

A GMO Primer

“Ultimately, it is the food producer who is responsible for assuring safety.”¹

-- FDA

“Monsanto should not have to vouchsafe the safety of biotech food. . . Our interest is in selling as much of it as possible. Assuring its safety is the F.D.A.’s job.”²

--Phil Angell, Monsanto corporate communication director

"Who controls the food supply controls the people; who controls the energy can control whole continents; who controls money can control the world.”

--Attributed to Henry Kissinger³

“I don't know how animals know which products are genetically engineered, but when cows or pigs are exposed to GM corn versus non-GM corn, they tend to eat only the non-GM corn and avoid the GM corn altogether. Squirrels, rats, geese, deer, elk, raccoons...all of these animals have been shown to have a strong preference when given a choice.”

--Jeffrey Smith, Institute for Responsible Technology⁴

Many people have heard of the term GMO (Genetically Modified Organism) or GE (Genetically Engineered) food. But few actually know what the terms mean. This short article will introduce the reader to what GMO (also known as GE) food is and some of the serious concerns about its safety.

What exactly is genetic modification of food? Jeffrey Smith of the Institute for Responsible Technology says:

A GMO (genetically modified organism) is the result of a laboratory process where genes from the DNA of one species are extracted and artificially forced into the genes of an unrelated plant or animal. The foreign genes may come from bacteria, viruses, insects, animals or even humans. Because this involves the

¹ U. S. FDA. (1992, May 29). Statement of Policy: Foods Derived from New Plant Varieties. *Federal Register*, 57 (104):22991. Cited in Endnotes, Genetic Roulette, Jeffrey Smith.

² Pollan, Michael. (1998, October 25). Playing God in the Garden. *NYTimes.com*. Retrieved August 31, 2011, from <http://www.nytimes.com/1998/10/25/magazine/playing-god-in-the-garden.html?src=pm>

³ Engdahl, F. William. (2003, September). The Dollar System and US economic reality post-Iraq War. *Engdahl.oilgeopolitics.net*. Retrieved August 31, 2011, from http://www.engdahl.oilgeopolitics.net/1973_Oil_Shock/Dollar_System/dollar_system.html

⁴ “An Interview with Jeffrey Smith.” <http://www.shareguide.com/SmithJeffrey.html>. Accessed September 18, 2011.

transfer of genes, GMOs are also known as “transgenic” organisms. This process may be called either Genetic Engineering (GE) or Genetic Modification (GM); they are one and the same.⁵

How is GMO food created?

Again, from the Institute of Responsible Technology:

Because living organisms have natural barriers to protect themselves against the introduction of DNA from a different species, genetic engineers must force the DNA from one organism into another. Their methods include:

- Using viruses or bacteria to "infect" animal or plant cells with the new DNA.
- Coating DNA onto tiny metal pellets, and firing it with a special gun into the cells.
- Injecting the new DNA into fertilized eggs with a very fine needle.
- Using electric shocks to create holes in the membrane covering sperm, and then forcing the new DNA into the sperm through these holes⁶

Genetically Modified foods have existed since the 1990's. However, scientists have been warning against tampering with Mother Nature since at least the 1970s.⁷ A huge problem with GMO foods is that, unlike in many other developed countries (e.g., United Kingdom, Japan), most Americans are not aware that they are even eating such foods. In the United States, the FDA and USDA have not made GMO labeling mandatory. Another problem is that very little in the way of human health studies has been done on the effects of eating Genetically Modified foods. Pro-GMO studies have been done mostly by biotechnology firms themselves (especially, Monsanto), with the USDA approving such foods based solely on such industry studies.⁸

One has to wonder: If GM food and crops are not dangerous or harmful, why are so many Americans just now hearing about genetically modified foods? Why didn't the biotech industry and the federal government let us know about such foods back in the 1990's before placing GM food in our food supplies? Despite assurances from the government

⁵ Institute for Responsible Technology. The GE Process. *Responsibletechnology.org*. Retrieved August 31, 2011, from <http://www.responsibletechnology.org/gmo-basics/the-ge-process>

⁶ *ibid.*

⁷ Wald, George. (1976, Sept/Oct). The Case Against Genetic Engineering. *The Sciences*. Retrieved August 31, 2011, from <http://www.healthtruthrevealed.com/articles/11565515306/article>

⁸ Rain, Lois. (2011, April 22). USDA to Let Monsanto Perform Its Own GMO Studies. *Healthfreedom.org*. Retrieved July 31, 2011, from <http://healthfreedom.org/2011/04/22/usda-to-let-monsanto-perform-its-own-gmo-studies/>

and the biotechnology industry, numerous studies on animals have come up with results that are sobering and scary.

