THE NERVOUS SYSTEM

The nervous system is the control system for our entire body. Without this system we would cease to function. It enables the body to react to its environment and to perform everyday activities. The basic structures of the nervous system are the brain and spinal cord (central nervous system), and cranial nerves and spinal nerves (peripheral nervous system).

Nerve cells, called neurons, are the functional units of the nervous system. These develop before birth at a rate of 250,000 per minute. Upon birth, the human body has 100 billion nonreplaceable neurons. We will not be able to grow any more neurons for the rest of our lives!

A nerve cell consists of a cell body with a nucleus, numerous tree-like extensions called dendrites, a long axon that resembles link sausage, and tiny, finger-like projections called terminal axons. Brain cells are able to communicate with each other through electrical and chemical signals. Electrical impulses begin and continue through the entire neuron, from dendrite tips to the terminal axons. Electricity, however, is unable to jump the synapse, or gap, between each neuron. Therefore, the message must be converted to chemicals in order to continue. In the cerebrum alone, there are 60 trillion synaptic gaps. The electricity stimulates the terminal axon to release chemicals called neurotransmitters into the synapse. The chemicals travel to the dendrite tips of the next neuron and act as a key to the dendrites’ lock. With the locks held open by the neurotransmitters, sodium ions, as an example, are free to rush into the neuron. It is with this movement that the electrica impulses are able to begin once again until another synapse is reached.

You are not able to see individual neurons with the naked eye, but you would be able to see groups of them. Nerves extend throughout your body; everything from your brain down to your littlest toe is under the constant watch of the nervous system. Your brain is directly connected to 12 pairs of cranial nerves. The optic nerve, for instance, connects the eyes directly to the brain. The spinal cord has 32 pairs of nerves that branch off and leave the cord through spaces the vertebrae. These nerves are responsible for constantly sending messages back to the central nervous system regarding the environmental conditions around the body.

Probably the most incredible organ in the human body is the brain. It weighs approximately three pounds and is 78 percent water. The rest of the brain is made up of mostly lipids and proteins, but does contain trace amounts of carbohydrates and salts. The brain is the greatest user of blood in the body. Fifteen to 20 percent of the body’s blood flow goes straight to the brain after being oxygenated. The heart sends 12 ounces of blood to the brain via the carotid arteries per minute. The brain also consumes an average of 2.6 pints of oxygen out of the average total of 1.6 gallons we breathe in every minute.
Cerebrum
Thalamus
Hypothalamus
Pituitary Gland
Cerebellum
Medulla Oblongata
### The Anatomy of the Brain

<table>
<thead>
<tr>
<th>Part of Brain</th>
<th>Description</th>
<th>Function</th>
<th>% of Brain</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDULLA OBLONGATA (BRAIN STEM)</td>
<td>Sits at the base of the brain and becomes the spinal cord</td>
<td>Responsible for automatic functions like heart and respiratory rate, digestion, and body temperature</td>
<td>10%</td>
</tr>
<tr>
<td>CEREBELLUM (&quot;SARAH-BELL-UM&quot;)</td>
<td>Ball-like structure attached to the base of the brain</td>
<td>Balance, coordination of voluntary muscle movements</td>
<td>10%</td>
</tr>
<tr>
<td>CEREBRUM (&quot;SUH-REE-BRUM&quot;)</td>
<td>Wrinkly with gyri (folds), the majority of the brain</td>
<td>Gives us qualities unique to humans</td>
<td>77%</td>
</tr>
<tr>
<td>RIGHT CEREBRAL HEMISPHERE</td>
<td>N/A</td>
<td>Controls left side of body, pattern recognition, mental images, intuitive thinking, music, art, etc.</td>
<td>N/A</td>
</tr>
<tr>
<td>LEFT CEREBRAL HEMISPHERE</td>
<td>N/A</td>
<td>Controls right side of body, language, math, logic, etc.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Impacts of Exercise on the Nervous System

Exercise has several positive effects on the nervous system, particularly the brain. Exercise can actually generate growth of new neurons in the brain while strengthening the existing connections between neurons. The connections between neurons are directly related to memory and learning; strengthening these connections enhances memory and improves concentration and attention. The size and density of brain capillaries, which increase the amount of oxygen and blood flow to the brain, are also increased. Exercise is also known to increase the concentration of neurotransmitters such as serotonin and norepinephrine. Increased levels of these neurotransmitters enhance the mood and can decrease levels of depression.

### Credits and More Information:

http://www.aarp.org/