



# FINDING THE ROOT CAUSE WITH NATUROPATHIC MEDICINE

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# **Finding the Root Cause with Naturopathic Medicine**

**By**

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## FINDING THE ROOT CAUSE WITH NATUROPATHIC MEDICINE

Throughout school I was taught to find the root cause and to focus on the root cause of disease. I was learning loads of information about human anatomy, human biochemistry, nutritional biochemistry, cellular physiology, functional blood chemistry, pharmacology, botanical medicine, and a wide range of other topics involving clinical and basic sciences. Those classes gave me a solid foundation of knowledge on human health. It wasn't until I started practicing, that I was able to expand upon my knowledge of health and gain a better understanding of the root causes of disease. Sure it sounds awesome to say the best course of treatment is to address the root cause, but what does that exactly mean?

Before we dive into the root causes of disease, I would like to briefly explain the differences between Naturopathic Medicine and Conventional Medicine. Ever since we were little, we were lead to believe “medicine” was taking drugs to make you feel better. I wish medicine was this easy, but it simply is not. Pharmacology is only a small section of medicine and leaves off the vast majority of other modalities of what medicine actually is. Don't get me wrong, pharmacology is vitally important in the role of health care today, but there is a proper place and time for it. Way too often doctors go straight to drugs and avoid all other modalities of medicine. Remember, **drugs are not medicine, drugs are one modality used in medicine.** Naturopathic medicine focuses on using all modalities of medicine.

Naturopathic medicine is a distinct primary health care profession that combines natural therapies with modern medicine. Yes, pretty awesome, I agree. Naturopathic doctors (ND) are trained as primary care providers during their time at school. Naturopathic Doctors and Medical Doctors have the same basic and clinical science education during their time at medical school. I often compare classes taken at Yale medical school to the curriculum taken at Naturopathic medical school. They are very similar but



Naturopathic Doctors actually take more classes. This is because we add about 10 more classes involving nutritional sciences, while our colleagues have a few more classes in pharmacology. **The number one myth about naturopathic medicine:** it's not based off evidence-based science. That is 100% false. I wouldn't recommend any protocol or therapy without the use of evidence-based science. Any individual who states it's not based off evidence-based research is either uneducated or extremely biased. Again, I'm a huge believer in evidence-based medicine and I've developed my protocols based on the latest peer reviewed research.

In school we are taught to use least invasive therapies first and gradually move towards more invasive therapies as they are needed. This stepping stone of therapies is called the therapeutic order and includes all the modalities of medicine. Below is a very brief explanation on the therapeutic order.

## THERAPEUTIC ORDER

1. Identify and remove obstacles to cure
  - a. If dairy causes gas: Remove dairy from diet
2. Stimulate self-healing mechanisms
  - a. Example: paper cut healed by the immune system.
    - i. Numerous phytonutrients can help stimulate the immune system to help heal injuries. Drugs don't heal, our immune system does.
3. Support and restore weakened systems
  - a. Fatty acids are important for the reproductive system
4. Restore proper structural integrity
  - a. Example: chiropractic adjustment
5. Natural substances to help alleviate symptoms and signs of poor health
  - a. Vitamins, minerals, botanicals, and other supplements
6. Synthetic substances to help alleviate symptoms and signs of poor health
  - a. Pharmacology



## 7. Surgery

Based off the therapeutic order, drugs and surgery should not be the first option health care practitioners use. Visits with your ND are usually around 90 minutes for your first appointment and 30 minutes for follow up appointments. This is because we are asking detailed questions about your health history to determine which step of the therapeutic order to use.

## PREVENTATIVE MEDICINE AND HEALTH CARE COST

Where in the world has preventative medicine gone? Unfortunately, with the current health care system, most MD's only get 3-5 minutes with patients. Most MD's don't like this either, it's just the system they work in. That blows my mind and I believe it's the culprit of the epidemic of chronic disease in the United States. **7 of the top 10 causes of death in 2010 were chronic diseases.** Two of these chronic diseases, heart disease and cancer, together accounted for nearly 48% of all deaths. <sup>(1)</sup> Arthritis is the most common cause of disability. <sup>(2)</sup> Diabetes is the leading cause of kidney failure, lower-limb amputations other than those caused by injury, and new cases of blindness among adults. <sup>(3)</sup> The numbers are approaching that 1/3 of individuals in the United States will be either pre-diabetic or diabetic in the near future. These stats are screaming: WE NEED PREVENTATIVE MEDICINE. Clearly, the current system in place is not optimal and is not working.

The cost of health care is rising at a very fast rate. 86% of all health care spending in 2010 was for people with one or more chronic medical conditions. <sup>(4)</sup> The total cost of heart disease and stroke in 2010 were estimated to be \$314.4 billion <sup>(5)</sup> and \$157 billion for cancer care. <sup>(6)</sup> The total estimated cost of diagnosed diabetes in 2012 was \$245 billion <sup>(7)</sup> and in 2003 the **total cost of arthritis and related conditions was about \$128 billion.** <sup>(8)</sup> Preventative Medicine can go a long way towards reducing cost of health care in the United States today. Guess what Naturopathic



Medicine focuses on? If you said Preventative Medicine, you would be correct.

## THE ROOT CAUSE

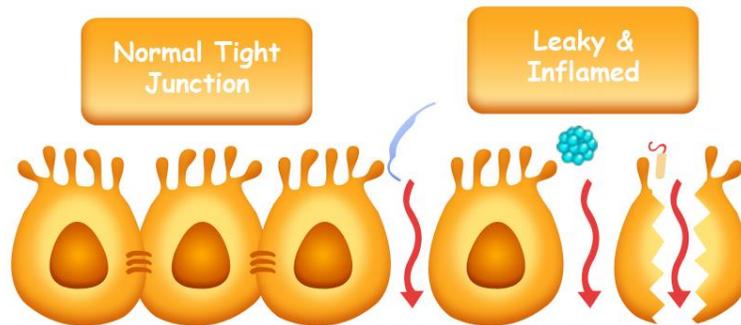
The topics covered in this ebook are not the only causes of chronic diseases. I simply wanted to educate individuals on a different school of thought, one that maybe you've never heard of. Of course, there are other causes of disease and dysfunction in the body that I won't be addressing. This ebook is not a replacement for medical intervention. This information is to help you find a possible explanation for your health issues and to generate a platform on which to work with your physician. I encourage you to discuss these health issues with your doctor. In my opinion, the root causes I discuss in this book are the top common causes of disease that are often overlooked by health care professionals.



