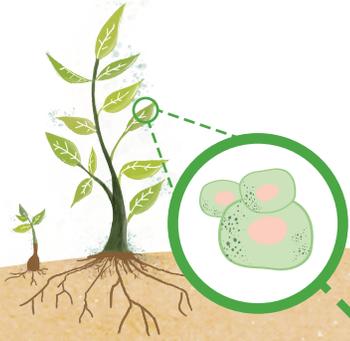


UNDERSTANDING RNAi

RNAi, or “RNA Interference,” is a natural process that occurs in the cells of plants, animals, and people.



All living things – like this plant – are made up of **cells**, the basic units of life.

Inside the nucleus of each cell is a detailed genetic blueprint, encoded in **DNA**...

... which is transcribed (copied) into **messenger RNA (mRNA)** ...

...which gets translated by the cell's machinery to make a specific **protein**.

Proteins are the building blocks of tissues and they carry out many essential biological functions. In some cases, decreasing the production of specific proteins can be beneficial. RNAi is a natural process that works like a “dimmer switch” to dial down the level of a protein. It likely evolved to protect cells from viruses.

HOW DOES RNAi WORK?

1 It begins when a form of RNA made of two strands (**double-stranded RNA, or dsRNA**) is introduced into the cell, for example by a virus, or produced in the cell.

2 When a cell “sees” dsRNA, it activates structures that work like scissors to **cut it up**.

3 Next, **other structures attach** to these small pieces of RNA and turn them back into single-stranded RNA.

4 These structures then bind to **mRNA with a matching code**.

5 As a result, **production of the protein** encoded by that mRNA is prevented.

When we know the gene that encodes a certain protein, we can use RNAi to target that protein and dial it down in a highly specific way. In agriculture, for example, this can potentially impact the production of proteins responsible for the development of a disease or essential for a pest's survival, thus protecting plants from such disease or pest infestations.

USING RNAi IN AGRICULTURE

RNAi has the power to target agricultural problems like pests and diseases in a highly specific way. In fact, it has been used to help protect plants for more than 25 years. Today, it's possible to utilize this natural process in even more ways, giving farmers additional options for addressing a constantly changing set of challenges and threats.

PLANTS

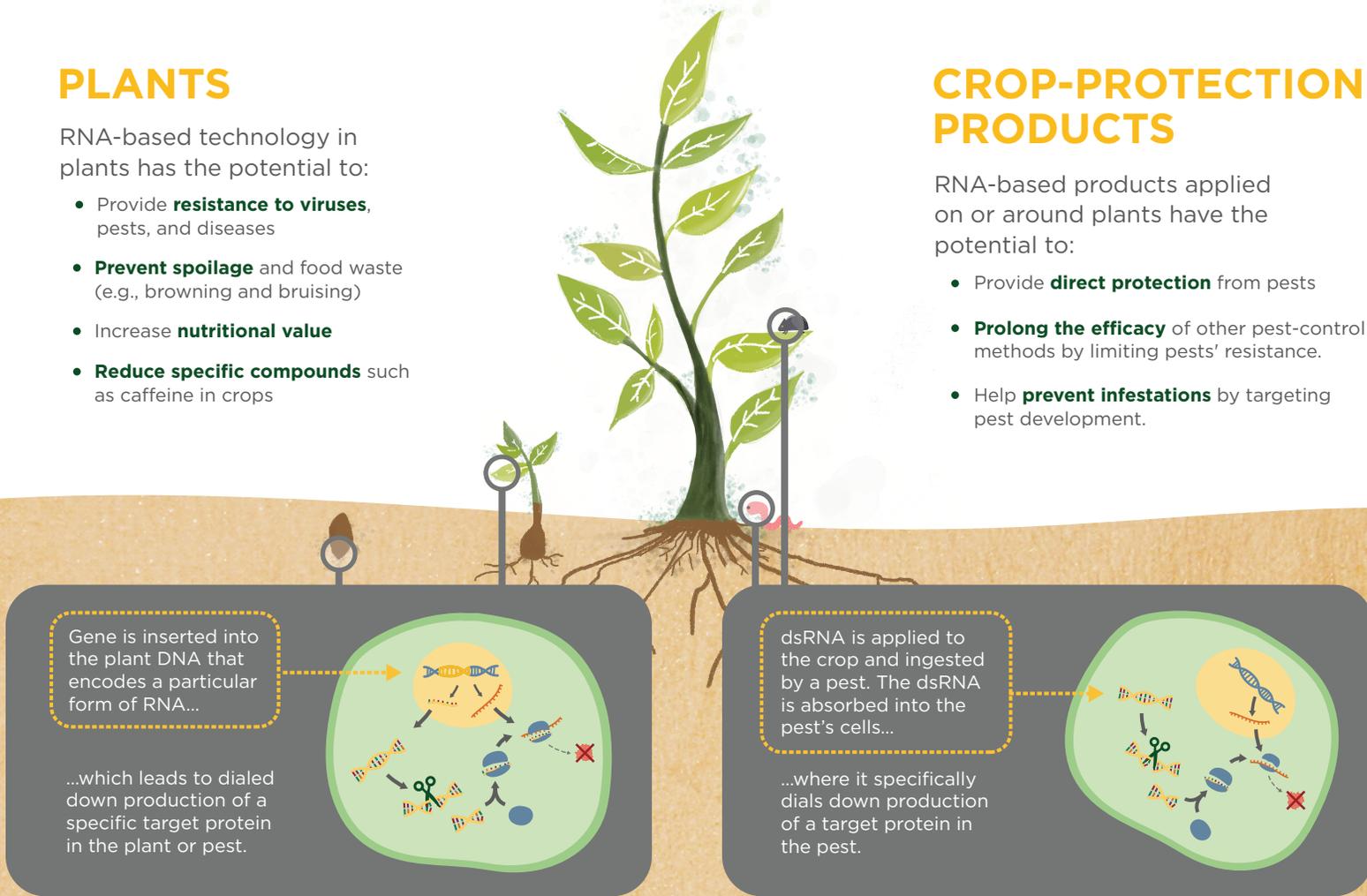
RNA-based technology in plants has the potential to:

- Provide **resistance to viruses**, pests, and diseases
- **Prevent spoilage** and food waste (e.g., browning and bruising)
- Increase **nutritional value**
- **Reduce specific compounds** such as caffeine in crops

CROP-PROTECTION PRODUCTS

RNA-based products applied on or around plants have the potential to:

- Provide **direct protection** from pests
- **Prolong the efficacy** of other pest-control methods by limiting pests' resistance.
- Help **prevent infestations** by targeting pest development.



Gene is inserted into the plant DNA that encodes a particular form of RNA...

...which leads to dialed down production of a specific target protein in the plant or pest.

dsRNA is applied to the crop and ingested by a pest. The dsRNA is absorbed into the pest's cells...

...where it specifically dials down production of a target protein in the pest.

These are not the only ways RNAi can be used in agriculture. Numerous RNA-based plant products are already approved, and other promising products targeting the plant or pest are currently in development.