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Coordination and control in animals

Coordination means to cause the part to function together or in proper order.

Coordination and control in animals is performed by the nervous system and endocrine system.

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

The nervous system.

The nervous system is divided into:-

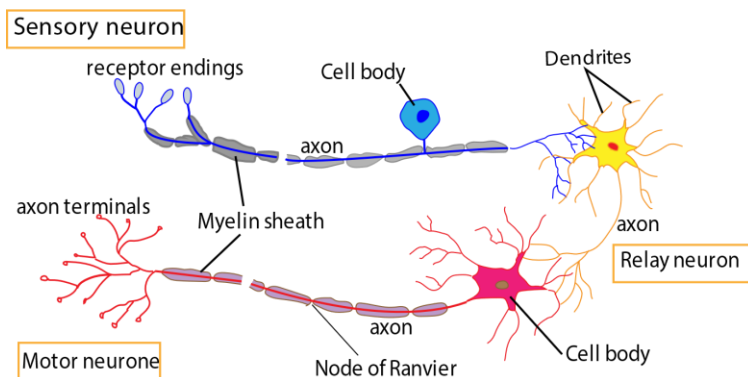
- The **central nervous system** (CNS) includes the brain and spinal cord and,
- The **peripheral nervous system** includes all of the nerves that branch out from the brain and spinal cord and extend to other parts of the body including muscles and organs.

The nerve cells

The nervous system is composed of highly specialized cells called **nerve cells** or **neurons**.

Sensory neurons are nerve cells that carry impulses from receptors to the control nervous system.

Effector neurons are nerve cells that carry impulses from the Central Nervous System to effector.



Reflex action and reflex arch.

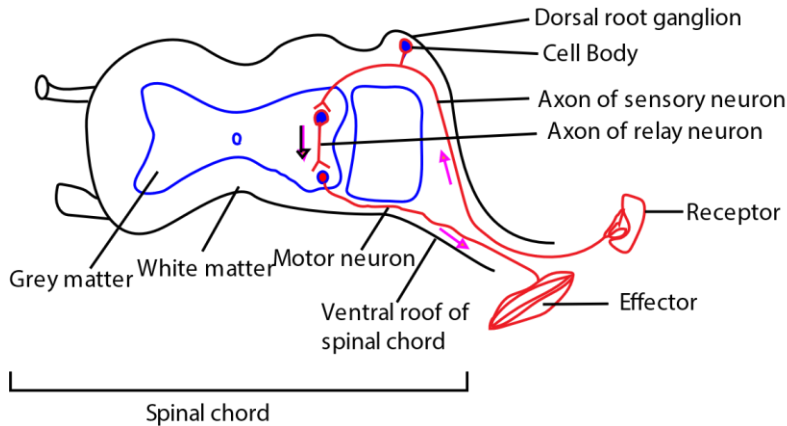
The reflex action is a rapid, automatic stereotyped response to a stimulus which is not under the conscious control of the brain. It's also described as involuntary action.

Example of reflex actions

- Rapid withdraw of the arm from a hot object
- Rapid withdraw of the foot from a sharp object.

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

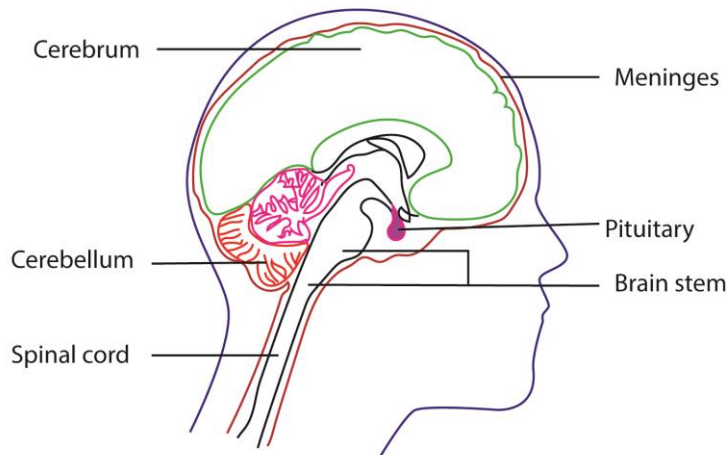
The brain is the swollen anterior end of the vertebrate neural tube which has the overall role of the coordination and control of the activities of the whole nervous system.

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. Receives impulses from receptors
2. Integrates these impulses
3. Sends out new impulses to the appropriate effect.

The Central nervous system



Function of the main parts of the brain the human brain.

