A14 · Water and salt balance: ADH 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 · Decide which hormone responds

A hiker has no water all day in the heat. Which hormone responds, and what is the urine like?

1. Step 1: water is lost, so the blood is too concentrated.
2. Step 2: ADH is released.
3. Step 3: the kidneys return more water to the blood.
4. Step 4: the urine is small in volume and concentrated.

Answer: ADH. A small volume of concentrated urine.

Example 2 · Read urine data

A person makes 12 L of dilute urine a day, with no glucose in it. What does this suggest?

1. A very large volume of dilute urine means the kidneys return little water.
2. No glucose rules out diabetes mellitus.

Answer: Little or no ADH: diabetes insipidus.

Practice

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

EASY

1. State what the letters ADH stand for.

1. It works against making urine.
2. ADH is antidiuretic hormone.

EASY

2. Name the receptors that detect how concentrated the blood is.

1. They are in the hypothalamus.
2. They are osmoreceptors.

EASY

3. Name the gland that releases ADH into the blood.

1. The hypothalamus makes ADH.
2. The posterior lobe of the pituitary gland releases it.

EASY

4. Name the gland that releases aldosterone.

1. It is the outer layer of the adrenal gland.
2. It is the adrenal cortex.

MEDIUM

5. State what happens to the osmotic pressure of the blood when you drink a lot of water.

1. The blood becomes more dilute.
2. Its osmotic pressure falls.

MEDIUM

6. Describe the urine of a person who has a lot of ADH in the blood.

1. The kidneys return more water to the blood.
2. The urine is small in volume and concentrated.

MEDIUM

7. State what the kidneys return to the blood because of ADH, and because of aldosterone.

1. ADH: water.
2. Aldosterone: sodium ions, and water follows.

MEDIUM

8. A healthy person makes 1.5 L of urine a day. A person with no ADH makes 12 L. Calculate the extra volume. Name the condition.

1. 12 − 1.5 = 10.5 L.
2. The condition is diabetes insipidus.

HARDER

9. A person has severe diarrhea for two days and loses a lot of fluid. Use the four steps to predict the hormone released and its effect.

1. There is too little blood.
2. Aldosterone is released.
3. The kidneys return more sodium ions, and water follows.
4. Blood volume and blood pressure rise.

HARDER

10. The posterior lobe of the pituitary gland is damaged in an accident. Predict the effect on the volume of urine. Explain.

1. The posterior lobe releases ADH.
2. With little ADH, the kidneys return less water to the blood.
3. The urine is large in volume and dilute.