

Total Immunity Bundle

**ReMag, D3-K2 ReSet,
Vitamin C ReSet, Pico Zinc**



Carolyn Dean MD ND

A Complementation Formula Book

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Vitamin C ReSet, Pico Zinc**

CAROLYN DEAN, MD, ND

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INTRODUCTION

I set out to write an eBook about our latest dietary supplement, *D3-K2 ReSet*, one that we felt compelled to offer to our customers to help support the immune system. But I quickly realized it's not a standalone product. First of all, it's much more effective if you're already saturated with *ReMag* and it goes along with *Vitamin C ReSet*, *D3-K2 ReSet*, and *Pico Zinc*, which make up our *Total Immunity Bundle*

I could write a full-length book about each of these nutrients and all their myriad activities, but I'll try to focus on the ability of these nutrients to support the structure and function of the immune system – although they are also going to boost longevity, energy, and happiness too! So, this book, *Total Body Immunity*, will bring together the synergism of these supplements and their wonderful effects on the immune system.

Sugar and The Immune System

At the beginning of *Total Body Immunity*, I want to drop sugar into your lap as the most dangerous “food” for the immune system. The words below are taken from a 2006 article by the late Dr. James Howenstine and represent the strongest indictment I've seen against sugar and its detrimental effect on the immune system.

“Ascorbic Acid Competes with Sugar in the Immune System”

Insulin moves both glucose and ascorbic acid into cells including phagocytic immune cells (white blood cells). The phagocytic cells like leukocytes attack and remove microbes, tumor cells and debris from the blood. The level of ascorbic acid in leukocytes may be 80 times greater than that found in plasma. Glucose and ascorbic acid are constantly competing for insulin transport so diets high in sugar and carbohydrates will decrease the amount of ascorbic acid that enters cells and thus create undesirable effects on the immune response.

Dr. Howenstine makes another comment about the ascorbic acid/glucose competition disrupting superoxide – a pathogen killer and inhibiting the ability of DNA and RNA to make new white blood cells. He says:

There is another form of competition between glucose and ascorbic acid. Ascorbic acid stimulates the hexose monophosphate (HMP) shunt and glucose inhibits it. The HMP is a series of chemical reactions that reduces niacin coenzyme NADP to NADPH. *Phagocytes need NADPH to create superoxide and other reactive oxygen species that are used to destroy pathogens.* In addition to creating NADPH ascorbic acid has the ability to deactivate excess quantities of NADPH and oxidative substances that could harm normal tissues.

The hexose monophosphate shunt also produces 5 carbon sugars (ribose and deoxyribose). These 5 carbon sugars are *needed to make DNA and RNA.* When the immune system faces microbial invasion it immediately signals for production of new immune cells that need these genetic materials DNA and RNA. If the body has too much glucose and too little ascorbic acid, *there will be a lack of genetic material and inadequate DNA and RNA for creation of needed new leukocytes.* Clearly high sugar intake will reduce the potential health benefits of this pathway.

On my March 30, 2020 radio show, Dr. Levy reinforced Dr. Howenstine's statement. Dr. Levy said:

Ascorbate is derived from glucose – it's a very simple molecule. Ascorbate uses the insulin transporter of glucose to get into cells. It even crosses the blood brain barrier. There's not a cell in your body that does not utilize vitamin C as the primary source of electrons, donating them to glutathione which is the most concentrated antioxidant inside your cells. But, in addition to that, vitamin C donates 2 electrons per molecule. Most other antioxidants donate only one. So, this gives ascorbate more power.

It's obvious that this simple chemical competition results in vitamin C losing its position in the cells if there is too much circulating glucose and nullifying its important antioxidant mechanism.

The Causes of COVID-19 Deaths

I want to address this question at the outset so we know why the nutrients I'm recommending can work to support the immune system. Intense study of COVID-19 victims tells us that the final cause of death is endothelial dysfunction and destruction.

The endothelium is a single layer of cells that line the interior surface of blood vessels, and also lymphatic vessels. These cells form an interface between circulating blood or lymph in the vessel and the vessel itself. Endothelial cells are the crucial barrier between the tube and the tissue and control the flow of fluid substances into and out of tissue cells.

Now, let's find out who's susceptible to COVID-19 and who dies from it. If 100 people are exposed to coronavirus, most will have no, mild, or moderate symptoms and they will recover. Fifteen to 20% of those who "catch" the virus will develop pneumonia and 4% will suffer severe lung disease, and 1% will die.

The current fatality rate is said to be 0.26%. However, the more antibody testing that is done to determine the people who were infected and didn't even know it, the rate will continue to drop. What scared the world was the original case fatality rate out of China of 4%. I'll discuss this further below.

Those patients who develop pneumonia already have an extremely high degree of inflammation and are likely to have a high incidence of some of the inflammatory diseases like obesity, coronary heart disease, Type 2 diabetes, hypertension, peripheral artery disease, asthma, and COPD (chronic obstructive pulmonary disease).

What else is common in this population? Lots of drugs are prescribed for these “incurable” diseases. I’m all too familiar with these diseases – they are evidence of magnesium deficiency, and the drugs that are erroneously-prescribed cause more magnesium deficiency. So, bottom line, COVID-19 patients are magnesium-deficient as well as potassium-deficient as noted above. Often the two go hand-in-hand but unfortunately, magnesium is not even measured in a routine electrolyte testing panel.

Obesity is a challenge to our immunity because it is associated with a low-grade inflammation of white adipose tissue (WAT). This chronic activation of the innate immune system can subsequently lead to insulin resistance, impaired glucose tolerance and even diabetes. Here’s part of the abstract of a paper called “Adipose Tissue, Adipokines, and Inflammation.“ It’s pretty dense, so feel free to just glance at it, but I think it gives proof of the damage caused by obesity that opens the door to metabolic syndrome and escalates magnesium deficiency.

WAT is no longer considered an inert tissue mainly devoted to energy storage but is emerging as an active participant in regulating physiologic and pathologic processes, including immunity and inflammation. Macrophages are components of adipose tissue and actively participate in its activities. Furthermore, cross-talk between lymphocytes and adipocytes can lead to immune regulation. Adipose tissue produces and releases a wide variety of proinflammatory and anti-inflammatory factors. Proinflammatory molecules produced by adipose tissue have been implicated as active participants in the development of insulin resistance and the increased risk of cardiovascular disease associated with obesity.

Are COVID-19 patients tested or treated for magnesium deficiency? NO! This population is experiencing *Total Body Meltdown* and can’t fight off a virus. We should be treating this population with nutrients and building up the structure and function of the body and immune system so they have a fighting chance. You

should also know that when people die of the “ordinary” influenza virus, it is usually due to pneumonia because the same negative factors of magnesium deficiency are at play.

Inflammation itself is another huge marker for susceptibility to COVID-19. The blood tests of COVID-19 patients show elevation of D-Dimer (a risk factor for blood clots), LDH (a marker for inflammation), and C-Reactive Protein (another marker for inflammation). Specifically, the virus binds to histamine-2 receptors in many tissues. Also, 100% of people who died had the virus cultured from their lungs. As billions of viruses go through their life cycle and die, their cells create foreign waste material that triggers what’s known as a cytokine storm as white blood cells rush into tissues to try and eliminate this debris. This whole process further increases inflammation. Most people die with severely damaged lungs, ARDS (acute respiratory disease) or blood clots.

Asymptomatic Cases of COVID-19

It took until the first week of June, when more antibody testing was being done, for us to see that “The Number of Asymptomatic Infections Dramatically Lowers the COVID-19 Case-fatality Rate.” On June 7, 2020, the *Orthomolecular Medical News Service* put out the following press release:

The public has been made aware of the number of COVID-19 deaths and reported cases that have occurred since the beginning of the current pandemic. However, the number of unreported cases has not been widely known or publicized. Recently the CDC estimated that more than one-third of SARS-CoV-2 (the coronavirus that can lead to COVID-19) infections are asymptomatic, meaning that initial estimations of its severity were grossly overestimated. Physicians for Informed Consent (PIC) has collated data from U.S. antibody studies and produced an educational document outlining how an accurate case-fatality rate (CFR) requires antibody studies

in order to guide and measure medical care and public health policies.

Similar to CDC estimations, PIC's analysis results in a COVID-19 CFR of 0.26%, which is comparable to the case fatality rates of previous seasonal and pandemic flu periods.

What I take from this information is that we should be studying the people that get the virus and either experience no symptoms or recover quickly. What is the lifestyle, diet, and supplement history of these "survivors" and what can we learn from them?

CHAPTER ONE: OUR INTRIGUING IMMUNE SYSTEM

On my March 30, 2020 radio show, Dr. Michael Gonzalez, a vitamin C expert said the following:

One of the most important things, in all types of diseases, is that you have enough nutrient co-factors. The immune system is very complex and requires a lot of metabolic phases. All these phases need specific enzymes and the enzymes require many co-factors. That's why magnesium, vitamin C, vitamin B complex, and zinc all have a role. The better you are with these, the more you can modulate your immune system in order to respond to any attack.

Our immune system is the body's natural Department of Defense, working around the clock to fight off germs and protect our health. The old Pacman video game is a great visualization of the immune system composed of various types of white blood cells that spring into action whenever germs and toxins threaten your health. I've done a lot of reading recently about the immune system and looked at several videos. I've taken words from the [Introduction to the Immune System](#) to give you a simplified overview.

Below is a brief summary of the immune system components and functions – obviously it's a lot more complex. However, the bottom line remains – the immune system is made of cells and we have to keep making healthy cells using the right building blocks. These building blocks are available to you in our *Completement Formulas*.

THE LYMPHATIC SYSTEM

The lymphatic system oversees the whole immune system and is responsible for the development and circulation of immune cells that are produced in the bone marrow and reside in the spleen, thymus, and lymph nodes.

Immune System Function

There are lots of analogies about the immune system to try and make sense of its complexity. One is a sports analogy that we have to be on the defense to protect ourselves from foreign invaders. The defense is all lined up as invisible allies known as white blood cells that are born in the bone marrow and reside in lymph nodes, spleen, thymus, tonsils, and the intestines. When I was in medical school, we weren't even aware that 70% of immune function occurs in the intestines! Seventy Percent! So, added to the list of immune cells are the trillions of organisms that make up the intestinal Microbiome.

INNATE AND ADAPTIVE IMMUNE SYSTEMS

The innate immune system is like the padding and helmet of a player comprising skin, nose hairs, enzymes in saliva, perspiration, even tears, along with an inflammatory process that immune cells set off to deter germs. If the innate system is breached, the adaptive immune system provides backup against pathogens in more specific ways.

White blood cells involved in the innate immune response include macrophages, dendritic cells, and granulocytes (neutrophils, eosinophils, and basophils). These cells respond immediately to threats and they also bridge the gap to activate the adaptive immune cells.

1. Humoral Immunity

This system enlists white blood cells called B cell lymphocytes that have the ability to recognize germs that don't belong in the body. They are made in the bone marrow but migrate to the spleen and lymph nodes to monitor and sift through the blood for germs. When they locate germs, they activate an intruder alert! Intruders

are called antigens (Ag) and the B cells produce antibodies (Ab) that recognize and bind to a specific antigen, which puts a big sign on the Ag/Ab compound that says, "Kill Me Now".

2. Cell Mediated Immunity (CMI)

The cell mediated immune response protects against germs that have gotten past the innate system and have managed to infect body cells. CMI cells also sweep up newly formed cancer cells. The names of the white blood cells involved in CMI include macrophages, natural killer (NK) cells, and T Cell lymphocytes. The B cells mark the pathogen (with an antigen) for destruction and the T cells dispose of them. Special proteins on the T cells called T cell receptors are able to recognize a specific antigen.

A Germ's Fate

I'll skip descriptions of all the other white blood cells and walk you through the complete immune response when a pathogen enters the lungs.

Innate Response

1. Bacteria are breathed in and slip by your nose hairs, past the cilia in the airways, and penetrate past the epithelium layer of the bronchial tubes in the lungs.
2. In the lung tissue, bacteria will start to divide and might encounter a resident macrophage, which will ingest the bacteria and start releasing cytokines.
3. The purpose of the cytokines is to start the inflammatory process by making blood vessels leaky and attracting nearby eosinophils, basophils, and mast cells, which release their own cytokines and granules amplifying the inflammation while they are hunting down pathogens. Note, this is the

cytokine storm that is responsible for people succumbing to COVID-19.

4. Neutrophils from the blood as well as fresh new ones from the bone marrow dive into the tissue and join the battle.
5. If the pathogen is a virus, NK cells will join in to help destroy the infected calls.
6. Immature dendritic cells digest the pathogens and migrate from the lung tissue to nearby lymph nodes where they present the processed antigen on an MHC II protein to a new T Cell.

Adaptive Immune Response

1. The dendritic cells, which are part of the innate immune system, bridge the innate and adaptive immune responses when they presents the antigens to the T Cell.
2. Bacteria might find their own way to a lymph node without the help of the dendritic cell where B cells can directly engulf the bacteria like a Pacman and present it to a T cell.
3. Either way, if the antigen is the right "fit" for the T Cell, it will begin to differentiate and undergo replication so it can kill similar antigens.
4. Differentiated T cells will release cytokines that will induce B Cells to differentiate into plasma cells which secrete antibodies that will go into the lymph and then the bloodstream. The antibodies will tag pathogens making it easier for phagocytes to eat them. If the pathogen is a virus, another type of T Cell will kill the virus replicating in a cell. Over time, as the invading pathogen dies off, most of the B and T cells die off because they are unused but a certain proportion turn into memory B cells and memory T Cells, which linger for years in case there are needed in the future.

Ten Immune Busters

The following blog went to our customers to help people steer clear of commonly-encountered immune busters.

1. Stress, anxiety, panic

When we are stressed, our bodies tell our nervous systems and stress hormones that it is time to take action. Our hypothalamus, in the brain, tells the adrenal glands to produce more hormones, such as adrenaline and as well as cortisol, and release them into the bloodstream. Experiments where adrenaline is given intravenously shows it decreases magnesium as well as calcium, potassium, and sodium. This proves that when you are in a revved-up state and burning adrenaline, you are also burning off magnesium. And, because studies have found that magnesium has a strong relationship with the immune system, you'll want to restore your body's magnesium levels to keep the immune system working properly.

2. Inadequate sleep

According to the National Sleep Foundation, even though sleeping more isn't likely to help you avoid getting sick, missing precious hours of sleep could weaken your immune system, leaving you more susceptible to infection.

3. Yeast Overgrowth

Yeast overgrowth is a major immune suppressant because yeast produces 178 different yeast toxins that, once released, have to be helped by the immune system to be eliminated from the body. All of the work the body undertakes to expel the toxins uses up nutrients and takes energy away from other body functions, especially the immune system.

Start by eliminating foods that feed yeast. For example, high-sugar fruits, added sugars, grains that contain gluten, caffeine, soda pop, and desserts. Read my book, *ReSet The Yeast Connection* and consider following my [Yeast Management Protocol](#) to balance yeast.

4. Fast food and junk food

According to [research](#) out of Germany, the immune system reacts similarly to a high fat and high caloric, fast-food diet as it does to a bacterial infection. And, this hyperreactivity can persist long after switching to a healthy diet. Therefore, the sooner these foods are eliminated, the better.

5. GMO-based foods

Genetically modified organisms place a burden on the immune system. Our immune system has developed and evolved over thousands of years. When we introduce a genetically modified food, the immune system doesn't recognize the language of "genetically modified" and, as a result, identifies it as foreign and executes an immune response.

The source of many vegetable oils – corn, soybean, cottonseed, palm, rapeseed, safflower, etc. – are genetically modified foods. These oils are in many processed foods, so watch out for them in the ingredient listing, or look for the "non-GMO" label.

6. Foods containing MSG

[Research](#) indicates that eating foods containing MSG can cause unwanted changes to your thymus and spleen, both of which are key players in your immune function. Both your thymus and your spleen create lymphocytes, which take out foreign invaders; your spleen also makes antibodies that help keep you well.

7. Sodas

The chemicals in soft drinks can wreak havoc on gut bacteria. This is problematic because there is a lot of interaction between the body's immune system and bacteria in the gut.

A recent study done involving diet soda and gut bacteria found that consuming diet soda (containing aspartame) may cause harmful damage to your body's Microbiome. The digestive and intestinal tracts are filled with good bacteria that keep the body healthy.

8. Overdoing caffeine

Too much caffeine can decrease the ability of our immune system to fight infections as well as remove damaged or abnormal cells. Studies also show women and men who drink large amounts of caffeine release higher levels of the stress hormone cortisol in response to physical and mental stress.

9. Smoking

Smoking suppresses immune cells. Cigarette smoke contains more than 4,000 toxins, most of which can irritate or kill cells in the body, according to the Centers for Disease Control. Smoking alters the number of various immune cells and impairs the functioning of others. As a result of these changes, smokers are more likely to succumb to several types of infectious diseases, including respiratory infections, flu, and even gum disease. When smokers quit, their immune activity begins to improve within 30 days.

10. Alcohol

There is significant evidence that alcohol disrupts immune system function. These

disruptions can impair the body's ability to defend against infection. Alcohol alters the numbers and relative abundance of microbes in the gut Microbiome, an extensive community of microorganisms in the intestine that aid in normal gut function. These organisms affect the maturation and function of the immune system. Alcohol disrupts communication between these organisms and the intestinal immune system.

The GABA and Cortisol Response to Stress

Stress lowers your defenses and can cause you to succumb to worrying thoughts. Here's what's happening biochemically: During stress there's an increase in the neurotransmitter GABA, which helps slow down your thought processes, which allows you to get to sleep. Magnesium increases levels of GABA in the brain, but magnesium deficiency causes depletion of this important neurotransmitter. Magnesium counters stress by binding to and stimulating GABA receptors in the brain.

When GABA is low, your thought processes are out of control. Your brain gets stuck in "indecision" and, what I call, gramophone thoughts, as you struggle to relax. So, people faced with low GABA often wake up with racing thoughts and can always find something new to worry about. Low GABA shows up in people with generalized anxiety disorder, irritable bowel syndrome, panic attacks, and involuntary movements such as seen in Parkinson's Disease.

When a person experiences stress, the body releases a cascade of stress hormones that lead to negative physical effects. Part of the reason is that stress events consume magnesium and create magnesium deficiency. The major hormone released during stress is cortisol. This hormone depletes melatonin, which interferes with sleep, causing insomnia, which weakens the immune system. Excess cortisol caused by stress has an immunosuppressive effect that directly affects the function of macrophages and natural killer cells and suppresses the maturation of T cells in the thymus.

Elevated cortisol also contributes to belly fat, depression, anxiety, mood swings, dementia, brain fog, insomnia, concentration problems, and mental disorders. How does magnesium help? It restricts the release of this stress hormone, providing a filter that prevents it from reaching the brain.

CHAPTER TWO: MAGNESIUM

Like everything else that I research, I want to know where magnesium fits into the big picture of immune function. As always, I start with the fact that magnesium is required for 80% of known metabolic functions in the body.

Serendipitously, I came across an article called "ATP as a Neuromediator at the Brain-Immune Interface" which pinpoints the importance of ATP (the energy molecule) in immune system function. You may know that I often talk about the mitochondrial Krebs Cycle that makes ATP and how it requires magnesium in 6 of its 8 steps. In fact, ATP is often called Mg-ATP. Here are a few words from the above article that put ATP and magnesium in the forefront of immune system activity:

It has now also become clear that ATP-mediated signaling is not restricted within the border of the nervous system. These ATP receptors are expressed in essentially all cells and tissues, including the cells of the immune system. Therefore, ATP is now regarded as a universal signaling substance, rather than a pure neurotransmitter or neuromodulator, playing a major role in the cross talk between different cell types, and at the interface between the nervous system and the immune system.

