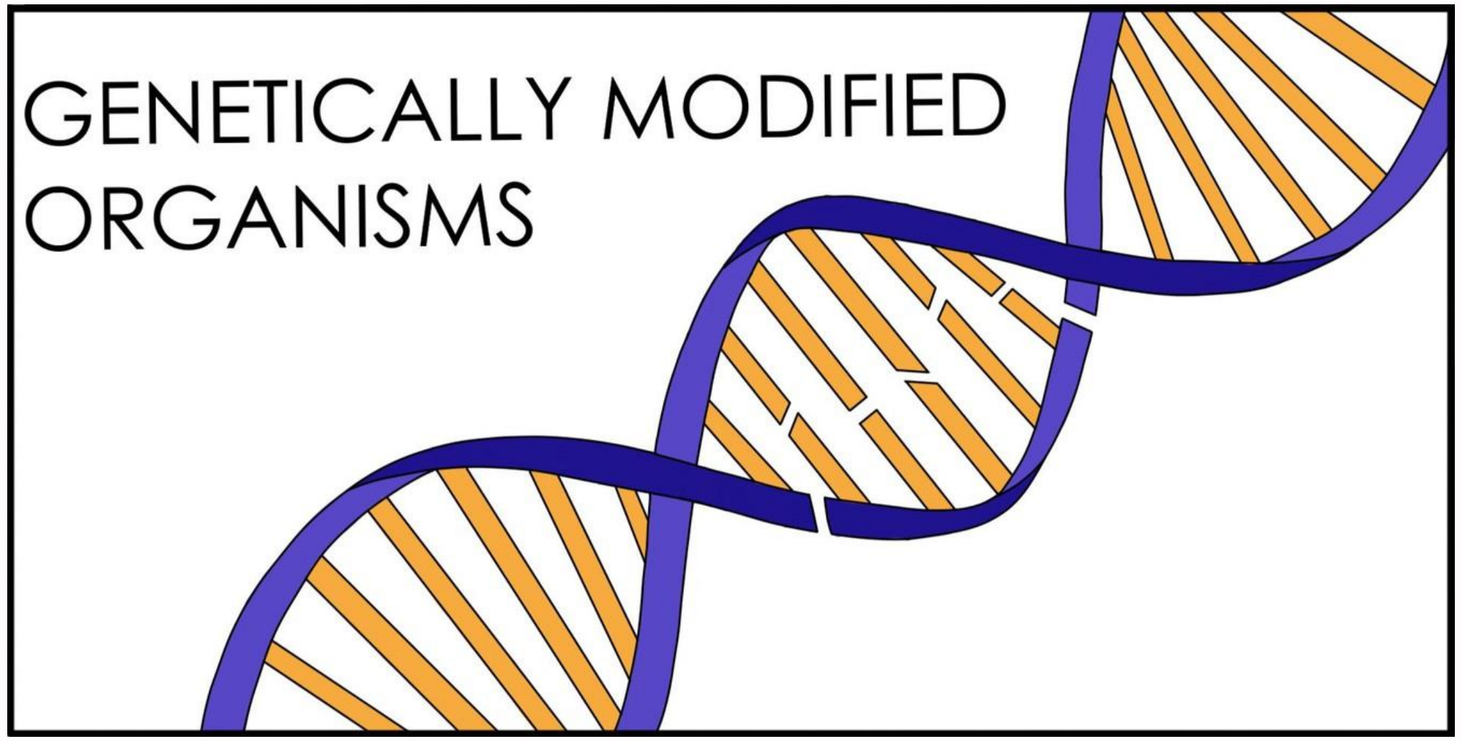
GMO Science

educate to regenerate



Fact From Fiction

Michelle Perro, MD, DHom

2025

Agenda:

Key concepts

- GMOs: What’s the problem?
- Gene editing
- Solutions

GENETIC TRAITS EXPRESSED IN GMOs IN THE U.S.

APPLE

Genetic Traits
Non-browning
Uses: Food

POTATO

Genetic Traits
Reduced Bruising and Black Spot
Non-browning
Low Acrylamide
Blight Resistance
Uses: Food

FIELD CORN

Genetic Traits
Insect Resistance
Herbicide Tolerance
Drought Tolerance
Uses:
- Livestock and poultry feed
- Fuel ethanol
- High-fructose corn syrup and other sweeteners
- Corn oil
- Starch
- Cereal and other food ingredients
- Alcohol
- Industrial uses

CANOLA

Genetic Traits
Herbicide Tolerance
Uses: Cooking oil, Animal feed

ALFALFA

Genetic Traits
Herbicide Tolerance
Uses: Animal feed

SOYBEAN

Genetic Traits
Insect Resistance
Herbicide Tolerance
Uses:
- Livestock and poultry feed
- Aquaculture
- Soybean oil (vegetable oil)
- High oleic acid (monounsaturated fatty acid)
- Biodiesel fuel
- Soymilk, soy sauce, tofu, other food uses
- Lecithin
- Pet food
- Adhesives and building materials
- Printing ink
- Other industrial uses

RAINBOW PAPAYA

Genetic Traits
Disease Resistance
Uses: Table fruit

COTTON

Genetic Traits
Insect Resistance
Herbicide Tolerance
Uses: Fiber, Animal feed, Cottonseed oil

SUGAR BEET

Genetic Traits
Herbicide Tolerance
Uses: Sugar, Animal feed

SWEET CORN

Genetic Traits
Insect Resistance
Herbicide Tolerarnce
Uses: Food

SUMMER SQUASH

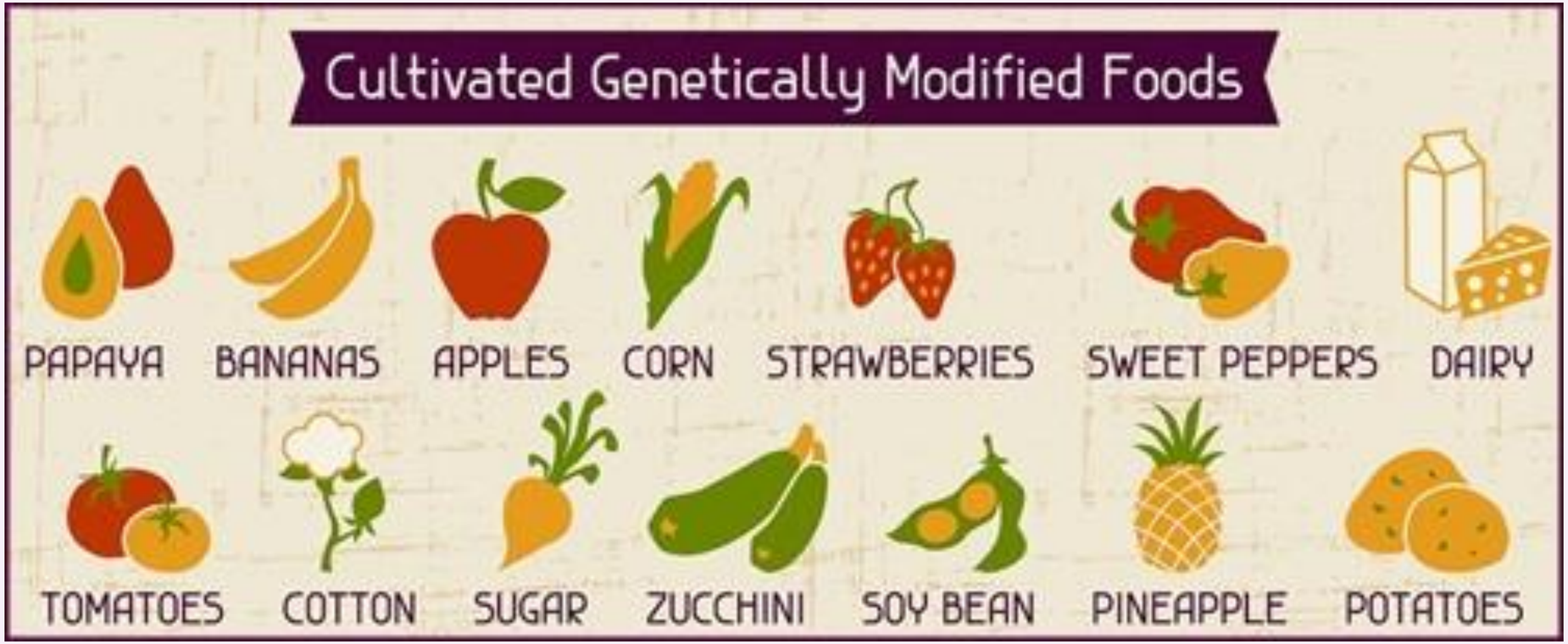
Genetic Traits
Disease Resistance
Uses: Food