## LEAKY GUT

### WHAT IS LEAKY GUT SYNDROME?

Leaky gut is a term used as a simple explanation for increased intestinal permeability. Imagine your intestines as a long hose. If the hose is not damaged, then water will move freely through one end and out the other side. Now, imagine that same hose with tiny punctures. The water now leaks out before reaching its intended destination. Leaky Gut Syndrome is similar to a damaged hose, as particles can leak out into the body where they shouldn't be. This causes damage and dysfunction resulting in poor health.



Your intestines are designed to act as a natural and selective barrier allowing nutrients in while keeping foreign objects from entering and reaching the blood supply. **With leaky gut, there is damage to this natural barrier**, exposing our body's immune system to objects it normally isn't exposed to. The natural barrier is called a tight junction and with leaky gut, tight junctions fail (picture above). Your tight junction is what keeps out toxins, microbes, and undigested food particles from reaching the blood stream. A healthy functioning intestinal mucosa is the body's primary line of defense against these potentially lethal agents.

As more individuals are affected by poor dietary choices, toxin and chemical exposure, high levels of stress, and dysbiosis (bacteria imbalance),



it seems that the prevalence of leaky gut has increased significantly. <sup>(9)</sup> Good news is that the medical community is finally agreeing this condition exists, so hopefully more research will be available soon. Currently, there is plenty of research that links leaky gut to a number of health problems.

## WHAT CAUSES LEAKY GUT?

It's important to note; **it's rarely one trigger that causes leaky gut.** It's an accumulation of some factors, over time, that attributes to leaky gut syndrome. <sup>(18-30)</sup>

Diet

Alcohol

NSAIDs

Infections

Inflammation

Stress

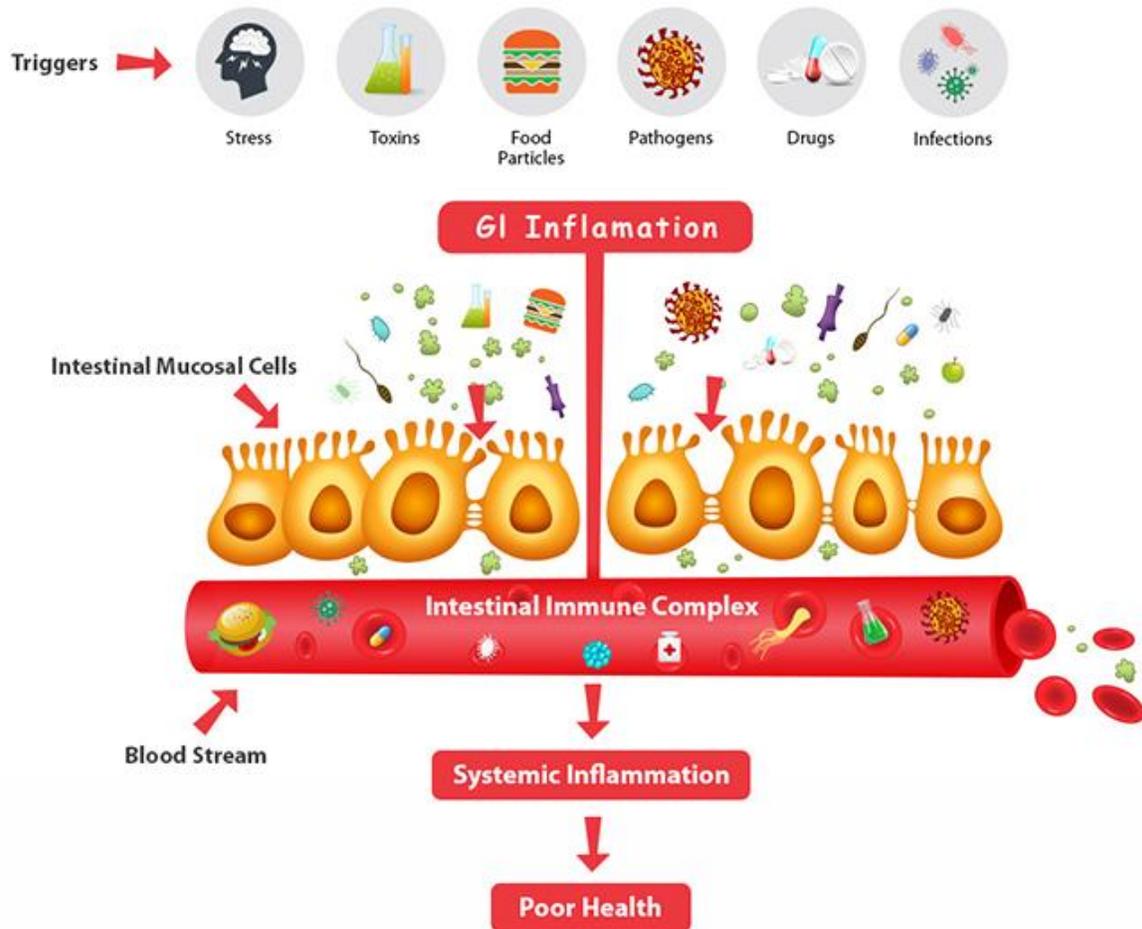
Pancreatic insufficiency

Bacterial imbalances

Oxidative stress



## PROGRESSION OF LEAKY GUT



### WHAT ARE THE SYMPTOMS OF LEAKY GUT SYNDROME?

Leaky Gut Syndrome can express itself many ways, **which is why it's missed by health care professionals**. Currently there is plenty of research that links leaky gut to a number of seemingly unrelated health issues and chronic diseases, and not just digestive disorders which is a common misconception.



