

# Genetically Engineered Food

## A SERIOUS HEALTH RISK

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**G**enetically engineered foods containing genes derived from animals, fish, insects and bacteria are appearing in Canadian stores. Many scientists feel that these foods have not been properly tested and pose serious health risks.

Given the huge complexity of genetic coding, no one can possibly predict the the side effects of genetic manipulation. Already one genetically engineered food supplement (genetically engineered tryptophan) killed at least 37 people in North America, and permanent disabled 1,500 others. Because genetically engineered products are not required to be labelled, consumers have been denied even the right to choose whether to consume these experimental foods.

The dangers of genetic engineering identified so far include: new toxins and allergens in foods; increased use of chemicals on crops, resulting in greater contamination of our environment; increased likelihood of new and dangerous disease, which can spread across species boundaries, disruption of the ecosystem, and other unpredicted effects of genetic mistakes, which are passed on to all future generations.

### WHAT IS GENETIC ENGINEERING?

Genes are the blueprints for every part of an organism. Every plant or animal is different because of the different genetic material or genes contained within the cells of that organism. Genetic engineering is the process of modifying this information, particularly by artificially transferring the genes of one organism into another. While traditional breeding techniques can exchange genes between similar species, genetic engineering allows the insertion of genes from any plant or animal into any other organism. For instance, the genes from a fish were inserted into a tomato to create a more durable tomato.

### SIDE EFFECTS OF GENETIC ENGINEERING

It might seem quite appealing to transfer desirable properties from one food into another. Perhaps, we could design super foods that last forever and contain all the nutrients we need. However, given the huge complexity of the genetic code, no one can possibly predict all the effects of introducing new genes into any organism.

Biotechnology companies claim their methods are precise. In fact, there is always some uncertainty where the inserted gene is going to land. Also, a gene may act differently when placed in a new host and the functioning of the host organism could be unpredictably altered. The risks of genetic mistakes are unlimited.

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## **T**OXIC TRYPTOPHAN

### **CATASTROPHE - 37 PEOPLE KILLED**

The tryptophan incident is an alarming example (Ref: *Trends in Biotechnology*, vol. 12, pp. 346-352, 1994). Tryptophan is a food supplement. In the USA in 1989, there was an epidemic of a new and mysterious disease, termed eosinophilia myalgia syndrome. This disease was characterized by severe, often crippling muscle pain. Eventually, this disease was traced to the consumption of genetically engineered tryptophan, produced by the company SHOWA DENKO K.K. in Japan. The company had apparently altered its process of genetic engineering to speed up production, and had not realized the toxic side effects. The result: 37 people died, and at least 1500 more were permanently disabled.

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## **P**OTATOES AND CORN THAT CONTAIN THEIR OWN PESTICIDES

Insect resistant potatoes are now on the market in Canada. This potato has been genetically engineered to contain its own pesticide. The potato contains a particular bacterial gene (called *bacillus thuringiensis*, or B.t.) that creates a toxin in the potato to kill insects. Because the insecticide is contained in the potato, farmers don't have to spray with pesticides.

Biotechnology supporters claim that when these potatoes are eaten by people (or other mammals), the toxin becomes deactivated in the acidic environment of the stomach. Research on animals supports this claim. When these potatoes were fed to rats, mice and quails, these animals showed no immediate poisonous effects. However, the long term effects of all genetically engineered foods are completely unknown. The same B.t. toxin was added to the genes of corn to kill insects. This genetically engineered corn is used to make corn starch, corn syrup and other products derived from corn, which are ingredients in an estimated 25% of processed foods in Canada. Because the long term effects of this corn are not known and since this food is being simultaneously introduced into a wide range of other foods, any damaging side effects could be disastrous.

For both the corn and potatoes containing B.t. toxin, scientists are concerned that these foods may cause allergies in certain people or poisonous effects in those using ulcer medications or antacids that reduce stomach acidity.

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## **H**ERBICIDE RESISTANT SOYBEANS AND CANOLA OIL

Soybeans and canola oil now in our stores have been genetically engineered to be resistant to herbicides. This allows farmers to spray higher levels of herbicides without damaging crops. *The result:* increased contamination of food, soil, and water, toxicity to animals and plants, and reduced soil fertility, in addition to the unknown effects of gene pollution.

Soybeans are used in approximately 60% of processed foods, including margarine, ice cream, breads, cereals, pasta, soya sauce, tofu, and vegetarian burgers and meat substitutes. Since canola oil and soybeans are used in such a wide range of foods, it will be very hard to trace any health problems, allergies, or other toxic effects should they arise.