Nineteen (19) animal studies have found health dangers such as damage to liver and kidneys, blood cells, and heart.⁹ GE soy has been implicated in increased and quicker deaths in rats and severely underweight rats.^{10 11} With regards to humans, the Alliance for Natural Health, states: “There are no human clinical trials of genetically engineered foods. The only published human feeding experiment revealed that genetic material inserted into GE soy transfers into the DNA of bacteria living inside our intestines and continues to function.”¹² Exactly what harm this “altered” bacteria does to our human bodies no one yet knows. And, just recently, “new research from Canada has found a Bt toxin produced by GM insect resistant crops in the blood of women and clear evidence that it was passed to fetuses.”¹³ It also appears that GM foods affect our healthy bacteria.¹⁴ Again, what effect GM food has on fetuses, infants, or adult humans is unknown. That’s part of the problem -- even after decades of genetically modified food being in our food supply, we still don’t know what it does to humans. But if GM food’s effects on humans are similar to the effects it has on animals, we’re are facing serious health threats. We will possibly end up with health problems from new and increased allergens (which appears to be happening already¹⁵) all the way to sterility. It appears that Monsanto and the United States government are willing to let Americans be unwitting guinea pigs with unknown future results.

⁹ Seralini, Gilles-Eric, & Mesnage, Robin, & Clair, Emilie, & Gress, Steeve, & de Vendomois Joel S, & Cellier, Dominique. (2011). Genetically modified crops safety assessments: present limits and possible improvements. *Environmental Sciences Europe* 2011, 23:10. Retrieved August 31, 2011, from <http://www.enveurope.com/content/23/1/10>

¹⁰ O’Brien, Robyn. (2009). *THE UNHEALTHY TRUTH*. New York: Broadway Books.

¹¹ Also, see Domnitskaya, Maria. (2010, April 16). Russia says genetically modified foods are harmful. *The Voice of Russia*. Retrieved August 28, 2011, from <http://english.ruvr.ru/2010/04/16/6524765.html>. Also, see Goldstein, Katherine, & Emami, Gazelle. (2010, Jan 12). Monsanto's GMO Corn Linked To Organ Failure, Study Reveals. *HuffingtonPost.com*. Retrieved August 28, 2011, from http://www.huffingtonpost.com/2010/01/12/monsantos-gmo-corn-linked_n_420365.html

¹² Alliance for Natural Health USA. Genetically Engineered Food Alters Our Digestive Systems. (2011, May 31). *Anh-usa.org*. Retrieved July 31, 2011, from <http://www.anh-usa.org/genetically-engineered-food-alters-our-digestive-systems/>

¹³ SayNotoGMOs. GM Bt toxins in blood. Press Release. (2011, May 20). *saynotogmos.org*. Retrieved July 31, 2011, from

<http://www.saynotogmos.org/ud2011/index.php/2011/05/20/gm-bt-toxins-in-blood/>

¹⁴ Natural News. GMOs Alter the Genetic Make Up of Our Healthy Bacteria. (2010, April 23). *Naturalnews.com*. Retrieved August 28, 2011, from http://www.naturalnews.com/028635_GMOs_bacteria.html

¹⁵ cf. *THE UNHEALTHY TRUTH*.

Another problem is that BOTH biotech industries AND the FDA are being less than truthful with the American people. When GM food first came to light before the FDA, numerous FDA scientists issued warnings about the health hazards of GM food.¹⁶ The FDA's response to these warnings was to disregard them.

A further problem is the regulations themselves. As Carol Foreman states:

The current regulatory system is convoluted and illogical. Most of the laws were written before food biotechnology was developed or even dreamed of. Three agencies and ten statutes overlap. The FDA, the nation's primary food safety agency, does not examine and declare plant products safe for human consumption before they are allowed on the market. It is illegal to market a genetically modified plant without USDA approval that the plant will not harm other plants, or to market a genetically modified pest-protected plant without EPA approval that the plant will not harm the environment. Only the process for determining human safety is voluntary.¹⁷

And, since the process is voluntary, can we really trust biotech companies to have our best interests in mind when they create, sell, and transmit GMO crops and foods? For example, despite Monsanto's pledge of integrity and transparency,¹⁸ the company has a history of preventing objective research and has a tendency to harass scientists whose findings end up being negative toward GMOs.¹⁹ Monsanto states their technology betters lives,²⁰ but try telling that to the 200,000 or so Indian farmers whose suicides are believed to be connected to Monsanto's GM crops.²¹

A main argument of biotech firms trying to convince the world of the greatness of GMOs is that genetically modified foods are the world's answer to hunger and malnutrition.

¹⁶ See <http://biointegrity.org/list.html> for actual FDA documents from some of these scientists. Retrieved August 28, 2011.

¹⁷ Furman, Carol. (2004, March). Killing the Frankenfood Monster: How People Can Love, not Fear, Biotech Food. *The American Enterprise*, March 2004, 31.

¹⁸ Monsanto. Our Pledge. *Monsanto.com*. Retrieved August 28, 2011, from <http://www.monsanto.com/whoweare/Pages/monsanto-pledge.aspx>

¹⁹ Bloom, Jeremy. (2011, February 14). Monsanto blocks research on GMO safety. *Redgreenandblue.org*. Retrieved August 28, 2011, from

<http://redgreenandblue.org/2011/02/14/monsanto-blocks-research-on-gmo-safety/>

²⁰ Monsanto. Indian Farmers Producing More, Conserving More and Improving Lives with Better Technology. (2011, July 14). *Monsanto.com*. Retrieved August 31, 2011, from <http://www.monsantoblog.com/2011/07/14/indian-farmers-producing-more-conserving-more-and-improving-lives-with-better-technology/>

²¹ Renton, Alex. (2001, January 2). India's hidden climate change catastrophe.

