

Genetically Modified Organisms

GMO Timeline

1972: A gene is moved from one organism to another.

1986: Agribusiness creates soybean plants that are herbicide resistant. The federal government begins eight years of biosafety and food testing.

1990: Regulators approve the first genetically modified food product, chymosin, used in making cheese.

1994: The first genetically modified organism, or GMO, arrives in the grocery store. The FlavrSaver tomato contains a gene that slows down ripening so tomatoes can ripen naturally on the vine.

1995: The EPA follows the USDA and the FDA in approving herbicide resistant soybeans.

1995-96: GMO corn, cotton, and potato seeds are sold to farmers.

1997: Eighteen crop applications of biotechnology gain U.S. government approval.

1999: Approximately 50 different GMOs are so in American supermarkets. The European Union countries, followed by Japan and China, block imports of GMOs.

2000: More than half of the products sold in U.S. supermarkets contain ingredients that have been genetically modified.

2003: GloFish was the first genetically modified animal to be sold as a pet.



What is a GMO?

An organism that has had its DNA altered using molecular cloning or transformation.



Transformation is the insertion of genetic material using bacterial plasmids.

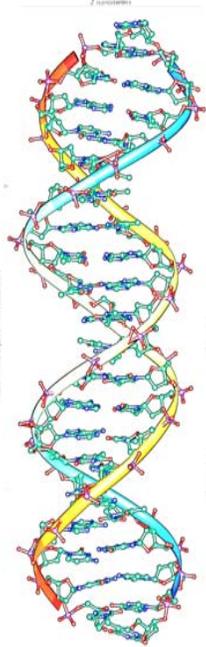


E. Coli has been modified to produce human insulin and human growth hormones.

Bt Corn

Genetic engineering has created corn plants that are resistant to the corn borer using a gene from a bacterium that infects caterpillars. The Bt gene produces a toxin that kills corn borers, but not the beneficial insects that may be in or around the fields.

Genetic modification of plants can be achieved using Agrobacterium Mediated Transformation or Gun Mediated Transformation.



Pros

- Fewer pesticides, herbicides, and fertilizers.
- Increased nutritional value..
- Disease resistance.
- Drought resistance.
- Longer shelf life.
- Increased food production.
- Production of pharmaceuticals.



Golden corn

Some GMOs are created to increase certain essential nutrients or vitamins in foods. Golden rice has a gene added that produces pro-vitamin A, the precursor to vitamin A. Deficiencies in this vitamin result in blindness and are common in developing countries where rice is the main food source.



Roundup Ready Soybeans®

Soybean plants have been modified to include a gene that produces resistance to the herbicide Roundup®. Fields cultivated with Roundup Ready® soy do not have to be cultivated as often to remove weeds. This saves energy and money. Since less tillage is required, soil is also conserved.



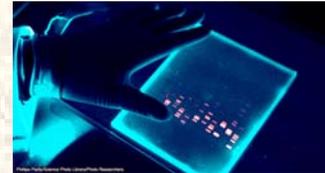
Cons

- Foreign genes may not stay put.
- May cause allergies.
- May cross pollinate wild varieties.
- May increase antibiotic resistance.
- May increase loss of biodiversity.
- Not enough research—humans are test subjects
- Labeling not mandatory in U.S.
- May cause human population to exceed the Earth's carrying capacity.



Detecting GMOs

Check for labels—some GMOs are labeled. ELISA tests detect specific GMO proteins. Polymerase Chain Reactions (PCR)- DNA is extracted from the food, amplified, and analyzed using gel electrophoresis.



The Future of GMOs

Food crops that can take nitrogen directly from the air.
Nicotine free cigarettes.
Reduction of lignin content in trees making pulp recovery easier.
Production of vanilla, orange, and lemon vesicles from GM tissue culture.
Enhanced disease resistance in farm animals, reducing use of antibiotics.

