



Dr. Bbosa Science

Sponsored by
The Science Foundation College
Uganda East Africa
 Senior one to senior six
 +256 778 633 682, 753 802709
Based On, best for science

digitalteachers.co.ug



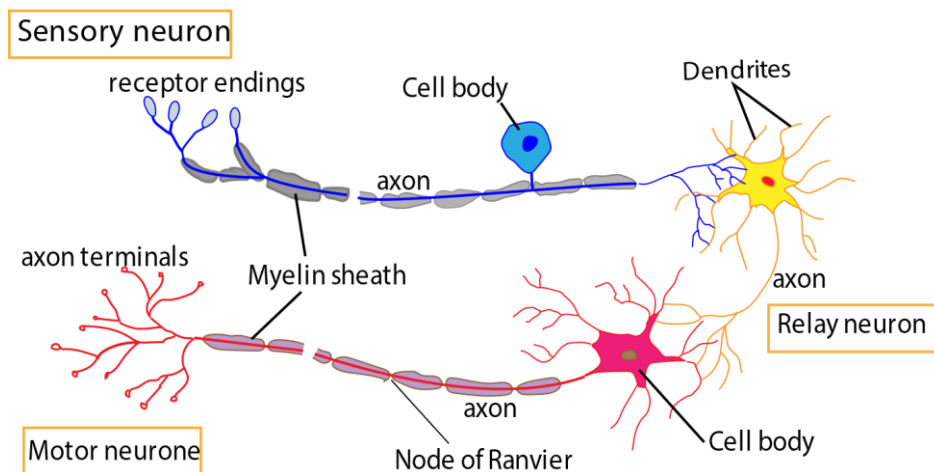
Nurture your dreams

Theme: Coordination in animals

S3 New Curriculum Biology-Chapter 5– Nervous coordination in humans

The nervous system.

The nervous system is composed of highly differentiated cells called **nerve cells** or **neurons**. Those that carry impulses from receptors to the control nervous system are called **sensory neurons** while those that carry impulses from the CNS to effector are called **effector neurons**.



Differences between effector and sensory neuron

	Effector neurons	Sensory neuron
1.	Transmit impulse from CNS to the effector	Transmit impulse from sense organ or receptor to the CNS cell body in the middle of axon
2.	Cell body at the end of the axon	Cell body in the middle of axon
3.	Cell body located in grey matter of spinal cord	Cell body located in dorsal root ganglion of the spinal chord

Structure of the nerve cell

1. The cytoplasm contains the same organelles as the other body cell; mitochondria, nucleus cell membrane and ribosome grouped in Nissl's granules.
2. Along nerve fibre or axon extend from the cell body in effector neurons or either sides of the cell body in sensory neuron to transmits impulses. The axon enclosed within a fatty **myelin sheath** which is not part of the neuron but another cell Schwann cell which wraps itself repeatedly round the axon. The myelin sheath protects the axon, but also insulates the axon and speeds up transmission of impulse.

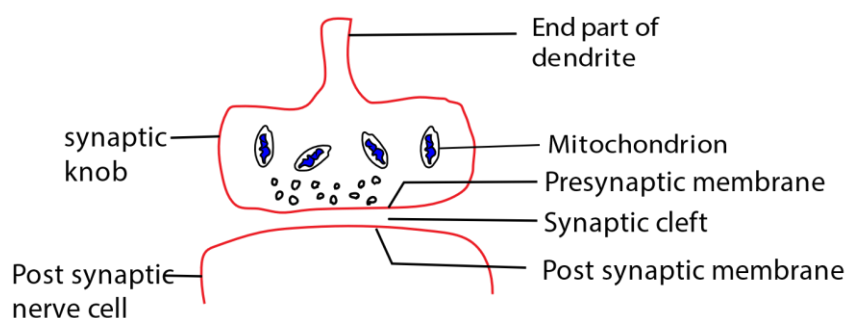
Functions of parts of nerve cell

- Nerve fibre or axon transmits impulses
- The myelin sheath protects the axon; it also insulates the axon and speeds up transmission of impulse.
- Nucleus controls cellular activity
- Dendrites or make contacts with other nerve cells or effector
- Nodes of Ranvier are microscopic gaps found within myelinated axons. Their function is to speed up propagation of action potentials along the axon via saltatory conduction
- The cell body preserves the structural integrity of the neuron, houses the genetic material, and supplies energy to drive activities.

