

## Chapter – 7 Control and Coordination

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**Q1. What is the difference between a reflex action and walking?**

**Answer:**

Reflex action is an automatic, response to the stimulus which is not under the voluntary control. It is involuntary action which involves spinal cord. Walking is a voluntary action which involves thinking by the brain. The central nervous system takes part in the action of walking.

**Q2. What happens at the synapse between two nervous?**

**Answer:**

The synapse is a microscopic gap between any two adjacent neurons. Electrical impulses carrying messages pass over the synapse when going from neuron to another. Synapse between two neuron acts as a one-way valve which allows electrical impulses to pass in one direction.

When an electrical impulse from the receptor reaches the end of the axon of sensory neuron, electrical impulse releases a chemical substance into the synapse and starts electrical impulse in the dendrite of the next neuron.

So, the electrical impulse is passed from one neuron to the next across the synapse.

**Q3. Which part of the brain maintains posture and equilibrium of the body?**

**Answer:**

Cerebellum is a part of the brain which maintains posture and equilibrium of the body.

**Q4. How do we detect the smell of an *agarbatti* (incense stick)?**

**Answer:**

When *agarbatti* burns, it produces vapours having pleasant smell which is detected by the olfactory receptors inside our nose. The action of smell of *agarbatti* on receptors produce chemical reactions to generate electrical impulses. The sensory neurons carry these electrical impulses to cerebrum and detect the smell of burning *agarbatti*.

**Q5. What is the role of the brain in reflex action?**

**Answer:**

Reflex action takes place in the spinal cord and information that a reflex action has taken place goes on to reach the brain.

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**Q1. What are plant hormones?**

**Answer:**

The organic chemical produced in plants control growth, development and responses called plant hormones. The examples are: Auxins, Gibberellins, Cytokinin and Abscisic acid.

**Q2. How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?**

**Answer:**

The main differences between the movement of the leaves of a sensitive plant and the movement of a shoot towards light are:

S/No.	Movement of leaves of sensitive plant	Movement of a shoot towards light
1.	It is a nastic movement which does not depend on the direction of stimulus applied.	It is a tropic movement which depends on the direction of stimulus applied.
2.	The stimulus is 'touch'.	The stimulus of 'light'.
3.	It is caused by the sudden loss of water from the swellings at the base of leaves.	It is caused by the unequal growth on the two sides of the shoot.
4.	It is not a growth movement.	It is a growth movement.

**Q3. Give an example of a plant hormone that promotes growth.**

**Answer:**

Auxin is an example of a plant hormone that promotes growth.

**Q4. How do auxins promote the growth of a tendril around a support?**

**Answer:**

When a tip of a tendril touches a support, then the auxins in its tip move to that side which is away from the support. Auxins promote growth. So, due to more auxins in it, tendril grows faster and makes the tendril curve towards the support. This 'curving' tendril encircle the support and wind around it.

**Q5. Design an experiment to demonstrate hydrotropism.**

**Answer:**

We take two glass troughs A and B and fill each one of them two-thirds with soil. In trough A we plant a tiny seedling. In trough B we plant a similar seedling and also place a small 'clay pot' inside the soil. Water the soil in trough A daily and do not water the soil in trough B. Leave both the troughs for a few days.

Now, dig up the seedlings, without damaging their roots. The root of seedling in trough A is straight and the root of seedling B in trough B is bent to the right side.



This experiment shows that the root of a plant grows towards water or is positively hydrotropic.

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**Q1. How does the chemical coordination take place in animals?**

**Answer:**

The chemical coordination in animals takes place through the action of chemicals called 'hormones'. Hormones are the chemicals inside the animal body in small amounts by certain glands and are released into the blood. They are carried by the blood circulatory system to other parts of the body. The organs which they affect are called target organs. The hormones control and coordinate several functions such as growth, development, metabolism, behaviour and secondary sexual characteristics etc.

**Q2. Why is the use of iodised salt advisable?**

**Answer:**

Iodine is necessary for the thyroid gland to make thyroxine hormone. It regulates the metabolism of carbohydrates, fats and proteins for growth. If there is deficiency of

iodine in our diet, the formation of thyroxine hormone is reduced causing a disease called goitre.

Iodised salt provides all the iodine by the thyroid to make thyroxine. Hence, if we take iodised salt and goitre disease can be prevented.

**Q3. How does our body respond when adrenaline is secreted into the blood?**

**Answer:**

The adrenaline prepares our body to function at maximum efficiency during danger, anger, excitement, etc.

When we face a dangerous situation, nervous system stimulates the adrenal glands to secrete adrenaline into our blood which increases 'heart beats' breathing rate, blood flow into muscles and causes liver to store glucose into our body. Thus, adrenaline hormone produce energy and help to cope up with emergency situations.

**Q4. Why are some patients of diabetes treated by giving injections of insulin?**

**Answer:**

Insulin is a hormone produced and secreted by a gland pancreas. The function of insulin hormone is to lower the blood sugar level. Deficiency of insulin hormone raises the blood sugar level causing diabetes. Some person having diabetes are treated by injections of insulin as it lowers the blood sugar level.

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**Q1. Which of the following is a plant hormone?**

- a) Insulin
- b) Thyroxin
- c) Oestrogen
- d) Cytokinin

**Answer:** Option d)

Cytokinin are chemicals that induce cell proliferation and trigger callus differentiation to shoot when applied with auxins, but now it is known that cytokinin. Cytokinin helps in cell growth in the apical region and leaf senescence.

**Q2. The gap between two neurons is called as:**

- a) Dendrite
- b) Synapse
- c) Axon

**d) Impulse**

**Answer:** Option b)

Synapse is defined as the point of contact between the terminal branches of the axon of one neuron with the dendrite of another neuron.

