

# Wellness in A Minute: What are GMO's?

*Beth Maloney  
The Evening Sun  
February 4, 2012*

Often times when we hear about genetics, we think about human genes, disease, or family characteristics. But, these days, genetic engineering can refer to the foods that we eat as well.

Farmers have long practiced the process of breeding plants and animals to produce products that are more desirable to consumers. Today, this process occurs at a whole new level.

GMO's (genetically modified organisms) are the result of a laboratory process where genes from the DNA of one species are extracted and artificially inserted into the genes of an unrelated plant or animal. The resulting products are used for both human and animal consumption.

The most common food groups produced using genetic modification are tomatoes, potatoes, squash, corn and soybeans. New food groups are being added to this list every day. According to the National Institutes of Health (NIH), there are some benefits to using GMO's. Some of the benefits include more nutritious foods, tastier foods, disease- and drought-resistant plants that require fewer environmental resources (water, fertilizer, etc.), decreased use of pesticides, increased supply of food with reduced cost and longer shelf life, faster growing plants and animals, and foods with more desirable traits.

However, NIH also reports that there are potential hazards of using GMO's and that there is a lack of research on the long term effects of these foods on humans and animals. Modified plants or animals may have genetic changes that could be unexpected and/or harmful. There have been some studies that have shown unexpected allergic reactions in humans to foods that have been genetically modified. For instance, if a person is allergic to peanuts and eats a potato that has been modified with a peanut gene, there is potential for that person to have an allergic reaction to the potato. Simply put, it is harder to know exactly what you are putting in your mouth when foods have been genetically modified.

Genetic modification of plants can decrease the variety of species of plants and ultimately lead to the extinction of the original plant or to other unpredictable environmental effects. It is also unknown what effect introducing these

engineered plants into the environment can have on our ecosystem over a long period of time.

Currently, The Food and Drug Administration does not require foods to be labeled if they contain GMO's. However, products that are non-GMO's are generally labeled very clearly. If you would like to avoid consuming GMO's, look for these products and stick to organic foods. You can also find a wealth of information at [www.nongmoshoppingguide.com](http://www.nongmoshoppingguide.com). There continues to be much controversy surrounding the use of GMO's in the United States. However, several European countries have outlawed the use of GMO's in their agricultural systems.

It is important that we all make informed decisions about what we choose to eat and not to eat but it never hurts to eat as natural as possible.

# **Don't Be Afraid of GMO's**

*Lauren Gros*

*University Wire*

*November 14, 2014*

What's a GMO? This is the question Jimmy Kimmel recently asked those shopping in a farmer's market during his ask the public segment.

Most of the interviewed stumbled over the acronym unsure what it stood for, making for a comic segment. Despite not knowing what a GMO was, everyone interviewed felt certain they were bad for you. This response is sad because it is so far from the truth.

GMO's or Genetically Modified Organisms are organisms whose genomes have been altered by the techniques of genetic engineering so that its DNA contains one or more genes not normally found there.

GMOs are commonly used in agriculture to modify crops. For example, strawberry seeds can be engineered to be more tolerant to frost with the insertion of an arctic fish gene. Other seeds can be manufactured to be drought resistant, produce more yields for the same amount of input, and increase the amount of nutrients in a plant, among other things.

All of these modifications will help agriculture evolve in the way it must to feed the worlds growing population. By 2050 global population is projected to reach 9.6 billion, which is 2.5 billion more people than inhabit the world currently. GMO's will allow farmers to grow more food on less land, which is exactly what we will need in the future.

Approvals by multiple food safety organizations like the FDA have confirmed GMO crops on the market are safe for eating. Many of the crops we eat today are genetically modified and no cases of harmful side effects have been reported. However, the question of if GMO's are actually safe remains highly controversial.

This is partly because large GMO corporations like Monsanto have hurt the GMO image. Monsanto is a huge figure in the GMO market. They produce 80% of GMO corn and 90% of GMO soy in the United States. Therefore, the actions of Monsanto play a large role influencing public opinion on GMOs.

When Monsanto's executive vice president and chief technology officer spoke at Georgetown last week he said the public's misunderstanding of GMOs was the

result of a lack of education on the topic. Dr. Fraley said that Monsanto is taking this issue very seriously and just launched a new television campaign to make people aware of the benefits of GMOs.

