

4 - Control and Coordination

08 November 2021
15:17

Stimulus: a change in the environment: heat, cold, sound, smell,
e.g. seeing a snake, smelling gas, hearing a thud, feeling a touch
Response: the reaction to the stimulus.

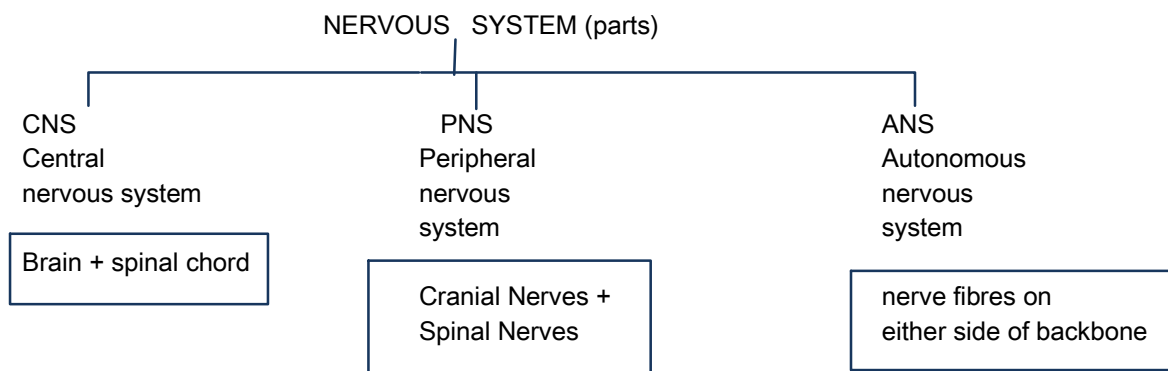
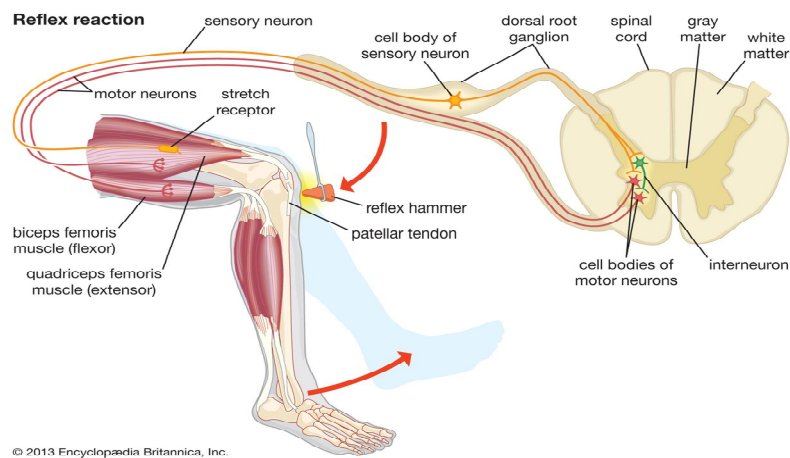
Nervous System: Communication System of the Body (Information Highway) . *It is a control system responsible for sending electrical messages called nerve impulses throughout body.*

Endocrine System: *glands that secrete chemical messengers called hormones directly into blood stream.*

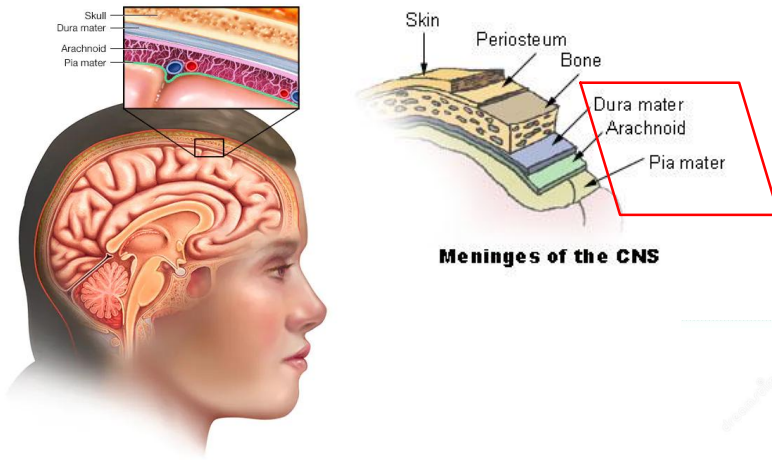
Response is coordinated by both Nervous system and Endocrine system.

