HEALTH DANGERS OF A PLANT-BASED DIET

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Content

In this paper we are going to look at various parts of plants that humans eat – everything from their seeds to roots to stems to leaves to their fruits. And with each "Plant Part" we are going to highlight a particular "Plant Poison" that the plant uses to deter predators.

Here's where we're going:

Plant Part / Plant Poison

Health Dangers of a Plant-Based Diet

To claim there are health dangers with a plant-based diet flies in the face of conventional wisdom. It's surely heresy among nutrition experts. These experts tell us we need to eat fruits and vegetables for their essential vitamins and minerals. Their potent antioxidants ward off aging and cancer. And their fiber cleans our tubing, keeping our intestines and arteries clean.

Could there really be health dangers to a plant-based diet?

Contrary to popular belief, plants don't have human health as their top priority.

Like all organisms, they are more concerned about their survival than ours.

In fact, protecting themselves from predators like humans is high on their priority list. And since plants can't fight us off with fangs or flee with their feet they've evolved other mechanisms to deter predators.

3 Plant Secrets

When we think of plants, we think of "good guys." They are good for decoration, good for the environment, and good for our health.

Floyd, my money tree, is sitting right next to my desk as I write this. While keeping me company, he sucks up my carbon dioxide emissions and pumps oxygen into the air for me to breathe.

Floyd and I are pals but I don't let him fool me. He, like 99% of all plants, is completely inedible. If I tried, I would surely get sick. While nearly 100% of animals are edible, the opposite is true for plants.

It's strange to assume then that the plants we do consider edible are completely safe.

I think the reason is that plants fool us.

They are masters of disguise.

Plant Secret #1

Plants are so good at disguise that we don't even realize they hide in most of our foods.

When I think of Floyd I know he started as a seed. And from his seed beginnings he then puts down roots that buried deep into the soil. These roots anchor him down and he absorbs nutrients from the soil.

I know that Floyd's roots connect to a stem. His stem is not unlike a rose stem, or the stem of a tree covered in bark. They provide structure to their stature.

I can see leaves that branch from Floyd's stem. And I know that many of Floyd's plant friends bloom flowers and ripen fruits.

Floyd, however, is a money tree, so he is supposed to bloom cash, but I'm still waiting on this.

But these flowers and fruits disseminate seeds which contain the offspring for the next generation.

I get it. No big secrets here.

But it's a strange paradigm shift to realize these plant structures give us so many of our foods.

When we eat potatoes and carrots, we are eating roots of plants that grow underground. Crunching on celery and broccoli, we are eating stems of plants. A salad with spinach and kale is plant leaves. When we eat apples and berries we are eating the fruits of these plants. And when we eat grains, nuts, or beans we are eating seeds. We are eating plant parts.

Now the seeds are the really tricky ones.

Grains are the seeds of grasses like wheat, corn, oats, and rice. Nuts are the seeds of trees like walnuts, hazelnuts and pecans. And beans are the seeds of legumes like peas, lentils, soybeans, and chickpeas.

But they are all just seeds.

Classifications can get confusing like trying to figure out where peanuts and cashews and almonds fit in – is it a nut or a legume – but it doesn't matter, they are all seeds.

So when you are eating a bowl of oats topped with nuts, you are eating seeds.

All from plants.

For me it was a shocking discovery how well plant parts hide in our food.

Take sugar for example.

The sugar that has invaded so much of our food comes from plants.

Sucrose is table sugar. And most sugar comes from sugar cane, which is a tall grass with a big stem. What happens is the cane is shredded, mixed with water, then crushed to extract the juice. The juice is then dried into a granulated form.

And viola. Sugar.

Sugar is simply a processed and refined plant part.

The sugar beet, which is a root, can also be refined to give us sucrose. And there are other forms of sugar like fructose found heavily in fruits and glucose that can be found in fruits and some roots like carrots.

But almost all sugar in our diet comes from plants. Lactose, milk sugar, is an exception. However, until recent history lactose was indigestible beyond childhood and is still not tolerated by a majority of the world.

It's a strange thought:

- My grandma's homemade cookies are a plant-based food – the sugar, the flour, the vegetable oil – all from plants.

I remember when I started looking closer and was hit with a startling realization…

We are all on a plant-based diet and we don't even know it.

Pretty much anything we eat comes from a plant or an animal. There are "gray area foods" like mushrooms and algae that are neither plant nor animal, but for the most part, all our food is derived from plants or animals.

And what shocked me more is that most of our "unhealthy" foods are simply derived from our "healthy" plant-based foods.

A whole grain is healthy, but when it's crushed into a flour it's then unhealthy?

Is it possible that these "healthy" plant-based foods are actually "unhealthy?"

Plants are not only hiding in all our food – but they are hiding their poisons.

Plant Secret #2

Floyd's motivation is his survival not my health.

For 500 million years, plants, like all living organisms, have fought for survival. And plants have millions of years of evolutionary advantage on us humans. Since they can't fight or flee predators, they evolved other clever mechanisms to survive.

And like I mentioned, plants tend to be masters of disguise.

Many plants are like chameleons. They can change the color of their leaves to blend into their surroundings. And they can grow in places difficult for these herbivore predators and insect pests to reach.

Some plants will even mimic the presence of insect eggs on their leaves, which dissuades insects from laying real eggs there.

But plants use far more than clever camouflage to deter predators.

They can illicit the protection of natural enemies of herbivores by releasing chemicals to attract these protectors. They can react to touch. And they can release irritants and poisons.

They also use less subtle defenses.

Leaves can produce resins, saps, and waxes that trap insects. Leaves and stems can be covered with sharp prickles, spines, and thorns.

Plants didn't evolve to be a food source for predators.

Plant Secret #3

Plants' best kept secret is hidden even better than how they hide in our food or from herbivore predators.

They look innocent enough. But these masters of disguise have an arsenal of chemical weapons ready to go to battle with anything that dares eat it.

They hide their phytochemical warfare agents from view. Not until a predator bites into them do they realize the mistake.

When Plants Attack

Plants produce these chemicals to defend themselves. And it's not just one or two plants that have this super power. It's all of them.

In fact, **99.99% of all pesticides in our diet are natural chemicals plants produce to deter predators.**

They produce toxins to protect themselves from fungi, insects, and animal predators. There are tens of thousands of these natural pesticides. And every species of every plant contains its own set of toxins. Different parts of each plant contain different toxins in different amounts.

Like humans, plants get stressed. When feeling the pressure and damage from a pest attack, they can increase their natural pesticide levels. Levels that can be poisonous, even deadly, to humans.

These chemicals attack predators in various ways. Some of these plant toxins break into cells and kill mitochondria, some use enzymes to interfere with metabolism, and some attack our DNA directly.

It helps to look at survival from the plant's point of view.

Some parts of the plant are more vital for the success of the species than others.

Seeds are critical. Because they are so important plants take extra care to protect them and lace them with potent toxins to deter predators.

Grains, nuts, and beans are all seeds. These are the plant's babies. And messing with a mother's offspring often has dire consequences. The parent plant wants to protect them and ensure their offspring's survival. The plant isn't concerned about the health, nutrition, or survival of humans. Quite the contrary.

So even though I'm hungry and Floyd is sitting right next to me, I know what he's hiding. One bite into his leaves and I'd regret it. Mess with his seeds and Floyd and I wouldn't be pals anymore. He's not edible in the least.

So this begs the question…

"What are these plant chemicals, which plants have them, and which can I eat?"

And that's where we're going.

This is how we're going to attack back at the plants:

1. We are going to look at a plant part. For example, the seed.
2. We are going to evaluate their warfare agents. Like lectins.
3. We are going to see if there is a way to mitigate its attack. Like cooking.

Health Dangers of Eating Seeds

"Antinutrients"

Health Dangers of Eating Seeds

There are health dangers with eating seeds. In the first article of this series, we discovered how plants have motivations for their survival, not human health. And to protect themselves, plants use phytochemicals to deter predators from eating them. These toxins fight back against fungi, insects, and animal predators – including us humans.

Seed Survival and Success

Some plant structures are more vital than others to the success of their species. Seeds are such a structure.

It's why there are health dangers when eating seeds. Because seeds are so important plants take extra measures to ensure they get protected, spread, and have the best chance of growing and producing their own seeds.

What are seeds?

Of all plant parts, seeds tend to be the most tricky. Grasses, trees, and legumes are plants and have seeds that we call different things.

Grains are the seeds of grasses which include wheat, corn, oats, and rice. Walnuts, hazelnuts, and pecans are all nuts, which are the seeds of trees. And legumes like peas, lentils, soybeans, and chickpeas have seeds called beans.

But they are all just seeds. And it's not worth getting caught up in trying to determine whether a peanut or a cashew is a nut or legume. Just know they are seeds.

Your morning bowl of oats topped with nuts and chia seeds – all seeds.

These seeds are the plant's babies. Ensuring the babies survival and success is of paramount importance to the plant. Contrary to popular belief, the nutrition in seeds is intended for that growing baby plant, not for human health and nutrition. And trying to steal that nutrition for ourselves often has dire consequences.

Health Dangers of Eating Seeds: Naked vs Protected

Naked Seeds

Some seeds are covered in a protective hull which acts as a shelter. Others are naked. Naked seeds are exposed babies. They grow on grasses and vines and must use internal deterrents to prevent predators from eating them. Parent plants drop these seeds right where they grow, so that in the winter, when the parent plant dies off, the offspring can sprout right there in the same area.

Although these naked seeds seem bare and exposed on the outside, on the inside they are potent fighters armed with chemical warfare agents.

A “healthy” spinach salad topped with tomatoes, onions, bell peppers, and cucumbers has an arsenal of weapons.

Some weapons like tannins are bitter. Others like phytates interfere with nutrient absorption aiming to malnourish the predator. Similarly, enzyme inhibitors disrupt a predator’s food processing. From the plant’s perspective, if they are going to get eaten, they are at least going to cause negative consequences for the predator to discourage their consumption in the future.

Protected Seeds

Unlike plants with naked seeds which want to drop their seeds nearby, some plants want their seeds to be spread further away so that the offspring doesn’t have to compete for space and sunlight with the parent plant.

To accomplish this, plants enclose their offspring in a protective hull. This housing allows a predator to eat the baby offspring without killing it. The seed can survive through the predator’s GI tract completely intact. The predator can then eliminate the seed in it’s dung, a natural fertilizer for the baby seed, in a distant location.

Spreading Seed

It’s fascinating to think how clever these plants are.

We think we are using apple trees, when in reality they are using us.

An apple tree entices us and other animals like gorillas visually with big red colorful fruit.

Further, they load it with sugar, appealing to our taste buds. And not just any sugar, but with fructose.

This special sugar doesn't stimulate leptin which is a hormone that signals to us animals that we are full when we've eaten enough. Since fructose doesn't turn this hormone "on" we keep on eating more and more apples.

This was beneficial for the gorilla that needs to store up fat for the winter. Since the fruit was only available in season they would pad their fat stores with the overconsumption of seasonal fruit.

Incidentally, gorillas only gain weight during the season when fruit is ripe. While this is helpful for apes in the wild, it's not so helpful for us domesticated humans with no famine in sight.

In addition, plants make these fruits easy to pick and even lace them with sugar alcohols that have a natural laxative effect. This speeds the seed through the digestive tract, further improving its survival chances.

Green means "Stop" Red means "Go"

The tree uses us. It attracts us with color, and it makes addicts of us with sugar. All so that we animals can spread its seed.

It's crazy to think how the apple tree controls our behavior.

While the seeds and its protective coating are still developing, the apple is green and bitter. Green doesn't attract us like red does. It blends in. And we want a sweet sugar loaded apple, not a bitter, sour one.