I do not think this campaign will be much a success. If Monsanto wants to improve the image of GMO's they have to take criticism of the technology seriously. Instead Dr. Fraley quickly dismissed all criticisms of GMOs as "internet myths" we should ignore. He was even distributed flash drives loaded with academic studies that support Monsanto and GMOs, so we would not be led astray by anything "false" online. These actions gave the audience the impression Monsanto had something to hide. Instead Monsanto should take criticism of their products seriously, and work with outside agencies to ensure their products are safe. Hiding behind scripted statements is not going to make the public trust GMOs any more.

A more transparent image of GMOs needs to become available to the public since they are the future of agriculture. Every step should be taken to ensure people are comfortable with the increasing use of GMOs in agriculture. As the world evolves we must evolve with it. Increased use of GMOs in agriculture is really just the next natural step in our evolution.

# **We must control chemicals in our food**

*Thomas Braun  
The Daily Herald  
June 15, 2015*

Mary Flanagan is right when she states: Just because a group is a nonprofit or contains scientific sounding words does not make its agenda valid.

Unfortunately, when you investigate the bias of organizations that are weighing in on issues such as GMOs, the bulk of them are well funded by the industry that is benefiting from less-than-objective research.

In the case of GMO's some of these groups spent \$50 million dollars to defeat an American citizen's right to know when they are buying a GMO product. That was in California only.

They spent \$18 million in Oregon to defeat a similar law. They are now pushing a bill through Congress that would prevent the labeling of GMO products nationwide.

Monsanto sells chemicals; our beautiful planet is being saturated with chemicals. Our soil is being poisoned.

If you read the book "The 6th Extinction" you will understand what is transpiring in our world. The glyphosate kills all living things, both animal and vegetable.

It's only the amount of exposure that decides if you die, are crippled for life or have an allergic reaction.

Canada has banned the use of Monsanto's glyphosate to be sprayed on wheat for ripening. Almost 40 countries around the world will not allow GMO plants to be grown on their soil. GMO products imported must be labeled in some of those countries.

We can't wait for a scientific controlled study of 10,000 schoolchildren who eat GMO breakfast cereal to determine what harm they are experiencing and then decide to stop this madness of playing God with plant DNA.

When will we start protecting the health of our babies, our children and the adults before we protect the industries that deliver these chemicals?

# **GMO Health Risks**

*Sandra Clark*

*Healthy Food- Naturally*

*February 7, 2012*

In the first article of my GMO series, I gave a descriptions of what GMOs are and touched briefly on health and environmental issues that are a result. In this article, I'm going to go much more in-depth into the health issues. Because many commodity GMO crops are specifically altered to allow Monsanto's RoundUp to be sprayed on the plants, or the plants have been genetically modified to actually produce a pesticide, I'm including health issues with Roundup in this article as well. Hang on, it's going to be bumpy.

This article references animal studies since most studies first take place in animals, and they are a viable means of determining areas of issues for humans.

So what are the prevailing health issues with GM foods and the herbicides that are used on them?

## **Organ Damage**

The reasons get complicated, but basically in order to gain FDA approval for GM corn, Monsanto conducted a 90 day test. Rather than conduct its own test or even draw its own conclusions, the FDA accepted Monsanto's published results. Monsanto kept the study data private, only giving it up in 2005 after a court case in which Monsanto had to produce the data. The study was published in 2009 in the International Journal of Biological Sciences and concluded that 3 varieties of GM corn (NK 603, MON 810 and MON 863) all of which were modified to be tolerant of the herbicide Roundup, were associated with damage mostly to the kidneys and liver. Damage was also noticed in the heart, adrenal glands, spleen and blood flow system. This data was derived the same data that the United States used to approve those corn varieties in the first place. Keep in mind that it is very

rare for chronic issues to show up after 90 days (more likely after a study that goes for at least 2 years), the fact that the study found this many problems is stunning. It's also possible that longer term damage is even more problematic.