- Multiple food intolerances / sensitivities / allergies
- Chronic pain
- Inflammatory issues
- Bloating
- Fatigue
- Digestive complaints: Diarrhea, Constipation, Bloating, Gas
- Irritable Bowel Syndrome (IBS) symptoms
- Slow metabolism (weight gain or difficulty losing weight)
- Headaches
- Joint pain
- Poor Skin health (Acne, Eczema, Rosacea)
- Poor Thyroid Function
- Immune System Dysfunction
- Oxidative Stress
- Blood Sugar Dysfunction

## HOW CAN NATURAL MEDICINE HELP?

**Numerous studies link leaky gut to intestinal inflammation, oxidative stress, and depletion of vital micro-nutrients.** Addressing these causes will benefit individuals suffering with leaky gut. Here are 3 tips that can help.

1. Quercetin is an antioxidant and also acts as a natural anti-inflammatory.<sup>(10)</sup> Studies have shown that Quercetin enhances intestinal barrier function and reduces intestinal inflammation.<sup>(11-13)</sup>
2. L-Glutamine is an important energy source for cells of the intestinal mucosa and has been shown to be important for normal mucosal structure and function.<sup>(14-16)</sup>
3. Zinc deficiency has been shown to cause disruption in mucosal barrier function and inflammation.<sup>(17)</sup>



## INFLAMMATION

### WHAT IS INFLAMMATION?

Inflammation is a process that occurs to protect ourselves from further injury, usually as a reaction to an injury, stress, or infection. Short term or acute inflammation is an important component of our immune systems, to help fight infection or injury. For example; when a person sprains their ankle and swelling results, this is a form of acute inflammation. **The immune system immediately responds to the injury by activating certain cellular responses** at the site to release inflammatory mediators, which will result in increased blood flow and white blood cells to injured tissue to stimulate the healing process. In this example, inflammatory mediators will result in increased sensitivity to pain (to prevent further injury), heat, redness, and swelling to injured region. Acute inflammation is an innate and normal process.



### CHRONIC INFLAMMATION

Chronic inflammation is an entirely different story and can wreak havoc on our bodies in numerous different ways. Chronic inflammation is low grade and systemic, and is often asymptomatic, meaning no presentable symptoms. This



process is usually a result of an over-active immune system attempting to fight an underlying problem. Over time, the overactive immune system floods the body with defense cells and other mediators, that **results in damaging tissue as opposed to healing tissue**. More often than not, this chronic inflammation is a result of consumption of a standard American diet, stress overload, and/or environmental toxins, just to name a few. Determining the cause of the chronic inflammation is vital to address the root cause of the problem. Chronic inflammation isn't the root cause, something is causing the chronic inflammation which needs to be determined before treatment. Other chapters will discuss factors that can cause inflammation such as leaky gut, oxidative stress, and mitochondrial dysfunction.

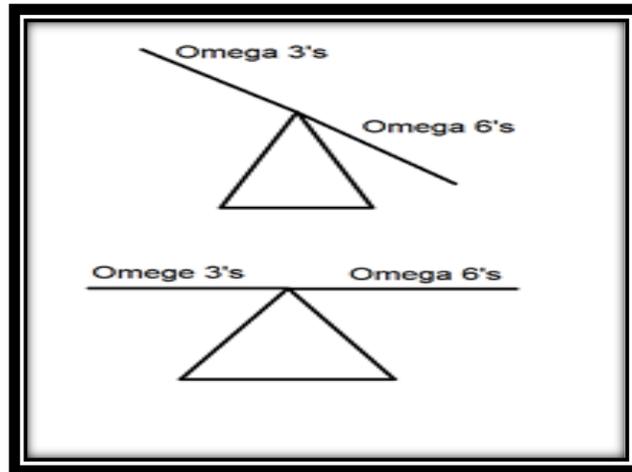
I mentioned above that inflammation occurs when the immune system is fighting a threat to the body. Possible threats include pathogens/microbes, injuries (like a paper cut), and toxic or chemical exposure the body doesn't recognize. The immune system uses inflammation in the short term to its benefit which helps repair damaged tissue. Hormones (bradykinin and histamine) dilate blood vessels in the surrounding area of the inflammation allowing for more blood to reach the injured tissue resulting in healing of the tissues. The cardiovascular system is vital in delivering immune cells to the injured tissue. If the threat is contained or eliminated and the tissue repaired, then inflammation is no longer needed to help the body heal. **Chronic inflammation is a complication in the body where the tissues are not healing because of a constant stress.** To be able to address the root cause one must determine the cause of the chronic inflammation.

## WHAT INFLUENCES INFLAMMATION?

Sub-optimal fatty acid ratios can lead to a worsening of chronic inflammation. Processed foods are usually loaded with omega-6's because it's cost effective to use certain oils to make said processed food. Our livestock are being feed diets high in omega-6 containing grains to speed up time from farm to grocery stores. This process is actually changing the makeup of the livestock we consume at the cellular level. Omega-6's are perfectly healthy and have a number of different actions in the human body. The problem occurs with the



incorporation of including excessive amounts of omega-6's into the diet. This has led to a dramatic change in the ratio of omega-6 and omega-3 fats consumed.



This increased ratio of omega-6's to omega-3's has contributed to the epidemic of chronic inflammation. A normal ratio of omega-6's to omega-3's is about 1:1 to 4:1. **Anything above this ratio has shown to have an inflammatory effect.** Guess what the ratio is for the average American? 10:1..... nope, a whopping 20:1. Normalizing levels to a 1:1 ratio can have profound health benefits.

