

Homeostasis

What is homeostasis ?

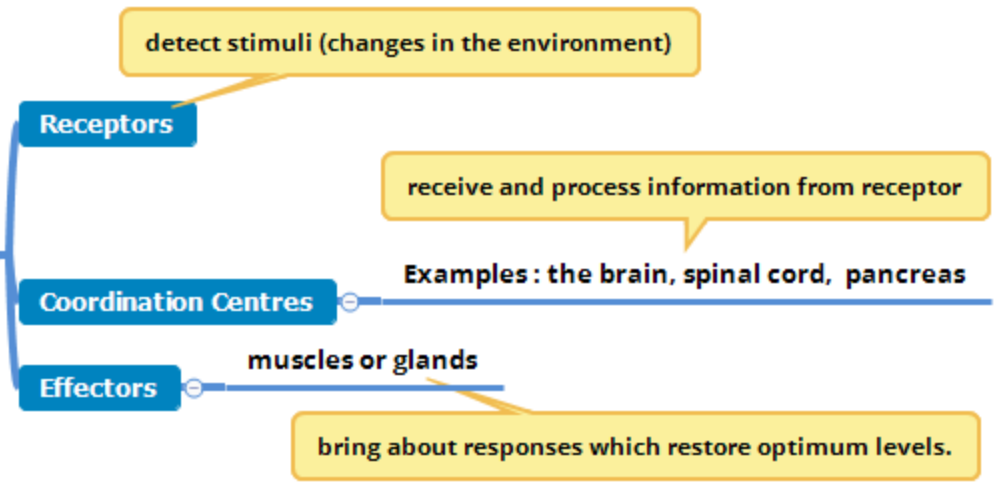
The regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes

Negative feedback in action

Types of responses

- Chemical
- Nervous

Control System Components



Nervous System

Information from receptors
passes along cells (neurones) as electrical impulses
to the central nervous system (CNS)
CNS is the brain and spinal cord
CNS coordinates the response of effectors
responses can be muscles contracting or glands secreting hormones
stimulus to receptor to coordinator to effector to response
Reflex actions do not involve the conscious part of the brain

Body Temperature Regulation

Body temperature too high....
....blood vessels dilate (vasodilation)
....sweat is produced from the sweat gland
body temperature is too low
...blood vessels constrict (vasoconstriction)
..sweating stops
skeletal muscles contract (shiver)

Blood Glucose Concentration

Blood glucose concentration is too high
.... pancreas produces the hormone insulin
....causes glucose to move from the blood into the cells.
Excess glucose is converted to glycogen for storage
...in liver and muscle cells
Blood glucose concentration is monitored and controlled by the pancreas
Type 1 diabetes: the pancreas fails to produce sufficient insulin
....characterised by uncontrolled high blood glucose levels
.... treated with insulin injections
Type 2 diabetes: the body cells no longer responds to insulin produced by the pancreas....
....a carbohydrate controlled diet and an exercise regime are common treatments
Obesity is a risk factor for Type 2 diabetes

Maintaining Water Balance

Water level in the body is controlled by the hormone ADH
....which acts on the kidney tubules
ADH is released by the pituitary gland
....when the blood is too concentrated
This causes more water to be reabsorbed back into the blood
....from the kidney tubules