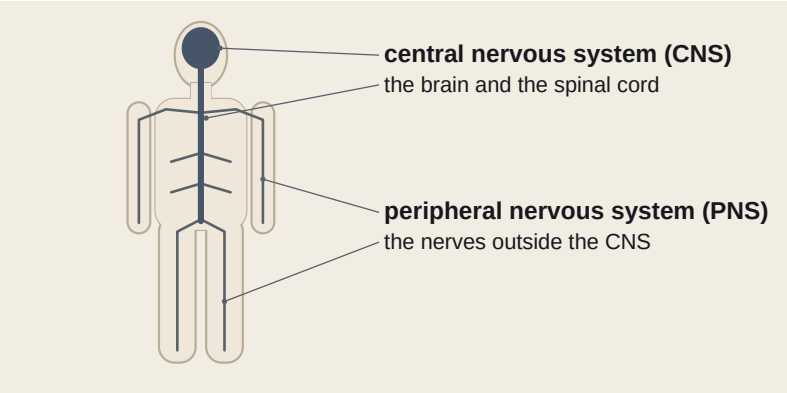
A5 · How the nervous system is organized · Completed notes

Goals: Name the parts of the central and the peripheral nervous system. Tell voluntary control from involuntary control. Say what the sensory-somatic and the autonomic nervous systems control. Compare the effects of the sympathetic and parasympathetic nervous systems. Predict the effect of the autonomic nervous system on an organ.

These are the completed notes. The blanks are filled in and each question is worked.

Slide 1 of 5 · Two main parts: the CNS and the PNS

In lessons A1 to A4 you studied one neuron and one synapse. Today you step back and see how the whole nervous system is organized.



Key ideas

The **central nervous system** is the brain and the spinal cord.

The **peripheral nervous system** is the nerves outside the brain and spinal cord.

Interneurons are found only in the central nervous system.

Example

Is a nerve in your leg part of the CNS or the PNS? Explain.

1. The CNS is the brain and the spinal cord only.
2. A nerve in the leg is outside them.
3. It is part of the PNS.

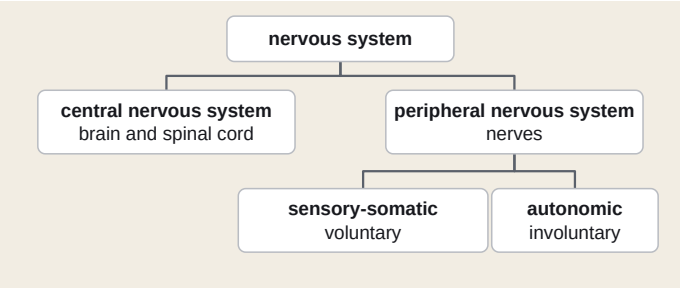
Try it

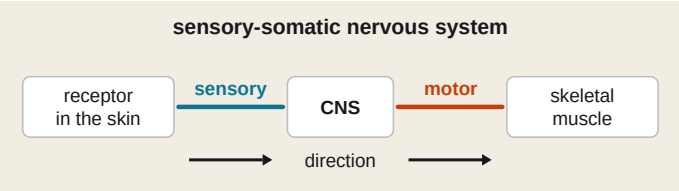
Name the two parts of the central nervous system.

1. The brain.
2. The spinal cord.

Slide 2 of 5 · The sensory-somatic nervous system

On the last slide, the peripheral nervous system was all the nerves outside the CNS. Those nerves do two different jobs.





Key ideas

An action you choose to do is **voluntary**. An action you do not choose is **involuntary**.

The **sensory-somatic nervous system** is the voluntary part.

Its motor neurons carry nerve impulses to **skeletal muscles**.

Example

Sort into voluntary or involuntary: kicking a ball, and your heart beating faster.