Leaky gut, also known as, “increased intestinal permeability”, causes inflammation and is linked to numerous chronic conditions. We discussed leaky gut in the previous chapter, but I’ll give a brief explanation of leaky gut again. Tight junctions acting as a barrier in the intestines become damaged and undigested food particles, microbes, and toxins leak into the blood stream leading to chronic inflammation and activation of immune complexes. Auto-immune disease is a self-perpetuating immune reaction that results in tissue damage and inflammation. Some evidence suggests this process is caused by a “leaky gut”. I only mention this because leaky gut is a cause of inflammation and another connection to chronic disease that isn’t being addressed.



## DISEASES LINKED TO CHRONIC INFLAMMATION

Inflammation has been linked to numerous health issues and researchers are currently investigating the role chronic inflammation has on bodily functions. **Chronic inflammation can occur for years without you noticing** and has been linked to conditions such as cancer, heart disease, diabetes, arthritis, depression, and Alzheimer's. <sup>(31)</sup> Other conditions that also have a connection to chronic inflammation include autoimmune diseases, arthritis, inflammatory bowel disease, allergies, neurological diseases, and a number of digestive disorders.

## ADDRESSING CHRONIC INFLAMMATION AT THE ROOT CAUSE

Most doctors focus on treatment of the symptoms and not addressing the root cause of an issue. Medications are often given to reduce pain, but I believe a better approach would be to reduce inflammation in the body. The following suggestions are a few additions you can add to your meals to help address inflammation. These 3 tips can help individuals suffering from chronic inflammation, but remember each individual is unique and usually suffering from more than just chronic inflammation. This is a great start though.

1. Normalize omega-6 to omega-3 ratio by increasing foods such as wild caught salmon, walnuts, chia seeds, and flax seeds. Avoiding processed foods will also help normalize the ratio.



Tip: orange color is indicative of increased omega-6's because its farm raised salmon. Dark pink or red salmon is higher in omega-3's and a good indication it was wild caught.



2. Increase anti-inflammatory phytonutrients found in turmeric, rosemary, ginger, and boswellia. Over 25,000 phytonutrients exist in nature and each one has several benefits. Turmeric has been found to exert antioxidant, anti-inflammatory, and anti-mutagenic activity. <sup>(32)</sup>



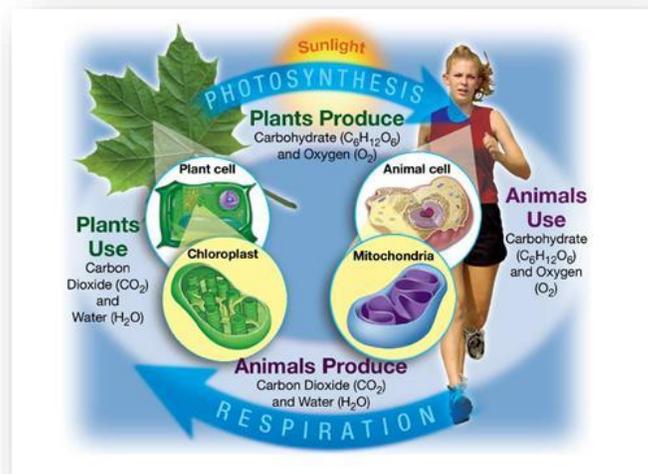
3. Avoid inflammatory foods <sup>(31)</sup>
  - a. Refined carbohydrates such as white bread and pastries.
  - b. Fried foods
  - c. Soda and other sugar sweetened beverages
  - d. Red meat and processed meats
  - e. Margarine and shortening



## MITOCHONDRIA: YOUR POWER HOUSE

### WHAT ARE MITOCHONDRIA?

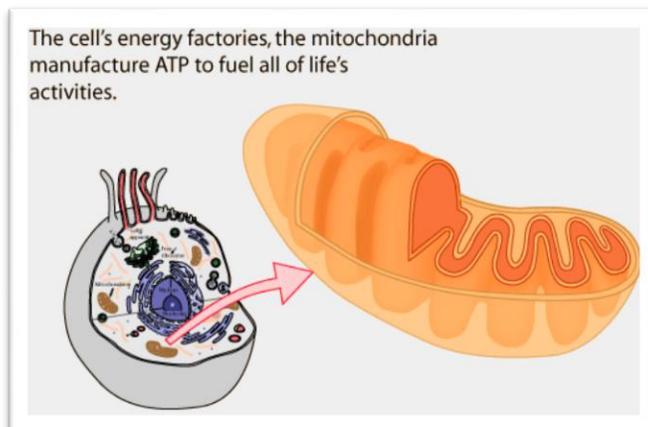
Mitochondria are organelles found in most cells where energy production occurs. Cells that require a lot of energy, such as the heart, have the most Mitochondria. It is here, in the Mitochondria, that the air we breathe meets with nutrients we consume to form energy. This is a massively complex process involving the electron transport chain and the Krebs cycle that I won't bore you with. Yea, you could say it's a vital process in the body that everyone should have some general knowledge of because it involves 2 things we are constantly doing, breathing and eating. **Anyone who is fatigued needs to pay attention to this chapter.**