The Synapse

This a functional area, where an axon come into contact with another for the purpose of transferring information. These are two types of synapse, electrical and chemical, depending on the nature of transfer of information across the synapse, A structurally dissimilar but functionally similar synapse exists between the terminal of a motor neuron and the surface of a muscle fibre and this is called neuromuscular junction.

Structure of the chemical synapse



The vertebrate nervous system.

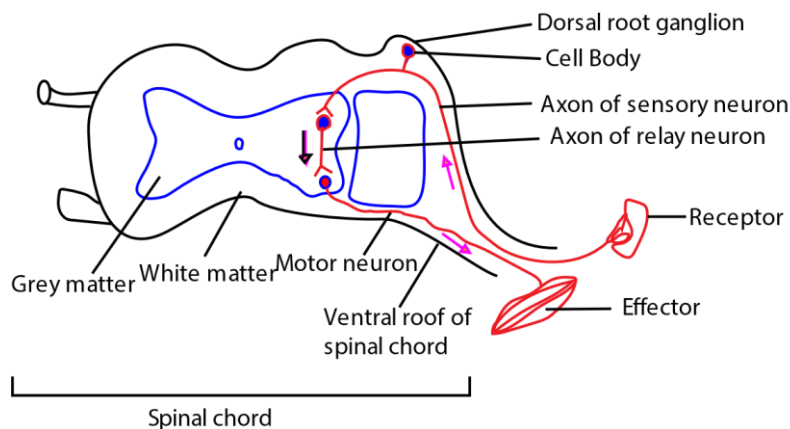
The nervous system of vertebrate is characterized by the structural and functional diversity of neurons and their complex organization with the body. The nervous system is subdivided into two main parts, the central nervous system [CNS] and peripheral nervous system.

The central nervous system consists of brain and spinal cord while peripheral nervous system consists of numerous nerves which link the CNS with the receptors and effectors.

Reflex action and reflex arch.

The reflex action is a rapid, automatic stereotyped response to a stimulus which is not under the conscious control of the brain. It's also described as involuntary action. The neurons forming the pathway taken by the nerve impulse in reflex action is referred to as reflex arch. Illustrated below.

The reflex arc



The brain

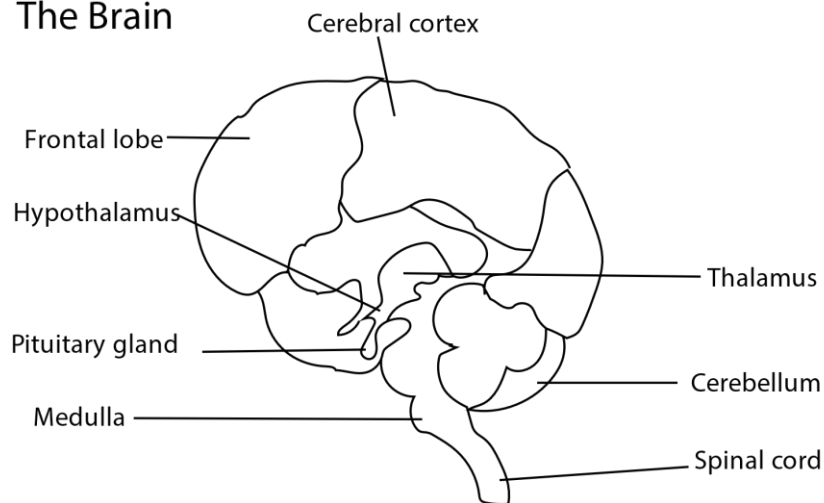
The brain is swollen anterior end of the vertebrate neural tube which has the over role of the coordination and control of the activities of the whole nervous system. To accomplish this there are special centers or nuclei in the different parts of the brain for dealing with specific functions such as locomotion, balancing and so on

Functions of the brain

1. Recieves impulses from receptors
2. Intergrates these impulses

3.sends out new impulses to the appropriate effect.