Plus, during this unripe period, the apple has the highest toxic load. The gorilla loves apples but is deterred from picking it until the apple is ripe.

Gorillas, like humans and all fruit eating animals, have color vision.

Once the protective covering of the seed has fully developed, the apple turns red, increases its sugar content and decreases its toxic load. The red, sweet, and less toxic apple is snatched up by us animals who will do the trees bidding, and spread it seed.

We'll cover fruit more in depth later, but of all plant parts, fruit may be humans' best option.

It's the only part of the plant designed to be eaten.

Unfortunately, **the fruit today is quite different from the fruit of yesteryear** (as well see in the "toxin-time continuum"). We've bred them for size and sugar, we've engineered them for survival of seasons and sprays. We pick them unripe, treat them with chemicals, then transport them across the world.

What was once a seasonal treat that helped pack on pounds transformed into a daily "health" food, loaded with sugar and an enhanced toxic load.

Heath Dangers of Eating Seeds: Antinutrients

The salad I mentioned earlier is loaded with antinutrients. These are plant compounds that interfere with our ability to absorb vitamins and minerals, can damage our intestinal lining, and trigger inflammatory responses in the body.

Antinutrients are often responsible for food sensitivities, allergies, digestive ailments, and autoimmune diseases. They can cause symptoms such as headaches, joint pain, and asthma.

Of all the various plant parts, the seeds are often the most likely to hurt human health.

Eating Plant Seeds

Under most circumstances, I don't recommend it.

But if you must, there are a few ways to mitigate the plant attack.

- Soak
- Sprout
- Ferment

While I think eating seed-bearing fruits may be the best option for humans, because of modern day manipulation and lifestyle, I'd exercise caution with even these. Most of us don't need to store up for a winter famine. But choosing local, in season, ripe, organic fruits is the best bet.

Simply not eating plant-based foods is the even safer bet.

Health Dangers of Lectins

"Wheat Leaks"

Health Dangers of Lectins

One of the hidden dangers of a plant-based diet are proteins called lectins. The health dangers of lectins can be numerous and insidious.

Seeds like grains, beans, and nuts house the plant's embryo.

Naturally, the plant wants to protect these offspring and uses **lectins** as a means to do so. [r]

NOTE: *This chapter is more in-depth and more scientific than most of the other chapters. It lays a foundation. But don't get bogged down in the details. Don't let the trees interfere with your sight of the forest.*

Health Dangers of Lectins: *What are Lectins?*

Lectins are one of the most insidious chemical weapons plants have in their arsenal to fight back against predators. Heavy concentrations of lectins can be found in the plant's seeds.

Why? Plants are serious about protecting their offspring.

But they can be found in other parts of the plant as well.

As part of a plant's immune system, lectins go on the attack when a plant is stressed or damaged.

They are natural insecticides.

So when a grasshopper starts chewing away at a leaf, the plant can stop it in its track with its lectins.

Lectins are so effective that crops are genetically modified to express higher concentrations to better ward of pests. Unfortunately, this scientific marvel that protects crops doesn't protect us from lectins attack.

While lectins are ancient molecules that surely evolved as a defense to insects and various pathogens, it turns out humans aren't immune to their damaging effects.

How Lectins Attack

Many lectins are resistant to human digestion. So if I were foolish enough to eat a piece of whole wheat bread, the lectins could access my gut completely intact.

A helpful way to think of the gut is to think of it as a tubing system made of bricks. The bricks (cells called enterocytes) are attached by mortar (tight-junctions). This brick wall is very selective of what it lets in. In fact, it's job is to only let "good guys" pass through while keeping the "bad guys" out.

Lectin proteins are big, bad guys. Way too big to squeeze through the mortar of the brick wall (i.e. tight-junctions between enterocytes). But lectins are "sticky," and they connect to the wall. Once connected they tell the wall to open up (release zonulin which then causes the "mortar" between the "bricks" to open). [r]

While sticking to the wall, these big lectin proteins start doing damage by blocking vitamins and nutrients from getting access through the wall to the inside. [r]

But that's just the beginning.

"Leaky Gut"

After the message (zonulin) is sent, the mortar (tight-junctions) between the bricks (enterocytes) pry apart. This creates a breach in the wall and the big lectin proteins can get in. [r]

And not only the lectins, but other dietary and bacterial compounds that aren't supposed to be allowed in, can get through the brick wall.

For example, parts of bacteria called lipopolysaccharides (LPSs), which are "bad guys" (endotoxins), can slide on through to the inside.

We now have a situation where **foreign invaders have gained access to the inside** and can invade in to the lymph nodes, glands, and blood stream.

Just like any break in – the body's alarm goes off and an immune response mounts and inflammatory cytokines stimulate battle.

This breach in the wall of the gut is often referred to as ***"leaky gut."***

And the attack is on.

Health Dangers of Lectins: The Lectin Attack

Once the border is breached, the sirens go off, and the war begins.

Inflammation

After the lectins cause a breach in the brick wall, the foreign invaders slide in, like LPSs. And like any war, the body calls in the troops – i.e. white blood cells release inflammatory cytokines like IFN-gamma, IL-1, and TNF-alpha. [r] These signaling molecules promote inflammation to identify, destroy and remove the enemy.

But lectins don't go down without a fight.

Autoimmune

Our immune system tags lectins as foreign invaders and creates antibodies against them. [r, r] But these foreign invaders can latch on to healthy cells.

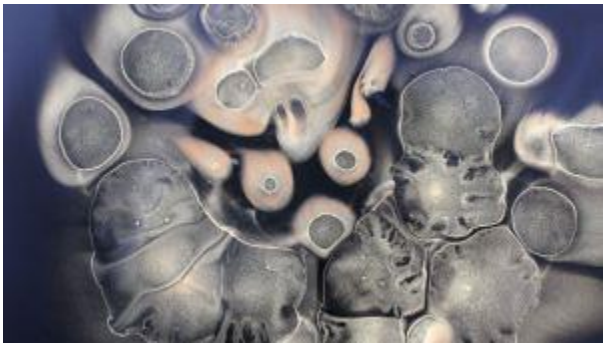
In fact, lectins are called "sticky proteins" because they bind to carbohydrates or glycolipids and glycoproteins that stick off the membranes of our cells. So we have a situation where a "bad guy" lectin hooks on to a "good guy" normal cell, and "friendly fire" results. The body attacks healthy cells. [r]

For example, lectins binds sialic acid which is a molecule that is prevalent in our brain and gut cells, and triggers autoimmune responses to these vital cells.

Inflammation is often a double-edge sword. It can save the day destroying enemies, but can leave many unintentional casualties.

Cellular Disruption

Cellular Communication



Lectins are known for disrupting communication between cells. When one neuron is trying to relay a message to another neuron, lectins can block the transmission.

The main reason I stopped eating plant lectins was because of this blocking mechanism which can result in symptoms like brain fog and decreases mental performance.

Endocrine Disruption

Another way lectins disrupt communication is via interacting and modifying hormone functions. Lectins can interact with endocrine receptors, disrupting and modifying hormone function.

Hormones are like managers whose job is to tell employees (cells and tissues) what to do. They keep everything and everyone working together in a coordinated effort. Lectins can silence these

managers, they can camouflage and mimic them, or even change the messages that the manger would otherwise direct to employees.

This confuses the employees, has them doing the wrong work, doing too much or too little or not doing any work at all.

> Translation = The coordinated work and communication between cells and tissues gets thrown out of whack.

Agglutination

Lectins are also known for their ability to clump cells together. For example, when lectins are swimming in the bloodstream they can clump blood cells together. [r] The body then has no choice but to dispose of these which can result in adverse effects like anemia.

They can also agglutinate immune cells thereby activating or inactivating them, which can lead to allergies and autoimmune issues.

Mitogens

A mitogen is a compound that helps induce mitosis, or cell division. Lectins can encourage this inappropriately and cause cells to replicate in cancerous ways. [r, r]

Health Dangers of Lectins: Lectin Diversity

There are many different types of lectins with different carbohydrate targets, different attack strategies, and variable potencies.

Some plant lectins, like the castor bean ricin, are serious plant weapons against humans. So much so that humans turned them into weapons against humans. Ricin has been used in chemical warfare to cause blood agglutination. [r] Other lectins damaging effects are more subtle.

Health Dangers of Lectins: Gluten

Perhaps the most notorious lectin is gluten. It's a seed storage protein found in wheat, barley and rye. And like other seeds, gluten is meant to nourish the plant embryo when it sprouts.

People with Celiac's disease have an autoimmune attack when they eat gluten.

"Full blown" Celiac's disease is fairly uncommon, however, reports of gluten sensitivity are quite common. In fact, gluten intolerance is now commonly looked at on a spectrum that goes from full blown Celiac's at one end to a low-grade gluten sensitivity on the other.[r]

The problem with the gluten lectin is that they are very difficult for our enzymes to digest. So they get partially digested creating toxic gliadin peptides as well as gluteomorphins.

The gliadin peptides can stimulate an immune response and inflammation while gluteomorphins act like opiate drugs, which can explain some of glutens addictive properties. Gluten has also transformed over time – more on this in the "toxin-time continuum."

I don't recommend eating gluten too often but there are other lectins that I think are even worse…

Health Dangers of Lectins: Wheat Germ Agglutinin (WGA)

Not all lectins are created equal. They have different structures which target different carbohydrates to attack and latch on to. Some are harmless. Some aren't.

Wheat Germ Agglutinin (WGA) is an exceptional bad guy. [r, r]

It is also a prime example demonstrating many of the tricks and attacks lectins can have on humans.

WGA Hormone Mimicry [r]

Insulin plays a major role in directing how our bodies use energy. For example, when insulin connects with a cell, it tells that cell to allow energy to enter. But WGA camouflages itself to look like insulin. [r] And it can steal insulin's spots (receptors) on cells. It then horribly disrupts the message that insulin would normally send.

When WGA connects with a fat cell, it can block out insulin. It then can tell that cell to store fat, just as insulin would do. But, unlike insulin which binds to the cell, delivers its message and then leaves, WGA binds indefinitely. It keeps the floodgates open for fat storage. [r]

To make matter worse, WGA also binds to the insulin receptors on muscle cells and brain cells.

Typically, insulin would bind to these cells and tell them to allow in energy. This energy is needed for building muscle and fueling brain cell activity. But WGA, instead of opening the energy gates for these muscle cells and neurons, acts as a blocker preventing the cells from allowing energy entry. Since these muscle and brain cells don't get the message to let energy in, the cells starve. Muscle cells waste. Brain cells panic.

Neurons, in an attempt to survive, send hunger signals and cravings for sugar.

Because I'm likely no match to these cravings, I'll fill another bowl of ice cream. My pancreas then gets to work and releases more insulin into the blood. This insulin is shuttled to the starving

brain cells. However, because WGA is blocking insulin receptors and not letting go, insulin cannot send its message to the brain cells to allow in energy.

So we have a situation where the neuron is starving, there is food all around, but it's blind from seeing the food because it's being blocked. Eventually these brain cells and peripheral nerves die. And this is thought to contribute to dementia, Parkinson's and peripheral neuropathy. [r]

WGA – Entry and 4 "B's" Attack

Brain

Although most lectins are rather large, WGA is smaller, and because of this can sneak through the gut more easily than other lectins. [r]

And because the vagus nerve connects the gut to the brain, WGA can hop on this highway and go straight to the brain. To make matters worse, WGA can cross the blood-brain barrier. And because it's a "sticky" protein, it can connect with many other substances that have no business in the brain, and transport them right on in. Naturally, this can result in neurological problems. [r]

Body

In addition to invading the brain, WGA can invade the body too. Like other lectins WGA can cross-react with good proteins forming a good guy-bad guy connection. The body's immune system sees WGA as a bad guy, creates antibodies to combat it, and ends up taking out the good guy and bad guy. Again, we have a "friendly fire" autoimmune response.