### **Sterility and Infant Mortality**

Many people in the United States are facing infertility. It's been a big issue for those around me at various times of my life. Speculation on the reasons range from STD's to the electronics we work with everyday, but did you know:

In 2005, a Russian scientist, conducted a study using rats. This study showed that more than half of the babies who were born from rats fed GM soy died within three weeks. This is compared to the 10% death rate of babies from rats fed non-GMO soy. In 2009, another Russian biologist conducted a study on GM soy (which accounts for 91% of the United States soy bean production) on hamsters. Within 3 generations, those hamsters on the maximum soy diet became infertile. These hamsters were also slower to grow and the pups had a very high mortality rate. Italian scientists found that male rats had sperm cell damage, resulting in infertility. In 2008, an Austrian government study shows that the more GM corn mice ate, the fewer babies they had and the smaller the babies were.

There is other anecdotal evidence specifically that many farmers are noticing that their livestock, pigs and cows are becoming sterile after being fed GM corn feed.

### **Birth Defects**

In Argentina, a study done on GM soy which was doused with RoundUp (glyphosate) has been shown to cause brain, intestinal and heart defects in amphibian fetuses. (The study actually used lower levels than that which is actually used in the soy fields).

### **Immune Reactions and Allergies**

Allergies and Food sensitivities are rising:

A research study inserted a gene from a Brazil nut into soybeans. After tests verified that people who are allergic to Brazil nuts would also react to the GM soy. The study was canceled, but it does verify that genetic engineering can transfer allergens to other crops. A year after GM soy was introduced into the British diet, researchers at the York Laboratory reported that soy allergies had gone up by 50% in a single year. While no tests have been conducted, there are several ways that GM soy might have been the culprit. The proteins produced in GM soy (but not conventional soy) are identical to shrimp and dust mite allergens. So if a person was allergic to either shrimp or dust mites, then eating GM soy could trigger the same reaction.

Although there is no definitive study done, it should be noted that in the five years after GM soy was introduced in the United States, peanut allergies in the US doubled. There is a protein in natural soy beans that cross-reacts with peanut allergies. At this time, there have been no studies that I could find which investigates whether this cross-reaction is amplified in GM soy.

### **Increased Cancer Risks**

In the district of Ituzaingo, in Argentina, over 300 cases of cancer have been reported in the areas where the pesticide Roundup is being used. (Approximately 5000 people live in this district which equates to a cancer rate of 6% of the population.)

In 1996, rats fed GM potatoes engineered to produce their own insecticide developed potentially pre-cancerous cell growth as well as other issues, most notably organ damage. The research determined the cause was not the insecticide, but was the process of the genetic engineering itself

Milk from rbGH treated cows (which is not labeled) show much higher levels of a hormone (IGF-1) which is considered to be a high risk factor for breast, prostate, colon, lung and other cancers. The milk also is lower in nutritional values, has increased antibiotics and more pus from infected udders (another reason to drink

raw milk from cows that aren't injected with rbGH). Most commercial dairies in the US have routinely used rbGH injections on their herds to increase milk production.

### **Accelerated Aging**

According to the American Academy of Environmental Medicine, certain animal studies of GMO's show altered structure and function of the liver as a result of eating GMO foods, which include altered metabolism and cell changes which could lead to accelerated aging.

### **Immune System Dysfunction and Increase of Diabetes**

In 2008, a study of mice fed GM corn showed that over 400 genes were different in the mice fed GM corn than the mice fed conventional corn. Some of these genes control cholesterol and insulin regulation. The studies also showed intestinal damage in the animals fed GM foods, which included disruption of the intestinal immune system.

### **Other Symptoms**

Many of the symptoms identified in the UK soy allergy study could be those related to glyphosate (RoundUp) exposure. "The allergy study identified irritable bowel syndrome, digestion problems, chronic fatigue, headaches, lethargy, and skin complaints, including acne and eczema, all related to soy consumption. Symptoms of glyphosate exposure include nausea, headaches, lethargy, skin rashes, and burning or itchy skin].

In 2003, approximately 100 people living next to a GM modified corn field in the Philippines developed skin, respiratory and intestinal reactions when the corn was producing pollen. Blood tests of 38 people showed antibodies to the Bt-toxin which supported (but did not prove) a link. The symptoms reappeared the following year in at least four other villages which planted the same variety of GM corn.

### **Death**

When plants (such as Bt cotton) are modified to actually produce pesticides inside the plants, it not only kills or deters insects from feeding on the plants, but it

renders the plant itself toxic. In India, farmers who let their sheep graze on their fields of Bt cotton after the harvest, saw thousands of the sheep die.

