NERVOUS SYSTEM

1.0. INTRODUCTION

Living organisms live in the environment. They interact with the environment in search of food, shelter, reproductive mate etc. In other to be successful in the course of these searches, they have seen, sensed, felt and touch some components of the environment. The nervous system is one of the systems in the body that helps living organisms to explore their, response to change in the environment and live a successful life.

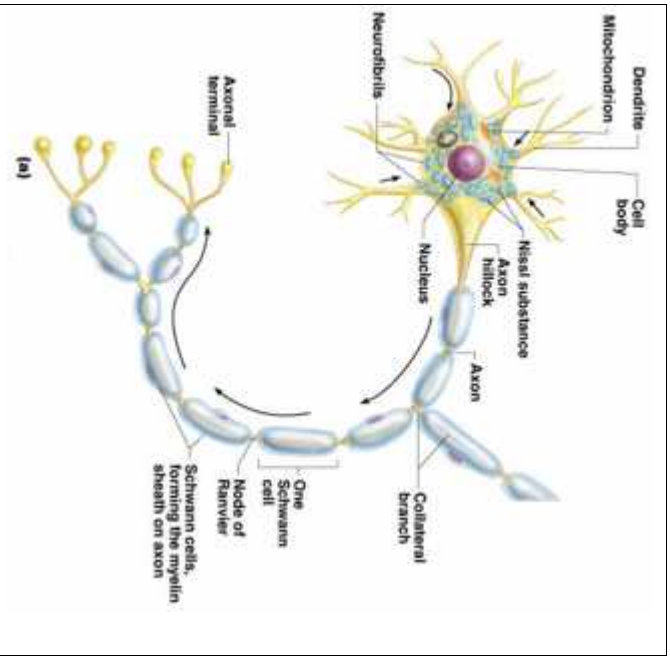
1.1. What is the nervous system?

Nervous system is a system of cells, organs, tissues which coordinates and controls the activities of living organisms.

1.2. **Functions of the nervous system**

1. Control center for all body activities
2. Responds and adapts to changes that occur both inside and outside the body (Ex: pain, temperature, pregnancy)

1.2. Neurons

Neurons are the structural and functional units of the nervous system. The neurons form network of nerve fibres spanning al parts and organs of the body. Neurons carry electrical messages called impulses from one part of the body to another. (More on neurons)	

1.2.1. Parts of a neuron

Neurons are made up of four basic parts, namely:

1. **Dendrites**

2. **Cell Body**
3. **Terminal Axons**
4. **Myelin sheath**

1. **Dendrites**

Dendrites receive chemical signals from neighboring cells.

2. Cell Body

The cell body contains the nucleus and organelles

3. Axon

The axon is a long extension of the neuron that carries electrical messages away from the body to the terminal axons

4. Terminal Axons

The terminal axons passes the signal to the next cell.

5. Myelin sheath

Myelin sheet covers and protects the axon

1.2.2. Types of neurons

Basically there are three types of neurons, namely:

1. Sensory Neurons
2. Interneurons
3. Motor Neurons

1. **Sensory Neurons**

The sensory neurons picks up the stimuli (nerve impulse) and carries it to the spinal cord and brain.

2. Interneurons

The interneurons are found within the brain and spinal cord. Relays the message between the sensory neurons and the motor neurons.

3. Motor Neurons

The motor neurons transfers impulses away from the brain to the spinal cord

1.2.3. How does Neurons work?

The neurons execute their function in five different phases, namely:

1. **Reception**
2. **Transmission**
3. **Data Interpretation**
4. **Transmission**
5. **Response**

1. Reception Receptors in the skin sense stimuli **3. Transmission** Sensory neurons transmit the touch message **4. Data Interpretation** Information is sorted and interpreted **6. Transmission** Motor Neurons transmit a response message to a muscle. **7. Response** Muscles are activated causing a response	

1.3. TYPES OF NERVOUS SYSTEM.

The nervous system are of three types, namely:

1.3.1. CENTRAL NERVOUS SYSTEM

The central nervous system is one of the types of nervous system that controls and coordinates the various metabolic activities taking place within the body of living organisms.

