

Plant Growth Hormones.

Like humans, plants produce hormones to **respond to stimuli** to regulate their growth. **Auxin** and **gibberellin** are two **plant growth hormones** that allow plants to grow in response to a stimulus.

A plant's growth response to a stimulus is called a **tropism**. A **positive tropism** is growing **towards** a stimulus and a **negative tropism** is growing **away** from a stimulus. Two examples of tropisms are **phototropism** and **gravitropism** (geotropism).

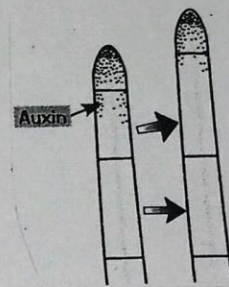
PHOTOTROPISM — the growth of a plant in response to **light**. Shoots are **positively phototropic** — they grow **towards light**.

GRAVITROPISM (GEOTROPISM) — the growth of a plant in response to **gravity**. Roots are **positively gravitropic** — they grow **downwards**.

The Plant Hormone Auxin.

Auxin, a plant hormone controls the growth at the tips of shoots and roots. Auxin is produced in the tips and **diffuses backwards** to stimulate the cells just behind the tip to **elongate** (grow longer).

If the tip of a shoot is **removed** the shoot **stops growing** because no auxin is available. In shoots auxin **promotes** growth, but in roots high concentrations of auxin **inhibit** growth.



Shoots are **positively phototropic**. A shoot tip exposed to **light** produces **more auxin** on the side that's in the **shade** than the side that's in the light.

This makes the cells elongate (grow) **faster** on the **shaded side**, so the shoot bends **towards** the light.

This response allows plants to absorb more light for photosynthesis to produce more sugar, which provides energy for growth.

Roots are **positively gravitropic** (geotropic). When a root grows sideways, gravity causes an uneven distribution of auxin in the root tip, with more on the lower side.

However, extra auxin **inhibits** growth so the cells on **top** elongate **faster**, causing the root to bend downwards.

This response allows the plant to extend its roots deep in the soil, so they are well anchored. It also allows the plant to absorb more water and minerals, which are needed for photosynthesis.

The plant hormone gibberellin

During the period of germination seeds release plant hormones called **gibberellins**. They cause the starch stored in a seed to be turned into sugars that the seed uses for energy to grow.

Gibberellin also stimulates **stem growth** by stem elongation, helping the plant to grow tall. Dwarf varieties of plants can grow to the same height as the tall variety when treated with gibberellin.

