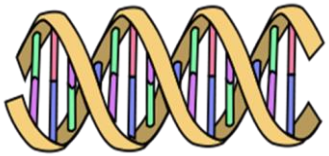
# Autism:
# Putting It All Together

# Potential Factor #1: Synaptic Dysfunction in the Brain



## Genetic Autism Factors

1) **mTor** protein overproduction: can block synaptic pruning
2) **CNTNAP2** protein: can cause dysfunctional synaptic misfiring when defective

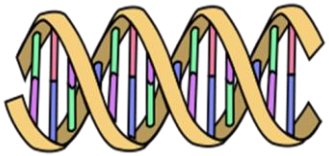
## Other Synaptic Dysfunction Factors

1) Many parents have noticed that their child's autism symptoms improve during a high fever
2) Heat Shock Proteins protect brain cells and brain **synapses** during a fever

## Nutritional Research

1) **Cruciferous veggies**: Sulphoraphane research studies have reported positive effects on mTor proteins and Heat Shock Proteins

# Potential Factor #2: Oxidative Stress in the Brain

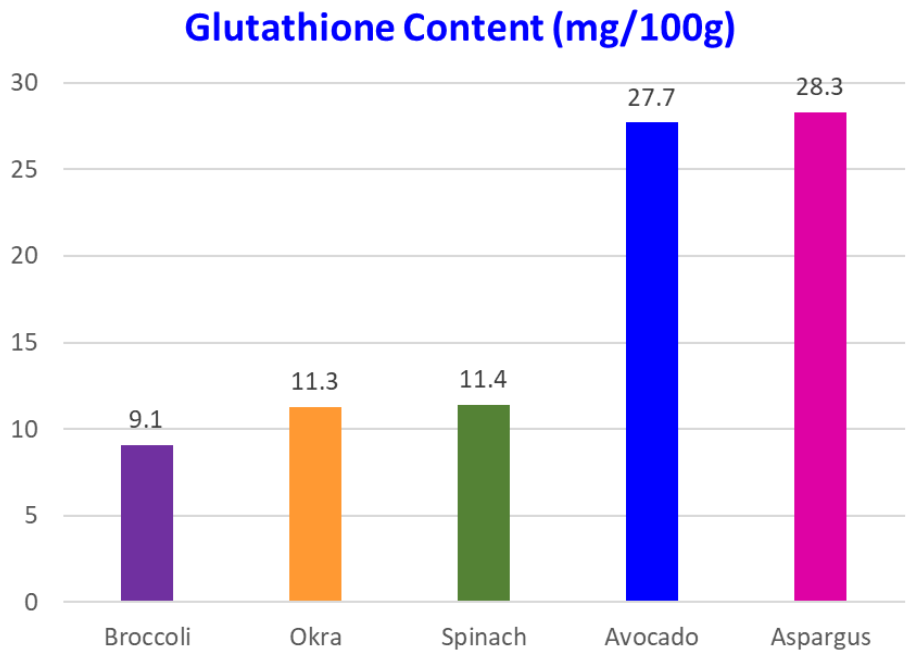


## Genetic Autism Factors

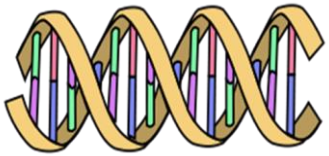
1) Glutathione is a potent antioxidant that can help protect the brain from oxidative stress, but can be **underproduced in autistic patients**

2) **Commonly affected genes include:** Glutathione-S-transferase (GST M1), Reduced-F-carrier (RFC 80G), transcobalamin II (TCN2), catechol-O-methyltransferase (COMT 472G)

## Nutritional Research



# Potential Factor #3: Mitochondrial Dysfunction



**Genetic Autism Factors**

1) Mitochondria contain their own DNA

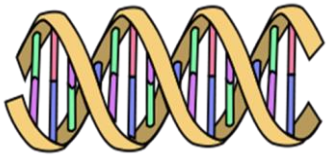
2) In early 2018, researchers at UCLA, Brown University and Vanderbilt University published a study called ***"Strong correlation of downregulated genes related to synaptic transmission and mitochondria in post-mortem autism cerebral cortex."***

**Nutritional Research**

1) Nutrients that have been used to support mitochondria:

**Sulforaphane, Coenzyme Q10, Vitamin C, L-carnitine, Creatine, B-Vitamins, Alpha lipoic acid**

# Potential Factor #4: Heavy Metal Toxicity



**Genetic Autism Factors**

1) **Heavy metal toxicity is a health hazard**, so our body has detoxification tools it uses to protect us

One of the most important weapons our body uses to battle heavy metals is a protein called **metallothionein (MT)**