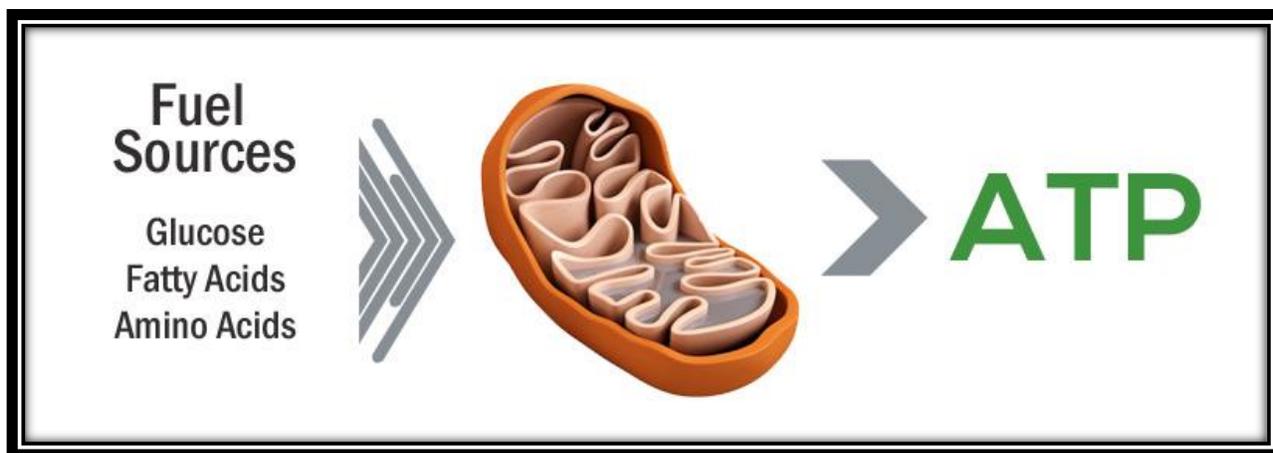
As we all learned in high school, the mitochondria are the power house of the cell! What in the world does that mean? Well the mitochondria generate most of the cell's supply of ATP which is a source of chemical energy. If dysfunction is occurring inside the mitochondria, we generate less ATP resulting in fatigue and a wide range of other health problems. The mitochondria have numerous other roles in the body such as cell signaling, cellular differentiation, and programmed cell death, but that's a different story for a different day. Let's



focus mostly on the energy producing effects of the mitochondria and it's role with chronic disease and fatigue.

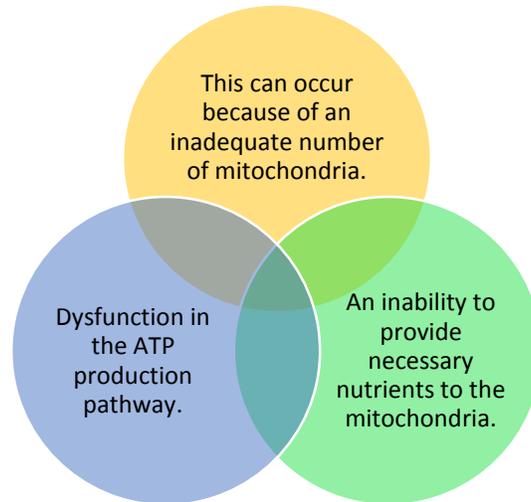


**The simplest explanation I've come up with for mitochondrial dysfunction;** we consume macronutrients (carbs, protein, fats) and micronutrients, (vitamins and minerals) which are broken down (metabolized), which eventually leads to energy production (ATP production) from the mitochondria. If this process is inhibited, then we have less energy production.



Of courses it really isn't that simple. Mitochondrial dysfunction results in a reduced ability of mitochondria to produce ATP which is a naturally occurring process of aging but is also involved in chronic disease. There are numerous causes for this to occur but the top three are listed below.





Loss of function in mitochondria, the key organelle responsible for cellular energy production, can result in fatigue and other symptoms that are common complaints in numerous chronic diseases. <sup>(33)</sup> At the molecular level, a reduction in mitochondrial function is linked to chronic disease including neurodegenerative diseases, such as Alzheimer's disease, Parkinson's disease, and ALS, as well as heart disease, diabetes, mood disorders, digestive disorders, chronic fatigue syndrome, and fibromyalgia.

## SUPPORTING MITOCHONDRIAL DYSFUNCTION

Fatigue can be a result of dozens of different health issues and is usually described as a loss of overall energy and inability to perform even the simplest tasks without exertion. **Moderate to severe fatigue is always related to mitochondrial dysfunction in some capacity.** You need to seek medical care for a full explanation of your fatigue and one question you need to ask your doctor is how can you improve mitochondrial function. A few natural options include CoQ10, L-Carnitine, and A-lipoic acid. <sup>(33)</sup>

1. A-lipoic acid acts as an important co-factor for certain chemical reactions involving the mitochondria. Studies have shown A-lipoic acid combats oxidative stress of mitochondria as well as increasing electron transport function aka producing more chemical energy.



2. L-Carnitine: directly involved in transport of fatty acids into mitochondrial matrix. L-Carnitine deficiency is linked to reduced mitochondrial function.
3. CoQ10: co-factor and vitally important part of the electron transport chain and a potent antioxidant. CoQ10 is a common nutrient found to be deficient in a number of different chronic diseases.



## OXIDATIVE STRESS

### WHAT IS OXIDATIVE STRESS?

You've probably heard about oxidative stress, free radicals, ORAC scores, or antioxidants through a friend or blog or news outlet. This is a major process that is often misunderstood. I've read blogs stating that free radicals are the root cause of all disease and everyone must supplement with antioxidants. This is just not true. Our bodies produce free radicals as byproducts of certain cellular reactions and can even help detoxify the body. Our immune system uses free radicals to destroy foreign invaders and destroy damaged cells. It's true that free radicals also damage DNA, cell membranes, enzymes, but it's all about maintaining a healthy balance of free radicals and antioxidants in the body.

I could write an entire book discussing the process involved with oxidative stress. But first let's start with a simple example. You take a bite of an apple and the phone rings. It's your boss so you have to take it, so you put the apple down and talk on the phone for a while. When you return the part of the apple you bit into has turned brown. The browning of the apple is oxidative stress. The same thing is occurring inside our bodies every single day. **Though we can fight back and prevent oxidative damage with antioxidants we produce ourselves and through the foods we eat.** Maintaining a healthy balance of free radicals and antioxidants is key for optimal health and proper bodily functions.





