Chapter 6: Health

(Subcommittee Four: Melissa Fulton, Larry Heine, Sequoia Lyn-Franklin, Michelle Scully)

by Larry Heine and Sequoia Lyn-Franklin

NOTE: this Chapter has not yet been approved by the subcommittee or reviewed by the full committee

The subcommittee of Religious, Social/Ethical and Health Issues as related to GE products split the studies into 3 groups and the relation to GE in those areas. Religion was the first, Social/Ethical was second, and Health the third. In the previous reports the attempt was to show without prejudice both sides of the arguments for and against GE food products, just reporting in a neutral fact gathering report those points most used in how positions have been arrived at by those involved. This health report will attempt to do the same.

In studying Health and the relation to GE products much effort was spent trying to find long term health studies related to what effects GE has on humans. None could be found. Time constrains placed on this committee for a final report, and the main arguments within a particular aspect could not all be covered. The effects of GE food on other species should also be included in this report, but time does not allow for that research to be done.

Because GE is used in a wide context this committee had to define what specific GE foods are in this report. Therefore this report is focused on one type of Food Engineering. Engineering plants through gene modification.

This type of plant modification is done through the introduction of a gene from one species into another called “transgenic,” using a recombinant-DNA. This technique uses a biological vector, a plasmid or viral chromosome into whose genome a fragment of foreign DNA is inserted, to introduce foreign DNA into a host cell.

There are two main arguments against the use of transgenic in food plants. Allergies and Antibiotic resistance are one. The other is transforming a food plant thru transgenic modification, a Cologne University study in 1998 showed that DNA from such a source fed to mice did survive the digestive system and invade other cells.

Because the FDA and the USDA do not require the labeling of GE foods, it hides the difference between GE and non GE foods. The FDA does not consider genetically engineered foods as food additives as long as they come from an approved food source. Protein content and gene makeup of GE plants in comparison to non GE plants are different. Proteins that have been introduced bring with them into the host plant those allergens which existed in the introduced protein. An example would be a GE soy product that has had a trait added from a milk protein would cause an allergy to someone who is allergic to that milk protein and the source of the allergic reaction would not be known. This is consistent throughout all foods. The danger being without proper food studies and labeling to allow the consumer the choice, the increase in allergies to food for a large portion of the population may continue to grow. It should be noted that those traits are identifiable and precaution can be taken to substantially reduce those occurrences, and with proper labeling avoided.

Antibiotic resistance is a major concern in GE foods. One of the ways to genetically modify plants is the use of the npt11and bla genes. These particular genes confer resistance to antibiotics. This resistance to antibiotics in GE foods taken with antibiotics, produce enzymes that would reduce the effectiveness of the antibiotics taken. Without labeling a person taking antibiotics has no idea if the food source is diminishing the antibiotics being taken. Those same genes from GE foods could be transferred to human or animal pathogens making them impervious to antibiotics. Although unmediated transfers of genetically modified material from plant to bacteria is unlikely, a Cologne University study in 1998 showed that DNA from such a source fed to mice did survive the digestive system and invade other cells.

The concern of using this type of transgenic gene, would be the building of antibiotic resistance in young whose bodies have not yet developed strong immune systems, and others who may have weak immune systems. This is of particular concern for developing nations where nutrition is often suspect and immune systems are not well developed.

The second major concern is using transgenic for the development of food producing plants that are altered to produce toxins. While this plant type has greater ecological concerns, it is in the health report because the toxin *Bacillus thuringiensis* is in the food, not just in the plant. This toxin is a pesticide and the health risks are real. Starlink corn a Bt product was removed from the market by the EPA because of health concerns. It had a protein Cry9C which the EPA did not accept as safe. The FDA and USDA had approved this corn, and it had been on the market for two years before it was determined unsafe and removed. Starlink removed the corn from the market and it is no longer grown. Other Bt crops are still being grown commercially, none in Lake County.

The arguments for transgenic foods is offered by the industry which promotes its use. Industry states Not all GE crops are the same. Inadvertent creation of allergens or toxins is not limited to GMOs, but also occurs by classical breeding technologies (5), and likely also by same species transgenic manipulations. Indeed, introduction of unmodified “natural” Kiwi fruit to U.S. markets in the late 1960s was associated with unexpected cross-reactions with latex rubber (5). This suggests that natural selection, classical breeding techniques, and GE food creation may all have a risk of introducing potential new allergens. Conversely, GE could be used to reduce or eliminate specific allergens plus:

- Value-added output traits, such as corn with higher amounts of lysine for animal feed, or vegetable oils with increased levels of omega-3 fatty acids.
- Drought and salinity tolerance
- Increased yield
- Tool toward diminishing environmental impact of agriculture (ex. China . . .) and
- Creation of nutritionally enhanced foods ex. Vitamin A.

The World Health Organization has proposed nutritional well-being efforts, one of which is the development of fortified rice plants.

It is also promoted by science departments from major universities in the United States. The same universities are funded by the Biotech industry. Within the United States, bio-tech companies which promote GE products as safe, have produced no independent peer reviewed studies to support those claims. The industry uses the FDA, USDA, and EPA. The major problem with this is the internal arguments within each department and the policies that follow. The basis for which these government entities are making policy are based more on politics than science. The FDA relies on industry provided information without independent long term peer

review. It approved GE foods as “substantially equivalent” without the long term studies to prove that claim. Requires no labeling. These are major concerns not only from private sector scientists, but from scientists within the FDA, USDA, and EPA departments. The policies Genetic Engineering developed through politics rather than sound science. Scientist on both sides of this issue believe government sponsored research should be free of politics and fair to both industry and consumer. Ultimately, not giving the choice for GE or Non GE foods is a disservice to both industry and consumer.

The GE products that are listed below have been altered through trangenics and approved by the FDA, and cleared by the EPA.
Currently in our food supply are ingredients from four GE crops. Corn, soy, canola, and cotton.

- Corn: corn flour, corn oil, corn meal, corn starch, corn gluten, and corn syrup. Sweeteners such as fructose, dextrose, and glucose.
- Soy: Soybean oil, soy flour, soy protein, soy lecithin, and soy is flavones.
- Canola: canola oil
- Cotton: cottonseed oil
- Hawaiian Papayas

The type and amount of transgenic material in the foods listed above could not be found by this subcommittee.

This subcommittee on Health, Social/Ethical, and Religion has reached the following conclusions concerning Lake County Crops and the use of transgenic modification.

- Currently there are no transgenic or Bt crops commercially grown in Lake County. Should they be allowed to be grown in Lake County the public should have the right to know. Transparency would increase pubic trust.
- The Lake County Board of Supervisors write a letter to the FDA requesting the need for labeling of transgenic foods for the health and safety reasons stated above.
- The subcommittee was split on allowing transgenic crops to be grown in Lake County. Two for a moratorium, two for allowing. The compromise is stated above.

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