Jeffrey Smith is a leading spokesperson on the health dangers of Genetically Modified Organisms (GMOs). In 2003 his first book, *Seeds of Deception*, documented the serious yet unknown side effects of genetically engineered foods. His second book, *Genetic Roulette*, just released this year, shows how the world's most powerful Ag biotech companies bluff and mislead critics, Congress, and the FDA about food safety research for the products Americans buy every day. Mr. Smith directs the Campaign for Healthier Eating in America from the Institute for Responsible Technology, where he is executive director.

Most people are somewhat aware of the environmental issues related to Genetically Modified Organisms, but not as many realize that there are also a great deal of health risks associated with eating foods with genetically engineered ingredients. More importantly, most people don't realize the extent to which they are already in our food supply—in processed foods, in supplements, in animal feed, and in cooking oils used in restaurants—and the impending threat of a much larger proliferation of GMOs looming just around the corner. GMO expert Jeffrey Smith spent time with us to explain just what the biotech industry doesn't want you to know—and what you can do to turn the tide against this very dangerous technology.

Jeffrey, in your latest book, *Genetic Roulette*, you discuss how animals fed genetically modified foods have developed severe health problems, such as cancer, bleeding stomachs, intestinal damage, and liver disease. What are the most significant health risks to humans?

The standard list includes allergies, toxins, new diseases, and nutritional problems. But because of the unpredictable nature of genetic engineering, there could be a huge range of health problems that might already be occurring among the population. Allergies are certainly a major issue. Soon after genetically modified soy was introduced to the U.K., soy allergies skyrocketed by 50%. We know that genetically modified soy has higher levels of a known allergen, as well as the introduction of a new protein that has allergenic properties.

GMO soy also has higher residues of herbicide, and it appears to interfere with the production of digestive enzymes, which could also increase the potential for allergic reactions. There is a cross-reactivity between soy allergies and peanut allergies, and so it may not have been a coincidence that peanut allergies doubled in the United States between 1997 and 2002, the 5 years immediately following the introduction of genetically modified soy.

We know that many products, like corn and cotton, are genetically engineered to produce a pesticide called BT or Bacillus thuringiensis. The excuse for allowing these plants to be inserted with genes that create this pesticide was that the pesticide has a history of safe use in conventional and organic agriculture. Those making this assumption, however, failed to take into consideration human and animal reactions that had been recorded. For example, about 500 Americans and Canadians reported allergic reactions, some quite serious, when they were sprayed with BT, which was being sprayed from the air by planes to combat gypsy moth infestation. Likewise, cotton farmers and agricultural laborers in India are reporting the exact same allergic reaction when they har-
vest this BT cotton—or even load it onto trucks, lean against it, or work in ginning factories. So we don’t know if the corn that produces this BT is also contributing to allergic reactions in humans.

We do know that when sheep in India were allowed to graze on the cotton plants after harvest, one in four sheep died within five to seven days, with an estimated 10,000 dead sheep in the region. We also know that farmers in the Philippines and in Germany describe how animals fed certain varieties of GM corn died. In the United States, about two dozen farmers say that certain varieties of BT corn cause their pigs or cows to become sterile. (Most likely thousands of pigs were involved.) Even Filipinos living next to a BT cornfield developed serious and mysterious symptoms while they were breathing in the corn pollen during the time of pollination. Blood tests verified an immune response to the BT toxin from these villagers.

The following year, when the same seeds were planted in four more villages, the same symptoms returned during the time of pollination, when the people were breathing in the BT pollen. And that’s just allergies. We know about reproductive problems and toxins, as well.

*Is there actually research proving a connection between GMOs and food sensitivity, autoimmune disease, and/or cancer?*

There’s not a lot of peer reviewed animal feeding safety studies on GMOs—perhaps about two dozen studies altogether. Research has shown potentially pre-cancerous cell growth in the digestive tract of rats. And scientists saw damaged and proliferative cell growth in rats that were fed BT. We’ve seen immune responses in almost every animal feeding study that has been tested for immune responses. That included Monsanto’s BT corn, an experimental potato, etc. We don’t have any studies that specifically track autoimmune disease. However, we did

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**INTRODUCING THE NON-GMO PROJECT:**

**An innovative effort that’s establishing a consistent Non-GMO choice in the USA & Canada**

The Non-GMO Project is a non-profit organization created by leaders representing all sectors of the organic and natural products industry in the United States and Canada. It’s purpose is to develop and uphold a standardized definition of “non-GMO” for organic and natural products that are produced without genetic engineering or recombinant DNA technologies.