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## **S**PRAYING SCORPION TOXIN ON OUR CROPS

Another alarming product now being tested in Southern Ontario is a genetically engineered insect virus. A gene for scorpion toxin has been inserted into an insect virus, which is sprayed onto leafy vegetables such as lettuce, broccoli and cabbage, to kill insects.

This genetically engineered virus is highly potent in destroying insects, both pests and their natural predators, as well as pollinators. The toxin may not be threatening to humans who eat it, but its impact on cuts and open sores is a concern. In addition, such a gene, if incorporated into the human chromosomes, could create a terrible nerve disease or a powerful autoimmune disease. The virus that acquires the scorpion toxin gene could also gain a genetic advantage and become a formidable parasite. Scientists are further concerned that the toxin gene could easily spread from experimental crops to neighbouring areas, and that the spread of the toxin is not being properly monitored.

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## **T**OMATOES WITH RABIES VIRUS GENES

Genes from the rabies virus have been inserted into tomatoes to provide a low cost mass vaccine. When wild animals such as foxes or raccoons eat the tomatoes, they become immunized against rabies. Virus genes are frequently added to the cells of crops to confer resistance to invading viruses. (A commercial virus-resistant squash targeted to baby food production is that type). The use of such viruses is very dangerous because viral genes introduced into chromosomes of plants or animals have the ability to join wild viruses by a process called genetic recombination.

## INSERTING VIRUSES INTO CROPS

The addition of virus genes to every cell of a target crop or plant greatly increases the number of total virus genes in the environment and along with it the chance that a virus gene will recombine with a wild relative. The massive load of virus genes in the environment and in the human body creates increased potential for new and deadly diseases, and greatly raises the likelihood that these viruses produce super viruses.

## GENETICALLY ENGINEERED ENZYMES AND FOOD ADDITIVES

Many genetically engineered food additives and enzymes have also been approved, including amylase, catalase and lactase, which are used in the production of bread, baby foods, sugar, fruit juices, baking powder, soft drinks, corn syrup and other processed foods. Rennets that are manufactured using genetically engineered bacteria are used to make cheese. Whey residues are then used to manufacture chocolate and margarine.

## SPLICING HUMAN GENES INTO CROPS AND ANIMALS

Farm animals are being altered with human genes to provide replacement parts for human transplantation or to provide human factors to treat diseases. A pig named Astrid was first modified with human genes so that her organs could be transplanted to humans. Each organ for transplantation will be marketed for about sixteen thousand dollars. Rabbits engineered to produce human growth hormone were mainly sterile, but a few animals were recovered that produced milk rich in human growth hormone. There is also concern for the unknown effects if these rabbits with human genes escape and breed with wild rabbits.

The human gene, human metallothionein, has been spliced into plants. This gene produces a product that ties up toxic metals such as mercury or cadmium in the body. The modified plants would remove pollution from the soil. Unfortunately, this gene also has the property of a cancer gene and scientists are concerned about releasing cancer genes into the environment.

## OTHER GENETICALLY ENGINEERED PRODUCTS

Genetically engineered yeast is approved for use in beer, bread, spreads, food supplements, pizza base and other processed foods. Nutrasweet, used widely in soft drinks, is made by genetic biotechnology. Genetically engineered herbi-

cide resistant varieties of maize (corn) are approved.

Transgenic Tomatoes can be used in canned tomato products including puree, ketchup and pizza sauces. These tomatoes can carry anti-ripening genes, antibiotic markers and herbicide resistant genes. Some varieties may also contain flounder genes. rBGH (genetically engineered bovine growth hormone) is banned in Canada due to evidence of health hazards after its use in the United States.

Many more of these foods are reaching supermarkets because they are being introduced in the USA, Japan and other countries and are entering the food chain through global trade. As over 4,000 field projects are in progress worldwide, basically the market is about to be flooded with genetically modified products.

## GLOBAL THREAT TO HUMANITY'S FOOD SUPPLY

The introduction of genetically engineered foods amounts to a dangerous global experiment by giant trans-national biotechnology companies who control large segments of the world's food, including food patents, seed companies, and other aspects of the food chain. Short term commercial gain is being placed before the health and safety of the whole population. If the intentions of the industry come to fruition, almost every food we eat will be altered within a few years. Tampering with the genetic code of food is reckless and poses a serious threat to life. Some of the effects we can expect are: new toxins and allergies, new diseases which spread across species barriers (like mad cow disease), increased use of pesticides and herbicides, loss of biodiversity and ecological balance, and other unexpected, health damaging effects from genetic defects. And unlike chemical or nuclear contamination, gene pollution can never be cleaned up. The effects of genetic mistakes will be passed on to all future generations.

**For more information, or to support the campaign to ban genetically engineered foods, contact:**

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