Blood Vessels

WGA can also bind to cells that line the blood vessels. The body then attacks the WGA and the blood vessels get hit by the attack leading to a hardening of arteries which may play a role in the progression of atherosclerosis.

Bad Guys

Just like WGA can drag along other substances across the blood-brain-barrier, its "stickiness" also enables it to bind with influenzas and other pathogens and transport them across the gut into the body.

When I hear of someone that gets sick all the time, I immediate think "leaky gut," "wheat leaks," and "WGA tag-along."

Our Defense Against Lectins

Plants evolved lectins to deter predation. But humans also evolved protective and adaptive mechanisms to deal with lectins.

Mucous

Our first line of defense against lectins is mucus. We have mucus that lines our nose and our mouth to trap lectins as well as provide a protective coating. This mucus continues down in our intestines. The intestinal mucosal wall functions to keep lectins in the gut and out of the body.

Gastric Acid

While many lectins are resistant to digestion, gastric acid can disarm some lectin proteins.

Microbiome

Our third line of defense is the vast microbiome residing in the gut. There are many bacteria that will eat up a lectin before it has a chance to invade.

Good but Not Good Enough

Although these defenses are good and likely more than adequate pre-Agricultural Revolution (see Time-Toxin Continuum), they are often insufficient to deal with the onslaught of lectins that now make up a modern diet.

We are exposed to more lectins than ever.

Eating plant-based foods that didn't even exist until modern human history now makes up the majority of our diet. Further, we've genetically modified crops to express even more lectins.

For example, because lectins are so effective against pathogens like fungi and insects, biotech companies engineer crops to express WGA. So now our corn and tomatoes come with a big dose of WGA.

Suffice it to say – our human defenses are not enough…

Health Dangers of Lectins: *What to do?*

What I do is I don't eat plant-based lectins. Problem solved.

But if I were forced to eat plant-based foods, here are some precautions I'd take.

1. Use a pressure cooker

Some lectins are temperature sensitive. So tossing beans and potatoes into the Instant Pot can destroy some lectins. Though not all. Grains are quite resistant.

Beans have more lectins than anything else though, so they and all legumes go in the pressure cooker.

Boiling, while less effective than the pressure cooker, is a good alternative.

Dry heat, like baking, tends to be less effective.

2. Soak

Before you put the beans in the pressure cooker, soak them. Change the water several times. Let them soak overnight. Add baking soda with each new soak.

Yes this is a pain, but less than the pain resulting from eating them improperly prepared. Easiest just not to eat them.

3. Ferment

I don't think anyone should ever eat soy. But if one had to, they should ferment it first.

4. Sprout

Sprouting seeds will often help decrease the lectin load (although there are exceptions like alfalfa which actually increases lectin load when sprouted). As the seed sprouts the lectin gets broken down to feed the growing seedling.

5. Peel and Deseed

The seeds and peels are where lectins tend to concentrate. Not eating seeds is a good start. And remember seeds include grains, nuts and beans.

Peeling and deseeding also go a long way to reduce lectin exposure. This includes fruits like squash and pumpkin and nightshades like peppers and tomatoes.

6. Choose Wisely

Choosing wisely, to me, means not choosing to eat foods inherently high in lectins.

But what if you must eat some grains?

Choose white versions over the whole grain version. I'd pick white rice over brown, white bread over whole wheat.

Yes this is contrary to everything we've been told, and eating the more refined versions of these aren't good either, but with the hull stripped away, some lectins get stripped out as well.

Health Dangers of Lectins: Conclusion

A lectin-free diet would basically eliminate all plant-based foods. In this light, it's not surprising that the Carnivore Diet is so effective.

There are many very smart doctors and researchers who believe and convincingly argue that this intestinal permeability is a root cause of so many of our modern diseases. And lectins play a large role in creating these breaches in the gut.

A damaged gut is often the first domino to fall in a cascade of detrimental effects. Lectins can be the inflammatory, immunotoxic, neurotoxic, and cytotoxic domino.

Some plants and "plant parts" contain more lectins than others. Seeds (grains, beans, and nuts) as well as legumes and nightshades are lectin loaded. It's why people have intolerances and reactions to wheat, beans, peanuts, potatoes and tomatoes.

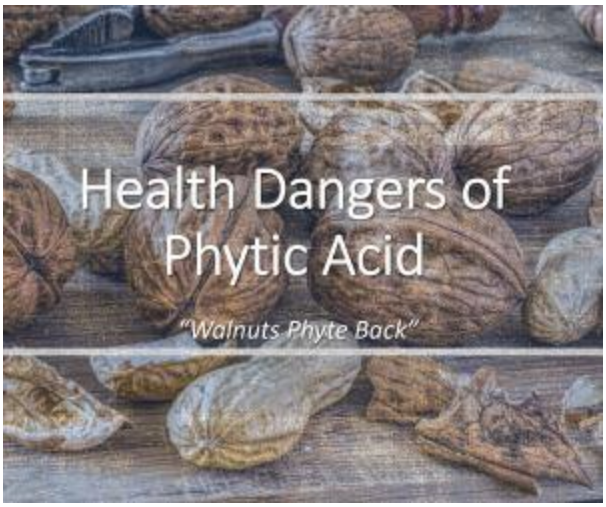
As mentioned, some preparation methods can be used to reduce lectins toxic impact. Consequently, these methods can also destroy the healthy vitamins – perhaps the reason why someone is eating them in the first place.

Instead of trying to manipulate plants to make them edible and somehow satisfy our nutritional needs, it may be easier to focus on an animal-based diet, congruent with how we are designed to eat.

Health Dangers of Phytic Acid

“Walnuts Phyte Back”

Health Dangers of Phytic Acid



One of the hidden health dangers in plant-based foods is an antinutrient called phytic acid.

It is a thief.

But the health dangers of phytic acid are often insidious. The theft happens, and we don't even know it.

Yet phytic acid steals from us, only because we stole first.

"Walnuts Phyte Back"

The biggest mistake we make is that we assume that a plant's nutrition is our nutrition. However, this nutrition is intended for a growing baby plant. When we try and steal this nutrition, it comes with consequences.

Phytic acid has the job to hold on to essential minerals that the baby plant needs to grow. But when we steal this nutrition for ourselves, the phytic acid binds to our minerals like phosphorus, iron, zinc, magnesium, and calcium and prevents absorption.

So even though we think we are getting a certain amount of nutrition when we eat a walnut, phytic acid "phytes back."

Animals like cows and sheep have bacteria in their guts that break down phytates. Their guts are designed for plant-based diets. Humans guts aren't designed to handle phytic acid.

It passes through our digestive tract, stealing minerals as it travels along all the way to the colon.

The Biggest Mineral Deficiency in the World

Iron deficiency is the most common nutrient deficiency in the world.

Since iron plays a crucial role in carrying oxygen to cells, deficiencies are extremely problematic to human health.

Plants have a form of iron called "non-heme iron." And phytic acid interferes with its absorption.

Luckily, animal iron, called "heme iron" is immune from phytic acid's theft.

Studies have shown the discrepancy in plant vs animal iron absorption by comparing vegetarians to meat eaters. Even though both groups eat similar amounts of iron, vegetarians have a higher incidence of iron deficiency. [r]

For example, a study of 75 vegan women found that 40% of them were deficient in iron despite having above average the recommended daily allowance (RDA). [r]

In nutrition, we often measure what goes in, but what really matters is what gets absorbed.

Enzyme Inhibitor

Just because the labels says I'm eating adequate amounts of iron, calcium, zinc, and magnesium, if phytic acid is preventing their absorption, I may be deficient.

But it's not just minerals that phytic acid steals. In addition. phytic acid can inhibit digestive enzymes like amylase, trypsin, and pepsin. This results in macronutrients not getting digested properly. This is a problem.

For example, grains like wheat are a "great" source of phytic acid.

To compound the problem, grains are inherently poor in nutrition (evidenced by the fact most must be fortified with vitamins and minerals). Most also lack essential amino acids. So if phytic acid is further preventing the digestion of the proteins it makes a poor source of protein even worse.

Health Dangers of Phytic Acid – What to Do

Seeds have the highest concentrations of phytic acid.

Some of the wort offenders are whole grains, nuts, and soybeans. Removing the bran rich layer of seeds can help reduce the phytic acid in grains like wheat and rice. But it is also concentrated in the cotyledon layer which is not easy to remove. Therefore many beans like kidney beans and soybeans deliver a large punch of phytic acid.

Phytic acid is also in other parts of plants like roots, leaves, and fruits. So while not eating seeds is a great place to start, it doesn't solve the whole problem.

To make matters worse, phytic acid is resistant to most cooking methods. But cooking and draining water can help a bit. Also soaking in an acid like lemon juice or vinegar can help reduce the phytic acid concentration.

But the best way to reduce phytic acid is fermentation. This works much for the same reason that cows can eat phytic acid without any issues – because both have microorganisms that can digest the phytic acid.

An interesting observation – animal-based foods don't have phytic acid.

Health Dangers of Eating Soy

“Soybean Sabotage”

Health Dangers of Eating Soy

When I was in high school, I thought soy was a health food. I ate soy protein powder. I ate "soynut butter."

I was soy stupid.

No clue about the health dangers of eating soy.

Soy is one of the only plant-based foods that is a complete protein. Most are missing essential amino acids. Logically, I thought it was a good choice.

At the time soy was thought (still is by many…) to be "heart healthy."

But it turns out I fell victim to propaganda and bad "science." [r]

The soybean epitomizes many issues with eating plant-based foods. It has enzyme inhibitors, endocrine disruptors, and saponins.

I call it "Soybean Sabotage."

Soybean Sabotage

Enzyme Inhibitors

Whenever you eat food special enzymes break down large molecules of protein, carbohydrates, or fats, into absorbable forms. If these enzymes get blocked, digestion gets disrupted.

Plant-based food like the soybean come "prepackaged" with enzyme inhibitors. These enzyme blockers can have adverse effects that can result in malnutrition as well as gut inflammation that can lead to leaky gut and all its associated pathologies.

Protease, Amylase, and Lipase

Protease inhibitors are one class of enzyme inhibitors that interfere with protein digestion. For example, wheat has protease inhibitors that not only block the breakdown of proteins but can also trigger an innate immune response as seen in people with Celiac's Disease.

In addition, people without Celiac's can have an immune response. Because wheat also has amylase trypsin inhibitors that cause intestinal inflammation by activating a specific receptor (called toll-like receptor 4). Amylase inhibitors interfere with starch digestion.

Lipase inhibitors interfere with the lipase enzyme which helps digest fats.

Like the antinutrient phytic acid which interferes with micronutrient absorption, enzyme inhibitors disrupt macronutrient digestion.

Trypsin Inhibitor

A soybean is a seed. Just like grains and nuts are seeds, so too are beans.

Like the seeds of other plants, soybean plants don't want predators to eat their baby offspring.

Soybeans are rich in antinutrients like phytic acid and tannins as well as trypsin inhibitors which deter predation. [r]

The trypsin inhibitors fall under the broader category of "Protease Inhibitors" which disrupt protein digestion.

But interference of protein digestion from trypsin inhibitors is just one of many issues with eating soybeans.

Phytoestrogen

Along with the antinutrient effects from its enzyme inhibitors, soybeans also contain isoflavones which are a major source of phytoestrogens.

These isoflavones aid in plant defense and are great fungicides. When a soybean plant is under attack by a fungus, it can even upregulate production to strengthen its defense and kill the fungus. While perhaps designed to ward of fungus, they should also ward off humans.

Estrogenic

Molecularly, these isoflavones look very much like estradiol. Thus, it confuses our body and has estrogenic effects.