Reflex Tests:

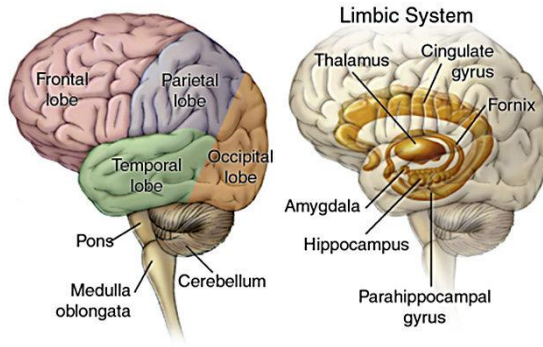
<https://stanfordmedicine25.stanford.edu/the25/tendon.html>



CNS : Central Nervous System (Brain + Spinal Cord)

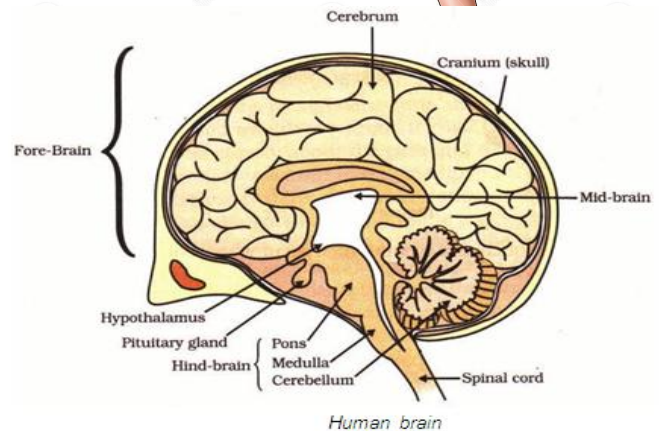
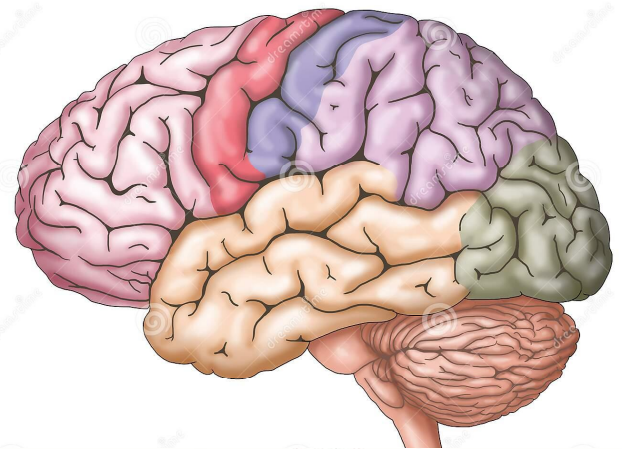


Anatomy of the Brain



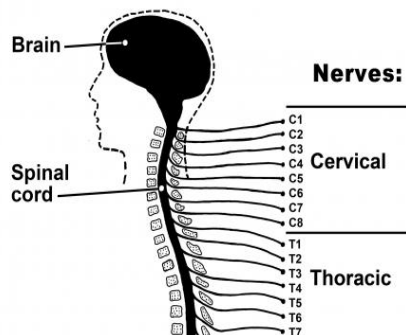
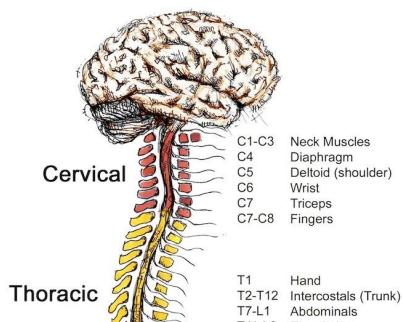
© 2000 by BrightFocus Foundation