Independent.co.uk. Retrieved August 31, 2011, from

<http://www.independent.co.uk/environment/climate-change/indias-hidden-climate-change-catastrophe-2173995.html>

For years now (if not for decades), GMO advocates have stated their rallying banner: Genetically Modified Foods are the answer to world hunger!²² GM food has been around for about two decades, yet, we have seen no decrease in world hunger.

Furthermore, advocates of GM food state that “more nutritious food is now produced with less environmental costs because genetically modified crops require almost no pesticides. Vitamin-enhanced crops and foods are helping to reduce malnutrition in parts of the developing world. . . .”²³ But this is not true. Use of GMO crops results in the use of MORE pesticides and herbicides than before. The primary GM trait engineered into crops is tolerance of herbicide so that MORE can be used, not less. The other main trait engineered into crops is the emission of a pesticide toxin by the plant itself – obviously increasing the pesticide load on the environment. Despite these realities, the “industry is still saying to the public that genetic engineering [has] reduced herbicide use.”²⁴

GM advocates have also stated that genetically modified crops have a higher yield. This is also incorrect.²⁵ GM crops do not normally have higher yields, especially in drought years, where organic fields possess higher crop yields. In addition, claims of added nutritional value in GM food are unsupported. The few crops which have been proposed for nutrient enrichment have not been developed.

Avoiding GMOs in food is not easy to do. Corn and soy are in just about every processed food used as oils, sweeteners, texture modifiers, starches, etc. The vast majority of soy and corn produced in the United States is now GMO, so unless the food is organic (which forbids the use of GMO seed), it is virtually certain that the corn and soy will be GE. In fact, as of 2009, Monsanto is “responsible for producing over 80 percent of the world’s soy in the form of a widely used genetically engineered soybean.”²⁶ Thus, Monsanto has made it very difficult for consumers to find and purchase non-GMO soy.

²² The Alliance for Better Foods. Promise of Biotechnology. *Betterfoods.org*. Retrieved August 13, 2011, from <http://www.betterfoods.org/Promise/Hunger/Hunger.htm>

²³ Entine, Jon. (2006) *Let them Eat Precaution: How Politics is Undermining the Genetic Revolution in Agriculture* (front flap). Washington, D.C.: The AEI Press.

²⁴ Masis, Julie. (2009, December 21). More herbicide use reported on genetically modified crops. *Csmonitor.com*. Retrieved August 28, 2011, from <http://www.csmonitor.com/Environment/2009/1221/More-herbicide-use-reported-on-genetically-modified-crops>

²⁵ Gurian-Sherman, Doug. (2009, April). Failure to Yield: Evaluating the Performance of Genetically Engineered Crops. *Ucsusa.org*. Retrieved August 31, 2011, from http://www.ucsus.org/food_and_agriculture/science_and_impacts/science/failure-to-yield.html

²⁶ O’Brien, Robyn. (2009). *THE UNHEALTHY TRUTH*. (p. 80). New York: Broadway Books.

GE crops include, but are not limited to: soybeans, sugar beets, canola, corn, and cotton.²⁷ As of the writing of this article, the USDA just recently deregulated GE alfalfa. Monsanto “now controls nearly all genetically modified cotton, soy and corn seeds.”²⁸

Unfortunately, there does not appear to be much of a chance of the current government putting a stop to or even slowing down the genetic modification of the American food supply, considering our current U.S. Secretary of Agriculture. Tom Vilsack has very close connections to agribusiness and biotechnology. Secretary Vilsack was the very pro-biotechnology governor of Iowa previously. Now he is still making friends with, and doing favors for, biotechnology, engaging in such “favors” as allowing for the recent passage of GE alfalfa, alfalfa created by. . . you guessed it: Monsanto.²⁹

There are actions, however, you can take to help yourself, your family and friends. Please read up as much as you can about GMOs and genetically modified foods. The internet is a great starting place, and we have an annotated list of other good sites right here at nofamass.org. Once you have educated yourself you can write to your state and federal legislators telling them not to support genetically modified food; write to local newspapers expressing your concerns; patronize local organic-only farms and, in supermarkets, buy only processed foods which bear the “Non-GMO Project” label. The Non-GMO Shopping Guide (at www.nongmoshoppingguide.com) can help guide you on your way to a healthy, organic, GMO-free life!

²⁷ The Organic & Non-GMO Report. What is Non-GMO? *Non-gmoreport.com*.

Retrieved September 3, 2011, from <http://www.non-gmoreport.com/whatisnon-gmo.php>

²⁸ Waddington, Lynda. (2009, Dec. 4). Iowa law firm files as Monsanto lobbyist ahead of DOJ/USDA antitrust workshops. *Iowaindependent*. Retrieved July 31, 2011, <http://iowaindependent.com/22980/iowa-law-firm-files-as-monsanto-lobbyist-in-advance-of-ag-antitrust-workshop>

²⁹ *ibid.*