1.3.1.1. Division of the central nervous system

The central nervous system comprised of two parts, namely:
1.The brain
2. Spinal cord

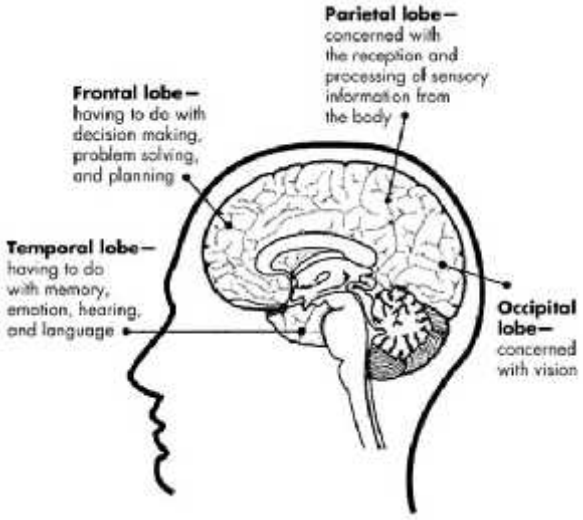
1. **The brain**

The brain is an organ situated at the anterior part of the body (head). It is surrounded by the skull and other tissues.

Parts of the brain

The brain has three different parts, namely:

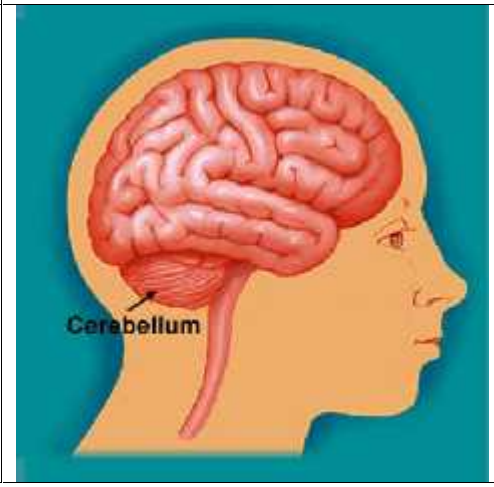
1. Cerebrum
2. Cerebellum
3. Brainstem

The brain- Cerebrum The cerebrum is the uppermost and bulkiest part of the brain. It possess several folds and grooves and covered with an outer layer of gray matter called the **cerebral cortex**. **Parts of the cerebrum** The cerebrum is divided into four lobes, namely: 1. Temporal lobe 2. Frontal lobe 3. Parietal lobe 4. Occipital lobe	

Functions of the cerebrum

The cerebrum controls and coordinates conscious activities such as:

1. Conscious activities
2. Intelligence
3. Memory
4. Language
5. Muscles.

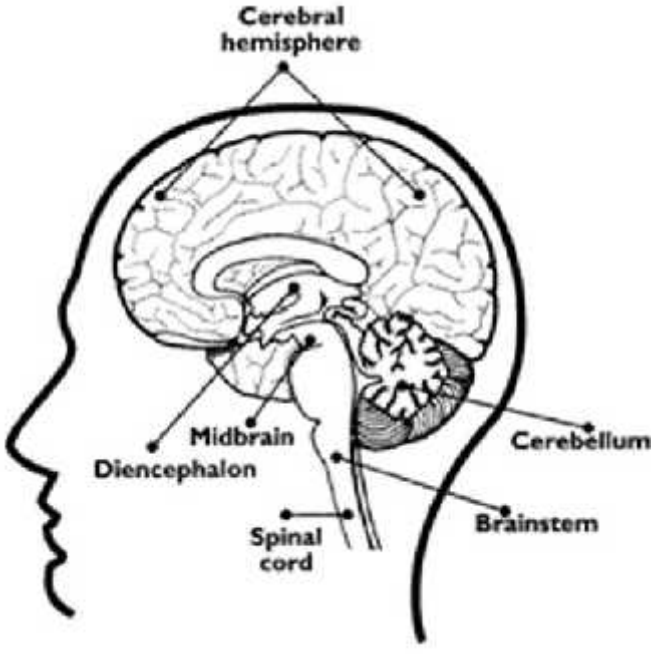
The brain- Cerebellum The cerebellum is situated at the base of the cerebrum. It is smaller in size compared to the cerebrum.	