Ok, I'm going to give a brief scientific explanation here because I'm a nerd and that's what I do. The most important structural feature of an atom for determining its chemical behavior is the number of electrons it has. Oxidation is a reactive chemical process where one atom with an unpaired electron (electrons like to be in pairs) robs an electron from another atom to make it a pair. Guess what, now this atom has an unpaired electron and needs to steal an electron from a different atom. You can probably guess this can have a snowball effect and cause dysfunction in the body. A free radical is an atom that is missing an electron and is therefore unstable and highly reactive, wanting to steal from other atoms. The damage done by free radicals is called oxidation. Antioxidants carry an extra electron with them to combat oxidation by donating one of their own electrons. These antioxidants then pick up another electron from a safe source without generating a new free radical. **We can both produce our own antioxidants or obtain them through our diets.** There are many things in our environment that are free radical producers which leads to oxidative stress. These include fried and char-broiled foods, drugs, alcohol, lead, mercury, excess UV light, air pollution, pesticides, breathing, normal metabolism, immune function, pollution, radiation, smoking, herbicides, and the list goes on.



**One of the major causes of oxidative stress in the body is a result of elevated blood glucose.** Individuals with metabolic diseases such as diabetes need to maintain healthy blood glucose levels to prevent dealing with the consequences of oxidative stress. This is especially important for the cardiovascular system, kidneys, eye, and nervous system as they lack GLUT 4 receptors that are important for blood glucose regulation. These are the 4 areas of the body that diabetics usually have some sort of complication arise. Maintaining healthy blood glucose levels and intake of adequate amounts of antioxidants is crucial for diabetics.

Research supports a theory that **free radical damage is behind the process of aging**, where accumulated damage over a lifetime leads to eventual breakdown of cellular processes. <sup>(34)</sup> Free radicals and the resulting oxidative stress has been linked to heart disease, diabetes, arthritis, lupus, autoimmune disease, and chronic inflammation. When antioxidant levels in the body are lower than that of free radicals due to poor nutrition or excess oxidative stress, oxidation occurs (browning of apple) causing damage at the cellular level and even mutates our own DNA.

## GOALS TO COMBATING OXIDATIVE STRESS

The body has multiple ways in dealing with oxidative stress. These include micronutrients that we consume, repair mechanisms via the immune system, and a process called apoptosis (destruction of cells) via the immune system. Constant influx of certain foods can cause an excessive amount of oxidative stress. Foods with a high glycemic index or glycemic load (foods that can raise blood sugar levels) have been linked to oxidative stress. Processed foods have also been linked to excess oxidative stress. Eating antioxidants rich foods will help the body avoid being in a state of excess oxidative stress. Eat “ACE” and you will get plenty of antioxidants. ACE stands for vitamin A, C, and E.





### Vitamin C Foods

- Red peppers
- Guavas
- Kale
- Parsley
- Collard greens
- Green peppers
- Broccoli
- Brussels sprouts
- Mustard greens
- Watercress
- Cauliflower
- Red cabbage
- Strawberries
- Papayas
- Spinach
- Orange
- Cabbage
- Lemon
- Grapefruit – careful with meds
- Turnips
- Mangoes
- Asparagus
- Cantaloupe
- Swiss chard
- Green onions
- Tangerines
- Peas
- Radishes
- Raspberries
- Squash
- Honeydew melon

### Vitamin A Foods

- Liver
- Dairy products like whole milk, cheese, and butter
- Fish: tuna, sardines, herring, trout
- Chili peppers
- Apricots
- Collard greens
- Carrots
- Kale



- Sweet potatoes
- Parsley
- Mustard greens
- Mangos
- Papayas
- Tomatoes
- Squash
- Grapefruit – careful with meds
- Pumpkins
- Broccoli
- Cantaloupe
- Peas
- Spinach
- Watermelon
- Orange peppers
- Corn
- Eggs
- Beets
- Kiwi

#### Vitamin E Foods

- Sunflower seeds
- Almonds
- Whole-wheat flour
- Spinach
- Peaches
- Prunes
- Tomatoes
- Cabbage
- Asparagus
- Avocados
- Broccoli



## ACIDIC VS ALKALINE

### WHAT IS pH?

Before diving into acidic vs alkaline states of our bodies, we first must discuss what pH means and why it's important in terms of a healthy body. pH is a measure of the hydrogen ion concentration of a solution. What does that mean regarding your health? It's basically a measure of the acidity or alkalinity of our body's fluids and tissues. A sub-optimal pH will result in bodily dysfunction and miscommunication at the cellular level. The human body has an amazing ability to maintain a steady pH in the blood with the main compensatory mechanisms involving renal (kidneys) and respiratory systems.

- Solutions with a high concentration of hydrogen ions have a low pH which is termed an acidic state.
- Solutions with a low concentration of hydrogen ions have a high pH which is termed a basic state or alkaline state.

**Different systems in the body require varying levels of pH.** Our kidneys are the major organ responsible for regulating pH levels of the blood plasma. When the pH is outside a certain range, then dysfunction occurs. pH is measured on a scale of 0 – 14; a lower pH is considered acidic and a higher pH alkaline. A pH of 7 is neutral and pure water is scaled at 7. For most bodily processes, a slightly alkaline pH of 7.3-7.4 is optimal. This of course is very generalized as different biochemical processes require a wide range of pH levels. This is a topic that is highly debated in the medical world and one that current research is building upon. I will say metabolic acidosis can be a severe condition that warrants immediate medical attention and could be a clear indication of kidney dysfunction. The following graph shows varying pH levels in our bodies along with its function. Varying internal environments thrive in a more acidic environment while others a more alkaline environment. Chart below. <sup>(35)</sup>



Organ, fluid or membrane	pH	Function of pH
Skin	Natural pH is between 4 and 6.5	Barrier protection from microbes
Urine	4.6 to 8.0	Limit overgrowth of microbes
Gastric	1.35 to 3.5	Break down protein
Bile	7.6 to 8.8	Neutralize stomach acid, aid in digestion
Pancreatic fluid	8.8	Neutralize stomach acid, aid in digestion
Vaginal fluid	<4.7	Limit overgrowth of opportunistic microbes
Cerebrospinal fluid	7.3	Bathes the exterior of the brain
Intracellular fluid	6.0–7.2	Due to acid production in cells
Serum venous	7.35	Tightly regulated
Serum arterial	7.4	Tightly regulated

