

# Edexcel (B) Biology A-level

## 9.3 - Chemical control in plants

### Flashcards

This work by [PMT Education](https://www.pmt.education) is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



Name 3 groups of plant growth factors.



Name 3 groups of plant growth factors.

- Auxins
- Cytokinins
- Gibberellins



List the functions of auxins.



List the functions of auxins.

- Involved in trophic responses e.g. IAA.
- Control cell elongation.
- Suppress lateral buds to maintain apical dominance.
- Promote root growth e.g. in rooting powders.



# How do auxins cause cell elongation?



# How do auxins cause cell elongation?

## Acid growth hypothesis

1. IAA causes active transport of  $H^+$  ions into cell wall.
2. Disruption to H-bonds between cellulose molecules & action of expansins make cell more permeable to water.
3. Cells with higher turgor pressure elongate faster.



List the functions of gibberellins.





List the functions of gibberellins.

Stimulate:

- germination
- elongation at cell internodes
- fruit growth
- rapid growth / flowering



# How is germination stimulated?



## How is germination stimulated?

1. Seed absorbs water, activating embryo to secrete gibberellins.
2. Gibberellins diffuse to aleurone layer, which produces amylase.
3. Amylase diffuses to endosperm layer to hydrolyse starch.
4. Hexose sugars act as respiratory substrate to produce ATP as 'energy currency'.



List the functions of cytokinins.



List the functions of cytokinins.

- Stimulate development of lateral buds by promoting cell division at apical meristems.
- Promote leaf abscission synergistically with ethene.



Name the 2 ways plants growth hormones interact.



Name the 2 ways plants growth hormones interact.

- **Synergistically** to achieve same effect e.g. auxins & gibberellins.
- **Antagonistically** with inverse effects e.g. auxins (suppress lateral buds) & cytokinins (stimulate lateral buds).



# What is phytochrome?





## What is phytochrome?

Plant photoreceptor with bilin chromophore group. Converts between 2 forms:

- Biologically inactive Pr absorbs red light.
- Biologically active Pfr absorbs far-red light.



State the time of day when each form of phytochrome is most abundant.



State the time of day when each form of phytochrome is most abundant.

In darkness: Pr abundant.

In sunlight: Pfr abundant.

Ratio of Pr:Pfr enables plant to detect how long days are.



# How does phytochrome control flowering?



How does phytochrome control flowering?

Pr absorbs red light and converts to Pfr, which stimulates flowering. (signifies that light intensity is high enough for photosynthesis).



# What are long and short day plants?



What are long and short day plants?

**Long day:** flower when sunlight hours exceed a critical value.

**Short day:** flower when darkness hours exceed a critical value.



# What is photomorphogenesis?





# What is photomorphogenesis?

Pattern of plant growth and development determined by light intensity.



# How does phytochrome control photomorphogenesis?



How does phytochrome control photomorphogenesis?

Transition from Pr to Pfr controls: localization of proteins within cells, transcription of certain genes, phosphorylation of proteins.

Therefore affects: germination, circadian rhythm, flowering.