Functions of the cerebellum

The cerebellum coordinates and controls voluntary activities such as:

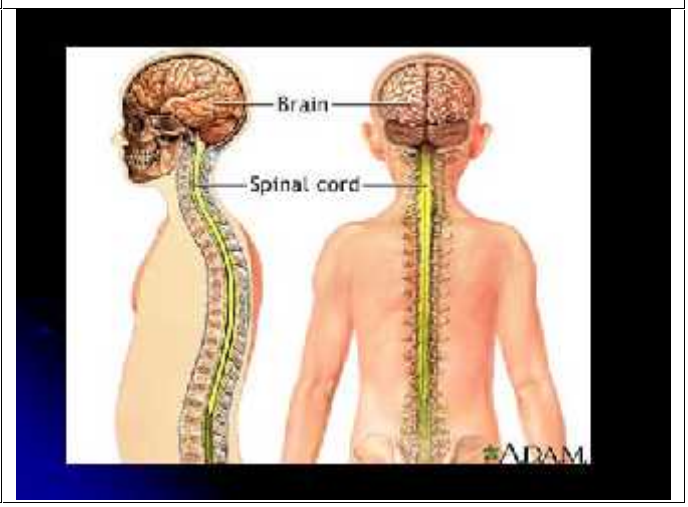
1. Muscle coordination
2. Balance
3. Posture

The brain- Brainstem

Made up of the medulla oblongata, pons and midbrain. Medulla oblongata controls involuntary activities such as heart rate and breathing. Pons and midbrain act as pathways connecting various part of the brain with each other. Sometimes called the reptilian brain, because it resembles the entire brain of a reptile.	

Functions of brainstem

Controls involuntary activities such as breathing, swallowing, coughing, sneezing, and vomiting

Spinal cord Considered as the bodys information superhighway. The spinal cord is a bundle of several nerve fibres(neuron) that runs from the bottom of the brain to the tail region. It is surrounded and protected by the vertebral column	

Functions of the spinal cord

The spinal cord comprised of billion sets of neurons that connects different parts of the body. These neurons information called impulses. Impulses may travel as fast at 268 miles/hr

1.3.2. PERIPHERAL NERVOUS SYSTEM

The peripheral nervous system comprised of several set of nerve fibres or neurons that carry messages to and from the central nervous system/spinal cord. This can be likened to telephone wires that connect all of our houses in the community

Functions of the peripheral nervous system.

Some of the functions of the peripheral nervous system are:

1. Sends signals to the CNS
2. Receives and transmits motor signals from the CNS
3. Stimulates effectors

Divisions of the peripheral nervous system

The peripheral nervous system is of two types, namely:

1. Somatic Nervous System

2. Autonomic Nervous System

1.3.2.1.Somatic nervous system

The somatic division of the peripheral nervous system that relay information between skin, skeletal muscles and central nervous system. In essence it controls the voluntary actions in man. For instance, you can decide before lifting your hand or leg.

It also deals with reflexes: Automatic response to stimulus.

Functions of the somatic nervous system.

Some of the functions of the somatic nervous system are:

1. Motor neurons that control voluntary movements by activating skeletal muscles.
2. Also involved in what we perceive as involuntary movements, such as reflexes (though voluntary control of the muscles involved, such as tensing them, can reduce the response).

1.3.2.2.Autonomic nervous system

The autonomic nervous system is one of the part of the nervous system that relay information from central nervous system to organs. The autonomic nervous system controls the involuntary activities within the body.

