

### 5.1 Homeostasis

**homeostasis** - the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes

In the human body, homeostasis controls :

- blood glucose concentration
- body temperature
- water levels

These automatic control systems, involving **nervous responses & hormonal (chemical) responses**, detect changes and respond to them.

All control systems include :

- **receptors** - cells that detect *stimuli* (changes in the environment)
- **coordination centres** - receive and process information from receptors, e.g. brain, spinal cord, pancreas
- **effectors** - muscles or glands that bring about responses to restore optimum levels

#### 5.2.1 Structure and Function

The nervous system enables humans to react to their surroundings and to coordinate their behaviour.

- neurone** · long axon - can travel long distances in the body
- adaptations** · myelin sheath - insulates axon -> increases speed of nerve impulses
- dendrites - branch from dendrons ; receive incoming nerve impulses from other neurones

stimulus > receptor > coordinator > effector > response

- Information from *receptors* passes along cells (neurones) as electrical impulses to the *central nervous system* (CNS)
- The CNS (brain & spinal cord) coordinates the response of *effectors* which may be muscles contracting or glands secreting hormones

**reflexes** - automatic responses which occurs unconsciously

The information travels down a **reflex arc**, allowing vital responses to take place quickly.

These impulses do not pass through the conscious part of the brain.

- When a *stimulus* is detected by *receptors*, impulses are sent along a **sensory neurone** to the CNS
- In the CNS the impulse passes to a **relay neurone** from a sensory neurone via a **synapse**\*
- Impulses are passed onto a **motor neurone** from a motor neurone via another synapse\*
- The impulse reach an *effector* resulting in an appropriate response (quicker than normal)

**synapse** - the connection/gap between two neurones

- \* · The electrical impulse is transferred by chemicals which diffuse across the gap
- These chemicals then set off a new electrical impulse in the next neurone.

stimulus > receptor > sensory neurone > CNS > motor neurone > effector > response

**reaction time** - how long it takes you to respond to a stimulus

- can be measured with the ruler drop test

#### 5.2.2 The Brain

#### 5.2.3 The Eye



