

# Phyiscology



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The BrainWe??™ ve long known that the brain is an amazing thing, but there are intricate details we overlook.

The brain is the most complex ??? machine??? in the universe. According to William Calvin (1997), ??? it has over 100, 000, 000, 000 nerve cells each with up to one hundred and fifty thousand connections; each cell is connected with twenty-five thousand others???. Each half of the brain controls the other half of the body. The right side of the brain controls our musical talent, fantasy, imagination, and dreams; the left side of the brain controls our math solving ability, logic, and language skills (Calvin 1997). Your brain is the supervisor of your body. It runs the show and controls just about everything you do, even when youre asleep. Serendip (2005) acknowledges that the brain is made up of three main parts: the cerebrum, the cerebellum, and the brain stem. It is found that ??? the cerebrum or cortex is the largest part of the human brain, associated with higher brain function such as thought and action??? (2005).

The cerebral cortex is divided into four sections, called lobes: the frontal lobe, parietal lobe, occipital lobe, and temporal lobe. Each lobe has a specific function: the frontal lobe is ??? associated with reasoning, planning, parts of speech, movement, emotions, and problem solving???.; the parietal lobe is ??? associated with movement, orientation, recognition, perception of stimuli???.; the occipital lobe is ??? associated with visual processing???.; and the temporal lobe is ??? associated with perception and recognition of auditory stimuli, memory, and speech???. (Serendip 2005). The cerebral cortex is highly wrinkled; fundamentally this makes the brain more efficient, because it can increase the surface area of the brain and the amount of

neurons within it. A deep channel divides the cerebrum into two halves, known as the left and right hemispheres. The two hemispheres look mostly symmetrical, however it has been shown that each side functions slightly different than the other.

??? The right hemisphere is associated with creativity and the left hemisphere is associated with logic abilities??? (Serendip 2005). The two hemispheres are connected by the corpus callosum. The cerebellum, also known as the ??? little brain???, is similar to the cerebrum because it has two hemispheres and has a highly folded surface. This cerebellum is involved in the regulation and coordination of movement, posture, and balance. The limbic system, referred to as the “ emotional brain”, is found buried within the cerebrum. This system contains the thalamus, hypothalamus, amygdala, and hippocampus.

Underneath the limbic system is the brain stem. This structure is responsible for basic vital life functions such as breathing, heartbeat, and blood pressure. ??? Scientists say that this is the ??? simplest???™ part of human brain??? (Serendip 2005).

With all of the complexities of the brain many things can go wrong. One common problem is strokes, which occur when the blood supply to the brain is blocked, usually due to plaque and blood clot buildup. Damage to any portion of the brain, through trauma or drug intake, may cause problems relating to the function of that portion of the brain.

Damage to the cerebral cortex, for example, may cause memory loss. Brain and spinal cord cells are the only cells in the body which cannot re-grow;

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once you lose them they don't come back. According to Willis (2002) if the frontal lobe is damaged an individual will suffer ??? loss of reasoning ability, caution, and inhibitions.

??? Damage to the parietal lobe will cause ??? loss of fine motor skills, and slower reaction time??? (Willis 2002). ??? Speech and hearing impairment??? will occur if the temporal lobe is harmed (Willis 2002). If the occipital lobe comes within harm??™s way it is quite possible that one will experience blurred vision or poor distance judgments.

Since the cerebellum is responsible for coordination, damage to this lobe will create a lack of muscle coordination and balance. Impairment in the brain stem will lead to ??? loss of vital functions??? (Willis 2002). Damage to the brain can affect a person??™s behavior, and lead to severe mental conditions. However, psychologists are able to study the brain through MRI??™s to determine what is wrong with it. A Magnetic resonance imaging (MRI) is ??? a noninvasive medical test that helps physicians diagnose and treat medical conditions??? (??? Functional mr imaging-brain??? 2009).

According to the ??? Functional MR Imaging-Brain??? article, a MR imaging uses a powerful magnetic field, radio frequency pulses and a computer to produce detailed pictures of organs, soft tissues, bone and virtually all other internal body structures. The images can then be examined on a computer monitor, printed or copied to CD. MRI does not use ionizing radiation (x-rays). Functional magnetic resonance imaging (fMRI) is a relatively new procedure that uses MR imaging to measure the tiny metabolic changes that take place in an active part of the brain. Physiologists perform fMRI to: observe the

anatomy of the brain; determine specifically which division of the brain is handling significant functions such as thinking, dialogue, movement and awareness; help evaluate the effects of stroke, trauma or degenerative disease brain function; guide the planning of surgical treatments for the brain. In reference to ??? Methods Used to Study the Brain,??? (2008) ??? psychologists use an EEG to help them learn more about the brain.??? In an EEG, electrodes are pasted on different sites on the scalp and electrical activity is measure during various activities. The brain waves are then attracted by the electrodes, travel to the recording device and then amplified so that they can be more easily seen and examined.

A drawback of this method is that the electrodes are large and they sample electrical activity from fairly large areas of the brain. It is only a weak method of studying functional localization in the brain. The EEG recording can be used to examine a variety of brain functions including the different stages of sleep and different psychological disorders (??? Methods used to study the brain??? 2008). According to Calvin (1997), ??? the human brain is a complex organ that allows us to think, move, feel, see, hear, taste, and smell. It controls our body, receives information, analyzes information, and stores information (our memories).??? Psychology seeks to understand mind and behavior, and neurology is ??? the medical discipline that diagnoses and treats pathologies of the nervous system??? (Calvin 1997). The brain is the most important organ studied in psychiatry, which works to study, prevent and treat mental disorders.

Regardless of rapid scientific advancement, much about how the brains work remains a mystery. The procedures of individual neurons and synapse are

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currently understood in substantial detail, however the way they operate in groups of thousands or millions has been extremely complicated to interpret.

Each major progress in understanding the brain has been created more or less directly from the expansion of an innovative method of investigation.

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