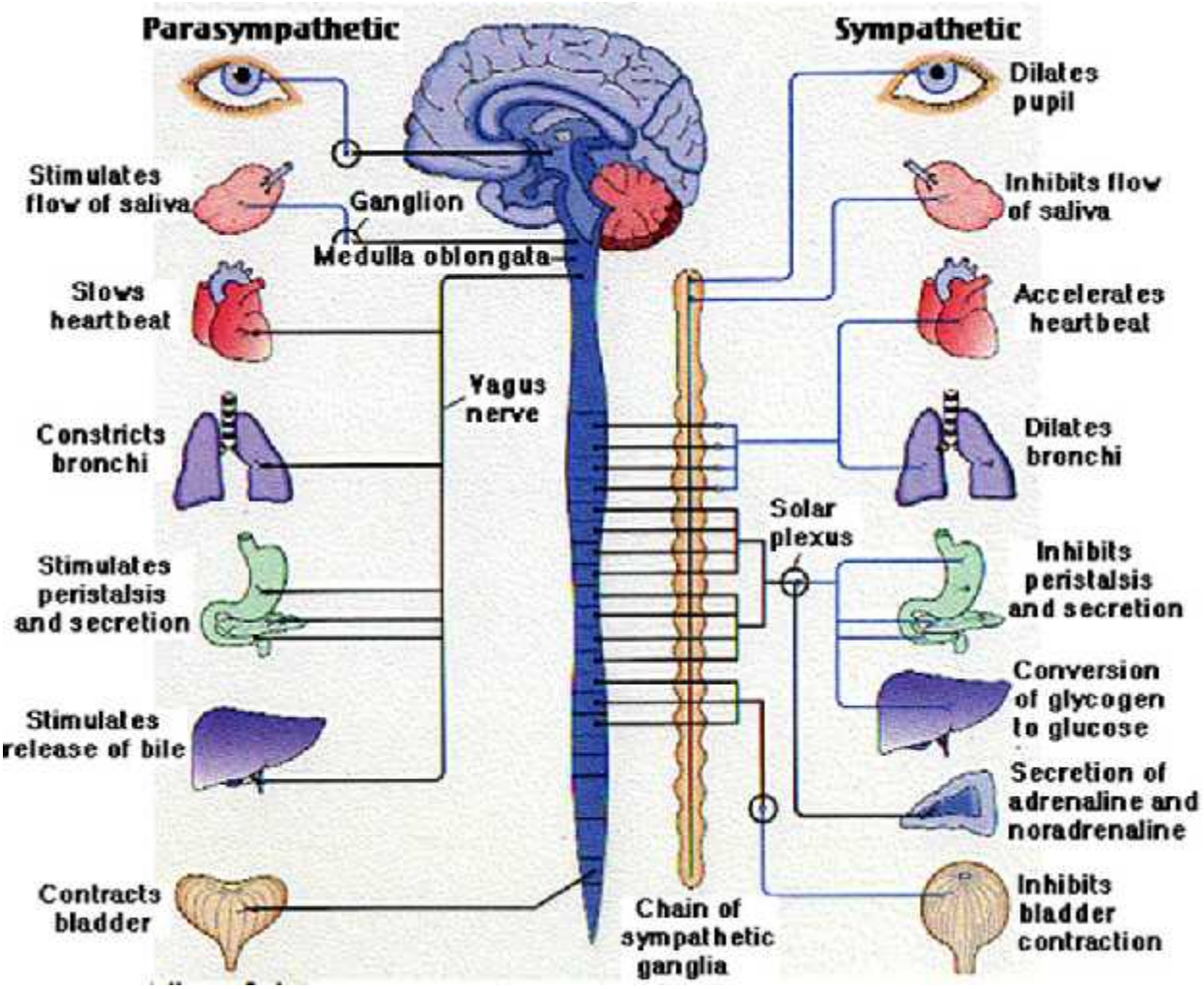
Functions of the autonomic nervous system

The functions of the autonomic system is to control involuntary activities in the body.

Divisions of autonomic nervous system

The autonomic system is divided into two, namely:

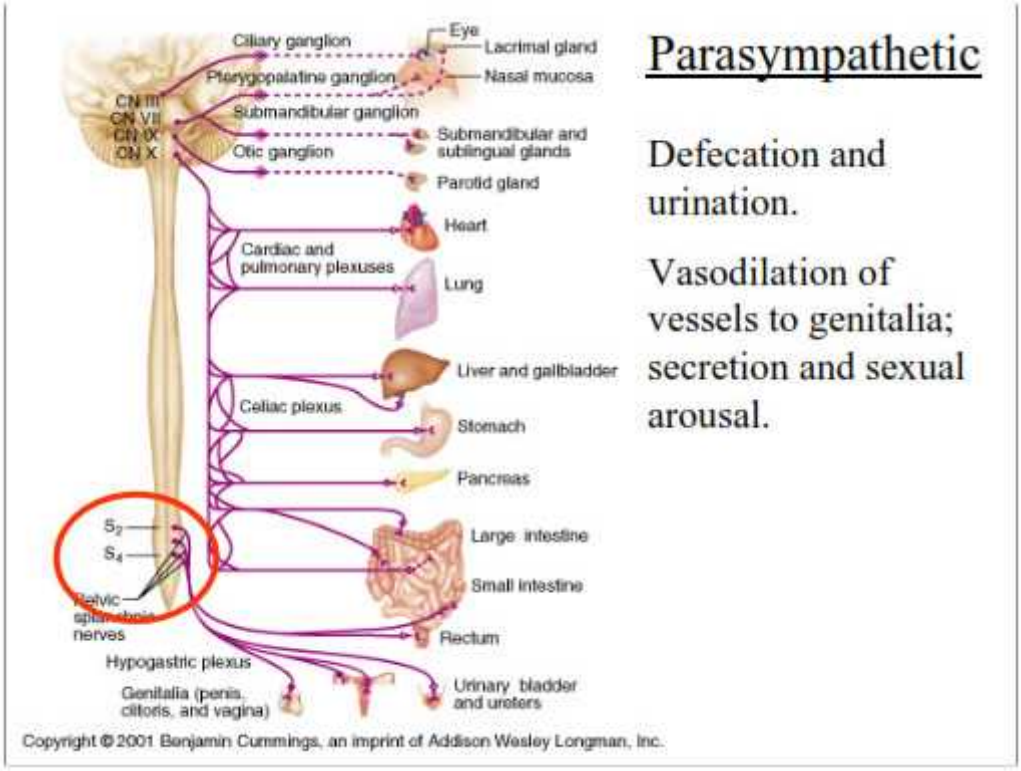
1. **Parasympathetic**
2. **Sympathetic**



