**From:** Schmidt, Emily <Emily.Schmidt@ketchum.com>

**Sent time:** 07/31/2013 09:15:20 PM

**To:** Folta, Kevin M.

**Subject:** Additional GMO Answers Question - Assistance Requested

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Hi Kevin- I hope you are doing well. I believe you in Hawaii w/ Steve...? I hope things are going well – sounded like you folks were headed out there for a real boondoggle.

I following up on the GMO Answers front – now live at www.GMOAnswers.com. The conversation on the site is very lively, we have received tons of new comments and questions from consumers – as expected the website has invited some diverse viewpoints - many are critical of biotechnology. Feel free to share your thoughts and feedback on the site – we are still working through a few functionalities since the launch of the site.

Curious if you would be willing to respond to a question posted to the site (see below)...know there are a lot of request of your time and we certainly understand if you will not be able to respond, just let us know and we will develop a new approach for the question responses.

Thanks.

**Can you describe in detail the process by which genes are altered in foods?**
*Background Information: (Please free to revise and use your own words here...only background information)*

In the wild, the transfer of genes within and across species is fairly common, either through traditional reproduction (breeding) or through non-traditional means. Viruses and bacteria do this all the time, as do plants and animals. Human DNA, for instance, is full of viral genes.

When humans began to farm about ten thousand years ago, they took the seeds from edible wild plants and sowed them to create crops. Early farmers selected the most desirable plants to provide seeds for the next year's crop. They looked for faster growth, higher yields, larger seeds, tastier fruit, bigger plants, resistance to insects, other pests, and disease, and other desirable traits. Eventually they learned that plants within the same species, and in the 1700's, across different species could be artificially mated or cross-pollinated to improve the characteristics of the plant. These farmers knew nothing of genes, of course, but were actually altering the genetic makeup of the plants. By creating better plants through **selective breeding**, they were practicing what is now called genetic modification.

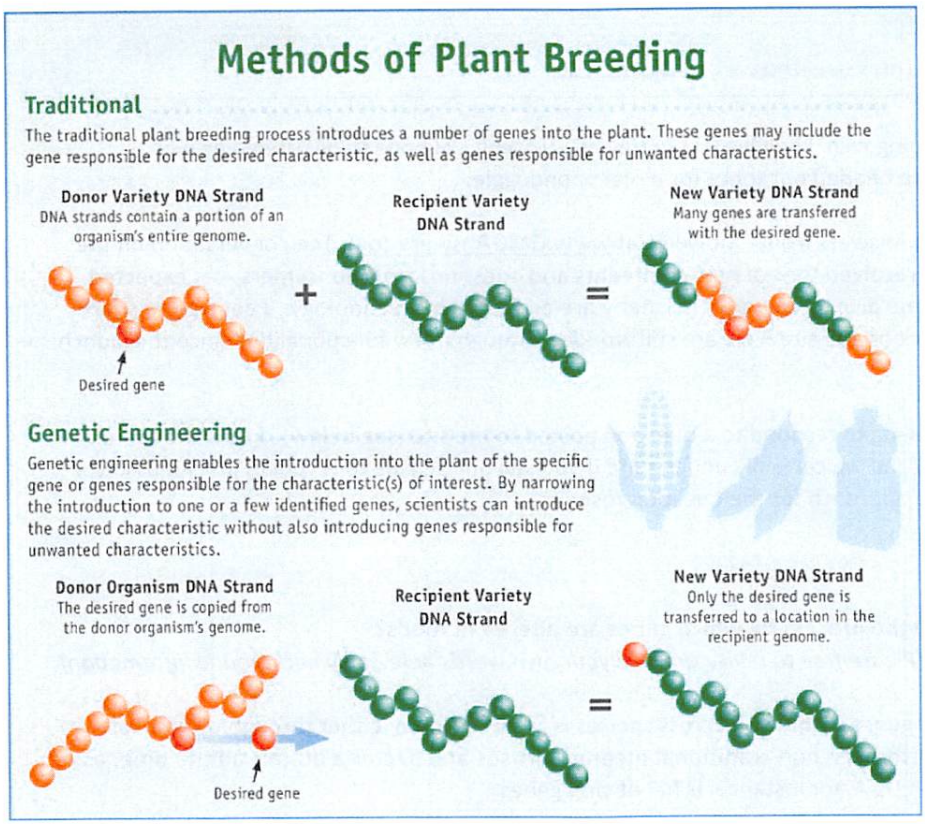
In the 20$^{th}$ century, scientists began to experiment with a new different form of breeding in corn called **hybridization**. This involves developing a "pure" line of corn (a strain in which desired characteristics are present in successive generations) and then combining ("crossing") it with another pure line to create an even better and more vigorous line. Hybrids came to dominate the corn market, and the technique was applied to other crops as well. In the United States, 95 percent of the corn acreage is planted with hybrid corn, enabling us to produce six times more corn on three percent fewer acres than we did 80 years ago.