The following may be TMI (too much information) but I refer you to another article called "Regulation of T Helper Cell Function by Extracellular ATP." It highlights the importance of ATP in the function of the T cells and says that "Extracellular ATP can modulate the function of cells of the innate immune system as well as of T lymphocytes."

Feel free to just glance over these papers but realize that the real bit of gold they represent is that without magnesium there would be no ATP. Thus, the function of magnesium in the Krebs Cycle makes magnesium pivotal in the function of the immune system. Without ATP you wouldn't have a mechanism for alerting

the T lymphocytes to do their job of killing foreign pathogens.

You can find a wonderful illustration of the Krebs Cycle in [Appendix F](#).

Bottom line? Magnesium, and all the other cofactors in the Krebs cycle are required to make the energy to drive immune system functions. I went searching for the other cofactors in the Krebs cycle. There are B vitamins that you can obtain in our *ReAline* and manganese and copper that are in *ReMyte*.

When I read about copper, I realized I haven't emphasized enough that copper is also found in our *Whole C Reset*. I mention on the *Whole C ReSet* label that tyrosinase is part of a food-based vitamin C complex and tyrosinase contains copper. For the people who say that copper deficiency is one of the causes of chronic illness, you'll be glad to know you are covered with *ReMyte* and *Whole C ReSet*.

Never forget that magnesium is responsible for 80% of all the metabolic functions in the body,¹ which translates into 1,000 enzyme systems many of which have wide-ranging effects on the immune system that go beyond the above ATP connection.

Magnesium and Yeast Overgrowth

A clinical finding that I've observed with our *ReMag* is that after taking it for a few months, some people who suffer from yeast overgrowth start having yeast die-off symptoms. They can have itchy rashes, a coated tongue, gas, diarrhea, and brain fog. Since the symptoms are obviously yeast die-off, we tell customers to meet it head on and go on a yeast detox.

When I began seeing this pattern with our customers, I realized that as they become saturated with magnesium their immune systems and detoxification systems were becoming activated enough to start killing yeast and disposing of its waste products through the skin and intestines. When I told this to my good friend,

Roby Mitchell MD, he confirmed that he has found scientific research that proves magnesium kills yeast.

Histamine-2 Receptors

In COVID-19 patients, the endothelial layer of blood cells is most affected. The virus attaches to histamine-2 receptors of the endothelial calls. We know that magnesium activates 1,000 enzymes. One of the 1,000 enzyme systems that is activated by magnesium is the histamine degrading enzyme, diamine oxidase (DAO).

An animal study published in the journal, *Drug-Nutrient Reactions*, found that dietary restriction of magnesium caused histamine levels to rise considerably after just four days of restriction, with histamine levels reaching a peak after eight days.² But levels then quickly dropped after just two days of adding magnesium back in the diet.

Another study in the *Journal of Nutritional Science and Vitaminology* tells us that magnesium deficiency is linked to increased mast cells migration to the small intestine, kidney, bone marrow, and liver.³ Mast cells contain histamine and release it when fighting microorganisms.

These studies point to the possibility that people with histamine sensitivity are magnesium-deficient. I also know that our customers with histamine sensitivity, who saturate with *ReMag* say their histamine sensitivity subsides.

MAGNESIUM AND THE IMMUNE SYSTEM

The following reports were written in the early 1900s, but timing doesn't make them any less valid. Here is what I wrote about a magnesium researcher, Dr. Pierre Delbet, in *The Magnesium Miracle*:

After judging magnesium chloride to be a very effective antiseptic solution, Dr. Delbet began testing oral forms of it on dogs and then on his patients, finding it to be a powerful immune system booster. In a paper presented to the French Academy of Medicine in September 1915, Delbet describes the effect on white blood cells of a solution of magnesium chloride injected into the veins of dogs. White blood cells from blood samples taken before and after the injection were tested for their microbe-killing ability.

Delbet continues:

...five hundred white cells in the first sample destroyed 245 microbes. Five hundred white cells from the second destroyed 681 microbes. This increase in microbe-killing under the influence of magnesium chloride was 180 percent greater than the other solutions. More experiments were performed; in one there was an increase of 129 percent, in another, 333 percent.

Magnesium and Polio

Polio is a viral illness, which can lead to paralysis in 0.5% of cases. It's a terrible disease and spread fear throughout the world when it cycled through communities back in the 1950s. I quote from *The Magnesium Miracle*:

Fortunately, polio is not the scourge it once was. However, back in the 1920's it was a terrible disease. A follower of Dr. Delbet, Dr. Neveu, published a booklet titled *Therapeutic Treatment of Infectious Diseases by Magnesium Chloride: Poliomyelitis*. The book described fifteen cases of polio effectively treated with magnesium chloride. Neveu was so convinced of the effectiveness of magnesium chloride that he insisted that every home should have a solution of magnesium chloride on hand to treat the first signs of sore throat, especially when stiffness of the neck was involved.

His formula was 20 grams of magnesium chloride powder to 1 liter of water.

Dr. Neveu's work was also reported in *Magnesium, The Nutrient That Could Change Your Life*, a Rodale Press book. Here is a quote that explains the use of Dr. Neveu's magnesium chloride formula for polio:

Dr. Neveu's idea is that every household should have on hand a mixture of a certain amount of magnesium chloride in water . . . the mixture being 20 grams of desiccated magnesium chloride to one liter (about a quart) of water, and at the first appearance of a sore throat and a stiff feeling in the back of the neck, or even as late as the first appearance of paralysis, the taking of the magnesium mixture will put the patient out of danger within two days, with an eventual total cure, he claims.

Dr. Neveu says that all sore throats do not predict polio, but when a sore throat is accompanied by a stiffness of the vertebral column, then treatment should begin as soon as possible, under the care of a qualified physician.

Dr. Neveu says that the virus of Poliomyelitis destroys the nerve substance of the anterior horns of the marrow, and that this destruction leaves in its wake sclerotic scars that escape all medical or surgical intervention. The destruction of the nervous substance occurs in a period of time more or less long, and the magnesium arrests the process.

Epstein-Barr Virus and Magnesium

Allow me to bring this conversation about magnesium and viruses up to the present. When Ginney Sanders and I attended *The Magnesium in Health and Disease Conference* at the NIH, March 2019, one presentation really caught our attention. It was by Dr. Mike Lenardo, who is Chief of Molecular Development of the Immune

System Section and Co-Director of the NIAID (National Institute of Allergy and Infectious Disease) Clinical Genomics Program. Dr. Lenardo is a medical doctor, a molecular immunologist, and geneticist recognized for his work on fundamental immunological mechanisms.

The paper Dr. Lenardo presented is called "XMEN disease: A New Primary Immunodeficiency Affecting Mg²⁺ Regulation of Immunity against Epstein-Barr Virus."⁴ Here are some notes I took during Lenardo's presentation:

1. A kinase enzyme that works with T Cells requires two magnesium ions. We used to think it was just one magnesium, but it is two making magnesium activity twice as important.
2. The T Cell kinase enzymes act as a magnesium sensors for T cell activation.
3. If you deprive mice of magnesium for 7 days, T cells dramatically lower and EBV is activated in this magnesium-depleted environment.

The abstract for Lenardo's paper said that the study: "...revealed an unexpected quantitative role for intracellular free magnesium in immune functions and has led to novel diagnostic and therapeutic strategies."

People who suffer Chronic Fatigue Syndrome are said to be infected with EBV, which clinically seems to be the case. But I also add yeast overgrowth that I think completes the picture and I call the condition Total Body Meltdown.

MAGNESIUM AND VITAMIN D

Magnesium regulates vitamin D, copper, zinc, and potassium levels in the body. All of these nutrients are involved with supporting the immune system but let's take a closer look at vitamin D.

GrassrootsHealth (primarily a vitamin D research organization) analyzed their dietary supplement intake data and asked the question "Are Both

Supplemental Magnesium and Vitamin K2 Combined Important for Vitamin D Levels?" Here are their findings:

On average, those taking both supplemental magnesium and vitamin K2 have a higher vitamin D level for any given vitamin D intake amount than those taking either supplemental magnesium or vitamin K2 or neither. Specifically, 244% more supplemental vitamin D was needed for 50% of the population to achieve 40 ng/mL (100 nmol/L) for those not taking supplemental magnesium or vitamin K2 compared to those who usually took both supplemental magnesium and vitamin K2.

In another paper that echoes the first, GrassrootsHealth asks "Is Supplemental Magnesium Important For Vitamin D Levels?" Here's their argument:

Using the data provided for the GrassrootsHealth study from over 3,000 participants with supplemental magnesium information, we plotted every participant's supplemental vitamin D intake (dose) and blood level (response) and determined the average trends for participants who reported taking no supplemental magnesium, those who reported taking 1 to 399 mg/day, and those who reported taking 400 mg/day or more.

The dose-response chart shows that on average, those taking more supplemental magnesium have a higher vitamin D level for any given vitamin D intake amount than those taking less supplemental magnesium. Specifically, 146% more supplemental vitamin D was needed for 50% of the population to achieve 40 ng/mL (100 nmol/L) for those not taking supplemental magnesium as compared to those who took 400 mg/day or more.

A study "Magnesium Status and Supplementation Influence Vitamin D Status and Metabolism" in *The American Journal of Clinical Nutrition*, concludes that optimal levels of magnesium may play an important role in

the vitamin D status of an individual.⁵

In over 12,000 individuals taking part in the *National Health and Nutrition Examination Survey (NHANES) 2001–2006*, the research team found that individuals with high levels of magnesium intake, whether from dietary sources or supplements had higher levels of vitamin D. They found that magnesium is a cofactor in the synthesis of vitamin D from both exposure to sunlight and dietary sources. They also saw that magnesium deficiency shuts down the vitamin D synthesis and metabolism pathway.

MAGNESIUM VERSUS VITAMIN C

On my March 30, 2020 radio show I asked vitamin C and magnesium expert, Dr. Thomas Levy which vitamin he thought was more important, magnesium or vitamin C. Here's what Dr. Levy said:

It's a good question. I would say that they are equally important insofar as achieving a normal level of oxidative stress inside your cell, which is what you need in order to have a healthy cell. Your primary constituents inside the cell with regard to redox balance are calcium, magnesium, vitamin C, and glutathione.

When you have high calcium, you have low magnesium and low vitamin C and lots of oxidative stress. When you can push both magnesium and vitamin C inside the cell, the calcium leaves the cell and you have the potential not only to bring that intracellular oxidative stress into a normal range. But when you do that, you actually have restored the cell to a normal state, no matter what disease process it might have been involved with earlier.

Actually, I have to be honest and say the magnesium is more

important than vitamin C. Why would I say that? With vitamin C, there are many other antioxidants that can partially compensate for lack of vitamin C. So, in the face of a vitamin C deficiency, you can still get some antioxidant effect with other antioxidants. But when you are deficient in magnesium, nothing can deal with that deficiency other than magnesium. So, in that regard, I would say magnesium is a more important supplement because nothing else can take its place.

REMAG DOSAGE

The RDA of magnesium is only 350-400mg, but I say we probably require 600mg per day. And if you are taking medications or under stress or have had surgery or infections and a myriad of other stressors, then you will require more. I needed to take 1,200mg of ReMag, equal to 4 teaspoons for a year and a half before I was saturated with enough magnesium. You can read more about that in my *Magnesium Miracle* book or my online book [*ReMag – Invisible Minerals Part I*](#).

The amount of *ReMag* for protecting the immune system can range from 1 tsp to 4 tsp a day. I would gauge that amount by doing the GrassrootsHealth Home Blood Test and finding out your whole blood RBC levels. You want to be at the top of the range which is 28-46 mg/L.

CHAPTER THREE: D3-K2

I think it's fairly safe to say that I've had a love-hate relationship with vitamin D for many years. Or is it a hate-love relationship? Because I used to "hate" this hormone disguised as a vitamin, but now it's my new best friend because it's also the best friend of magnesium!

I have a huge file on high-dose vitamin D that I started in 2010 when it became the latest supplement on the block. It seems that as soon as calcium fell out of favor, because it was causing body-wide calcification, vitamin D took its place. But ironically, high-dose vitamin D can also cause calcification if you are not saturated with magnesium!

Sure enough, several years ago, I began hearing from clients, who, when they took high-dose vitamin D, on the recommendation of their practitioner, began re-experiencing their magnesium deficiency symptoms. At first, I chalked it up to the buildup of calcium, since a major role of vitamin D is to absorb calcium from the intestines. However, with a little digging I found that magnesium is required in 8 steps that transform vitamin D from the inactive state to the active state. Please click to [Appendix E](#) where you will find an illustration of the complex pathways that create vitamin D3 and you can count for yourself the 8 Mg circles that show where it is required as a cofactor. These 8 steps can come to a shuddering halt when you take high-dose vitamin D without having enough magnesium on board.

That's when I started railing against vitamin D and telling people to stay within a 1,000-2,000iu range, and to be sure and maintain magnesium saturation with *ReMag*.

However, the opposite story is being told by promoters of high-dose vitamin D. They say that SEVERAL HUNDRED THOUSAND international units of vitamin D are a miracle cure and they display testimonials confirming the "cures." Of course, I wondered how long the "cure" lasts and if the many magnesium

deficiency symptoms that can occur are even recorded.

When I was doing research for *The Magnesium Miracle*, Dr. Mildred Seelig, a magnesium expert, told me that when people take medications, drug toxicity forces magnesium to come out of storage to detoxify the drugs and in that transitory period a person can feel better because there is more magnesium circulating in the blood and cells!

Could this be happening with high dose vitamin D? As I mentioned above, magnesium is necessary for most of the steps that activate vitamin D, thus magnesium is similarly pulled out of storage. As it's being shunted to tissues to help vitamin D metabolism, is it participating in other metabolic functions. Could magnesium account for the "miraculous cures" purportedly caused by vitamin D or at the very least be part of the cure? It is possible, but nobody was doing the necessary research to investigate the relationship between magnesium and vitamin D until GrassrootsHealth came along!

GrassrootsHealth (GRH), Vitamin D, and Magnesium

GrassrootsHealth was founded by Carole Baggerly in 2007 to research how much vitamin D was required to achieve clinical results and match those results to certain blood levels of vitamin D. The GRH motto is *Moving Research Into Practice*.

Carole told me that Dr. Mercola suggested she get in touch with me about my work with magnesium and bring magnesium into her research. The results of the first vitamin D blood tests that I and many of our customers submitted showed very low levels. Most of us are taking *Blue Ice Royal*, the food-based A, D, K supplement and it's not giving us enough to put us in the clinically effective range for vitamin D.

Once the comparisons began between vitamin D and magnesium, it didn't take long for Carole to realize that magnesium is essential for vitamin D metabolism and that optimal dosing of both nutrients is crucial for good health. In our research

project we added magnesium and TSH to the tests they were already running, which are vitamin D and omega-3 fatty acids.

The History of GrassrootsHealth

Here's the skinny on GrassrootsHealth. It's an online nutrient research portal for the lay public. It has a panel of 48 senior vitamin D researchers from around the world contributing to its operations as well as many new researchers lending their support with the expanded focus on other nutrients like magnesium and assessing TSH for thyroid function.

GRH analyzes supplement intake, monthly health improvements, and validates them with blood tests. The method of blood collection taht GRH makes available are In-Home, Finger-Stick, blood smears on specially treated cardboard strips.

When I blogged about GRH initially I said that this project is earth-shattering for me because I'm reversing my stand against blood testing. That's because with GRH I have found a way to work closely with one blood testing lab using standardized methods. We correlate these blood tests with uniquely designed questionnaires that document supplements and symptoms, and the progress that people are achieving on our protocols.

It's the type of nutrient research that I've always wanted to do and that has never been done before. Note what I just said. This type of research has never been done before!

Having one lab do all the testing removes the inconsistency of having thousands of customers using the 5,000 different labs in the U.S. and being subject to the variability of their test procedures. We use questionnaires that we design to cover the symptoms, conditions, and reactions that we most often see, making them specific to our customer base. Doing monthly tracking gives us data on what's

working and how we can improve our customers' outcomes even more! We can also offer the test to regions and countries that don't have certain types of lab testing. For example, I can't get a Whole Blood Magnesium test in Maui and neither can most of Canada! But I can poke my finger in the comfort of my own home and drop my blood on a piece of cardboard and mail it off the same day.

The big problem with medical research is that it obsessively tests only one-thing-at-a-time, completely ignoring the commonsense fact that the body doesn't work like that. Every biochemical reaction in the body draws upon many different nutrient factors to achieve health. Isolating one nutrient just doesn't make sense.

GRH recommends following your serum 25(OH)D levels to determine your individual vitamin D adequacy, not just giving a blanket dosage of vitamin D to a person according to their age. They have found that the amount of vitamin D needed varies considerably from person-to-person. Again, this may be related to the amount of magnesium a person has in storage and that is available for vitamin D metabolism.

The GRH Scientific Panel has made great strides over the past 12 years and has concluded that a level of 40-60 ng/mL (100-150 nmol/L) is optimal. They have also found some compelling evidence that women with a vitamin D level of 60ng/mL have a much lower risk of breast cancer or breast cancer recurrence. Since I've only been recommending levels of 30-40ng/mL, I wanted to learn what amount of vitamin D our customers require to reach optimum blood levels. With the testing we will also find out if the vitamin D levels in the blood will be affected when a person has sufficient magnesium.

My Personal Vitamin D Experiment

My own vitamin D was an abysmally low 19 ng/mL, yet I feel terrific. My *Whole Blood Magnesium* was a whopping 60, well over the range of 28-46 mg/L. Could the magnesium saturation I've achieved with *ReMag* make my vitamin D work more

effectively? I don't know the answer but it's one of the many questions GrassrootsHealth will try to solve by analyzing their data.

Since I'm engaged with GrassrootsHealth in a research experiment and I love experimenting on myself, I decided to add 5,000 IU of vitamin D to my supplements and continue with 1-2 *Blue Ice Royal* capsules per day. After reading more about the benefits of vitamin D and having Carole Baggerly of GRH on my radio show, I increased to 10,000 IU. At no time did I suffer an increase in magnesium deficiency symptoms or require more than 300mg (1 tsp) of *ReMag* a day. I believe that attests to my degree of magnesium saturation.

I redid my GrassrootsHealth test on May 18, 2020 and my vitamin D, which was 19 ng/mL is a robust 53 ng/mL, so I will continue taking 10,000 IU of vitamin D and check the levels again in 6 months. Interestingly enough, my magnesium level dropped to 48 mg/L from 60mg/L. However, you will note that the magnesium range is 28-46mg/L, so I'm at the high normal level that I recommend. With no other changes in my supplement intake, I presume the loss is due to magnesium taken from storage to metabolize the extra vitamin D I'm taking. I will experiment by taking 1.5 tsp of *ReMag* every other day to see if I can raise my magnesium levels on my next test.

It's also interesting that I feel no different taking 10,000 IU of vitamin D, and neither have experienced any magnesium deficiency symptoms or have I needed to take more *ReMag*. However, now I know that my magnesium levels are lower, which may be due to the extra drain on magnesium caused by my increased intake of vitamin D. I find it all very fascinating and will continue to experiment.

Dosing Vitamin D Through the Ages

Part of the issue with vitamin D is defining "normal" dosage. Sixty years ago the recommended dosages of vitamin D were much higher.

- Before 1964 – 4,000-5,000
- 1964 – lowered to 2,000
- 1975 – lowered to 1,000
- 1992 – lowered to 400

The 1992 recommendation was introduced because 1 tsp of cod liver oil, containing only 400 IU of vitamin D, was known to prevent rickets. This dosage aligns with the draconian policy of the NIH that the RDA for nutrients should merely prevent nutrient-deficiency diseases, such as scurvy (vitamin C deficiency) and pellagra (niacin deficiency). Furthermore, the NIH and FDA say that allopathic medicine is in charge of preventing and treating disease with drugs and surgery.

