For years we have known that offspring inherit their genes from their parents, and that gene activity changes in response to environmental conditions. But is this only half the story?

Now, biologists are exploring whether environmentally-triggered changes in gene activity are also passed on to future generations, and what evolutionary benefits this might have. Welcome to the intriguing world of epigenetics.

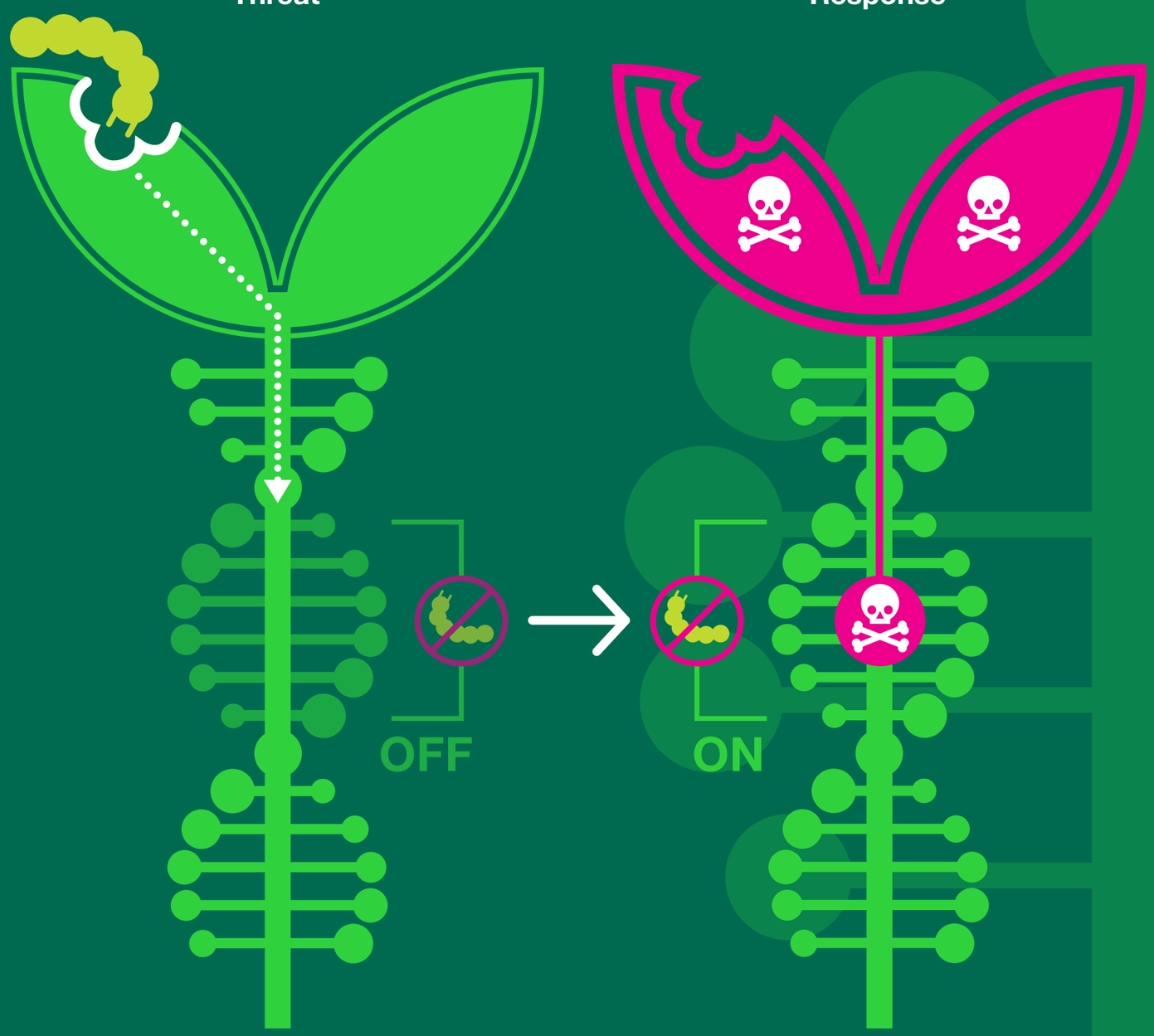
PlantPower

Epigenetics
The hidden secrets of inheritance

How scientists are discovering the science of epigenetics.