In the 1940s Scientists also learned that they could alter the genetic makeup of plants by exposing them to chemicals, x-rays and other forms of radiation, and then selected the plants that expressed the traits that were being sought. This is called "**mutagenesis**" and has created many varieties of important crops.

These techniques and many others are called, "traditional or **conventional breeding**," and there is a high degree of uncertainty and unpredictability associated with these types of genetic modification, as large amounts of genetic material are exchanged when two organisms' genomes are crossed, or in the case of mutagenesis, genetic changes are created randomly.

Genetic engineering is more precise. Only a few genes that are needed to achieve the desired trait are transferred from one organism to another. The difference between traditional breeding and genetic engineering is illustrated in the picture below from the U.S. Food & Drug Administration. In popular culture,

genetic engineering has become synonymous with genetic modification and an organism that has been genetic engineered is often referred to as a genetically engineered organism or **GMO**.

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Some farmers grow crops not for food but to supply seeds for seed companies. These certified seed growers follow very strict practices to ensure purity of the seeds, in accordance with the Federal Seed Act. These include isolating the seed crop from other genetic varieties of that crop; keeping crops from previous years from growing as volunteer plants; cleaning planting equipment and keeping equipment for seed production separate from equipment for crop production. In addition, post-harvesting handling, storage, and transport are important factors in maintaining the genetic integrity of each variety. These measures are important for seeds for all types of crops, both GM and non-GM.

For more information on the various practices that growers use to preserve the genetic integrity of a seed variety: http://www.amseed.org/pdfs/ASTA-CoexistenceProductionPractices.pdf and http://www.amseed.org/pdfs/ASTA-CoexistencePrinciples.pdf

For more information about certified seed production for specific crops in different countries, visit the Association of Official Seed Certifying Agencies website at www.aosca.org.

Q2: Is it possible to create organic seeds from GMOs in the future?
If we turn the clock ahead 20 years I think this is where we'll be. Organic production has nothing to do with genetics—it is production and handling techniques for plant products as outlined here http://www.usda.gov/wps/portal/usda/usdahome?navid=ORGANIC_CERTIFICATIO . Scientists and consumers of all backgrounds appreciate the aim of growing more food with fewer inputs and less environmental impact. We're all on the same page there.

Transgenic technology is a complement to, not in opposition of, organic production techniques. Bt crops have cut the use of pesticides. The future promises crops that may make better use of fertilizer, resist disease, and perhaps can produce more food with less labor and fuel. These benefits may be augmented when teamed with effective organic production techniques.

However, the National Organic Program (NOP) would need to revise its rather arbitrary policy that transgenic (GMO) materials not be allowed within organic certification guidelines. The original policy was based on public feedback, not science. This remains the policy. There would need to be a radical change in thinking, but with education and letting science dictate decisions, it will happen.

Q3: How can biotech seeds help with climate change and environmental swings?
GM seeds can play an important role in helping world agriculture adapt to climate change. Certain GM seeds give plants protection against insects that leads to stronger root systems from less insect damage. This will enable these crops to absorb the available moisture better and allow them to grow in drier conditions. GM seeds are also being used to grow plants that require less rainfall and still produce good harvests due to traits that impart drought resistance. In addition, herbicide-tolerant crops developed with biotechnology have significantly increased the use of no-till agriculture, preserving precious soil moisture.

Another way in which GM seeds are helping with climate change is the reduction in the number of tractor trips through the farm field due to better seed technology. By making crops herbicide-tolerant and insect-resistant, it means farmer need fewer trips through the field to control these pests. This decreases the use of fuel and greenhouse gas emissions, thus promoting less impact on climate change.

