

15.2 Control and coordination in plants

Name: _____ Class: _____ Date: _____

Total: 10 marks

KEY WORDS gibberellin • venus fly trap • auxin • proton
• germination

Objective

Build the skills to answer exam questions on **control and coordination in plants** – the **Venus fly trap**, **auxin** in elongation growth, and **gibberellin** in germination.

You must be able to:

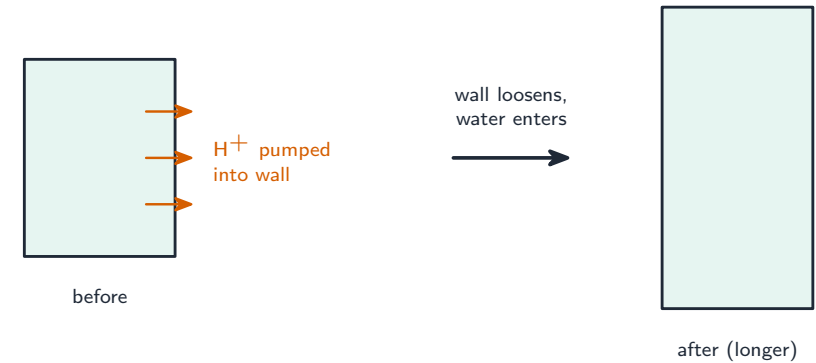
- describe the rapid response of the Venus fly trap and how the trap closes
- explain how auxin causes elongation growth by acidifying the cell wall
- describe the role of gibberellin in the germination of barley

1 Key knowledge and worked examples

■ The Venus fly trap

Touching the trigger hairs starts a fast electrical signal; cells rapidly lose water and change shape, so the trap snaps shut to catch the insect.

■ Auxin and elongation growth



Auxin's “acid growth”: H^+ pumped into the wall loosens it, so the cell stretches as water enters

Auxin makes the cell pump **protons** (H^+) into the **cell wall**; this **acidifies** and loosens the wall, so the cell can stretch as water enters – **elongation** growth.

■ Gibberellin and germination

In germinating **barley**, gibberellin switches on the genes that make **amylase**, which breaks down stored starch into sugars to feed the growing seedling.

2 Practice

2.1 Name the plant hormone responsible for elongation growth. [1]

2.2 State what gibberellin causes to be made during the germination of barley. [1]

3 Exam-style questions

3.1 How does auxin loosen a plant cell wall? [1]

- ☐ **A** by pumping protons (H^+) into the wall, acidifying it
B by removing water from the cell
C by adding cellulose to the wall
D by closing the stomata

3.2 In germinating barley, gibberellin switches on the gene for: [1]

☐

- A** amylase
- B** auxin
- C** chlorophyll
- D** rubisco

3.3 Explain how auxin causes a plant cell to grow longer. [3]

3.4 A seedling is given gibberellin and grows much taller than an untreated one.

(a) Suggest why the untreated seedling grew less. [2]

(b) Suggest **one** control the experimenter should include. [1]

Solutions

Each answer shows the steps, then the **result**.

2.1

- auxin

2.2

- amylase

3.1 A

- Auxin pumps H^+ into the wall, acidifying and loosening it

3.2 A

- Gibberellin switches on the amylase gene

3.3

- auxin makes the cell pump protons (H^+) into the cell wall; the acidified wall is loosened; so the cell stretches/elongates as water enters by osmosis

3.4

(a)

- the untreated seedling may make less gibberellin itself, so less starch is broken down / less elongation occurs

(b)

- e.g. treat with water only / same conditions otherwise