The Nervous System allows communication between the brain and all other parts of the body. Nerves transmit messages back and forth to every organ, tissue and cell. It consists of-the Central Nervous System (CNS) and the Peripheral Nervous System (PNS).

Nerve cells are called neurons. They consist of a cell body, dendrites, and axons. They carry messages to and from the spinal cord and brain.

- The cell body- contains the nucleus, the control center of the cell
- Dendrites- are the branches that extend form the cell body. They receive and transmit information to the cell body from other neurons or sensory receptors.
- Axons- transmit impulses away from the cell body to another neuron, muscle cell or gland. Some axons are covered by a myelin sheath that allows faster transmission of impulses.

The PNS is made up of all the nerves that extend from the brain and spinal cord and the sensory receptors. It carries messages between the CNS and the rest of the body. The PNS can be divided into two categories:

1. Autonomic Nervous System – controls involuntary functions such as digestion and heart rate. It is divided into 2 networks:
    a. sympathetic NS – speeds up body functions – like heart rate. Examples of this are the "flight" or "flight" response and a reflex* which is the spontaneous response of the body to a stimulus
    b. parasympathetic – this system opposes the sympathetic ns by slowing down body functions
2. Somatic Nervous System consists of sensory neurons that relay messages from receptors in the eyes, ears, nose and tongue and skin to the CNS and motor neurons that carry impulses from the CNS to skeletal muscles.

Central Nervous System consists of the brain and spinal cord. The spinal cord is a long column of nerve tissue that extends from the brain down your back. It is protected by the vertebrae.

- The brain integrates and controls the activities of the nervous system. It helps you receive and process messages. It is protected by the skull.

Three major parts of the brain:

- 1. The cerebrum- is the largest and most complex part of the brain. The cerebrum is divided into two hemispheres (left and right). The two hemispheres communicate with each other. The right hemisphere controls the left side of the body and the left hemisphere controls the right side of the body. The left is the center for language, reasoning, analytical ability to do math and science. The right is the center for processing music and art and comprehending special relationships. Each hemisphere has four lobes:
- Frontal- controls voluntary movements and has a role in language. The prefrontal areas are
- thought to be involved with intellect and personality.
- Parietal – is involved with sensory information
- Occipital- controls the sense of vision
- Temporal controls the sense of hearing and smell. It is also involved with memory, thought and judgment.
- 2. Cerebellum – the second largest part of the brain the principal function is to coordinate the movement of skeletal muscles
- 3. Brain stem is a 3 inch stalk of nerve cells and fibers that connects the spinal cord to the rest of the brain. Incoming sensory impulses and outgoing motor impulses pass through the brain stem.

Magneto encephalography – is a noninvasive neurophysiological technique that is similar to the EEG but more accurate and measures deeply into the brain where speech and language centers are located. The "MEG" measures the magnetic fields generated by neuronal activity of the brain. John is pictured here preparing for the MEG. It is especially helpful when superimposed on the MRI to locate the source of epileptic activity and pathological areas for surgery.

Electroencephalography "EEG" - is a technique for studying the electrical current on surface areas of the brain. Electrodes are attached to the scalp. Wires attach these electrodes to a machine which records the electrical impulses. The results are either printed out or displayed on a computer screen. Electroencephalogram is abbreviated EEG.

Positron emission tomography: PET. A highly specialized imaging technique that uses short-lived radioactive substances to produce three-dimensional colored images of those substances functioning within the body. These images are called PET scans and the technique is termed PET scanning.

PET scanning provides information about the body's chemistry not available through other procedures. Unlike CT (computerized tomography) or MRI (magnetic resonance imaging), techniques that look at anatomy or body form, PET studies metabolic activity or body function. PET has been used primarily in cardiology, neurology, and oncology.

Problems of the Nervous System

- Problems can result from damage to nerve cells, injury to the head or spinal cord, damage from degenerative diseases, or using drugs and alcohol.
- 1. Injuries – head injuries – such as a concussion, contusion or major trauma resulting in coma.
- - spinal cord injuries – serious injuries could result in paraplegia or quadriplegia.
- 2. Degenerative diseases – these are progressive and the tissues continue to deteriorate over time
- Examples are:
    - A. Parkinson's disease – muscles function is impaired as a result of destruction fo nerve cells in the brain
    - B. multiple sclerosis – is an autoimmune disease in which the body attacks tits own tissues, destroying the myelin sheath
    - C. Alzheimers disease – gradual mental deterioration when neurons in the brain are destroyed
- 3. Other disorders and problems – these are not progressive examples are:
    - A. epilepsy* - is a disorder of the nervous system that is characterized by recurrent seizures – sudden episodes of uncontrolled electrical activity in the brain
    - B. *cerebral palsy – refers to a group of nonprogressive neurological disorders that are the result of damage to the brain before, during , or just after birth or in early childhood.

Long term heavy uses- effect varies from person to person:

- In the images on these pages, you can see 'dead spots' - where there is no brain activity because of little blood flow - revealed black holes.
- Depending on the location of these dead spots, the patient's behaviour will change.
- For instance, if these occur at the front of the brain, which controls forward thinking , your sense of judgment deteriorates.
- When it comes to the effect of caffeine and alcohol, the good news is that once you stop taking them, the brain recovers (and the same may be true for other substances
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Read more: http://www.dailymail.co.uk/health/article-1177258/Are-wrecking-brain-Chilling-pictures-reveal-shocking-effects-alcohol-cigarettes-caffeine-mind.html#ixzz1mVlJ7Buu