**Q4: Can you give any examples of how biotech seeds have improved sustainability?**

Herbicide-tolerant crops have encouraged farmers to practice no-till farming. In conventional farming, the fields are plowed ("tilled") every year to get rid of weeds. Because of the superior weed control from GM crops, farmers now have to till much less often. This has led to improved soil health and water retention, reduced runoff, and reduced greenhouse gas emissions from agriculture. (National Academy of Sciences, Impact of Genetically Engineered Crops on Farm Sustainability in the United States, 2010) http://www.nap.edu/catalog.php?record_id=12804

Insect-resistant crops have greatly reduced the amount of insecticide that has to be applied to insect-protected crops. It's estimated that an astounding 600 million pounds LESS active ingredient of

insecticide has been used in the United States because of the use of GM crops, significantly reducing farmers' costs and environmental footprint.
(Brookes and Barfoot, Key environmental impacts of global GM crop use 1996-2011, in GM Crops and Food, 4/26/2013) http://www.pgeconomics.co.uk/pdf/2013globalimpactstudyfinalreport.pdf)

In developing countries, the increased production from GM seeds has allowed small farmers to generate more income off of the same amount of land, thus reducing the practice of cutting down forest for more cropland.

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| **From:** | Schmidt, Emily |
| **To:** | ruthmacd@iastate.edu |
| **Subject:** | GMO Answers - Your Assistance Requested |
| **Date:** | Friday, July 05, 2013 3:55:53 PM |

Hi Ruth,

As we shared with you in our briefing, we would like to include you in a new forum designed to address the challenging questions about biotechnology in food and agriculture. The number of everyday people wanting to understand GMOs better is increasing, but we haven't always done a great job of communicating with the public. The Council for Biotechnology Information (CBI) is committed to responding to consumer questions about how our food is grown through a new forum we call "GMO Answers."

As a critical component to addressing consumer questions, we're inviting experts from academia, government, the industry, and others to share facts, insight and stories that help explain in an independent voice what GMOs are, and how and why they are used. This is a new way to build trust, dialogue and support for biotech in agriculture.

**We've compiled frequently asked questions in preparation for our site launch this month and we need your help responding.** We selected several questions that fit your expertise (below). In addition, we've provided information (sample answers and references) that may be helpful in formulating your response. However, we understand you have data and research at your disposal, and can draw on your own experiences and expertise. We want your responses to be authentically yours. **Please feel free to edit or draft all-new responses if you'd like.**

In an effort to meet the needs of the GMO Answers community, we'd appreciate responses by **July 10,** 2013. If it's not possible to draft a response by that date, please let us know and we'll determine a new approach.

Finally, we'd like to credit our experts for their thoughtful responses. If possible, we'd appreciate the following:

- Photo (jpg image)
- Link to bio
- Preferred title

As a respected leader in the nation's food conversation, your voice is critical and we hope you will consider sharing your story, your research and perspective in your own words.

We thank you in advance for your attention to this request.

Thanks,

Emily

949.599.5072 cell
415.984.6216 office

**Hasn't the rise in obesity been linked directly to when GMOs were introduced into our diet?**

Background Information: "Obesity occurs when, over time, the body takes in more calories than it burns," according to The Endocrine Society. When a person's Body Mass Index (BMI) is over 30, that person is considered obese.

Because obesity is related to the number of calories a person consumes, a GM crop would have to contain considerably more calories than non-GM varieties of that crop to be linked to obesity. But the fact is that GM crops are carefully reviewed to make sure they are substantially equivalent to non-GM crops in their composition and nutritional qualities. This includes levels of protein, carbohydrate, fat, vitamin, mineral, fiber, moisture, among others. The caloric value of food from a GM plant will be in same range as the comparable non-GM plant.

Whatever is causing obesity today, it isn't the calories from GM plants.

Some people have claimed that GM crops cause obesity in ways unrelated to the caloric content of the food. However, more than 150 studies have been conducted in a wide variety of animals comparing the effect of GMO in their feed to non-GMO. The results of these studies do not provide any cause for concern about weight gain or other negative impacts from GMOs.

