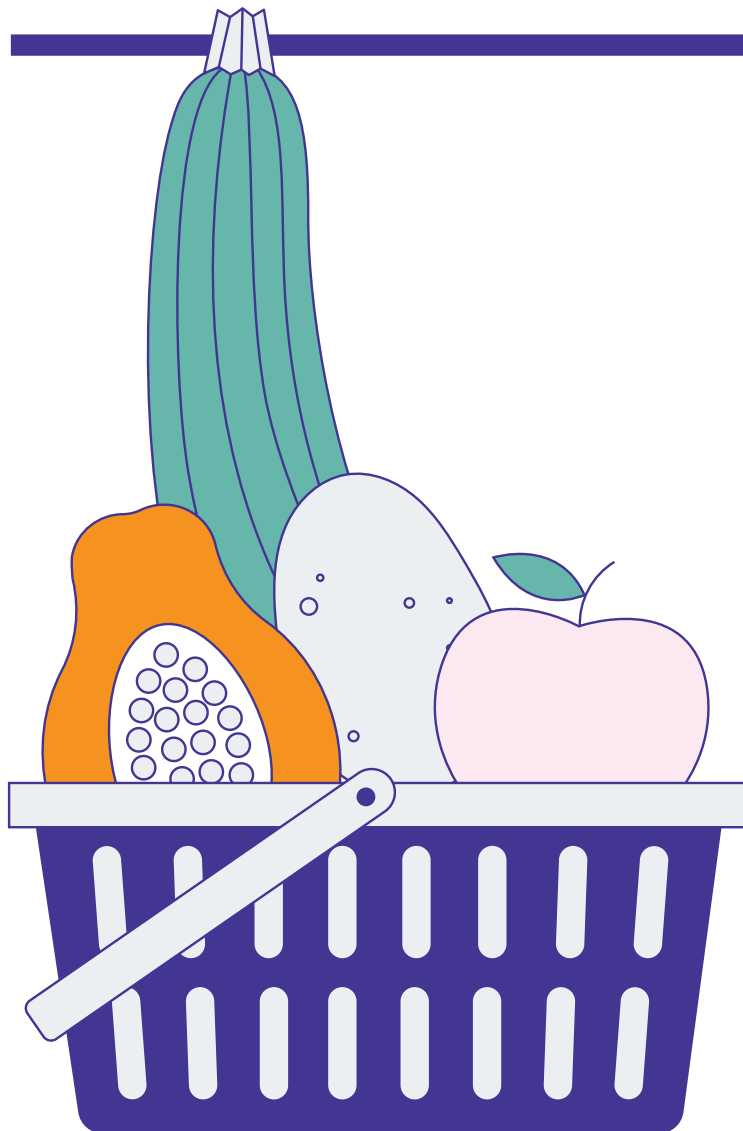

GMOs AND YOUR HEALTH



What is a GMO?

A GMO (genetically modified organism) is a plant, animal, or microorganism that has had its genetic material (DNA) changed using technology that generally involves the specific modification of DNA, including the transfer of specific DNA from one organism to another. Scientists often refer to this process as [genetic engineering](#).¹

Are GMO foods on the market safe to eat?

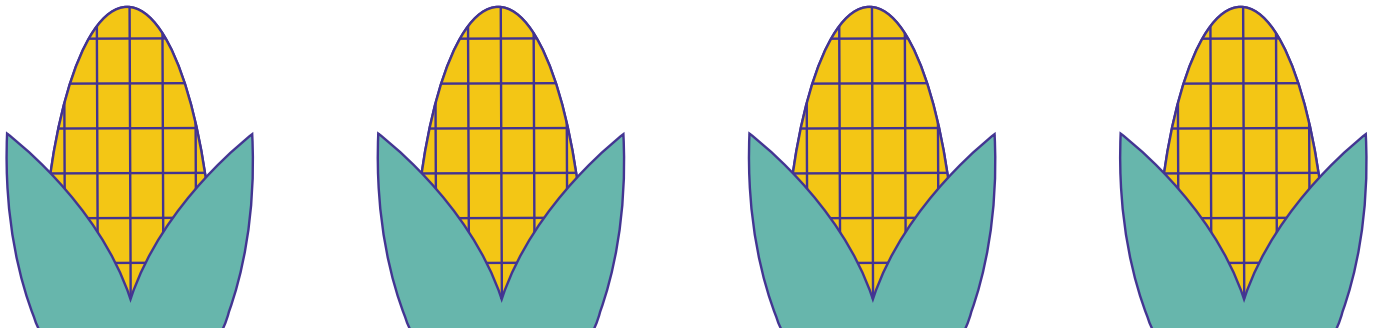
Yes. GMO foods are carefully studied before they are sold to the public to ensure they are [as safe as](#)² the foods we currently eat. These [studies](#)³ show that GMOs do not affect you differently than non-GMO foods.

