

Technology Today

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Alan Pierce

Food for Thought

GENETIC engineering is the process of changing the information contained in the genes of plants and animals. This is done to develop desired characteristics in their offspring or correct flaws in the parent's genes. Today, scientists and technologists are performing directed evolution by mixing naturally occurring genes in a laboratory for later infusion into plants and animals. The scientific goal is to improve breeds through genetic modification (GM).

To date, 40 crops have been genetically altered and approved by the FDA for human consumption. Each of these crops was screened molecule-by-molecule to determine its safety. Today, you are definitely eating some GM-enriched food on a weekly, if not daily, basis. It is now estimated that 60 percent of all U.S. processed foods and all American candy contain GM material (*Business Week*, Oct. 18, 1999).

A massive boycott of GM foods is now underway in Europe and Japan. This boy-

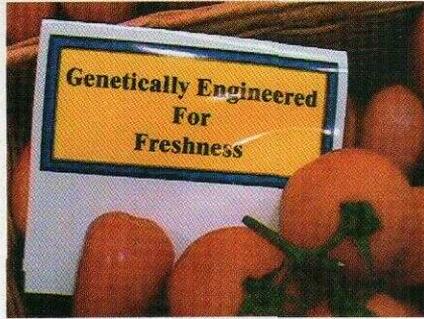


Image courtesy of the USDA.

cott threatens to spread to all parts of the world. If the boycott topples GM technology, many scientists fear that we will lose, our war on hunger. The "Frankenfood" boycotters feel threatened by the genetic engineering technology that they don't feel anyone can completely control. They believe that GM foods might contain unobservable dangers that won't show themselves until our food supply can't be returned to its former natural state. They can point to food allergies caused by infused genes and the death of monarch butterfly caterpillars that feed on GM corn that has a "natural" pesticide-creating gene. They also fear that breeding in the wild will create super weeds.

Are boycott concerns of unanticipated outcomes of genetic engineering realistic? Have your students research the pros, cons, and ethics that now surround genetic engineering. The protests against genetic engineered foods started in 1993 when the first bioengineered food went on sale in America. The "MacGregor Flavor Savr" tomato has an altered gene that blocks the natural enzyme that causes vegetables to rot. Today, 33 percent of our corn and 50 percent of our soybean crops are genetically altered to create larger yields, require less water, and less spraying of pesticides. The altered genes of these crops also give them a natural immunity to parasites and disease.

Some crops have been altered so they aren't affected by the herbicide Roundup. This allows farmers to spray Roundup indiscriminately to kill undesirable vegetation without fear of hurting their cash crops. Should we be concerned that approximately 76 million acres of U.S. farmland is dedicated to growing GM crops? Should we be concerned that nature's winds help these altered seeds crossbreed with unaltered crops and weeds? Should we, control the march of scientific discovery?

Because of Congressional and world pressure, the FDA has decided to reexamine its food safety program for genetically altered crops. Europe and Japan already require GM food labeling. Should these foods be labeled in America, or has past FDA testing really proven them completely safe?

The newest research into genetic engineering will be discussed in future columns. This research has scientists and technologists building human hearts and heart valves using a person's own cells. Researchers have increased animal intelligence and longevity through genetic engineering. Scientists are attacking the very building blocks of disease by correcting an animal's damaged genes.

The Human Genome Project will complete the sequencing of the human genome this summer. This will give our genetic toolmakers all the technical drawings of the human body. Once the 3 billion bits of genetic information contained in



Image courtesy of the FDA.

our 100,000 genes is known, scientists will start to unravel the purpose of each gene. A venture into a brave new world will become possible as we learn to use our own genome code. Do we want to stifle new knowledge and prevent the eventual manipulation of the human genome? Should we eventually produce smarter, faster, healthier human beings with life spans that far exceed our own?

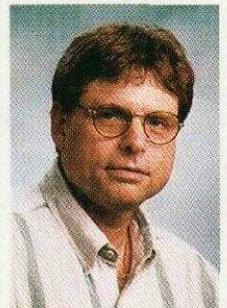
It is interesting to note that just one gram of DNA (1/30th of an ounce) can hold as much information as you can fit on a trillion DVDs. This explosion of knowledge gives a person reason to pause and realize that manipulating the code of life doesn't leave much room for error. Welcome to the Biotechnology Revolution!

Have a great summer, and if you have a chance, re-read Aldous Huxley's 1932 book *Brave New World*. **TD**

Recalling the facts

1. Define genetic engineering.
2. Why do the Europeans and Japanese fear the use of GM foods?
3. Why is GM corn killing butterflies?

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