Some companies are using genetic modification to improve the nutritional value of crops, such as soybeans. These nutritionally-improved GM soybeans contain more oleic acid—an unsaturated fatty acid found in olive oil—and significantly less saturated fatty acids than traditional soybeans.
"Feed from Transgenic Plants in Animal Nutrition," Gerhard Flachowsky, Institute of Animal Nutrition, German Federal Research Institute for Animal Health, Braunschweig, Germany, GMSAFOOD Conference, Vienna, March 2012
http://www.gmsafoodproject.eu/UserFiles/file/keynotes%20presentation/FLACHOWSKY.pdf

For information about obesity and its causes:
http://www.hormone.org/Resources/Cardio/loader.cfm?csModule=security/getfile&pageid=1095
http://obesityinamerica.org/understanding-obesity/

**What potential does the future hold for biotech seeds to improve nutrition?**

Background Information: The first wave of commercialized GM seeds was developed for "input traits" or agronomic improvements. Recently there has been a greater emphasis on "output traits" that include improved nutrition.

Here are some examples of biotechnology's potential to improve crops:

**Vitamin A Enrichment**: Vitamin A deficiency is a leading cause of blindness in the developing world and is particularly prevalent among children there. To combat this deficiency,

biotechnology is being used to enrich staple crops with beta-carotene (provitamin A). The development of the biotech crop
"Golden Rice," used genetic engineering to significantly increase the amount of beta-carotene in rice. A typical serving of the Golden Rice variety that may soon be grown in the Philippines could provide half the required daily intake of provitamin A for a 1 to 3 year old child. Biotechnologists are also working to increase levels of beta-carotene in other common crops in developing countries such as sweet potatoes, corn and cassava.

**Iron Bioavailability**: Two billion people in the world suffer from iron deficiency, which impairs mental and physical development, increases susceptibility to infections and is responsible for 20 percent of all maternal deaths after childbirth. Unlike most malnutrition, iron deficiency is not necessarily associated with poverty. Approximately 20 percent of U.S. female college students are iron-deficient because of poor food choices. Plants absorb iron from the soil and protect it by storing it inside watertight structures or attaching it to molecules, such as phytate. Both protection mechanisms make it difficult for humans to extract iron from plants. Biotechnologists have pursued a number of tactics to increase the amount and bioavailability of iron in staple crops, such as (1) increasing iron content by inserting a gene for a protein molecule that increases the amount of iron taken up from the soil, (2) decreasing the level of phytate in the crop, and 3) providing the plant with a gene for a protein that helps humans absorb iron and move it from our digestive tracts into our bloodstream where it is needed.

**Essential Amino Acids:** Virtually all plant foods, including the major staple crops used in food and animal feed around the world, are poor sources of at least one of the essential amino acids that humans, poultry and livestock must consume. Researchers in India successfully increased the amount of three essential amino acids in potato, the most important non-cereal staple crop throughout the world, by providing potatoes with a gene from amaranth, which is a high-protein grain that has been consumed by certain people in Asia and South America for centuries.

**Fats and Oils**: While many people in developing countries have difficulty getting access to enough nutritious food, the dietary problems for people in the industrialized world often stem from making poor choices. For example, even though fats and oils are an essential part of a healthy diet, they contain many calories, and while some types are good for your heart, e.g. unsaturated fats, others are linked to heart disease. Many people in industrialized countries consume both too much fat and oil, which can lead to obesity, and the wrong types, such as the saturated fatty acids associated with cardiovascular problems that can lead to heart attacks and strokes.

Plant biotechnology has been used to optimize the fatty acid profile of oilseed crops, such as soybean, corn and canola, to promote human health. In some cases, researchers have shifted the various amounts of saturated and unsaturated fatty acids, while others have provided plants with the ability to produce "good" fatty acids not normally found in plants.

http://www.isaaa.org/resources/publications/pocketk/27/default.asp

http://www.who.int/mediacentre/factsheets/fs311/en/

http://www.plantphysiol.org/content/147/3/962.full

**Q:** Can you describe in detail the process by which genes are altered in foods?

Question Submitted By: snlgmo from Washington, DC *

** Questions submitted to GMO Answers appear as written at the time of submission. Questions are reviewed to ensure they conform with our house rules, but are never edited or altered by GMO Answers.*

Notification Preferences

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**A:** # Expert Answer

By: Kevin Folta, Professor and Chairman, Horticultural Sciences Department, University of Florida on Thursday, 8/08/2013 8:35 pm

In the wild, the transfer of genes within and across species is fairly common, either through traditional reproduction (breeding) or through non-traditional means. Viruses and bacteria do this all the time, as do plants and animals. Human DNA, for instance, is full of viral genes.