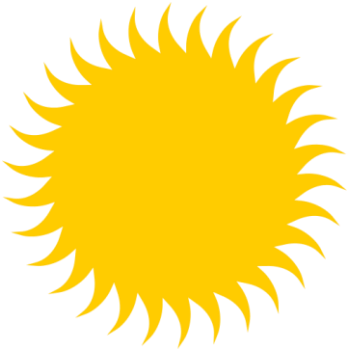
Metallothionein proteins are made up of over 60 amino acids and 7 atoms of zinc. Their number one job is to bind to heavy metals

**Nutritional Research**

1) Foods that have been studied for their anti-heavy metal plant compounds

**Ginger, Garlic, Citrus Fruits (Pectin), Turmeric, Sulforaphane**

# Diet & Vitamin Deficiencies: Chronically Low Vitamin D Levels



**Possible Dietary Autism Factors**

1) Sun avoidance

2) Diet deficient in Vitamin D

3) Synthetic Ergocalciferol (D2), found in "fortified" foods, may not absorb well

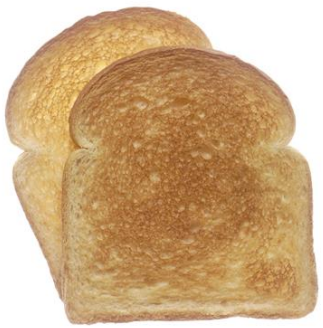
**Nutritional Research**

1) Recent research found "significantly lower in children with autism as compared to controls"

2) In 2016, the *Journal of Child Psychology and Psychiatry* reported on the "first double-blinded RCT proving the efficacy of vitamin D3" in a group of autistic patients.

**The placebo group showed no signs of improvement, but for the vitamin D3 group, "the autism symptoms of the children improved significantly."**

# Diet & Vitamin Deficiencies: Gluten



## Possible Dietary Autism Factors

1) A recent study, titled **"Markers of Celiac Disease and Gluten Sensitivity in Children with Autism,"** demonstrated how gluten can affect some patients more than others.

2) This study found that a subset of children with autism "had significantly higher levels of IgG antibodies to gliadin."

## Nutritional Research

1) Gliadin, which is a component of gluten, is the **potentially immunotoxic protein in wheat** that is directly associated with Celiac disease.

2) Gliadins from the gluten are "not being properly broken down through digestive processes and are entering into the blood through a compromised intestinal tract (leaky gut)."

# Diet & Vitamin Deficiencies: Dairy

## Possible Dietary Autism Factors

1) A recent study found that certain autistic children tested positive for **"high levels of IgA antigen specific antibodies"** for dairy proteins such as "casein, lactalbumin and beta-lactoglobulin, and IgG and IgM for casein."

2) Exorphins from dairy are peptides that bind to **opioid receptors** in the brain, and mimic things like morphine. These opioid fragments are showing up in the urine of certain autistic patients.

## Nutritional Research

1) We now know through bloodwork analysis that dairy can literally **block the absorption** of key antioxidants from various foods and beverages, like tea, blackberries, blueberries and many more.

## Dairy: Try To Limit the Following Foods at The Same Time

**Catechin containing foods:**

Green tea, dark chocolate, pecans, peaches, strawberries, cherries, grapes

**Caffeic acid containing foods:**

Coffee, sage, thyme, oregano, rosemary, spearmint, cinnamon, turmeric, ginger, blueberries, cranberries