**Biochemical processes function optimally in a set pH range.** Varying from these ranges contributes to dysfunction in the body, creates an environment for harmful organisms to thrive, damages tissues, and stresses immune function which leads to poor health. Now the most important question. What causes an acidic state in our bodies? The list is long and includes:

- Alcohol
- Drugs
- Stress
- Dietary imbalances
- Toxins
- Pesticides
- Shallow breathing
- Excess hormones from food
- Beauty and home cleaning products
- Use of plastics
- Food preservatives
- Exercise



## ELECTROLYTES AND pH

Everyone has heard the term electrolytes and everyone knows they are vital for health, especially in athletes. Electrolytes such as calcium, magnesium, and potassium will help influence a healthy pH balance throughout the body. In states of high acidity, our bodies will actually rob these important nutrients from one area of the body to another area with increased need. **Over time these cells and tissues which are being robbed end up being deficient in these nutrients which will result in dysfunction.** These electrolytes could be beneficial for individuals who want to focus on prevention and general wellness.



Popeye most likely ate a more alkaline diet as spinach is loaded with calcium, magnesium and potassium.

The effects of an acidic internal environment can be seen throughout the body via numerous biochemical pathways which will deplete one system, while another system responds to the abnormal pH levels. Sodium intake has shown to have an influence on pH for individuals that consume excessive amounts of acidic foods. **Research has shown that an alkaline diet increases growth hormone and osteocalcin, which can be beneficial for bone growth.** <sup>(35)</sup> A healthy balance of alkaline and acidic foods is needed in ones diet to maintain optimal health.

An area of the body where pH is extremely important is in the stomach. Your stomach must be highly acidic to break down the food you're consuming and for proper absorption of nutrients. If you're pH is sub-optimal in the stomach then you won't be getting those vital nutrients needed for optimal health. If



you're having issues with heartburn, burping, bloating, nausea, or gas after eating, then it's very likely you have sub-optimal stomach pH. Appropriate amounts of stomach acid is crucial for our immune system, gastrointestinal system, and for adequate nutrient absorption.

## CONDITIONS LINKED TO A SUB-OPTIMAL pH ENVIRONMENT

- Allergies
- Fibromyalgia
- IBS
- Heartburn
- Digestive disorders
- Fatigue
- Headaches
- Inflammation
- Joint and muscle pain
- Weight gain or difficulty losing weight
- Irritable bowel syndrome
- Arthritis
- Diabetes
- Osteoporosis

## GOALS TO HELP WITH SUB-OPTIMAL pH LEVELS

- Detoxification: It's very common for individuals with sub-optimal pH levels to have some degree of chemical or metal toxicity. Starting a simple liver cleanse will help your body detoxify these harmful molecules.





- Nutrition: an optimal diet is composed of a balance of acid and alkaline foods.
  - Increased fruits and vegetables in an alkaline diet would improve the sodium/potassium ratio and may benefit bone health, reduce muscle wasting, and has shown to be beneficial for heart health.
  - The resultant increase in growth hormone with an alkaline diet may improve many outcomes from cardiovascular health to memory and cognition.
- Magnesium, which is required for the function of many enzymatic systems, is another added benefit of the alkaline diet. Magnesium is required to activate vitamin D, which has numerous benefits such as immune health.

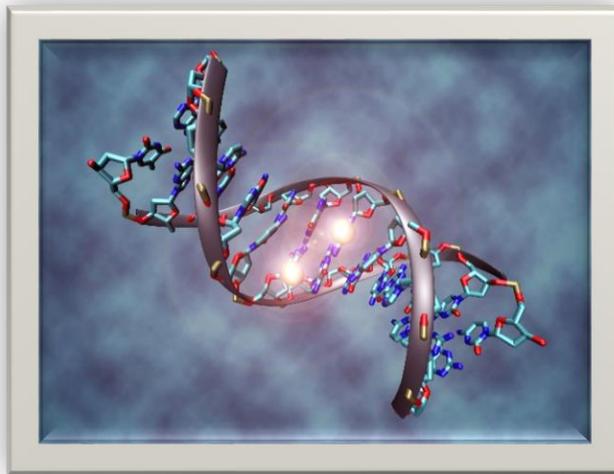


## METHYLATION

### IT'S IN YOUR GENES

Like it or not, genetics plays a huge role in regards to our health. Now I absolutely HATE it when doctors state, “it’s your genetics” and there’s nothing that can be done. There is no simple way to say this, that is a lazy answer. Of course it’s genetic, every condition or trait is genetic. Just because your genetically susceptible to a condition doesn’t mean you are doomed.

Epigenetics is the study of biochemical processes that can either turns genes on or off. There are over 20,000 genes which act to make proteins complexes which trigger vital bodily functions. So we might be genetically susceptible to a certain disease, but ultimately our epigenetics decides which genes to turn on and which genes to turn off. Now, I hope you can appreciate that this is a very complex topic, which I’m not going to break down fully. I just want to cover the basics.



**Just because your mother or father has elevated cholesterol, doesn’t mean you will have elevated cholesterol.** It does mean you most likely have a higher susceptibility towards elevated cholesterol levels. I like to use a metaphor when explaining epigenetics or preventative medicine. Imagine you have a glass



40% filled with water. This glass is representative of you being 40% susceptible towards having elevated cholesterol. Now we will fill the cup with an additional 20% of water for a total.....



of 60% filled. That additional 20% is a representation of eating a diet high in saturated fats. Now add an additional 20% because you live a sedentary lifestyle, another 20% because you smoke, and another 5% because you drink 2 sodas a day. Now the water is overflowing and now you have elevated cholesterol. These additional amounts of water you pour into the cup is representative of certain epigenetic factors.