A NEW CONVERSATION, PUBLIC Q&A AND CENTRAL ONLINE RESOURCE FOR INFORMATION ON GMOs.

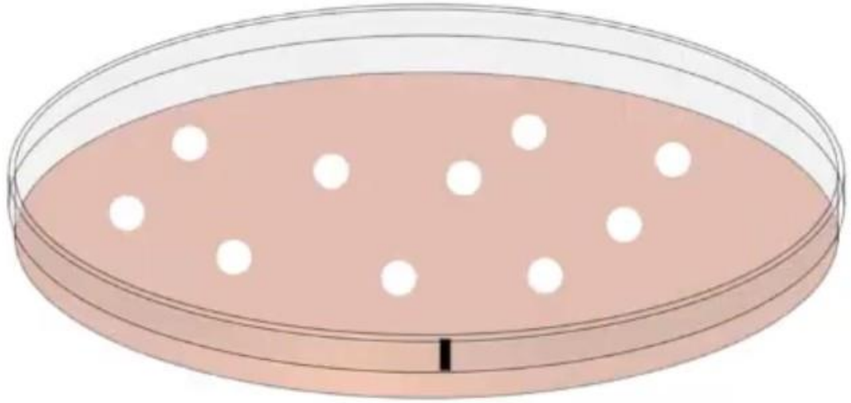
ASK. LINK. FOLLOW. TWEET.

WWW.GMOANSWERS.COM | @GMOANSWERS

gmo answers


Cultivated Genetically Modified Foods
PAPAYA
BANANAS
APPLES
CORN
STRAWBERRIES
SWEET PEPPERS
DAIRY
TOMATOES
COTTON
SUGAR
ZUCCHINI
SOY BEAN
PINEAPPLE
POTATOES

GMO example: Bt Corn



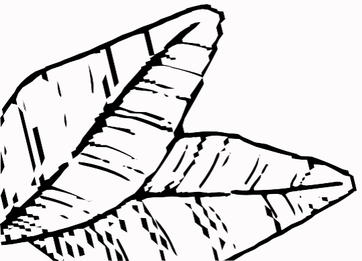
Corn includes DNA of a bacterium

Issues...

- Process: Mutations and deletions throughout the DNA
- Increased allergens/new allergens
- Increased novel toxins
- Process is random secondary due to collateral damage
- Chemicals used on GMO crops have created superweeds
- Chemicals the GMO plants are engineered to tolerated accumulate in the plants which we then consume

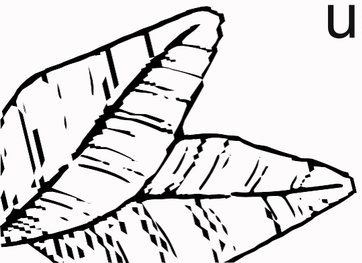
Issues...

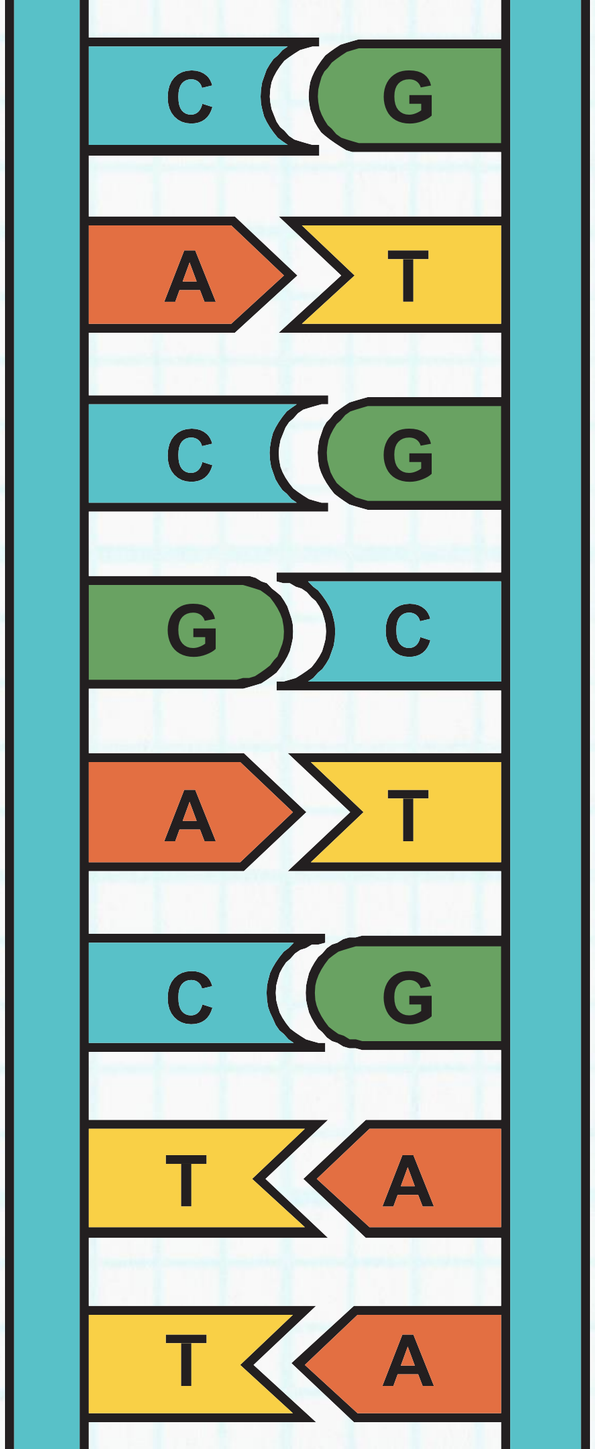
- Gene insertion disrupts DNA and can create unpredictable problems
- Gene insertions create genomic changes in gene expression
- Promoters: Switch genes on - may accidentally switch on harmful genes and dormant viruses
- Gene editing turns can turn off enzymes needed for disease resistance
- Decreased nutrients
- Produce unintentional RNA variants



Issues...