**Ferulic acid containing foods:**

Flax seeds, dark chocolate, dates, green olives, asparagus

**Chlorogenic acid containing foods:**

Coffee, dark chocolate, bamboo shoots, eggplant, pears, potatoes

**Elagic acid containing foods:**

Chestnuts, blackberries, walnuts, pomegranates, strawberries, grapes

# References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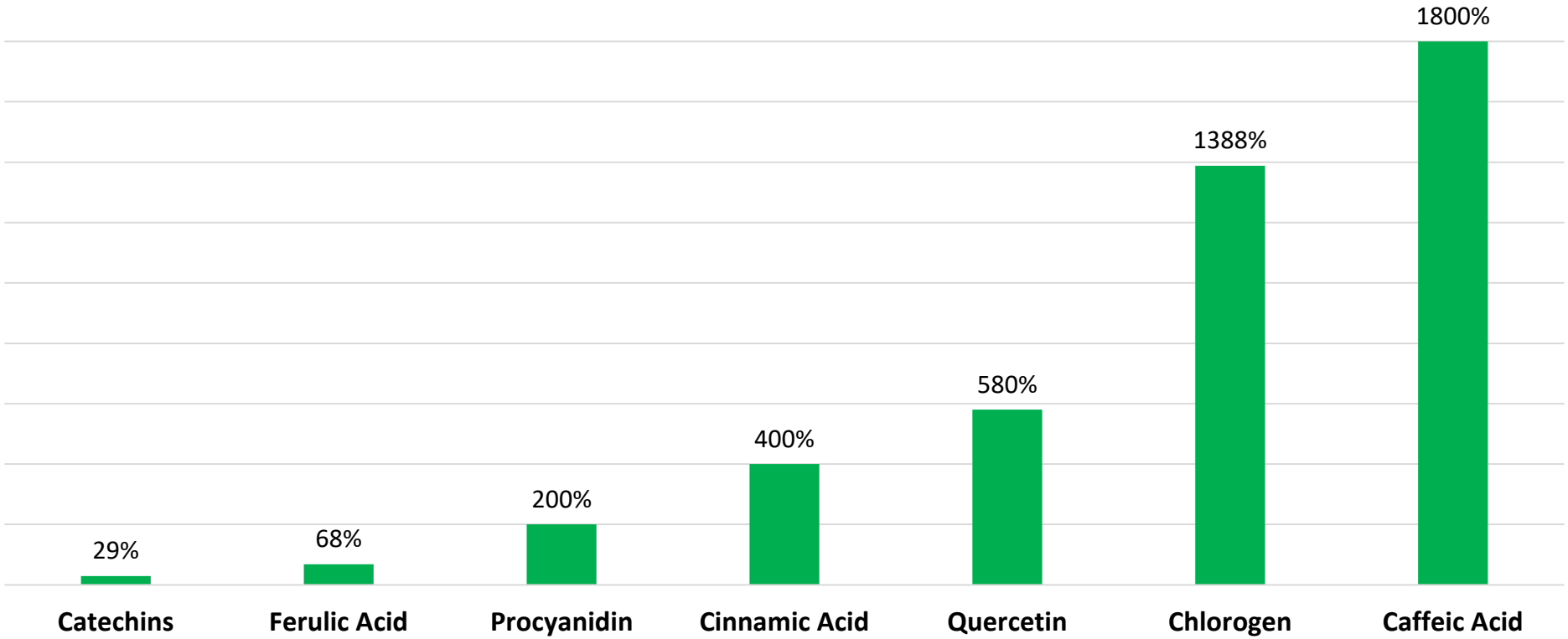
# % Increase in Antioxidant Content in Broccoli Sprouts

**(When Grown with Sugar Water on Days 4 & 5)**




**Why the massive antioxidant boost?** Sugar is a toxin for the growing broccoli sprouts, so the sugar water triggers an upregulation in the "genes involved in the biosynthesis and transcriptional regulation" of **antioxidants**.

**This is basically the broccoli plant's way of protecting itself from sugar.**

Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5039501/ and https://www.ncbi.nlm.nih.gov/pubmed/25212340

## Cooking: Good

| | Nutrient | Food Sources | Comments |
|---|---|---|---|
| 1 | Lycopene | Tomato, red peppers, asparagus | 35% increase when tomatoes are cooked |
| 2 | Carotenoids (BC) | Sweet potato, carrots, spinach | Beta-carotene absorbs better when cooked |
| 3 | Ferulic acid | Mushrooms, asparagus, squash | Antioxidant involved in skin health |
| 4 | Vitamin B12 | Fish, beef, chicken, eggs, oysters | Not measurably affected by heat |
| 5 | Turmeric (Antioxidants) | Fresh turmeric root or powder | Boiling (tea) & cooking increases antioxidants |
| 6 | Indole-3-carbinol | Cauliflower, broccoli, cabbage, kale, Brussels sprouts, asparagus | Anti-cancer compound in cruciferous veggies improved by heat |

## Cooking: Bad

| | Nutrient | Food Sources | Comments |
|---|---|---|---|
| 7 | Polyphenols | Berries, cherries, plums, apples | Cooking causes total loss of some polyphenols |
| 8 | Vitamin C | Guava, bell peppers, citrus fruit | Heat can deactivate Vitamin C >30-50% |
| 9 | Quercetin/Allicin | Capers, onions, garlic | Damaged when overcooked at high temps |
| 10 | Vitamin B9 (Folate) | Avocados, mangos, romaine | Overcooking depletes folate |
| 11 | Flavonoids | Pomegranates, berries, onions | Powerful plant compounds damaged by heat |
| 12 | Turmeric (Curcumin) | Fresh turmeric root or powder | Boiling/cooking above 190 F destroys >85% |
| 13 | Piperine | Fresh black pepper | Nearly 60% is lost during cooking process |

# STRESS & STRAIN: 16 CE Webinar

The Autistic Brain

Common Signs of Autism
Lack of spoken language
Repetitive or restricted use of language
Repetitive use of motor mannerisms (head shaking, twirling, etc..)
Little or no eye contact with others
Little or no interest in peer relationships
Lack of make-believe play
Persistent fixation on objects or parts of objects

Initially termed Autistic Psycopathy (AP), Asperger's syndrome is considered a milder form of autism and is now classified under the umbrella of Autism Spectrum Disorders.

As cases of autism began to skyrocket in the 1990's, autism started to gain national attention. In fact, there was over an 8-fold increase in autistic cases during that time period.
Sadly, the number of autism cases continues to rise, having essentially doubled over the past 10 years. Autism now affects 1 in 59 children in the United States.