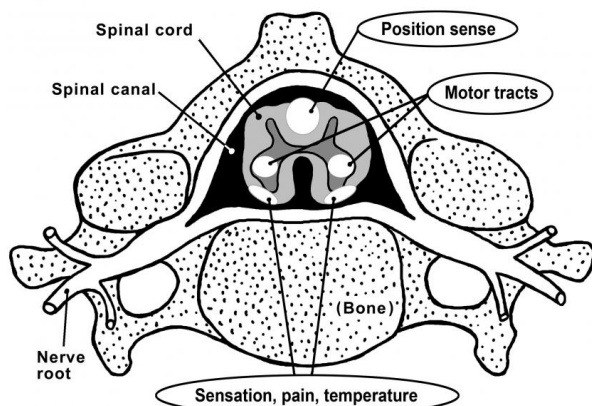
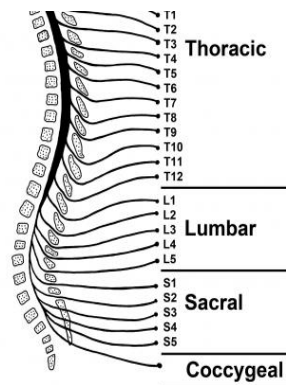
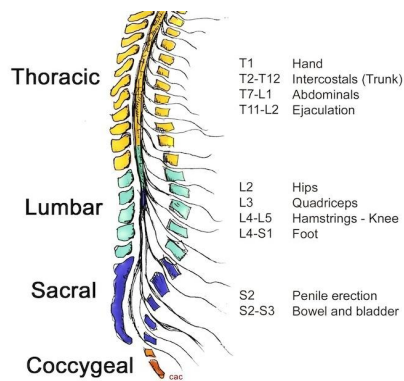
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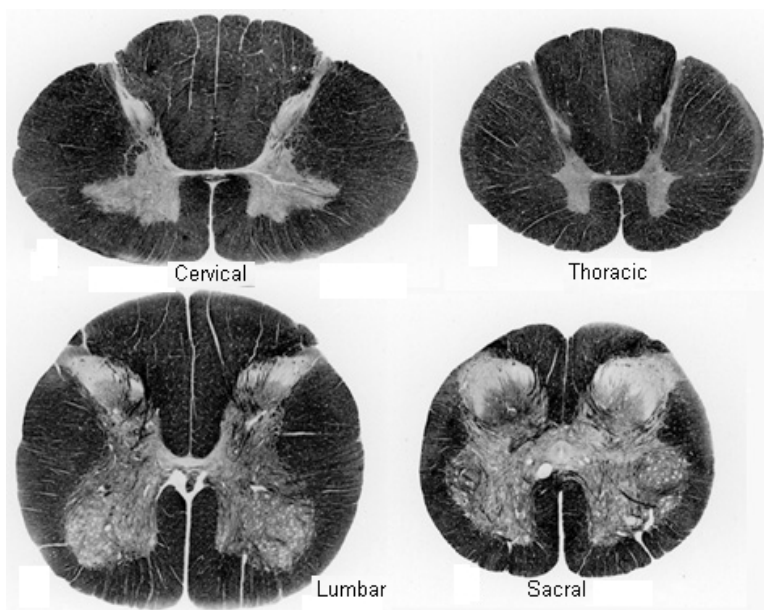
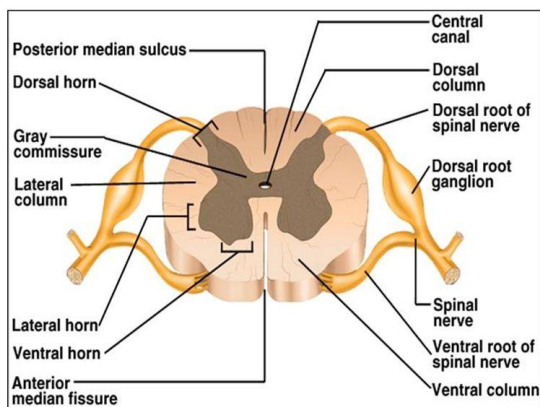
BRAIN TOUR: https://youtu.be/_aCCsRCw78g

Spinal Cord:



