

Peripheral Nervous System (PNS)

by Sophia Tutorial



WHAT'S COVERED

This tutorial will cover the peripheral nervous system and its component parts. Our discussion breaks down as follows:

1. Peripheral Nervous System Overview
2. Somatic Nervous System
3. Autonomic Nervous System
 - a. Sympathetic Nervous System
 - b. Parasympathetic Nervous Systems

1. Peripheral Nervous System

The nervous system is the body's communication system. It sends information to and from the brain and allows the control of the rest of the body in response. The nervous system is divided into two parts: the central nervous system, which consists of the brain and the spinal cord; and the peripheral nervous system.

The peripheral nervous system is the part of the nervous system that extends out from the brain and spinal cord to the rest of the body. Carrying motor and sensory information, it controls voluntary as well as involuntary behaviors and actions in the body.

The peripheral nervous system is divided into two parts:

- Somatic nervous system
- Autonomic nervous system

NERVOUS SYSTEM

PERIPHERAL NERVOUS SYSTEM



2. Somatic Nervous System

The **somatic nervous system** includes all of the nerves that connect to the sense organs and the skeletal muscles within the body. It controls all of the voluntary behavior and the motor neurons, which help to move the body. These motor neurons allow for actions, like drawing, jumping, running, and anything that we control directly.

Motor neurons can also control involuntary reactions, those called the **reflex arc**, which are simple, automatic responses to stimuli in the world.

🔗 **EXAMPLE** When you go to the doctor's office and they hit your knee to see if your knee reacts very quickly, it's not an action that you necessarily control. The stimuli, the hitting of the knee, sends a reaction--not directly to your brain, but rather just to your spinal cord. The spinal cord is where reflex arcs are controlled. Then, that response is sent right back to your leg more quickly than if it had to go directly to your brain, and this is what allows your knee to give a quick, reflexive jerk.

Sensory neurons are also controlled in the somatic system, which is responsible for smell, taste, sight, as well as the skin for touch. As you can see, the somatic system covers quite a lot of ground.



TERMS TO KNOW

Somatic Nervous System

Nerves connected to the sense organs and skeletal muscles, which control voluntary movement, reflexes, and sensory neurons

Reflex Arc

Simple, automatic responses to stimuli

Sensory Neurons

Neurons that send information to brain from sense organs

3. Autonomic Nervous System

The **autonomic nervous system** includes all of the nerves within the rest of the body that connect to the internal organs. They control all of the internal involuntary body functions like breathing, which we can control voluntarily but that generally is something that we do automatically, outside of our control. These nerves also control functions like heart rate and digestion.



HINT

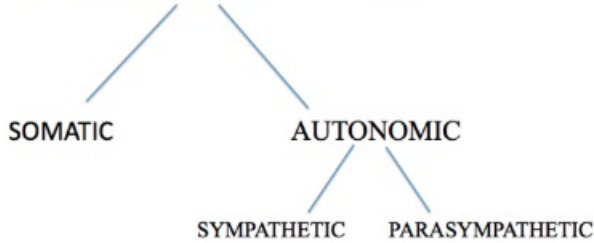
The name itself, "autonomic," looks a little bit like the word "automatic", which may help you remember that this system is responsible for automatic, involuntary reactions.

The autonomic nervous system is further subdivided into two different parts:

- Sympathetic nervous system
- Parasympathetic nervous system

NERVOUS SYSTEM

PERIPHERAL NERVOUS SYSTEM



TERM TO KNOW

Autonomic Nervous System

Nerves connected to internal organs, which control internal, involuntary body functions (like breathing, heart rate, and digestion)

3a. Sympathetic Nervous System

The **sympathetic nervous system** controls any body responses that are related to fight or flight. This is a protective response that kicks in when you feel like you're in danger.

The sympathetic branch of the autonomic nervous system is responsible for the following responses:

- Increase in heart rate
- Dilation of pupils
- Release of adrenaline
- Halt in digestion
- Release of the bladder



EXAMPLE When you feel threatened, perhaps your heart beats faster or your palms sweat. This is a result of the sympathetic nervous system. Sometimes, people get so excited that they might throw up or accidentally urinate themselves. This is also the sympathetic nervous system in action.



TERM TO KNOW

Sympathetic Nervous System

Controls body responses related to “flight or fight” response, when feel like we are in danger

3b. Parasympathetic Nervous System

While the sympathetic nervous system excites the body, the **parasympathetic nervous system** keeps it at a normal level. It decreases the body from an excited state to a lesser level and helps to maintain the body after danger has passed.

The parasympathetic branch of the autonomic nervous system:

- Constricts pupils

- Stimulates digestion to get you back on track
- Slows the heart rate
- Makes you feel more calm

➞ **EXAMPLE** Suppose someone is driving too close behind you and honking the horn. Once they turn off, you take a deep breath and your hands are no longer sweaty. This is a result of the parasympathetic nervous system.



TERM TO KNOW

Parasympathetic Nervous System

Helps to maintain normal body functions and calm it down when excited by the sympathetic nervous system



SUMMARY

This tutorial covered the breakdown of the **peripheral nervous system** into its component parts: the somatic and autonomic systems. The **somatic nervous system** handles all the actions we do with voluntary, direct control, such as drawing or jumping, while the **autonomic nervous system** is responsible for involuntary reactions, such as the knee jerk and breathing.

The autonomic system is further broken down into the **sympathetic nervous system**, which is responsible for exciting the body related to flight or fight responses, and the **parasympathetic nervous system**, which calms the body down and helps to maintain normal body functions.

Good luck!

Source: This work is adapted from Sophia author Erick Taggart.



TERMS TO KNOW

Autonomic Nervous System

Nerves connected to internal organs, which control internal, involuntary body functions (like breathing, heart rate, and digestion).

Parasympathetic Nervous System

Helps to maintain normal body functions and calm it down when excited by the sympathetic nervous system.

Reflex Arc

Simple, automatic responses to stimuli.

Sensory Neurons

Neurons that send information to brain from sense organs.

Somatic Nervous System

Nerves connected to the sense organs and skeletal muscles, which control voluntary movement, reflexes, and sensory neurons.

Sympathetic Nervous System

Controls body responses related to “flight or fight” response, when feel like in danger.