Edexcel (B) Biology A-level

9.1 - Homeostasis

9.2 - Chemical control in mammals

Flashcards

What is homeostasis?

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Internal environment is maintained in dynamic equilibrium within set limits around an optimum.

Why is it important that core temperature remains stable?

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Maintain stable rate of enzyme-controlled reactions.

Temperature too low = enzyme & substrate molecules have insufficient kinetic energy.

Temperature too high = enzymes denature.

Why is is important that blood pH remains stable?

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Maintain stable rate of enzyme-controlled reactions (& optimum conditions for other proteins).

Acidic pH = H^+ ions interact with H-bonds & ionic bonds in tertiary structure of enzymes → shape of active site changes so no ES complexes form.

Why is it important that blood water potential remains stable?

Why is it important that blood water potential remains stable?

Prevent osmotic lysis/ crenation of cells

Define negative feedback.

Define negative feedback.

Self-regulatory mechanisms return the internal environment to optimum when there is a fluctuation.

Define positive feedback.

Define positive feedback.

A fluctuation triggers changes that result in an even greater deviation from the normal level.

What are hormones?

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Proteins secreted by endocrine glands & transported in bloodstream. Specific tertiary structure is only complementary to receptors on certain cells.

Outline the general stages involved in negative feedback.

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Receptors detect deviation → coordinator → corrective mechanism by effector → receptors detect that conditions have returned to normal.

Suggest why separate negative feedback mechanisms control fluctuations in different directions.

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Provides more control, especially in case of ‘overcorrection’, which would lead to a deviation in the opposite direction from the original one.

Why is there a time lag between hormone production and response by an effector?

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It takes time to:

- Produce hormone.
- Transport hormone in the blood.
- Cause required change to the target protein.

Explain the mode of action of adrenaline.

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Secondary messenger model

1. Hormone-receptor complex forms.
2. Conformational change to receptor activates G-protein.
3. Activates **adenylate cyclase**, which converts ATP to **cyclic AMP** (cAMP).
4. cAMP activates **protein kinase A** pathway.
5. Results in **glycogenolysis**.

Explain the mode of action of oestrogen.

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1. Steroid hormone diffuses through cell membrane.
2. Forms hormone-receptor complex with ER α receptor in the cytoplasm.
3. Complex enters the nucleus & acts as transcription factor.