- There are numerous new proteins
- A growing list and concentration of toxic pesticides within the cells 800 to as many as 1400 codon changes (most with protein associations) that occurred with GE inserts
- Many differences from one insert to another of supposedly the same material. That is why each GE event has to be analyzed since no two are the same!
- Other aberrations that have never been evaluated or seen in nature: Genes are pormiscuous and can be transferred from the GI tract to us (and our babies)





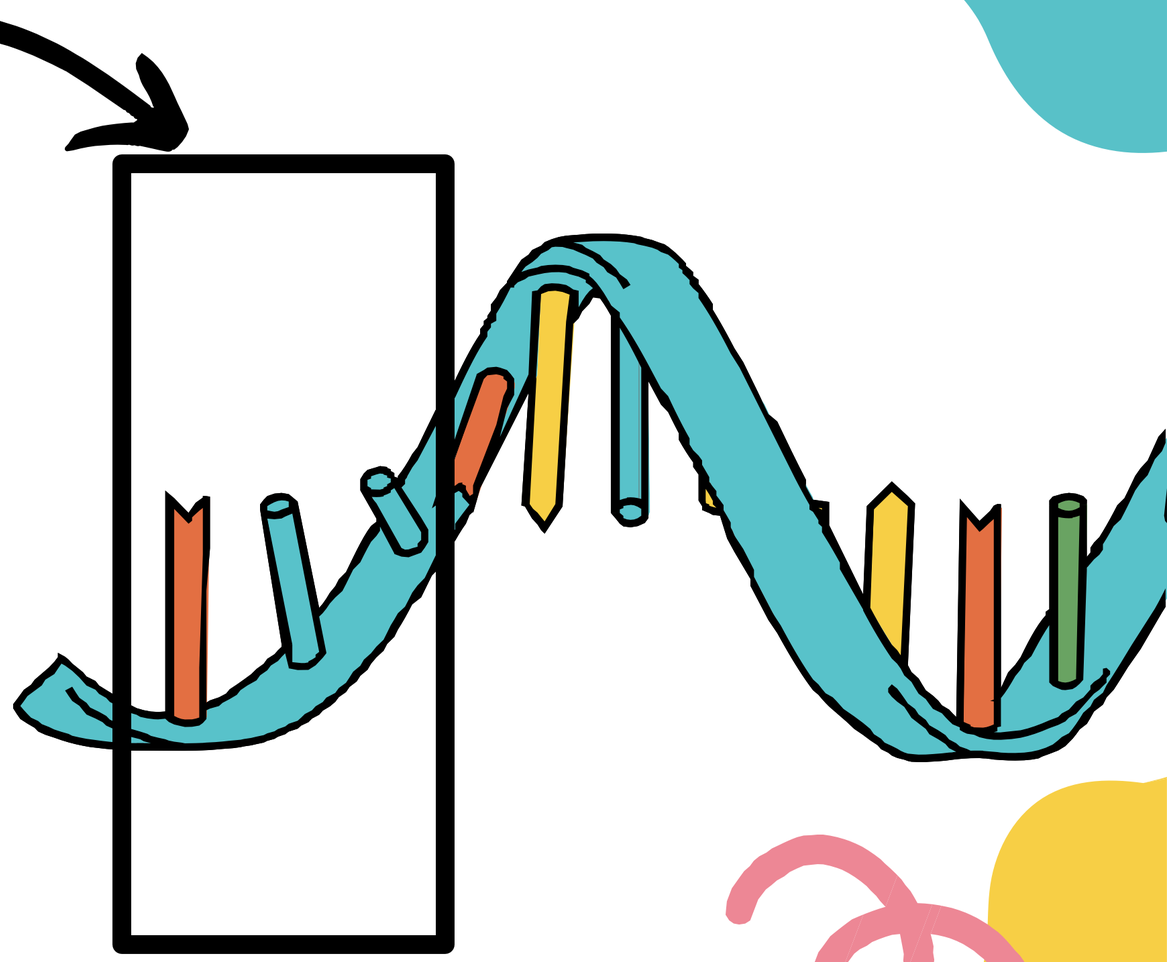
Codons

What is a codon?

- A codon is a sequence of three nucleotides in mRNA (or DNA) that corresponds to a specific amino acid or a stop signal during protein synthesis.
- Example: The codon AUG codes for methionine (also the "start" codon).

Codon Change

Codon changes refer to alterations in the sequence of DNA or RNA that affect the codons—which are three-letter "words" made of nucleotides (A, T/U, C, G) that instruct the cell which amino acids to use when building proteins.



What’s the Problem?

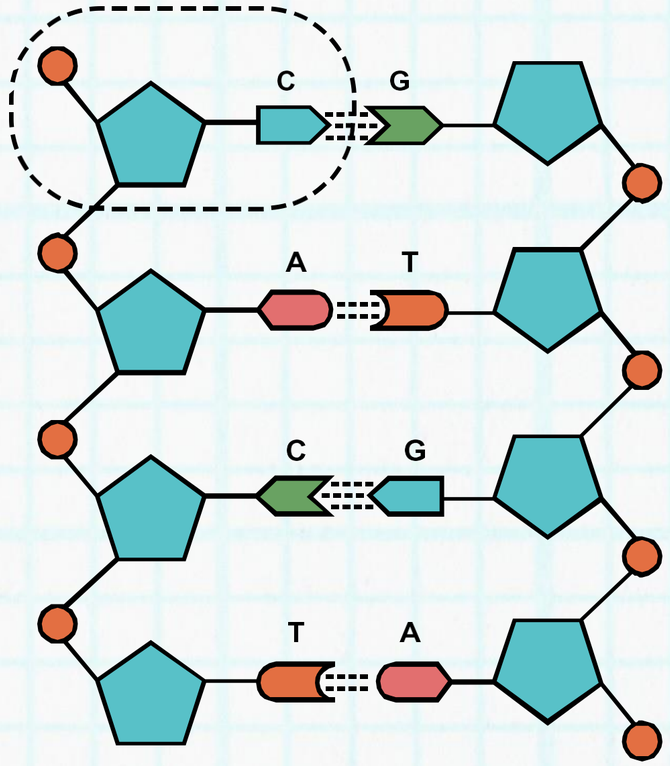
A codon change occurs when a mutation or genetic editing alters the original three-nucleotide sequence. This can happen through:

1. Point mutations (a single nucleotide is changed)
2. Insertions or deletions (which can shift the reading frame—called a frameshift mutation)

Why It Matters

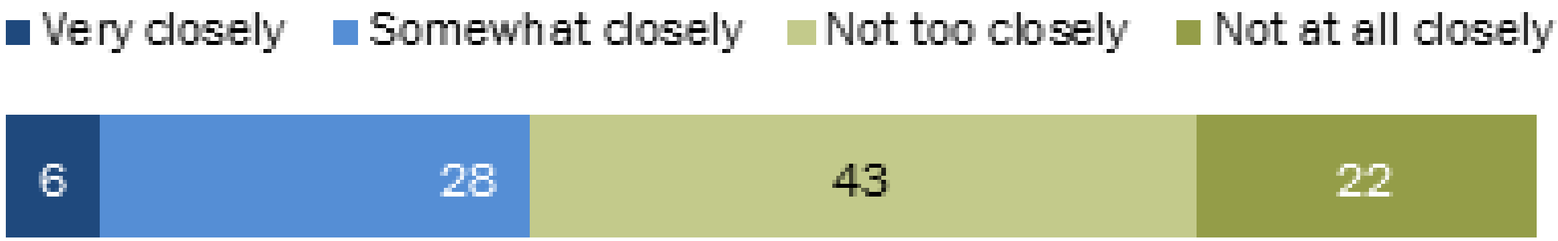
Codon changes can:

- Alter the structure or function of a protein, or create new proteins
- Lead to genetic diseases (e.g., sickle cell anemia results from a codon change),
- Be intentionally introduced in genetic engineering or mRNA vaccine design to optimize expression or avoid immune detection.