These phytoestrogens have the potential to inhibit testosterone production and increase estrogen. [r] There's evidence that this can also interfere with fertility by reducing sperm quality.

In addition, phytoestrogens in soy formulas put infants at risk for growth problems and altered sexual development (especially if the infant is premature).

If we just look at the urine levels of babies fed soy formulas, we see that they have up to 500X more isoflavones. Because it's in the urine we know it is being metabolized, traveling through the body, and potentially causing serious consequences.

If you want to have children you should think twice before eating soy. And if you have children (especially infants), you should really think twice or three times about feeding them soy.

Thyroid Disruption

Soy can also cause problems with the thyroid.

In an interesting case study [r], a woman took a supplement with soybean extract and she developed a severe hypothyroid problem and a large goiter. But once she stopped taking it, her thyroid returned to normal functioning and the goiter disappeared.[r]

Soy can mimic and mess with hormonal function.

Saponins

A major source of saponins in the human diet come from soybeans. Saponins help protect plants from microbes and fungi. But humans voluntarily eat them.

And because they are resistant to digestion, they can enter the gut, cause inflammation, leaky gut, and autoimmune issues. [r]

Saponins are natural pest control that are bitter making them less desirable to eat to deter birds and insects. Perhaps humans should take the hint.

GMO

From about the year 2000 to 2010 soybeans changed. In the beginning of that decade less than 10% of soybeans were genetically modified. By the end of it, over 90% were.

Soybeans are engineered to be resistant to glyphosate. This enables farmers to spray the crops with RoundUp. The chemical kill the weeds but not the genetically modified crops. As I've talked about before, this can have serious impacts on human health. Because while the crops may be engineered to survive glyphosate, we aren't.

Health Dangers of Eating Soy: "Soybean Sabotage" Conclusion

What to do?

The high antinutrient concentrations in soy are a health concern to humans and livestock.

In order to limit their damage, food processors do the best they can to reduce the damaging chemicals. Soybeans are soaked which can reduce tannin levels by about half, but it doesn't do much to decrease phytic acid or trypsin inhibitors. [r]

Then they are often boiled and/or roasted to try and reduce antinutrients further. Fermenting with fungi and bacteria can help too.

But all this processing also comes at a cost. It can damage essential amino acids making it difficult or impossible to digest and assimilate. [r]

So food manufacturers are tasked with the impossible: cook soybean enough to reduce the antinutrients but not too much. An impossible balancing act.

Just like other seeds, instead of trying to process away offending chemicals, I just don't eat soybeans. They have enzyme inhibitors, endocrine disruptors, and saponins that can cause problems to human health.

Like lectins they can cause gut issues, hormone mimicry, and autoimmune issues.

An interesting perspective is that there is a really high incidence of soy allergy. Many peoples' bodies go on an all-out attack when consumed.

Not only that, but raw soybeans are toxic to all monogastric animals – and we humans are monogastric.

Evidence suggest that we are not designed to eat soybeans – and enzyme inhibitors, endocrine disruption, and saponins are just a few reasons why.

Health Dangers of Glycoalkaloids

"Potato Paralysis"

Health Dangers of Glycoalkaloids

One of the health dangers associated with a plant-based diet are neurotoxins called glycoalkaloids. They are enzyme inhibitors. And health dangers of glycoalkaloids are numerous.

The potato is a good example of glycoalkaloids and their hazards. One of the enzyme inhibitors is called an acetylcholinesterase inhibitor. This blocks the breakdown of acetylcholine – a neurotransmitter.

When acetylcholine doesn't get broken down it builds up. [r] The buildup of this neurotransmitter causes muscular paralysis and even death for many predators and pests that dare try and eat the potato.

For humans, the health dangers of glycoalkaloids are often insidious though.

"Potato Paralysis"

A plant root, like the potato, is a carbohydrate storage organ. It's starch that the plant uses for energy.

Humans like to steal energy from plants and use it for our nutrition. As seen with plant seeds (which have stored energy intended for the baby offspring of the plant) when we steal a plant's energy is can come with consequences.

Potato Paralysis

The glycoalkaloids in a potato function as a natural pesticide. Their bitter taste is the first signal to the predator not to eat them.

But if this is ignored, they deter pests and predators with this neurotoxin. It's nature's natural nerve gas. It works the same way that our man-made warfare nerve agents work.

The natural cholinesterase inhibitors in a potato prevent the breakdown of acetylcholine. [r] And since acetylcholine carries messages between nerve cells and muscle cells, these signals keep getting sent.

It's kind of like…

For a terrible analogy – this is like someone calling you on the phone.

They tell you this important message and give you directions on what to do. You follow the directions step-by-step just as they are telling you. Everything is working great. All done. Time to stop and hang up the phone.

But right when you do, the phone rings again. You have to pick up. It's your job. And they start repeating the same message again. In this situation, you are powerless and must do your job which is answering the phone and carrying out the directions.

And thanks to this neurotoxin you can't stop picking up and can't hang up on them. You answer, listen, activate – again. And again. And again.

Health Dangers of Glycoalkaloids – *Potato Problems*

Ultimately, this over-stimulates the nervous system. It can cause paralysis, convulsions, and even respiratory arrest and death.

Understandably, significant glycoalkaloid consumption is linked with mental health problems like anxiety, insomnia, and restlessness. The neuropsychiatric side effects are numerous and insidious.[r]

It's often hard to point-the-finger and pinpoint glycoalkaloids as the "root" of the problem. Because with a healthy GI tract most won't make it into your bloodstream. Most. But those that do can take days to clear out. So when eaten regularly they can build up. And the impact can be cumulative. [r, r]

With a compromised GI tract the impact can be exacerbated. And worse, they can even play a role in creating this "leaky gut." [r]

Solanine

Potato plants make a specific glycoalkaloid called solanine (they also make another one called chaconine). The health implications of solanine are not a secret.

The US even has a maximum legal limit to the amount of solanine a potato can have (200 mg/kg potatoes). [r] The problem is that even low doses can be toxic. And eating just 3 mg/kg body weight can be fatal. [r] I say "just" because it's very doable. [r]

Solanine is not just in potatoes either. It's also found in significant quantities in other nightshades like eggplant, peppers and tomatoes.

And it's not just solanine. The potato's other glycoalkaloid, chaconine, is considered even more toxic than solanine. [r]

Glycoalkaloid poisoning from potatoes is more likely when improperly stored, green, or sprouting. A low dose poisoning might just cause nausea, vomiting, and diarrhea. Higher doses can lead to fever, low blood pressure and neurological problems. And as mentioned, high doses can even be fatal.

Metabolism and Membranes

If you need more reasons to be weary of glycoalkaloids consider their ability to disrupt other enzymes and alter carbohydrate and fat metabolism.

They can bind nucleic acids and interfere with protein synthesis and DNA repair. They bind strongly to cholesterol on cell membranes and can rupture cells open. [r]

Health Dangers of Glycoalkaloids – *What to do?*

Potatoes are one of the most common foods eaten in the world (behind wheat, rice, and corn). So this isn't some minute issue.

Unfortunately boiling or frying doesn't disarm glycoalkaloids. They survive most cooking methods. Frying can even make it worse. [r, r]

If you must eat a potato there are a few helpful precautions.

First, the highest concentration of glycoalkaloids are in the peel, so be sure to peel that off. [r]

Do not eat unripe or sprouting potatoes. If it's green don't eat it. Avoid regular consumption. Don't store them in light or a warm place.

Probably just easiest not to eat them at all.

I remember the classic bodybuilding diet back in the day – steak and potatoes – but maybe it's better to leave out that second ingredient. Yes, you can build muscle on just steak without the potatoes and without the carbs.

Beware the perils of potatoes. The miracles come from meat.

Health Dangers of Cruciferous Vegetables

“Broccoli Bombs”

Health Dangers of Cruciferous Vegetables

In our look at the health dangers of a plant-based diet we turn to the cruciferous vegetables.

You might be surprised to learn that broccoli and brussel sprouts have a dark side.

I mean these are the vegetables that kill cancer, right?

How can there possibly be health dangers of cruciferous vegetables?

Well just like other plants, these vegetables place a high priority on survival. And this means protecting themselves with phytochemicals.

The cruciferous vegetables use a special chemical called glucosinolate to deter pests. [r, r] Here we'll look at glucosinolates and their role and potential impact on human health.

Health Dangers of Cruciferous Vegetables – What are they?

Last week as I was walking the perimeter of the grocery store (headed to the butcher) I realized how many vegetables are from the cruciferous family. It's not just broccoli and brussel sprouts. But it also includes cabbage and cauliflower, kale and collards, radishes and arugula, mustard greens and mustard seeds, and the list goes on.

They are known for their pungent smell. It's the sulfur. And it's a part of their defense.

"Broccoli Bomb"

The crucifers like broccoli have this chemical called glucosinolate.

I like to think of this chemical as the main ingredient of the "bomb."

They also have another chemical called myrosinase.

I think of this as the "matchstick" that lights the bomb.

While growing out in a field the bomb and the matchstick sit in separate compartments so that the broccoli doesn't blow itself up.

But when a little hungry animal comes looking for a snack and bites into the broccoli the bomb gets lit by the match. The explosion that results are bioactive chemicals call isothiocyanates. [r, r]

One of the most well-studied isothiocyanate is call sulforaphane.

Sulforaphane

Sulforaphane is a pungent molecule (perhaps you've cooked broccoli and smelled it…) that can deter and kill insects, bacteria, and fungi. It causes cellular apoptosis (cell death). This happens in the cells of these small predators as well as human cells.

If you eat broccoli about 75% of the sulforaphane will be absorbed into the bloodstream and taken up by cells.

Once inside sulforaphane can damage important intracellular structures like mitochondria and enzymes.

The damage increases reactive oxygen species (ROS). And in an attempt to limit the damage, glutathione, our powerful endogenous antioxidant, binds with sulforaphane to get rid of it as quickly as possible (~2-3 hours after eating it). [r] This depletes our glutathione (our most potent human antioxidant) leaving cells vulnerable to further oxidative damage.

Sulforaphane can even disrupt epithelial barriers providing yet another plant chemical that can contribute to "leaky gut." " [r, r]

Sulforaphane and Cancer

It's not surprising that this cell killer has been recognized as an anticancer chemical. It kills cells. Cancer cells and healthy cells. [r, r, r]

Isothiocyanates like sulforaphane trigger the activation of Phase II enzymes. [r] This is like turning up the dial on the human immune system.

For some reason, research paints this in a positive light. Sulforaphane is a hero. Isothiocyanates increase our natural antioxidants. They say it's a hormetic response. [r] If it doesn't kill you, it makes you stronger.

I see it through another lens though.

When the body encounters something that is damaging, it wants to get rid of it. To do this it will upregulate an army to fight it. Some of these troops are antioxidants like our friend glutathione.

While this is good in the context of fighting a cancerous cell or ridding the body of sulforaphane, I don't think sending the troops to battle on a constant basis should be seen as a good thing.

The fact that the body puts such a vast importance on getting rid of sulforaphane as quickly as possible suggest to me that it's more of a danger than a cancer-killing sidekick.

For me, a helpful analogy is to relate to chemotherapy treatment. It is very effective at killing cells. And while the intent is to kill cancerous cells, there is often a significant amount of "collateral damage" and the death of healthy cells as well.

Most people don't take low dose chemotherapy as a cancer prevention strategy. There's a reason for this.

Health Dangers of Cruciferous Vegetables – Thyroid Health

The isothiocyanates created by chewing up broccoli can have potent antithyroid effects and interfere with thyroid hormone production.

They compete with iodine and thereby block its uptake by the thyroid. With inadequate iodine there is decreased production of thyroxine and potential for hypothyroidism. [r]

The abnormal absorption of iodine also provokes hypertrophy of the thyroid and goiter. [r]

And it's not just humans, but animals too.

