# Exercise walk-through

## Control and coordination in plants ▪ 15.2

eXercise

# 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

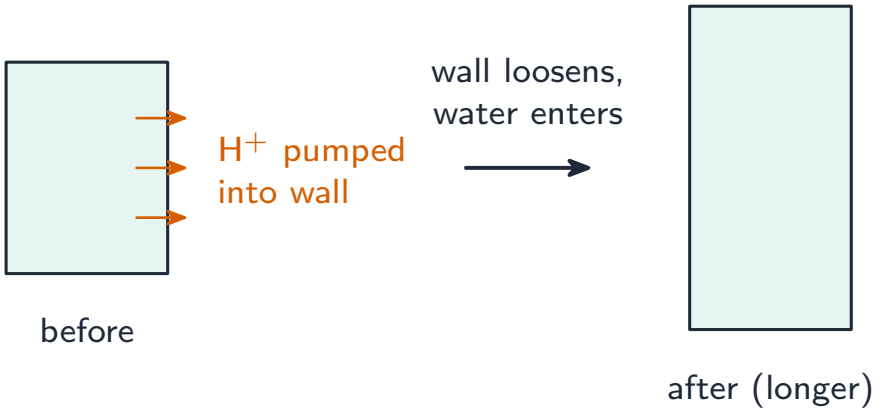
# Method — The Venus fly trap

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.

# Method — Auxin and elongation growth

**Auxin** makes the cell pump **protons** 质子 ($H^+$) into the **cell wall** 细胞壁; this **acidifies** 酸化 and loosens the wall, so the cell can stretch as water enters — **elongation** 伸长 growth.

# Method — Auxin and elongation growth



# Method — Gibberellin and germination

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

## Practice 2.1 ▪ 1 mark

Name the plant hormone responsible for elongation growth.

# Solution 2.1

Method: Auxin and elongation growth

**Worked steps**

auxin B1.

## Practice 2.2 ▪ 1 mark

State what gibberellin causes to be made during the germination of barley.

# Solution 2.2

Method: Gibberellin and germination

**Worked steps**

amylase B1.

## Exam-style 3.1 ▪ 1 mark

How does auxin loosen a plant cell wall?

**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

# Solution 3.1

Method: Auxin and elongation growth

**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

## Worked steps

**A**. Auxin pumps H into the wall, acidifying and loosening it.

## Exam-style 3.2 ▪ 1 mark

In germinating barley, gibberellin switches on the gene for:

**A** amylase

**B** auxin

**C** chlorophyll

**D** rubisco

# Solution 3.2

Method: Gibberellin and germination

**A** amylase ✓

**B** auxin

**C** chlorophyll

**D** rubisco

## Worked steps

**A**. Gibberellin switches on the amylase gene.

## Exam-style 3.3 ▪ 3 marks

Explain how auxin causes a plant cell to grow longer.

# Solution 3.3

Method: Auxin and elongation growth

**Worked steps**

auxin makes the cell pump protons ($H^+$) into the cell wall M1; the acidified wall is loosened M1; so the cell stretches/elongates as water enters by osmosis A1.

# Exam-style 3.4 ▪ 2 marks

A seedling is given gibberellin and grows much taller than an untreated one.
(a) Suggest why the untreated seedling grew less.
(b) Suggest **one** control the experimenter should include.

# Solution 3.4

Method: Gibberellin and germination

**Worked steps**

(a) the untreated seedling may make less gibberellin itself M1, so less starch is broken down / less elongation occurs A1.
(b) e.g. treat with water only / same conditions otherwise B1.