Do GMOs affect your health?

GMO foods are as healthful and safe to eat as their non-GMO counterparts. Some GMO plants have actually been modified to improve their nutritional value. An example is GMO soybeans with healthier oils that can be used to replace oils that contain *trans* fats. Since GMO foods were introduced in the 1990s, [research](#)⁵ has shown that they are just as safe as non-GMO foods. Additionally, [research](#)⁶ shows that GMO plants fed to farm animals are as safe as non-GMO animal food.

Could I be allergic to GMOs?

Not unless you're allergic to the [non-GMO version](#)⁷ of that food. Most food allergies (90%) are caused by allergens found in just eight foods: peanuts, tree nuts, milk, eggs, wheat, soy, shellfish, and fish. For example, soy is an allergenic food available in a GMO version. If you are allergic to foods made with traditional (non-GMO) soy, you will be allergic to foods made with GMO soy. If you're not allergic to foods made with traditional soy, you won't be allergic to foods made with GMO soy. Scientists developing GMOs run tests to make sure allergens aren't transferred from one food to another. Research shows that GMO foods are no more likely to cause allergies than non-GMOs.



Did you know?

GMO crops are not changed in ways that would increase the risk of cancer for the humans or animals that eat them. An [analysis of data](#)⁴ by the National Academies of Sciences, Engineering, and Medicine found that patterns of change in cancer rates in the United States are similar to Europe and the United Kingdom, where people eat less GMO foods. Cancer rates are not connected with eating GMOs.

Did you know?

The way GMOs are created allows scientists to know precisely which new proteins are produced in a plant. Scientists perform tests to make sure these proteins are not allergens. This type of testing, called *allergenicity testing*, is always part of the process for developing GMOs. Also, FDA regulations ensure that foods derived from GMOs must be as safe as⁸ the non-GMOs you eat.

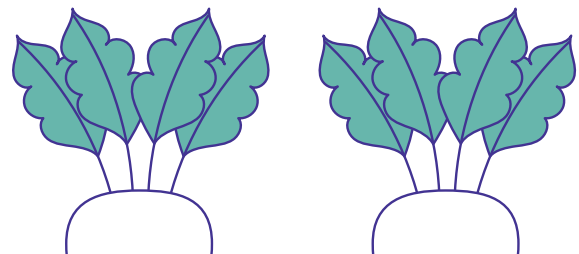
Some people wonder if the cases of celiac disease are rising because of GMOs. Celiac disease⁹ is a serious condition that affects the digestive system. It is caused by an abnormal sensitivity to gluten, a protein found in wheat, rye, and barley. There is no evidence that GMOs on the market today cause celiac disease. Plus, there is no GMO wheat, rye, or barley for commercial sale in the United States.

Is there a connection between GMO foods and antibiotics or steroids?

No. GMO foods do not contain more antibiotic or steroid residues than the non-GMO versions of those foods. There is no connection between whether a food is a GMO or non-GMO and whether or not it has any antibiotic or steroid residues.

What's on the horizon for food production?

Scientists are continuing to look for new ways to develop foods with increased nutritional value or other useful traits. Scientists are also exploring a new technology called genome editing¹⁰ that could have uses for food modification, such as CRISPR.



Get more information about GMOs at www.fda.gov/feedyourmind.



Sources:

¹<https://www.fda.gov/food/food-new-plant-varieties/understanding-new-plant-varieties>

²<https://www.medlineplus.gov/ency/article/002432.htm>

³<https://www.fda.gov/food/food-new-plant-varieties/understanding-new-plant-varieties>

⁴<https://www.nas-sites.org/ge-crops/2016/05/17/report/>

⁵<https://www.nas-sites.org/ge-crops/2016/05/17/report/>

⁶<https://www.nas-sites.org/ge-crops/2016/05/17/report/>

⁷<https://www.fda.gov/food/food-new-plant-varieties/understanding-new-plant-varieties>

⁸<https://www.fda.gov/food/food-new-plant-varieties/understanding-new-plant-varieties>