When humans began to farm between 10 and 20 thousand years ago, they took the seeds from their best edible wild plants and sowed them to create crops. Early farmers selected the most desirable plants to provide seeds for the next year's crop. They looked for faster growth; higher yields; larger seeds; tastier fruit; bigger plants; resistance to insects, other pests, and disease; and other desirable traits. One of the most important traits was that the plants didn't make them sick. Eventually they learned that plants within the same species, and, in the 1700s, across different species, could be artificially mated or cross-pollinated to improve the characteristics of the plant. These farmers knew nothing of genes, of course, but were actually altering the genetic makeup of the plants. By creating better plants through **selective breeding**, they were practicing genetic modification—changing a genome through human intervention.

In the 20th century, scientists began to experiment with a new, different form of breeding in corn, called

**hybridization**. This involves developing an “inbred” line of corn (a genetically “pure” line where desired characteristics breed true in every subsequent generation) and then combining (“crossing”) it with another pure line to create an even better and more vigorous line. Hybrids came to dominate the corn market, and the technique was applied to other crops as well. In the United States, 95 percent of the corn acreage is planted with hybrid corn, enabling us to produce six times more corn on three percent fewer acres than we did 80 years ago.

Hybrids were great for the seed industry. Because they owned the parental inbred lines, only they could produce a specific hybrid, meaning that farmers would return annually for the improved seeds.

In the 1940s, scientists also learned that they could alter the genetic makeup of plants by exposing them to chemicals, X-rays and other forms of radiation, and then select the plants that expressed the traits that were being sought. This is called “**mutation breeding**” and has created many varieties of important crops.

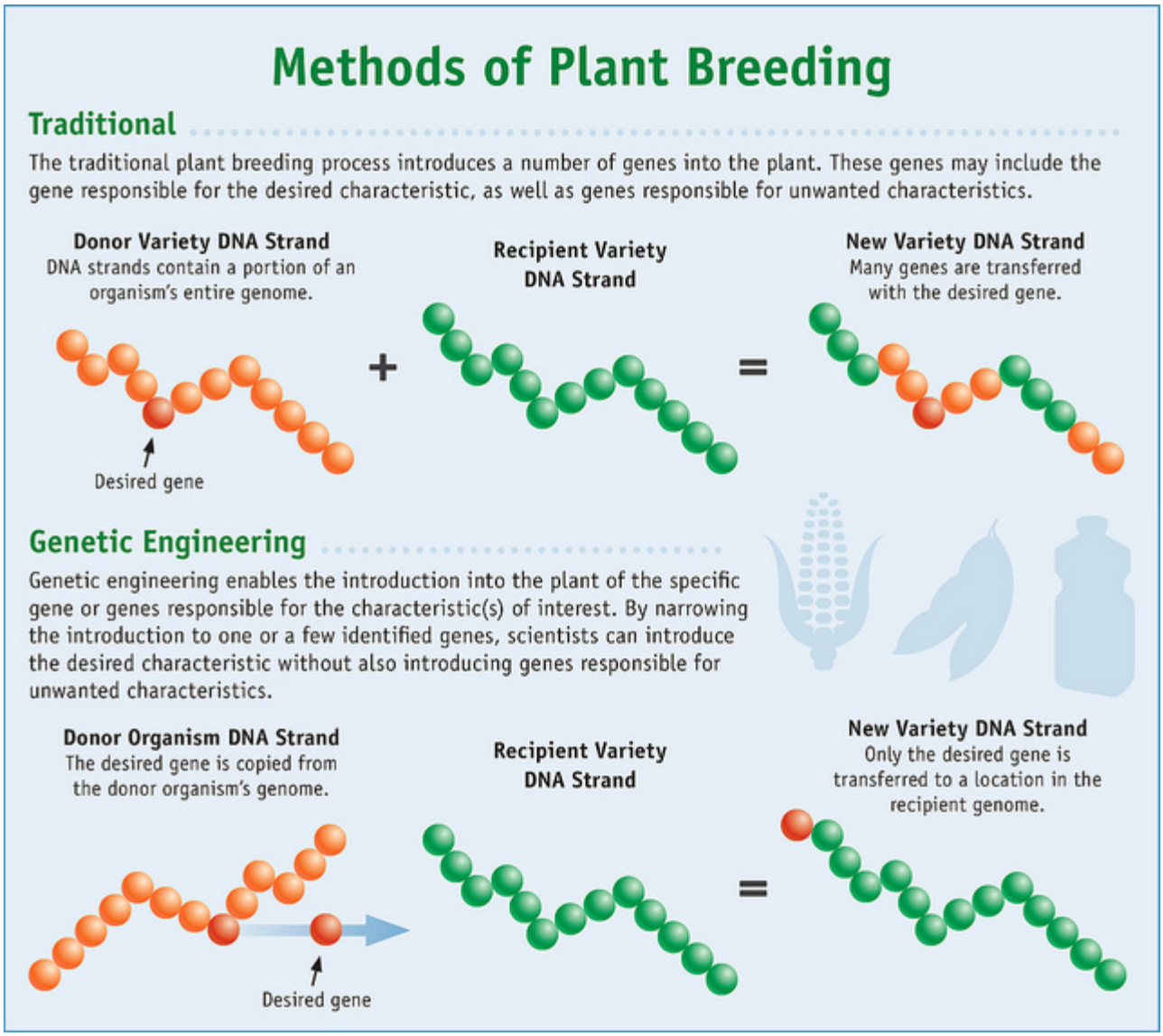
These techniques and many others are called “traditional or **conventional breeding**,” and there is a high degree of uncertainty and unpredictability associated with these types of genetic modification, as large amounts of genetic material are exchanged when two organisms’ genomes are crossed or, in the case of mutagenesis, genetic changes are created randomly. Mobile DNA found in every plant and animal also is mixed. These **transposable elements** jump in and out of genomes, remodeling the genome continuously.