The FDA recommendations for nutrients to only prevent nutrient deficiency are enforceable. For example, I have been told directly by the FDA that if I say or even imply, or have testimonials on my websites saying that magnesium treats a disease, then I am declaring that magnesium is a drug and I have to do a billion dollar study to prove that magnesium treats that a particular disease. Does anyone have a spare 65 billion dollars stashed away so I can research the 65 disease conditions that may be caused by magnesium deficiency?

Active Vitamin D vs Storage Vitamin D

The standard vitamin D blood test measures total 25-hydroxy vitamin D (vitamin D₂ plus vitamin D₃) in the blood. This is called the storage form of vitamin D, which is then converted by the kidneys to the biologically active form, 1,25-dihydroxycholecalciferol.

Researchers say that there is generally no need to calculate the level of active vitamin D. They say the critical factor is how well stocked the vitamin D stores are. But I say the true critical factor is probably the amount of magnesium available that will move the inactive vitamin D into the active position.

It's at the kidney level that magnesium comes into play. When vitamin D deficiency symptoms don't improve, or vitamin D blood levels don't improve doctors may give higher and higher doses of vitamin D to try and force conversion without realizing that magnesium is probably the deciding factor. If you don't have enough magnesium you can't convert vitamin D, and if you take too much vitamin D, it can use up your magnesium stores and give you magnesium deficiency symptoms and make you even less likely to convert vitamin D.

Another concern that made me question high-dose vitamin D is the fact that the active form, 1,25 (OH)D is a hormone, not a vitamin. Hormone levels are regulated through a biochemical feedback system. For example, one of the main jobs of vitamin D is to grab calcium from the diet and put it in the bloodstream and then into the bones and teeth. When you have enough calcium, then "hormone" D levels should go down because no more calcium is required (at that time).

But if you regard vitamin D as a vitamin, you might think it's not good for a vitamin to be low and you should take more of it. In our current state of too much calcium and not enough magnesium in our diet and supplements, perhaps we are finding low vitamin D, whereas if our calcium was lower and our magnesium higher, our vitamin D would be higher as well.

Again, this is where GRH research is crucial because they are correlating vitamin D blood levels with clinical outcomes not just speculating about dosage.

Vitamin D, Vitamin C, and Magnesium

Carole Baggerly said on my April 6, 2020 radio show that "We already see scientifically that people who are taking up to about 1,000mg of vitamin C per day can take considerably less vitamin D to achieve a given serum level of vitamin D. The same seems to be true with magnesium but GRH is amassing more data to draw conclusions and give us the amount of magnesium that makes a difference.

This is exactly the kind of information we need in order to fine tune our
Carolyn Dean MD ND

supplement intake. Please join in this testing. The *GrassrootsHealth Test Kit* can be accessed by our customers all over the world! Just go to the [RnA ReSet](#) website and click on Research Project on the home page. Even better news is that we will give you coupons for our products that equal the cost of the test.

More Than A Calcium Grab

As I mentioned above, I used to think that vitamin D's only task was to grab calcium from the diet to help build our bones and teeth. Even then, it requires vitamin K2 to complete that transaction.

There are thousands of studies that give a much broader picture of the importance of vitamin D. However, not enough of them talk about the importance of magnesium as the driver of vitamin D activity. I think that's what makes many vitamin D studies ambiguous. As I've said, I want to focus on the immune building aspects of vitamin D.

What follows is a list of scientific studies that focus on vitamin D as far more than a calcium sponge but as an important factor in many conditions, and especially COVID-19, inflammation, lung disease, and cancer. I was going to put them in the Appendix but I want them front and center to show you the importance of vitamin D in supporting your immune system.

The Science Behind Vitamin D

1. Low Population Mortality from COVID-19 in Countries South of Latitude 35 Degrees North Supports Vitamin D as a Factor Determining Severity.⁶
2. The Possible Role of Vitamin D in Suppressing Cytokine Storm and Associated Mortality in COVID-19 Patients.⁷
3. Vitamin D levels appear to play role in COVID-19 mortality rates. Patients with severe deficiency are twice as likely to experience major complications.⁸
4. Associations of C-reactive Protein with 25-hydroxyvitamin D in 24 Specific

- Diseases: A Cross-sectional Study from NHANES.⁹
5. Evidence that Vitamin D Supplementation Could Reduce Risk of Influenza and COVID-19 Infections and Deaths.¹⁰
 6. Former CDC Chief Dr. Tom Frieden: Coronavirus infection risk may be reduced by Vitamin D.¹¹
 7. Patterns of COVID-19 Mortality and Vitamin D: An Indonesian Study. Vitamin D status is strongly associated with COVID-19 mortality outcome of cases.¹²
 8. Why are African Americans so much more deficient in vitamin D?^{13,14}
 9. Vitamin D Supplementation to Prevent Acute Respiratory Tract Infections.¹⁵
 10. Vitamin D deficiency contributes directly to the acute respiratory distress syndrome (ARDS).¹⁶
 11. Associations of C-Reactive Protein (a measurement of inflammation) with 25-Hydroxyvitamin D in 24 Specific Diseases.¹⁷
 12. Association of C-reactive protein and vitamin D deficiency with cardiovascular disease.¹⁸
 13. Vitamin D deficiency - a potential risk factor for sepsis development, correlation with inflammatory markers, SOFA score and higher early mortality risk in sepsis.¹⁹
 14. Dietary Vitamin D and Its Metabolites Non-Genomically Stabilize the Endothelium.²⁰
 15. Breast Cancer Risk Markedly Lower with Serum 25-Hydroxyvitamin D Concentrations ≥ 60 vs < 20 ng/mL.²¹
 16. Reduce the Risk of Breast Cancer by 80%.²²

Science Daily, an online research news publication, stated that "Vitamin D Levels Appear to Play Role in Covid-19 Mortality Rates." This study found that patients with severe vitamin D deficiency are twice as likely to experience major complications. Here is their executive summary:

Researchers analyzed patient data from 10 countries. The team found a correlation between low vitamin D levels and hyperactive immune systems. Vitamin D strengthens innate immunity and prevents overactive immune responses.

The research team conducted a statistical analysis of data from hospitals and clinics across China, France, Germany, Italy, Iran, South Korea, Spain, Switzerland, the United Kingdom (UK) and the United States. They found that patients from countries with high COVID-19 mortality rates, such as Italy, Spain, and the UK had lower levels of vitamin D compared to patients in countries that were not as severely affected.

The team discovered a strong correlation between vitamin D levels and the cytokine storm – a hyper-inflammatory condition caused by an overactive immune system – as well as a correlation between vitamin D deficiency and mortality. They concluded that, "Cytokine storm can severely damage lungs and lead to acute respiratory distress syndrome and death in patients. This is what seems to kill a majority of COVID-19 patients, not the destruction of the lungs by the virus itself. It is the complications from the misdirected fire from the immune system."

This is exactly where vitamin D plays a major role. Not only does vitamin D enhance our innate immune system, it also prevents our immune system from becoming dangerously overactive. This means that having healthy levels of vitamin D could protect COVID-19 patients against severe complications, including death. The researchers continued, "Our analysis shows that it might be as high as cutting the mortality rate in half. It will not prevent a patient from contracting the virus, but it may reduce complications and prevent death in those who are infected."

I've already mentioned above that people who are susceptible to COVID-19 often suffer from metabolic syndrome and inflammatory conditions like obesity, heart disease, high cholesterol, high blood pressure, which cause endothelial inflammation and dysfunction. Fortunately, vitamin D helps regulate inflammation.

Of course, the article ended by saying that more research is needed to determine whether the public should take vitamin D and how much. As Carole Baggerly famously said at an NIH conference on vitamin D, "Where is our sense of urgency?" It's with a sense of urgency that we're doing the research with GrassrootsHealth and that's why I'm writing this book.

The Best Vitamin D Information Sources

I endorse the following websites because they are up to date and they totally embrace the Magnesium-Vitamin D connection and understand how crucial it is for a person to have enough magnesium to help metabolize their vitamin D. How much vitamin D? I'll talk about that in Chapter Two.

<https://www.grassrootshealth.net/> run by Carole Baggerly

<https://vitamindwiki.com/> run by Henry Lahore

COVID-19 AND BEYOND

The founder of GrassrootsHealth, Carole Baggerly wrote in a recent [press release](#) that:

There are two main reasons why respiratory tract infections such as influenza and COVID-19 occur in winter: winter sun and weather and low vitamin D status.

Many viruses live longer outside the body when sunlight, temperature, and humidity levels are low as in winter. Vitamin D is an important component of the body's immune system, and it is low in winter due to low solar ultraviolet-B (UVB) doses from exposure and the low supplement intakes of most. While nothing can be done about winter sun and weather, vitamin D status can be raised through vitamin D supplements.

Vitamin D has several mechanisms that can reduce risk of infections ([Grant et al., 2020](#)). Important mechanisms regarding respiratory tract infections include:

- Inducing production of cathelicidins and defensins that can lower viral survival and replication rates as well as reduce risk of bacterial infection
- Reducing the cytokine storm that causes inflammation and damage to the lining of the lungs that can lead to pneumonia

In addition, vitamin D deficiency has been found to contribute to acute respiratory distress syndrome, a major cause of death associated with COVID-19.

To reduce risk of infection, it is recommended that people at risk of influenza and/or COVID-19 consider taking 10,000 IU/day (250 micrograms/day) of vitamin D for a few weeks to rapidly raise 25-hydroxyvitamin D [25(OH)D] concentrations, followed by 5,000 IU/day. The goal should be to raise 25(OH)D concentrations above 40–60 ng/mL (100–150 nmol/l), taking whatever is necessary for that individual to achieve that level. For treatment of people who become infected with COVID-19, higher vitamin D doses would be required to rapidly increase 25(OH)D concentrations.

Carole also says the following about the association of vitamin D and magnesium:

Magnesium supplementation is recommended when taking vitamin D supplements. Magnesium helps activate vitamin D, which in turn helps regulate calcium and phosphate homeostasis to influence growth and maintenance of bones. All the enzymes that metabolize vitamin D seem to require magnesium, which acts as a cofactor in the enzymatic reactions in the liver and kidneys. The dose of magnesium should be in the range of 250–

500 mg/day. Other cofactors include vitamin C and omega-3 fatty acids.

Carole again emphasizes the importance of sunshine in her blog:

Evidence supporting the role of vitamin D in reducing risk of COVID-19 includes that the outbreak occurred in winter, a time when 25-hydroxyvitamin D [25(OH)D] concentrations are lowest; that the number of cases in the Southern Hemisphere near the end of summer are low; that vitamin D deficiency has been found to contribute to acute respiratory distress syndrome, and that case-fatality rates increase with age and with chronic disease comorbidity, both of which are associated with lower 25(OH)D concentration.

BENEFITS OF VITAMIN D

I've listed the scientific studies associated with the antiviral properties of vitamin D, above in "[The Science Behind Vitamin D](#)." With the following list, I'm going beyond the immune system topic of this book, but I can't help but share the benefits of vitamin D and noting that they often depend on concurrent use of magnesium.

1. Building Bones

Vitamin D assists the efficient uptake of calcium that becomes part of our bone matrix. It is well known that people who don't get enough exposure to sunlight are prone to brittle bones. Also, consuming vitamin D lowers the incidence of osteoarthritis. Hand-in-hand in this endeavor is magnesium; without it, bones are brittle and shatter more easily. Even more specifically, magnesium stimulates a particular hormone, calcitonin, that helps to preserve bone structure and draw calcium out of the blood and soft tissues back into the bones, preventing some forms of arthritis and kidney stones.

2. Increased Testosterone

As a prohormone, vitamin D helps the body produce and regulate several hormones, including testosterone, which will increase muscle mass, virility, strength, and energy levels. Also, many studies have found that the higher the magnesium levels, the higher the testosterone.

3. Managing Diabetes

The beneficial effect of vitamin D on managing diabetes is likely due to its prohormone effects, which help regulate insulin. Magnesium is also an important nutrient in the management of diabetes. In fact, magnesium deficiency is an independent predictor of diabetes. Diabetics both need more magnesium and lose more magnesium than non-diabetics. Magnesium is necessary for the production, function, and transport of insulin. Much more can be said about diabetes and magnesium; the following list of common complications of diabetes that relate to magnesium deficiency is taken from *The Magnesium Miracle*:

- Nerve damage, called diabetic neuropathy, which mostly affects the feet, with symptoms of numbness, tingling, burning, and pain
- Atherosclerosis and heart attacks
- Damage to small blood vessels in the eyes and kidneys, causing:
 - Vision loss (diabetes is the leading cause of blindness in the United States)
 - Kidney disease (often related to renal artery calcification)
- Diabetic foot ulcers, with increased susceptibility to infection, gangrene, and amputation
- Impotence in men

All these complications relate to magnesium deficiency and demonstrate the need

for more sensitive magnesium testing and magnesium supplementation for all diabetics.

4. Lung Function

Vitamin D supports lung function by increasing oxygenation in the lungs for people suffering with lung disease and it also helps to improve athletic performance. The exact mechanism is not clear but it's likely through vitamin D's action in regulating inflammation and its action on muscles.

5. Strength

The hormonal action of vitamin D helps to boost testosterone levels. This alone can be enough to increase strength both in the long term and in the short term. At the same time, it can increase strength by increasing the absorption of calcium and magnesium. These minerals aren't only engaged in producing bone, they also strengthen connective tissue, which has been shown in studies to actually increase contractile strength and thereby help athletes to lift and push greater weights.

6. Teeth

Better absorption of calcium and magnesium through the activity of vitamin D helps to strengthen teeth and make them appear whiter.

7. Energy Levels

Vitamin D helps increase your energy levels. You have direct experience of that when you play outside and pull in vitamin D from the sun and you feel your energy soar. We also know that magnesium is even more important in the production of energy since it is required for 6 of the 8 steps in the Krebs energy cycle that makes ATP.

8. Sleep

Vitamin D boosts sleep and helps regulate your biological clock. Magnesium is also important for sleep and the mechanisms are more well defined. It relaxes muscles, calms the nerves, and increases calming and sleep-inducing neurotransmitters including melatonin.

9. Insulin Regulation

Research has repeatedly found a clear association between low vitamin D levels in patients with insulin resistance and a high risk of developing type 2 diabetes.²³ Vitamin D increases insulin sensitivity and helps balance blood sugar levels as does magnesium.

10. Athletic Performance

Vitamin D can strengthen bones and muscle contractions, improve breathing, increase energy levels, and balance blood sugar. Therefore, it has performance benefits for athletes.

11. Mood

Your mood may be affected in part because vitamin D supports both your energy levels and insulin sensitivity. Also, this sunshine vitamin helps to combat the effects of SAD (Seasonal Affective Disorder).

12. Renin-Angiotensin System

Vitamin D deficiency leads to overexpression of renin and thus activation of the Renin-Angiotensin System (RAS), causing renal and cardiovascular injuries by tightening arteries and leading to hypertension. Vitamin D maintains kidney/heart

balance by suppressing the RAS. Magnesium counteracts the effects of renin by relaxing blood vessels.

PREGNANCY

Deficiencies in vitamin D have been linked to higher-than-average risks of preeclampsia, a dangerous condition that affects women during childbirth. Magnesium is also a crucial nutrient in pregnancy to prevent and treat preeclampsia and eclampsia. Research shows that using vitamin D and magnesium together decreases the likelihood of needing a caesarean section.

GrassrootsHealth has made vitamin D testing in pregnancy a priority. Here's what they say about vitamin D dosage in pregnancy.

Vitamin D sufficiency is defined as being over 40 ng/mL (100 nmol/L) as early as possible in pregnancy (before conception is ideal). GRH maintains that there is no standardized ideal dosage because there is a six-fold difference in how people react to supplementation. This means that two women can take 4,000 IU vitamin D daily and one will only have a vitamin D status of 20 ng/mL (50 nmol/L) and another will have 120 ng/mL (300 nmol/L). This conclusion is based on [GRH Ongoing Research](#). It is clear that the amount of vitamin found in the prenatal stage is almost always too low unless you are regularly sunbathing in southern regions or getting vitamin D in other forms.

CD: Of course, I say that the reason that one woman may have a higher level of vitamin D than another may be the amount of magnesium that she has in storage. If you have enough magnesium to help metabolize 4,000 IU of vitamin, then you will have a higher level of vitamin D in your blood.

GRH makes an important point that you need to test, not guess. They have a [D*Action Project](#), which just tests for vitamin D. You can also test for vitamin D

and Omega-3 fatty acids in the D*action+Omega-3 project. The project we are involved with is the Magnesium* Plus Focus Project testing vitamin D, omega-3 fatty acids, TSH and magnesium. With each testing project you are not only finding out your own nutrient levels but you are joining a research cohort that will help others learn the benefits of nutrient sufficiency from all the data collected.

Why Take Vitamin D In Pregnancy

5 Reasons For the Mother

Multiple research studies have found that vitamin D levels above 40 ng/mL during conception and pregnancy help the mother in many ways:

1. 60% lower risk of preterm birth
2. Virtually eliminates pre-eclampsia
3. Supplementing up to 6400 IU/day is safe and effective.
4. Lower risk of gestational diabetes
5. Lower risk of post-partum depression

4 Reasons For the Baby

Research has found that vitamin D levels above 40 ng/mL during conception and pregnancy help the newborn in the following ways:

1. 70% lower prevalence of common cold
2. 66% lower prevalence of ear infections
3. Improved language development
4. Reduction in the development of type 1 diabetes (in adulthood -what about childhood type 1? not just adulthood)

VITAMIN D DEFICIENCY SYMPTOMS

One of the many vitamin D authors I read recently described the major systems that suffer vitamin D deficiency and listed their symptoms:

1. **Muscles:** muscle cramps, twitches, trembling, vibrating pain, muscle weakness
2. **Energy:** listlessness, lack of energy, permanent exhaustion, constant fatigue
3. **Nervous system:** dizziness, paresthesia, sleep disorders, sudden awakening, a great need for sleep, impaired concentration, restlessness, anxiety, behavioral changes such as aggression, impaired coordination and vertigo, instability when walking and standing
4. **Low blood pressure:** circulatory disorders, daily headaches increasing at noon, feeling cold, freezing, especially hands and feet at night, Raynaud's syndrome
5. **Bones and Teeth:** pain in bones and joints increasing with exercise, reduction in bone mass, tendency to fractures, bones painful to the touch

The doctor that made this list doesn't appreciate the fact that vitamin D requires magnesium to work properly. In fact, almost all of the symptoms he lists are also magnesium deficiency symptoms. Shockingly, he doesn't recommend magnesium to his patients.

In fact, he's not happy with magnesium at all. He wrote in his book that "The large-scale marketing of magnesium has obscured people's focus on simple, effective treatments using vitamin D." He's completely unaware that vitamin D and magnesium are already best friends and no nutrient is an island!

In the Muscles category, he says that vitamin D deficiency means you also have calcium deficiency, which causes muscle symptoms because the muscles

require calcium to trigger cell contractions. He then says that this calcium deficiency manifests especially at night with pain in the leg muscles.

But I would remind him that calcium tightens muscles and magnesium relaxes them, so both minerals are required to balance muscle activity.

For Energy, he doesn't realize that magnesium is necessary for 6 of the 8 steps in making ATP energy molecules or that all 8 steps that convert inactive vitamin D to active vitamin D require magnesium.

He says that nervous system symptoms are also caused by calcium deficiency and high-dose vitamin D is the cure! However, a balance between calcium and magnesium is absolutely required for proper nerve transmission.