The Non-GMO Project’s central mission is to provide:

1) **Knowledge**
   Offering information on GMOs that will help the organic and natural foods industry to understand and avoid using them in their products.

2) **Standard**
   A uniform, authoritative, consensus-based standard with which to verify non-GMO foods.

3) **Verification Program**
   A centralized, economical, confidential, third-party program for verifying that products meet the non-GMO standard. (The seal shown at right will appear on products beginning in 2008.) A draft of the non-GMO standard has been finished and is available for comment through November 30, 2007. The content of this draft reflects diligent efforts on the part of the Non-GMO Project’s Board of Directors and Technical Advisory Board—a collective group of over 30 leading members of the North American natural products industry. (You can read the draft online at www.nongmoproject.org) After this review process the standard will be finalized and starting in January 2008 products will begin showing the Non-GMO seal.

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find that in the case of peas that were genetically engineered (as well as corn), that the animals developed sensitivity to formerly harmless compounds, not just the genetically modified proteins. In other words, it was as if it was invoking multiple chemical sensitivity in the animals, so that products which were normally nourishing were now being interpreted as a threat to the immune system.

What are the most common GM food ingredients on the market today? And if people cannot afford to eat all organic foods, what are the things most important to avoid?

There are seven food crops. Soy, corn, cottonseed, and canola are the four major ones, all used for vegetable oil. Soy and corn derivatives are almost omnipresent among processed foods. There’s also Hawaiian papaya and a little bit of zucchini and yellow squash. In addition, there are dairy products made from cows injected with rBGH (synthetic growth hormone). And there are genetically modified enzymes and food additives that are not usually listed on the label of processed foods. One exception is aspartame, a genetically engineered sweetener which is listed on labels. There’s also milk and dairy products from animals that have been fed genetically modified grain.

If someone is seeking to limit their intake of genetically modified crop inputs, then one can either buy organic products or buy products that say non-GMO on their label. Otherwise, you can read the label and avoid the ingredients that are at risk, which would include soy and corn derivatives, vegetable oil made from soy, corn, cottonseed, or canola, or any Hawaiian papaya. (Unfortunately, there’s been a huge contamination of papaya, even of the organic and wild papaya varieties on the islands.) Lastly, eating nonorganic zucchini and yellow squash will always be a risk while it’s on the market unlabeled, although it’s only in small quantities. In addition to avoiding GMO crops I just mentioned, there are varieties of sweet corn that are genetically engineered, but it’s not a large percentage.

On a positive note, many dairies are now advertising or labeling their products as free from the use of rBGH. And of course, organic certification does not allow rBGH to be used on the cows. Also popcorn, white corn, blue corn, and red corn are all free of genetic engineering at this point.

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History of The Non-GMO Project

The Non-GMO Project started in Berkeley at The Natural Grocery Company, a small neighborhood natural grocery store. In 2003, in response to letters from customers who were concerned about a GM soy lecithin that the store was carrying, a group of employees initiated the “People Want to Know Campaign.” This effort rallied 161 grocery stores and co-ops throughout the United States in a letter-writing campaign to manufacturers of natural food products and supplements in the United States. The goal was to discover the GMO status of products, so that the stores’ consumers could be offered an informed choice. The results of this campaign were mixed, with a central problem being the lack of a consistent, industry-wide standard for what “non-GMO” actually meant.

Prior to this, in 2001, The Big Carrot Natural Food Market in Toronto, Ontario implemented a non-GMO purchasing policy after a year and a half of research. They simply discontinued those product lines that were not confirmed by the manufacturer to be non-GMO. It was a radical and very successful move for the store. But the absence of an authoritative standard for non-GMO created problems for this effort as well, and led The Big Carrot to look for a more comprehensive and reliable way in which to continue providing its customers with non-GMO foods. In 2005, The Natural Grocery Company and The Big Carrot Natural Food Market teamed up to form the Non-GMO Project, with a common goal of creating a standardized meaning of non-GMO for the North American food industry. To give the Project the rigorous scientific foundation and world-class technical support necessary for this endeavor, the stores began working with the Global ID Group, the world’s leaders in non-GMO testing, certification, and consulting.

In the spring of 2007, the Non-GMO Project expanded its Board of Directors to include representatives from all stakeholder groups in the natural products industry, including consumers, retailers, farmers, and manufacturers. Major sponsors of the project include Eden Foods, Organic Valley, Lundberg Rice, Nature’s Path, Whole Foods, Good Earth Natural Foods, The Big Carrot, The Natural Grocery Company, and United Natural Foods.