Find out more at
www.saps.org.uk/epigenetics

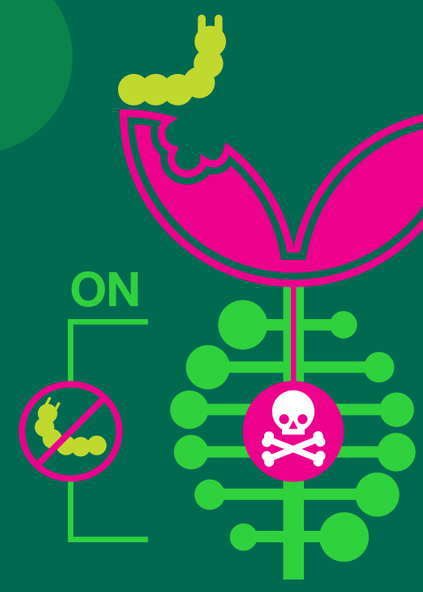
When plants fight back



Epigenetic inheritance

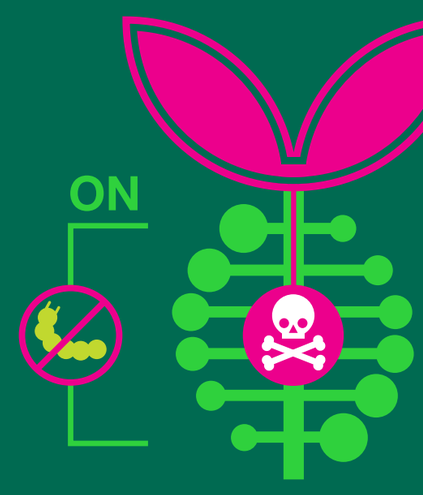
Parent plants

When caterpillars attack, plants defend themselves by producing toxins and toughening up cell walls. The plants then stay primed to respond to future attacks more quickly and strongly.



1st generation

Biologists found that when *Arabidopsis* plants were exposed to caterpillars, their offspring germinated with pre-primed defences. If the offspring were attacked, toxins and tough cell walls repelled the caterpillars.

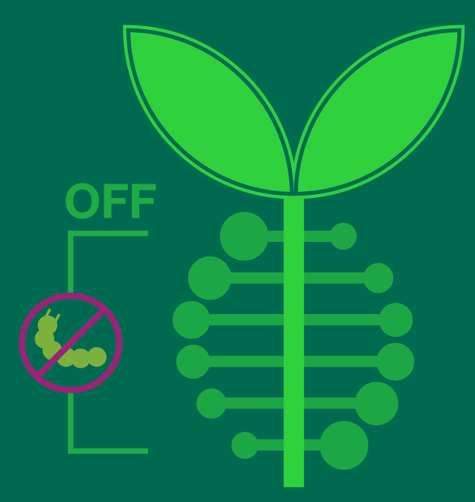


2nd generation

The same was seen in the second generation. Their fundamental DNA was unchanged, but they too were primed for defence. Somehow, they 'know' their grandparents were attacked and are ready. Biologists argue that this effect depends on epigenetic inheritance – perhaps genes that normally inhibit defence responses have been switched off.

3rd generation

After two caterpillar-free generations, the effect vanishes. Biologists suspect this means that epigenetic inheritance can be re-set if conditions change.



The importance of epigenetics is controversial. Are examples like boosted defence mere oddities or a fundamental part of plant adaptation? The question applies to humans too. How might the challenges faced by parents influence the physiology, behaviour and health of their children and grandchildren?

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