# 25.1 Feedback and internal conditions

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

**KEY WORDS** homeostasis • negative feedback

## Objective

Feedback and internal conditions. Original classroom practice for IB HL; not an official IB paper.

## 1 Key knowledge and worked examples

### What would explain this observation?

- Blood glucose rises after a meal, but usually does not keep rising indefinitely. A control system responds to the change in internal conditions.

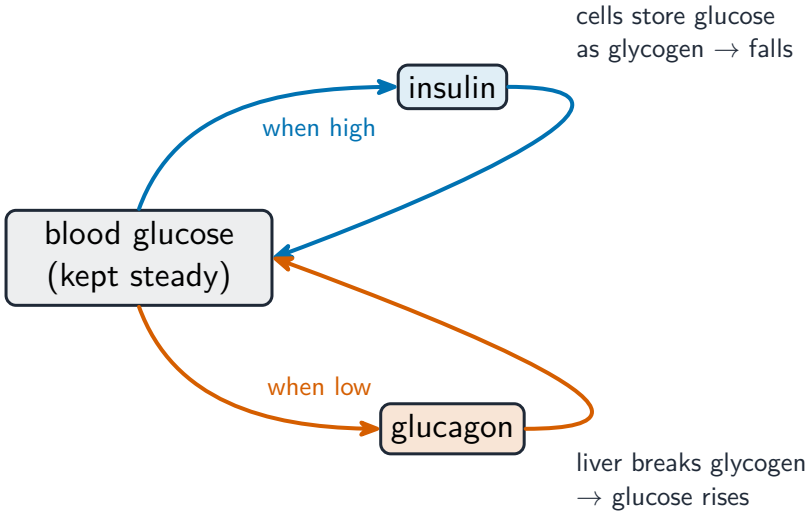
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### Build the model

- **Homeostasis** maintains internal conditions within suitable limits.
- Receptors detect changes, coordination centres process information, and effectors respond.
- **Negative feedback** opposes the original change.
- homeostasis: Maintenance of suitable internal conditions.
- negative feedback: A response opposing the original change.



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### Choose evidence that can test it

- When blood glucose is high, insulin helps increase glucose uptake and storage as glycogen.
- When it is low, glucagon supports release of glucose from stores.
- These responses are coordinated, not identical effects of two hormones.

**In the lab:** Interpret a time graph by identifying the initial disturbance, the response and the return toward the normal range. Mark the delay before a response. Do not assume a graph shows an instantaneous correction.

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### Work from known quantities

- Known: glucose changes from 5.0 to 7.0 arbitrary concentration units.
- Increase = final - initial.
- Increase = 7.0 - 5.0 = 2.0 units.
- Percentage increase = $2.0/5.0 \times 100 = 40\%$.
- The numerical change is evidence of a disturbance, not a diagnosis on its own.

**Your turn:** A value rises from 4.0 to 5.0. Calculate the percentage increase.

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### Check the conclusion and its limits

- Negative feedback does not mean the response is harmful or the measured value becomes negative.
- Diabetes has different mechanisms; do not treat every case as a failure to make insulin.

**Not true:** Negative feedback always makes the measured value negative. Negative feedback means the response opposes the change - it pushes the value back towards the set point. "Negative" describes the direction of correction, not a harmful effect or a negative measurement.

**Key:**

- Homeostasis maintains internal conditions within suitable limits.
- When blood glucose is high, insulin helps increase glucose uptake and storage as glycogen.
- Watch for: negative feedback does not mean the response is harmful or the measured value becomes negative.

■ **Write from a rise of 60 percent**

- A glucose value rises from 5.0 to 8.0 units.
- Find the percentage increase. The number is not a diagnosis.

## 2 Practice

**2.1** Which response opposes a rise in blood glucose? Choose one answer.

- **A** Increased release of glucose from glycogen
- **B** Increased insulin action
- **C** Stopping all cellular respiration [1]

**2.2** A value rises from 4.0 to 5.0. Calculate the percentage increase. Show the relation, substitution and units. [2]

**2.3** Decide whether this claim is true and justify: Negative feedback means the response opposes the change - it pushes the value back towards the set point. “Negative” describes the direction of correction, not a harmful effect or a negative measurement. [2]

**2.4** Maintenance of suitable internal conditions: write the technical term. [1]



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## 3 Exam-style questions

**3.1** A fictional regulated variable changes from 4 to 5 units, then returns to 4. Explain the sign of the corrective response and why recovery alone does not identify the sensor. [4]



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