Few Americans follow news about genetically modified foods very closely

% of U.S. adults who say they follow news about GM foods ...



Note: Respondents who did not give an answer are not shown.
Source: Survey conducted May 10-June 6, 2016.
"The New Food Fights: U.S. Public Divides Over Food Science"

PEW RESEARCH CENTER


10 reasons we don't need GMO foods
1. GMO crops do not increase yield potential
2. GMO crops increase pesticide use
3. GMO crops have created "superweeds"
4. GMO crops have toxic or allergenic effects on laboratory animals
5. GMO and non-GMO crops cannot "coexist"
6. GMO is not needed for good nutrition
7. There are better ways to feed the world
8. Conventional breeding is better than GMO at producing crops with useful traits
9. GMO is an imprecise technology that will continue to deliver unpleasant surprises
10. GMO crops are not about feeding the world but about patented ownership of the food supply
Coalition Powered by Green America
GMOINSIDE.ORG

One gene, one protein outdated

A single gene has the capability to code for multiple proteins. This is possible due to alternative splicing, a process where different sections of a gene’s DNA can be selected and combined in different ways, resulting in the production of different protein variants. In this way, one gene can produce a variety of proteins with different structures and functions.

My biggest concerns...

- GMOs can survive an acidic digestion
- GM crops unlike normal plant genes can transfer between species
- 1 human feeding study: Genetic material from RR soy was transferred into the gut bacteria of 3 of 7 human volunteers
- GM crops increase antibiotic resistance
- If Bt genes transfer, they can turn our gut bacteria into living pesticide factories
- GM crops may concentrate toxicants - heavy metals and herbicides.

Gene Editing?

The global CRISPR technology market

A recent report published by MarketsandMarkets reveals that the value of the CRISPR technology market will grow from $562 million in 2018 to $1.7 billion by 2023.

Source: "CRISPR Technology Market by Product, Service, Application, End user - Global forecast to 2023",*MarketsAndMarkets*, 2018

Issues...

- Genetic scissors can cut in the wrong place
- CRISPR introduces the genetic scissors, cuts DNA and a guide tells the scissor where to cut
- Damage off-target areas
- Sloppy repair
- Mixing genes
- Mutant proteins
- Insertional damage
- Mutations from the process
- Epigenetic changes which can affect inheritance

results

DIY Bacterial Genome Engineering CRISPR Kit

Brand: The ODIN

4.0 ★★★★☆ 36 ratings | Search this page

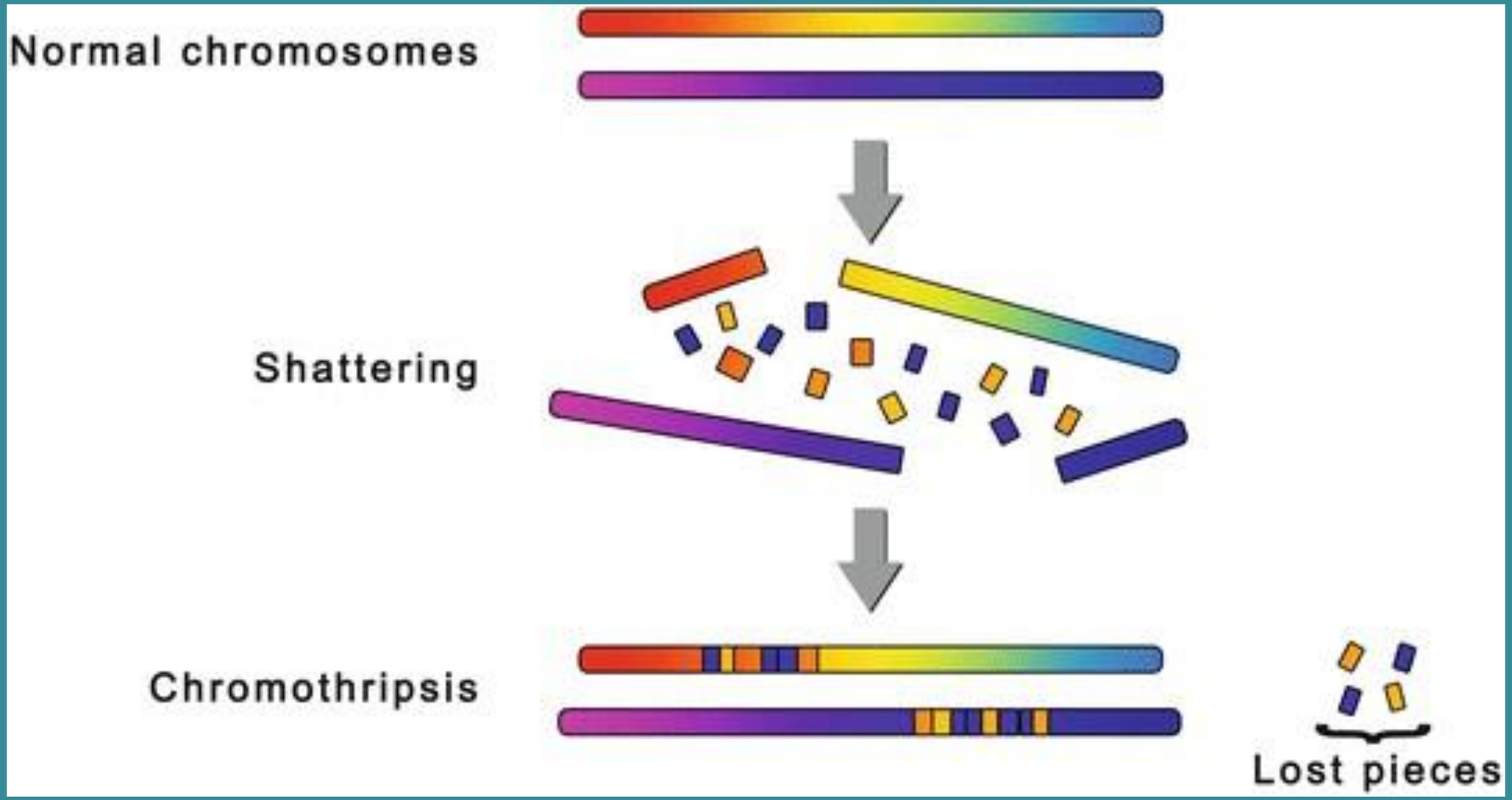
$169.00

Or **$16.98** /mo (12 mo). Select from 1 plan

FREE Returns

- All-In-One kit, you don't need anything else but water and a microwave
- Actual Genetic Engineering
- Learn CRISPR Technology through Hands-On experimentation