This past year the Non-GMO Project has been engaged in a comprehensive benchmarking process to create the authoritative definition of non-GMO that has been missing, and formulate a standard and corresponding Non-GMO Seal, which will begin implementation in 2008.
Interview with Jeffrey Smith on GMOs — continued from page 73

Regarding the Hawaiian papaya you mentioned earlier, are you saying there’s been contamination of papaya because of cross pollination?

The contamination of papaya comes from two sources. First, there’s the cross-pollination of the trees from the wind that carries the seeds. This means that the fruit that’s produced by the tree is still non-GMO, but the seeds produced within that fruit are GM contaminated. Second, because people eat papaya and just throw the seeds away, or throw them out into the fields, they can grow in the wild. So people inadvertently spread the seeds of the genetically engineered varieties.

Do you think the rise in cancer rates could be a result of GM foods?

Most certainly it could be. In fact, any upturn in health problems that corresponds with the last 10 years could be related to GM consumption. However, it’s difficult to identify and isolate, given that there’s no human clinical trials and no post-marketing surveillance. The indications from animal studies are that there’s probably several health dangers and effects already mounting in the population.

What about other food allergies besides soy? Are those on the upswing as well?

There are several food allergies that are on the upswing, but there’s no surveillance mechanism in the United States that carefully monitors food allergies. We’ve been hearing reports from hospitals and doctors and other experts describing this huge increase, particularly among children, who are most susceptible to allergies. It’s possible that the ingestion of genetically modified foods could cause a sensitivity to non-GM foods, as I mentioned before, by breaking down the normal functioning of the immune system.

What are the risks to children and babies? Your latest book says that the trans genes can survive digestion and be passed through the placenta into the fetus.

The transfer of genes is a very, very serious issue. The only human feeding study ever conducted on GM foods verified that the gene inserted into soybeans transferred into human gut bacteria DNA, and was integrated on a stable basis. This means long after you stop eating a genetically modified food, you might still have this foreign protein produced — continued on page 78
inside your gut. One of the more scary examples would be if you ate a genetically modified corn chip, and the gene that produces the BT toxin (the pesticide) were to transfer to your gut bacteria, it could theoretically transform your intestinal flora into living pesticide factories...possibly for the rest of your life. In addition, genes might also transfer into your own cellular DNA, causing it to produce foreign proteins. Or the promoter, the so-called “on switch” which switches on the foreign genes in these genetically modified crops, might transfer into your own human DNA and turn on genes at random, causing them to overproduce either a toxin, allergen, carcinogen, or anti-nutrient. We just don’t know; it’s a genetic roulette!

**So when you insert foreign genes into DNA, can it trigger reactions throughout the whole DNA chain?**

Well, that’s a different thing. What we’re talking about now is the gene that you insert into corn, for example, or soy. The way that you create that gene and insert it tends to dismantle the normal barriers for gene transfer—which means it optimizes the likelihood that that foreign gene will take up residence in the DNA of your gut bacteria, and be producing its foreign protein within you. Now, that is a very serious long-term threat of genetically modified products. It also threatens children, because their digestive juices are less developed, and so the transgenic DNA may be likely to survive longer (and more of it), and therefore, transfer more readily into the gut bacteria or possibly into the organs. So we’re creating what might be lifelong health issues by exposing infants and children to genetically modified products. From studies we’ve seen with DNA fed to pregnant mice, fragments of it ended up in the brains of their offspring, showing that DNA can travel through the placenta and across the blood-brain barrier.

**You’ve mentioned damage can occur in the process of inserting a gene. Can you explain?**

This is a very critical feature of the genetic engineering process, and it’s important to understand how imprecise and primitive the technology is—and all the unpredictable ways that it can create problems. When a scientist wants to create a pesticide-producing crop, for example, he or she will typically take a gene out of the soil bacteria that produces the pesticide naturally, make some changes in the gene, add a promoter to turn it on, and an antibiotic-resistant marker gene, and then make millions of copies of that gene and place them in a gene gun, and then blast them into millions
of cells in the hopes that some of the genes make it into the DNA of some of those cells. They can't evaluate which genes got the cells, so they douse all the cells with antibiotics, killing them all except the very few that have the gene inserted into the DNA—because there, the antibiotic-resistant marker gene causes a cell to become invincible to a particular antibiotic. Then they take the surviving cells and they clone them into plants in a process called “tissue culture,” which may, in turn, be cloned again to reproduce enough available seed. The process of inserting the gene and cloning creates massive collateral damage in the DNA.