1. Parasympathetic division

The parasympathetic nervous system is the division of the autonomic nervous system that controls and coordinates the activities during inactivity. That is when the body is at rest, sleeping. Some of the effects of parasympathetic nervous system are:

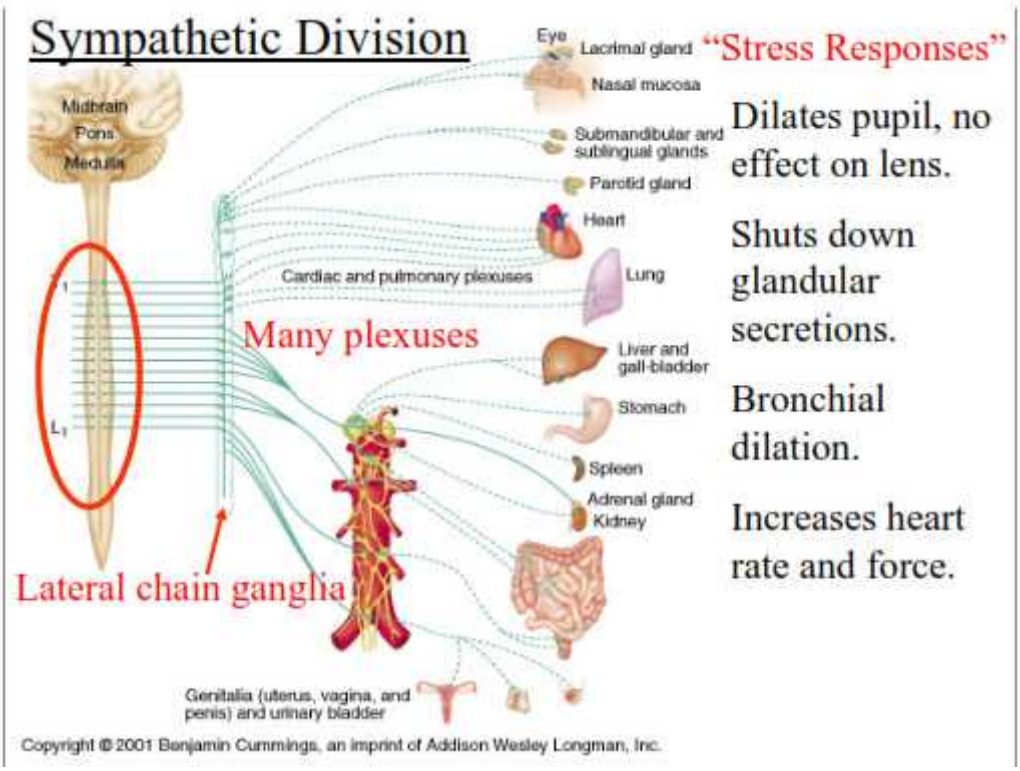
1. Constricts pupils
2. Dilates blood vessels
3. Reduces heart and breathing rates.
4. Stimulates digestion



2. *Sympathetic division*

The sympathetic nervous system is the division of the autonomic nervous system controls and coordinates the activities of the body when the body is under stress, when in trouble. It helps people to confront or adjust to dangerous situations. It produces the “fight or flight” response:

1. Dilation of pupils
2. Increased heart and breathing rates
3. Constriction of blood vessels
4. Inhibits digestion


Sympathetic Division
"Stress Responses"
Midbrain
Pons
Medulla
Eye
Lacrimal gland
Nasal mucosa
Submandibular and sublingual glands
Parotid gland
Heart
Lung
Cardiac and pulmonary plexuses
Many plexuses
Liver and gall-bladder
Stomach
Spleen
Adrenal gland
Kidney
Lateral chain ganglia
Genitalia (uterus, vagina, and penis) and urinary bladder
Dilates pupil, no effect on lens.
Shuts down glandular secretions.
Bronchial dilation.
Increases heart rate and force.
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