Report an issue with this product or seller


Normal chromosomes
Shattering
Chromothripsis
Lost pieces

100 HIDDEN GMO INGREDIENTS

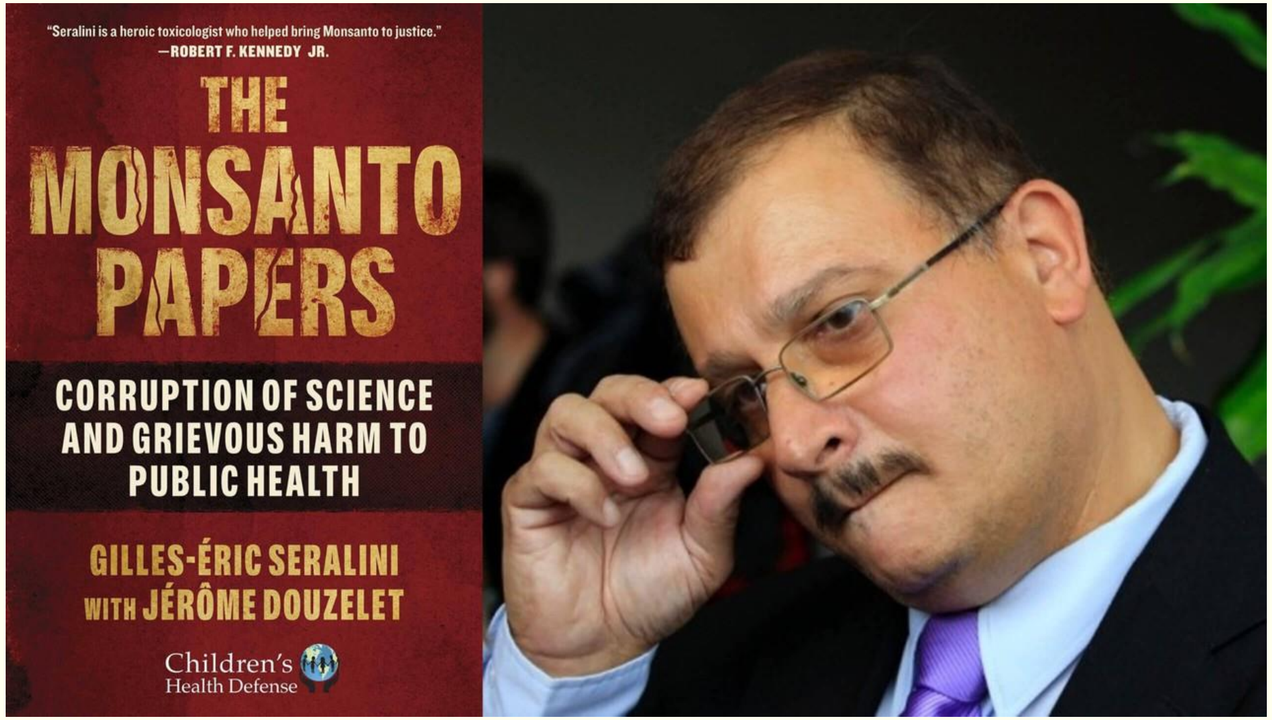
- CORN FLOUR
- CORN MASA
- CORN MEAL
- CORN OIL
- CORN SUGAR
- CORN SYRUP
- CORNSTARCH
- STARCH
- FOOD STARCH
- MODIFIED STARCH
- MODIFIED FOOD STARCH
- HYDROGENATED STARCH
- MILO STARCH
- HIGH FRUCTOSE CORN SYRUP (HFCS)
- DEXTRIN
- CYCLODEXTRIN
- MALTODEXTRIN
- DEXTROSE
- SUGAR (UNLESS SPECIFIED AS CANE SUGAR)
- HYDROLYZED VEGETABLE PROTEIN
- MALT
- MALT SYRUP
- MALT EXTRACT
- BAKING POWDER

- CARAMEL COLOR
- E951
- NUTRASWEET
- ASPARTAME
- MINOSWEET
- CANDEREL
- BENEVIA
- PHENYLALANINE
- EQUAL
- INVERT SUGAR
- INVERSE SYRUP
- FRUCTOSE (ANY FORM)
- CONFECTIONERS SUGAR
- GLUCOSE
- CONDENSED MILK
- MILK POWDER
- GLYCERIDES
- GLYCERIN
- GLYCEROL
- GLYCEROL MONOOLEATE
- DIGLYCERIDE
- MONO AND DIGLYCERIDES
- TRIGLYCERIDE
- TERIYAKI MARINADES
- TOFU

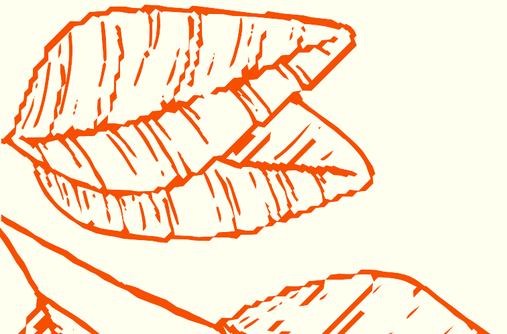
- TAMARI
- TEMPEH
- TEXTURED VEGETABLE PROTEIN
- SOY FLOUR
- SOY ISOLATES
- SOY MILK
- SOY OIL
- SOY SAUCE
- SOY PROTEIN
- SOY PROTEIN CONCENTRATE
- SOY PROTEIN ISOLATE
- PROTEIN ISOLATE
- SOY LECITHIN
- LECITHIN
- WHEY
- WHEY POWDER
- XANTHAN GUM
- CANOLA OIL (RAPESEED OIL)
- COTTONSEED OIL
- VEGETABLE OIL
- VEGETABLE FAT
- SHOYU
- GLUTAMATE
- MONOSODIUM GLUTAMATE (MSG)

- GLUTAMIC ACID
- CITRIC ACID
- LACTIC ACID
- PHYTIC ACID
- OLEIC ACID
- STEARIC ACID
- ERYTHRITOL
- INOSITOL
- MANNITOL
- SORBITOL
- CELLULOSE
- HEMICELLULOSE
- METHYLCELLULOSE
- TREHALOSE
- COLOROSE
- MALITOLMALTOSE
- VITAMIN B12
- VITAMIN E
- COBALAMIN (VITAMIN B12)
- DIACETYL
- ISOFLAVONES
- TOCOPHEROLS (VITAMIN E)
- THREONINE
- GLYCINE
- LEUCINE
- LYSINE
- CYSTEIN


GMOscience
educate to regenerate
presents:
Is the Impossible Possible?
What is in the Impossible Burger?
Michelle Perro, MD, DHom



“We have identified heavy metals and petroleum residues 6600 times more dangerous in conventional food than in equivalent organic products in Europe due to pesticides.”



Medicines produced by GE

Medicines produced by GE are divided into 2 categories:

- Medicines derived or produced from GMOs = biological medicines
- GMOs that are intended for use as medicinal agents = GMO medicines

Biological medicines are therapeutic goods that are derived from biological sources (including GMOs and GM products) and are regulated as registered prescription medicines. Examples include:

- vaccines
- antivenoms
- bacteria derived toxins
- Immunoglobulins
- monoclonal antibodies
- allergens
- blood products and clotting factors
- hormones such as insulin, growth hormone
- enzymes such as pancreatins
- heparins.