The process of genetic engineering is a more precise method of genetic modification. Only one gene, or maybe a few genes, are needed to achieve the desired trait and are transferred from one organism to another. The difference between traditional breeding and genetic engineering is illustrated in the picture below, from the U.S. Food and Drug Administration. In popular culture, genetic engineering has become synonymous with genetic modification, and an organism that has been genetically engineered is often referred to as a genetically modified organism, or **GMO**. The technical term is "**transgenic**."

For more than 40 years, scientists have been able to cut DNA and paste it into a new context. Transgenic plants rely on scientists identifying and amplifying the gene of interest and then inserting it into **Agrobacterium**, a bacterial species that makes natural genetic exchanges with plants. Scientists have disarmed Agrobacterium to work for them. The lab strains of Agrobacterium (usually referred to as simply “Agro”) can deposit DNA into a plant cell. Scientists place the gene of interest into Agro and incubate it with plant tissues. Agro places the DNA into one cell, and then it is integrated into the genome. The one cell can be placed into media where it will divide into a clump called a **callus**, a blob of generic cells.

Plant cells make decisions based on plant hormones. Placing a callus on various hormone combinations causes the callus to produce organized cellular structures that eventually emerge as new organs or embryos that later emerge into a whole plant. If that foundational cell has your gene in it, it will be present in every cell of the new plant.

This is the process in a short form. In any lab, it is reasonably simple for most species. Today, most labs don’t even bother. Instead, they contract the work out to one of several companies or university services that make the transgenic for you. Basically, you can get your favorite gene installed in most ag crops pretty easily. From there, the gene might instruct the plant to do something it never did, produce more of a product that is naturally there or even turn a gene off. All of these are valuable outcomes of the process.




Topic: Science and GMO Basics 3 Comments | Add Comment

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## Other Questions in this Category

**Q:** are you ever going to stop killing the bees? I wouldnt like to die

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**Q:** Have any engineered crop genes ended up in wild, weedy, or otherwise freeliving populations of crop relatives?

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**Q:** If livestock eat genetically modified grain, will there be GMOs in my meat? -- Submitted as part of GMO Answers' Top Consumer Questions Survey --

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**Q:** In transgenetic Bt cultivars, do all the cells of the plant contain DNA which includes the transgene? And in those cells which do contain the gene, when and under what conditions is the insecticide protein expressed?

**Q:** Is the company wegmans GMO

See All Questions

## Moderator Updates

Welcome to the GMO Answers community! Please remember to vote on the questions you'd like to see answered first.