The author, in his treatment plan, recommends a massive dose of 400,000 IU of vitamin D and then a daily dose of about 4,000 IU. This strikes me as an entirely allopathic approach to treat the numbers and not the patients. This author wants to force your vitamin D levels to surge overnight. What if you are one of those people who doesn't have enough magnesium to process the massive first dose and you end up with severe magnesium deficiency symptoms?

Note: I've recently read a half dozen books and dozens of websites on vitamin D and they all have different ways of approaching vitamin D therapy. It's obvious there is absolutely no consensus or standardization, which is a serious problem for people who want to know how to improve their vitamin D status. Luckily, you can find out how much vitamin D you need to take to reach a certain protective level of vitamin D. You can join our GrassrootsHealth project by going to [RnA ReSet](#) and clicking on Research Project.

VITAMIN D STATS

Up to 80% of the U.S. population is magnesium-deficient and it seems that 40-75%

of the world's population is also deficient in vitamin D. The vitamin D deficiency link to rickets, osteomalacia, and osteoporosis is well established. However, vitamin D deficiency is being associated with many other diseases, including tuberculosis, psoriasis, multiple sclerosis, inflammatory bowel disease, type-1 diabetes, high blood pressure, increased heart failure, myopathy, and breast and other cancers.

The latest Institute of Medicine (IOM) report, from 2010, indicates 10,000 IU/day is considered the NOAEL (no observed adverse effect level). They also say that 4,000 IU/day can be considered a safe upper intake level for adults aged 19 and older. But that's a one size fits all recommendation that is not going to be suitable for everyone.

It is well documented that the darker the skin, the greater the probability of a vitamin D deficiency. Even in southern climates, 55% of African Americans and 22% of Caucasians are deficient.

VITAMIN D DOSAGE

Vitamin D researchers, including GrassrootsHealth agree that the dosage of vitamin D should be based on the blood levels of the vitamin and they're come up with a nifty Vitamin D Calculator to help you figure out how much you require to reach a certain level. For the average individual, 40-60ng/mL is desirable, but if you want to avoid breast cancer or breast cancer recurrence, you will need to strive for a higher level above 60ng/mL.

[Click on this link for The Vitamin D*Calculator](#)

Enter: Current Weight in lbs; Current Serum Level in ng/mL; Desired Serum Level ng/mL; Calculate and you will see the amount of vitamin D you will have to take to achieve your goal.

Note: The Endocrine Society defines vitamin D deficiency as occurring below

20ng/mL and vitamin D insufficiency is below 30ng/mL. The cutoff point of 20ng/mL is the level at which parathyroid hormone becomes elevated in response to lowering levels of calcium.

DAILY OR MONTHLY DOSING OF VITAMIN D

The debate about the timing of vitamin D dosing arose from the way vitamin D has been studied throughout the years. There are two separate body systems that vitamin D influences and each has its own mechanism of action. One is the endocrine system that targets cells at a distance and the other is a system where vitamin D targets the same cells that make the vitamin D.

Here are the steps of the endocrine system that target bone and teeth formation.

1. Vitamin D arrives in the body from exposure to the sun, from diet, or dietary supplements.
2. Vitamin D is delivered to the liver, converted to 25-hydroxyvitamin D (25(OH)D), and moves into the circulation where it has a half-life of approximately 3 weeks.

This is why researchers have developed the erroneous conclusion that all you need to do is take huge doses of vitamin D once a month because it will last for 3 weeks.

3. 25(OH)D is then transferred, as needed, to the kidneys where it is converted to the active form of 1,25(OH)2D which has a half-life of only a few hours.
This active form helps to control calcium absorption and bone health.

This form of vitamin D only lasts a few hours, which reinforces the need to take vitamin D daily.

4. 25(OH)D is delivered directly to all tissues of the body. Many of these tissues, such as breast, colon, prostate, and brain, can convert vitamin D to its active

form *within* the tissue. It is through this process that vitamin D can help enable the cells to fight against infections, disease, and autoimmune disorders.

With this knowledge, researchers are beginning to realize that the frequency of dosing matters. For disease prevention and treatment, daily dosing (food, sun, and supplement) is very important! It's only in the past 10 years that the focus has shifted from bone health to autoimmune disorders, cancer, cardiovascular disease, and infections that the importance of dose timing has been uncovered.

SUNSHINE = VITAMIN D

When you visit the [GrassrootsHealth website](#) you will find numerous educational blogs about vitamin D. Here is one about the sunshine vitamin. They want to remind you that even though sunshine vitamin D is the best form of vitamin D, people in northern climates are not able to get sufficient vitamin D from the sun.

We are living in an age of 'sun deficiency,' and this has had a negative health impact through increased risk of a number of serious diseases, such as those caused by coronaviruses. These 'diseases of darkness' largely started in the 1800's with industrialization, indoor work, and the rapid movement of populations around the world to places their skins were not accustomed to.

Sunshine provides more beneficial vitamin D effects than what can be gained from supplements alone. Many research studies have been published, even just within the last year, noting that avoidance of the sun contributes to very low vitamin D levels, and with the restoration of vitamin D levels from 20 ng/mL (50 nmol/L) to at least 40-60 ng/mL (100-150 nmol/L), increased prevention of health conditions such as preterm births,

cancers, and respiratory infections can be seen. Important especially now is the potential of reducing the impact and severity of the symptoms caused by multiple types of coronavirus.

A very noticeable trend is that many people of darker skin are more greatly impacted by these diseases. When looking at the complexity of the skin itself and attending to the skin's processing of the sun's rays to vitamin D for human health, a strong relationship can be observed. This goes with the fact that the majority of the population doesn't know how to determine how much sun might be needed for darker skinned individuals.

Data from the 2013-2014 National Health and Nutrition Examination Survey (NHANES) shows that within the United States population, approximately one-quarter (23%) have levels below 20 ng/mL (50 nmol/L) and a vast majority (89%) have levels below 40 ng/mL (100 nmol/L), the bottom level of the range recommended by the GrassrootsHealth panel of expert scientists. Contributing to this deficiency is the decreased amount of time spent outdoors compared to any other time in human history.

VITAMIN K2, VITAMIN D'S BEST FRIEND

I've read a lot about vitamin K2, however, Dr. Kate Rheaume-Bleue's book, *Vitamin K2 and the Calcium Paradox* and Dr. Mercola's many articles about Vitamin K2 gave me a grounding in this misunderstood and unrecognized nutrient.

I'm not including vitamin K here because of its effects on the immune system, in fact, it doesn't appear to have any, however, when you are taking vitamin D, you really should take vitamin K2 along with it to direct calcium toward bones and teeth. K2 polices your calcium, which means it helps to keep your arteries clear of calcium-cholesterol plaque. Unfortunately, a large percentage of the population is deficient in vitamin K2, like they are with so many necessary

nutrients.

Vitamin K has two sides – K1 (phylloquinone) and K2 (menaquinone). Vitamin K 1 is a blood coagulant and it's not the topic of this chapter.

Functions of Vitamin K2

Of course, I'm going to bring magnesium into the discussion about the functions of vitamin K2 because they are obvious companions. In fact, they seem to be kissing cousins and further research will likely attest to the fact that they are interdependent.

- Bringing calcium to bones and teeth, preventing osteoporosis and cavities. Magnesium also performs this function.
- Reducing atherosclerosis in arteries such as the coronary, carotid and renal arteries by redirecting calcium misplaced in soft tissues to the bones and teeth. Ditto for magnesium.
- Balancing hormones by increasing testosterone and fertility in men, and decreasing androgens, the male hormones, in women with polycystic ovarian syndrome (PCOS). Magnesium helps increase testosterone in men and is a beneficial nutrient in the treatment of PCOS.
- Helping to produce insulin to stabilize blood sugar and prevent diabetes and associated metabolic problems including obesity. Magnesium has a role in insulin production, reducing insulin resistance, and decreasing obesity.
- Suppressing genes that can promote cancer while strengthening genes that promote healthy cells. Magnesium stabilizes RNA and DNA.
- Enhancing energy utilization during exercise to improve performance. Magnesium is the reigning master of energy by being a cofactor in 6 of the 8 steps in the production of ATP energy molecules in the Krebs cycle.

America might not be big on vitamin K2 research, but a study in Rotterdam called

"Dietary Intake of Menaquinone is Associated With a Reduced Risk of Coronary Heart Disease" came to some important conclusions. Researchers followed 4,809 Dutch adults and found that those with the highest vitamin K2 intake had a 50% reduced risk of arterial calcification and also a 50% risk reduction for cardiovascular events during the study period. Researchers say that because vitamin K2 is only found in some fermented cheeses and organ meats, the lack of it in modern diets has led to the rise of cardiovascular disease.

Food Sources of Vitamin K2

Although some websites wax poetic about the top 10 or 20 K2-containing foods, you're in for a shock when you realize that fermented natto that smells like dirty socks and gourmet goose liver are at the top of the list. If you want to get your K2 from cheese, you have to eat 3.5 ounces to make a dent in your daily requirement. The only food I could conceivably eat would be chicken liver. I can't imagine eating 3.5 ounces of egg yolks to obtain only 15 mcg of K2 or 3.5 ounces of butter for the same amount. That's why we include 100mcg of K2-MK7 in each *D3-K2* capsule.

Food	mcg per 100 g (3.5 oz)
Natto	1100
Goose Liver	369
Hard Cheeses	76
Soft cheese	56
Curd cheese	24
Goose leg	31
Egg yolk	15
Butter	15
Chicken liver	15

Contraindication: Unfortunately, there are contradictions to the contraindications for vitamin K2 and the use of warfarin - coumadin blood thinners. Some sources say that Vitamin K2 supplementation higher than 50 mcg per day requires INR monitoring by your doctor because the K2 may undo some of the intended effect of warfarin. However, other sources say that using vitamin K2 can help stabilize INR with patients on anticoagulant therapy. Vitamin K1 is involved with blood coagulation, not K2, so I wonder if there is confusion about the two types. Also, it is standard practice to monitor blood coagulation while on warfarin, so your doctor will tell you if it's OK for you to continue taking vitamin K2.

D3-K2 RESET DOSAGE

Our D3-K2 ReSet has 5,000 IU of vitamin D3 and 100 mcg of K2. Test your vitamin D levels with the GrassrootsHealth Home Test Kit. It's located under Research Project at [RnA ReSet](#). With this number you can use [**The Vitamin D*Calculator**](#) to find out how much vitamin D3 you should be taking to reach the level you desire, which may be 40-60ng or over 60ng as I describe above.

CHAPTER FOUR: VITAMIN C RESET

As I say on our *Vitamin C ReSet* label, vitamin C is the most popular vitamin in the world. Linus Pauling, two time Nobel Prize winner helped make vitamin C, a household word as the “cure” for the common cold.

Most of my discussions about vitamin C for the past several decades have been about the vitamin C complex derived from food sources. These supplements contain the whole molecular complex, not just one component – ascorbic acid. Recently, however, I’ve been exposed to more information about ascorbic acid in light of COVID-19 and the anti-viral functions of ascorbic acid. I’ve decided that both food-based vitamin C and ascorbic acid are important. It’s not a matter of taking one or the other. You can choose both.

In this section I’ll refer to food-based vitamin C as vitamin C and the non-food-based vitamin C as ascorbic acid.

The multiple components of vitamin C complex that are found in foods include a number of co-factors: factors P, J, and K. The P factors help strengthen blood vessels thus preventing bruising and bleeding gums; K factors help with blood coagulation; and J factors help with the oxygen carrying capacity of the blood. Other components include rutin, hesperidin, bioflavonoids, ascorbinogen, protein chaperones, and various enzymes like tyrosinase.

The enzyme tyrosinase helps break down tyrosine molecules, which are incorporated into thyroglobulin along with iodine and 8 other minerals to make thyroid hormones. Surprisingly, tyrosinase contains copper, which is the main reason that vitamin C assists in the absorption of iron.

You also need the tyrosinase in vitamin C to metabolize tyrosine into the neurotransmitters norepinephrine, epinephrine, and melanin. Ascorbic acid levels in the adrenals are very high. That’s why I recommend extra food-based vitamin C and ascorbic acid (1-2 grams a day) for people with adrenal fatigue.

Norepinephrine and epinephrine secreted by the adrenal glands boost your energy and put your body on high alert by increasing heart rate, blood pressure, and respiratory rate. Of note is that norepinephrine is produced from dopamine, with the help of the amino acids; phenylalanine, lysine, and methionine; minerals: magnesium, manganese; vitamins: C and B6. The more norepinephrine and epinephrine that you produce means you are depleting your nutrient building blocks.

There are 8 major enzymes that require vitamin C for proper function. Compare this number with the 1,000 enzymes that require magnesium. But that doesn't make vitamin C any less important.

Several of the vitamin C-dependent enzymes are critical for producing the connective tissue called collagen. Collagen is found throughout the body, but it is especially important for the structure and function of bones, tendons, ligaments, and blood vessels. Lysine is also a building block of collagen and is an added ingredient in *ReStructure*.

Vitamin C-dependent enzymes help synthesize carnitine, which is essential for converting fats into energy. If you are on a Keto diet, which is high in fats, you will require more vitamin C and ascorbic acid. This is especially true since a Keto diet limits your intake of fruit carbohydrates. Here are the functions of ascorbic acid which comprise most of the vitamin C research.

- Brain development during fetal and post-natal growth, and maintenance of brain health throughout life, including effective anti-oxidative defense
- Efficient communication between nerve cells
- Maintenance of healthy skin and connective tissue
- Wound healing
- Structural integrity and function of heart and blood vessels
- Growth of new blood vessels
- Proper structure and function of circulating blood cells

- Formation of the cells of our immune system (white blood cells)
- Maintenance of a healthy and effective immune response
- Generation and storage of energy in the 'power plants' of our cells, the mitochondria.

LET'S ASK THE VITAMIN C EXPERTS

I've been speaking with several vitamin C experts recently on my radio show and I thought I'd let them tell you the story about the most talked about vitamin in the world. I'll start with present day experts and then go back 50-70 years to pioneering doctors who were treating viruses with high dose intravenous vitamin C.

DR. RHONDA PATRICK

Dr. Rhonda Patrick is an American biomedical scientist, researcher, and entrepreneur. Born in 1978, she missed being a Millennial by a couple of years, but I think she appeals to the younger generation. Dr. Patrick has a gift for translating complex scientific topics into insights in her videos, podcasts, and articles. She's dedicated to the pursuit of longevity and optimal health—and shares the latest research on nutrition, aging, and disease prevention with her growing audience.

I subscribe to Dr. Patrick's newsletter and was excited to see a publication simply titled "Vitamin C." It's a 42-page, 20,000-word, up-to-the minute description of the benefits of vitamin C that's tuned in to our current COVID-19 crisis. She's included almost 200 references and you should print this up and give it to your doctor as evidence that you should have IV vitamin C if you have symptoms of COVID-19. Here is how Dr. Patrick begins her paper:

Vitamin C, also known as ascorbic acid, is an essential nutrient, widely recognized for its antioxidant properties. These properties arise from its

potent redox potential due to its capacity to donate electrons to oxidized molecules. Even in small quantities vitamin C can protect critical molecules in the body such as proteins, lipids, carbohydrates, and nucleic acids (DNA and RNA) from damage by reactive oxygen species, which are generated during normal metabolism, by active immune cells, and through exposure to toxins and pollutants (e.g., certain chemotherapy drugs and cigarette smoke). The vitamin also plays a critical role as a cofactor – a molecule that assists enzymes in chemical reactions. This dual nature of vitamin C means that it is instrumental in multiple physiological processes, including those involved in the biosynthesis of collagen, carnitine, and catecholamines. As such, vitamin C participates in immune function, wound healing, fatty acid metabolism, neurotransmitter production, and blood vessel formation, as well as other key processes and pathways.

DRS. LEVY, GONZALEZ, AND MARY

Vitamin C experts and practitioners, Dr. Thomas Levy, Dr. Michael Gonzalez, Dr. Mignonne Mary, and Dr. Charles Mary were all on my [radio show March 30, 2020](#). Please listen to the entire show to learn to support the immune system against viruses. Many customers have told us that they learned so much practical information on this show that they could take care of their health with confidence using our *Completement Formulas* and extra vitamin D, ascorbic acid, and zinc – all of which we are offering to our customers.

DR. FREDERICK KLENNER

Dr. Klenner was a pioneer in the application of vitamin C for viral infections. In 1949, he published a report on his treatment of 60 cases of polio using oral and injectable vitamin C. He achieved a cure in 57 out of 60 cases in three days and

the other three patients the cure took five days. Below is an excerpt from his published paper "The Treatment of Poliomyelitis and Other Virus Diseases with Vitamin C."²⁴

In a previous report dealing with the antagonistic properties of ascorbic acid to the virus of atypical pneumonia, mention was made of the fact that other types of virus infections had responded favorably to vitamin C. This paper is to present these findings as well as the results of subsequent studies on the virus of poliomyelitis, the viruses causing measles, mumps, chickenpox, herpes zoster, herpes simplex and influenza. Further studies with the virus of atypical pneumonia will also be discussed.

A review of the literature in preparation of this paper presented an almost unbelievable record of similar studies. The years of labor in animal experimentations; the cost in human effort and in "grants," and the volumes written, make it difficult to understand how so many investigators could have failed in comprehending the one thing that would have given positive results a decade ago. It was Jungeblut who unequivocally said that 'vitamin C can truthfully be designated as the antitoxic and antiviral vitamin.'

An online collection of Dr. Klenner's and Dr. Cathcart's papers can be found at the following [University of Helsinki](#) link. For even more ascorbic acid research, [Ascorbate Web](#) offers an historical compendium of 20th century medical and scientific literature on ascorbic acid in the treatment and prevention of human and animal diseases. The entries range from 1935-1999. This website also offers a brief overview of vitamin C articles (2000 - 2013) and a link to a PDF copy of the book *The Healing Factor* by Irwin Stone.

DR. ROBERT CATHCART

Another famous vitamin C practitioner is Dr. Robert Cathcart, who successfully treated over 20,000 patients with very large doses of vitamin C, beginning in 1969. His doses could be as high as 150,000mg per day resulting in remarkable and miraculous results and no ill effects. You may be interested in a short biography of Dr. Cathcart and you can read his 1991 paper called "A Unique Function of Vitamin C" online. A bibliography of his work can be found in [Appendix C](#).

Ascorbic Acid versus Food-Based Vitamin C

Dr. Levy answered the following question that Jonathan asked on my March 30, 2020 radio show. "I've heard that ascorbic acid is not a true form of vitamin C and causes other issues. This comes from holistic recommendations to find sources of all natural vitamin C. Can you comment please?" Dr. Levy said:

In a nutshell it's really outlandish. Vitamin C is ascorbic acid; ascorbic acid is vitamin C. The part of ascorbic acid that is the essence of vitamin C is the ascorbate anion. You could have sodium ascorbate, calcium ascorbate, or magnesium ascorbate. They're all vitamin C with a different cation attached to them. Now, with regard to food-based vitamin C, let me say that vitamin C is the premiere antioxidant in your body. But all antioxidants work together. I like to say you want to establish in your body an optimal matrix of different antioxidants all working together to regenerate each other back to the reduced form once they are oxidized by a toxic or oxidative stress.

If you eat perfect food, it's only helpful to the degree that it metabolizes down to a molecule that is an antioxidant with electron-donating capacity. So, in that regard, yes, the more different, wonderful antioxidant substances that you take with vitamin C, the better. This is where a lot of confusion comes in because when a company tries to sell

their food-based product, they put down ascorbic acid.

We have 80 years of literature that shows ascorbic acid by itself or as sodium ascorbate, most prominently, has cured a whole host of viral syndromes, bacterial syndromes, even protozoa and fungal syndromes, and neutralized an almost uncountable number of toxins. Some people say crazy stuff like ascorbic acid can cause cancer or it can cause kidney stones. The bottom line is that it's been around for 80 or 90 years. It's dealt with many symptoms and conditions all by itself without side effects. But, if you want to take additional antioxidants, just like additional good nutrition, then great. But, just don't minimize what ascorbic acid has done repeatedly, documented in the literature, all by itself.