Potential Autism Factor #1: Synaptic Dysfunction in the Brain

Over the past decade, major technological advancements have improved our understanding of how an autistic patient's brain functions. For example, modern "neuroimaging studies have provided considerable insights underlying neurobiological mechanisms" of autism. Similar to other neurological conditions, autism tends to affect specific parts of the brain, so mapping these areas has been a focal point for autism researchers.

For example, using MEG technology, researchers were able to find a "significant correlation" between the dysfunction of the "anterior cingulate cortex (ACC) and increased social communication impairments in children with ASD."

When it comes to brain diseases, such as Alzheimer's, ALS, & Parkinson's, the brain begins to degenerate, which causes us to lose many of our synaptic brain connections.
However, a 2014 brain tissue study performed by neuroscientists at the Columbia University Medical Center made an unbelievable discovery: Children with autism do not have a loss of brain synapses, they may have too many brain synapses!

A baby's brain is like a sponge. Every image they see, every word they hear, every object they touch builds new synaptic brain connections.

But, here's the strange part:
From birth to approximately age 2, a baby's brain ends up making too many brain synapses.

The name of this antioxidant is sulforaphane, and it's an organosulfur from the potent group of plant antioxidants called isothiocyanates.
But, this antioxidant can only be found in one class of food: Cruciferous vegetables
In 2008, a major study published in the journal Pediatrics found that in many cases, without question, a high fever can significantly improve the signs and symptoms of autism….

During a fever, your body massively ramps up the production of these heat shock proteins.

A first-of-its-kind randomized, double-blind, placebo controlled clinical trial took a group of patients with moderate to severe autism and gave half of them sulforaphane and the other half a placebo. So, what happened? "Those who received the sulforaphane had significant improvements in social interactions, abnormal behavior, and verbal communication."

Potential Autism Factor #2: Oxidative Stress in the Brain

Everyone has heard of free radicals. Free radicals are atoms that have a single unpaired electron, which makes them very unstable. The damage and stress caused by free radicals is called oxidative stress.

If you look at the brain tissue of patients with autism, you will likely find high levels of neuroinflammation.
Free radical formation causes oxidative stress, which causes inflammation, and then the inflammation causes more oxidative stress and more free radicals to form.

In the non-autistic brain, glutathione is able to clear free radicals out of the brain before they have a chance to cause problems. In an autistic brain, however, there is now evidence that the child may have chronically low levels of glutathione.

Here's the good news when it comes to bad diet: you actually don't need to eat healthy foods to get glutathione into your body. But, here's the bad news when it comes to bad diet:
Study after study has found that autistic children often don't make enough glutathione.
Why? Genetics.
Here are some examples of genes that have been shown to have abnormalities in autistic children: Glutathione-S-transferase (GST M1), Reduced-F-carrier (RFC 80G), transcobalamin II (TCN2), catechol-O-methyltransferase (COMT 472G). What do these genes all have in common? They are supposed to protect our brain from oxidative stress.

Brain neurotrophins are a class of proteins that literally protect the function, development and survival of brain synapses.

Potential Autism Factor #3: Mitochondrial Dysfunction

One of the major focal points right now in autism research centers on the role of mitochondria in the brain. In our cells, DNA is stored in the nucleus.
What makes mitochondria unique is that they have their own DNA.
In 2018, researchers at UCLA, Brown University and Vanderbilt University published an important study called "Strong correlation of downregulated genes related to synaptic transmission and mitochondria in post-mortem autism cerebral cortex."

What makes this genetic downregulation so damaging is these "these genes were correlated with genes related to synaptic function. MR spectroscopy measures several metabolites in the brain, such as amino acids, lipids, N-acetyl aspartate, creatine, choline and lactate.
When it comes to autism, lactate is a key biomarker related to mitochondrial dysfunction.

Having dysfunctional mitochondria can lead to a whole host of conditions, such as Parkinson's, Alzheimer's, ALS, muscular dystrophy, and cancer.

Besides sulforaphane, here are some nutritional supplements that have been used to support mitochondrial health:
1) Coenzyme Q10: used by every cell in the body as both an "antioxidant and also as a key participant in the mitochondrial respiratory chain."
2) Vitamin C: A recent study found that a deficiency can lead to a spike in free radicals and "diminished mitochondrial respiration."
3) L-carnitine: This amino acid plays a critical role in the transportation of essential fatty acids to our mitochondria to be burned as fuel.
4) Creatine: Commonly used as a muscle building nutrient, this is also found in brain mitochondria where it "facilitates the formation of adenosine triphosphate (ATP) and thereby helps to supply energy" to the brain cells.
5) B vitamins: help with the synthesis and repair of mitochondrial DNA, as well as decrease inflammatory markers.
6) Alpha lipoic acid: A 2011 study in the Journal of Nucleic Acids found that ALA can "reverse mitochondrial decay and aging."

