What Is A GMO?

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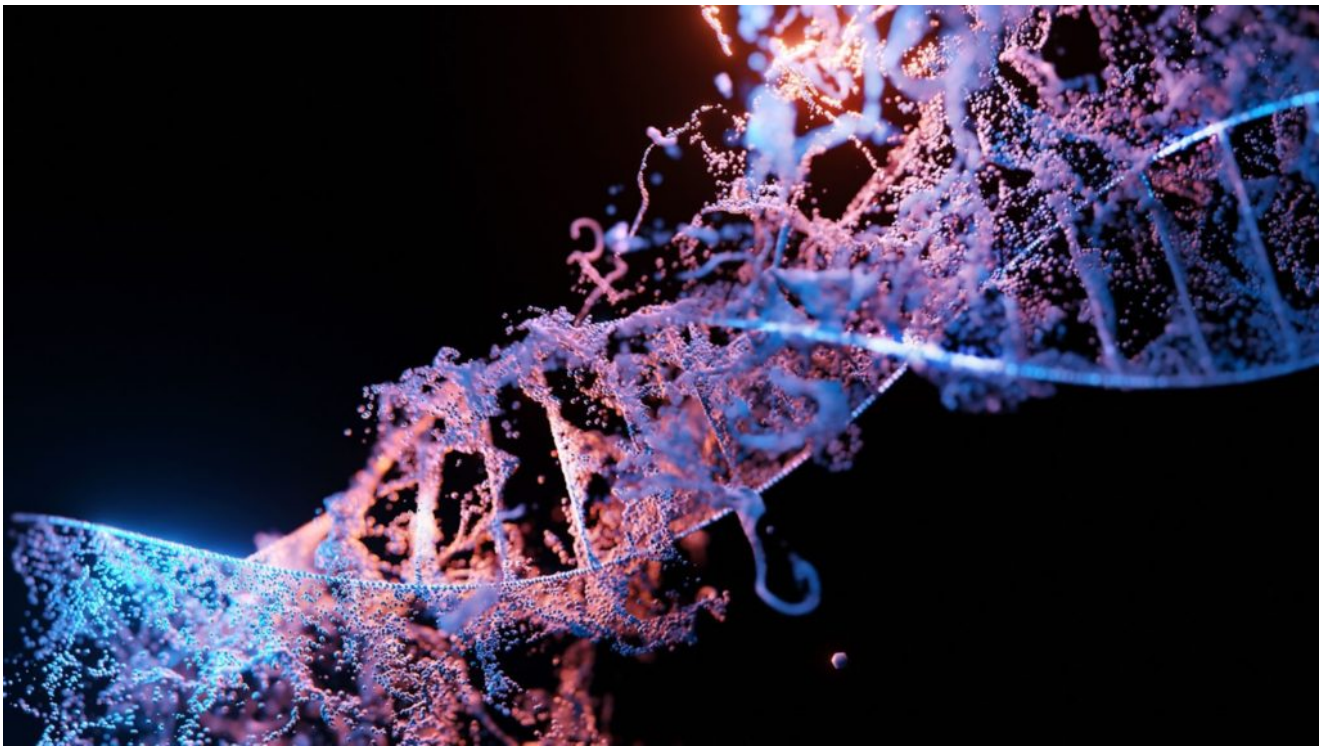

When GMOs first came on the market in the 1990s, the general public didn't know much about them. Thankfully, we've come a long way since then. Through the advocacy of activist organizations, including the Non-GMO Project, familiarity with the term GMO is nearly universal.*

We love to see awareness of the GMO issue grow (in the early days, most Americans were unaware that GMOs were entering the food supply). We believe that everyone has the right to decide for themselves whether or not to consume GMOs, and providing folks with the latest information is what the Non-GMO Project is all about.

However, there's still a lot of confusion about what a GMO is — and what it isn't — due mainly to the speed at which the biotech landscape evolves. It's not surprising. As science leaps forward, regulation lags behind. Meanwhile, new products continue to enter the market.

The Non-GMO Project's research team stays on top of new developments so we can bring you the latest information. So let's get down to it: What is a GMO, what are "new GMOs" and how does the changing landscape of biotechnology impact your food supply?

The application of biotechnology

The term “G-M-O” stands for genetically modified organism, a living organism whose genetic makeup has been altered using biotechnology.