I then summed up Dr. Levy's remarks. "So, you're saying that the molecule of ascorbate is and always will be a molecule of ascorbate, wherever it comes from, and that it's mainly this transfer of electrons back and forth that keeps the antioxidant of that ascorbate working." Dr. Levy agreed.

Dr. Levy replied and added another excellent piece of information on the association of vitamin C and glucose, which I have already noted in the Introduction. He further explained high dose ascorbic acid saying:

Compared to the other animals in the animal kingdom, we have a vitamin C gene, but humans have lost the ability to transcribe it inside our liver to make vitamin C from glucose. When you look at an animal, about the size of a human, they'll make roughly 10,000mg of vitamin C a day and deliver it directly into the blood stream which means an overwhelmingly much larger amount of supplementation will be needed to ever approach the amount of delivery from your liver. So, this is why vitamin C is unique in needing to be supplemented. If someone asks, 'If I eat a quality diet, I should get enough.' The answer is 'Yes, for most things but not for vitamin C.'

Vitamin C and Kidney Stones

Dr. Levy was also asked the age-old question about vitamin C causing kidney stones in the form of calcium oxalic. Dr. Levy answered:

Biochemically, vitamin C can break down into small amounts of oxalates. Since 85% of kidney stones are composed of calcium oxalate, people who oppose high dose vitamin C immediately jump on the bandwagon and say, "Vitamin C causes kidney stones." That is complete bunk. Lots of foods break down into oxalates, which are readily excreted.

Instead, you have to look at the calcium. People who ingest huge amounts of dairy, drink a lot of milk, and take calcium supplements are going to be the ones that get stones. When you stop dietary calcium, when you stop the calcium supplementation, and take generous doses of magnesium, vitamin C, vitamin D, and vitamin K2, you not only prevent kidney stones, you actually help dissolve pre-existing stones. So, vitamin C is inconsequential with regard to causing kidney stones, even though it does metabolize down to oxalate. So, I like to say when this issue comes up, it's simple, four words: No calcium, no problem.

In fact, Dr. Cathcart, who has given in the course of his life hundreds of thousands of grams of vitamin C orally and intravenously never encountered a single person in which he caused stones. As a matter of fact, the higher your blood level of Vitamin C – they have studies to show this - the lower the incidence of kidney stones.

DR. MICHAEL GONZALEZ

Dr. Michael Gonzalez is a professor at the Nutrition Program at the School of Public Health on the Medical Sciences Campus of the University of Puerto Rico. He is an

author of over 100 scientific publications. He is an active member on several scientific journal editorial boards. At present, he is a consultant for the Center for Improvement of Function, Wichita Kansas, and has obtained several awards for his work on nutrition and cancer.

Ascorbic Acid Antiviral Mechanisms Provided by Dr Gonzalez

Direct Antiviral Mechanisms

1. Disruption of viral capsid (capsule) by structurally interfering with the sugar molecule of its glycoprotein envelope.
2. Damage of the viral capsid due to ascorbic acid's ReDox (detoxification) capacity when given in pharmacological doses.
3. Inhibition of viral replication when provided in pharmacological doses by creating a hostile environment for this activity to occur, in addition to inhibiting viral replication enzymes.

Indirect Physiological Mechanisms

4. Increase cellular immunity of white blood cells (neutrophils, macrophages, lymphocytes, NK cells).
5. Increase humoral immunity (B cells, antibodies).
6. Increase antiviral proteins (Interferon).
7. Increase energy by providing necessary electrons and electron movement for mitochondrial ATP generation.
8. Competes for sugar uptake, the main source of fuel for pathogenic organisms.
9. Potent, quick antioxidant action when provided in proper doses to prevent the dangerous and severe pathological cascade of the cytokine storm.
10. Maintain structural integrity of cells by favoring collagen formation.
11. Modulate gene expression. Vitamin C administration decreases expression of genes susceptible to mutation.

See Appendix C for the 25 Scientific References that accompany the above list of [vitamin C](#) antiviral attributes.

Vitamin C and the Endothelium

In the Introduction I mentioned that the endothelial lining of the blood and lymph vessels are targeted by infections. I said that infections affects the H2 receptors, which are on the endothelial surface layer causing inflammation. In Chapter Two, I noted that the virus attaches to the histamine-2 receptors of the endothelial cells and that magnesium is a necessary cofactor for the function of the histamine degrading enzyme, diamine oxidase. In Chapter Three I talked about the endothelium being at risk in patients who have low levels of vitamin D. Now, in Chapter Four, we'll review the "Role of Vitamin C in the Function of the Vascular Endothelium."²⁵ Here is a slightly edited comprehensive, but complex abstract:

Vitamin C, or ascorbic acid, has long been known to participate in several important functions in the vascular bed in support of endothelial cells. These functions include increasing the synthesis and deposition of type IV collagen in the basement membrane, stimulating endothelial proliferation, inhibiting apoptosis, scavenging radical species, and sparing endothelial cell-derived nitric oxide to help modulate blood flow. Although ascorbate may not be able to reverse inflammatory vascular diseases such as atherosclerosis, it may well play a role in preventing the endothelial dysfunction that is the earliest sign of many such diseases.

Beyond simply preventing scurvy, evidence is mounting that ascorbate is required for optimal function of many dioxygenase enzymes in addition to those involved in collagen synthesis. Several of these enzymes regulate transcription of proteins involved in endothelial function and proliferation. More recently, ascorbate has been found to acutely tighten the endothelial permeability barrier and, thus, may modulate access of ascorbate and other molecules into tissues and organs.

Many diseases and conditions have either systemic or localized

cellular ascorbate deficiency as a cause for endothelial dysfunction, including early atherosclerosis, sepsis, smoking, and diabetes.

DR. ANDREW SAUL

Dr. Saul spearheads the *Orthomolecular News Service* and was a guest on my show April 2, 2018. In a May 21, 2020 interview with the *Epoch Times* called "Censoring Evidence on Vitamin C," Dr. Saul explains how vitamin C can help prevent infections but you aren't going to find that out from mainstream media. Here is an extensive excerpt from the online edition.

Vitamin C is an antioxidant. So, it goes after free radicals. We've all heard about that. When somebody is seriously ill with a disease like COVID, their need for vitamin C skyrockets. If you test people with pneumonia, influenza, or other infections, you can measure and see that their vitamin C levels are low. So, the body is actually consuming it in this battle to recover.

Another thing that vitamin C does is it strengthens the bonds among the cells of the body. The substance that cements all our cells together is made out of collagen. It's what keeps your joints and skin together. It's what keeps your blood vessels intact. When you don't have enough vitamin C, you don't make collagen. The connective tissue becomes weak and you get scurvy. In the old days, wherever you touched a sailor with scurvy, they would instantly have a bruise because the little blood vessels would all break. Vitamin C enables the manufacture of collagen so that you don't bleed into yourself. Well, with certain infections the lungs are just full of blood. If you don't have enough vitamin C, those blood vessels are going to rupture, so the person will fill with blood and die.

Vitamin C also enables our white blood cells as an army that fights invaders; white blood cells require vitamin C to function.

And in high enough doses, vitamin C is actually an antiviral. This goes back to the ridiculously-sounding high doses with Dr. Klenner and Dr. Cathcart. Klenner was reversing viral pneumonia in 52 hours.

In every nutrition textbook ever written, it says that vitamin C is essential for a properly functioning immune system. Well, if you have certain infections, the one thing you want more than anything else is a properly functioning immune system. Too little vitamin C will cause the immune system to be weak or cause the immune system to work wrongly.

Pneumonia and SARS (Severe Acute Respiratory Syndrome) are what ultimately kills a person. You can also get pneumonia from a cold that just gets worse. It happened to me many years ago. I had a severe cold; I didn't take care of myself and I got double viral pneumonia. So, I decided to do what Dr. Cathcart did—I took 2,000mg of vitamin C every six minutes I was awake. I had a high fever and I was coughing. In three hours, my temperature came down three degrees and my cough stopped. This is exactly what Klenner and Cathcart reported in their medical papers.

All of this makes it a plausible therapy for certain infections. What people are being told is that this is being looked into, but there's no evidence or proof, so don't do it because we're not going to have the results until November. Well, we can't wait until November. So, we're going to the doctors who are getting the results now.

Doctors are morally and ethically bound to do everything they can for the good of the patient. If they don't know about vitamin C, we can understand why they might not use it. But now, the cat is out of the bag. Doctors know other doctors who are using vitamin C. And now, it's a political battle to tell them to not do it.

TOM TAYLOR

Tom Taylor is an avid vitamin C enthusiast and member of the *Orthomolecular News Service* giving some great advice about vitamin C. He calls his article "Smothering The Fire: How Vitamin C Can Stop Viral Infections Quickly."

The Vitamin C Fire Smothering Technique: Four Keys

The first key is to pay attention to your early indicators that you are about to get sick. For me that is stuffiness in my left nostril. Years ago, it was a sore spot in the back of my throat. For you it may be different. The important thing is to be aware of your early warning indicators of illness.

The second key is to be very quick to start the high dose vitamin C at your first indication of illness. My experience has taught me to go immediately to 2 grams an hour (not per day) and keep the rate up for a few hours or for the whole day or evening. When this gives you enough vitamin C, your first indication of a shift is that you suddenly perk up and feel, maybe not great, but better.

For some nasty illnesses, four grams an hour or one gram every fifteen minutes will be the solution to stop the viral infection. Dr. Cathcart in his video and papers reports a young woman who took around 450 grams in two days to bring a case of mononucleosis under control.

The third key is closely or evenly spacing the dosages. All sources agree that vitamin C has a very short half-life in your body, on the order of a few hours when you are well. When you are sick and heavily stressed, the sources say the body can easily consume a gram or more in fifteen minutes.

What happens if you take too much? After starting to feel better, the next indicator is you start feeling a little gassy with some flatulence. This is annoying but OK. However, in the rare event you wildly overdo it, you will clean out your bowels for a few hours, but this is usually a very short-term event. Though unpleasant, it far beats the alternative of being sick and it could be looked upon as a detoxification. Dr. Cathcart called this method of trial-and-error with the dose "bowel tolerance,"

The fourth key is to keep vitamin C handy. Just as you would small bandages or lip balm.

Tom Taylor finishes his article by reminding us that "Most animals do make their own vitamin C naturally. The exception in the pet world is the guinea pig. They, like humans and other primates, do not make their own vitamin C."

VITAMIN C RESET AND ASCORBATE DOSAGE

I'm in favor of taking 1-2,000mg of ascorbic acid daily. You could take 2,000mg or more of *Vitamin C ReSet* which many of our customers love to do! It is also a wonderful flavor mask for the ReMag and Pico Zinc in the Total Immunity Bundle.

CHAPTER FIVE: PICO ZINC

I've talked about the wonders of zinc for many years and I'll include those words here. Zinc for immune system support should be taken in low doses daily, as you are doing with *ReMyte*, because zinc does not have storage sites in the body. However, higher doses of *Pico Zinc* may be necessary to support the immune system against viral attacks, but they are not to be taken long term. I'll describe why zinc is important below but first I'll make my dosage recommendations very clear.

Let me remind you first that taking *Pico Zinc* and all the immune boosting formulas will be doing much more than just supporting the immune system. Already we have reports of interesting health improvements with people taking extra zinc. Our own Ginney Sanders, AKA Ginney Almighty, had a year-long facial rash that suddenly disappeared after she took some extra *Pico Zinc* for only a few days. Zinc is known for its benefits to 'skin, hair, and nails', so that makes sense. I'm sure we will be hearing lots more stories like this from our customers.

The Importance of Zinc

I was alerted to the crucial role that zinc plays as an antiviral when I saw it being used successfully, along with hydroxychloroquine, to treat COVID-19. On my [March 30, 2020 Dr. Carolyn Dean Live Radio Show](#) I spoke with several vitamin C experts and we also delved into the immune system benefits of zinc. Here is Dr. Thomas Levy's experience:

There is an abundance of literature showing that zinc, as an ion, is very effective in combating infections. You've all heard of zinc lozenges for sore throats. Zinc, however, has a very difficult time getting inside the living cell but studies show that once zinc is inside the cell, it is a powerful anti-viral.

As it turns out, hydroxychloroquine is an ionophore, which is just a big

word meaning that it opens up cell mineral ion channels that allow zinc ions to easily get inside the cell. Once inside a cell that is infected with a replicating virus, the zinc completely stifles the viral RNA polymerase that allows the virus to replicate and ends up resolving the viral infection very quickly. So, this is a very consistent and reliable outcome.

So, everybody understands, you never take high dose zinc long term; it can be toxic. You don't want to take that on a regular basis, you don't want to take more than 20-40 mg. But, in a case where you are fighting something like COVID-19, you can load up on it and really sharpen the knife of the hydroxychloroquine.

Pico Zinc, because of its ability as a stabilized ion of zinc. can readily enter cells and act as its own ionophore without needing the help of hydroxychloroquine.

The Endothelial Connection

I've mentioned how magnesium, vitamin D, and vitamin C all have a role to play in keeping the endothelial lining of the blood vessels intact. It turns out that zinc is necessary to maintain the health of cardiovascular cells and the endothelium. Low levels of zinc in the body can cause a deficiency in the endothelial barrier, which leads to inflammation and potential buildup of calcium/cholesterol plaque.

ZINC BASICS

We have about 3 grams of zinc in our bodies. Around 1934, zinc was declared essential for humans and animals. It was several years before the enzymes governed by zinc began to be researched. Zinc-containing enzymes are involved in many aspects of metabolism, many of them overlapping and intersecting with magnesium enzymes.

Zinc, according to the NIH Office of Dietary Supplements, plays an important
Carolyn Dean MD ND

role in the structure and function of the immune system. They say it is a cofactor for nearly 100 enzymes in the body. Other sources say that number is closer to 300 with about 3,000 body proteins out of 100,000 requiring and utilizing zinc.

Zinc is also involved in protein synthesis, cell signaling, neurotransmission, and vision. Specifically, for the immune system, it influences T-cell activity, cytokine production, and phagocytosis.²⁶ It's found in skeletal muscles and is especially high in white and red blood cells, the retina of the eyes, liver, kidneys, bones, and pancreas. Semen and the prostate gland also contain enough zinc to make it an important mineral in reproduction.

The NIH only admits that zinc has a role functions 1 to 7, below, however dozens of benefits are swirling all over the internet. We want zinc to support the structure and function of the immune system and any other benefits are a bonus! Here is a sampling of the many attributes of zinc:

1. Protein synthesis
2. Wound healing (zinc travels to wound sites: burns, abscesses, injury, and surgery)
3. DNA synthesis
4. Cell division
5. Supporting normal growth and development during pregnancy, childhood, and adolescence
6. The sense of taste and smell.
7. Blood formation
8. Not just DNA, but also RNA, and protein metabolism
9. Fatty acid and prostaglandin metabolism

10. Vitamin A metabolism
11. Growth phases (fetal, infancy, childhood, and puberty, ensuring proper physical, mental, and sexual development)
12. Regulation of sex hormones
13. Reproductive organ function and fertility (miscarriage, birth defects, and immune deficiency are common effects of zinc deficiency)
14. Membrane stabilization
15. Free radical protection with superoxide dismutase with zinc as a cofactor
16. Inhibiting intestinal absorption of toxic heavy metals (such as lead and cadmium)
17. Regulation of brain neurotransmitters (GABA, glutamate, and the storage of histamine)
18. Sensory functions not just taste and smell but also vision and hearing.
19. Immune defense (cellular and antibody immunity)
20. Necessary for many functions in the thyroid including production of T3.
21. Like magnesium, zinc is a calcium antagonist or calcium channel blocker, preventing calcium from improperly activating muscle and nerve cells and depositing in soft tissue in the body.
22. Zinc is required for the synthesis of thyroid hormones and the delicate conversion of T4 to T3. Thus, zinc deficiency can result in hypothyroidism.
23. Conversely, thyroid hormones are essential for the absorption of zinc. Researchers have found that the hair loss attributed to hypothyroidism may not improve with thyroid hormone replacement unless zinc supplements are added.

Zinc and The Common Cold

I keep thinking that since allopathic medicine can't "cure" the common cold, what chance does it have against COVID-19? But alternative medicine has lots of evidence that zinc can help colds and flus. My favorite non-biased research group – The Cochrane Reports published a 2011 meta-analysis called "[Zinc For The Common Cold.](#)"

Data from 13 randomized double-blind, placebo-controlled trials totaling 1300 subjects concluded that zinc lozenges or zinc syrup reduced the duration and symptoms of a cold in otherwise healthy people when given at the first sign of symptoms. When zinc was taken during a five month trial, it reduced the incidence of colds by 37%.

I remind you that just using zinc as if it were a drug to "treat" the common cold is not the way the immune system works. It wants magnesium, vitamin C, vitamin D, probiotics, silver, and zinc working together to give the best possible outcome.

An article, "[Adequate zinc eases pneumonia in elderly](#)" reported on a study done in nursing homes. Those patients with higher zinc levels had a reduced incidence and duration of pneumonia. This report is especially important in light of the patients hardest hit with COVID-19.

Zinc Deficiency Symptoms

- Growth retardation
- Low blood pressure
- Retarded bone growth
- Loss of appetite

- Loss of smell and taste senses
- Depression
- Rough skin/Pale Skin
- Acne
- Weight loss
- Diarrhea
- Hair Loss
- Fatigue
- White spots under fingernails
- Delayed
- Erectile dysfunction

Causes of Zinc Deficiency

The causes of zinc deficiency are somewhat similar to the causes of magnesium deficiency, such as:

- Zinc is depleted by the body during pregnancy and nursing.
- There is a lack of zinc in the soil and, therefore, the food supply.
- The body may absorb only about 25% of the zinc that does find its way into the diet.
- Fast food diets are low in zinc.
- Strict vegetarian diets are low in zinc. Animal products have more zinc.
- Alcoholism promotes zinc deficiency.

- Excessive sweating in athletes or laborers depletes zinc.
- Use of cortisone or steroids creates zinc deficiency.
- Zinc is lost by metabolism of the birth control pill.
- Copper IUDs cause copper build up and depletion of zinc.

Losing Zinc

Many symptoms and diseases burn off zinc such as the following:

1. Severe skin rashes like psoriasis. A vicious cycle can occur, where a zinc-dependent enzyme involved in the lipid synthesis of skin cells is not functioning properly, creating dermatitis, dry skin, and eczema, which causes more loss of zinc.
2. Diarrhea
3. Vomiting
4. Increased urination in:
 - a. Diabetes
 - b. Burns
 - c. Acute and chronic infections
 - d. Surgery
 - e. Cancer
 - f. Heart attacks.

Diagnosing Zinc Deficiency

Testing for zinc is not routinely done in allopathic medicine but when you learn about all its functions, you'll wonder why it isn't. Immediately after that thought

you will remember that allopathic medicine knows nothing and teaches nothing about nutrition and nutrients – to everyone's detriment.

You may have zinc deficiency if you have to cover up white spots on your fingernails with bright nail polish!

Ninety percent of the body's zinc is found in red and white blood cells so a red blood cell test will help diagnose deficiency.

On our [RnA ReSet Website](#), you can order a [Mg+Elements Test](#) at the Research Link that will analyze Magnesium, Selenium, Zinc, Copper; Cadmium, Lead, Mercury) & Vitamin D. It's a very convenient In Home test kit using a few drops of blood from a finger stick.

Ten percent of your total body zinc is found in serum. (By comparison, only one percent of magnesium is found in serum). Note that zinc is naturally elevated in hair, which indicates that hair analysis is not an accurate measure of zinc. (Yet another reason why I don't find hair analyses consistent enough to be useful.)

