

The Nervous System

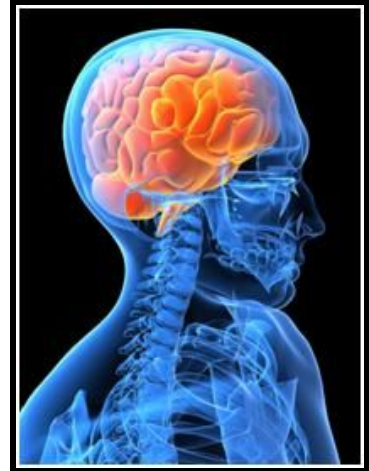
Alexander Born

The nervous system is responsible for collecting sensory input, processing information, and providing instructions to most other systems.

The nervous system is broken down into two sub-groups:

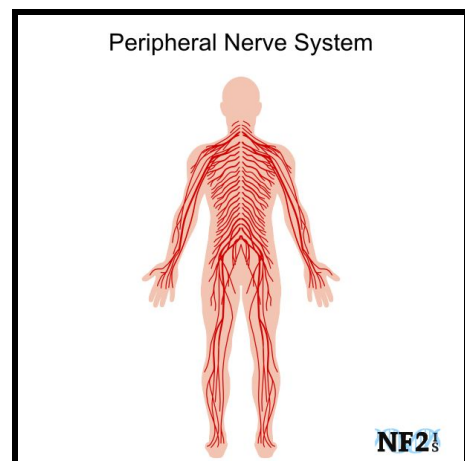
- Central Nervous System:
 - This consists of the brain and spinal cord. This system processes information.

The Central Nervous System consists of two main parts, the brain and the spine. The spine is responsible for rapid decision making and information transmission. On the other hand, the brain is vital to processing complex material.



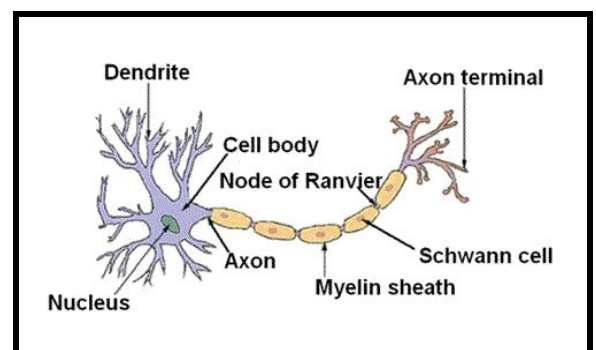
- Peripheral Nervous System:
 - The peripheral nervous system allows for input (five senses) and output (control systems).

The Peripheral Nervous System allow for communication, both input and output, with the majority of the body. It can be divided into two divisions, Somatic and Autonomic. The somatic nervous system is voluntary (can be controlled) unlike the autonomic system. The Autonomic System keeps controls involuntary muscles, ultimately, keeping the heart beating while asleep. It can be subdivided into two categories, sympathetic (while body is active) and parasympathetic (while body is not active).



Structure of a neuron:

Neurons are the core cells in the brain, spinal cord, and ganglia. There are three types of neurons: *motor neurons* cause muscle contractions and glandular functions, *sensory neurons* that respond to stimuli in the sensory

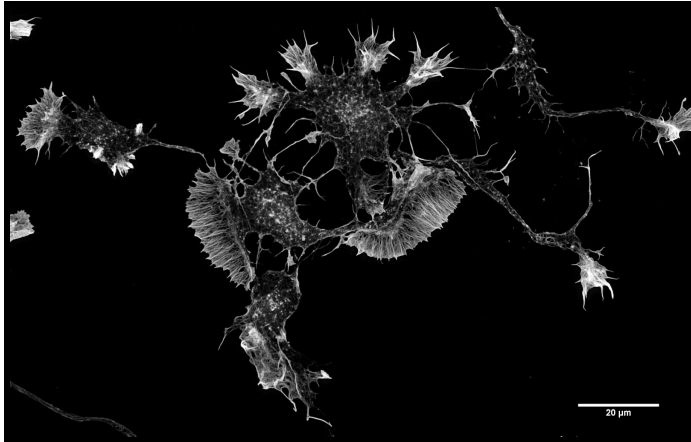


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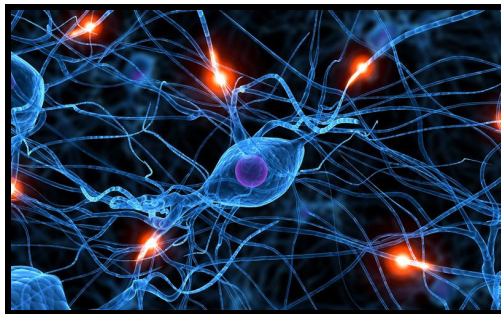
categories: vestibular, olfactory, gustatory, somatic, vision, and auditory, and *interneurons* which connect to other neurons.

The basic structure of the neuron includes dendrites, the soma, the axon hillock, the axon, the terminal buttons and synapses. Dendrites are branching extensions that receive information



from other neurons and transmit electrical stimulation. The soma is the body of the cell. It contains a cell nucleus and produces the proteins that the other parts of the neuron need to function. The axon hillock is located at the end of the soma and controls the firing of the neuron. When the strength of the signal is greater than the limit of the axon hillock, the signal will be fired. This is called action potential. The axon is a fiber that connects the cell body to the terminal endings and transmits the signal. The terminal buttons are found

at the end of neurons and send the signal to the other neurons. At the end of the terminal buttons is a gap called a synapse where neurotransmitters carry the signal to another neuron.



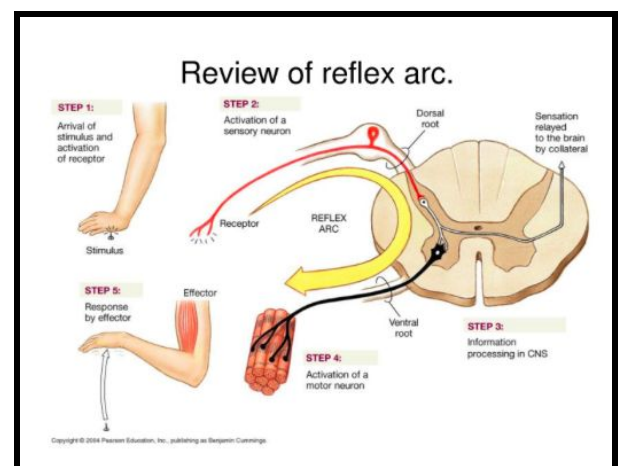
Nerve Travel:

Nerve impulses travel across the nerve synapse, the intersection between the axon of one neuron and dendrite of another neuron, using chemicals called neurotransmitters.

The Reflex Arc:

Have you ever touched a hot cup? Have you been amazed by your ability to withdraw your hand quickly? This is due to the Reflex Arc. The Reflex Arc is a feedback loop managed within the spine. It operates as follows:

1. A stimulus triggers the system.
2. A impulse travels up a sensory neuron.



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3. The signal gets automatically relayed to the to the neurons in the arm. (CNS Processing)
4. Activate motor neuron.
5. Arm responds.