### **GMOs**

Part of the issue for us with GMO foods, is that the genetically modified proteins we ingest don't go away. There is only one published human feeding experiment and that showed that the genetic material inserted into GM soy transfers into the bacteria living inside our guts and continues to function. While we don't know yet what that actually means, the implications of it are dangerous.

### **Conclusion**

Even though GMOs have neither been around very long nor been well-studied, the implications of the studies done are horrendous. So why does our Government allow this? That will be the part of the subject in the next installment of the series, GMO's and Monsanto.

# **GMO FACTS- Frequently asked Questions**

*Nongmoproject.org*

## **What are GMOs?**

GMOs (or “genetically modified organisms”) are living organisms whose genetic material has been artificially manipulated in a laboratory through genetic engineering, or GE. This relatively new science creates unstable combinations of plant, animal, bacteria and viral genes that do not occur in nature or through traditional crossbreeding methods.

Virtually all commercial GMOs are engineered to withstand direct application of herbicide and/or to produce an insecticide. Despite biotech industry promises, none of the GMO traits currently on the market offer increased yield, drought tolerance, enhanced nutrition, or any other consumer benefit.

Meanwhile, a growing body of evidence connects GMOs with health problems, environmental damage and violation of farmers’ and consumers’ rights.

## **Are GMOs safe?**

Most developed nations do not consider GMOs to be safe. In more than 60 countries around the world, including Australia, Japan, and all of the countries in the European Union, there are significant restrictions or outright bans on the production and sale of GMOs. In the U.S., the government has approved GMOs based on studies conducted by the same corporations that created them and profit from their sale. Increasingly, Americans are taking matters into their own hands and choosing to opt out of the GMO experiment.

## **Are GMOs labeled?**

Unfortunately, even though polls consistently show that a significant majority of Americans want to know if the food they’re purchasing contains GMOs, the powerful biotech lobby has succeeded in keeping this information from the public. In the absence of mandatory labeling, the Non-GMO Project was created to give consumers the informed choice they deserve.

## **Where does the Non-GMO Project come in?**

The Non-GMO Project is a non-profit organization with a mission of protecting the non-GMO food supply and giving consumers an informed choice. We offer North America’s ONLY third party verification for products produced according to rigorous best practices for GMO avoidance (for more info, [click here](#)). Our strategy is to empower consumers to make change through the marketplace. If people stop buying GMOs, companies will stop using them and farmers will stop growing them.

## **Do Americans want non-GMO foods and supplements?**

Polls consistently show that a significant majority of North Americans would like to be able to tell if the food they’re purchasing contains GMOs (a 2012 Mellman Group poll found that 91% of American consumers wanted GMOs labeled). And, according to a recent CBS/New York Times poll, 53% of consumers said they would not buy food that has been genetically modified. The Non-GMO Project’s

seal for verified products will, for the first time, give the public an opportunity to make an informed choice when it comes to GMOs.

### **How common are GMOs?**

In the U.S., GMOs are in as much as 80% of conventional processed food.

### **Why does the Non-GMO Project verify products that have a low risk of containing GMOs?**

Some ingredients that seem low-risk may have less-visible high-risk ingredients. Take, for example, dried fruit. Raisins and similar fruit are sometimes packed with a small quantity of oil to keep them moist. This oil, when used, is sometimes high-GMO-risk. As such, it is critical that we do take the time to look carefully at ingredient spec sheets during the verification process, to ensure that risks like this are effectively mitigated, even in apparently low-risk products.

Contamination incidents have occurred with seemingly “low-risk” products (rice, starling corn, flax). Non-GMO Project Verification supports manufacturers in being able to quickly and proactively respond to unexpected contamination issues. Verifying only high-risk products puts a heavy burden on consumers to know what products are at risk of containing GMOs. Many people, even in the world of

Natural Foods, don’t know what a GMO is, let alone which crops and processed ingredients are high-risk. As such, labeling only products that contain high-risk ingredients could give an unfair competitive advantage to products that contain ingredients containing corn, soy, etc. Taking the cereal aisle for our example, if we verified only high-risk products, a shopper might see the seal on a box of verified corn flakes, but not on the wheat-based cereal box next to them, produced with the same high standards by the same company. This could leave them thinking the corn flakes were non-GMO, but that they should avoid the wheat product, even though there’s no GMO wheat on the market. Given the lack of understanding of the issue, this presents some serious issues.