### Kevin Folta

**Professor and Chairman, Horticultural Sciences Department, University of Florida**

Kevin Folta is a professor in and chairman of the Horticultural Sciences Department at the University of Florida, Gainesville. He got his Ph.D. in Molecular Biology from University of Illinois at Chicago in 1998, and he has worked at University of Wisconsin before settling in at University of Florida. Dr. Folta researches the functional genomics of small fruit crops, the plant transformation, the genetic basis of flavors, and studies at photomorphogenesis and flowering. He has also written many publications and edited books, most recently was the 2011 Genetics, Genomics, and Breeding of Berries. Dr. Folta received the NSF CAREER Award, an HHMI Mentoring Award and was recognized as "University of Florida Foundation Research Professor" in 2010.

**Q:** I am interested in learning more about how biotech seeds improve sustainability. Can you provide examples?

Question Submitted By: SM1791 from San Francisco, CA *

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Notification Preferences

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**A:** # Expert Answer

By: Kevin Folta, Professor and Chairman, Horticultural Sciences Department, University of Florida on Sunday, 10/13/2013 5:16 pm

Herbicide-tolerant crops have encouraged farmers to practice no-till farming. In conventional farming, the fields are plowed ("tilled") to control weeds. Because of the superior weed control from GM crops, farmers now have to till much less often. This has led to improved soil health and water retention, reduced runoff, and reduced greenhouse gas emissions from agriculture. (National Academy of Sciences, Impact of Genetically Engineered Crops on Farm Sustainability in the United States, 2010) http://www.nap.edu/catalog.php?record_id=12804

Insect-resistant crops have greatly reduced the amount of insecticide that has to be applied to insect-protected crops. It's estimated that an astounding 600 million pounds LESS active ingredient of insecticide has been used in the United States because of the use of GM crops, significantly reducing farmers' costs and environmental footprint. (Brookes and Barfoot, Key environmental impacts of global GM crop use 1996-2011, in GM Crops and Food, 4/26/2013) http://www.pgeconomics.co.uk/pdf/2013globalimpactstudyfinalreport.pdf)

In developing countries, the increased production from GM seeds has allowed small farmers to generate

more income off of the same amount of land, thus reducing the practice of cutting down forest for more cropland.

The greatest gains are yet to come. GM plants with more efficient use of nitrogen and other important nutrients mean less fertilizer will be needed, saving farmers money, and less fertilizer ends up in the environment. As mentioned previously, GM plants are available to withstand moderate water deficits. In the near future these same traits may allow the same yields or better while consuming less water. Such technologies have been demonstrated as effective in the laboratory and in field contexts.

Going forward, as we apply what we learning about organic, low-input and sustainable production practices to GM crops, we'll see comparable or improved performance with less cost and environmental impact.

Topic: Impact on Environment 2 Comments | Add Comment SHARE

To post a comment, please **login**.

## Other Questions in this Category

**Q:** Why are people so against GMOs? Are they healthy? What threats do they pose against the environment?

**Q:** I am under the impression that monocropping and not specifically GMOmonocropping is responsible for agricultures threat to the environment. My impression is that land management practices such as beneficial insect attractors, crop biodiversity and...

**Q:** What is the application rate equivalence for a field of BT corn vs a field of Organic corn spraying BT as an insecticide?

**Q:** I know that farming and agriculture is a almost tradition Im some families. How would the ancestors of GM farmers feel about the growers spraying their crops with pounds of pesticides and herbicides just to yield more product and therefore profit.

**Q:** Why cant GMO be used by organic farmers outside of science denial? GMOs are supposed to be better for the environment than conventional crops. If organic farming methodologies are better for the environment, why dont organic farmers use GMOs?...

See All Questions

## Moderator Updates

Welcome to the GMO Answers community! Please remember to vote on the questions you'd like to see answered first.

## Kevin Folta

**Professor and Chairman, Horticultural Sciences Department, University of Florida**

Kevin Folta is a professor in and chairman of the Horticultural Sciences Department at the University of Florida, Gainesville. He got his Ph.D. in Molecular Biology from University of Illinois at Chicago in 1998, and he has worked at University of Wisconsin before settling in at University of Florida. Dr. Folta researches the functional genomics of small fruit crops, the plant transformation, the genetic basis of flavors, and studies at photomorphogenesis and flowering. He has also written many publications and edited books, most recently was the 2011 Genetics, Genomics, and Breeding of Berries. Dr. Folta received the NSF CAREER Award, an HHMI Mentoring Award and was recognized as "University of Florida Foundation Research Professor" in 2010.