⁹<https://www.ghr.nlm.nih.gov/condition/celiac-disease>

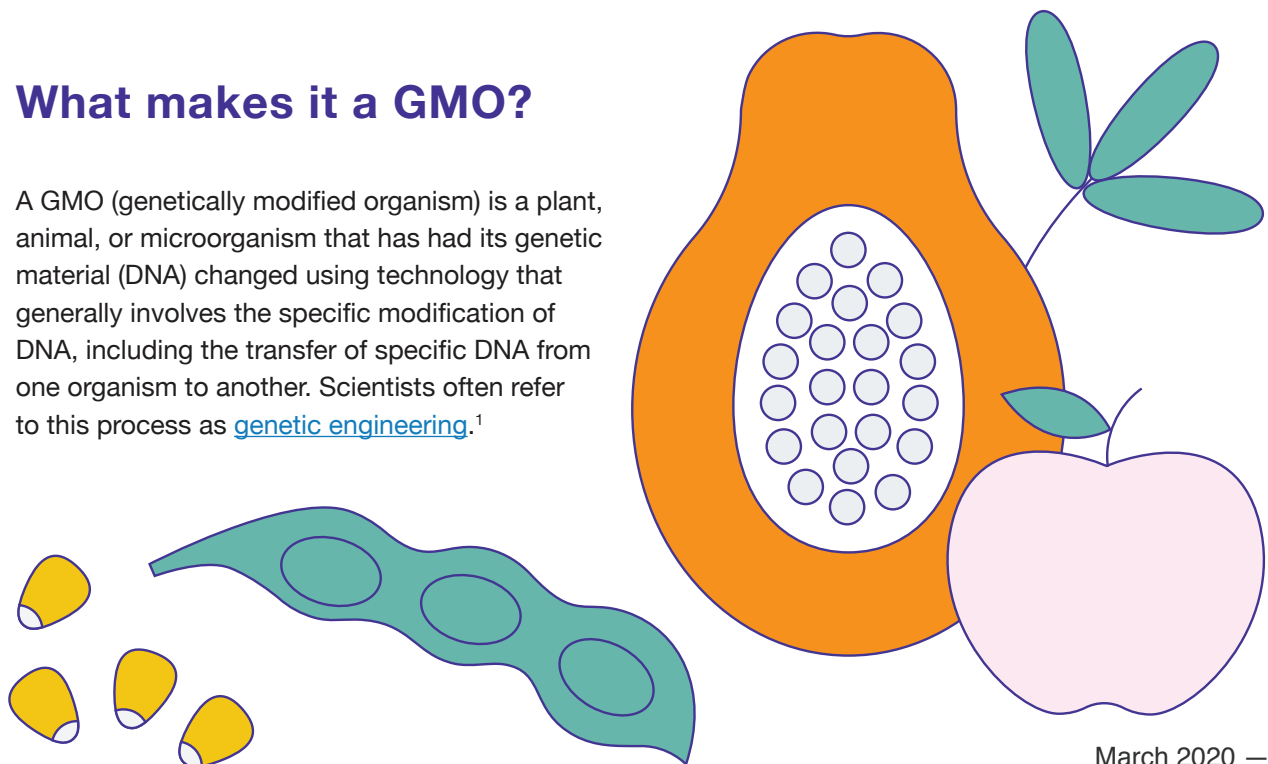
¹⁰<https://www.nas-sites.org/ge-crops/2016/05/17/report/>

GMOs 101: YOUR BASIC QUESTIONS ANSWERED

GMO foods have been available to consumers since the early 1990s. Since then, the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency (EPA), and U.S. Department of Agriculture (USDA) have worked together to ensure that crops produced through genetic engineering are safe for people, animals, and the environment. Despite there being a wide range of foods—GMO and non-GMO—available to consumers, there is some confusion around what GMOs are and how they are used in our food supply.

What makes it a GMO?

A GMO (genetically modified organism) is a plant, animal, or microorganism that has had its genetic material (DNA) changed using technology that generally involves the specific modification of DNA, including the transfer of specific DNA from one organism to another. Scientists often refer to this process as [genetic engineering](#).¹



Is it called GMO or something else?

“GMO” has become the common term consumers and popular media use to describe foods that have been created through genetic engineering. This term is not generally used to refer to plants or animals developed with selective breeding, like the common garden strawberries available today that were created from a cross between a species native to North America and a species native to South America. While “genetic engineering” is the term typically used by scientists, you will start seeing the “bioengineered” label on some of the foods we eat in the United States because of the new [National Bioengineered Food Disclosure Standard](#).²











Did you know?

