A12 · Stress: epinephrine, cortisol and aldosterone · Practice key

This is the worked key. Every practice question is worked step by step.

Worked examples

Read these first. There is one for each kind of question in this lesson.

Example 1 · Sort a stress response

A sprinter's heart pounds one second after the starting gun. Which response is this, and which hormone?

1. It starts within seconds, so nerves trigger it.
2. Sympathetic nerves make the adrenal medulla release epinephrine.

Answer: The short-term stress response; epinephrine.

Example 2 · Trace the cortisol loop

List the glands and hormones from long-term stress to a rise in blood sugar.

1. The hypothalamus sends a releasing hormone to the pituitary gland.
2. The pituitary gland releases ACTH.
3. The adrenal cortex releases cortisol.
4. Cortisol raises blood sugar.

Answer: Hypothalamus, pituitary gland (ACTH), adrenal cortex (cortisol).

Practice

Questions 1 to 4 are easy. Questions 5 to 8 are medium. Questions 9 and 10 are harder.

EASY

1. Name the inner part of the adrenal gland.

1. Nerves control it.
2. It is the adrenal medulla.

EASY

2. Name the hormone released in the short-term stress response.

1. The adrenal medulla releases it.
2. It is epinephrine.

EASY

3. Name the hormone that makes the adrenal cortex release cortisol.

1. The pituitary gland releases it.
2. It is ACTH.

EASY

4. Name the organ that aldosterone acts on.

1. It returns sodium ions to the blood.
2. It is the kidney.

MEDIUM

5. State two changes that epinephrine causes in the body.

1. Any two: blood sugar rises, heart rate rises.
2. Also: breathing rate rises, pupils dilate.

MEDIUM

6. Explain how cortisol raises blood sugar.

1. It makes the liver change amino acids into glucose.
2. It also makes fat break down.

MEDIUM

7. Explain how aldosterone helps to keep blood pressure up.

1. It makes the kidneys return more sodium ions to the blood, and water follows.
2. The volume of the blood stays up, so the blood pressure stays up.

MEDIUM

8. Compare the short-term and the long-term stress response. Give what starts each one.

1. Short-term: started by nerves.
2. Long-term: started by a hormone, ACTH.

HARDER

9. A tumour makes the pituitary gland release too much ACTH. Predict the level of cortisol and its effect on blood sugar. Explain.

1. ACTH makes the adrenal cortex release cortisol.
2. So cortisol is high.
3. Cortisol raises blood sugar, so blood sugar is high.

HARDER

10. A person takes cortisol pills for many months. Use the loop to predict the level of their own ACTH. Explain.

1. Cortisol in the blood is high.
2. It inhibits the hypothalamus and the pituitary gland.
3. So the pituitary gland releases little ACTH.