The cloning alone can cause changes in the genetic structure of 2–4% of the DNA. That’s thousands and millions of changes that can occur as a result of the insertion process. Also, there’s damage typically adjacent to the insertion point, and fragments of other genes that can be placed up and down the DNA. All told, you can end up increasing or decreasing levels of proteins that are being created by normal, native genes in the DNA. In fact, one study of a human cell showed that just the insertion process alone caused up to 5% of all of the active genes to change their levels of expression. This shows that there’s a holistic response to this insertion process that is not well-understood and is completely unpredictable.

**So it’s not like snapping a Lego into place.**

That’s right. It’s a holistic effect. In fact, there was an article in the *New York Times* recently that said the understanding that genes react as whole networks dismantles all of the safety risk assessments of GMOs that have gone on. This basically undermines the foundation of genetically engineered crops, which is under the assumption that a single gene will be able to insert precisely and have only a single effect, but there’s actually a holistic effect that has not been taken into consideration.

**You write that when given the choice, animals avoid GM foods. How do you think they can tell the difference, and is there any way people can learn to recognize GMO foods the way animals do?**

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. We don’t know if it’s the smell or something more subtle, but it would be wonderful to raise humans to the level of animals. Right now we cannot do this.

**Your book Genetic Roulette also talks about unintended changes in nutrients that occur in GM foods. So are people unwittingly feeding their families foods that are not as nourishing?**

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That's a real possibility. Not only may some of the nourishing elements of foods be reduced, but it may be that some of the medicinal qualities of foods that haven't even been discovered yet might be eliminated—due to the unpredicted changes in the DNA of these genetically modified crops. The functionality of foods and how these natural products can fight disease and improve our well-being is a new science. We have yet to identify most of these compounds, and yet, we're making massive changes in genetically modified crops that could increase or decrease these compounds without our knowing it. We do know that certain products, like genetically modified soy, have about 12 to 14% less of their cancer-fighting properties. And they have less protein, plus higher levels of an anti-nutrient which could block the absorption of other nutrients. Many of these things were accepted by reviewers of these products without question, although in most cases the nutrient changes have not been tested or monitored at all.

Most people don't realize that there have not been extensive tests on GM foods. Why has the FDA been so lax on this matter?

It wasn't the scientists' idea to allow these foods on the market without some significant testing. Documents made public from a lawsuit show that the overwhelming consensus among the FDA scientists was that these foods were inherently dangerous and could create poisons or allergens, new diseases, or nutritional problems, and they had urged superiors to require a long-term study. However, the FDA was under orders from the White House to promote the biotechnology industry. Therefore, they created a new position, the Deputy Commissioner of Policy, and hired Monsanto's former attorney, Michael Taylor. So Michael Taylor was in charge of policy at the FDA when the GMO policy was created. That policy stated that the agency was not aware of any information showing that the foods created from these new methods differed in any meaningful or uniform way. On the basis of that one sentence the FDA said "We require no safety studies whatsoever." If Monsanto and others wanted to claim that their foods were safe, the FDA had no further questions. That sentence, which was the basis of the policy, turned out to be a lie. Not only was the agency aware of the differences of GM foods, but this was the overwhelming consensus among their own scientists.

The consistent denials and cover-up about the health risks of GM foods seems very similar to what went on with the cigarette industry.
There's absolutely a consistent theme of denial of health risks. There's also the rigging of research to force conclusions of safety. In *Genetic Roulette* I have a whole section dedicated to showing how the industry meticulously designs their studies to avoid finding problems. They have bad science down to a science!

**This has been going on longer than people realize.** Many people know that the amino acid L-tryptophan was banned from the natural marketplace for years due to some people falling ill from it. But until reading your book, we did not realize that this was linked to a genetically engineered bacteria used to produce the supplement.

Back in the 1980s about 100 people died, and anywhere from 5 to 10,000 fell sick or were permanently disabled due to one brand of L-tryptophan (out of the six brands of this supplement that were being imported into the United States). The one brand was manufactured through a genetically modified bacteria. It took many years to identify that there was even an epidemic taking place, and they tracked it to specific contaminants in this brand of L-tryptophan that almost certainly were the result of the genetic engineering process. The FDA, however, decided to take all tryptophan off the market, not just this particular brand, and withheld information from the public and even from Congress about the genetic engineering aspects of the problem. It was a sobering lesson. The only reason that they were able to even discover the epidemic was because the disease was rare, acute, and came on quickly. If all three characteristics had not been in place at the same time, it is likely that this same dangerous L-tryptophan could still be on the market today. It begs the question: What about the current crops on the market? Might they be contributing to common diseases, like heart disease, cancer, obesity, and diabetes? Might they also be contributing to diseases that are not as serious, so that they could pass undetected? Or might they be building up a disease that will take us 20 years to discover, or even until the next generation to manifest? We don't know if the introduction of genetically modified foods is related to the doubling of food-related illnesses in the United States between 1994 and 2001, because it may not stand out the way the tryptophan disaster did.

