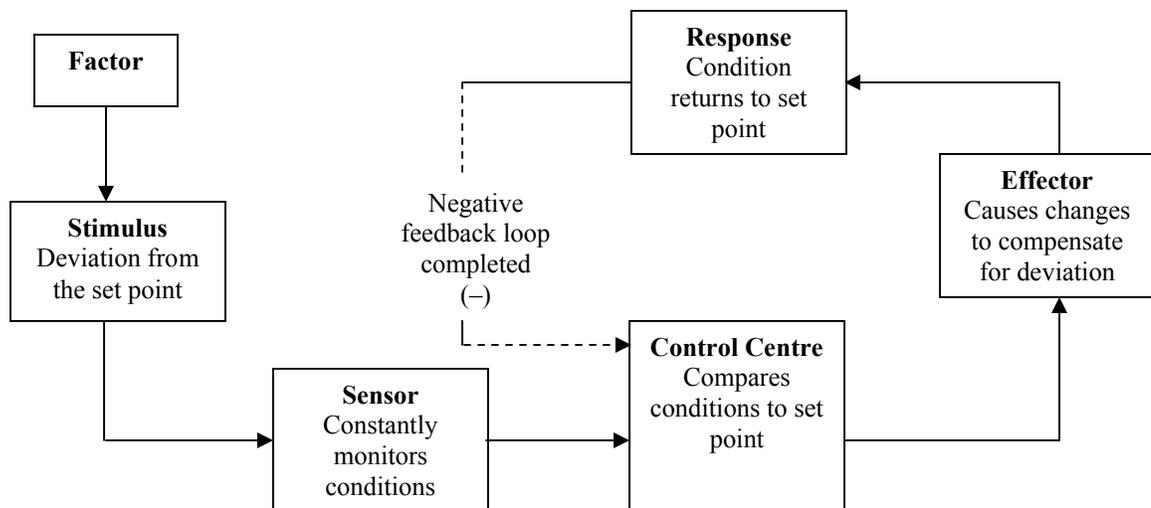


SUMMARY OF HOMEOSTASIS

- Homeostasis is defined as “the dynamic constancy of the internal environment.” The term “dynamic” is used because conditions in a living organism are never absolutely constant but fluctuate continuously within narrow limits. Homeostasis is essential for life, and most of the regulatory mechanisms of the vertebrate body that are not devoted to reproduction are concerned with maintaining homeostasis.
- To maintain internal constancy, the human body must have sensors that are able to measure each condition of the internal environment. These sensors constantly monitor the extracellular conditions and relay this information to a control centre, which maintains the “set point” (the proper value for that condition). The control centre is often a particular region of the brain or spinal cord. However, it can also be cells of endocrine glands.
- The control centre receives messages from several sensors, weighing the relative strength of each sensor input, and then determines whether the value of the condition is deviating from the set point. When a deviation in a condition occurs (the “stimulus”), the integrating centre sends a message to increase or decrease the activity of particular effectors.
- Effectors are generally muscles or glands and can change the value of the condition in question back to the “set point.” This is called the response.
- Negative feedback loops maintain a state of homeostasis, or dynamic constancy of the internal environment, by correcting deviations from a set point. In terms of negative feedback, a sensor detects a change that disrupts a balanced state and signals a control centre. The control centre then activates an effector, which reverses the change and restores the balanced state.



Homeostasis

- The figure below shows how negative feedback applies to the control of body temperature by using a “seesaw model.” A seesaw is level when the forces acting on it are balanced. If a change occurs to disrupt the balance, the seesaw can be made level again by applying a force to reverse the change.
- Negative feedback loops keep the body temperature within a normal range around the set point of 37 °C. An increase (above normal) or decrease (below normal) in body temperature is sensed by the brain. The control centre in the brain processes the information and activates effectors, such as the surface blood vessels, sweat glands, and skeletal muscles. When the body temperature returns to normal, negative feedback prevents further stimulation of the effectors by the control centre.