Through verifying low-risk products, the Non-GMO Project’s work builds consumer interest and industry investment in Non-GMO, even for crops that aren’t genetically engineered yet. Biotech is constantly working to patent and commercialize new organisms (salmon, apples, etc.), and the more companies that have committed to Non-GMO production, the more resistance these new developments will see prior to release.

### **What are the impacts of GMOs on the environment?**

Over 80% of all GMOs grown worldwide are engineered for herbicide tolerance. As a result, use of toxic herbicides like Roundup has increased 15 times since GMOs were introduced. GMO crops are also responsible for the emergence of “super weeds” and “super bugs:” which can only be killed with ever more toxic poisons like 2,4-D (a major ingredient in Agent Orange). GMOs are a direct extension of chemical agriculture, and are developed and sold by the world’s biggest chemical companies. The long-term impacts of GMOs are unknown, and once released into the environment these novel organisms cannot be recalled.

**How do GMOs affect farmers?**

Because GMOs are novel life forms, biotechnology companies have been able to obtain patents with which to restrict their use. As a result, the companies that make GMOs now have the power to sue farmers whose fields are contaminated with GMOs, even when it is the result of inevitable drift from neighboring fields. GMOs therefore pose a serious threat to farmer sovereignty and to the national food security of any country where they are grown, including the United States.

**How can I avoid GMOs?**

Choose food and products that are Non-GMO Project Verified!

# Commonly Asked Questions about the Food Safety of GMOs

*Monsanto.com*

In recent years, people have become increasingly interested in where their food comes from and how it is produced. And unfortunately, despite a 20-year record of safety and almost 2,500 independent, global scientific reviews and approvals of GMO crops, there is still conflicting and confusing information about GMOs.

## **What are biotechnology, genetic engineering, genetic modification and GMOs? And, why does Monsanto use it?**

We use agricultural biotechnology, or genetic engineering of plants, to develop new varieties of plant seeds with a range of desirable characteristics, such as being able to resist certain insects or harsh weather conditions.

Genetically modified crops – also known as genetically modified organisms (GMOs), GE crops or biotech crops – include one or more genes from another organism, such as a bacterium or other microbe or other plant species. For plants, the inserted gene results in a beneficial characteristic in the plant, such as the ability to tolerate environmental pressures from damaging insects or drought. GMO is commonly used to refer to GM plants, as well as the food or ingredients from GM plants.

As a seed company, Monsanto studies, breeds, grows and sells GM seeds – as well as conventional seeds – to farmers around the world. Our research teams use traditional and advanced breeding techniques to develop new varieties; they use biotechnology to give those varieties an additional desirable characteristic (or beneficial trait) that often cannot be effectively developed through breeding practices alone.

The GM traits we develop typically help farmers increase yields on their farmland, while conserving resources such as soil and water. Examples of these traits are herbicide, insect and drought tolerance. However, we also work to develop traits that can contribute to an improvement in our diets, such as soybeans that produce fatty acids that provide better nutrition.

## **Are foods and ingredients developed through biotechnology (or GMOs) safe to eat?**

Yes. Plants and crops with GM traits have been tested more than any other crops—with no credible evidence of harm to humans or animals.

As consumers ourselves, we place the highest priority on the safety of our products and conduct rigorous and comprehensive testing on each. In fact, seeds with GM traits have been tested more than any other crops in the history of agriculture – with no credible evidence of harm to humans or animals.

Governmental regulatory agencies, scientific organizations and leading health associations worldwide agree that food grown from GM crops is safe to eat. The World Health Organization, the American Medical Association, the U.S. National Academy of Sciences, the British Royal Society, among others that have examined the evidence, all come to the same conclusion: consuming foods containing ingredients derived from GM crops is safe to eat and no riskier than consuming the same foods containing ingredients from crop plants modified by conventional plant improvement techniques (i.e. plant breeding).

## **Who makes sure biotech crops are safe to eat and safe for the environment?**

Independent scientists and the companies that develop biotech crops conduct tests for food, feed and environmental safety. Scientists at regulatory agencies review this data and are responsible for regulating the crops.

