

LESSON NOTE FOR WEEK SEVEN (7)

SUBJECT TEACHER: Mr. Princewill Wilson (BIOLOGY TEACHER)

TOPIC: Reflex and Voluntary Actions, Conditional Reflex

OBJECTIVES

In today's class, we will be talking about reflex and voluntary actions, conditional reflex. Enjoy the class!

CONTENT

- ✓ Reflex and voluntary actions
- ✓ The reflex arc
- ✓ Differences between reflex and voluntary actions
- ✓ Conditioned reflexes
- ✓ Differences between hormonal and nervous coordination

Reflex and voluntary actions

Actions are responses to stimuli. These actions are grouped into two: involuntary (reflex) and voluntary actions.

Reflex actions

Reflex actions are automatic responses to stimuli which do not involve the conscious or higher centre of the brain. These actions are mainly protective, guarding us from dangerous stimuli and helping us to maintain posture and balance. Reflex actions include jerking of the legs, blinking of the eyes etc.

The reflex arc

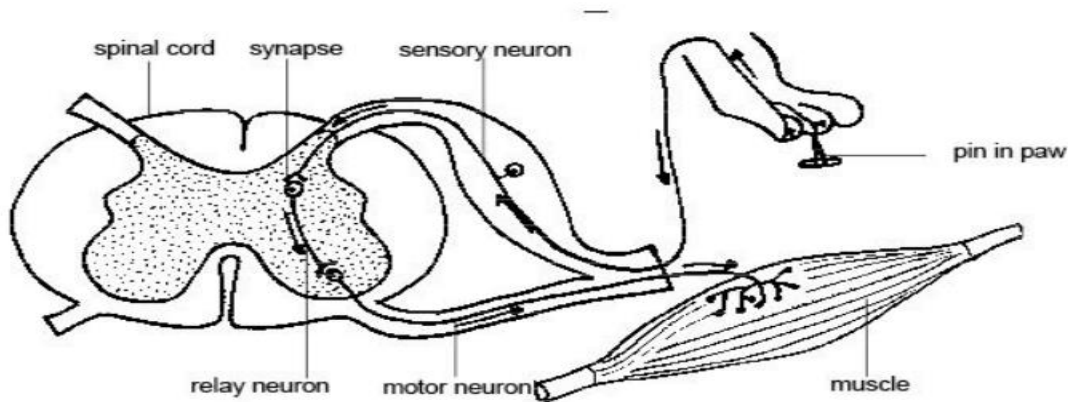
The reflex arc involves the following:

1. the sensory receptors that receive the stimulus.
2. the sensory neurones along which the sensory impulse travels
3. the relay or intermediate neurone through which the sensory impulse is passed on.
4. the motor (efferent) neurones along which the response is transmitted.
5. the effectors (muscles and glands) which the motor impulses trigger to bring about an appropriate response.

Reflex actions can be:

1. Spinal reflex involving the spinal cord e.g knee jerk
2. Cranial reflex involving the brain e.g closing of the pupil in the presence of bright light.

The reflex arc



Voluntary actions

These are actions initiated and controlled by the conscious part of the brain, which involves thoughts before a performance. They involve:

1. the conscious parts of the cerebrum
2. most of the reflex arc components
3. ascending and descending fibres in the spinal cord.

Examples of voluntary actions are playing football, solving mathematical problems, walking, driving etc.

Differences between reflex and voluntary actions

REFLEX ACTION	VOLUNTARY ACTION
1. Actions does not involve the higher centre of the brain (unconscious)	Actions involve the higher centre of the brain (conscious)
2. Involves a smaller number of neurones.	Involves numerous neurones.
3. Response is rapid	Response is slow
4. Response is stereotyped	Response varies with circumstances.
5, It is inborn	It can be learnt

Conditioned reflexes

A reflex action may be instinctive (does not have to be learned) e. g. sucking behaviour of newly born baby or conditioned reflex (learned responses or behaviour that can be performed without thinking about it) e. g. walking, riding a bicycle, writing e.t.c. A famous Russian biologist, Ivan Pavlov demonstrates what is meant by conditioned reflex using a puppy and associating its food time with the sound of a bell.

Roles of conditioned reflex on behaviour

1. It helps us to acquire new skills by learning such habits.
2. It helps to modify many simple reflex actions because of conditions associated with them.
3. It helps us to behave in a highly complicated manner (movements become faster and automatic.

Differences between hormonal and nervous coordination

NERVOUS COORDINATION	HORMONAL COORDINATION
1. Messages are transmitted as electrical impulses.	Messages are transmitted as chemical impulses.
2. Transmission is via nerve fibres.	Transmission is via the bloodstream.
3. Transmission is very fast	Transmission is slow.
4. Response is fast, short-lived and precise.	Response is slow, long-lasting and widespread.
5. It is mainly controlled by the brain and the spinal cord.	It is controlled by the pituitary gland.
6. Effectors (muscles and glands) receive the message.	Target organs receive the message.

ASSIGNMENT

1. Differentiate between conditioned and instinctive reflex actions
2. What are voluntary actions? Give five examples
3. Describe the pathway of a simple reflex arc.
4. What are reflex actions? Give five example
5. What are voluntary actions? Give five examples