When I was studying Naturopathic Medicine, we were told that our sense of taste can be used to diagnose zinc deficiency. I used this method in my practice for a time, but the results were inconsistent. The test required you to put two teaspoons of Zinc Tally (Metagenics) in your mouth to gauge your deficiency. If you tasted nothing or the solution tasted sweet, you were thought to be suffering from zinc deficiency. If you perceive a metallic taste, you were supposedly not deficient. However, even if you begin to taste *Pico Zinc* as metallic, the fact that zinc is not stored in the body means that it still should be taken daily.

I just looked up the Zinc Tally product online and a 4 oz bottle is \$54.00 and 2 tsp equals 2 mg of zinc! If you want to try the taste test with *Pico Zinc*, you would only use 6 drops which would be equivalent to 2 mg of zinc. I would be interested in your findings.

In my *ReMyte & ReCalcia* book I say that the very low potency of zinc and

the other minerals in *ReMyte* allows us to take small doses of these minerals in bioavailable form and let our body decide how much of each mineral it wants to use. However, with the current focus on the immune system, I've added *Pico Zinc* for stronger immune support.

Sources of Zinc

The highest amount of zinc is found in oysters, but the amount of zinc in oysters varies widely from 20mg – 80mg on different websites so it's difficult to get an accurate number. Not many people eat oysters every day, but most people do eat meat, which is the second highest source.

- Oysters, 3 ounces (oz): 74 mg
- Beef patty, 3 oz: 5.3 mg
- Alaska king crab, 3 oz: 6.5 mg
- Fortified breakfast cereal, 3/4 cup serving: 3.8 mg
- Cooked lobster, 3 oz: 3.4 mg
- Cooked pork chop loin, 3 oz: 2.9 mg
- Baked beans, 1/2 cup serving: 2.9 mg
- Dark meat chicken, 3 oz: 2.4 mg

Other zinc sources in a person's diet include turnips, peas, chickpeas, oatmeal, peanuts, almonds, whole wheat, pumpkin seeds, ginger root, and pecan nuts, low fat yogurt, and cheddar cheese. But these sources only contain around 1–2 mg of zinc per serving. Since vegetarians don't eat meat, they tend to have low levels of zinc in their diet and in their blood. Eating high levels of legumes and whole grains, which contain phytates that bind zinc and inhibit its absorption add to the risk of zinc deficiency. For that reason, vegetarians sometimes require as much as 50% more of the RDA for zinc (11mg) than non-vegetarians to allow for the phytate binding.

THE RELATIONSHIP OF COPPER AND ZINC

Any time you talk about zinc, copper has to come up in the conversation. Similarly, if you take zinc, you have to take copper. That's why I have zinc and copper in *ReMyte*. Two copper atoms reside inside the tyrosinase enzyme molecule, which is found in food-based vitamin C supplements.

Copper was recognized as an essential element in 1928, much earlier than most other minerals. Its uptake from the diet through the intestines is very low, only about 5 percent, and adults only have about 80-100mg stored in the body.

In my naturopathic training, I learned about copper as an antagonist of zinc; if you took too much zinc, you could lower your levels of copper. Then with the work of Carl Pfeiffer PhD, MD, who in 1987 wrote, "Excess Copper as a Factor in Human Diseases," I learned that copper can be toxic but that you still need bioavailable copper for many functions in the body.

I hear from practitioners, who do hair tissue mineral analysis, that there is a noticeable level of copper toxicity in the population. The alarm has been sounded and many people are afraid of copper. The most common sources of copper toxicity are from water contaminated by copper plumbing, estrogen in birth control pills that drive down zinc and elevate copper, copper IUDs, and copper in multiple vitamin mineral supplements.

As I said, we walk a tightrope with copper because it is vital to the body in many ways, but its reported toxicity makes people afraid to take it. I've been aware of the problems presented by copper since the late 1970's and I designed *ReMyte* to contain a low dose, bioavailable copper that cannot become toxic since it is balanced with the proper 10:1 ratio of zinc to copper.

Copper is important in red and white blood cell formation; it is found in most antibodies; it is necessary for creating the color and texture of your hair: it is responsible for the elasticity of your skin through the production of elastin, which

cross-links with collagen in connective tissue. Adequate copper levels are essential for the growth of new blood vessels, wound healing, and recovering from heart attacks and strokes. Copper functions as a constituent of several antioxidant enzymes. Superoxide dismutase (SOD), monoamine oxidase (MAO), and cytochrome oxidase are the most important ones. Cytochrome oxidase is involved in the final step in the Krebs Cycle, occurring in mitochondria that creates ATP (adenosine triphosphate), the main energy source in our cells. ATP is also identified as Mg-ATP, which acknowledges magnesium's role in making energy.

A copper-to-zinc imbalance, with too much copper and not enough zinc, can be a factor in postpartum-depression, premenstrual tension, ADHD, psychosis, and paranoia, since copper acts as a brain stimulant. Copper also plays a role in histamine imbalance. When copper is low, histamine can become elevated. Thus, when people are told they have high copper levels and try to bring them down, they can begin to experience histamine activation.

Histamine can also become elevated in magnesium deficiency. Enzymes that metabolize histamine require magnesium, copper and vitamin B6 to be able to function. The solution to histamine elevation is to take *ReMag* and *ReMyte*. As an ion, the copper in *ReMyte* is biologically active and assists the body in crucial metabolic functions that require copper.

Copper and Ceruloplasmin

You can't talk about copper without mentioning an important protein called ceruloplasmin. I learned about this very complex substance in my naturopathic training. It's responsible for iron absorption, oxygenating the body, and, along with magnesium, producing energy in the form of ATP.

Ceruloplasmin is the transport system that binds copper and ferries it through the blood. When ceruloplasmin levels are depleted, copper activity is low because it's not moving into the cells. At the same time, the free copper that is not properly

bound to ceruloplasmin can become toxic as it deposits in the wrong places. Remember, all this happens when there isn't enough ceruloplasmin to go around.

If you have copper toxicity, the excess mineral can jam the copper receptor sites, causing simultaneous symptoms of copper excess and copper deficiency. However, you can't just avoid copper because the body must have copper in a bioavailable form in order to function. The solution is to have enough ceruloplasmin to do its job.

The picometer-sized, stabilized ionic copper in *ReMyte* is fully absorbed at the cellular level and does not require special transport, so it is completely bioavailable. Also, bioactive copper ions will displace toxic copper compounds that jam up receptor sites, eliminating them and their negative effects.

Ceruloplasmin has many important functions besides ferrying copper around the body. It's a lifesaver because it binds up free iron so that it can't be used to feed infectious organisms that want to increase their territory in your body; and the excess iron cannot build up in the liver causing iron overload. In general, bioavailable copper is crucial to keep iron regulated.

Inhibiting Ceruloplasmin

I've told you what's required to make ceruloplasmin but what's standing in its way? Proper functioning of both the adrenals and liver are required to make ceruloplasmin. If the liver is overloaded with chemical, environmental, and drug toxins, ceruloplasmin becomes depleted and therefore there is not enough to keep iron and copper from depositing in soft tissues and causing damage.

Any stressors can deplete ceruloplasmin as well as the following:

- Too much Vitamin D can deplete both ceruloplasmin and magnesium. With the over prescribing of vitamin D in recent years, ceruloplasmin and magnesium are both under attack.

- Ceruloplasmin requires vitamin A for production but vitamin D is required to support the function of vitamin A. I recommend *Blue Ice Royal*, which provides a good balance of vitamins, A, D, and K2 from food sources. Vitamin A, apparently is one of the nutrients that can still be found in foods – spinach, squash, tuna, sweet potato, chard, and cantaloupe are all good sources.
- Stress depletes ceruloplasmin. That's why I recommend *ReMag*, oral liquid or *ReMag Lotion* to decrease these stress reactions that lead to chemical changes in the body.
- Iron supplements and iron-fortified foods can overload ceruloplasmin and deplete it.
- Calcium can deplete ceruloplasmin, possibly because it also depletes magnesium.
- Zinc and manganese are copper antagonists that can dump toxic copper out of storage sites into the blood stream. According to researchers, on its way out of the body, copper excess can cause symptoms of skin rash, acne, and headaches. More extreme symptoms can include anxiety, OCD, joint or muscle pain, and mood swings.
- Bile is required to bind excess copper and remove it from the body. If the liver does not properly perform this function, copper may be retained and continue to cause copper toxicity symptoms.

PICO ZINC DOSAGE

I considered recommending taking ½ tsp (20mg) of *Pico Zinc* with a meal once daily for one week per month as a preventive measure. But zinc does not have an efficient storage system so, it's best to take it daily. You are already doing that because there are 3mg of stabilized ions of zinc already in your *ReMyte* minerals per ¾ tsp dose.

However, during times of high viral activity with COVID-19, on top of the 6 mg of zinc in your 1.5 tsp of *ReMyte*, I recommend adding 5-10mg of *Pico Zinc* daily. I highly recommend that you take it with meals because it may cause some slight nausea if taken alone. Label instructions show that ½ tsp of *Pico Zinc* equals 20 mg, so for 5 mg you would take 1/8th tsp and for 10 mg you would take ¼ tsp. If you want to use a dropper – ½ tsp equals 60 drops, ¼ is 30 drops, 1/8th is 15 drops.

If you are exposed to someone with a cold or flu, the protocol changes. Take ½ tsp twice a day for 2 weeks. If you still have symptoms, take ½ tsp per day for another 2 weeks, then go back to maintenance dose of 1/8th or ¼ tsp per day. Take With Food.

You will hear about much larger doses of zinc being used; 100-200mg doses of zinc compounds are prescribed along with hydroxychloroquine, for example. But such large doses are only used for a short time in the case of COVID-19. Also zinc compounds in tablet form can be very poorly absorbed.

Fortunately, the stabilized ions of *Pico Zinc* are fully absorbed at the cellular level, so a much lower dosage is sufficient. *ReMyte* contains zinc and its antagonist copper in the correct proportions and in low enough amounts that neither will cause any toxicity. *The ReMyte* dosages don't have to be high because both zinc and copper are bioavailable ions that are fully absorbed at the cellular level.

Be aware that high doses of zinc are not recommended due to the imbalance that is caused in other minerals. High doses of zinc can block the absorption of copper and manganese. However, when modest amounts of zinc and copper are bioavailable and absorbed at the cellular level, they play very well together, enhancing each other's functions.

Zinc overdose is very rare, except if people are taking 50-100mg daily for extended periods. Overdose symptoms focus on the GI tract with nausea and vomiting.

CHAPTER SIX: DIET AND FIRST AID

IMMUNE SYSTEM DIET

I looked for books on diets for the immune system on Amazon and only found ones that on diets for inflammation and for autoimmune disease. These authors were waiting for the problem to get bad enough before they mount an attack. I'd rather identify the causes of a weakened immune system and eliminate them right out of the chute.

Dr. Gonzalez on my May 23, 2020 radio show was asked about diet and he said:

I think people should be on a preventive type of protocol. One of the important things is to try and not consume sugar and refined carbohydrates, because that will really compromise your immune system. The other thing is to eat a lot of vegetables and fruits, if possible. Also, it's a good time to try Intermittent Fasting. Dr. Levy said diet was important but that you really have to add magnesium and vitamin C to your supplementation and also selenium and probiotics.

It's the type of diet that we all know but you notice that Dr. Levy reinforced that fact that we can't get away from taking supplements. There aren't enough nutrients in our current food supply to prevent and treat serious viral attacks, however foods like sugar and refined carbohydrates are going to bring down your immunity.

I did mention how sugar can be an assault on your immune system in the Introduction and I think it's important enough to repeat here. The following words about sugar are taken from a 2006 article by the late Dr. James Howenstine and represent the strongest indictment I've seen against sugar and its detrimental effect on the immune system.

"Ascorbic Acid Competes with Sugar in the Immune System"

Insulin moves both glucose and ascorbic acid into cells including phagocytic immune cells. The phagocytic cells like leukocytes attack and remove microbes, tumor cells and debris from the blood. The level of ascorbic acid in leukocytes may be 80 times greater than that found in plasma. Glucose and ascorbic acid are constantly competing for insulin transport so diets high in sugar and carbohydrates will decrease the amount of ascorbic acid that enters cells and thus create undesirable effects on the immune response.

IMMUNE SYSTEM FIRST AID

Nebulizing Hydrogen peroxide

During my March 30, 2020 radio show, Dr. Tom Levy gave us instructions on how to use Hydrogen Peroxide to prevent and treat viral infections. He said:

There is one other thing that's extremely effective for viruses and probably the cheapest thing on the planet and that's hydrogen peroxide. I have been advocating for some time now, especially if you don't have access to anything else. It can stop things before, they start. Where are they testing for the coronavirus? In the nose. They go there because that's where the virus multiplies. Hydrogen peroxide is arguably the most potent general anti-pathogen, viruses included, that you can have. It costs about 80 cents for a pint of it at any drug store.

When you get any sort of flu, virus, respiratory virus, or coronavirus, they all share this rapid and continual multiplication and replication in your sinuses, your nasal pharynx, your oral pharynx, your throat, your upper and lower respiratory tracts, which is why some cases progress so rapidly inside the lungs because for whatever reason, they are propagating more prolifically in the upper and lower respiratory tract. This replication feeds the viral load throughout the body. Now, if you can chop the head off a snake

and knock out that virus replication, then most people, unless they are just a few minutes away from death, they can then, with their own immune system and with the help of vitamin C and these other things are talking about, they can mop up the virus in the rest of the body quite readily if you stop the new virus from coming in.

Nebulization is a fine mist that you can inhale created by a special machine called a nebulizer. You normally see it used for kids and adults with asthma. You nebulize 3% hydrogen peroxide. Most people need to dilute it a little bit with saline – 50:50, because it might sting a little bit. But, if you use it full strength – the 3% solution and it doesn't burn or sting, it's because your mucous membrane is already coated with pathogens, and it's eating up the biofilm and then killing the pathogens.

You can inhale through the nebulizer several times a day if you have any type of respiratory symptoms. But only for 5-10 minutes at a time. Never put on the mask or even let a nebulizer spray mist through the night. You can do it once a day if you think you are in an area with high viral exposure. I do it every time I come off a plane. A plane has gotten me sick so many times. Well, I've never gotten sick since I started using this nebulization therapy. So, it's very effective, very cheap, virtually and completely non-toxic.

You inhale the hydrogen peroxide into your oral and nasal pharynx making direct contact. It chews up the bacterial/viral/fungal biofilm which keeps pathogens from being accessed by an antibiotic. Antibiotics cannot penetrate a biofilm. So, it knocks out the biofilm, kills the pathogen, and then you stop supplying new viruses to the rest of the body, and you either never get the flu or coronavirus, or if you've already had it, you're in a position to resolve it much more quickly.

My nebulizer has a medicine well that only holds 10 cc of fluid, which is 2 tsp, so I put in ½ tsp of hydrogen peroxide and ½ tsp of saline and run it for 5 minutes.

Vaporizing ReMag

ReMag liquid does not have any additives or preservatives, either. An older friend, who is also a customer, was coughing on the phone when I spoke with him in March 2020. He said he had bronchitis in the winter and still had a lingering cough. I told him to get a vaporizer and put *ReMag* in 10-12 ounces of distilled water in case he was dealing with magnesium-deficient bronchial tubes that were in spasm. When I spoke with him again in May, he told me he put a vaporizer on his desk and ran it while he was working. He put 2 tablespoons of *ReMag* in 12oz of water and just breathed in the misted air. Within 3-4 days the cough was completely gone. I told him that if there was ever another infection, he could vaporize diluted *Pico Zinc* in the same way.

If you have a medicinal nebulizer, you can mix ½ tsp *ReMag* and ½ tsp saline and inhale the vapor for 5-10 minutes. You can use it several times a day for acute or serious symptoms and once a day for mild symptoms.

APPENDIX A

Orthomolecular Medicine News Service, June 9, 2020

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The role of vitamin D in reducing risk of COVID-19: a brief survey of the literature

by William B. Grant, PhD

(OMNS June 9, 2020) The evidence that higher vitamin D status is causally linked to lower risk of COVID-19 incidence, severity, and death continues to increase. This brief report outlines what has been learned through early June 2020 and provides links to some of the key references.

It should be noted that acceptance of the role of vitamin D supplementation will probably not be achieved before reports are published that demonstrate randomized controlled trials of vitamin D supplementation significantly reduced COVID-19 incidence or death. Several RCTs and observational studies regarding vitamin D supplementation and COVID-19 incidence and outcomes are either in the planning stage or in progress. The obvious groups to study are those at highest risk: dark-skinned people living at high latitudes, people in nursing homes or health care facilities; prisoners; factory workers such as in meat-packing facilities in the U.S.; health care workers. A major problem is that the powers that be see vitamin D as a threat to income and profit, so use the Disinformation Playbook to suppress positive information on vitamin D. [\[1\]](#)

In a review published in early April, it was proposed that vitamin D supplementation could reduce the risk of COVID-19. Two mechanisms were identified: 1, reduced survival and replication of viruses through vitamin D-stimulated release of cathelicidin and defensins, and 2, reduced risk of the cytokine storm by reducing production of pro-inflammatory cytokines. [\[2\]](#)

Reference was also made to the finding that vitamin D supplementation reduces risk of acute respiratory tract infections as demonstrated by randomized controlled trials. [\[3\]](#) It was recommended that vitamin D supplementation be aimed at increasing serum 25-hydroxyvitamin D [25(OH)D] levels to 40-60 ng/mL (100-150 nmol/l), which would require daily doses up to 4000 to 5000 IU/d vitamin D3. Magnesium should also be supplemented, perhaps 400 mg/d, since the conversion of vitamin D to different metabolites requires the presence of magnesium. This recommendation was based on findings in observational studies such as one conducted by [Grassrootshealth.net](#) on influenza-like illness. [\[4\]](#)

More recently, it was suggested that for those who have not been supplementing with vitamin D that they start supplementing with a large bolus dose of vitamin D of several hundred thousand IU within one-to-two weeks. The rationale is that without the bolus the body would otherwise take several months to achieve the optimum level. [5] It was also suggested that while vitamin D supplementation could stop COVID-19 from developing at the beginning of symptoms, it probably would not be very useful after lung and organ damage occurs in the acute stage. Most recently, evidence was outlined to show that vitamin D deficiency could explain much of the reason for higher case and mortality rates for Black, Asian, and Minority Ethnic (BAME) residents in England. [6]

References

1. Grant WB. (2018) Vitamin D acceptance delayed by Big Pharma following the Disinformation Playbook. Orthomolecular Medicine News Service, Oct. 1, 2018. <http://orthomolecular.org/resources/omns/v14n22.shtml>
2. Grant WB, Lahore H, McDonnell SL, et al. (2020) Evidence that vitamin D supplementation could reduce risk of influenza and COVID-19 infections and deaths. Nutrients April 2, 2020, 12, 988. <https://www.mdpi.com/2072-6643/12/4/988>
3. Martineau AR, Jolliffe DA, Greenberg L, et al. (2017) Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. BMJ. 356:i6583. <https://www.bmj.com/content/356/bmj.i6583>
4. Grant WB, Lahore H, McDonnell SL, et al., (2020) Vitamin D Supplementation Could Prevent and Treat Influenza, Coronavirus, and Pneumonia Infections" Nutrients preprint, March 14, 2020 <https://www.preprints.org/manuscript/202003.0235/v1>
5. Grant WB, Baggerly CA, Lahore H. (2020) Response to Comments Regarding "Evidence that Vitamin D Supplementation Could Reduce Risk of Influenza and COVID-19 Infections and Deaths". Nutrients June 1, 2020, 12(6), 1620. <https://www.mdpi.com/2072-6643/12/6/1620>
6. Grant WB, Boucher BJ. (2020) Vitamin D deficiency due to skin pigmentation and diet may explain much of the higher rates of COVID-19 among BAME in England. BMJ comments, June 6, 2020. <https://www.bmj.com/content/369/bmj.m1548/rr-22>

Annotated links to related publications and preprints

"Of the 212 cases of COVID-19, majority had ordinary clinical outcome. Mean serum 25(OH)D level was 23.8 ng/mL. Serum 25(OH)D level was lowest in critical cases, but highest in mild cases. Serum 25(OH)D levels were statistically significant among clinical outcomes."