Potential Autism Factor #4: Heavy Metal Toxicity

It's no secret that people all over the world are exposed to heavy metals every single day.
One of the most important weapons our body uses to battle heavy metals is a protein called metallothionein (MT).

But, similar to the other causal factors of autism, genetic problems can result in either defective proteins or chronically low levels of these important proteins.

Once you realize how much exposure we're all getting to heavy metals, it's not hard to understand how organs and tissues can become overloaded if the patient's detox systems are genetically weak.
But, here's the even scarier part: blood testing doesn't always tell the whole story when it comes to heavy metals.

1) Lead: old, peeling lead paint, toys and ceramic glazes from foreign countries, industrial waste & small airplanes (over 160,000) in the U.S.
2) Cadmium: cigarette smoke is one of the main sources of exposure, but it's also found in various plastics and synthetic rubber, water pollution from mining operations, Ni-Cd batteries and ink drums from old copy machines.
3) Aluminum: aluminum cookware, aluminum hydroxide antacids, cosmetics, antiperspirants, city drinking water, and aluminum foil.
4) Arsenic: used in the production of fertilizers, pesticides, herbicides and insecticides, as well as semiconductor manufacturing, and treated lumber for residential decks, wood fences and play structures. Found in rice!

5) Mercury: Seafood (methylmercury), dental amalgams (50% mercury by weight), fungicides, pesticides, the paper industry, and "emissions from coal fired power plants."

A 2017 research report in the journal Biomedicine & Pharmacotherapy found that one of ginger's most important antioxidants, called 6-gingerol, can play a role in alleviating "liver and kidney dysfunctions and oxidative stress" caused by exposure to mercury.

A remarkable 2013 report in the journal Basic & Clinical Pharmacology & Toxicology noted that garlic is "a natural detoxifier of lead and is not only as effective as a common chelation drug known as d-penicillamine at pulling this metal out of the body, but is also much safer."

Pectin contains a polysaccharide called Rhamnogalacturonan II (RG-II). RG-II is believed to be the main driver behind its heavy metal binding.

In a study "focused on the protective role of turmeric against liver injury induced by heavy metals," it has "shown, in clinical and preclinical studies" to potentially reduce liver toxicity caused by "arsenic, cadmium, chromium, copper, lead and mercury."

The Environmental Pharmacology and Toxicology journal reported in 2017 that "sulforaphane decreased cadmium-induced cytotoxic" effects in human white blood cells, such as lymphocytes and monocytes. Cadmium, the toxic heavy metal found in things like cigarette smoke, has been shown to cause cell death of white blood cells.

Diet and Vitamin Deficiencies:

In 2017, autism researchers published an eye-opening report that found that vitamin D levels were "significantly lower in children with autism as compared to controls." Many children simply don't eat many of the foods that are rich sources of vitamin D, such as salmon, sardines, oysters, eggs, and mushrooms.

The researchers found that a subset of autistic children have significantly higher levels of antibodies to gliadin. Gliadin, which is a major component of gluten, is one of the "primary immunotoxic proteins in Celica disease."

A recent study found that certain autistic children tested positive for "high levels of IgA antigen specific antibodies" for dairy proteins. Using an enzyme-linked immunosorbent assay (ELISA) test, the researchers discovered that "autistic children have significantly higher levels of urine casomorphin-7 than control children," and that "the severity of autistic symptoms correlated with concentrations of casomorphin-7 in the urine."

Hidden in Plain Sight

Since 1990, a chemical called potassium bromate has been listed as a known carcinogen by the state of California. It has also been shown to cause tumors at multiple sites in animals, and is potentially toxic to the kidneys and other organs.

In 2014, the California Office of Environmental Health Hazard Assessment proposed adding nitrites to the list of substances known to cause cancer in humans when combined with amines, such as amino acids found in processed meat.

Dangerous During Pregnancy:

1) Dong Quai: This herbal supplement is indigenous to the highest mountains in China, and is sometimes known as "Female Ginseng." Historically, this supplement has been used to treat menstrual pain, circulatory problems and high blood pressure. However, this herbal remedy has been known to cause powerful uterine contractions, and should be completely avoided during pregnancy.

2) Red sage: This wild flowering plant is native to the forests and hillsides of Japan.
It has been primarily used as a way to improve the visual function of patients with diabetic retinopathy, but it is also sometimes considered to be a liver detoxifier. This supplement is best avoided during pregnancy because it has been shown to trigger seizures. There is also evidence that it can decrease a mother's milk supply during lactation.

3) Ginkgo biloba: This very common supplement actually comes from the oldest tree species on earth, one that Yale University calls a living fossil that has remained unchanged for 200 million years.
Best known for improving memory, this supplement should not be taken during the final trimester of pregnancy. As its popularity has increased, there have been reports that this can cause early labor and increased bleeding during delivery.