Oil meals, like rapeseed meal for example, are important protein supplements for livestock. And they are high in glucosinolates.

Animals can tolerate up to 5-10% rapeseed meal in their diets before suffering from goiters, depressed growth, gastrointestinal irritation, anemia, perosis, poor egg production, and liver and kidney lesions. [r, r]

The high sulfur diet can result in trace mineral deficiencies and polio encephalomalacia, a neurologic disease in ruminants.

Health Dangers of Cruciferous Vegetables – What to do

If you decide to eat cruciferous vegetables, it's a good idea to take some protective measures.

- Adding extra iodine to counteract the thiocyanates is helpful. However, additional iodine consumption cannot counteract other glucosinolate byproducts like oxazolidine-2-thiones which also blocks iodine preventing thyroxine production. [r]
- Avoid sprouts and seeds as they can have orders of magnitude more glucosinolate than matured plants. Eat them with caution.
- Freezing as well as boiling them can help reduce the glucosinolate concentration (~50%).

Heat actually destroys the myrosinase (the matchstick that lights the bomb); however, the bacteria in our gut can act as the lighter, so sulforaphane will still be produced. [r]

As with other plant chemicals, the poison is in the dose, and an individual's ability (or lack thereof) to disarm the plant poisons. But as we'll see in the "Toxin-Time Continuum" – most of our plant-based foods and their accompanying toxins are pushing into the poison side of the spectrum.

Health Dangers of Oxalates

“Spinach Prick”

Health Dangers of Oxalates

Oxalates are especially troublesome. They are insidious, and they appeal to the "health conscious" who have large spinach and kale salads topped with almonds and sesame seeds.

They think they are eating healthy.

But they are flooding their body with oxalates. Here we're going to look at the health dangers of oxalates.

Health Dangers of Oxalates: Seed Strategy

Plants use great strategy with their seeds.

Plants lace their seeds with natural pesticides to deter pests and predators. The sharp oxalate crystals can prick a predator's mouth thereby playing a role in plant defense. [r, r]

Plants also load their seeds with nutrition for the baby plant. And they use oxalate to store calcium for the baby offspring.

When seeds start to germinate, they split off the oxalic acid which frees the calcium for the baby plant.

"Spinach Prick"

Oxalate Accumulation

While oxalate is useful as a calcium storage mechanism for plants, it's toxic to humans in acute and chronic amounts. If you eat too much oxalate you die.

Simple as that.

But often oxalate toxicity is more insidious. [r]

Similarly to how phytic acid is a mineral thief, oxalic acid is a magnet for minerals, especially calcium. Oxalic acid grabs calcium and forms calcium oxalate – the main ingredient in kidney stones. [r, r]

These oxalate crystals build up into bigger and bigger crystals. They bioaccumulate.

As they accumulate the body deposits these sharp crystals throughout the body – in joints, muscles, and especially the kidneys. [r, r, r, r, r, r]

With oxalate crystals growing and stored throughout the body muscles start aching, eyes, ears, mouth, and throat can burn, and stones form in the kidneys.

"Spinach Prick"

Many people think spinach is a good source of calcium. But it's a fraud. The calcium in spinach is completely useless. It's all tied up in oxalate. And this is true for all high-oxalate foods.

In the lab we can measure the calcium content in spinach, but that doesn't mean it's available as a nutrient for the body. There is a big difference in the nutrition measured in food and the nutrition that the body can actually absorb and use.

This is where standard nutrition guidelines fail miserably.

If we eat 100% of our RDI (recommended daily intake) of calcium from spinach, but 100% of it is tied up in oxalate, we really got 0% of the RDI.

Making matters worse, certain foods can increase the amount of a nutrients we need.

For example, If I were to eat a large bowl of spinach every day for lunch, I would increase my need for certain vitamins and minerals. Processing the high oxalate concentration in the spinach depletes vitamin B6 and likely requires an increased amount of biotin and thiamine in my diet.

Spinach Sabotage

Oxalate isn't just an antinutrient that depletes calcium and iron, stealing essential vitamins and minerals. It's also toxic.

Oxalate crystals cause renal damage; they are neurotoxic; they activate the immune system, upset the GI tract, deplete glutathione, and corrode connective tissue (via interference with hyaluronic acid).

Oxalates can impact nearly every bodily system. [r, r, r, r, r, r, r, r, r]

- They can cause neurological symptoms which disturb sleep and adversely affect coordination, memory, learning, and concentration.
- They cause pain via mast cell degranulation and histamine release.
- Mysterious vulva pain, fibromyalgia, and carpal tunnel syndrome can all have oxalates causing or worsening the symptoms.

- Increased calcium excretion and increased oxalic acid excretion ride hand-in-hand and are linked with osteoporosis.
- Common practice for autism treatment is the elimination of oxalate-containing foods (as well as gluten, casein and soy).

Oxalate Absorption

Absorption of oxalate differs among people. For some, oxalate is largely broken down in the gut and eliminated without causing too many issues. In others, a large percentage of consumed oxalate is absorbed.

Someone with a compromised, "leaky gut," can see increased absorption of oxalate.

Not only does this increased intestinal permeability allow more oxalate to get in, oxalate can be implicit in exacerbating the leaky gut. The needle shape of oxalate crystals can perforate mucus membrane cells damaging the gut and increasing "leakiness". [r, r, r, r, r, r]

Health Dangers of Oxalates: High-Oxalate Foods

It's not only spinach pricks that can hurt you.

Many of the cruciferous vegetables like kale, cauliflower, and broccoli have high concentrations of oxalate.

Other culprits include chocolate, most nuts (especially cashews and almonds that are popular among the health conscious) and seeds like sesame and poppy seeds. [r, r, r]

One of the worst offenders is soy. Remember when I was soy stupid – clueless that my soy protein shakes were loaded with oxalates.

Berries and beans. Potatoes and sweet potatoes. Okra. Swiss chard. Anything in the buckwheat family like sorrel. All high in oxalates.

Sorrel is actually worse than spinach and kale. And for some reason it is popular in fancy restaurants. There is this case report of a man who ordered sorrel soup for dinner. Two hours later he died in the hospital from acute oxalic acid poisoning. [r]

The man had poor metabolic health. He was obese and diabetic. And this poor metabolic health further impairs the handling of oxalate toxins. Yet, today we encourage obese diabetic patients to eat diets that are high in oxalates.

Health Dangers of Oxalates: Insidious Impact

Like other plant toxins, we don't know (with any degree of accuracy) the frequency and degree of harm from oxalates thanks to a general lack of awareness.

It often takes a bioaccumulation to the point of acute kidney injury until a healthcare practitioner even considers oxalate as a potential culprit. [r, r]

Sometimes patients with oxalate problems are asymptomatic until they find themselves trying to pass a kidney stone.

Sometimes mysterious lingering pain gets diagnosed as fibromyalgia or carpal tunnel syndrome without any knowledge as to why the pain is occurring.

Clearing the Crystals

Sometimes oxalate toxicity symptoms present when eating high-oxalate foods. But often they don't**. And sometimes symptoms don't present until one stops eating oxalates.**

For example, a flare up of pain can be from the release of stored oxalate that's been consumed over a period of time.

The reason is that you have all these oxalate crystals accumulated in tissues, and now that you aren't eating them, the body can process out the stores.

The tissues start dissolving big crystals down into smaller crystals (and into their ion form) which are what cause much of the cellular damage and pain.

But once back out into the bloodstream they can be excreted through the urinary tract. [r]

This process of breaking down and unloading the stored crystals for excretion can cause the same or worse symptoms than when they were originally eaten.

You've got to "re-eat" all that spinach.

Health Dangers of Oxalates: What (not) to do

Oxalate damage is from toxicity. It's not a food sensitivity or allergen. So reversal of oxalate toxicity is a 2-step process:

- Stop eating it
- Excrete that which is stored up

Unfortunately, there isn't a good way to determine how much oxalate damage you might have or how well you process them in general.

Urine test are unreliable and a biopsy of tissue from the kidney is quite invasive. [r]

It's also hard to correlate oxalate consumption with symptoms as mentioned (you may be asymptomatic with insidious accumulative damage that doesn't present until a serious event like kidney failure, or symptoms may only arise after you stop eating them. etc.).

The best thing you can do is limit the amount of oxalate you eat.

The major sources of oxalates are from plant-based foods. But oxalate is also a byproduct of metabolism.

For example, excess Vitamin C can get converted to oxalate. Just another reason megadoses of Vitamin C might not be a good idea.

Cooking and Cleanses

There's also a false notion that you can just cook the oxalate out of your vegetables. But this doesn't work.

Oxalate and oxalic acid crystals are so durable that they are used by paleontologists to determine what people ate thousands of years ago. They aren't destroyed by heat or cooking.

The one thing that can help is boiling them in water. The soluble parts of oxalic acid that aren't crystalized yet can leach out into the cooking water.

So if you boil your broccoli to mush you can reduce the oxalate concentration by maybe a third. [r]

There are a lot of misconceptions around "healthy" food, perhaps epitomized by the "green smoothie cleanse." People want to do the right thing but are often "stabbing" themselves in the foot (or more accurately the kidney).

But a green smoothie "cleanse" is more likely to lead you to needing an oxalate cleanse.

Health Dangers of Eating Fruit

"Peach Pit Poison"

Health Dangers of Eating Fruit

Continuing our exploration of the health dangers of a plant-based diet, fruit plays an especially interesting role.

Most people think fruit is healthy because they are high in antioxidants, they are a good source of fiber, and they contain essential vitamins and minerals.

And unlike other plant parts (roots, seeds, stems, and leaves) which the plant desperately wants to protect for survival, the plant actually wants predators to eat its fruit and spread their seeds.

So here we'll explore if there are any health dangers of eating fruit.

Health Dangers of Eating Fruit: Spreading Seed

Some plants don't want predators to spread their seeds (naked seeds). Others depend on animals to do so.

Naked Seeds

As we've discussed, naked seeds are exposed baby plants. They grow on grasses and vines and the parent plant drops these seeds right where they are growing.

Then in the winter, when the parent plant dies, the offspring can sprout right there in the same area.

Because they don't want pests and predators to eat these seeds, plants lace the seeds with phytochemicals to deter predators.

So while these naked seeds seem bare and exposed on the outside, on the inside they are potent fighters armed with chemical warfare agents.

Protected Seeds

Unlike plants with naked seeds, other plants protect their seeds. They need animals to spread these seeds so that the offspring don't have to compete for space and sunlight with the parent plant.

To accomplish this, plants enclose their offspring in a protective hull and house them in fruit.

The fruit entices the predator and the hull protects the seed as it passes through the predator's GI tract. The animal then eliminates the seed in its dung, a natural fertilizer for the baby seed, in a distant location.

Spreading Protected Seeds

I'll re-iterate it here: It's fascinating to think how clever these plants are.

We think we are using apple trees for their nutrition, when really they are using us.

An apple tree entices us visually with big red colorful fruit.

They load it with sugar, appealing to our taste buds.

They make these fruits easy to pick.

They even add sugar alcohols that have a natural laxative effect.

This speeds the seed through the digestive tract, further improving its survival chances. [r, r]

A Review: Green means "Stop" Red means "Go"

The tree uses us. It attracts us with color, and it makes sugar addicts of us. All so that we animals can spread its seeds.

The apple tree controls animal behavior every step of the way.

While the seeds and its protective coating are still developing, the apple is green and bitter. Green doesn't attract us like red does. It blends in. And we want a sweet apple loaded with sugar, not a bitter, sour one.

So, during this unripe period, the apple has its highest toxic load. So although a gorilla would love to eat the apple, it's deterred from picking it until the apple is ripe.