GMO medicines may include:

- live attenuated vaccines (viral or bacterial)
- viral vectors
- modified somatic cells.

Bioresour Bioprocess. 2021 Dec; 8(1): 65.
Published online 2021 Jul 27. doi: 10.1186/s40643-021-00419-w
PMCID: PMC8313369
PMID: 34336550

Downstream processing of recombinant human insulin and its analogues production from *E. coli* inclusion bodies

Yin Yin Siew and Wei Zhang

Author information Article notes Copyright and License information PMC Disclaimer

GE vaccines

Number° of GMO-containing vaccine clinical trials per country in Europe: 2004-2017	Absolute n°	% (out of 147 trials)
Austria	4	2.7
Belgium	13	8.8
Bulgaria	2	1.4
Czech republic	2	1.4
Denmark	3	2.0
Estonia	1	0.7
Finland	5	3.4
France	14	9.5
Germany	18	12.2
Hungary	7	4.8
Iceland	1	0.7
Ireland	1	0.7
Italy	4	2.7
Lithuania	1	0.7
Netherlands	8	5.4
Norway	1	0.7
Poland	3	2.0
Romania	1	0.7
Slovakia	1	0.7
Spain	16	10.9
Sweden	4	2.7
UK	91	61.9
TOTAL including all multi-country trials	201	NA
TOTAL representing each multi-country trial as one trial	147	100

Vaccines made with or using genetically modified organisms or technology include:

- mRNA vaccines (Pfizer, Moderna)
- Viral vector vaccines (J&J, AstraZeneca)
- Recombinant protein vaccines (Novavax, Hep B, HPV, Shingrix, FluBlok)