The Brain



General functions of the brain.

- (i) It stores information
- (ii) It receives impulses from all sensory organs
- (iii) It interprets impulses
- (iv) Coordinates body activities
- (v) Initiates response in glands and muscles.

Difference between nervous and endocrine system

	Nervous system	Endocrine system
1.	Fast acting	slow acting
2.	It's effects are localized	It's effects are diffuse
3.	Transmission are electrical and Chemical theory cell fibre	Relies on chemical transmission through circulatory system
4.	Transmission occur in nerve	It occurs in blood

Drug and drug abuse

Drugs

Drugs are substances that can alter the body's normal function. Some are used medically to treat diseases, while others are misused for recreational purposes, leading to harmful effects.

Drug Abuse and Its Effects

Drug abuse is the excessive or inappropriate use of substances, leading to addiction and health issues.

Health Effects:

- Damage to the brain, liver, lungs, and heart.
- Increased risk of mental disorders like depression and anxiety.
- Overdose, which can be fatal.

Social & Behavioral Effects:

- Strained relationships with family and friends.
- Poor work or school performance.
- Financial issues and legal trouble.

Long-Term Effects:

- Addiction, leading to dependence on the drug.
- Permanent damage to the brain and body.
- Higher risk of diseases like cancer and heart conditions.

Prevention & Treatment

- **Education & Awareness** – Teaching people about the dangers of drug abuse.
- **Counseling & Support Groups** – Providing help for individuals recovering from addiction.
- **Rehabilitation Centers** – Medical and psychological treatment for substance abuse.
- **Healthy Alternatives** – Engaging in hobbies, exercise, and positive social activities.

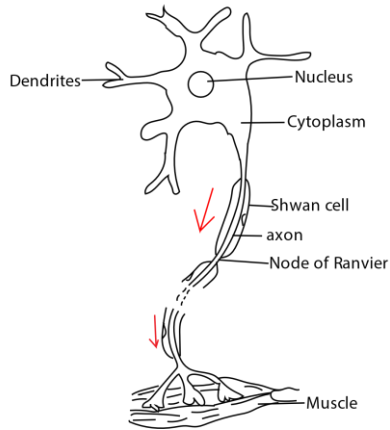
Revision questions

1. (a) Describe the structure of motor neuron
(b) (i) What is meant by the reflex action?
(ii) By means of a diagram show the path followed by a nerve impulse during a reflex action

Suggested answer

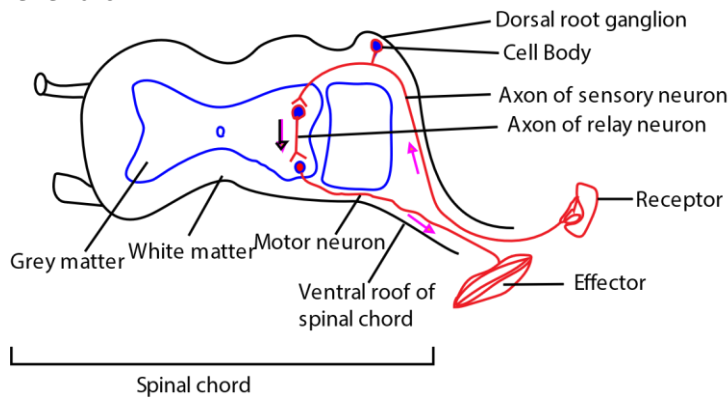
1. (a) A motor neuron is a nerve cell that conducts impulses from central nervous system to the effector.

Motor neuron



(b) A **reflex action** is an automatic and **rapid response** to a stimulus, without conscious thought.

(c) Reflex arc



Please obtain free notes, exams and marking guides of Physics, chemistry, biology, history, from digitalteachers.co.ug website.

Thanks

Dr. Bbosa Science