



The Nervous System



The nervous system has the functions of:

- **Sensing:** Information from the external and internal environment is collected and monitored from the eyes, ears, skin, hairs, mouth and nose. This information is sent to the central nervous system for further processing.
- **Processing:** The information received is processed, analysed, sifted through, compared and evaluated. It is then used to make decisions. This occurs in the central nervous system which consists of the brain and spinal cord. 'Useless' information is ignored. This is much like how an internet search engine works when searching for a specific enquiry.
- **Action:** The sensory information that has been processed is used to create action through the transfer of electrical impulses via nerve fibres from the central nervous system to the organs and muscles. When activated they release hormones and the body responds through such things as movement, blood pressure changes and temperature changes.



This complicated process is controlled and carried through various tissues and organs. The central nervous system (brain and spinal cord) is the control centre for the whole process. It takes the information received and processes it to decide what action should be taken. The brain is composed of a vast and dense network of neurons. Neurons are spidery looking cells that get excited when electricity surges through them. They form an intricate network that pass electrical and chemical messages between each other. The brain itself has many sections and areas that are believed to be responsible for different things, and there are numerous ways to divide the brain. This article will cover six key areas.

1. The Frontal Lobe

The frontal lobe is located at the front of the brain. It is responsible for many functions including – but not limited to:

- Ability to solve problems.
- Judgment of right and wrong.
- Inhibiting certain unwanted behaviours.
- Planning, organisation and preparation.
- Ability to anticipate what could happen.
- Keeping track of one's own behaviour and making sure it is appropriate.
- A person's personality.
- The emotions and feelings.
- Able to recognise our own limitations as well as abilities.
- Attention span and ability to focus.
- Ability to speak one's emotions and express opinions.



2. The Parietal Lobe

The parietal (pronounced *pa-ri-e-tal*) lobe is located at the top of the brain behind the frontal lobe. It is responsible for many functions including – but not limited to:

- Sense of touch.
- Being able to tell the difference between colour, shape and size of objects.
- Ability to sense space and size and judge sizes in relation to other objects.
- Sight.
- Ability to read and process what is being read.
- Sense of smell.



3. The Occipital Lobe

The occipital (pronounced *ox-sip-it-ahl*) lobe is located at the rear of the brain, above the brain stem and cerebellum. It is mainly responsible for sight and vision, plus associated skills:

- Ability to see and understand what is seen.
- Ability to read and understand what is seen as writing, that it has meaning.



4. The Temporal Lobe

The temporal lobe is located below the parietal lobe and in front of the occipital lobe. There are two halves to the temporal lobe called the right and left. The left side is associated with speech and the ability to remember what has been said or heard whereas the right side is associated with musical ability, visual memory and understanding other languages. Other functions include:

- The ability to remember what is seen and heard.
- Hearing.
- Understanding languages and the ability to learn new languages.
- Organising and ordering information.
- Awareness of musical beats, notes and tempos.



5. The Cerebellum

The cerebellum (pronounced *ser-a-bell-um*) is located beneath the occipital lobe and appears to be its own separate structure; it looks very separate to the other four lobes previously mentioned. This area is most associated with movement of the body:

- Allows movements to be coordinated and smooth.
- Controls a person's balance.
- Plays a role in emotions.



6. The Brain Stem

The brain stem is located at the rear of the brain and joins the brain to the spinal cord. It is a very important part of the brain as it controls most of the involuntary functions that our body performs. Simple animals such as lizards have a brain that only consists of a brain stem and they are therefore unable to perform higher levels of thinking and behaviour. It has the following functions:

- Breathing – makes sure each inhalation is followed by an exhalation.
- Provides the ability to sleep by creating drowsiness.
- Heart Rate.
- Vomit reflex.
- Monitors and controls blood pressure.
- Affects the level of alertness.
- Pupil dilation.
- Balance.
- Ability to swallow.
- Controls sweating.
- Controls digestion.
- Bladder control.
- Taste.
- Body temperature.



Within each of these six main sections of the brain there are other smaller divisions that have more specific functions. These areas and their functions have been established through three main methods. Firstly, by studying people who have injured certain areas of the brain and observing the difficulties that they have. Secondly, by using MRI and CAT scans to identify which areas are active when people are completing certain tasks. Neither of these is an exact science and research into the human brain continues to occur.