The Non-GMO Project Standard defines biotechnology as the application of:

1. in vitro nucleic acid techniques, including recombinant deoxyribonucleic acid (DNA) and the direct injection of nucleic acid into cells or organelles; or
2. Fusion of cells beyond the taxonomic family, that overcame natural physiological, reproductive, or recombination barriers and that are not techniques used in traditional breeding and selection.

Under the Standard, the application of biotechnology to an organism creates a GMO.

Biologists classify living organisms into groups based on their similarities or differences. It’s called taxonomy. Between 8 and 9 million species have been identified and classified by scientists. Some organisms are closely related, others only distantly. The closer the relationship, the easier it is for their genetic material to merge through natural reproduction or traditional cross-breeding techniques. The more different two organisms are, the more hijinks are needed to overcome natural reproductive obstacles. Biotechnology provides those hijinks.

Biotechnology can be used to combine genetic material from two or more organisms, creating a “transgenic” organism. Some organisms are so dissimilar that their cells don’t even recognize each other as potential mates. In answer to the question “will they or won’t they?” — these two won’t. If scientists want those cells to work together, they use biotechnology so the cells will accept each other despite their differences.

Traditional techniques, transgenic GMOs

The first GMOs to enter the food system were “transgenic” GMOs, meaning they contained DNA from two or more species. The first of these traditional GMOs were soy engineered to withstand herbicide and corn that produces its own insecticide. Genetically engineered corn and soy still dominate GMO acreage in North America, but they are not the only transgenic GMOs. Other transgenic GMOs include genetically engineered canola, cotton, sugar beets and alfalfa — all engineered for similar traits as the original corn and soy — and papaya engineered for disease resistance.

The biotechnology that drives genetic engineering continues to evolve. The Non-GMO Project research team is monitoring a growing number of products made with new genetic engineering techniques that outpace regulations and evade labeling requirements designed for first-generation GMOs.

New GMO techniques

New GMOs are produced using techniques including gene editing and synthetic biology.

Gene editing tools such as CRISPR and TALEN have been heralded as a highly precise form of biotechnology that makes targeted cuts to an organism's DNA. Still, there are significant uncertainties with the process, including "off-target" effects when the DNA strand is edited at the wrong site or other unintended outcomes.

Synthetic biology (or synbio) is sometimes referred to within the biotechnology industry as "precision fermentation." This technique (as it appears in the marketplace at this time?) generally relies on genetically modified microorganisms such as engineered yeast or algae that are programmed to produce specific compounds. Synbio ingredients already appear in virtually every aisle at the grocery store, including fragrances, flavors, vitamins and even non-animal dairy proteins. This means you may have consumed synbio ingredients already without your knowledge.

New GMOs differ from traditional GMOs in crucial ways which impact their regulation and labeling:

- New genetic engineering techniques don't necessarily use foreign DNA to modify an organism.
- Some new GMOs that rely on foreign DNA are highly processed, so the modified genetic material is removed from the final product.

New GMOs face fewer regulatory hurdles than traditional transgenic GMOs because they lack foreign DNA in the final product.

For example, the Canadian Food Inspection Agency recently moved to eliminate government oversight of gene-edited crops that do not contain foreign DNA. That's right — no foreign DNA, no government involvement in the release, cultivation or sale of genetically modified organisms despite the fact they are novel organisms.

The absence of foreign DNA also impacts labeling. In the U.S. the new federal Bioengineered (BE) Food labeling law does not apply to goods without detectable modified genetic material in the finished product. As a result, most products made with new GMO ingredients won't require a bioengineered food disclosure — and shoppers can't rely only on the BE label to be sure which products are made with GMOs.

Traditional GMOs represented only a handful of crops, but they've had a massive impact on North American acreage and the food supply. Today, most conventional prepared foods in the grocery store contain ingredients and inputs derived from GMOs. Meanwhile, new GMOs are proliferating in the supply chain. The techniques used to produce them are cheaper and more accessible than transgenic technology, leading to a dramatic increase in the number of biotech developers exploring the field.

In the past 30 years, a handful of transgenic GMOs and new techniques for creating GMOs have utterly disrupted the food system. This makes us wonder how many conscious eaters and thoughtful shoppers it takes to disrupt it again, to create a natural, regenerative and

equitable food system. A few well-placed changes can move mountains. Imagine what we can accomplish together.

*Source: *Organic and Beyond © 2020*, The Hartman Group, Inc.

Tags: bioengineered, biotechnology, GMOs