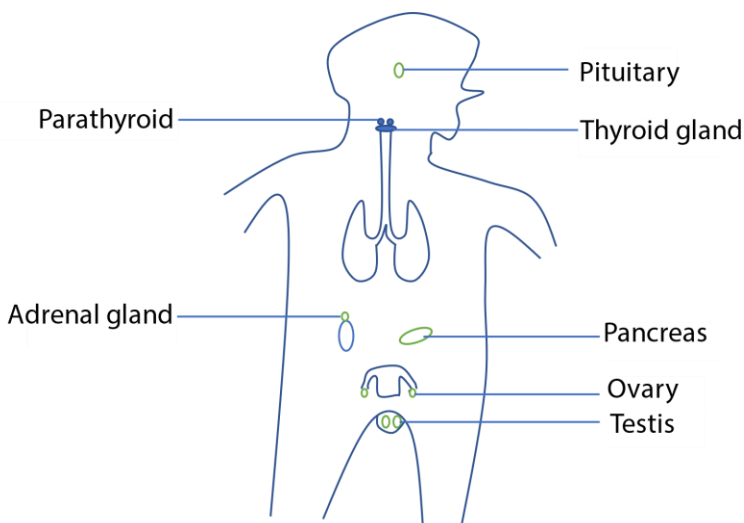
1. The **cerebellum** coordinates voluntary movements such as posture, balance, coordination, and speech, resulting in smooth and balanced muscular activity. It is also important for learning motor behaviors
2. **Pituitary** is an endocrine gland that secretes a wide range of hormones controlling such function as water and salt balance, growth, metabolism and sexual development.
3. **The cerebrum** is for initiation of movement, coordination of movement, temperature, touch, vision, hearing, judgment, reasoning, problem solving, emotions, and learning
4. **Brainstem**: acts as a relay center connecting the cerebrum and **cerebellum** to the spinal cord
5. **Spinal cord** has three major roles:
 - to relay messages from the brain to different parts of the body,
 - to perform an action, to pass along messages from **sensory** receptors to the brain,
 - and to coordinate reflexes that are managed by the spinal cord alone.
6. Meninges are membranes that protect the brain and spinal cord

Hormonal communication.

Hormones are organic compounds produced in one part of the body, from which is transported - usually in the blood stream – to another part when it evokes a response.

In the human and other vertebrate hormones are secreted into the blood stream by **endocrine glands**.

Position of the main endocrine gland in a human body

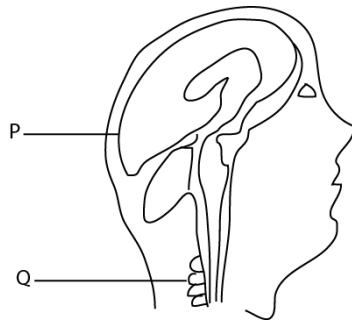


The principle endocrine glands of mammal, hormones and functions of the hormones

- (i) **Pituitary** produce hormones that control other endocrine glands
- (ii) **Ovaries** promotes produce estrogens hormones that secondary sexual characteristic of female control menstrual cycle and pregnancy.
- (iii) **Testis** produce androgens that promote development of testes and secondary sexual characteristics
- (iv) **Pancreas** produce insulin that regulates blood sugar concentration

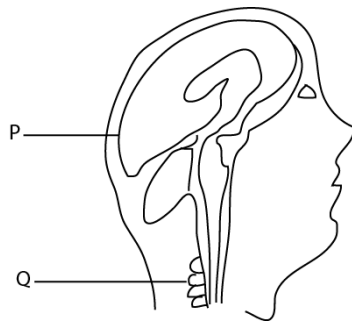
Revision Questions

1. Use the diagram below to answer the question which follow.



- (a) What name is given to the part labelled P
.....
 - (b) Give the function of the part marked Q.
.....
 - (c) Name two sense organs shown in the diagram above, by which someone can tell that there is something burning?
.....
.....
2. Give two functions of the nerves in e human body.
.....
.....
- (b) In which ways is food important in the human body?
.....
.....
3. State the most important part of the nervous system.
.....
4. How is the function of motor nerves different from those of sensory nerves?
.....
.....

1. Use the diagram below to answer the question which follow.



- (a) What name is given to the part labelled P
Cerebrum
- (b) Give the function of the part marked Q.
To protect the spinal cord.
- (c) Name two sense organs shown in the diagram above, by which someone can tell that there is something burning?
Nose
Eye
2. Give two functions of the nerves in the human body.
Conduct impulses to the brain
To transport impulses from the brain to the body
- (c) In which ways is food important in the human body?
To provide materials for growth
For body repair
Provide energy
Cure deficiency diseases
3. State the most important part of the nervous system.
Brain
4. How is the function of motor nerves different from those of sensory nerves?
Motor nerve carry impulses from the central nervous system to the body while sensory nerves carry impulses from the body to the central nervous system.