https://www.sciencedirect.com/science/article/abs/pii/S0264410X19310680

Examples of products made with or from GMOs

Detergent with enzymes
made with GMO microorganisms

Bioethanol
made with GMO microorganisms

Bioplastics from lactic acid
made with GMO microorganisms

Infant nutrition with human milk oligosaccharides
made with GMO microorganisms

COVID-19 vaccine (e.g. AstraZeneca)
made with GMO cell lines

Insulin
made with GMO microorganisms

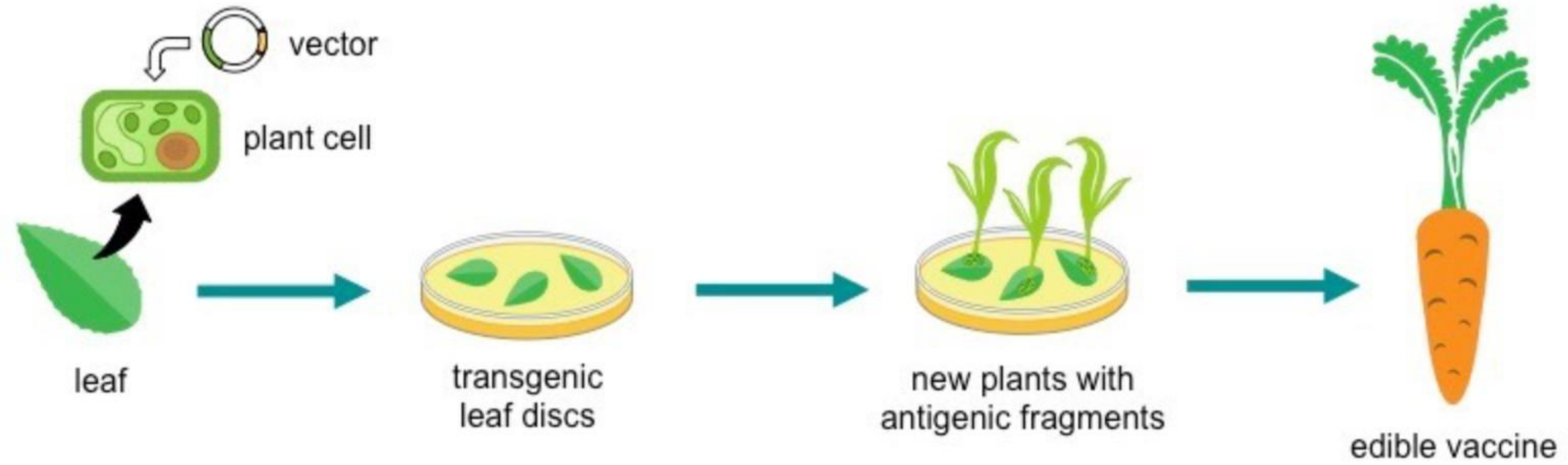
Clothing
made from GMO cotton

Omega-3 oil
made with GMO microorganisms

Source Roland Berger

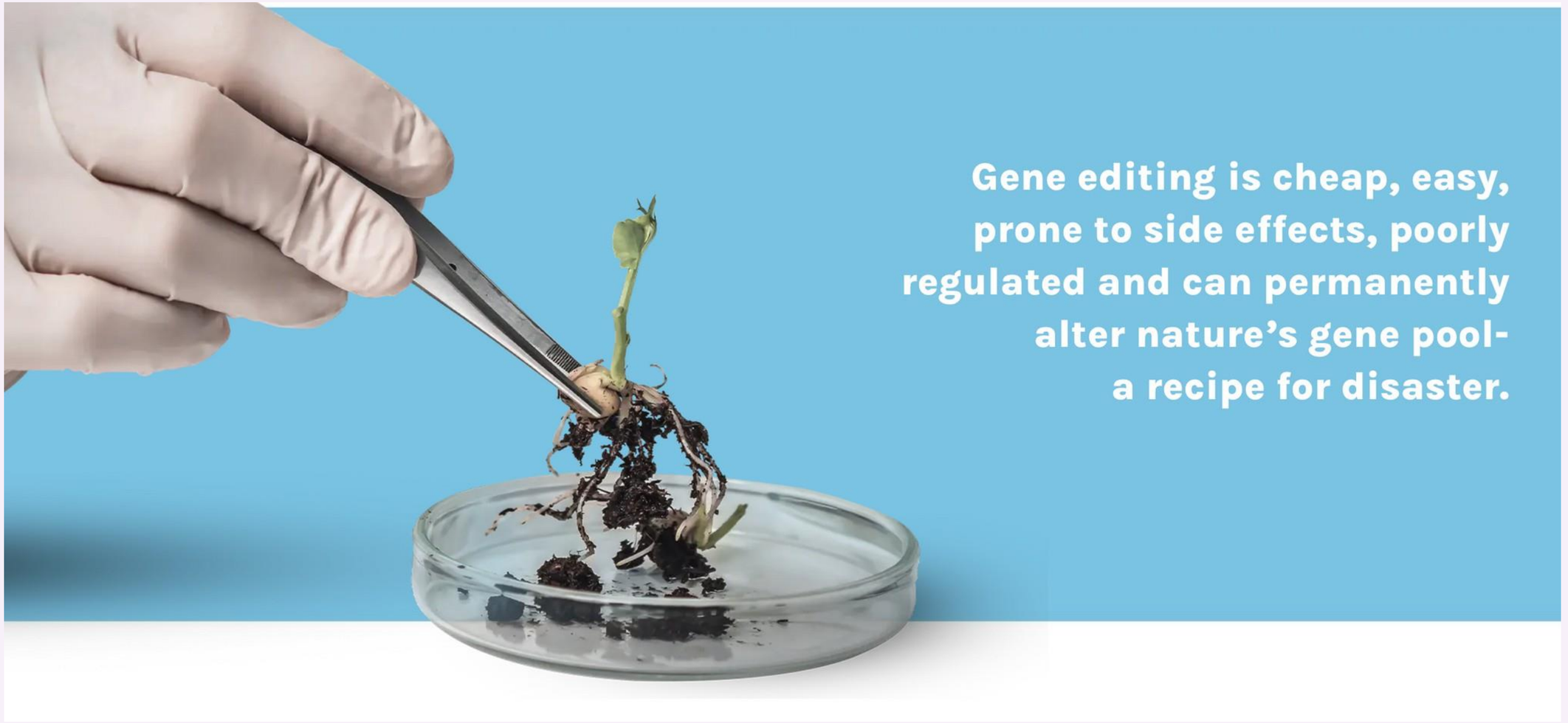
Roland Berger

Development of Edible Vaccines



https://old-ib.bioninja.com.au/options/untitled/b2-biotechnology-in-agricul/edible-vaccines.html

Regulation Dysregulation



We are witnessing a well-funded disinformation campaign, reminiscent of the tactics used by Monsanto for decades. They feed scripted talking points and ghostwritten materials to a coordinated chorus of promoters, front groups, paid scientists, captured regulatory agencies, and biotech friendly media. Government sanctioned pro-GMO committees are often comprised of industry-approved members with clear conflicts of interest. On the other hand, highly credentialed, independent experts are not invited to share their evidence of potential harm from gene editing.

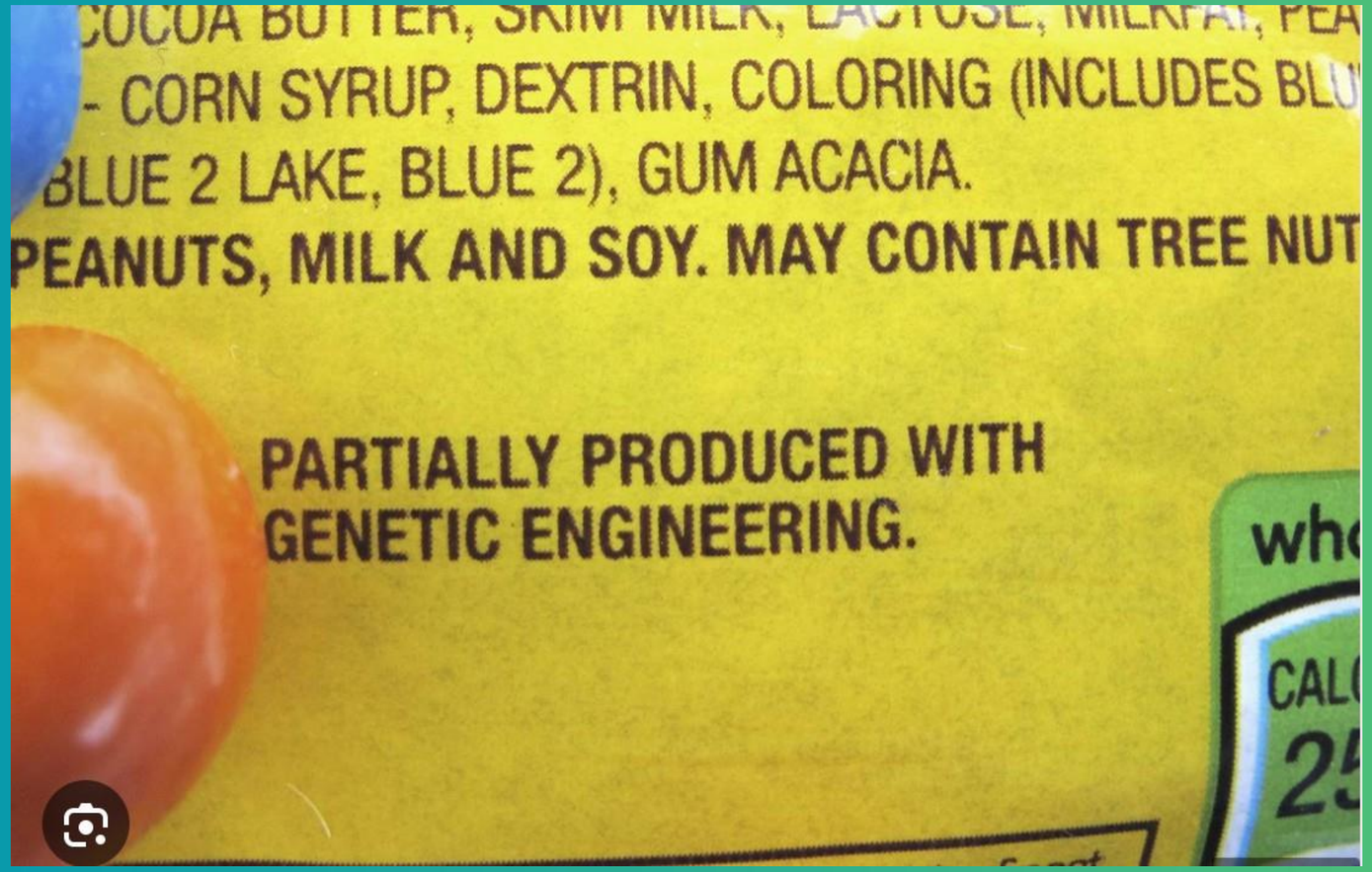
Jeffrey Smith

NEED FOR REGULATIONS

by IRT News Team | May 20, 2022 | Scientific References 2 | 0 comments

NEW GM PLANTS DO NOT HAVE A HISTORY OF SAFE USE AND SHOULD NOT BE EXEMPTED FROM BIOSAFETY ASSESSMENTS.

Solutions: What's An Eater To Do?




Nutrition Facts
None of Your Business
INGREDIENTS: You don't have a right to know

GMO DARK Act Sails Through the House

In a vote that's to be expected, the House passed the DARK Act last week, 275-150.

HR 1599 – "Safe and Accurate Food Labeling Act of 2015" – is Monsanto's dream bill – it permanently prohibits the FDA, state and local governments from requiring labeling or regulating genetically modified foods (GMOs), and foods that contain GMOs can be labeled "natural." That's why it is dubbed by the opposition as the DARK Act: "Deny Americans the Right to Know" Act.

As we have previously reported, under the bill, industry can voluntarily label foods with GMOs, but that's already allowed and no company has shown interest in doing so, other than Whole Foods Market and Chipotle.

The legislation erases more than 130 local and state statutes, regulations and ordinances in 43 states and blocks any going forward. In 2013 and 2014 more than 30 states introduced legislation to require GMO labels, and Vermont, Connecticut and Maine have passed GMO labeling laws.

Big Food companies through the Grocery Manufacturers Association – which wrote the bill – and Monsanto and other GMO companies, poured millions of dollars into lobbying efforts to pass it.

Its sponsor, Rep. Mike Pompeo (R-KS) is one of the single biggest recipients of campaign funds from Koch Industries, and Reps that voted for the bill received triple the contributions from the food and agriculture industries, according to Open Secrets. Collectively, they pulled in $29.9 million during the 2014 election cycle – about $109,000 each.