4) Goldenseal: Native to Canada, this member of the buttercup family has been traditionally used as an immune system booster, and often combined with echinacea in teas and capsules. Generally considered safe for the majority of adults, this herb must be avoided during pregnancy. The National Institutes of Health has reported that this can cross the placenta and increase the risk of fetal brain damage.

5) Pennyroyal: This member of the mint family is most commonly consumed as a medicinal tea. Used to treat headaches and menstrual cramps, this should not be taken during pregnancy. In 1996, the Annals of Internal Medicine reported that drinking this tea can "cause fetal death by liver and brain damage as well as promote uterine contractions that expel the fetus."

6) Licorice root: This supplement has been used to treat a whole host of ailments, such as asthma, baldness, dandruff, influenza, gout, emphysema, heartburn and ulcers. This supplement is definitely not recommended during pregnancy because it may cause a drop in potassium levels, raise blood pressure, exacerbate congestive heart failure, increase a patient's risk of developing an irregular heartbeat, and cause a miscarriage.

7) Angelica: The roots, seeds and fruit of this plant are used in supplements and herbal teas. This supplement is used to treat heartburn, intestinal conditions, insomnia, nervousness and circulation problems. However, this plant should be avoided during pregnancy because it can cause uterine contractions and spontaneous abortion. It also raises skin cancer risks due to an increased skin sensitivity to the sun.

From autism to cancer, sulforaphane in broccoli has been extensively studied, but we need to make sure that we prepare broccoli correctly.

For example, let's say you make two batches of soup. In one soup you use fresh-cut broccoli, and in the other soup you use frozen broccoli.
The broccoli in both soups has similar amounts of vitamins, minerals and antioxidants… except for one vital antioxidant: Sulforaphane

A free radical is basically any atom whose outer shell has a single unpaired electron.
Only having one electron makes a free radical incredibly unstable and harmful to any other atoms nearby.

Free radicals rampage throughout the body searching for electrons they can steal from our normal, stable atoms.
This causes oxidative damage on an atomic level.
Free radicals are also known as reactive oxygen species.
When free radicals steal electrons from stable atoms, it can lead to the breakdown of countless cellular functions.

Biotransformation is the chemical process that converts toxins, chemicals, pathogens and other harmful substances into less toxic waste products that can be excreted from the body.
The liver takes care of over 70% of our detoxification efforts, but other detox sites include the kidneys, lungs, intestinal cells and skin. Maximum health potential depends on your detoxification systems.
How do antioxidants protect us? They possess extra electrons that they can donate to free radicals.

**Antioxidant Examples:** Garlic: Allicin, Turmeric: Curcumin, Tomato: Lycopene, Broccoli: Sulforaphane, Lemon: Hesperidin, Walnuts: Tocopherols, Cherries: Anthocyanin, Carrots: Beta Carotene, Grapes: Resveratrol, Peppers: Capsanthin, Onions: Quercetin, Green Tea: Catechins.

Detoxification Problems
If a person has problems with phase 1 detoxification, it can lead to a toxic overload condition inside the liver.
Harmful chemicals that were supposed to be broken down begin to accumulate and eventually cause liver damage.

On the flip side, what if your Phase 1 detoxification system is working properly, but you have problems with Phase 2 clearance? Enzymes in your liver will have trouble binding to & eliminating the toxic chemicals that were processed during Phase 1 detoxification.

Cytochrome p450 is a superfamily of 57 detoxification genes. These 57 genes produce enzymes that are involved in the synthesis and breakdown of chemical toxins during Phase 1 detoxification.

The job of these p450 genes is to produce specific enzymes that bind to & break down the 1,000s of harmful toxins that we are exposed to.

Researchers are constantly studying antioxidants and other phytochemical compounds in healthy foods to find out how they work inside our body. For example, a recent study found that red onions are a rich source of the amino acid cysteine. Cysteine is used by the liver to produce the critical antioxidant glutathione.

Brassica vegetables like kale, Brussels sprouts, mustard greens, collard greens, & broccoli aid the liver's ability to fight cancer. These vegetables contain a natural compound called Diindolylmethane (DIM). DIM helps the liver break down excess estrogen in the body, which reduces breast and cervical cancer risks.

A George Mason University study found that drinking coffee each day helps prevent non-alcoholic fatty liver disease by limiting the accumulation of fat deposits in the liver.

Cauliflower has also been shown to protect the liver by boosting the detoxification of carcinogenic chemicals.

The Journal of Surgical Research reported in 2012 that watermelon, persimmon and grapefruit contain carotenoid antioxidants that have anti-genotoxic effects in obstructive jaundice cases.

**Kale:** For example, kale is actually a good source of anti-inflammatory omega-3 fatty acids that can lower your risks of heart disease, HBP, blood clots and stroke. Kale also contains important plant flavonoids, carotenoids, Vitamins K, A, and C, as well as dietary fiber that naturally reduces blood sugar. Kale contains a powerful antioxidant called glucosinolate isothiocyanate that combats H. pylori, a bacteria that causes chronic inflammation of the stomach lining as well as gastric ulcers.

