What is Phototropism?

Worksheet

Phototropism is the directional growth of a plant in response to light, caused by auxin accumulating on the shaded side of a shoot, making those cells elongate more and bending the stem toward the light source.

Questions

1. Which hormone is primarily responsible for phototropism?

A) Ethylene
B) Auxin
C) Insulin
D) Cytokinin

2. What causes the stem to bend toward light?

A) Equal cell elongation on both sides
B) More elongation on the shaded side
C) More elongation on the lit side
D) Cell death on the lit side

3. What photoreceptor detects the light direction for phototropism?

A) Phytochrome
B) Phototropin
C) Rhodopsin
D) Chlorophyll

4. Root phototropism is usually

A) Positive (toward light)
B) Negative (away from light)
C) Absent entirely
D) Random

5. A seedling on a windowsill is rotated 180 so its bent stem now points away from the window. What happens over the next few days?

6. A stem is illuminated evenly from all sides in a growth chamber. Will it show phototropism?

7. Why do plant roots often grow away from light (negative phototropism) while shoots grow toward it (positive phototropism)?

8. Define: What is phototropism?

9. Define: Which hormone controls phototropism?

10. Define: What detects light direction in phototropism?

Answer Key

1. B) Auxin - Auxin redistributes to the shaded side, driving uneven growth.

2. B) More elongation on the shaded side - Higher auxin on the shaded side makes those cells elongate more, curving the stem toward light.

3. B) Phototropin - Phototropin is the blue-light photoreceptor responsible for phototropic responses.

4. B) Negative (away from light) - Roots typically show negative phototropism, growing away from light and into soil.

5. Phototropin at the shoot tip detects the new direction of light Auxin redistributes to the new shaded side of the stem Cells on the new shaded side elongate more The stem gradually re-bends until it points toward the window again

6. Phototropism requires an uneven (directional) light source to create an auxin gradient With equal light on all sides, auxin distributes evenly around the stem No side elongates more than another The stem grows straight up rather than bending in any direction

7. In shoots, auxin accumulation on the shaded side promotes elongation, bending the stem toward light In roots, the same auxin concentration is inhibitory rather than stimulatory to cell elongation So the shaded side of a root grows less, and the lit side grows more This causes the root to curve away from light, into the soil

8. The growth of a plant toward or away from a light source, driven by uneven auxin distribution.

9. Auxin (IAA) - it accumulates on the shaded side of the stem, causing more elongation there.

10. Phototropin, a blue-light photoreceptor located mainly at the shoot tip.