Over 300 farmer, consumer and environmental groups oppose the DARK Act, including the second largest farming group- the National Farmers Union.

PRESS RELEASE

Bold New Agenda, New Name: GMA to Relaunch as Consumer Brands Association™ in 2020

FOR IMMEDIATE RELEASE

Leslie Lake, 571-378-6757 press@consumerbrandsassociation.org

ARLINGTON, Va. — The Grocery Manufacturers Association (GMA) today announced it will become the Consumer Brands Association (CBA), effective January 2020. The new identity is part of a sweeping overhaul of the 110-year old trade organization, led by President and CEO Geoff Freeman and the GMA board of directors.


LABELING
AROUND THE WORLD
64
Countries require labeling of GM foods currently
Germany
Norway
Denmark
Netherlands
Luxembourg
Belgium
United Kingdom
Iceland
Ireland
France
Spain
Portugal
Switzerland
Slovenia
Italy
Austria
Croatia
Czech Republic
Bosnia & Herzegovina
Slovakia
Hungary
Greece
Romania
Senegal
Brasil
El Salvador
Ecuador
Peru
Bolivia
Mali
Cameroon
South Africa
Sweden
Poland
Lithuania
Estonia
Finland
Lativa
Belarus
Ukraine
Turkey
Jordan
Kazakhstan
Russia
China
India
Sri Lanka
Thailand
Saudi Arabia
Mauritius
Ethiopia
Kenya
Malayasia
Singapore
Japan
South Korea
Taiwan
Vietnam
Indonesia
New Zealand
Australia
No GMO Labeling required
GMO Labeling required
NaturalNews.com
Natural Health, Natural Living, Natural News
Source: JustLabelIt.org

Choose

- Organic/regenerative
- Local
- Seasonal
- Whole foods
- Food with minimum of 1 organic certification
- Avoid processed foods
- Animal foods must be organic
- Dump canola
- Dump cottonseed oils
- Mindful of supplements
- Careful restaurant selection

https://www.whattoexpect.com/news/first-year/homemade-baby-formula-unsafe/

Avoid High Risk Foods

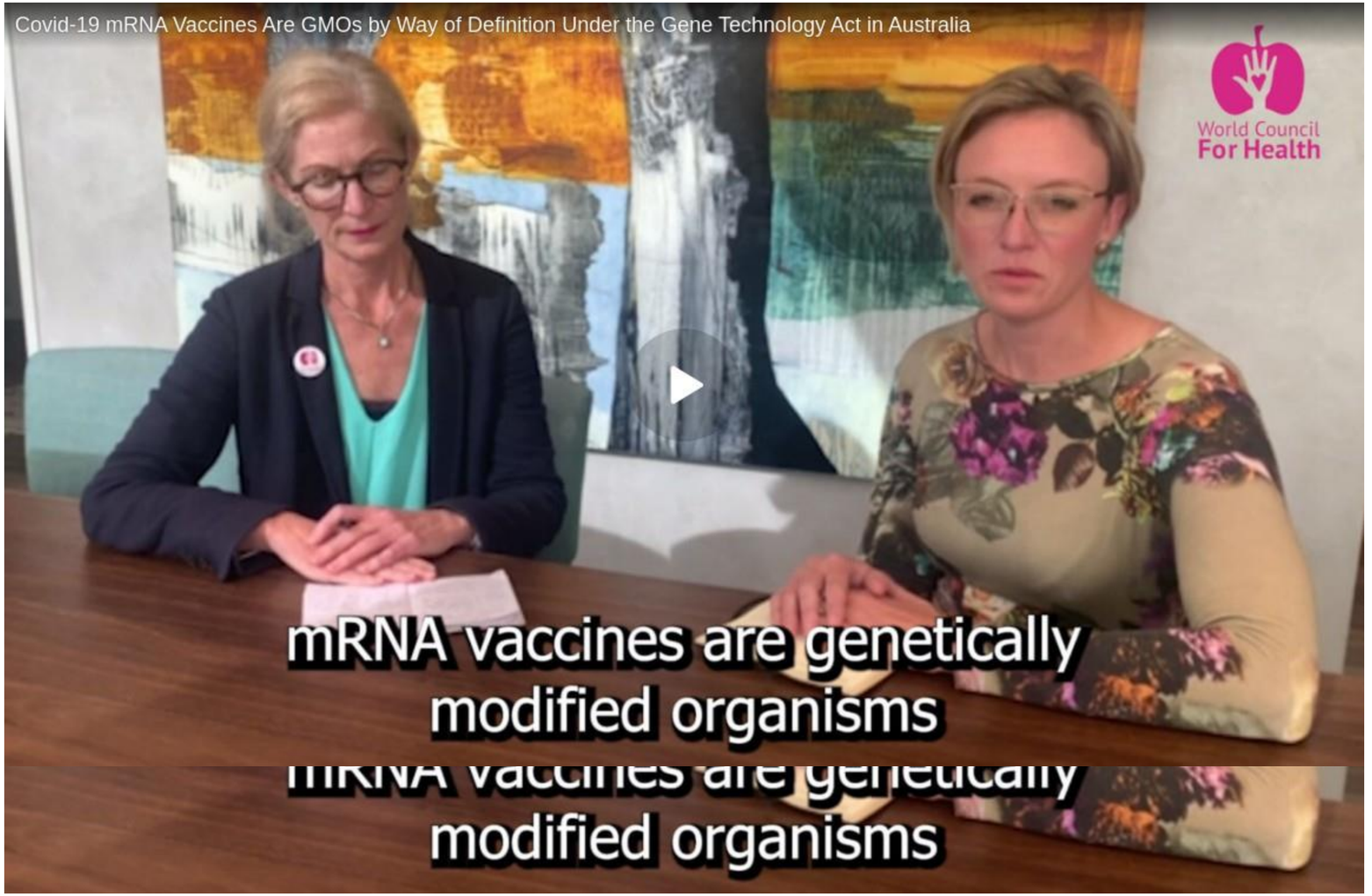
(unless organic)

TAKE ACTION

Tell the USDA to Keep Livestock Vaccine Trials in the Lab & Out of Our Food

Agriculture Secretary Tom Vilsack is conducting field trials of bird flu vaccines for dairy cows.

On August 28, 2024, his Center for Veterinary Biologics announced a huge change to the way the U.S. Department of Agriculture tests new livestock vaccines.



Covid-19 mRNA Vaccines Are GMOs by Way of Definition Under the Gene Technology Act in Australia


GMO science
educate to regenerate
What's in our food?

What's Making Our Children SICK?

How Industrial Food Is Causing an Epidemic of Chronic Illness, and What Parents (and Doctors) Can Do About It

EXPLORING THE LINKS BETWEEN GM FOODS, GLYPHOSATE, AND GUT HEALTH

Michelle Perro, MD *and* Vincanne Adams, PhD

Coming Soon!

Making Our Children WELL

A Parent's Guidebook: Empowering Healthy Families with Homeopathy and Nutrition

Michelle Perro, MD
Co-Author of the best seller
What's Making our Children Sick?

Thank you!

www.gmoscience.org

Non-profit since 2014:
501(c)(3)

Michelle Perro, MD, DHom

info@gmoscience.org