**Q:** Hasn't the rise in obesity been linked directly to when GMOs were introduced into our diet?

Question Submitted By: loyola90 from San Francisco, California *

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Notification Preferences

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**A:** # Expert Answer

By: Ruth MacDonald, Professor and Chair, Food Science and Human Nutrition, Assistant Dean of Graduate Programs, College of Agriculture and Life Sciences, Iowa State University on Tuesday, 7/30/2013 6:06 pm

First, let's start with the definition of obesity. "Obesity occurs when, over time, the body takes in more calories than it burns," according to the Endocrine Society. When a person's body mass index (BMI) is over 30, that person is considered obese.

Because obesity is related to the number of calories a person consumes, a GM crop would have to contain considerably more calories than non-GM varieties of that crop to be linked to obesity. But the fact is that GM crops are carefully reviewed to make sure they are substantially equivalent to non-GM crops in their composition and nutritional qualities. This includes levels of protein , carbohydrate, fat, vitamin, mineral, fiber and moisture, among others. The caloric value of food from a GM plant will be in the same range as that of the comparable non-GM plant.

Whatever is causing obesity today, it isn't the calories from GM plants.

Some people have claimed that GM crops cause obesity in ways unrelated to the caloric content of the food. However, more than 150 studies have been conducted, and the results of these studies do not provide any cause for concern about weight gain or other negative impacts from GMOs.

Some have raised concern that high-fructose corn syrup, which is processed primarily from GM corn, may be especially responsible for the obesity rise. However, research has shown HFCS provides the same calories and is used by the body in the same way as table sugar. Excessive calorie intake, regardless of the source, with inadequate physical activity is the primary cause of obesity in most people.

Some companies are using genetic modification to improve the nutritional value of crops, such as soybeans. These nutritionally improved GM soybeans contain more oleic acid—an unsaturated fatty acid found in olive oil—and significantly fewer saturated fatty acids than traditional soybeans.

“Feed from Transgenic Plants in Animal Nutrition,” Gerhard Flachowsky, Institute of Animal Nutrition, German Federal Research Institute for Animal Health, Braunschweig, Germany, GMSAFOOD Conference, Vienna, March 2012.

**For information about obesity and its causes, check out the following resources:**

- http://www.hormone.org/questions-and-answers/2010/hormones-and-obesity
- http://obesityinamerica.org/understanding-obesity/

Topic: Safety, Health, and Nutrition 52 Comments | Add Comment SHARE

To post a comment, please **login**.

# Other Questions in this Category

**Q:** Are potatoes genetically modified?

**Q:** It has been said Monsanto is behind the hybridization of wheat, and that modern wheat has 14 more proteins than ancient wheat, thereby triggering more allergic responses for those that are susceptible. Is this true?

**Q:** In regards to Glyphosate patent as an antibiotic. Has there been any research to test and see if glyphosateresistant bacteria in soil sprayed regularly with glyphosate, are also resistant to antibiotics used in humans. So, has it been shown that...

**Q:** I have heard that Europe does not allow GMO seeds. If I buy pasta from Italy and Oatmeal from Ireland are they GMO free?

**Q:** are oats GMOs

See All Questions

## Moderator Updates

We have received a high volume of questions and are doing our best to answer the “most voted” questions. Remember to vote for your favorite question!

### Ruth MacDonald

**Professor and Chair, Food Science and Human Nutrition, Assistant Dean of Graduate Programs, College of Agriculture and Life Sciences, Iowa State University**

Ruth MacDonald is currently the Chair and Professor of the Department of Food Science and Human Nutrition at Iowa State University since 2004. She received her Ph.D. in Nutrition and Food Science from University of Minnesota, and since then, she has written multiple publications about the relationship between soy components and botanicals and breast, prostate, and colon cancer progression.

For the 17 years before her position at Iowa State, she served on the faculty at University of Missouri in the Departments of Food Science and Nutritional Sciences. She was a member of the Food for the 21st Century Nutrition Cluster, and she serves on the editorial board of the Journal of Nutrition, The Korean Journal of Nutrition, been on grant review panels for the US Army Breast Cancer Program, US Department of Agriculture, National Institutes of Health and other funding groups. Additionally, she is a member of the American Association for Nutritional Sciences, American Association for Cancer Research, Sigma Xi, and the Institute for Food Technologists.

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