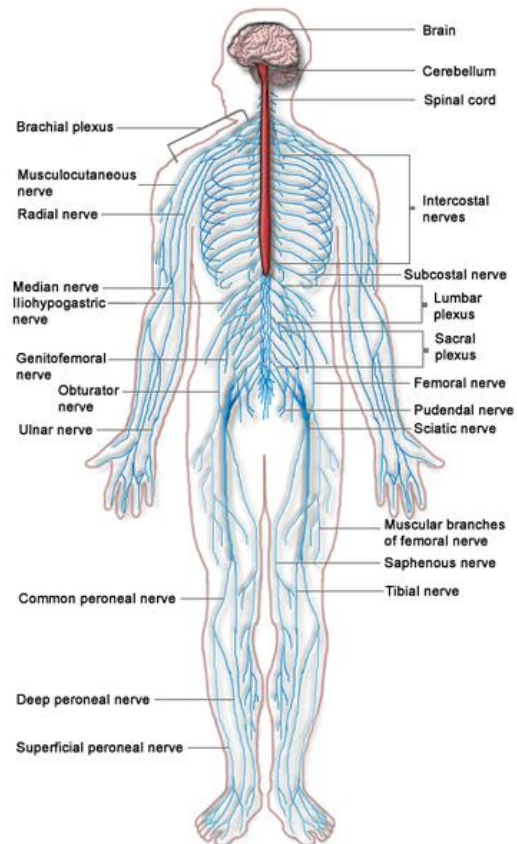


Labeled Spinal Cord Cross-section



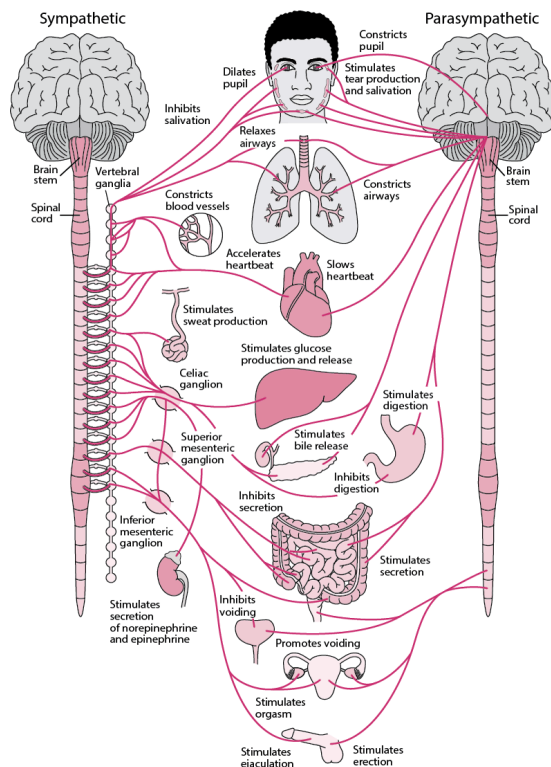
VFX Spinal cord: <https://youtu.be/qB6WPr5Jhc4>
 Actual Spinal Cord : <https://youtu.be/lAwk0pshcDE>
 Close up (10:20) : <https://youtu.be/AQ-XpRBZTn0>

PNS: Peripheral Nervous System



https://en.wikipedia.org/wiki/Peripheral_nervous_system

Autonomous Nervous System(ANS) :



So how many nerves all together?

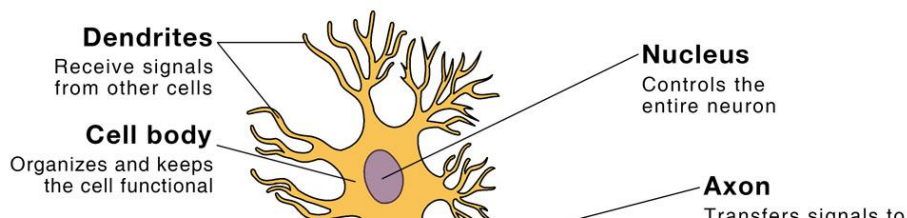
There are several hundred peripheral nerves throughout your body. The many sensory nerves that bring sensation from the skin and internal organs merge together to form the sensory branches of the cranial and spinal nerves.

The motor portions of the cranial nerves and spinal nerves divide into smaller nerves that divide into even smaller nerves. So one spinal or cranial nerve may divide into anywhere from 2 to 30 peripheral nerves.

