

## Vocabulary: Genetic Engineering



### Vocabulary

- Callus – a growing mass of unorganized plant cells.
  - Plant calluses have the potential to develop into fully grown plants.
  - Calluses are used for gene insertion because clones can be made that all contain the same genetic material. When a new gene is inserted into a callus clone, the effect of that gene on the plant can be compared to other clones.
- Exon – a part of a gene that codes for a protein.
  - Within a gene, the coding parts of the gene (exons) are separated by noncoding parts, or *introns*.
  - The introns are removed from mRNA
- Genetic engineering – the direct manipulation of an organism's genome using biotechnology.
- Genetically modified organism (GMO) – an organism whose genetic material has been altered using genetic engineering techniques.
  - Types of genetically modified crops include corn, soybeans, and cotton genetically modified to be resistant to insects and herbicide.
- Genome – the complete set of DNA in an organism, including all genes.
- Green fluorescent protein (GFP) – a protein, isolated from the jellyfish genome, that glows bright green when exposed to ultraviolet light.
  - In genetic engineering, the GFP gene can be attached to a promoter of interest to determine where in an organism that promoter is functional.
- Herbicide – a *pesticide* used to kill unwanted weeds.
  - Pesticides are substances that kill organisms that are harmful to crops.
- Insecticide – a pesticide used to kill unwanted insects.
- Intron – a part of a gene that does not code for a protein.
  - Introns are removed from mRNA during a process called RNA splicing.

- Promoter – a region of DNA that starts the transcription of a particular gene.
  - Transcription will eventually lead to protein production or other changes in cellular activity.
  - Promoters are often species-specific. A bacterial promoter may not work in a corn plant.
  - Promoters may only be active in certain parts of an organism or at specific times during the life cycle, so one promoter may be active only in the roots of a plant, another only in the leaves, and another only in seedlings.
- Transcription – the process of forming a nucleic acid by using another molecule as a template.
  - Transcription starts the process of protein synthesis by using a strand of DNA to form a complementary strand of mRNA.
  - Transcription is often followed by translation, which uses the mRNA to specify the sequence of amino acids in a protein molecule.
- Transformation – the uptake of genetic material from the environment by a cell.
  - In bacteria, transformation occurs when genetic material enters the cell through pores in the cell membrane.
  - In plants, a bacteria called *Agrobacterium tumefaciens* can be used to infect plant cells and insert pieces of DNA into the plant's genome.

