A genetically modified organism (GMO) is an organism whose genetic material has been altered using techniques in genetics generally known as recombinant DNA technology.

University of California, in San Diego defines something as a GMO “when a gene from one organism is purposely moved to improve or change another organism in a laboratory.” <http://www.bt.ucsd.edu/gmo.html>

When you think of someone splicing DNA from one organism to another, you probably imagine this very precise method and placement of the transgenic DNA to get the desired effect. I know that’s what I pictured in my head, until I did some research. One of the main ways to create a GMO is known as bombardment, in which small particles are coated with the DNA molecules that are being transferred. The particles are then fired at the plant cells with a gene gun, which is like a microscopic shotgun firing birdshot. The other method requires a bacterium to be used as the delivery mechanism. The plant cells are bathed in this bacterium with the hope that there will be a transfer of genetic material. With both methods scientists will look for specific marker genes that show the new genetic material has joined with the existing DNA. As you can probably tell this means we can’t precisely place the added genetic material. So instead of this new genetic material being segregate to one area of the plant, it is actually found all throughout the plant.

Surprisingly most people don’t seem to be that worried about what is in their food because the FDA is supposed to make sure all food sources are safe for human consumption. Unfortunately the FDA relies on the company producing the GMO to do all safety tests without any oversite or GMO specific guidelines. The FDA actually released a statement of policy for foods derived from new plant varieties, meaning GMO’s. The policy states that all regulations for GMO’s are “identical in principle to that applied to foods developed by traditional plant breeding”. This means they don’t do any extra testing to figure out if there could be a problem with a GMO, like lateral transference of genetic material. This is a fancy way of saying that the genetic material can attach to human DNA.

For example Monsanto likes to put the Bio-pesticide Bacillus thuringiensis, more commonly known as BT in many of their crops to fight off predatory insects. When an insect eats the plant containing BT, its toxins bind to receptors in the insects gut causing the insect to stop eating. Then BT’s protein crystals break down the gut wall and the bacteria’s spores spread throughout the body. The insect will then die from septicaemia, as the bacterium multiplies in its blood. The science is still being gathered on potential negative human interactions with BT in the food supply. This is because major GM companies, like Monsanto, pay scientist to create studies that show GMO’s to be safe. These companies then flood the internet with pro-GM propaganda making it hard for anyone to find the real information. Burying negative information about your company is actually a well-known tactic throughout the business world. If you don’t believe me do a google search and see how many guides exist just to help business’ hide damning information.

Sometimes these companies go after the scientists publishing negative results. Often they stoop to slander and lies to destroy the scientists’ credibility. In a few cases Gm companies have been so effective at this that careers were ruined.

\*\*\*\*\*\*\*scientist under attack\*\*\*\*\*\*

The Federation of American Scientist Known as FAS points out that plants containing the BT toxin fall under the EPA’s regulations, and that the ”EPA requires the developer to verify that the toxin is safe for the environment and conduct a food-safety analysis to ensure that the foreign protein is not allergenic”. This means that the company creating the GMO is the only place doing safety tests on the food. FAS also points out that, the ”FDA established a voluntary consultation process with GM crop developers” to review the developers data before the crop is marketed. Because this is voluntary and only a consultation the GMO developer is free to do what they like. <http://fas.org/biosecurity/education/dualuse-agriculture/2.-agricultural-biotechnology/us-regulation-of-genetically-engineered-crops.html>

Even worse there is no mandate requiring GMO foods to be label as GMO in the United States. So even if our bodies can handle a little bit of exposure to toxins like BT it would be hard for use to determine how much we are actually exposed to on a regular basis.

One of the reasons a company would create a GMO is to own all rights for that plant, including who can plant it, harvest it, and exchange it. Currently you are not allowed to patent any naturally created organism, but once its genes have been modified everything changes. Now the company that manipulated the DNA has the ability to patent it and pursue legal action against anyone they like.

There are known cases where companies like Monsanto have sued farmers for growing their crops without a license. People like Percy Schmeiser, a Canadian canola farmer, claims that the genetically modified crops, which are grown on all the surrounding farms, are unintentionally crossing with his non-GMO crops producing offspring with the patented DNA. And when Percy plants seeds he saved from the previous year, he is unknowingly planting GMO crops without permission. This is against the law and leaves him open to prosecution. And because you cannot control the spread of pollen outdoors there is no way for farmers to protect their crops from the accidental crossbreeding. And in some cases the crossbreeding causes farmers to lose their organic and non-GMO status. When this does happen no one compensates the farmer for his losses. This makes for a very one sided legal action that gives no support to or protection to anyone except the company producing the GMO.

Some seed companies are using GMO technology to produce plants that create sterile seeds, so that farmers are forced to buy new seeds every year. At first this doesn’t seem that bad, after all the seed companies need to make money. But can you image what would happen to our food supply if this gene managed to spread? Even if, for only one year, this kind of plants pollen was dominant in the fields and caused most crops to produce infertile seeds it would wreak havoc on our ability to produce enough food the next year.

Now I should point out that not all GMO’s are scary and produce toxins or sterile seeds. For instance, there is a GMO known as Golden Rice that was developed by scientist to combat blindness caused from malnutrition. Golden Rice is just like normal rice except that it was “modified to produce its own Vitamin A” causing the golden color. http://web.a.ebscohost.com.proxy.devry.edu/ehost/detail/detail?sid=21cadc6c-9112-41c7-9974-bc0141d415da%40sessionmgr4002&vid=0&hid=4207&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=102747217&db=a9h

This rice has the potential to save almost 3 million children, in poor countries, from losing their eye sight every year. In the article “Golden Rice and Beyond” Professor Potrykus discusses the difficult legal process that had to be navigated, because funding for the project came from a lot of sources, all of which tried to claim they owned the patent rights. In the end the exclusive commercial patent for Golden was granted to a company named Zeneca, but the creators managed to ensure the rice is distributed freely to farmers for humanitarian use. The farmers are then allowed to freely save and replant the seeds every year. The agreement that was worked out with Zeneca defines commercial use of the product to be a yearly income of more than $10,000 from the production of Golden Rice. Any profits below $10,000 fall under the humanitarian uses. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1539367/pdf/hw1157.pdf

This is science and GMO’s at their best. Nothing harmful was added to the crop. The major benefits went directly to farmers and children in poor countries, and the entire process was open for scientific review. And a company still got to capitalize off the invention. This should be the model for all GMO’s to follow.

Why you should care:

There is not enough scientific data to prove that GMO’s are safe. All studies on GMO’s should be open, reputable, and like all scientific studies, it should be independently reproducible. By open and reputable I mean that the scientist doing the research should not be funded by the company that created the GMO and that all finding should be released for public inspection so that we know the data is not manipulated selectively used to support the products safety.

We should have labels that notify us of genetically modified ingredients that include what was modified. I’m sure most of us would feel less comfortable with toxin infused GMO than a vitamin infused GMO.

Stricter FDA and EPA laws and regulations with specific guidelines on what tests should be done and what results are acceptable for human consumption.

Let’s “science the shit out of this” and make a future worth living for us all.

“lateral transference of genetic material”

It is also sometimes called "transgenic" for transfer of genes.

Vaccine banana