**Epigenetics is everywhere.** It's in what you eat, what you drink, environmental surroundings, beauty and cleaning products, other toxic exposures, etc. Epigenetics controls genes, and contributions from daily life can cause genes to be turned off or turned on by chemical modification. Epigenetics plays a role in a number of different diseases including cancer and Alzheimer's. Obviously, our susceptibility for certain diseases is different for all individuals. The field of epigenetics is growing very rapidly and will carry vast significance regarding our health once we have a better understanding of how epigenetics can influence certain genes.

My main reason for bringing up the topic of genetics is because of a common defect I see in a large portion of individuals in my office. MTHFR defect. Please feel free to giggle at the abbreviation. I'll pause a second for you.



Methylation is a process in human biochemistry that is vital for DNA/RNA synthesis, protein synthesis, lipid synthesis, neurotransmitter synthesis and hormone balance. **I would argue this is the most important process in human biochemistry that is often overlooked by health care professionals.** For women who are having difficulty becoming pregnant, methylation is a topic you need to discuss with your doctor.

The MTHFR gene is located from base pair 11,845,786 to base pair 11,866,159 located on chromosome 1. What did I just say? Don't worry about it, just realize there are about 3 billion base pairs. We are just now touching the surface of genetics and epigenetics in regards to health. The MTHFR gene provides instructions to make an enzyme called methylenetetrahydrofolate reductase which ultimately is responsible for donating methyl groups to different substrates in the body. Currently there are 43 different mutations or defects associated with this gene with the most common being 677 MTHFR and 1298 MTHFR.

## WHY IS METHYLATION IMPORTANT?

Why in the world do you care or why is this important? Because **methylation is a vitally important process occurring in the body, especially for women concerned about fertility.** The following bullet points are factors involving methylation.

- Processes estrogen
  - Lack of methylation results in excess estrogen
  - Infertility is common
- Optimal immune function and production of certain immune cells.
  - T cell and NK cell production
- DNA and RNA synthesis
- Important for energy
- Myelination: cover for our nerves
- Glutathione production
  - Glutathione is an antioxidant which helps with detoxification.



- Low levels of glutathione linked to issues with memory.
- Methylation helps clear heavy metals and BPA toxins
- Influences BH4 levels (tetrahydrobiopterin)
  - Co-factor important for production of serotonin, melatonin, dopamine, norepinephrine, and nitric oxide.



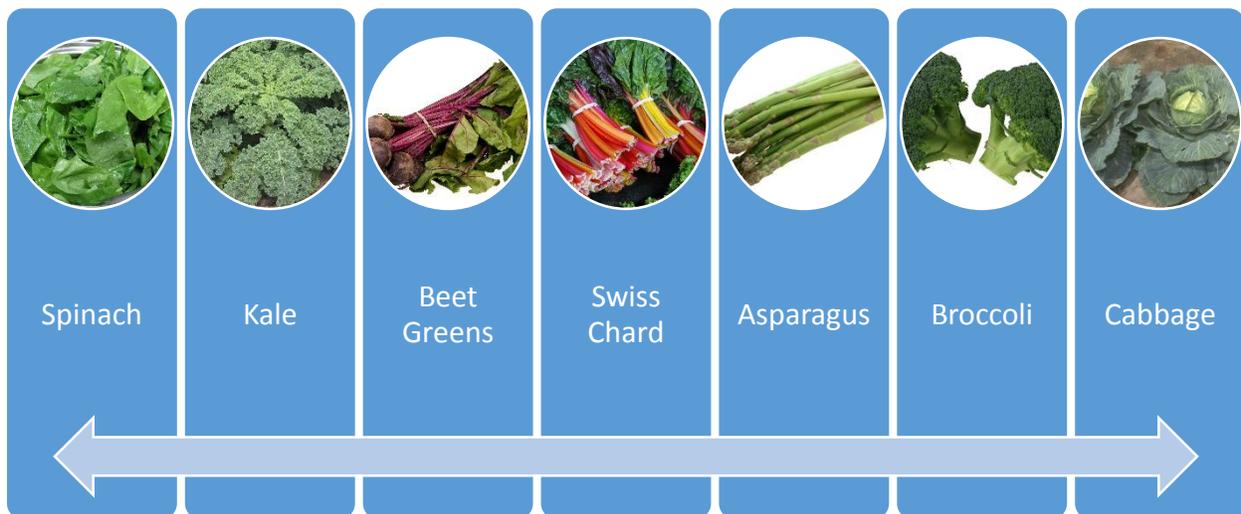
## CONDITIONS RELATED TO DEFECT

- |                     |                          |                         |
|---------------------|--------------------------|-------------------------|
| Diabetes            | Multiple Sclerosis       | Chronic Viral Infection |
| Cancer              | Dementia                 | Thyroid Dysfunction     |
| Pulmonary Embolisms | Chemical Sensitivity     | Neuropathy              |
| Cleft palate        | Congenital Heart Defects | Recurrent Miscarriages  |
| Spina bifida        | Fibromyalgia             | Infertility             |
| Autism              | Chronic Fatigue Syndrome | Anxiety                 |
| Parkinsons          | Depression               | Allergies               |
| Neural Tube Defects | Alcoholism               |                         |
| Atherosclerosis     | Addictive Behaviors      |                         |
| ADD/ADHD            | Insomnia                 |                         |



## HELP WITH METHYLATION

Vitamins and minerals are co-factors in human biochemistry. To get from point A to point B you need a catalyst to make the reaction happen. Co-factors are essentially a catalyst responsible for making reactions occur. With the poorly drawn picture above, vitamin B2, B6, and B12 are the co-factors necessary for methylation. **You can't make serotonin or dopamine without these important co-factors.** The list of the following foods contain co-factors that are essential with methylation.



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