Bioengineered food is the term that Congress used to describe certain types of GMOs when they passed the National Bioengineered Food Disclosure Standard. The Standard defines [bioengineered foods](#)³ as those that contain detectable genetic material that has been modified through certain lab techniques and cannot be created through conventional breeding or found in nature.

What GMO crops are out there?

Only a few types of GMO crops are grown in the United States, but some of these GMOs make up a large percentage of the crop grown (e.g., soybeans, corn, sugar beets, canola, and cotton). In [2018](#),⁴ GMO soybeans made up 94% of all soybeans planted, GMO cotton made up 94% of all cotton planted, and 92% of corn planted was GMO corn. Most GMO crops are used in food for animals like cows, chickens, and fish. They are also used to make ingredients that are then used in food products like cereal, snack chips, and vegetable oils. Even though you won’t find many GMO fruits or vegetables in the produce section of your grocery store, GMOs are a common part of today’s food supply.

A complete list of GMO crops currently available in the United States:

	Alfalfa		Papaya
	Apples		Potatoes
	Canola		Soybeans
	Corn		Summer squash
	Cotton		Sugar beets

Non-GMO versions of these crops are also available.

Why do we have GMOs?

Humans have used traditional ways to modify crops and animals to suit their needs and tastes for more than 10,000 years. Cross-breeding, selective breeding, and mutation breeding are examples of traditional ways to make these changes. These breeding methods often involve mixing all of the genes from two different sources. They are used to create common crops like [modern corn varieties](#)⁵ and seedless watermelon.

Modern technology now allows scientists to use genetic engineering to take just a beneficial gene, like insect resistance or drought tolerance, and transfer it into a plant. The reasons for genetic modification today are similar to what they were thousands of years ago: higher crop yields, less crop loss, longer storage life, better appearance, better nutrition, or some combination of these traits.

Did you know?

As of 2017, GMO crops are grown in 24 countries around the world, such as Canada, Brazil, the Philippines, and Bangladesh. The approval process for GMO crops varies from country to country, but all regulations are based on the same objective that GMOs should be safe for human and animal health and the environment.

Do GMOs affect your health?

GMO foods are as healthful and safe to eat as their non-GMO counterparts. Some GMO plants have actually been modified to improve their nutritional value. An example is GMO soybeans with healthier oils that can be used to replace oils that contain *trans* fats. Since GMO foods were introduced in the 1990s, [research](#)⁶ has shown that they are just as safe as non-GMO foods. Additionally, [research](#)⁷ shows that GMO plants fed to farm animals are as safe as non-GMO animal food.

Do GMO plants reduce pesticide use?

Some GMO plants contain [plant-incorporated protectants \(PIPs\)](#)⁸ to make them resistant to insects, reducing the need for and use of many [spray pesticides](#).⁹ As another safety measure, EPA works with developers and scientists to help develop GMOs that will resist insects for as long as possible through their [Insect Resistance Management program](#).¹⁰ Other GMO plants are developed to tolerate certain weed killers, which allows farmers a wide variety of options for weed control. Some people are concerned that farmers who grow these GMOs will use more weed killers. While this is sometimes the case, EPA regulates the safety of all weed killers that farmers use on GMO crops and non-GMO crops alike. EPA also shares [information](#)¹¹ to help farmers who are concerned about weeds developing resistance to weed killers.

Get more information about GMOs at
www.fda.gov/feedyourmind.



Sources:

¹<https://www.fda.gov/food/food-new-plant-varieties/understanding-new-plant-varieties>

²<https://www.ams.usda.gov/rules-regulations/be>

³<https://www.ams.usda.gov/rules-regulations/be/bioengineered-foods-list>

⁴<https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us.aspx>

⁵<https://www.fda.gov/food/food-new-plant-varieties/understanding-new-plant-varieties>

⁶<https://www.nas-sites.org/ge-crops/2016/05/17/report/>

⁷<https://www.nas-sites.org/ge-crops/2016/05/17/report/>

⁸<https://www.epa.gov/regulation-biotechnology-under-tsca-and-fifra/overview-plant-incorporated-protectants>

⁹<https://www.epa.gov/ingredients-used-pesticide-products/basic-information-about-pesticide-ingredients>

¹⁰<https://www.epa.gov/regulation-biotechnology-under-tsca-and-fifra/insect-resistance-management-bt-plant-incorporated>

¹¹<https://www.epa.gov/sites/production/files/2017-09/documents/prn-2017-2-herbicide-resistance-management.pdf>