Alipio, MM. (2020) Vitamin D Supplementation Could Possibly Improve Clinical Outcomes of Patients Infected with Coronavirus-2019 (COVID-2019); April 9, 2020. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3571484

"A lot of COVID-19 infected patients develop acute respiratory distress syndrome (ARDS), which may lead to multiple organ damage. These symptoms are associated with a cytokine storm syndrome. The aim of this letter is to note the 5 crucial points that vitamin D could have protective and therapeutic effects against COVID-19. For that reason, COVID-19 infection-induced multiple organ damage might be prevented by vitamin D."

Aygun H. (2020) Vitamin D can prevent COVID-19 infection-induced multiple organ damage. Naunyn Schmiedebergs Arch Pharmacol. 2020 May 25:14.

<https://pubmed.ncbi.nlm.nih.gov/32451597>

"Timely implementation of vitamin D supplementation programmes worldwide is critical; initial priority should be given to those who are at the highest risk, including the elderly, immobile, homebound, BAME and healthcare professionals. Population-wide vitamin D sufficiency could prevent seasonal respiratory epidemics, decrease our dependence on pharmaceutical solutions, reduce hospitalisations, and thus greatly lower healthcare costs while significantly increasing quality of life."

Davies G, Garami AR, Byers J. (2020) Evidence Supports a Causal Model for Vitamin D in COVID-19 Outcomes. 1 May, updated 3 June, 2020.

<https://www.medrxiv.org/content/10.1101/2020.05.01.20087965v2.full.pdf>

"We retrospectively investigated the 25-hydroxyvitamin D (25(OH)D) concentrations in plasma obtained from a cohort of patients from Switzerland. In this cohort, significantly lower 25(OH)D levels ($p = 0.004$) were found in PCR-positive for SARS-CoV-2 (median value 11.1 ng/mL) patients compared with negative patients (24.6 ng/mL)."

D'Avolio A, Avataneo V, Manca A, et al. (2020) 25-Hydroxyvitamin D Concentrations Are Lower in Patients with Positive PCR for SARS-CoV-2. Nutrients. 2020 May 9;12(5):E1359. <https://pubmed.ncbi.nlm.nih.gov/32397511>

"COVID-19 patients showed lower median 25(OH)D (18.6 ng/mL, IQR 12.6-25.3, versus 21.5 ng/mL, IQR 13.9-30.8; $P=0.0016$) and higher vitamin D deficiency rates (58.6% versus 45.2%, $P=0.0005$). Surprisingly, this difference was restricted to

male COVID-19 patients who had markedly higher deficiency rates than male controls (67.0% versus 49.2%, P=0.0006) that increased with advancing radiological stage and were not confounded vitamin D-impacted comorbidities."

De Smet D, De Smet K, Herroelen P, et al. (2020) (2020) Vitamin D deficiency as risk factor for severe COVID-19: a convergence of two pandemics, May 5, 2020.
<https://www.medrxiv.org/content/10.1101/2020.05.01.20079376v2>

"The RAS, which includes ACE and ACE2, is a complex network that has a major role in various biological functions 31. Chronic vitamin D deficiency may induce RAS activation lung fibrosis through activation of the RAS 35; therefore, increasing evidence indicates that 1,25(OH)2D3 may also be a negative endocrine regulator of the RAS. Inducing the expression of renin, ACE, Ang II and AT1R, and inhibiting ACE2 expression could result in acute lung injury. Vitamin D inhibits renin, ACE and Ang II expression, and induces ACE2 levels in ALI."

Ghavideldarestani M, Honardoost M, Khamseh ME. (2020) Role of Vitamin D in Pathogenesis and Severity of COVID-19 Infection
<https://www.preprints.org/manuscript/202004.0355/v1>

"We performed a retrospective study in two tertiary medical centers in South Asia. The medical records of COVID19 patients were reviewed and a total of 176 subjects included were the elderly whose age is at least 60 years, We reported that majority of the subjects had 25(OH)D level below 30 ng/mL, most of them were male, had diabetes, and were classified as severe. Most of the male and female subjects had 25(OH)D level below 30 ng/mL."

Glicio, EJ.(2020) Vitamin D Level of Mild and Severe Elderly Cases of COVID-19: A Preliminary Report (May 5, 2020). SSRN: <https://ssrn.com/abstract=3593258>

Several recent publications and preprints report multi-country studies based of COVID-19 case or death rates with respect to country mean 25(OH)D concentration. One concern regarding such studies is that the 25(OH)D concentrations used are probably not related to those most likely to develop COVID-19 at the time of incidence. However, a more serious problem is that life expectancy has a much stronger correlation (direct) than does 25(OH)D as discussed in this preprint. I have confirmed their findings using more recent COVID-19 case and death rate data.

Kumar V, Srivastaa A. (2020) Spurious Correlation? A review of the relationship between Vitamin D and Covid-19 infection and mortality.

<https://www.medrxiv.org/content/10.1101/2020.05.25.20110338v1.full.pdf>

This article presents retrospective results for 780 patients in Indonesia. Compared to 25(OH)D >30 ng/mL, 25(OH)D between 20 and 30 ng/mL had an odds ratio for death of 7.6 (P<0.001), while 25(OH)D <20 ng/mL had an odds ratio for death of 10.1 (P<0.001).

Raharusun, P, Priambada S, Budiart C, Agung E, Budi C. (2020) Patterns of COVID-

19 Mortality and Vitamin D: An Indonesian Study (April 26, revised 6 May, 2020).
SSRN. <https://ssrn.com/abstract=3585561>

JoAnn E. Manson, MD, DrPH, (2020) Does Vitamin D Protect Against COVID-19?
MEDSCAPE, May 11, 2020

The recommended dietary allowance of vitamin D is 600-800 IU/daily, but during this period, a multivitamin or supplement containing 1000-2000 IU/daily of vitamin D would be reasonable. <https://www.medscape.com/viewarticle/930152>

Other resources on vitamin D and COVID-19

<https://www.grassrootshealth.net/>

<https://vitamindwiki.com/>

APPENDIX B

Vitamin C Antiviral References

The following is the list of 25 scientific references from Dr. Michael Gonzalez that accompany his list of vitamin C antiviral attributes.

1. Gonzalez MJ, Miranda-Massari JR, Berdiel MJ, Duconge J, Rodríguez-López JL, Hunninghake R, Cobas-Rosario VJ. High dose intravenous vitamin C and chikungunya fever: A case report. *J Orthomolec Med*, 2014;29(4):154- 156.
2. Gonzalez MJ, Berdiel MJ, Miranda-Massari JR, Duconge J, Rodríguez-López JL, Adrover-López PA. High dose intravenous vitamin C treatment for zika fever. *J Orthomolec Med*, 2016;31(1):19-22.
3. Gonzalez MJ, Berdiel MJ, Duconge J, Levy TE, Alfaro IM, Morales-Borges R, Marcial-Vega V, Olalde J. High Dose Intravenous Vitamin C and Influenza: A Case Report. *J Orthomolec Med*, 2018;33 (3):1-3.
4. Hunt C, Chakravorty NK, Annan G, Habibzadeh N, Schorah CJ. (1994) The clinical effects of vitamin C supplementation in elderly hospitalized patients with acute respiratory infections. *Int J Vitamin Nutr Res*.64:212-219
5. Yejin Kim, Hyemin Kim, Seyeon Bae, Jiwon Choi, Sun Young Lim, Naeun Lee, Joo Myung Kong, Young-il Hwang, Jae Seung Kang, Wang Jae Lee. Vitamin C Is an Essential Factor on the Anti-viral Immune Responses through the Production of Interferon- α/β at the Initial Stage of Influenza A Virus (H3N2) Infection. *Immune Netw*. 2013 Apr; 13(2): 70–74.
6. Hemila H. Does vitamin C alleviate the symptoms of the common cold? A review of current evidence. *Scand J Infect Dis* 1994;26:1-6.
7. Hunt C, Chakravorty NK, Annan G, Habibzadeh H, Schorah CJ. The clinical effects of vitamin C supplementation in elderly hospitalized patients with acute respiratory infections. *Int J Vitam Nutr Res* 1994;64:212-19.
8. Peters EM, Goetzsche JM, Grobbelaar B, Noakes TD. Vitamin C supplementation reduces the incidence of postrace symptoms of upper-respiratory-tract infection in ultramarathon runners. *Am J Clin Nutr* 1993;57:170-4.
9. Mandl, J.; Szarka, A.; Banhegyi, G. Vitamin C: Update on physiology and pharmacology. *Br. J. Pharmacol.* 2009, 157, 1097–1110. Englard, S.; Seifter, S. The biochemical functions of ascorbic acid. *Annu. Rev. Nutr.* 1986, 6, 365–406.
10. Bergsten, P.; Amitai, G.; Kehrl, J.; Dhariwal, K.R.; Klein, H.G.; Levine, M. Millimolar concentrations of ascorbic acid in purified human mononuclear leukocytes. Depletion and reaccumulation. *J. Biol. Chem.* 1990, 265, 2584–2587.
11. Evans, R.M.; Currie, L.; Campbell, A. The distribution of ascorbic acid between various cellular components of blood, in normal individuals, and its relation to the plasma concentration. *Br. J. Nutr.* 1982, 47, 473–482.
12. Tanaka, M.; Muto, N.; Gohda, E.; Yamamoto, I. Enhancement by ascorbic acid 2-glucoside or repeated additions of ascorbate of mitogen-induced IgM and IgG productions by human peripheral blood lymphocytes. *Jpn. J. Pharmacol.* 1994, 66, 451–456.

13. Chen, Y.; Luo, G.; Yuan, J.; Wang, Y.; Yang, X.; Wang, X.; Li, G.; Liu, Z.; Zhong, N. Vitamin C mitigates oxidative stress and tumor necrosis factor-alpha in severe community-acquired pneumonia and LPS-induced macrophages. *Mediators Inflamm.* 2014, 2014, 426740.
14. Hajishengallis, G. Too old to fight? Aging and its toll on innate immunity. *Mol. Oral Microbiol.* 2010, 25, 25–37.
15. Cheng, L.; Cohen, M.; Bhagavan, H. Vitamin C and the elderly. In CRC Handbook of Nutrition in the Aged; Watson, R., Ed.; CRC Press Inc.: Boca Raton, FL, USA, 1985; pp. 157–185.
16. Simon, J.; Hudes, E.; Tice, J. Relation of serum ascorbic acid to mortality among US adults. *J. Am. Coll. Nutr.* 2001, 20, 255–263. mitigatesoxidative stress and tumor necrosis factor-alpha in severe community-acquired pneumonia and LPS-inducedmacrophages. *Mediators Inflamm.* 2014, 2014, 426740.
17. Hajishengallis, G. Too old to fight? Aging and its toll on innate immunity. *Mol. Oral Microbiol.* 2010, 25, 25–37.
18. Cheng, L.; Cohen, M.; Bhagavan, H. Vitamin C and the elderly. In CRC Handbook of Nutrition in the Aged; Watson, R., Ed.; CRC Press Inc.: Boca Raton, FL, USA, 1985; pp. 157–185.
19. Simon, J.; Hudes, E.; Tice, J. Relation of serum ascorbic acid to mortality among US adults. *J. Am. Coll. Nutr.* 2001, 20, 255–263.
20. Fletcher, A.; Breeze, E.; Shetty, P. Antioxidant vitamins and mortality in older persons: Findings from the nutrition add-on study to the Medical Research Council Trial of Assessment and Management of Older People in the Community. *Am. J. Clin. Nutr.* 2003, 78, 999–1010.
21. Hunt, C.; Chakravorty, N.K.; Annan, G.; Habibzadeh, N.; Schorah, C.J. The clinical effects of vitamin C supplementation in elderly hospitalised patients with acute respiratory infections. *Int. J. Vitam. Nutr. Res.* 1994, 64, 212–219.
22. Bharara, A.; Grossman, C.; Grinnan, D.; Syed, A.A.; Fisher, B.J.; DeWilde, C.; Natarajan, R.; Fowler, A.A. Intravenous vitamin C administered as adjunctive therapy for recurrent acute respiratory distress syndrome. *Case Rep. Crit. Care* 2016, 2016, 8560871.
23. Fowler, A.A.; Kim, C.; Lepler, L.; Malhotra, R.; Debesa, O.; Natarajan, R.; Fisher, B.J.; Syed, A.; DeWilde, C.; Priday, A.; et al. Intravenous vitamin C as adjunctive therapy for enterovirus/rhinovirus induced acute respiratory distress syndrome. *World J. Crit. Care Med.* 2017, 6, 85–90.
24. Vissers, M.C.; Wilkie, R.P. Ascorbate deficiency results in impaired neutrophil apoptosis and clearance and is associated with up-regulation of hypoxia-inducible factor 1alpha. *J. Leukoc. Biol.* 2007, 81, 1236–1244.
25. Schwager J; Bompard A; Weber P; Raederstorff D. Ascorbic acid modulates cell migration in differentiated HL-60 cells and peripheral blood leukocytes. *Mol Nutr Food Res.* 2015 Aug;59(8):1513-23.
26. Shilotri, P.G. Phagocytosis and leukocyte enzymes in ascorbic acid deficient guinea pigs. *J. Nutr.* 1977, 107, 1513–1516.
27. Anderson R. Effects of ascorbate on normal and abnormal leucocyte functions. *Int J Vitam Nutr Res Suppl.* 1982;23:23-34.

28. Sharma, P.; Raghavan, S.A.; Saini, R.; Dikshit, M. Ascorbate-mediated enhancement of reactive oxygen species generation from polymorphonuclear leukocytes: Modulatory effect of nitric oxide. *J. Leukoc. Biol.* 2004, 75, 1070–1078.
29. Cai Y, Li YF, Tang LP, et al. A new mechanism of vitamin C effects on A/FM/1/47(H1N1) virus-induced pneumonia in restraint-stressed mice. *Biomed Res Int.* 2015;2015:675149.

APPENDIX C

Vitamin C Bibliography: Andrew Saul and Susmita Ganguly

1. "Clinical Trial of Vitamin C", Letter to editor, Medical Tribune, June 25, 1975.
2. "The method of determining proper doses of vitamin C for treatment of diseases by titrating to bowel tolerance." Australian Nurses Journal 9(4):9-13 March, 1980. Also in: Journal of Orthomolecular Psychiatry 10:125-132, 1981.
<http://orthomolecular.org/library/jom/1981/pdf/1981-v10n02-p125.pdf>
3. "Vitamin C, Titration to Bowel Tolerance, Anascorbemia, and Acute Induced Scurvy." Medical Hypothesis 7:1359-1376, 1981. Also in Let's Live (Japan) 16:9, Nov 1983.<http://www.doctoryourself.com/titration.html>
4. "Vitamin C Function in AIDS", Medical Tribune, July 13, 1983. [Link to article](#)
5. "Vitamin C Treatment Protocol for AIDS" Bay Area Reporter, Part 1: XIV(1):14-15, Jan 5, 1984. Part 2: XIV(10)6, Mar 8 1984. (No known electronic link)
6. "Vitamin C in the treatment of Acquired Immune Deficiency Syndrome (AIDS)" Medical Hypothesis 14(4):423-433 Aug 1984. [Link to article](#)
7. "Vitamin C, the nontoxic, nonrate-limited antioxidant free radical scavenger." Medical Hypothesis 18:61-77. 1985 . [Link to article](#)
8. "The vitamin C treatment of allergy and the normally unprimed state of antibodies." Medical Hypothesis, 21(3):307-321 Nov 1986. [Link to article](#)
9. "A controversial protocol: Ascorbate challenges PCP." The San Francisco Sentinel, Sept 12, 1986, page 9. (No Known electronic link)
10. "A Unique Function for Ascorbate." Medical Hypothesis 35:32-37 May 1991. [Link to article](#)
11. "The third face of vitamin C" J Orthomolecular Med, Vol 7, Number 4, p 197-200, 1992. <http://orthomolecular.org/library/jom/1992/pdf/1992-v07n04-p197.pdf> or <http://orthomolecular.org/library/jom/1992/toc4.shtml>
12. Hickey DS, Roberts HJ, Cathcart RF. Dynamic flow: A new model for ascorbate. J Orthomolecular Med, Vol 20, Number 4, p 237-244, 2005.
<http://orthomolecular.org/library/jom/2005/pdf/2005-v20n04-p237.pdf>

APPENDIX D

MORE THAN YOU EVER WANTED TO KNOW ABOUT COFFEE ENEMAS

I have talked about coffee enemas but I've never written down a proper procedure. I'll embellish some excellent material from Dr. Sherry Rogers 1994 book *Wellness Against All Odds*, which I found on a website selling "the best coffee for coffee enemas." My comments are offset with my initials: CD.

The very last part of the colon, before reaching the rectum, is in an "S" shape and called the sigmoid colon. By the time stool gets to this part of the colon, most nutrients have been absorbed back into the bloodstream. Because the stool contains products of putrefaction at this point, there exists a special circulatory system between the sigmoid colon and the liver. There is a direct communication of veins called the enterohepatic circulation. Have you ever felt sick just before having a bowel movement, when stool material has just moved into the rectum for elimination? As soon as the material is evacuated, you no longer feel sick. This is due of the toxic quality of the material and the enterohepatic circulation coming into play. Because of this, it is important to evacuate when you have the urge. The rectum should usually be empty.

This circulatory system enables toxin to be sent directly to the liver for detoxification, rather than circulating them through the rest of the body and all of its vital organs including the brain. This system of veins carries rectal / sigmoid toxins directly to the liver for detoxification.

When a coffee enema is used, the caffeine from the coffee is preferentially absorbed into this system and goes directly to the liver where it becomes a very strong detoxificant. It causes the liver to produce more bile (which contains processed toxins) and moves bile out toward the small intestine for elimination. This seems to free up the liver to process more incoming toxic materials that have accumulated in the organs, tissues and bloodstream. The coffee does not go into the systemic circulation, unless the enema procedure is done improperly.

The coffee contains some alkaloids that also stimulate the production of glutathione-S-transferase, an enzyme used by the liver to make the detox pathways run. It is pivotal in the formation of more glutathione, one of the main conjugation chemicals, enabling toxins to be eliminated via bile into the small intestine. In other words, a coffee enema speeds up the detoxification process and minimizes the backlog of yet to be detoxified substances. You will need the following materials:

- An enema bag or bucket, preferably one of clear plastic that you can see through

CD: I buy my Disposable Enema Kits from Amazon. Being of Scottish descent, I reuse the bags and keep them clean by putting 2 ounces of 3% hydrogen peroxide in the

bag and through the tubing between uses.

- A stainless-steel cooking pot to boil the coffee.
- Organic coffee fully caffeinated, drip grind coffee.

CD: I buy my organic coffee from VitaCost.com. I make sure to grind it in my Blendtec high-speed blender before using it. If not, the larger grains WILL clog the tubing.

- A source of uncontaminated water. Chlorinated water should be boiled for 10 minutes
- The see-through enema bag/bucket is preferable, but an old-fashioned type that doubles as a hot water bottle can be used although it is hard to tell how much is used at each pass. Do not use any bag with a strong odor.

CD: Keep a few ounces of 3% hydrogen peroxide in the enema bag between uses to keep it perfectly clean and safe.