Incidentally, gorillas, like humans and all fruit eating animals, have color vision. [r]

While the apple ripens, and the protective hull of the seeds develop, the apple gradually turns red, increases its sugar content and decreases its toxic load.

The red, sweet, and less toxic apple is snatched up by us animals who will do the trees bidding, and spread it seed.

Fruit Phytochemicals

Based on the logic that plants intend for their fruits to be eaten one might think that these are a good choice for food.

However, fruits have a dark side.

Besides the dangers associated with the high lectin load in unripe fruit and the heave dose of insatiable sugar that few people need today, there are other potentially toxic phytochemicals.

Phenolics

Tannins

Many fruits have tannins which help protect a plant from harsh weather.

They also make proteins indigestible.

If you were to eat a leather shoe, the reason you couldn't get protein from it is because the proteins are bound up with tannins.

So tannins bind up protein as well as digestive enzymes and can interfere with digestion (i.e. they are enzyme inhibitors). They also interfere with our ability to absorb plant iron and have an antinutrient impact. So they can cause nutrient deficiency and GI problems like bloating diarrhea, and constipation.

Tannins also play a role in deterring pests. They are potent against insects. But they are also troublesome for animals.

For example, if cattle get trapped in an area and must resort to eating acorns, they can get poisoned from the tannins.

In humans, large tannin consumption can cause kidney and liver damage. [r, r, r, r]

Flavonoids

Isoflavone (a polyphenol, plant antioxidant) is found in many fruits and is also found heavily in soybeans.

This phytoestrogen can disrupt endocrine/hormone function and have estrogen-like effects. [r, r]

Photosensitizers

Other phenolics act as photosensitizers.

This is a plant defense mechanism that makes animals sensitive to light.

The story goes like this: An animal eats the plant, then light hits the animal, and the animal is severely injured.

In humans we refer to this as photodermatitis.

For example, celery is a known occupational risk. Celery handlers that go out in the sun can get celery dermatitis.

Lime juice is also a well-known cause of photodermatitis. An experiment I don't recommend trying, is squeezing limes then going out in the sun. The swelling can be horrifying. [r]

Another example is grapefruit.

Grapefruit interacts with almost every prescription drug. It has these toxic furanocoumarins (photosensitizers) that the liver has to break down using p450 enzymes.

The problem arises because the same p450 enzymes in the liver are trying to break down these grapefruit toxins. The liver gets overburdened trying to metabolize the drugs and the grapefruit. This can result in high levels of the drug in the bloodstream which can have severe adverse effects. [r, r, r, r]

It's an interesting thought that grapefruit and prescription drugs require so much detoxifying…perhaps not the best things to be putting in the body in the first place.

Cyanogenic Glycosides

Entomologists (scientists that study insects) use cyanogenic glycosides to kill insects. These toxins are in many fruits (over 2,500 plant species) like cherries and in the pits of peaches.

They work in a similar way to how the glucosinolates ("*Broccoli Bombs*") activate. Cyanogenic glycosides are activated upon tissue damage. So when you bite into the fruit the glycosides mix with an activating enzyme creating hydrogen cyanide. Yes, that cyanide.

We can detox small amounts of cyanide but at slightly higher doses it can interfere with iodine and disrupt normal thyroid function leading to goiter and hypothyroidism. At slightly higher concentrations it can block cellular respiration, suffocate mitochondria and be fatal. [r, r, r, r]

This isn't a negligible issue either.

Cassava is one of the main sources of calories in the tropics. It also has significant concentrations of cyanogenic glycosides. Over a half a billion people eat cassava on a regular basis resulting in serious thyroid and neurological impacts. [r,r,r]

Salicylates

Salicylates are phytochemicals plants use to fight back against predators. There are many drugs developed from the salicylate family like aspirin (acetylsalicylic acid).

But many people are very intolerant to salicylates. They experience immediate allergy-like symptoms (asthma like symptoms from constriction of bronchial passages and mucus production, hives, swelling and GI upset).

Salicylates are also associated with physical and mental symptoms like acne, restless leg syndrome, headaches, anxiety, disturbed vision, bad breath, and odor. [r, r, r, r, r]

While most people seem to be able to handle average amounts of salicylate in food and medications there is a danger that salicylates can bioaccumulate in the body over time (similar to the "*Spinach Pricks*" of oxalates).

Most fruits are high in salicylates. And like oxalates that bioaccumulate, they can be hard to pinpoint that they are the troublemakers.

Health Dangers of Eating Fruits

Even with all these phytochemicals fruit still very-well-may-be the best option to eat of all plant parts (and that is saying something about the other parts!).

It's the only part plants designed for predators to eat.

Health Dangers of Plant-Based Foods

The Toxin-Time Continuum

Health Dangers of Plant-Based Foods

The Toxin-Time Continuum

In this final chapter I want to zoom out and look at the big picture.

The health dangers of plant-based foods should be viewed on a continuum. This scale goes from natural toxins to man-enhanced toxins to man-made poisons. And I want to look at how these have emerged and changed over time.

By the end of this chapter, I want to uncover what is actually "healthy" and what is "poison" and everything in between. And I want you to be armed with the insight to see through propaganda, advertising, and false beliefs that make up so much of "conventional wisdom" – the "wisdom" that has led to widespread health epidemics.

Health Dangers of Plant-Based Foods – Natural Plant Toxins

Up to this point, we've looked in detail at some of the specific natural plant toxins. These toxins cause severe issues for many people that eat a plant-based diet.

Specifically, we've looked at various plants and plant parts and evaluated some of their most potent chemical defenses against herbivory.

Health Dangers of Plant-Based Foods – Recap

We've looked at seeds (naked vs protected) and saw how grains, nuts, and beans can destroy our health by causing "leaky gut," enzyme and endocrine dysfunction, and nutrient absorption interference.

We've looked at roots, like the potato, and how alkaloids can impair health.

We've evaluated plant stems, like broccoli, and saw how glucosinolates can set off problems.

We've picked the leaves, like spinach, and saw how it can be a real prick.

We've eaten the fruit, like peaches, and saw a wide range of dangers from phenolics to glycosides to salicylates to tannins.

The plant toxins we have reviewed are just the tip of the iceberg.

There are literally thousands of phytochemicals produced by plants to avoid being eaten. (r)

We have covered some of the major players in quite some detail – the ones that have been studied and recognized as harmful. And while I think these details are vitally important (and eye-opening to most people) I don't want to miss the forest by too closely inspecting the trees.

Let's zoom out for a more complete picture.

Let's look at the "*Toxin-Time Continuum*."

Our 24 Hour History

The First 23 Hours and 55 Minutes – Natural Plant Toxins

Health Dangers of Plant-Based Foods – *"The Toxin-Time Continuum"*

The evolution of the human diet takes place over millions of years.

To gain perspective, **let's assume this evolutionary history was condensed into one 24-hour day**.

The beginning of the day is marked with an astonishing divergence from our hominid ancestors – our brains exploded in size.

In *"What did humans evolve to eat"* we discovered that the selective pressures of climate change and food sources, as well as selective advantages associated with a large brain underpinned this stunning divergence from our primate ancestors. The human genus transitioned from tree-dwelling herbivore to bipedal meat eater. (r, r, r)

And by the time 23 hours passed on the clock (~50,000 years ago) isotope studies of fossils reveal a human diet nearly indistinguishable from carnivores. (r, r)

Though undoubtedly, during these 23 hours, humans were opportunistic plant eaters, and included some fruit and occasional plant material in the diet when available. But evidence is strong that for the first 23 hours and 55 minutes of the clock, humans became less and less equipped to eat plant-based foods and more and more equipped to scavenge, hunt, and subsist (and depend) on a meat-based diet. (r, r, r, r)

But as we'll see the plant-based foods eaten during this time and their natural toxins were vastly different than the plants-based foods of today.

The Last 5 Minutes – Natural Plant Toxins in Unnatural Quantities

"The Toxin-Time Continuum"

Early in our 24-hour clock we transitioned from the plant-based diet of our herbivore hominid ancestors to a meat-based diet, more closely resembling the metabolisms and anatomy of carnivores. And for 23 hours and 55 minutes our diet was consistent. It was a meat-based diet.

Surely during certain seasons, in certain locations, humans supplemented their meat-based diet with some fruits and plant-based material. And in other locations and times in history, especially during glacial periods, humans subsisted exclusively on meat. But meat was a constant. And during these 23 hours and 55 minutes, no human civilization ever survived without animal food.

Then in just the last 5 minutes we radically changed the human diet.

Agricultural Revolution: The Start of the End

With the advent of agriculture at the 23 hour and 55-minute mark, we completely abandoned our meat-based diet. We even abandoned the plant-based foods we had supplemented our meat-based diets with.

We began subsisting on plant-based foods that were rarely / never eaten in human history.

In fact, nearly all the plant-based foods we eat today did not exist (more than 5 minutes ago). Before agriculture there was **no wheat, no corn, no rice – which now make up about 50% of all the calories** eaten worldwide. (r, r) These are modern-man inventions.

For example, grains come from wild grasses. Naturally, in the wild, these grains are small with just a few seeds per plant. And they readily fall and disperse. Humans would have basically never eaten these.

But with agriculture and selective breeding, farmers cultivated these into staple foods. They began subsisting on grains and starchy crops for calories. This massive change in diet was low in protein, low in fat, and low in vitamins and minerals. It was also high in plant-based toxins.

Perhaps not surprisingly, during these last 5 minutes, our brains started to shrink – over 10% in just these last 5 minutes. Our stature shrank as well, we developed tooth defects, bone lesions, and degenerative conditions. (r, r, r, r, r, r, r, r, r)

For the first time, we were exposed to significant amounts of natural plant toxins, from plant parts we had never eaten in any significant quantity. And the human body had long become ill-equipped to detox such concentrations of phytochemicals.

Over the 23 hours and 55 minutes, our guts had transformed beyond recognition to that of our early herbivore primate ancestors. Our transformed gut was now optimized for the efficient absorption of meat that was dense in energy as was required to fuel our gigantic brains; it was no longer equipped for grazing 7 hours/day and using a microbiome to turn plant fiber into useable energy. (r)

Before the Agricultural Revolution, fatness was nonexistent. With this change in food production, the wealthy gained access to plentiful carbs and, for the first time in human history, became fat. Perhaps ironically, accompanying the rise of fat people was the rise of widespread malnutrition and deficiencies. Health deteriorated.

"The Dose Makes the Poison" – Part I

Prior to the Agricultural Revolution, the opportunistic eating of plant-based foods was a relatively miniscule part of the human diet.

Natural plant-based toxins like alkaloids, oxalates, and tannins were eaten in small quantities. And even though toxic – a healthy human body, for the most part, could detoxify them without major issues.

However, some plant tissues have especially high amounts of natural toxins. These tissues tend to be of special importance to the plant for its survival. For example, seeds tend to be laced with protective chemicals. These are the plant's babies, vital for the plant to protect.

Before the Agricultural Revolution, seeds made up little to no part of the human diet. But this changed just 5 minutes ago. Some of the most potent natural plant toxins, that were never eaten before, became food staples.

Our dosage of plant-based toxins drastically increased.

We began eating massive quantities of lectins, phytates, and enzyme inhibitors.

What was once a manageable dose to detoxify started to overwhelm our defenses.

We simply had not developed or evolved to defend this level of chemical warfare.

To make matters worse, the lower nutrition inherent in these foods combined with the antinutrients created a negative spiral of deteriorating health and nutrition. For example, while these plant-based foods are already lower in vitamins and minerals, they also come pre-packaged

with antinutrients like phytate that further prevent absorption of essential minerals. And while already lower in protein and fat, enzyme inhibitors further interfered with fat and protein absorption. (r)

Further, many of these toxins damage the gut, our 1st and primary level of defense. With increased intestinal permeability ("leaky gut"), our ability to defend against an ever-increasing phytochemical onslaught got worse and worse. (r, r, r, r, r)

To top off this cascade of damage, for the first time in history we started spiking our blood sugar, stressing our pancreas to pump out insulin, and dysregulating our metabolisms.