**Q3. The brain is responsible for:**

- a) Thinking**
- b) Regulating the heart beat**
- c) Balancing the body**
- d) All of the above**

**Answer:** Option d)

- The brain can be divided into three basic units: the forebrain, the midbrain, and the hindbrain.
- The brain directs our body's internal functions.
- The brain controls your ability to talk, feel, see, hear, think, remember things, walk, and much more.
- The Brain even controls your breathing.

**Q4. What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?**

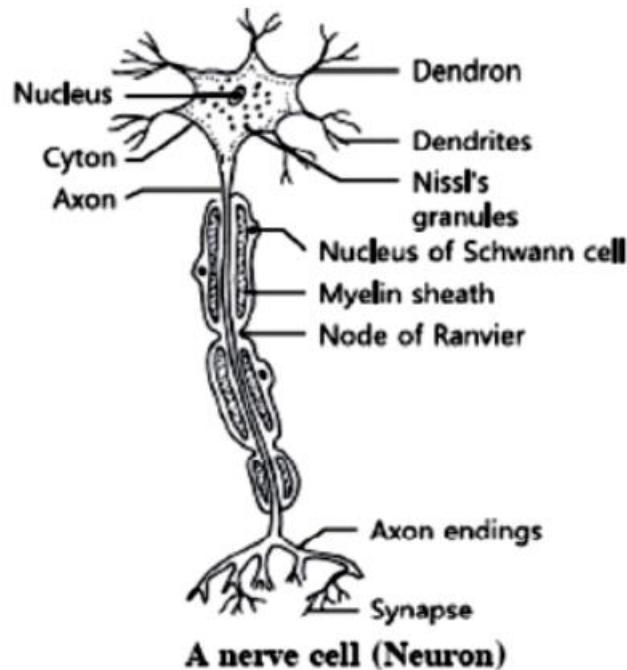
**Answer:**

Receptors are the special cells present in sense organs which detect all the information and feed it to the nervous system. Example, gustatory receptors in our tongue detect taste of food whereas olfactory receptors present in our nose detect smell.

**Q5. Draw the structure of a neuron and explain its functions.**

**Answer:**

A neuron has three parts: cell body, dendrites and axon. The cell body of a neuron is animal cell which contains cytoplasm and a nucleus. A long and thin fibres are called nerve fibres. The shorter fibres of a neuron are called dendrites. The longest fibre of a neuron is called axon. The axon has an insulating and protective sheath of myelin around it.



The function of neurons is to carry messages in the body of a person, in the form of electrical impulses. Neurons make the whole nervous system work effectively. Example, the sensory neurons transmit impulses from the sensory cells or receptors to central nervous system. And the motor neurons transmit impulses from the central nervous systems to muscle cells for taking action.

**Q6. How does phototropism occur in plants?**

**Answer:**

The process of phototropism is the growth of an entity to a light stimulus. This process is observed in plants and also in fungi. Plant cells that are away from light have a chemical auxin which are active and reacts when phototropism occurs. Tips of leaves and stems contain auxin, to grow towards the light. In this phenomenon, the plant grows towards the sunlight. When the plant body grows in the opposite direction to the sunlight, it is negative phototropism.

**Q7. Which signals will get disrupted in case of a spinal cord injury?**

**Answer:**

Reflex actions and involuntary actions get disrupted in spinal cord injury.

**Q8. How does chemical coordination occur in plants?**

**Answer:**

The plants do not have nervous system but still sense things such as light, gravity, chemicals, water, and touch etc., and respond to them by hormones. Thus, the plants coordinate their behaviour against environment changes by hormones called 'chemical coordination'. The hormones in plants coordinate their behaviour by affecting the growth of the plant resulting in the movement of plant part in response to a stimulus.

**Q9. What is the need for a system of control and coordination in an organism?**

**Answer:**

An organism needs a system of control and coordination.

- i) The plants need carbon dioxide, water and sunlight. It is due to the presence of a hormonal system of control and coordination in plants that the stomata allow in carbon dioxide gas, the roots bend towards water and the shoots grow towards sunlight. It is also due to control and coordination that tendrils in plants having weak stems make them climb on supports.
- ii) In human beings, the system of control and coordination is needed for all actions, thinking and behaviour. The human nervous system receives information from the surroundings, processes it and then responds. Our heart beats, breathing, reading, writing, cycling, dancing and various reflex actions are controlled by nervous systems.

**Q10. How are involuntary actions and reflex actions different from each other?**

**Answer:**

Involuntary actions are not control even if we want to. There is no stimulus involved in the involuntary actions. Example, heart beats all the time without thinking about it. So, the beating of heart is involuntary action. They are regulated by the brain. The reflex actions are also involuntary actions but they take place in response to a stimulus. Example, the decrease in the size of the pupil of eye towards bright light is a reflex action which takes place in response to a stimulus light.

**Q11. Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.**

**Animals:**

S/No.	Nervous system	Hormonal system
1.	Made of neurons	Made of secretory cells
2.	Messages transmitted in the	Messages transmitted in the form of

	form of electrical impulses.	chemicals called hormones.
3.	Messages transmitted along nerve fibres	Messages transmitted through blood stream
4.	Messages travel very quickly	Messages travel more slowly
5.	Effect of message usually lasts for a very short period of time.	Effect of message usually lasts longer.

**Q12. What is the difference between the manner in which movement takes place in a sensitive plant and the movement in your legs?**

**Answer:**

The movement in the leaves of a sensitive plant takes place due to sudden loss of water in the pad-like swellings at the base of all the leaves. The loss of water leads to drooping and folding of leaves and the movement in legs takes place when the leg muscles pull on the leg bones.