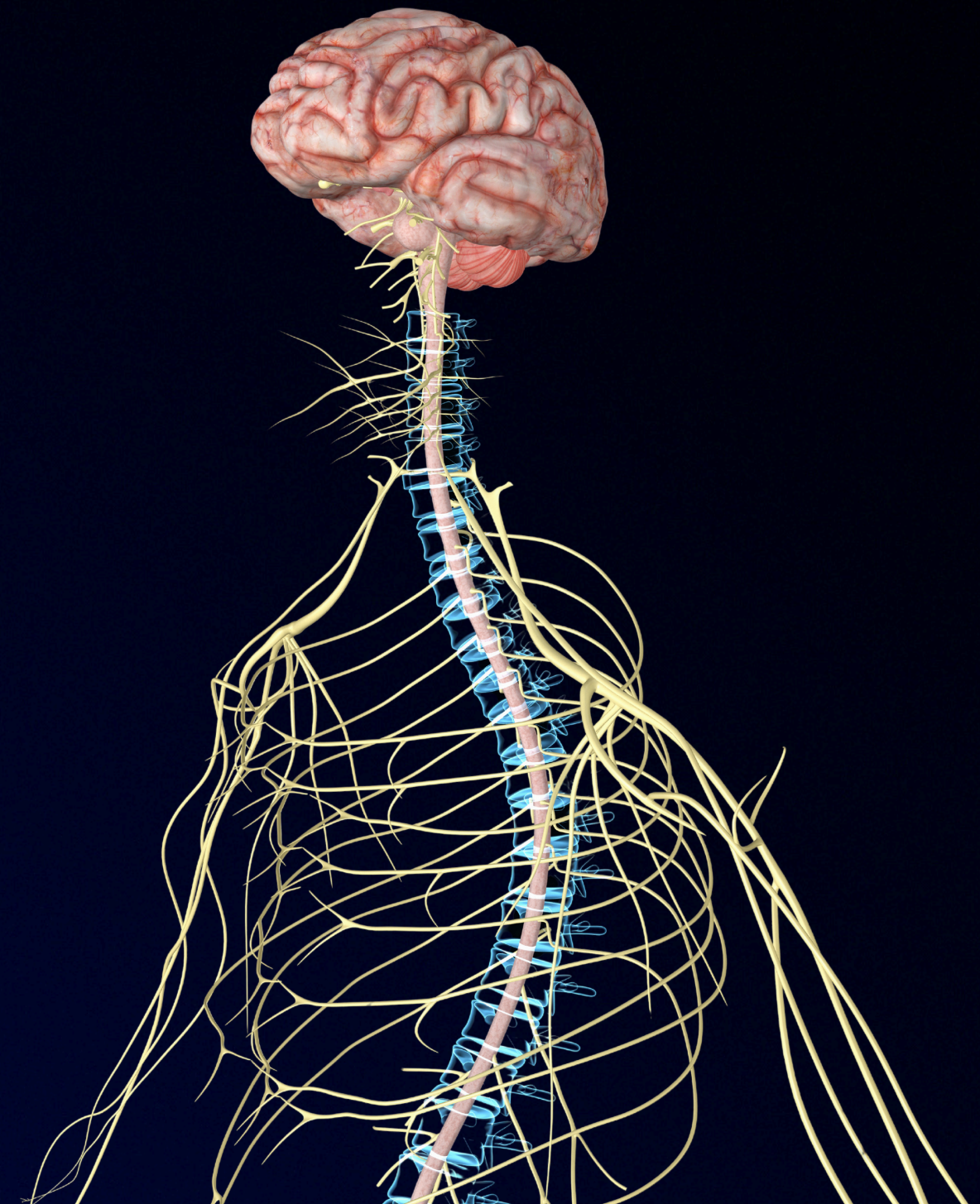
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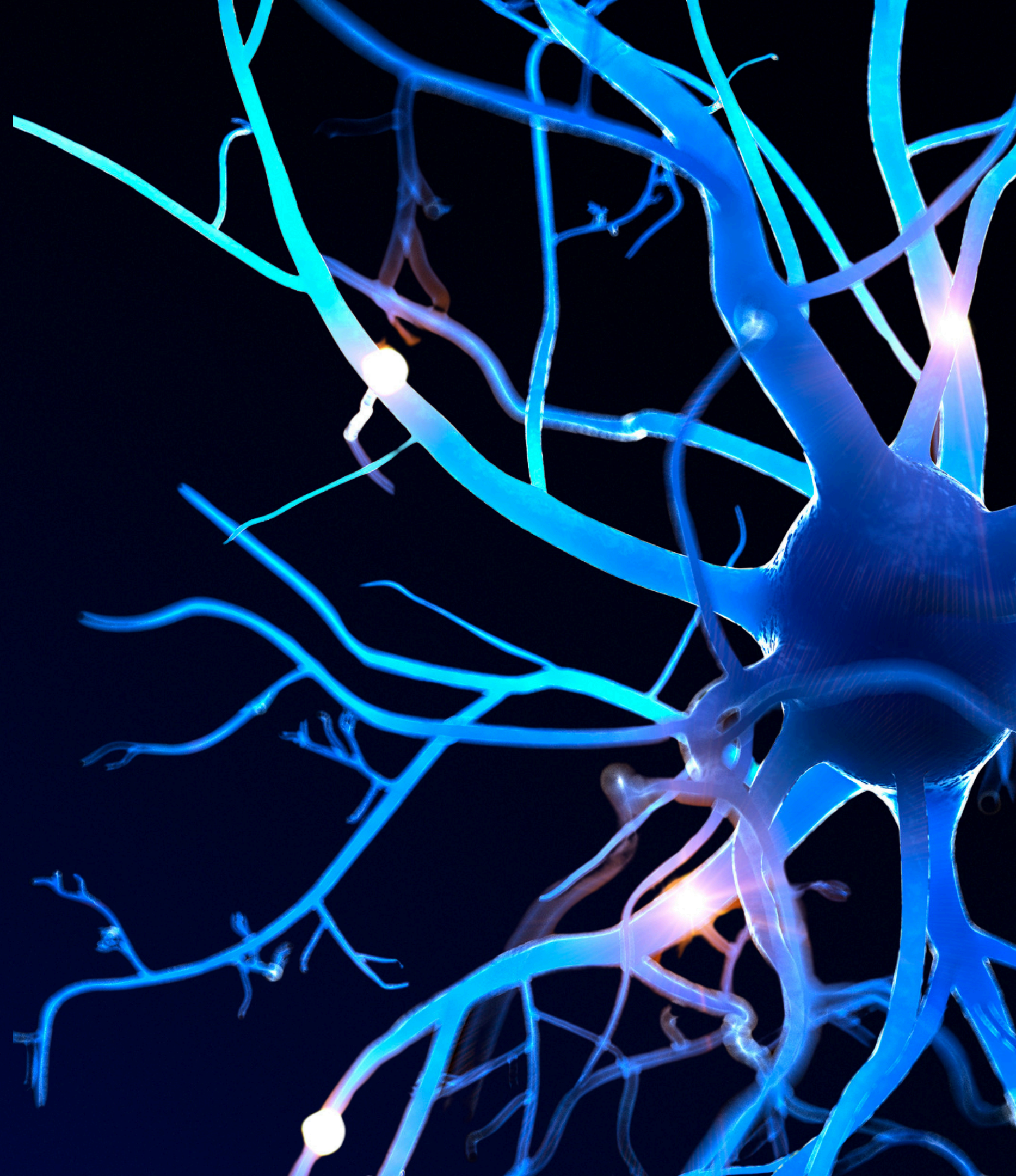
Parasympathetic Nervous System:

- Helps the body relax and recover after stress. This is called the "rest and digest" response.
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HOW THE NERVOUS SYSTEM WORKS

- The nervous system functions by using neurons, which are specialized cells that carry messages throughout the body.
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KEY FUNCTIONS OF THE NERVOUS SYSTEM

Sensory Input:

- The nervous system collects information from the external environment through sensory receptors for example your skin, eyes and ears.
- For example, if you touch something hot, sensory nerves send a signal to the brain.

Integration:

- The brain processes and interprets the sensory information to make decisions about how to respond.
- For instance, if the brain detects that something is hot, it will decide to move your hand away.

Motor Output:

- The nervous system sends signals to muscles or glands to make the body respond.
- For example, after touching something hot, your brain sends a signal to your hand muscles to pull away.



SUMMARY & IMPORTANCE

- The nervous system is essential for coordinating everything the body does, from thinking and feeling to moving and reacting.
- It keeps the body in balance or in homeostasis by controlling both voluntary actions, like moving your muscles and involuntary functions like breathing or digesting food.
- Key takeaway: Without the nervous system, we couldn't move, feel, think, or function properly. It's the control and communication system that keeps everything working together.