The Last Second – Natural Plant Toxins Transformed

"The Toxin-Time Continuum"

The transition that took place at 23 hours and 55 minutes was catastrophic. But the changes in the last second have been just as destructive to human health, if not more so.

Industrial Revolution

During this last second in time, the Industrial Revolution caused the next blow to human health – kicking ourselves while we were down.

The Dose Makes the Poison – Part II

With milling technology, we started stripping the bran and the wheat germ away from the grain, creating ultra-fine grains – the most refined flours in human history.

We took the foods that we invented, that were completely novel to the human diet, that were loaded with antinutrients, and which we were ill-equipped to eat, and began refining them and thereby concentrating them.

At the start of the last 5 minutes we radically increased the dosage of plant toxins. In this last second, we concentrated these toxins exponentially.

With the Industrial Revolution we saw the rise of technology for mass food production resulting in an even further decline in fresh food (as refrigeration was not yet available).

Accompanying these new technologies came the birth of never before seen health problems including obesity, cancers, and heart disease.

The Last Split-Second – Unnatural Plant-Transformed Poisons

"The Toxin-Time Continuum"

As if our diet wasn't already foreign enough, in this last split-second of the 24-hour day, we've engineered synthetic food so incongruent with our body that disease and deteriorated health have become the new normal.

Asthma and allergies are almost expected among our youth. IBS, indigestion, acid reflux, is considered normal digestion. Depression, diabetes, dementia, and dental abnormalities. We are the only primates whose teeth don't fit into our own heads. (r, r, r) We fight fatigue and brain fog daily. Acne, autism, and autoimmune disorders went from non-existent to commonplace. Osteoporosis and obesity. This became our new normal.

Technologic Revolution: Man-made Poisons

The Big 3

During this last split-second we have made mind-blowing advancements in science and technology. Many used for good. Many, knowingly or unknowingly, causing serious harm.

#1 – Grains

As we've discussed, grains didn't become any significant part of the human diet until 5 minutes ago. Moreover, they are laced with plant toxins and antinutrients to prevent herbivores from eating the plant's offspring.

Just 5 minutes ago we took these plant seeds and made them a significant part of the human diet by artificially breeding and selecting for size and abundance.

Then in the last second, during the Industrial Revolution, we began refining them, further concentrating toxins.

In this last split-second we altered them even further. We began genetically modifying them.

We've engineered new traits into plants that wouldn't otherwise naturally occur. We've engineered higher lectin loads to deter insects. We began spraying them with pesticides, insecticides, and fungicides.

We've added preservatives, so we can store and ship these foods around the world. And all these changes come with a heavy price.

Let's consider gluten.

Gluten is an energy storage protein in grains with the purpose of nourishing the developing baby seed once it sprouts.

When some people eat gluten it triggers an immediate, severe attack on the lining of the small intestines. It's known as Celiac disease.

Celiac disease dramatically increased in the US in the 1960s and 70s. This is the same time that genetic breeding further transformed wheat.

The 4.5 foot "amber waves of grain" turned into 2-foot-tall, semi-dwarf, wheat.

Yields went up. Profits went up. And so did the gluten concentration.

And it was not only more abundant, but the gluten was fundamentally different. The molecular structure of gluten was chemically altered. (r, r, r, r, r, r)

We know that our digestive tract doesn't handle wheat proteins (prolamins) like gluten and other lectins very well. Genetically modified wheat and altered proteins are like foreign invaders to the body. They cause damage to the gut ("leaky gut") that can lead to widespread inflammation, autoimmune disorders, and disease.

I call it "Grain Pain."

Today, just 3 grains – wheat, corn, and rice – make up about half of the world's food.

And if the dose makes the poison…

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*By eating genetically altered, ultra-concentrated, high doses of grains and their toxins, meal after meal, day after day – **the dose is poisoning us**.*

#2 – Vegetable Oils

For millions of years nearly all fat in the human diet was animal fat.

During the Agricultural Revolution we switched to a low-fat diet. But still, during this time, most of the fat eaten (up until 23 hours and 59 minutes and 59 seconds) was animal-based.

But during this last split-second, we invented industrial vegetable seed oils.

And in short order we replaced natural animal fats with unnatural plant-based industrialized fats. (r, r, r, r)

Cellular Disruption

Without getting into the molecular composition of fats, it's enough to know that animal fat is high in saturated and monounsaturated fatty acids, while vegetable seed oils are high in polyunsaturated fatty acids (PUFA).

These PUFA originate in plant seeds, and via complex industrial processing they give us vegetable oils like corn, soybean, and sunflower oils.

After further processing (hydrogenation) these fats can become solid at room temperature and used as margarine that spreads nicely on your bread or used as shortening to keep your baked goods tender and moist. This processing creates completely unnatural fats including the notorious trans fats.

And these fats are very dangerous.

Fat is an essential component of every cell in the body. It's vital in hormone production. It's necessary for vitamins and minerals. And in fact, the brain is over 60% fat. (r)

When we eat these unnatural fat molecules, they fool our bodies. They are similar enough to natural fats that they get incorporated into our cells and tissues.

But these unnatural industrialized fats don't function properly.

They damage cell membranes, disrupt function, and cause inflammation. And they are strongly correlated with heart disease, cancer, and neurological problems. (r, r, r, r, r, r)

Omega 3:6

The different ratios of fatty acids between animal fat and vegetable oils is extremely significant.

Omega 3 and omega 6s are essential fatty acids. Ideally these are balanced. Our ancestors likely ate omega 3 and omega 6 fatty acids in a ratio that was close to 1:1.

The reason balance is important is that omega 3 and omega 6s produce hormone-like signaling compounds called eicosanoids that are involved in inflammation. And omega 3s and 6s have opposite effects in some processes.

For example, eicosanoids from omega 3 fatty acids function through pathways that **decrease** inflammation, while those from omega 6 function through pathways that **increase** inflammation.

Striking the right balance is important.

We need inflammation for wound healing and tissue repair, but too much can lead to chronic systemic inflammation and to pathologies like autoimmune disease, IBS, and joint pain.

Vegetable seed oils are very high in omega 6 fatty acids. They are pro-inflammatory. And today, it's common to eat 10-20X more omega 6 fatty acids than omega 3s – thanks to oils like corn and soybean that are widespread and cheap.

Today the scale is steeply tipped toward inflammation.

Evidence is mounting that the overwhelming omega 6 to 3 ratio is implicit in heart disease, cancer, and even neurologic problems like depression, aggression, violent behavior, and anxiety. Which, again, is not surprising as our brains are mainly fat. (r, r, r, r, r, r, r, r, r, r, r, r, r)

Oxidation

Up until this last split second in time the only fats used in cooking were animal fats. Since these fats are more saturated, they are more stable, and thus less likely to oxidize and go rancid.

The high concentration of polyunsaturated fats found in vegetable oils are just the opposite.

By the time they reach the grocery store they are likely already damaged (oxidized).

Chemically this means they turn into free radicals. A free radical has unpaired electrons and are thus highly reactive. This high reactivity can damage molecules in the body and result in a domino-like chain reaction.

When a free radical damages a molecule, that molecule then becomes a free radical itself to continue damaging cellular structures and interfering with proper cellular function. One after another the dominos fall.

And these oxidized oils can be sneaky. At the store they may look and smell just fine but still be significantly damaged. By the time they have a noticeable "rancid" odor they've likely been damaged for quite some time.

To speed up the oxidation, all you have to do is heat these oils. Fried foods aren't only loaded with unnatural hydrogenated fats, they aren't only high in inflammation promoting omega 6 fatty acids, but they are easily oxidized. It's like throwing a wrecking ball into your body.

Heart Disease

For 23 hours and 55 minutes we were on a high fat (high saturated fat) diet and heart disease was largely non-existent. Then during this last split second, Ancel Keys told us saturated fats cause heart disease.

Thanks to his misleading association, health organizations turned this into "conventional wisdom" and animal fat consumption dropped while vegetable oil consumption skyrocketed. And so did heart disease.

This "conventional wisdom" that saturated fat is bad still permeates society today.

When really, polyunsaturated fats and the artificially hydrogenated fats like trans fats are among the most toxic "foods" in the modern world. And these fats are in everything.

Nearly all processed foods – from baked goods and breads to crackers and chips to peanut butter and pizza – all loaded with fats from plant-based foods extracted via industrial processing.

#3 – Sugar

With grains and vegetable oils we've manufactured unnatural foods into our daily food staples. We eat these in dosages that teeter on poison. And we've done the same with sugar.

Humans consumed minimal carbohydrates for the first 23 hours and 55 minutes.

This radically changed in the last 5 minutes with the Agricultural Revolution and the transition to a predominantly plant-based diet. Carbohydrate consumption changed even further in the last second when the Industrial Revolution spurred mass production of refined carbohydrate-based foods.

But sugar as we know it is even newer.

When refined white sugar first came to Europe it was very expensive. It was a luxury reserved for the wealthy.

Most carbohydrates in the diet at this time were still from refined grains and starches.

It was not until the 1900s, after industrial processing and extraction was developed, that sugar became any significant part of the diet.

And it was in this last split second that sugar became cheap and thus abundant.

We began eating massive quantities of sugar. It now makes up over 25% of our diet. And our bodies are not designed to handle this. (r, r, r, r)

With every meal we create a metabolic panic, stressing the pancreas to unload insulin to re-establish homeostatic blood sugar. This massively unnatural carbohydrate load and blood sugar spiking wreaks havoc on human health.

Metabolic hormones become dysregulated from the insulin rollercoaster, eventually cell start to give up (insulin resistance) and the pancreas wears out (Type II diabetes). The high blood sugar levels disrupt cellular water balance, impair the immune system, and damage vision, kidneys, and nerves. Obesity, cardiovascular disease, cancer, dementia (which some call "Type III Diabetes") all became increasingly common stepwise with the ever-increasing consumption of sugar.

Sugar also directly damages tissues through glycation.

Advanced Glycation Endproducts (AGEs) irreversibly damage molecules. This is like the domino effect of oxidized fats and their free radicals. When a molecule gets glycated, these AGEs can then cause damage by cross-linking with other molecules creating a cascade of damage. Glycation is implicit in many health problems including diabetes, hypertension, vascular damage, aging, and dementia. (r)

Sugar Cycle

The human body has about 1 tsp of glucose (sugar) in all the blood. Only a few cells in the body require any glucose at all, all of which can be made from protein. There is no essential carbohydrate. No need to eat any sugar at all. And yet we are eating it by the truck load.

And one reason why is that it's addicting. When we eat sugar the "pleasure centers" of the brain light up. It activates the same brain regions as cocaine. And it causes neurochemical changes similar to other addictive drugs. (r)

Sugar fuels a vicious cycle.

With a sugar surge the pancreas panics and pumps insulin. This immediately halts any fat burning. With this massive insulin dump, the blood sugar shortly drops too low and causes hormones to tell the brain to hurry up and replenish.

We feel this as a strong craving for more sugar. And since fat burning is largely turned off thanks to the insulin – the craving can feel more like a panic. Our energy drops, we get tired, our brain gets foggy, and we get "hangry" for more sugar.

Willpower gives way, we reach for more sugar, and feel the "reward" from the brain reinforcing this behavior. **What results is binging, cravings, and addiction.**

In this vicious “sugar cycle” we are always hungry and always storing more fat. We disrupt hormonal signaling and lose the ability to tap the abundant energy stored in our fat cells.

Fructose

Refined white sugar is bad.