Independent scientists at regulatory agencies worldwide review the data for each potential product and make their own scientific assessment of its food, feed and environmental safety. There is broad global agreement among food scientists, toxicology experts and regulatory food safety officials on how to evaluate the safety of GM foods; and this strong regulatory framework has successfully ensured the safety of GM seeds.

Since 1996, when the first GM crops were widely commercialized (1996-2014), over 60 different countries have granted over 3,083 commercial use approvals on 357 different GM traits in 27 crops. The majority (1,458) of approvals on GM crops have been on the food safety of the product.

Monsanto makes submissions to regulatory agencies in countries where we plan to sell our seed or where the crop is commonly imported. Regulatory agencies in each country must approve a potential product before it can be sold to farmers, or

imported for food and/or animal feed in their country. In the United States, for example, three agencies share responsibility for overseeing and approving GM crops based on their specific areas of scientific expertise:

- The Food and Drug Administration (FDA) is responsible for the safety and appropriate labeling of food and feed products grown from GM crops. This includes a review of nutrient composition, non-nutrient composition and the potential presence of allergens.
- The Department of Agriculture (USDA) is responsible for ensuring that GM crops are safe for agriculture. USDA oversees and regulates field testing, as well as the movement of GM crops and seeds.
- The Environmental Protection Agency (EPA) is responsible for the safety of pesticides, and so is responsible for reviewing GM plants that produce proteins to protect the plants from insect pests and disease. The EPA oversees field testing, as well as the sale and distribution of pest-protected crops to ensure public and environmental health.

### **Can consumers avoid GM foods in the grocery store if desired?**

Yes. Consumers can look for and choose those products that are labeled “certified non-GM product” or “certified organic” products.

### **Are foods and ingredients developed from genetically modified (GM) crops labeled?**

Many countries have different approaches to food labeling, both on GM ingredients and other things. In the United States, all ingredients must be listed, and when there is a meaningful difference in the safety, composition or nutrition of the crop from which they were derived, that difference is properly reflected on the label.

Each country establishes its own food labeling laws. Within the United States, the FDA requires the labeling of ingredients. If there is a **meaningful difference in the safety, composition or nutrition of the crop** from which the ingredients were derived, the FDA could require additional information be added to the label. This is not the case for GM ingredients. Recently the American Medical Association re-affirmed that there is no scientific justification for special labeling of foods that contain GM ingredients; the American Association for the

Advancement of Science stated a similar stance. We support these positions and the FDA's approach.

However, we also support a food company's right to voluntarily label its products to highlight or market attributes that are important to its customers, such as products that are certified organic or products labeled as not containing GM ingredients. FDA's labeling laws allow for voluntary labeling as long as the information is accurate, truthful and avoids misleading consumers about the food. We support voluntary labeling and a consumer's right to choose products based on the attributes that meet their individual preferences.

### **Do GM crops provide any benefits?**

Yes. GM crops can improve yields for farmers, reduce draws on natural resources and fossil fuels and provide nutritional benefits.

As demonstrated by the unprecedentedly rapid adoption of this technology among farmers, GM crops can provide farmers with the means to improve yields under weed and insect pressure; decrease tillage to protect soil and water resources; and reduce pesticide applications, thereby decreasing the use of fossil fuels. Some benefits, such as decreased insecticide applications, also are benefits recognized by consumers and environmentalists.

In addition, some GM crops provide nutritional benefits. For example, certain GM crops produce more nutritious oils (i.e. high oleic soybean oils), which can help people replace solid fat in their diets, potentially reducing saturated fat intake. Another example includes stearidonic acid (SDA)-containing soybeans, that produce healthful long chain omega-3 fatty acids like EPA.

*In 2004, FDA issued a letter of enforcement discretion regarding use of the Qualified Health Claim statement, "Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease". (Docket No. 2003Q-0401)*

### **Has anyone studied the long-term health effects of GM crops (GMOs)?**

Many studies are conducted to assess health effects of GM crops.