**Are any other supplements produced with genetically engineered ingredients?**

Yes, many supplements are created from genetically engineered bacteria or microorganisms. It is a secret among the supplement industry how embedded they are with genetically engineered technology.

**Will this come out in the labeling of GM foods starting next year?** —continued on page 82
Interview with Jeffrey Smith

on GMOs — continued from page 81

Yes, we are working on this, and helping supplement manufacturers to understand better where the genetic engineering is and what alternatives they have.

The situation with GMOs reminds us of another invention, chlorofluorohydrocarbons, or CFCs. When Charles Midgley invented these in 1928, everyone thought they were much safer than the poisonous ammonia and sulfur dioxide gases originally used in refrigerators. It took many years before we knew how badly they had affected the environment. But GMOs seem to be much worse, because they're alive and they can replicate themselves, and even if we stop now, it may be too late.

That's right. The effects of this self-propagating genetic pollution may outlast the effects of global warming and nuclear waste. We do not have the technology to fully clean it up today—but that should not be an excuse for giving up. We can certainly dramatically reduce the number of genetically modified plants out there, even if we do not have the ability to completely clean up the gene pool. If we don't stop it, and we simply give up, the biotech industry has a genetically engineered counterpart to virtually every fruit, vegetable, grain, and bean that is being sold on the market in the United States. More than 172 different species have been field-trialed, with more than 50,000 field trials performed in the United States alone.

The stated goal of the biotech industry is to genetically engineer 100% of the commercial seeds in the world and patent them. This was Monsanto's ideal future, as described to Arthur Anderson Consulting. They actually described this process at a January 1999 conference in San Francisco. In that same meeting, another biotech representative showed a graph projecting a 95% takeover of commercial seeds within the next 5 years. However, within three weeks their ideal future crashed when a food safety scandal erupted in Europe. This involved a genetically modified food researcher named Arpad Pusztai who discovered that supposedly harmless potatoes caused massive damage to rats. He was fired from his job after 35 years and silenced with threats of a lawsuit. Once he was able to speak, there was a massive rush in the media to cover the event—which, according to one writer, divided society into two warring blocks on the GMO issue. Within a few weeks, the consumer concern was too much and the manufacturers committed to remove GM ingredients from their European brand. So this kind of vulnerability of the GM industry is what we're seeing now in the United States. Oprah Winfrey could literally end genetic
engineering in the food supply in 60 minutes—because as soon as people realize these foods are in their diets already and how dangerous they are, they will definitely choose non-GM ingredients. We will give them the choice through non-GMO shopping guides, which I think will wipe out GMOs from the food supply.

The treatment of Arpad Pusztai is not uncommon. In Russia, a leading researcher in the Russian National Academy of Sciences discovered that female rats that were fed genetically modified soy had an infant mortality rate of over 50% within the first three weeks, compared to only about 10% of the offspring with mothers who were fed non-GM soy. This scientist has since been told she could not do any more GM food research. This type of pressure has been reproduced all over the world whenever adverse findings are found or reported.

In Europe, GM foods must be labeled, and there’s so much anti-GM sentiment that the food companies have eliminated them or changed recipes to remove soy, corn, and other GM foods from their products. What can we do to combat GM foods here in the United States?

The first thing would be to protect yourself against the potential dangers by adopting a non-GM diet. I also encourage people to begin GM-free school campaigns in their region. Our video, Hidden Dangers In Kids’ Meals, combined with our 60-page manual and our free website (ResponsibleTechnology.org) and listserv make this turnkey approach very easy as a method of alerting the community to the health dangers.

By shopping organically you can avoid a large percentage of tainted foods, but even if you’re discerning, can you avoid everything?

You can do very, very well by reading labels and knowing what to look for. At SeedsofDeception.com we have a list of many of the derivatives of soy and corn, which may not be obvious, like dextrose and maltodextrin. When eating in restaurants, it’s important to ask if they use vegetable oil which is genetically engineered—that would be soy, corn, cottonseed, or canola—or if they cook with olive oil or other oils. If the restaurant uses vegetable oil, I ask them to cook my food in olive oil, or I choose a different restaurant.

Learn more about GMOs at www.responsibletechnology.org and www.nongmoproject.org.

Read this Jeffrey Smith interview and other archived interviews and sign up for our Free Newsletter on our award-winning website: www.ShareGuide.com

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