A recent study found that turmeric is able to attack a highly aggressive form of breast cancer called triple negative breast cancer (TNBC).

The National Institutes of Health reports that turmeric helps curb inflammation and decreases joint destruction caused by Rheumatoid Arthritis Synovial Fibroblasts (RASF).

Bioavailability is the biggest problem with turmeric. These substances help increase absorption:

Foods high in quercetin include: red wine, red grapes, onions, green tea, apples, cranberries, blueberries, black plums, red leaf lettuce, raw kale, chicory greens, raw spinach, sweet peppers, snap beans and raw broccoli. Quercetin (capers is the best source), cruciferous veggies, fats (olive oil, flax seed oil), black pepper

Dangerous Drug & Herb Interactions: 1. CoQ10/Warfarin 2. Melatonin/Diabetes meds 3. Kava Kava/ 100 meds such as pain killer buprenorphine 4. Black Cohosh/Acetaminophen 5. Evening Primrose Oil/Anti-seizure meds 6. Grapefruit juice/85 meds 7. St. John's Wort/Over 800 meds

LBM = 1 - Body Fat % x Weight

WHR = Waist (inches) / Hip (inches)

Understanding Food Labels

Free: the product must have zero, or a physiologically insignificant amount, of the nutrient in question

Low: the product does not exceed the Daily Value for the nutrient in question, even if an individual eats a large amount

High: each serving of the product must contain 20 % or more of the targeted nutrient's Daily Value

Lean: the food contains less than each of the following: 10 g of fat, 4 g of saturated fat, 95 mg of cholesterol per serving

Extra Lean: the food contains less than each of the following: 5 g of fat, 2 g of saturated fat, 95 mg of cholesterol per serving

Good source: each serving of the product contains 10-19 % of the targeted nutrient's Daily Value

Light: the product must contain 33 % fewer calories or 50 % less fat than that of a comparable reference food

Reduced/ Less/ Fewer/ More: used to compare a nutritionally altered product with a regular product

**Calorie Claims**

- **Calorie free: less than 5 calories per serving**
- **Low calorie: 40 calories or less per serving**
- **Reduced/Fewer calories: at least 25 % fewer calories per serving than a reference food**

**Sugar Claims**

- **Sugar free: less than 0.5 g per serving**
- **Reduced sugar: at least 25 % less sugar per serving than reference food**
- **No sugar added: no sugar added during processing**

**Fat Claims**

- **Fat free: less than 0.5 g per serving**
- **Saturated fat free: less than 0.5 g per serving**
- **Low fat: 3 g or less per serving**
- **Low saturated fat: 1 g or less per serving**
- **Reduced/ Less fat: at least 25 % less per serving than a reference food**

**Sodium Claims**

- **Sodium (Salt) free: less than 5 mg per serving**
- **Very low sodium: 35 mg or less per serving**

- **Low sodium: 140 mg or less per serving**
- **Light in sodium: at least 50% less sodium per serving than a comparable food which has regular salt content**
- **Reduced/ Less sodium: at least 25% less sodium per serving than a comparable food**
- **Unsalted or No salt added: no salt added during processing**

**Organic Claims**

**100 % Organic: all ingredients are 100% organic**

**Organic: at least 95 % of ingredients are organic**

**Made with organic ingredients: at least 70-95 % of ingredients are organic**

**Cholesterol Claims**

- **Cholesterol free: 2 mg or less of cholesterol and 2 g or less of saturated fat per serving**
- **Low cholesterol: 20 mg or less of cholesterol and 2 g or less of saturated fat per serving**
- **Reduced/ Less cholesterol: at least 25 % less and 2g or less of saturated fat per serving than a reference food**

**Fiber Claims**

**High fiber: 5 g or more per serving**

**Good source of fiber: 2.5 to 4.9 g per serving**

**More/ Added fiber: at least 2.5 g more per serving than a reference food**

**Cancer**

**Four Types of Cancer**: Carcinoma, Sarcoma, Leukemia, Lymphoma

**10 Hallmarks of Cancer**: (1) Cancer cells produce their own growth signals. (2) Cancer cells block signals that stop cell division. (3) Cancer Cells Resist Programmed Cell Death. (4) Cancer cells have unlimited reproductive potential. (5) Cancer Cells Produce Their Own Blood Supply. (6) Ability To Spread Other Organs (Metastasis). (7) Cancer Cells Have the Ability To Survive With Little Oxygen. (8) Cancer Cells Evade the Immune System. (9) Cancer Causes Genetic Instability. (10) Chronic Inflammation.