1. You choose to kick a ball: voluntary.
2. You do not choose your heart rate: involuntary.

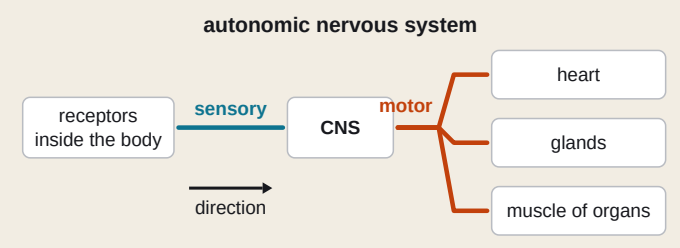
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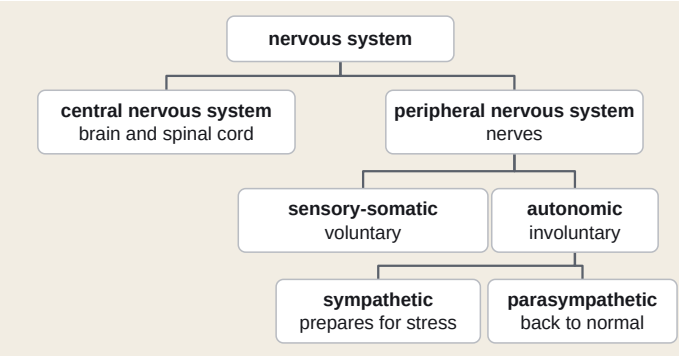
Name the effector that the sensory-somatic nervous system controls.

1. Its motor neurons run to skeletal muscles.
2. Skeletal muscles move the bones.

Slide 3 of 5 · The autonomic nervous system

On the last slide, the sensory-somatic nervous system controlled skeletal muscles, mostly by choice. Much of your body runs without any choice.





Key ideas

The **autonomic nervous system** is involuntary. It controls the heart, glands and organs.

The **sympathetic nervous system** prepares the body for stress.

The **parasympathetic nervous system** returns the body to normal.

Example

Name the part of the autonomic nervous system that acts when you are frightened.

1. Fright is a stress.
2. The sympathetic nervous system prepares the body for stress.

Try it

Name three things the autonomic nervous system controls.

1. The heart.
2. Glands.
3. The muscle of organs, such as the stomach.

Slide 4 of 5 · Sympathetic and parasympathetic effects

On the last slide, the autonomic nervous system had two parts with opposite effects. Here is what each part does.

Organ	Sympathetic	Parasympathetic
heart	heart rate goes up	heart rate goes down
digestive tract	peristalsis slows	peristalsis speeds up
liver	releases glucose	stores glucose
eyes	pupils dilate (widen)	pupils constrict (narrow)
adrenal gland	releases epinephrine	no effect

Key ideas

Under stress, the heart rate goes **up** and the pupils **dilate**.

Under stress, peristalsis in the digestive tract **slows**.

The sympathetic nervous system releases **norepinephrine** at the organ.

The parasympathetic nervous system releases **acetylcholine** at the organ.

Example

State what the parasympathetic nervous system does to the heart rate and to the pupils.

1. The heart rate goes down.
2. The pupils constrict.

Try it

Name the neurotransmitter each part of the autonomic nervous system releases at an organ.

1. Sympathetic: norepinephrine.
2. Parasympathetic: acetylcholine.

Slide 5 of 5 · Method: predict what the autonomic nervous system does to an organ

You do not need to memorize every row of the table. These four steps give the effect on any organ.

1. **Decide** if the body is under stress or at rest.
2. **Name** the system: stress is sympathetic, rest is parasympathetic.
3. **Ask** if the organ helps the body act right now.
4. **State** the effect: speed it up if it helps, slow it if not.



Check: the two systems have opposite effects on an organ.

Used again in: lessons A12 and A13

Key ideas

Step 1: decide if the body is under **stress** or at rest.

Step 2: stress is **sympathetic**. Rest is **parasympathetic**.

Step 3: ask if the organ **helps** the body act right now.

Step 4: state the effect on the organ.

Example

Use the four steps. A dog chases you. Predict what happens to your digestive tract.

1. The body is under stress.
2. The sympathetic nervous system acts.
3. Digesting food does not help you run.
4. Peristalsis slows.

Try it

Use the four steps. You rest after a large meal. Predict what happens to your heart rate.

1. The body is at rest.
2. The parasympathetic nervous system acts.
3. A fast heart is not needed at rest.
4. The heart rate goes down.