Since farmers first began growing biotech crops in 1996, there has been no credible evidence of harm to humans or animals. In addition, the following two studies assessed the long-term safety of GMOs:

- In December 2010, the European Commission published a report summarizing the results of 50 research projects addressing the safety of GMOs for the environment as well as for animal and human health. These projects received funding of €200 million from the EU and are part of a 25-year long research effort on GMOs. In announcing the report, the Commission stated, “...there is, as of today, no scientific evidence associating GMOs with higher risks for the environment or for food and feed safety than conventional plants.”
- In 2012, a literature review of well-designed, long-term and multigenerational animal feeding studies comparing GM and non-GM potatoes, soy, rice, corn and triticale found that GM crops and their non-GM counterparts are nutritionally equivalent and can be safely used in food and feed.

For more information on how Monsanto specifically establishes biotech crop safety, please see:

**In addition to animal feeding studies, are human clinical trials used to test the safety of biotech (GM) crops?**

There are not currently any human clinical trials used to test the safety of GM crops. This is not unusual; no existing food or ingredient – GM or otherwise – has been the subject of human clinical trials. However, there is broad global agreement among food scientists, toxicology experts and regulatory food safety officials on how to evaluate the safety of GM foods. We follow these expert recommendations.

The starting point is identifying differences between GM crops and their conventional counterparts. The experts agree that components of GM crops that are the same as existing foods do not require testing. As a result, the focus is on what is different in the GM crop – the inserted DNA/RNA and the proteins resulting from gene insertion.

DNA and RNA are a normal part of every plant and animal, and therefore in virtually every meal we eat. DNA and RNA carry no dietary hazard and are “generally recognized as safe” (GRAS) in the United States, and are considered safe by food safety experts globally. Proteins are also a normal part of the human diet, are extensively digested, and generally present no hazards, but that must be

confirmed for the specific proteins introduced in GM crops. To do this, an analysis of protein structure and function is performed and testing of digestibility is conducted to establish safety of the introduced proteins.

As long as the introduced gene protein is determined safe (an initial step in the safety assessment) and the GM and non-GM crops are alike in all respects, the GM crop is said to be substantially equivalent, or “equal to,” their conventional counterparts and are not expected to pose any health risks. Experts in the field of food safety are satisfied that this approach is sufficient and reliable to assure the GM crops are as safe their conventional counterparts. This expert community does not see a need and thus does not recommend long-term tests in humans in order to establish food safety.

Further, it is quite difficult and somewhat impractical to design a long-term safety test in humans. These types of tests using whole foods would require, for example, dietary intake of significantly large amounts of a particular food – amounts not typically consumed – over a very large span of time. This is, in part, why no existing whole foods—whether from organic, conventional or GM production – have been subjected to long-term human clinical trials.

For more information on how Monsanto, specifically, establishes biotech crop safety, please see:

### **Is food grown with or developed from biotech seeds contributing to allergies in America?**

The process of GM development has safeguards to prevent the introduction of new allergens. There is no evidence of any new allergens being introduced in GM foods.

Like anyone with products connected to food, we take food allergies very seriously. The process of GM development has safeguards to prevent the introduction of new allergens. There is no evidence of any new allergens being introduced in GM foods.

It is important to note that there are hundreds of thousands of different proteins in the human diet, and only a tiny fraction of these are significant food allergens. Thus, the risk of a new protein being a food allergen is very low. Regardless, in the initial stages of product development, Monsanto researchers avoid sources of known allergens, such as nuts and eggs, as potential gene sources for GM crops.

No matter the source of the gene though, we assess every new protein for certain characteristics to help avoid the introduction of potential allergens into a GM crop. Assessing for potential allergenicity of introduced proteins is an FDA-required component of the safety assessment of GM crops.

**I've seen reports of studies showing GM crops are safe and others saying they aren't. Who and what do I believe?**

It's true that there is a lot of conflicting information out there. But when it comes to the scientific community that has studied the issue, there really isn't any conflict – the broad consensus among scientists who have looked closely at GM crops is that they are as safe as any other crop.

When considering and comparing scientific data, there are several things we take into account:

- Is the study designed and executed well and according to accepted methods?
- Is it in alignment with other data on the same topic?
- Do the results make scientific/biological sense?
- Is the scope of the conclusions supported by the data?
- What is the opinion of credible scientific organizations such as regulatory agencies, AMA, National Academy of Sciences?

There is a large body of documented scientific testing showing that the GM crops being grown and harvested are safe (Center for Environmental Risk Assessment). These studies focus on the wholesomeness and nutritional value of GM crops and upon the safety of the specific varieties used.