

Homeostasis

Revision notes • Homeostasis keeps conditions in the body at the optimum for enzymes and cells, using receptors, coordination centres and effectors.

For AQA GCSE Biology 8461 and Combined Science: Trilogy 8464. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Homeostasis Spec 4.5.1

What homeostasis is Spec 4.5.1

Cells in the body can only survive within narrow physical and chemical limits. They need a constant temperature and pH, and a constant supply of dissolved food and water. The body therefore has control systems that constantly monitor and adjust the composition of the blood and tissues.

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.

Homeostasis maintains **optimal conditions for enzyme action** and for all cell functions. If conditions drift too far from the optimum, enzymes work more slowly or stop working, and cells cannot carry out their reactions.

In the human body, homeostasis includes control of:

- **blood glucose concentration**
- **body temperature**
- **water levels**

These control systems are **automatic**. They may involve **nervous responses** or **chemical responses** (hormones).

Exam tip: Homeostasis does not keep conditions exactly the same all the time. It keeps them close to the optimum. Link your answer to enzymes working at their best.

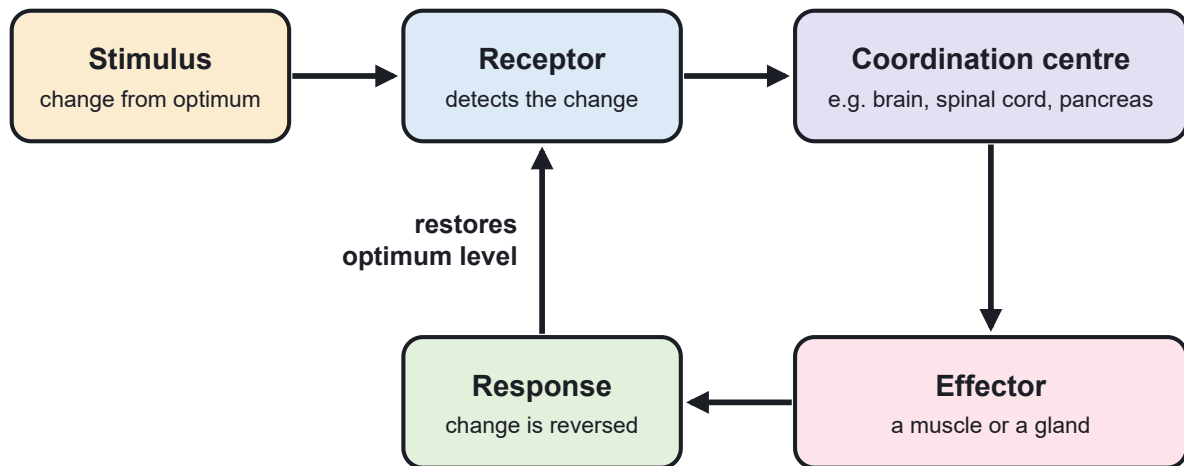
Parts of a control system Spec 4.5.1

All control systems include three types of component.

The three parts of every control system

Component	What it does	Examples
Receptors	Cells that detect stimuli (changes in the environment)	Temperature receptors in the skin
Coordination centres	Receive and process information from receptors	The brain, the spinal cord and the pancreas
Effectors	Muscles or glands that bring about responses which restore optimum levels	A muscle that contracts; a gland that secretes a hormone

The sequence is: stimulus, receptor, coordination centre, effector, response. The response restores the optimum level, which the receptors then detect again.



Every control system: **stimulus** → **receptor** → **coordination centre** → **effector** → **response**, which restores the optimum level.

Common mistake: Effectors are muscles or glands only. Do not write that the brain or a receptor is an effector.

Quick check

1. Define homeostasis.
2. Name three things controlled by homeostasis in the human body.
3. What do receptors do?
4. Name the two types of effector.

Quick check answers

Homeostasis

- 1 . The regulation of the internal conditions of a cell or organism to maintain optimum conditions for function, in response to internal and external changes.
- 2 . Blood glucose concentration, body temperature and water levels.
- 3 . They detect stimuli (changes in the environment).
- 4 . Muscles and glands.