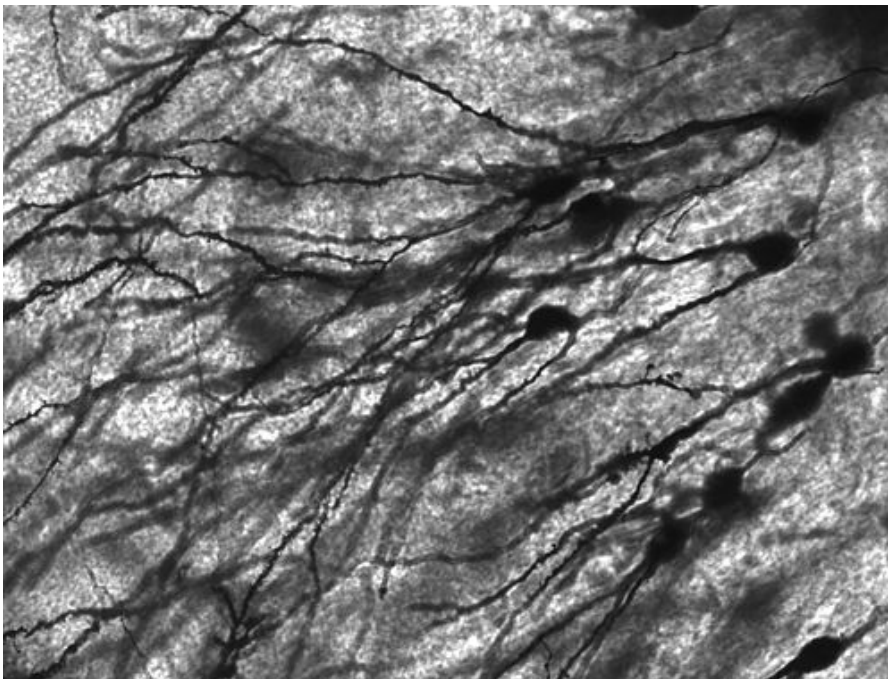
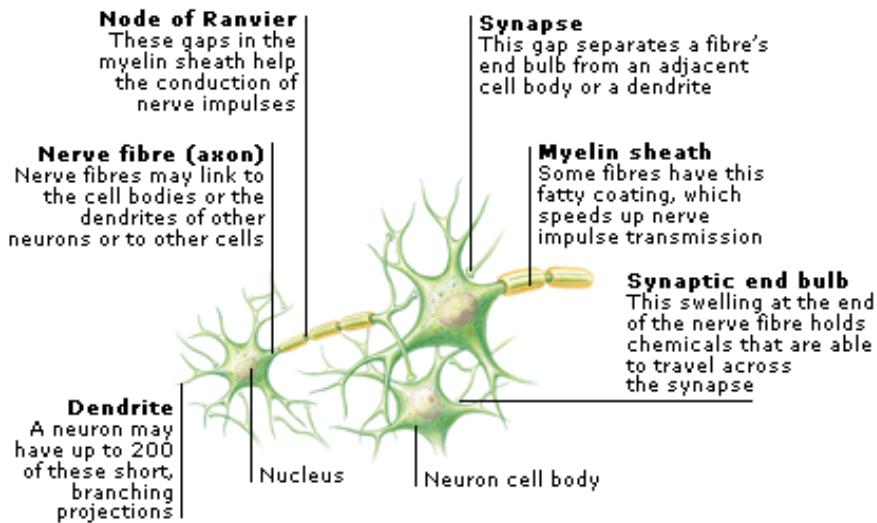
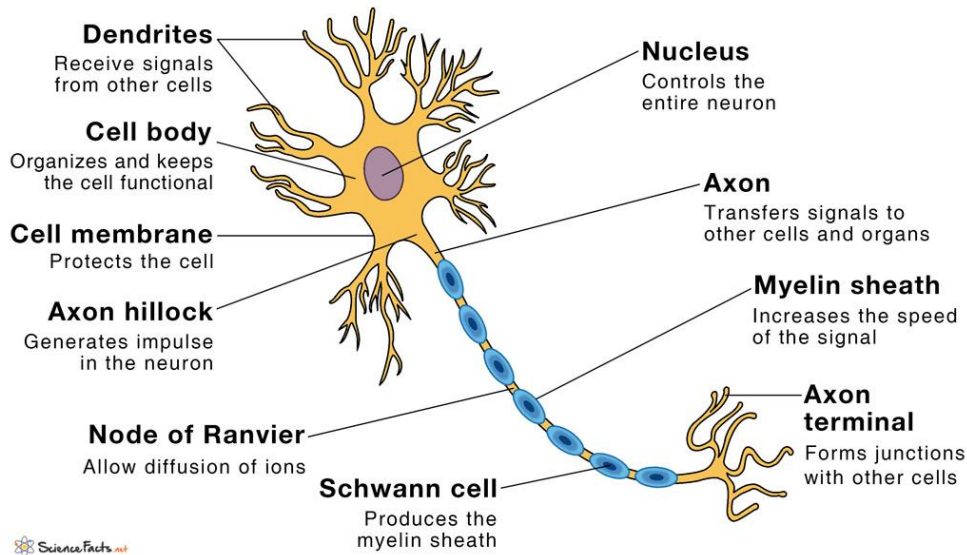
Pasted from <<https://www.healthline.com/health/how-many-nerves-are-in-the-human-body#in-the-body>>

