

# What is biotechnology?

Any technique that uses living organisms to make or modify products, to improve plants or animals, or to develop microorganisms for specific purposes. U.S Office of Technology Assessments.

One way of looking at it, is the changing of the recipe.

- 1) Preheat oven to 350 degrees F.
- 2) In a medium bowl mix in butter, sugar, vanilla, egg white, and water.
- 3) Stir in Chocolate Chips.
- 4) Drop dough by heaping spoonfuls onto ungreased cookie sheets.
- 5) Bake for 8 to 10 minutes.



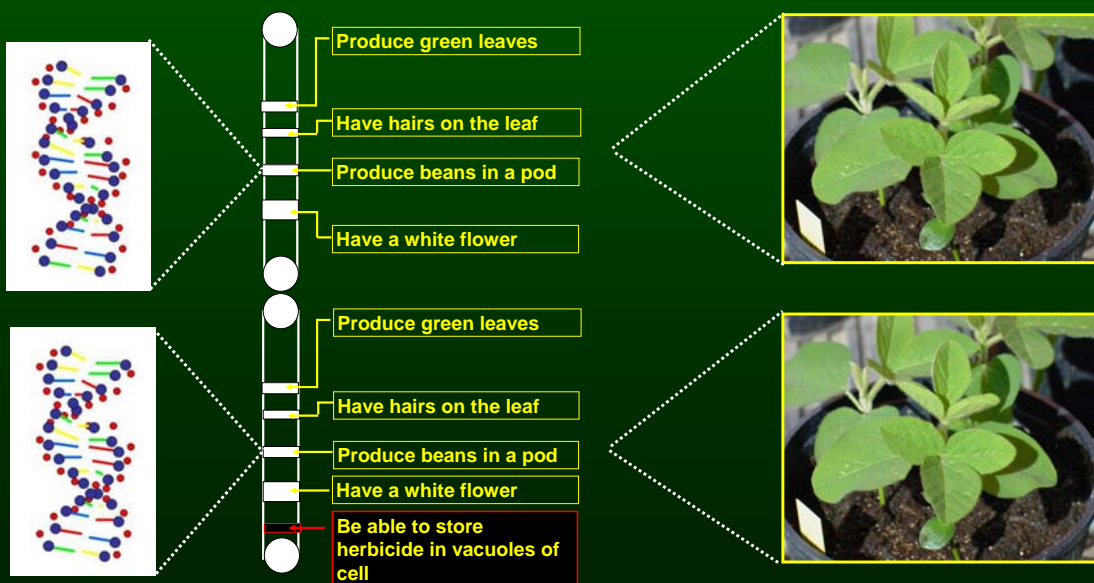
- 1) Preheat oven to 350 degrees F.
- 2) In a medium bowl mix in butter, sugar, vanilla, egg white, and water.
- 3) Stir in **sugar free** chocolate chips.
- 4) Drop dough by heaping spoonfuls onto ungreased cookie sheets.
- 5) Bake for 8 to 10 minutes.



Just like changing the recipe of the cookies, biotechnology changes the recipe of a living thing.

Just as the cookie was altered, the soybean plant is altered.

## Chromosome



## Some Examples of Biotechnology



An enzyme used in the production of cheese once obtained from a calf's stomach is now produced by bacteria.



Biotechnology has been used to build resistance to disease and increase weed management options for producers in soybean.



Corn also has been enhanced to resist diseases, insects, and increase weed management options.



The "Flavor Savor" tomato was one of the first crops enhanced by biotechnology. This tomato has delayed ripening to increase shelf life.



"Golden rice" has been enhanced to have higher levels of vitamin A.

Other crops where Biotechnology has been used are:

Canola	Cantaloupe	Sugar beet
Flax	Potato	Cotton
Radicchio	Squash	Papaya

Many of the crops enhanced by this new technology are done so to inhibit insects, viruses, disease and to increase weed control options by making the crop tolerant to a specific herbicide.

A few of the governmental agencies involved with regulating genetically modified organisms (GMO) are listed below.

Economic Research Service (ERS) keeps track of the acreage of crops that have been modified.

Food and Drug Administration (FDA) keeps lists of all the enhanced crops used for consumption and regulates crops for consumption.

Environmental Protection Agency (EPA) regulates any organism that has a built in pesticide.

Animal and Plant Health Inspection Service (APHIS) monitors and regulates the introduction of any new organism into the United States.

For more information please see: <http://www.agriculture.purdue.edu/agbiotech> a web site by Dr. Peter Goldsbrough.

# Biotechnology

- Find new and useful strategies for plant processes.
- Use biotechnology to reduce the amount of pesticides released into the environment.
- Can use biotechnology to find a more efficient way to produce many of the medicines used today.
- Use biotechnology to distribute vitamins to regions unable to obtain them.

- Perception that products produced by biotechnology are unnatural.
- Possibility of unknown proteins may being toxic or allergens.
- Possibility of genes moving from one species to related species through natural processes.
- Unknown long term consequences.

## ★ Are the products of biotechnology safe to eat?

Plants that are produced by biotechnology are generally screened for proteins that are similar to toxins or allergens. In the case of soybean, it is often the seed oils that are required. The refining of the oils removes the proteins. As for the long term exposure there is very little is known.

## ★ What are some of the techniques of biotechnology?

Originally, biotechnology meant any process using a living thing to produce a product. Today it refers to changing an organism's genetic makeup using the new processes.

- 1) A gene is found to do something desirable.
- 2) It is isolated and duplicated (cloned).
- 3) The gene is then inserted into a desirable target plant.

## ★ Do you eat DNA, the building blocks of genes?

Yes, there is DNA in everything you eat except refined oils.

## ★ Do we need biotechnology?

To survive, no. Like any new concept in the world of knowledge it has the potential to do great things. However, like any new concept, it also has the potential to have growing pains.

## What do you think?