But in 1956 we made sugar even more dangerous. We discovered how to further process it to give us high fructose corn syrup (HFCS) – which was even sweeter and cheaper than refined white sugar.

By the 70s and 80s HFCS infiltrated our diets. It was loaded into soft drinks and juices, snacks and desserts, syrups and salad dressings.

Fructose, “fruit sugar,” has to be processed by the liver in a special way. It must be detoxified.

Not unlike alcoholism, chronic HFCS consumption bombards the liver with a toxin in excess. This can fatten and damage the liver. In fact, it’s a primary player in nonalcoholic fatty liver disease.

With this abuse, the liver eventually starts ignoring insulin, thereby impairing its ability to process glucose. Again, blood glucose builds up, the pancreas pumps more insulin, fat accumulates, appetite gets dysregulated, and hormonal systems dysfunction. (r, r, r, r)

Glycation is especially dangerous with fructose – causing glycation at 7-10X the rate of glucose. And for diabetics who already have high blood sugar, this is a recipe for accelerated aging and vascular damage. (r, r)

Technologic Revolution: Man-made Poisons – Beyond the Big 3

Perhaps the deadliest inventions are the mass production and consumption of grains, vegetable oils, and sugar. And while these may be the biggest culprits in deteriorating health – there are many other “food” inventions that are hiding in our meals and causing harm.

Food Additives

Today our food comes in a box or a bag, with an ingredient list that most biochemist don’t recognize.

Pick up an item at the grocery store, and there is a very good chance you don't know what most of the ingredients are. We assume these chemicals are well tested with stringent health and safety research validating their consumption. But this is far from the truth.

Our foods are loaded with synthetic chemicals – acidity regulators, anti-caking agents, antifoaming agents, antioxidants, bulking agents, dyes and food coloring materials, emulsifiers, flavor enhancers, and artificial flavors, gelling agents, glazing agents, humectants, preservatives, stabilizers, artificial sweeteners, and thickeners. (r)

Many are potentially toxic and very little is actually known about their combined impact.

What happens when these chemicals are mixed together, or taken with medications, or how do they interact within a complex environment – like the human body?

We don't know.

But evidence is growing that these chemicals aren't harmless.

Artificial Sweeteners

Astute observers witnessed the damage associated with our massive consumption of sugar.

The obvious answer was to create artificial sweeteners.

In the 70s, one such sweetener called cyclamate was pulled from the market due to its association with testicular atrophy and cancer. But not to be deterred, others have popped up. Today saccharin and aspartame have gained widespread appeal and use. Though research suggest this may not be such a great thing. (r)

Aspartame is a classic example of money and politics winning over health and science. The aspartame industry funded numerous studies on the sweetener, all of which showing its safety. Yet over 90% of independent studies demonstrated problems with the sweetener including increased risk of brain tumors and lymphoma. (r, r, r, r)

It's thought that these artificial sweeteners also confuse the brain about energy consumption.

With the sweetness the brain thinks calories are coming in. But they don't. And this misinformation interferes with proper hormonal signaling.

When sweetness sometimes accurately reflects energy consumption and sometimes does not, appetite gets dysregulated. And evidence suggest this is leading to overeating and more sugar cravings. (r, r, r)

Artificial Colors and Dyes

There are big marketing dollars in bright colors. Artificial colors and dyes are added to make products more appealing. Some of these come from petrochemicals and coal tar like Blue No. 1 and Citrus Red No. 2, and Green No. 3. (r)

In animal studies many of these have been shown to be toxic, cause tumors, and are associated with other health problems like allergic reactions.

Human clinical trials even show evidence that they may contribute to hyperactivity.

Artificial dyes are classified as **excitotoxins**, which can damage nerve cells by excessive stimulation.

In fact, doctors have successfully treated hyperactivity by eliminating artificial colorings. MSG (monosodium glutamate) is another example of an excitotoxin that is widely used as a flavor enhancer. (r, r, r, r)

Emulsifiers

Human are known for trying to make substances behave in unnatural ways – like getting oil and water to mix.

Well that's what emulsifiers, also known as surfactants, do. They allow the mixture of substances that normally wouldn't mix.

Many processed foods are made possible by complex emulsions. For example, the chemicals that allow the food to have a long shelf life have to mix with the chemicals in the food. And it takes high concentrations of synthetic emulsifying agents to get it all to stick together.

Obviously, our bodies are not adapted to deal with these novel synthetic chemicals. They are thought to cause damage to the digestive tract and contribute to "leaky gut" (intestinal permeability).

A case in point – pharmaceutical companies actually use emulsifiers in their pills to help oral drugs move across the intestinal barrier. (r, r)

Food preservatives

Fresh food goes bad. This is not good for shelf life or profits, so food preservatives were invented to prevent the growth of microorganisms and avoid chemical changes associated with exposure to oxygen (i.e. oxidation).

If you look at the ingredients on a bag of food you'll likely see chemicals like sodium benzoate, calcium propionate, disodium EDTA, butylated hydroxyanisole (BHA), butylated

hydroxytoluene (BHT), sulphites, sodium sulfite, sodium and potassium bisulfite, sodium and potassium metabisulphite. (r)

Little is known about their effects on human health. Though we do know that some people are seriously affected by these. For example, allergic reactions to sulfites are quite common.

Processed grains need preservatives like BHT to block the oxidation of the PUFA in the oils. It's also an endocrine disruptor that acts like estrogen. This is a trifecta of damage – grains and oils mixed together with a synthetic preservative. (r, r)

What scares me is that we know how essential our microbiome is to our health. Yet we readily add these chemicals to our food…chemicals specifically designed to hinder bacteria and other microorganisms.

Today: Toxins Transformed to Poison

"The Toxin-Time Continuum"

For 23 hours, 59 minutes and 59 seconds the human species did not eat any refined sugars, refined grains, or refined vegetable oils.

Plant-based natural toxins were cultivated into unnatural doses and transformed into poisons.

Our staple foods, which many consider "health" foods, include grains and soybeans, which are loaded with antinutrients and plant defense phytochemicals that damage our guts and cause disease.

Our carbohydrate intake flipped from minimal to most of our calories. Simple sugars, fructose, and refined carbohydrates dysregulate our hormones and appetites, lead to overeating and obesity, insulin resistance and diabetes, and are implicit in the deadliest diseases today including heart disease, cancer, and dementia.

We replaced natural animal fats for industrialized plant-based fats that get incorporated to our cells, ruining their structure and function. Omega 6 fatty acids overwhelm omega 3s promoting inflammation. The PUFA are readily oxidized, and thus readily damage those who eat them.

We replaced nutrient dense meats with nutrient poor grains and sugars. Although we are fat, we are malnourished.

We have widespread artificial toxin exposure. Insecticides and additives are all over and in our food.

We do know that all of these "foods" were invented in less than 1 second on the human history clock.

And we know that grains, sugar, and vegetable oils make up a majority of all the calories eaten.

Yet somehow, we have propaganda that meat, the very food our species evolved eating, suddenly started to cause diseases and epidemics in the modern world.

It seems obvious there might be a mismatch between what we are designed to eat and the food inventions of the last 5 minutes.

We have powerful human engines designed to run on a specific fuel, and we not only diluted this fuel, but we completely changed it. And we wonder why we are getting weighed down, running slower, getting sicker, and developing disease at an alarming rate.

Technologic Revolution: The Fuel Weighing Us Down

To recap the "Toxin-Time Continuum" I think looking at a couple examples will highlight the issues we face today with our plant-based diets.

Soy

Let's say you eat a soybean – the body can handle its ill effects, detoxify it, and in general not cause any issues.

Let's say you eat soybeans everyday – now the body is detoxifying on a continuous basis. Still the dosage at any one time is low enough that you don't recognize any ill effects.

Now let's take those soybeans and refine them and process them to give you soy milk, soynut butter, soy protein, and soybean oil. All of a sudden soybeans are hiding in concentrated forms in all your food.

There are a number of issues with just eating "natural" soybeans. They are high in antinutrients like trypsin inhibitors, phytates, and tannins as well as bioactive compounds like isoflavones and phytosterols that have estrogenic properties.

But when its refined and concentrated in these food-like-products, products which are everyday staples, the dosage inches closer and closer to poison. We see hypothyroid effects and goiter, testosterone and fertility problems, and even promotion of breast cancer. (r)

Corn

There's a big difference between eating an organic ear of corn vs high fructose corn syrup extracted from genetically modified corn.

That said, an ear of corn is quite unnatural itself.

Originally corn was small, about the size of your little finger. The seeds of this wild grass easily fell off and dispersed.

Today we've engineered it to give us massive ears of corn. The seeds cling to the cob so tightly it can't even exist on its own in the wild.

So although an ear of corn is quite unnatural today, it's not even close to the other versions of corn that make up so much of our diets.

Today most of us eat the version after we steep it, take the starch, refine the syrup, and further process it to yield HFCS. This is the version of corn that we eat in massive quantities.

Corn is a good example of what we tend to do with many plant-based foods. In the wild the plant part is relatively scarce, small, and low in sugar. It would be difficult to eat in large quantities.

But we selectively breed, genetically modify, and change these natural plants into unnatural variations for bigger versions, sweeter versions, higher yield versions.

We then take it a step further.

- We process and refine them. The low dose toxin gets transformed to a high dose unnatural breed.
- We take the corn starch made from the endosperm and using it as a thickening agent.
- We squeeze the germ of corn and get oil, that we use to fry our food in. It gets further hydrogenated to make margarine.
- We use corn to make cereals, snack foods, salad dressings, soft drink sweeteners, gum, peanut butter, and flour products.

When we eat these end products, the fact that we are eating plant-based foods become obscured.

The Confusion

The whole world is already on a plant-based diet. We just don't realize it.

And this is where so much of the nutrition confusion arises.

Someone on a whole food plant-based diet that is eating unrefined, minimally processed plant-based foods, is eating a diet far better than most of the world that is eating the more refined and processed versions of these foods.

But just because it's unrefined doesn't make it healthy – it makes it less unhealthy – a toxic dose that the body may be able to handle in low quantities when eaten infrequently.

It's why if someone switches from a Standard American Diet (SAD) to a vegetarian whole food diet they notice improvements – they ditched the worst offenders.

More confusion arises when we see that there are so many other confounding variables, biases, and deceptions.

Health science is not immune to profit motives and popular press incentives. It's not immune to dogma ingrained in government agencies, health organizations, and taught to professionals who then pass it down as "conventional wisdom" repeated and reinforced in echo chambers. It's not immune to faulty assumptions and poorly done research.

Health Dangers of Plant-Based Foods

As we can see in our 24-hour human history, our diets have drastically changed in the last 5 minutes, even further in the last second, and even further in the last split-second.

Almost no food today is free from the impact of the Agricultural, Industrial, and Technological Revolutions.

Eliminating the 3 biggest offenders will go a long way. Get rid of grains, vegetable oils, and sugar.

Soy is a close 4th.

And an interesting thing happens when you do this. **You start eating a meat-based diet**.

A healthy diet is one build around meat.

I hear good health advice every-so-often, one such statement is "*Don't eat anything that wasn't around 100 years ago*," or "*Don't eat anything your grandparents didn't eat.*"

But they need to zoom out just 5 minutes.

Better advice:

"Only eat what was eaten during the first 23 hours and 55 minutes,"

or

"Don't eat anything that was eaten for the 1st time within the last 5 minutes."

If you want to know how to do that, you can check out the 30 day guide to going full carnivore – even if you have no intention – the concepts about how to succeed on that diet apply across the board.

On the Clock

The alarm should have sounded 5 minutes ago.

We hit snooze. Ignored the impact.

It sounded again 1 second ago.

We hit snooze. Ignored the impact.

It's ringing right now.

Time to wake up.