Most common metastatic sites: Bone, Liver, Lung

When cancer cells break away from a primary tumor site, they are called Circulating Tumor Cells (CTCs). As soon as these Circulating Tumor Cells get into the bloodstream, they can embed into a distant organ (like the lungs), where they are very capable of forming new and deadly tumors. Circulating Tumor Cells are extremely difficult to detect and treat with conventional cancer therapies, such as chemotherapy and radiation. Turmeric finds and destroys CTCs!!

For example, a 2014 study published in the journal *Cancer Prevention Research* found that injecting turmeric (curcumin) directly into breast cancer tumors resulted in the destruction of the malignant tumors.

**Chemical Stress**

In 2014, the California Office of Environmental Health Hazard Assessment proposed adding nitrites to the list of substances known to cause cancer in humans when combined with amines, such as amino acids found in processed meat.

According to the Cancer Prevention Coalition, children eating a dozen hot dogs a month have 9 times the risk of getting leukemia as the average child. Pregnant women eating one or more hot dogs a week double the risk of brain tumors for their babies.

Use of potassium bromate was approved by the FDA in 1958 and is still legal in the U.S., but due to modern cancer research, it has now been banned in Canada, China and the EU.

A 2010 study in the journal Food and Chemical Toxicology found that sodium benzoate causes significant damage to human DNA and chromosomes, as well as lymphocyte mutations. This artificial ingredient is even more toxic when combined with ascorbic acid.

Aliases for MSG: Glutamic acid, Autolized, Hydrolized, Textured protein, Yeast extract, Sodium caseinate, Soy protein isolate, Torula yeast.

In 2010, the Journal of Biological Chemistry reported that **carrageenan** causes an acute inflammatory response with the same Tumor Necrosis Factor cytokine as is seen in rheumatoid arthritis and inflammatory bowel disease.

The NIH study also found that **propyl gallate** was linked with prostate inflammation and a toxic liver condition called hepatic cytoplasmic vacuolization.

A 2010 study in the journal Food and Chemical Toxicology found that **sodium benzoate** causes significant damage to human DNA and chromosomes, as well as lymphocyte mutations. This artificial ingredient is even more toxic when combined with ascorbic acid.

This study also demonstrated that **potassium sorbate** caused significant increases in chromosomal aberrations and "DNA strand breaks" in lymphocytes.

The Center for Science in the Public Interest (CSPI) reports that a well-designed government study found that **TBHQ** increases the incidence of cancerous tumors in lab animals.

Wild salmon get their trademark pink color by eating tiny shrimp-like krill in the ocean. Farmed salmon, on the other hand, are usually fed synthetic fish food which gives their flesh an unappealing gray color.

**Fish to Avoid (Highest Mercury Levels):**

• King Mackerel

• Shark

• Swordfish

• Marlin

• Orange Roughy

• Tilefish (Gulf of Mexico)

**1 Serving per Week (Moderate Levels of Mercury):**

• Halibut

• Marlin

• Grouper

• Snapper

• Tuna (Canned, Albacore)

• Mahi Mahi

**2-3 Servings per Week (Lowest Levels of Mercury):**

• Anchovy

• Catfish

• Clams

• Crab

• Crawfish

• Lobster (Spiny)

• Oyster

• Pollock

• Salmon

• Sardines

• Scallops

• Shrimp

• Tilapia

• Trout (Freshwater)

## Cooking: Good

| | Nutrient | Food Sources | Comments |
|---|---|---|---|
| 1 | Lycopene | Tomato, red peppers, asparagus | 35% increase when tomatoes are cooked |
| 2 | Carotenoids (BC) | Sweet potato, carrots, spinach | Beta-carotene absorbs better when cooked |
| 3 | Ferulic acid | Mushrooms, asparagus, squash | Antioxidant involved in skin health |
| 4 | Vitamin B12 | Fish, beef, chicken, eggs, oysters | Not measurably affected by heat |
| 5 | Turmeric (Antioxidants) | Fresh turmeric root or powder | Boiling (tea) & cooking increases antioxidants |
| 6 | Indole-3-carbinol | Cauliflower, broccoli, cabbage, kale, Brussels sprouts, asparagus | Anti-cancer compound in cruciferous veggies improved by heat |

## Cooking: Bad

| | Nutrient | Food Sources | Comments |
|---|---|---|---|
| 7 | Polyphenols | Berries, cherries, plums, apples | Cooking causes total loss of some polyphenols |
| 8 | Vitamin C | Guava, bell peppers, citrus fruit | Heat can deactivate Vitamin C >30-50% |
| 9 | Quercetin/Allicin | Capers, onions, garlic | Damaged when overcooked at high temps |
| 10 | Vitamin B9 (Folate) | Avocados, mangos, romaine | Overcooking depletes folate |
| 11 | Flavonoids | Pomegranates, berries, onions | Powerful plant compounds damaged by heat |
| 12 | Turmeric (Curcumin) | Fresh turmeric root or powder | Boiling/cooking above 190 F destroys >85% |
| 13 | Piperine | Fresh black pepper | Nearly 60% is lost during cooking process |