Enema Procedure

1. Put a little over 1 quart of clean water in a pan and bring it to a boil. Add 2 flat tablespoons of coffee (or the coffee amount that has been prescribed for you; the Gerson Program recommends 3 rounded Tbsp.). Let it continue to boil for five minutes, then turn the stove off, leaving the pan on the hot burner.

CD: I learned my coffee enema technique when I was invited to be a member of the Gerson Institute Board and given the gift of a week's detox. I use 3 level Tbsp. of coffee. However, if you are new to coffee enemas, begin with only one teaspoon. The caffeine is not supposed to get into your bloodstream, but some people can feel a bit jittery after a coffee enema, so you need to allow your body to get used to a bit of caffeine in your system.

2. Allow it to cool down to a very comfortable, tepid temperature. Test with your finger. It should be the same temperature as a baby's bottle. It's safer to have it too cold than too warm; never use it hot or steaming; body temperature is good.

CD: Because I have no patience, I drop a half dozen ice cubes into the hot water to bring it to the right temperature. OR, an even more efficient way of preparing your coffee is to put the 3 Tbsp. of coffee in a mason jar with 24 ounces of water, shake it up, and let it sit overnight on the kitchen counter. In the morning, I shake it up again and let it sit for a few minutes and then pour the liquid into another mason jar and rinse the dregs out of the first jar. I also make a probiotic implant to use after my coffee enema. In a small jar, I open up one or two probiotic capsules and then add 2 ounces of filtered water.

3. Instructions on setting up the bathroom.

CD: Sherry's instructions are a bit convoluted. Let me just tell you what I do. I make my bathroom as comfortable as possible for my coffee enema experience, which I actually find quite enjoyable! I fold up a huge beach towel and put it on the floor. On top of that, I put a large Ziploc plastic bag and on top of that two double sheets of paper toweling to catch any and every drip that may occur! I use a bolster pillow for my head that is nice and solid so I don't have to chase a floppy pillow around the room. Since I'm not going to have anything on below the waist, I wear socks and a sweater and have another large beach towel ready to cover me up when I'm lying down on the towel. To my right I have my roll of paper towels and four pieces ripped off and ready. To my left I have my Kindle to read while I'm waiting.

4. Pour the coffee into the enema bag. Loosen the clamp to allow the coffee to run out to the end of the catheter tip and re-clamp the bag when all the air has been removed from the enema tubing.

CD: I just run the coffee to the clamp because if you let it run to the end, the section after the clamp will drip all over the place.

5. Use a coat hanger to hang the enema bag at least two feet above the floor; on a doorknob or towel rack. Do not hang it high, like on the shower bar, because the tubing won't be long enough and even if it does the flow will be too forceful from such a height. It should flow very gently into the rectum and distal sigmoid colon only. It is not a high enema or colonic. Allowing it to go well up into the colon may introduce caffeine into the general circulation as though you had taken it by mouth.

CD: I found some great shower hooks to hang my coffee enema bag. It is large enough to fit over a door handle or towel rack. It is stronger than a coat hanger and you can take it traveling with you.

Important Note: To make sure coffee doesn't get past your colon into your small intestine, you should hold your ileocecal valve closed while doing your enema. The valve is located about halfway between your belly button and your right hip bone. While introducing the coffee into your colon, hold the valve shut by placing the fingers of your right hand over the valve and pushing in, pulling up toward the left shoulder. You are exerting a deep pressure, not a superficial push.

6. Lie down on the floor on your back or right side and gently insert the catheter. If you need lubrication, food grade vegetable oil such as olive oil, a vitamin E capsule, or KY jelly should be fine, unless you are chemically sensitive. It is generally a good idea to avoid petroleum products.

CD: I just stay on my back during my enema. I use George's Aloe Gel from VitaCost.com as my lubricant. Before lying down, I put a generous amount of aloe on

the last several inches of the enema tubing and in and around my anus.

7. Gently insert the tube into the rectum a few inches and then release the clamp and let the first 1/2 of the quart (2 cups maximum) of coffee flow in. Clamp the tubing off as soon as there is the slightest amount of discomfort or fullness. Do not change positions or use an incline board to cause the enema to enter further into the colon; this defeats the purpose of this type of enema.
8. Try to retain the enema for a minimum of 12 or more minutes. Sometimes there will be an immediate urgency to get rid of it and that is fine. It helps to clean the stool out of the colon so that next time around you can hold more of the enema longer. Never force yourself to retain it if you feel that you can't. When you have clamped the tubing, remove the catheter tip and void when you have to. It is best to hold it for at least 12 minutes each time. After you have emptied the bowel, proceed with the remaining 1/2 quart and likewise hold that for at least 12 minutes, if able, then void.

CD: If you are going to do the 2-cup treatment, I would just put 2 cups in the enema bag to start with. That way you don't have to clamp the tubing closed and the intestinal peristalsis will just push gas or bowel contents and coffee back into the enema bag and cause you much less discomfort.

9. The goal is to have two enemas, not exceeding 1/2 a quart (2 cups) each, that you are able to hold for 12 to 15 minutes each. Usually 2 or 3 times will use up all of the enema, but that is not your goal. (The Gerson Program recommends one 4 cup enema) Being able to hold it for 12 to 15 minutes is. When you have finished your session, rinse out the bag and hang it up to dry. Periodically run boiling water, peroxide, or other comparable antimicrobial agent through the empty bag to discourage mold growth when not in use.

CD: I do the Gerson 4 cup enema and keep the tubing open to minimize distress. I hold it for 15 minutes and clamp off the tubing and use paper towels to keep everything clean as I remove the tubing from my anus, drop the enema bag and tubing in the sink, and dive over to the toilet! When I've emptied my bowels fully, I then rinse out the enema bag and put in the two ounces of probiotic water and repeat the enema procedure. But this time, when the probiotic implant is in place I clamp the tubing, remove it and lie on my towel for 5-10 minutes resting and allowing the implant to circulate through my colon.

If you feel wired or hyper or have palpitations or irregular heartbeats after a coffee enema, you should reduce the amount of coffee, usually by half for a few days or weeks. Or consider that you really need organic coffee. Be sure the source of your water is good clean chemical-free spring, well, or filtered water.

CD: You also could just be magnesium deficient, so you can take care of that very easily by using *ReMag*.

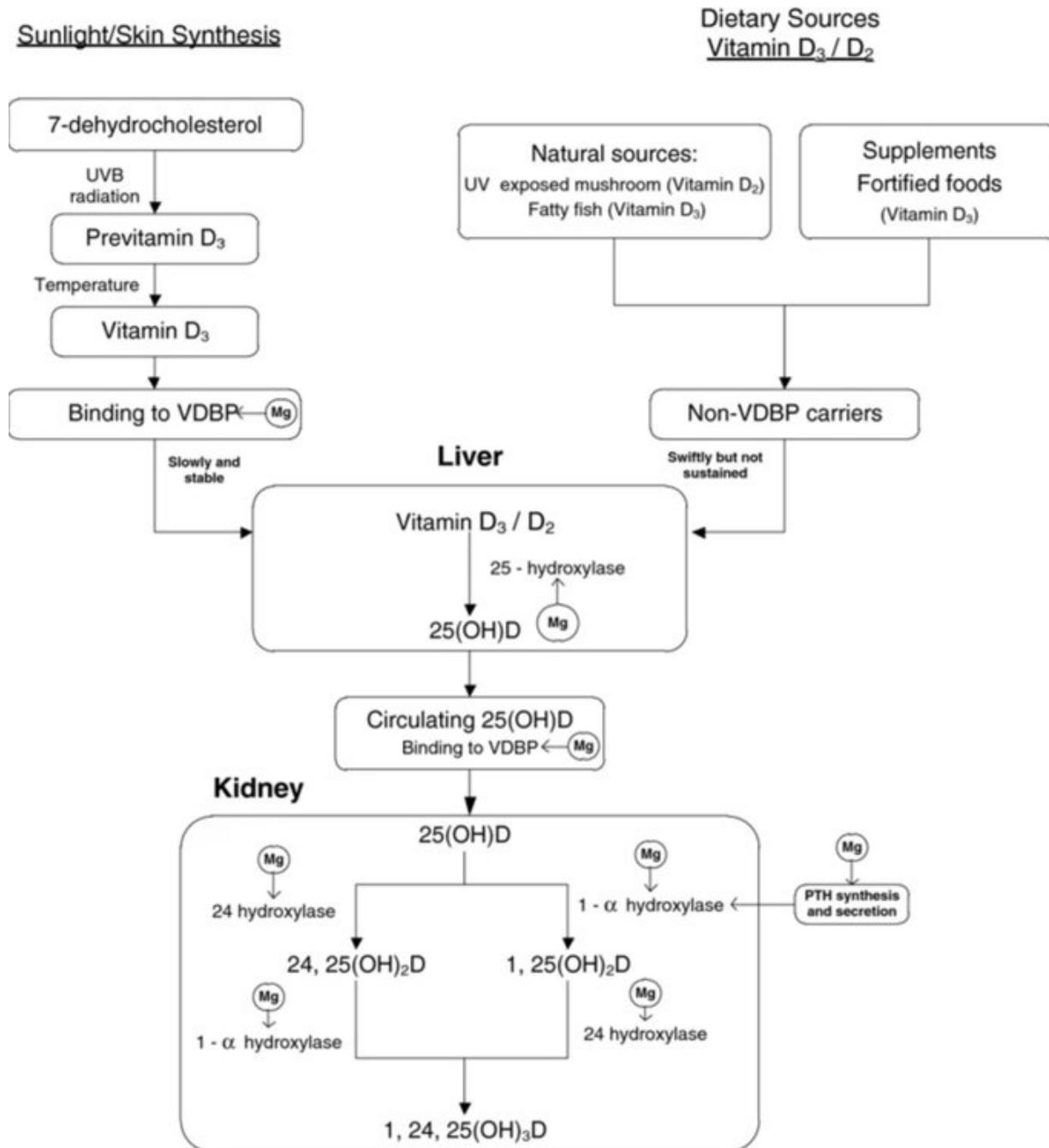
Sometimes you will hear or feel a squirting out and emptying of the gallbladder. This occurs under the right rib cage, or sometimes more closely to the mid line. If after a week of daily enemas, you have never felt or heard the gall bladder release, you should consider making the coffee stronger, going up in 1/2 tablespoon increments per quart, not exceeding 2 tablespoons per cup. Alternately, you may need a slightly larger volume, such as 3 cups at a time. Sometimes, 3 enemas (2 cups or less each) rather than two at a session are more beneficial for some.

CD: I experience this bile dump more at the colon level. It sometimes comes after I think the colon has emptied after my enema and then I get a flush of very warm liquid, which I think could be bile.

Always discontinue the enemas if there is any adverse reaction whatsoever, and discuss it with the doctor at your next appointment. If you find the enema helpful, do not use it more than once per day for any extended period without medical supervision. Use it as necessary, perhaps several days in a row, but more commonly a few times a week.

CD: I personally take one enema a week and an additional one on my fasting days. However, I will make a big confession. When I first began to experiment with coffee enemas I did them daily for several months. A friend of mine, the late Dr. Nick Gonzalez, recommended them to his cancer patients and did two a day himself. When I decided to cut back on them and maybe only do them once a week, I got caffeine withdrawal! But it took me weeks to realize this.

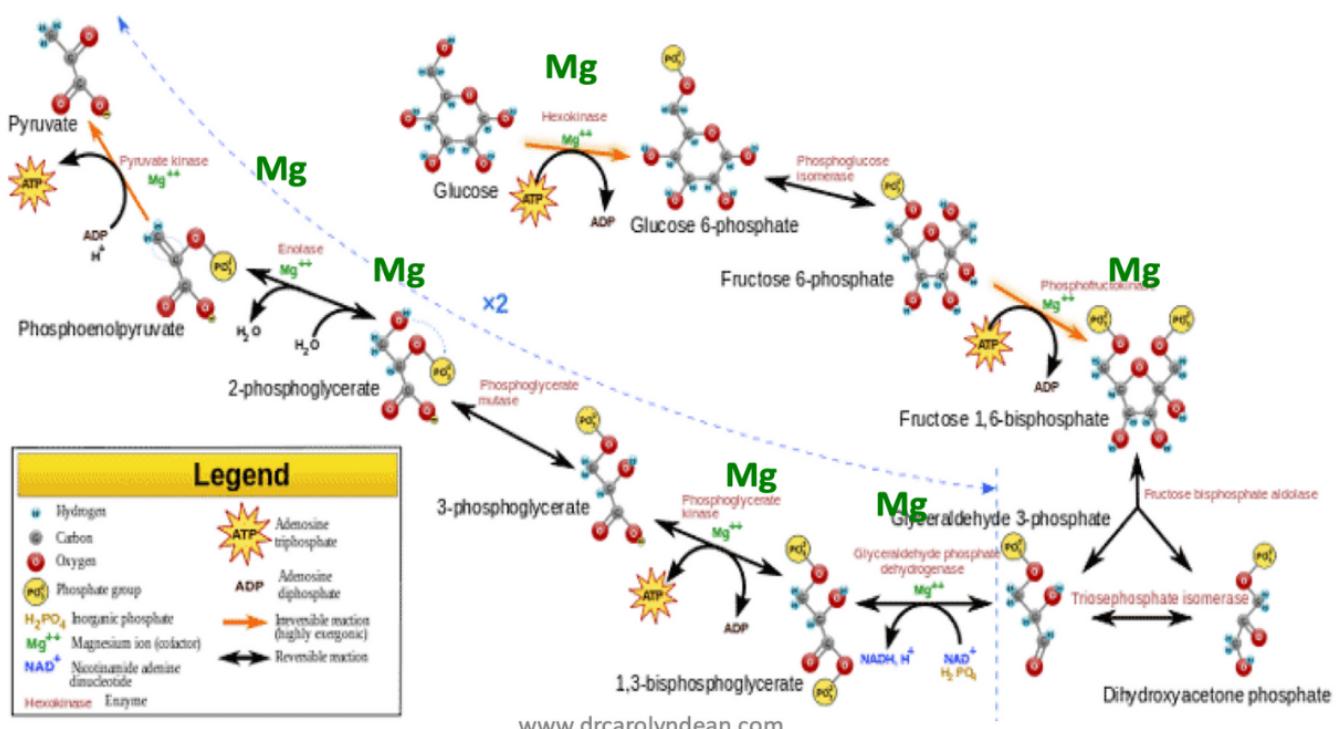
I never drink coffee, so I've never tried to go off it, and never developed a caffeine withdrawal headache. Well, that's what happened when I stopped doing coffee enemas! I'd wake up in the morning and a few hours after my usual enema time, I'd develop a heavy head. So, I would just do a coffee enema and feel better thinking I was toxic – or some such nonsense! I kept telling myself stories about how I needed to keep taking the coffee enemas. Then it finally hit me that I was in caffeine withdrawal, so I just bit the bullet and cut way back on my coffee enemas!

APPENDIX E**MAGNESIUM IN VITAMIN D METABOLISM**

"Magnesium, Vitamin D Status and Mortality" in *BMC Medicine*. Mg and metabolism of vitamin D, parathyroid hormone, ultraviolet B, and vitamin D binding protein.

APPENDIX F**MAGNESIUM IN THE KREBS CYCLE**

Krebs Cycle Creates ATP Energy



NOTES

- ¹ Workinger, J. L., et al. (2018). "Challenges in the Diagnosis of Magnesium Status." *Nutrients* 10(9).
- ² Nishio A, Ishiguro S, Miyao N. "Specific change of histamine metabolism in acute magnesium-deficient young rats." *Journal of Nutritional Science and Vitaminology*. 1987;5(2):89-96.
- ³ Takemoto, Satoshi, et al. "Magnesium Deficiency Induces the Emergence of Mast Cells in the Liver of Rats." *J Nutr Sci Vitaminol JNSV Journal of Nutritional Science and Vitaminology* 59.6 (2013): 560-63.
- ⁴ Li FY, Lenardo MJ et al. XMEN disease: a new primary immunodeficiency affecting Mg²⁺ regulation of immunity against Epstein-Barr virus. *Blood*. 2014 Apr 3;123(14):2148-52.
- ⁵ <https://academic.oup.com/ajcn/article/108/6/1249/5239886>
- ⁶ <https://onlinelibrary.wiley.com/doi/full/10.1111/apt.15777?af=R>
- ⁷ <https://www.medrxiv.org/content/10.1101/2020.04.08.20058578v3>
- ⁸ <https://www.sciencedaily.com/releases/2020/05/200507121353.htm>
- ⁹ <https://www.nature.com/articles/s41598-020-62754-w>
- ¹⁰ <https://www.ncbi.nlm.nih.gov/pubmed/32252338>
- ¹¹ <https://www.foxnews.com/opinion/former-cdc-chief-tom-frieden-coronavirus-risk-may-be-reduced-with-vitamin-d>
- ¹² https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=3585561
- ¹³ <https://www.grassrootshealth.net/blog/african-americans-much-deficient-vitamin-d/>
- ¹⁴ <https://www.ncbi.nlm.nih.gov/pubmed/15989379>
- ¹⁵ <https://www.bmjjournals.org/content/356/bmj.i6583>
- ¹⁶ <https://thorax.bmjjournals.org/content/70/7/617>
- ¹⁷ <https://www.nature.com/articles/s41598-020-62754-w>
- ¹⁸ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6605633/>
- ¹⁹ <https://www.ncbi.nlm.nih.gov/pubmed/31023051>
- ²⁰ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0140370>
- ²¹ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0199265>
- ²² <https://www.grassrootshealth.net/blog/reduce-risk-breast-cancer-80/>
- ²³ <https://www.ncbi.nlm.nih.gov/pubmed/20215450>
- ²⁴ Klenner F. R. "The Treatment of Poliomyelitis and Other Virus Diseases with Vitamin C." *Southern Medicine & Surgery*, Volume 111, Number 7, July, 1949, pp. 209-214.
https://www.seanet.com/~alexs/ascorbate/194x/klenner-fr-southern_med_surg-1949-v111-n7-p209.htm
- ²⁵ May JM, Harrison FE. Role of vitamin C in the function of the vascular endothelium. *Antioxid Redox Signal*. 2013;19(17):2068-2083. doi:10.1089/ars.2013.5205
- ²⁶ <https://pubmed.ncbi.nlm.nih.gov/9701160/>

THE DOCTOR OF THE FUTURE



Dr. Carolyn Dean is a medical doctor and naturopath. She's the author of over 50 books, of which [22 books](#) can be downloaded for free. Her best seller *The Magnesium Miracle* (2017) along with *IBS for Dummies*, *Hormone Balance*, *Death by Modern Medicine*, and over 110 Kindle books are available on Amazon. In 2011, she launched [RnA ReSet](#) and brought her 50 years of experience into her unique, proprietary formulations that give every individual at any stage of wellness or illness the necessary building blocks, at the cellular level, for sustained health, vitality and well-being. Dr. Dean's blog is at [Dr.CarolynDean](#). Free eBooks and her radio show archives are at [Dr.CarolynDeanLive](#).

Disclosure

Dr. Dean has a creative and economic interests in the innovative products of RnA ReSet, including, but not limited to: *RnA ReSet Drops*, *ReMag*, *ReMyte*, *ReAline*, *ReCalcium*, *Pico Potassium*, *ReStructure*, *Pico Silver*, *Pico Zinc*, *Flora ReVive*, *Flora ReVive Lite*, *Whole C ReSet*, *Vitamin C ReSet*, *D3K2 ReSet*, *Omega-3 Algae A+E*, *ReNew Serum*, *ReNew Face Cream*, and our agricultural product, *Mighty Mash*. For more information regarding all the *Completement Formulas*, go to the product website [RnA ReSet](#). If you have questions, email Customer Service at support@rnareset.com. If you wish to place an order by phone, call 1-888-577-3703.