NEURON :

Parts of a Neuron with Functions

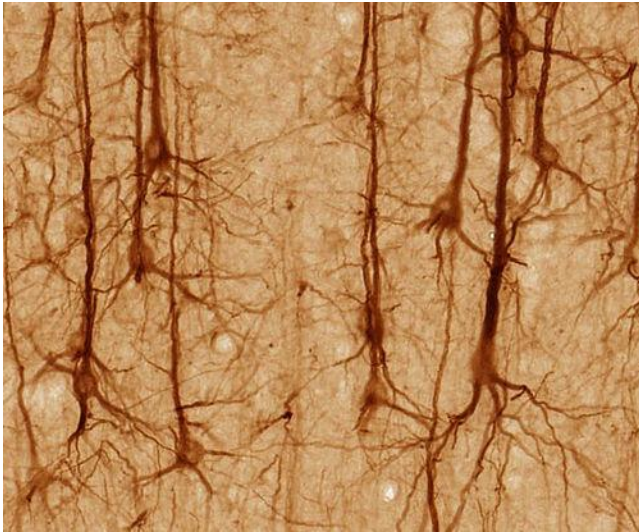


Parts of a Neuron with Functions



Golgi-stained neurons in human hippocampal tissue

Pasted from <<https://en.wikipedia.org/wiki/Neuron>>



SMI32-stained pyramidal neurons in [parietal cortex](#)

Pasted from <<https://en.wikipedia.org/wiki/Neuron>>

Size of Neurons:

The cell body of a motor neuron is approximately 100 microns in diameter.

The axon is about 1 meter .

Fun facts about the nervous system

1. The electrical impulses of nerves can be measured

In fact, during a nerve impulse a net change of [about 110 millivoltsTrusted Source](#) occurs across the axon's membrane.

2. Nerve impulses are fast

They can travel at a speed of up to [100 meters per secondTrusted Source](#).

3. Neurons don't undergo cell division

That means that if they're destroyed they can't be replaced. That's one of the reasons why injuries to the nervous system can be so serious.

4. You don't actually use just 10 percent of your brain

Your brain is divided up into [different parts](#), each with different functions. Integration of these functions helps us to perceive and react to internal and external stimuli.

5. Your brain uses a lot of energy

Your brain weighs about three pounds. This is small in comparison to your overall body weight, but according to the Smithsonian Institute, your brain gets [20 percent](#) of your oxygen supply and blood flow.

6. Your skull isn't the only thing that protects your brain

A special barrier called the blood-brain barrier prevents harmful substances in the blood from entering your brain.

7. You have a multitude of neurotransmitters

Since the first neurotransmitter was discovered in 1926, [more than 100Trusted Source](#) substances have been implicated in signal transmission between nerves. A couple that you may be familiar with are [dopamine and serotonin](#).

8. The possible methods to repair nervous system damage are diverse

Researchers are hard at work to develop ways to repair damage to the nervous system. Some methods [can include](#) but aren't limited to supplementation of growth-promoting cells, specific growth factors, or even stem cells to promote regeneration or repair of nerve tissue.

9. Stimulating the vagus nerve can help with epilepsy and depression

This is accomplished using a device that sends electrical signals to your vagus nerve. This, in turn, sends signals to specific parts of the brain.

Vagus nerve stimulation can help to lower the number of seizures in people with some types of [epilepsy](#). It may also improve [depression](#) symptoms over time in people whose depression hasn't responded to other treatments. Its effectiveness is being assessed for conditions like headaches and [rheumatoid arthritis](#) as well.

10. There's a set of nerves connected to fat tissue

A [2015 studyTrusted Source](#) in mice used imaging to visualize nerve cells surrounding fat tissue. Researchers found that stimulating these nerves also stimulated the breakdown of fat tissue. Additional research is needed, but this could have implications for conditions like [obesity](#).

11. Scientists have created an artificial sensory nerve

The [systemTrusted Source](#) is able to collect information on applied pressure and convert it into electric impulses that can be integrated on a transistor.

This transistor then releases electrical impulses in patterns consistent with those produced by neurons. The researchers were even able to use this system to move the muscles in a cockroach's leg.

Pasted from <<https://www.healthline.com/health/how-many-nerves-are-in-the-human-body#fun-facts>>

ENDOCRINE SYSTEM: