

Pico Potassium

Magnesium's Best Friend



Carolyn Dean MD ND

A Complement Formula Book

**PICO POTASSIUM
Magnesium's Best Friend**

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Learn How To Protect Your Health with the *Completement Formulas* by using our *Total Body ReSet* and *Total Body Immunity* protocols. (See [Appendix A.](#))

INTRODUCTION

Using the same proprietary technology that created *ReMag* and *ReMyte*, we have made *Pico Potassium* available to our customers. *Pico Potassium* is a stabilized ion of potassium that is fully absorbed at the cellular level. We add it to our mineral family to help support the electrolyte balance in the body. The potassium ions of *Pico Potassium* are derived from potassium chloride originally sourced from a potash mine in Saskatchewan, Canada.

Why A Supplement Instead of Food?

I have been saying for many years that people should be able to obtain their potassium requirements from food. You will be amazed at all the available sources when you look at Appendix B – the list of potassium-rich foods. Unlike magnesium – which is not a common soil fertilizer – potassium in the form of potash is regularly used by farmers. However, further on in the book, I'll talk about the causes of potassium deficiency and the difficulty some people have maintaining their levels.

In the meantime, Diana's experience is the perfect example of the importance of potassium supplementation:

Dr Dean, you are so on target about minerals and arrhythmia! I've been dealing with tremors, palpitations and some scary SVT (supraventricular tachycardia) episodes since last June. I had been using some form of magnesium for years but ordered your *ReMag* in October 2019 and found it easier on my gut.

For my SVT, I've tried *ReMag* plus Epsom Salt baths when I'd feel an electrolyte imbalance, or leg cramps, but the baths seemed to not help at

all. It wasn't until I tracked my food intake with the [Cronometer App](#) that I discovered how little potassium I was consuming - only about 2600mg per day!! (Note, the RDA is 4,700mg) Why? I eat mostly a Paleo diet but because of SIBO, I deal with food limitations on the amount of potassium-rich foods my gut can tolerate.

Bottom line here is that, for me, the issue was potassium. I now use a potassium chloride powder in my daily water along with 2.25 tsp ReMag, 1 tsp ReMyte and 0.5 tsp ReCalcina. Your minerals are so helpful!!

Since supplementing daily with potassium chloride, my episodes of AFib and tachycardia have vanished. My heart only starts to flutter when my dietary potassium intake drops. No one suggested I might have low potassium intake. I had to figure it out myself.

Thanks again for all your years of research and dedication to helping us get well. Big Hug. Thanks!! Diana

So, you see the dilemma that people can have when they aren't able to eat enough potassium rich foods. I congratulated Diana on her discovery and told her about our new *Pico Potassium* and I'll be very interested to see how much she needs compared with the potassium chloride powder she has been taking. With *Pico Potassium* being a stabilized ion of potassium that is fully absorbed I'm sure she will need less than half of the amount she is using of another product.

I also thanked Diana for drawing my attention to the [Cronometer App](#) that you can access online or on your phone. There is a list of potassium-rich foods in [Appendix B](#) but it doesn't do the math for you.

I do highlight the importance of potassium in my *ReMyte & ReCalcina* book and suggest people drink potassium broth if they aren't getting enough from their

diet, but again, if you are avoiding these foods, you are going to come up short. Having a *Pico Potassium* product will allow us to educate you more about potassium and help you identify and avoid potassium deficiency.

I wanted to lay out this pattern to you in the introduction, however, I'll be going into more reasons for potassium deficiency further on and how to tell you how to meet your requirements.

The Potassium Magnesium Dance

An electrolyte is a substance that dissociates in solution into charged particles called ions making the solution (i.e., the blood) capable of conducting electricity. Think of the way we measure the electrical conductivity of the heart with an EKG and the brain with an EEG. Normal body function depends on tight regulation of potassium concentrations both inside and outside of cells.

Potassium deficiency leads to muscle cramps and arrhythmias, as does magnesium deficiency, but to a lesser extent. These two minerals are joined at the hip. That's why the title of the book is *Pico Potassium – Magnesium's Best Friend*. Please memorize this next sentence! **It's impossible to overcome potassium deficiency without first replacing magnesium and low potassium levels can increase urinary magnesium losses.** Also, magnesium is the prime driver of the sodium-potassium pump that is active in all the cells of our body so, it's just not a good idea to be magnesium-deficient.

A Public Health Concern

The [Linus Pauling Institute](#) reports that "Potassium is considered to be a 'nutrient of public health concern' according to the 2015-2020 Dietary Guidelines for Americans since its underconsumption in the U.S. population is associated with adverse health effects."

However, the public gets mixed messages from doctors and researchers about the importance of potassium. Widespread potassium deficiency began with the medical treatment of hypertension. In an attempt to treat hypertension, doctors developed the half-truth that the less fluid in our bloodstream the lower the BP. Ignoring the fact that a dehydrated body is a sick body, diuretic drugs are still the first treatment of choice for newly diagnosed hypertension.

The main class of diuretics are thiazides discovered and developed by Merck in the 1950s and marketed as early as 1958. Some doctors recognized early on that diuretics deplete potassium, but medicine chose to ignore this fact for many years. Because doctors don't want to be accused of causing side effects with their drugs, they deny that potassium depletion is a problem. Even 70 years later they still don't recognize that these drugs are also depleting magnesium. And instead of using magnesium supplements and potassium supplements to actually treat hypertension, they advocate the use of what they call "potassium-sparing drugs."

Evidence of ignoring the role of potassium depletion with the use of diuretics come in an editorial in the *American Journal of Medicine*, written in 1982 opined on "[Our National Obsession with Potassium](#)" which you can read online. Here is the opening statement of the article.

It is our contention that the popular practice of prescribing either oral potassium supplements or potassium sparing agents routinely to patients being treated with diuretics for hypertension is one based largely on tradition and erroneous premises, and not on a careful consideration of benefits and risks.

When I was in medical school, in the mid 70s, I learned about the potassium controversy. I didn't have any patients on diuretics in my medical practice from 1979-1992 in Toronto, so I didn't know much about writing scripts for potassium. Also, I had become quite gun shy of prescribing high dose electrolytes by my hospital experience. We would create an incredible seesaw effect in people's

electrolyte balance by overprescribing an electrolyte – sodium, potassium, calcium, or chloride in response to low levels on a blood test. (Note: They didn't even follow the most important electrolyte – magnesium.) The next day the pendulum had swung in the opposite direction. From that experience, I resolved to advise people to solve and prevent their electrolyte problems with diet.

Now, since our diets are failing us because of the mineral depletion of our soils and our low carb diets, I'm using *ReMag*, *ReMyte*, and *Pico Potassium*, which are stabilized ions of electrolyte minerals in the correct balance to solve health problems.

The National Council on Potassium in Clinical Practice

By 2000, a task force called The National Council on Potassium in Clinical Practice produced a guideline for doctors on when, why and how much potassium they should recommend. The paper is called "[New Guidelines for Potassium Replacement in Clinical Practice.](#)"¹

This *Council* is comprised of a range of specialists in cardiology, hypertension, epidemiology, pharmacy, and compliance, met to examine the critical role of potassium in clinical practice. Their potassium documents are even more detailed and informative than those on the current *NIH* site and various hospital sites.

The *National Council on Potassium in Clinical Practice* preamble addresses the need for a comprehensive approach to potassium deficiency:

In recent years, studies of the potential pathogenetic role of potassium deficiency in various medical conditions have underscored the importance of preventing or correcting this deficiency. Although it has long been established that the maintenance of normal serum potassium is essential in reducing the risk of life-threatening cardiac arrhythmias, accumulating evidence suggests that the increased intake of potassium can also lower blood pressure and

reduce the risk of stroke. Few clinicians attempt to monitor and augment potassium stores on a routine basis. One reason may be the inconvenience of accurately measuring total body potassium, which entails a 24-hour urinary collection rather than a rapid laboratory serum measurement. Another reason is the practical difficulty of achieving and maintaining optimal potassium levels. Therefore, many clinicians may not attempt to remedy subnormal potassium levels except in high-risk patients.

Simply stated, doctors find that measuring and following potassium levels is inconvenient, so let's not bother doing it. Thus, an agency had to be formed to push compliance to the fore. However, most of the present potassium studies and reports are about hyperkalemia, not hypokalemia. The report continues:

The current lack of consensus on how to prevent and treat hypokalemia (low blood levels of potassium) has led to the neglect of a wide range of situations in which increasing potassium intake might help prevent sequelae of cardiovascular disease. The multifactorial and interactive mechanisms that are stimulated by hypertension and even more so by heart failure, which mandate the introduction of drugs that disrupt electrolyte homeostasis, emphasize the serious role of potassium. This article reviews contemporary thinking on potassium in clinical practice.

Using the link above, you can read the guidelines yourself online, but one thing in particular in *The National Council's* article stood out for me and it is something that every doctor should know. And I quote:

The Role of Magnesium in Potassium Repletion

Magnesium is an important cofactor for potassium uptake and for the maintenance of intracellular potassium levels. Recent studies using cellular models confirm the critical role of magnesium in maintaining intracellular

potassium and indicate that the mechanisms are multifactorial. Whang and colleagues² demonstrated that coexisting magnesium and potassium depletion could lead to refractory potassium repletion, which is the inability to replete (replace) potassium in the presence of unrecognized and continuing magnesium deficiency.

Many patients with potassium depletion may also have magnesium deficiency. In particular, loop diuretics (e.g., furosemide) produce substantial serum and intracellular potassium and magnesium loss. Digoxin accelerates the excretion of magnesium by reducing its reabsorption at the renal (kidney) tubules. The role of magnesium in maintaining intracellular potassium is particularly important in cardiac myocytes (muscle cells) because it desensitizes them to the calcium-induced arrhythmogenic actions of cardiac glycosides (drugs).

Routine determination of serum magnesium levels should be considered whenever the measurements of serum electrolytes are necessary in a patient. Whang et al recommend considering the repletion of both magnesium and potassium for patients with hypokalemia. Dietary sources of magnesium include whole-grain cereals, peas, beans, nuts, cocoa, seafood, and dark green vegetables.

Please reread the last paragraph of this quoted report. Doctors are being told to measure magnesium and give it to people who are low in potassium. Unfortunately, few doctors have taken that advice and I haven't come across one patient, client, or customer in the past 5 decades who has been given magnesium along with their prescription for diuretics. Another unfortunate truth is that the serum magnesium blood test that doctors use is not accurate enough to determine the amount of magnesium at the cellular level. The ionized magnesium blood test is the gold standard. You can read more about this test in my book [*ReMag: Invisible Minerals*](#)

[Part I](#) or *The Magnesium Miracle*, available at Amazon.

The current *NIH Office of Dietary Supplements* says the same thing about the close association of potassium and magnesium on their website:

Magnesium depletion can contribute to hypokalemia by increasing urinary potassium losses. It can also increase the risk of cardiac arrhythmias by decreasing intracellular potassium concentrations. More than 50% of individuals with clinically significant hypokalemia might have magnesium deficiency. In people with hypomagnesemia and hypokalemia, both should be treated concurrently.

DIETARY INTAKE OF POTASSIUM

Here's what *The National Council on Potassium* said about dietary intake of potassium.

People who eat large amounts of fruits and vegetables tend to have a high potassium intake of approximately 8000 to 11,000 mg/d (200-250 mEq). Urban whites typically consume approximately 2500 mg (62.5 mEq) of potassium daily. In contrast, many African Americans have low intakes of about 1000 mg (25 mEq) per day. The daily minimum requirement of potassium is considered to be approximately 1600 to 2000 mg (40-50 mmol or mEq).

I was surprised to learn, in the following part of the report, the degree of potassium deficiency in the population. Surprised, because so few people are prescribed potassium supplements by their doctors. The report stated:

Potassium depletion is one of the most common electrolyte abnormalities encountered in clinical practice. More than 20% of hospitalized patients have hypokalemia, widely defined as a serum potassium level of less than 3.5

mmol/L. Low serum (or plasma) concentrations of potassium may occur in up to 40% of outpatients treated with thiazide diuretics.

When there is excess potassium in the body it exits through the kidneys, whereas magnesium is eliminated via the kidneys and the bowels, giving it a failsafe mechanism that prevents hypermagnesemia. If someone has severe kidney dysfunction, serum potassium levels can become abnormal. The key word here is "severe." Unfortunately, any kidney dysfunction is now being used as a reason to avoid potassium supplementation. I have more to say about that in the section [Frequently Asked Questions: Question 1](#).

We also have to consider the relationship of sodium and potassium in the diet. The daily intake of sodium chloride (table salt) today is about three times higher than the daily intake of potassium. Eating salt raises the amount of sodium in your bloodstream and can throw off the delicate balance between the two minerals. By eating more fruit and vegetables, you will increase your potassium levels and help to restore the delicate balance.

Note: Sea salt is not as high in sodium chloride as table salt but is combined with 72 different minerals.

If dietary potassium is low and dietary sodium is high, this imbalance can lead to high blood pressure and heart disease. In healthy individuals, the kidneys respond to excess sodium by flushing it out in the urine. Unfortunately, this also removes potassium. If potassium levels are low, the body tries to hoard it, which also means hanging onto sodium.

POTASSIUM AND HEALTH CONDITIONS

To give you an overview of potassium's crucial role in certain health conditions I'm leaning heavily on two medical sources – The *NIH Office of Dietary Supplements* and *The National Council on Potassium*. Although putting their comments back to

back is somewhat redundant, I want to make it perfectly clear that potassium is an important and necessary mineral that medicine is highly focused on. I'll put the information from these sources in my own words and interject my comments.

I found it interesting that the *NIH Report on Magnesium and Health* only covers 4 categories: Hypertension and Cardiovascular disease, Type 2 Diabetes, Osteoporosis, and Migraine headaches, whereas I've listed 65 conditions that are related to magnesium deficiency in my 2017 edition of *The Magnesium Miracle*.

The *Potassium and Health* benefits are described on [The NIH Office of Dietary Supplements](#) website, and, like magnesium, covers only four major health conditions: Hypertension and Stroke, Kidney stones, Bone health, and Type 2 Diabetes. I don't know if the number 4 was chosen specifically or arbitrarily but it certainly downplays the multiplicity of roles that both minerals fulfill.

I will summarize the *NIH* findings but for the full text and references you can visit their website noted above. I'm including the information from *The National Council on Potassium* which goes beyond the *NIH* report and gives more information on potassium's relationship to Stroke, Hypertension, Diabetes, Kidney Stones, and Bone Health. It also reports on Congestive Heart Failure, Cardiac Arrhythmias, Kidney Disease, and includes animal research.

Of note in the animal research is research that suggests potassium exhibits inhibitory effects on free radical formation, vascular smooth muscle proliferation, and arterial thrombosis. It has also been shown experimentally that potassium may reduce macrophage adherence to the vascular wall (an important factor in the development of arterial lesions, oxidative stress of the endothelium, or vascular eicosanoid production). Hopefully this research as it expands to humans will convince more doctors to recommend potassium to their patients.

NATIONAL COUNCIL GENERAL GUIDELINES FOR HYPOKALEMIA

What follows are the *General Guidelines from The National Council on Potassium* directed toward a patient population at risk for hypokalemia but not necessarily suffering from hypokalemia.

1. Dietary consumption of potassium-rich foods should be supplemented with potassium replacement therapy. Often, increasing dietary potassium intake is not completely effective in replacing the potassium loss associated with chloride depletion, which occur in diuretic therapy, vomiting, or nasogastric drainage.
2. Potassium replacement is recommended for individuals who are sensitive to sodium or who are unable or unwilling to reduce salt intake; it is especially effective in reducing blood pressure in such persons. A high-sodium diet often results in excessive urinary potassium loss. (Unfortunately, magnesium is not considered in this mineral balance.)
3. Potassium replacement is recommended for individuals who are subject to nausea, vomiting, diarrhea, bulimia, or diuretic/laxative abuse. Potassium chloride has been shown to be the most effective means of replacing acute potassium loss.
4. Potassium supplements are best administered orally in a moderate dosage over a period of days to weeks to achieve the full repletion of potassium. (I say that a person might want to follow their potassium food intake and blood tests and determine a daily amount of potassium to take rather than wait for the potassium to become low and just take replacement potassium for a few days or weeks.)
5. Although laboratory measurement of serum potassium is convenient, it is not always an accurate indicator of total body potassium. Measurement of 24-hour urinary potassium excretion is appropriate for patients who are at high risk (e.g.,

those with congestive heart failure. (A 24-hour collection is very inconvenient and most doctors don't order it. Following the [Cronometer App](#) and taking Pico Potassium based on low to mid-range blood levels is more sustainable.

POTASSIUM CONDITIONS: NIH AND THE NATIONAL COUNCIL

The following are the specific recommendations from the *NIH* and *The National Council on Potassium* for patients with hypokalemia conditions and serves as a shocking reminder that most patients are potassium-deficient. I'm also shocked that there is only one mention about the concurrent use of magnesium in preventing and treating arrhythmias.

Potassium and Hypertension – NIH Office of Dietary Supplements

The *NIH* report confirmed that low potassium intake increases the risk of hypertension and conversely, higher potassium intake, may help decrease blood pressure, in part by increasing vasodilation and urinary sodium excretion. What are the effects of more potassium in the diet? This question was answered by the DASH diet, which provides 3 times more potassium than the average diet with an emphasis on fruits, vegetables, and low-fat dairy products. The DASH diet lowers systolic blood pressure by an average of 5.5 mmHg and diastolic blood pressure by 3.0 mmHg.

The *NIH* publication reports that most clinical trials suggest that potassium supplementation reduces blood pressure. This effect was seen in a 2017 meta-analysis of 25 randomized controlled trials in 1,163 participants with hypertension. The combined results showed significant reductions in systolic blood pressure (by 4.48 mm Hg) and diastolic blood pressure (by 2.96 mmHg) with potassium supplementation. Several other meta-analyses were reported covering 67 clinical trials also showed a reduction in blood pressure.

The range of dosage of potassium chloride in the 25 studies was 30–120 mmol/day of potassium (1,173–4,692 mg), for 4–15 weeks. That's quite a broad range and really gives no indication of the amount of potassium that should be used clinically.

It's not all good news, however, a Cochrane review of six of the highest-quality trials found nonsignificant reductions in systolic and diastolic blood pressure with potassium supplementation. I'd say that's because they didn't take into account the magnesium status of the participants.

In 2018, a review by the *Agency for Healthcare Research and Quality* (AHRQ) concluded that, based on observational studies, the associations between dietary potassium intakes and lower blood pressure in adults were inconsistent. Demonstrating their own inconsistency, the authors did report that potassium supplements (mostly containing potassium chloride) in doses ranging from 20 to 120 mmol/day (782 to 4,692 mg/day) for 1 to 36 months lowered both systolic and diastolic blood pressure compared to placebo. But they also noted that the reduction in BP in other studies may have been due to reduction in sodium. But that's what extra potassium does – it makes you excrete more sodium!

Here's what these hundreds of researchers in their hundreds of experiments are missing. When you are magnesium deficient, you are not able to overcome a potassium deficiency. Period. Full Stop. And if you are saturated with magnesium, you will not require as much potassium to overcome a potassium deficiency or to get a beneficial result from potassium therapy. Therefore, clinical trials that are just limited to studying potassium are going to be highly inconsistent. It is always best to use magnesium and potassium together when treating hypertension.

Potassium for Hypertension - National Council on Potassium

Here is what *The National Council on Potassium* recommends for hypertension. Patients with hypokalemia due to a diuretic being given for hypertension should

receive potassium supplementation. And in patients with asymptomatic hypertension, an effort should be made to achieve and maintain serum potassium levels of at least 4.0 mmol/L. Low serum potassium levels (e.g., 3.4 mmol/L) in asymptomatic patients with uncomplicated hypertension should not be regarded as inconsequential. Dietary consumption of potassium-rich foods and potassium supplementation should be instituted as necessary.

Potassium and Stroke – NIH Office of Dietary Supplements

The *NIH* report next turned to potassium and stroke. They began with the dietary intake of potassium and found that the more potassium in the diet the less risk of stroke and possibly other cardiovascular diseases (CVDs). A meta-analysis gathered 11 studies covering 247,510 adults and found that a 1,640 mg per day higher potassium intake was associated with a significant 21% lower risk of stroke as well as nonsignificant lower risks of coronary heart disease and total CVD. Another meta-analysis of 9 studies reported a significant 24% lower risk of stroke with higher potassium intakes and a nonsignificant reduction in coronary heart disease and CVD risk. Those findings were balanced, even negated, by 15 observational studies that found inconsistent relationships between potassium intakes and risk of stroke.

The Agency for Healthcare Research and Quality reports that any beneficial effect of potassium on CVD is likely due to its antihypertensive effects. All this data accumulation allowed the FDA to approve the following health claim:

“Diets containing foods that are a good source of potassium and that are low in sodium may reduce the risk of high blood pressure and stroke.” And everyone keeps saying that more research on both dietary and supplemental potassium is needed before firm conclusions can be drawn. May I remind you, researchers will never find answers until they account for the role of

magnesium in potassium absorption and metabolism.

Potassium for Stroke Prevention - National Council on Potassium

It is prudent to maintain optimal potassium levels in patients at high risk for stroke (including those with a history of atherosclerotic or hemorrhagic cerebral vascular accidents). Although the effectiveness of potassium supplementation in reducing the incidence of stroke in humans has not been demonstrated in randomized controlled trials, prospective studies suggest that the incidence of fatal and nonfatal stroke correlates inversely with dietary potassium intake. In addition, the association of stroke with hypertension is well known.

Potassium and Kidney Stones – NIH Office of Dietary Supplements

If you have read anything about magnesium you may already know that it helps prevent kidney stones. Painful kidney stones are most common in people aged 40 to 60. The most common type of kidney stones contains calcium in the form of calcium oxalate and calcium phosphate. It turns out that low potassium intake impairs calcium reabsorption in kidney tubules, increasing urinary calcium excretion and potentially causing hypercalciuria and kidney stones.

Can the same be said for magnesium? We know that taking magnesium and vitamin B6 can inhibit oxalate stone formation. Both nutrients are used by the body to metabolize oxalate into other substances. There is even evidence that vitamin B6 deficiency leads to an increase in kidney stones as a result of elevated urinary oxalate.

The *NIH* report lists research showing the association between low potassium in the diet and kidney stones. In 45,619 men aged 40 to 75 years with no history of kidney stones, those with the highest potassium intakes ($\geq 4,042$ mg/day on average) had a 51% lower risk of kidney stones over 4 years of follow-up than

those with the lowest intakes ($\leq 2,895$ mg/day) Similarly, in over 90,000 women aged 34–59 who participated in the Nurses' Health Study and had no history of kidney stones, those who consumed an average of over 4,099 mg of potassium per day had a 35% lower risk of kidney stones over a 12-year follow-up period than those who averaged less than 2,407 mg of potassium per day.

That's just from dietary potassium, what about supplements of potassium? Note that these trials have far fewer participants. A 2015 Cochrane review of seven studies that examined the effects of potassium supplementation in a total of 477 participants, most of whom had calcium oxalate stones found that a significant reduction in the risk of new stones and reduced stone size. However, there was some question about the citrate in potassium citrate being the deciding factor.

Unfortunately, the *NIH* report never mentions a link between kidney stones and both magnesium and potassium deficiencies.

Potassium and Bone Health – NIH Office of Dietary Supplements

The *NIH* report says that observational studies suggest that increased consumption of potassium from fruits and vegetables is associated with increased bone mineral density. They say that this evidence, combined with results from metabolic studies and a few clinical trials, suggests that dietary potassium may improve bone health.

They confess that they don't know why potassium supports bone health but suggest it may protect bone through balancing the pH of the body. They further explain that foods that are acid-forming, such as meats and cereal grains, contribute to metabolic acidosis and might help break down bone. Whereas alkaline foods, which contain more potassium and potassium supplements might counter the acidic effect and help preserve bone tissue.

Potassium supplements haven't been studied for saving bones from deteriorating into osteopenia or osteoporosis but only for markers of bone health.

For example – reducing urinary calcium excretion or increasing bone mineral density in the lumbar spine and improving bone microarchitecture have been seen in some studies using potassium supplements and not others. They end this particular section with a familiar refrain by calling for more research.

Potassium and Type 2 Diabetes – NIH Office of Dietary Supplements

Allopathic medicine is aware that magnesium deficiency is a marker for diabetes and has an effect on insulin secretion. Unfortunately, that information is not applied clinically.

It turns out that potassium is also needed for insulin secretion from pancreatic cells and hypokalemia impairs insulin secretion, possibly leading to glucose intolerance and eventually Type 2 Diabetes. Studies have reported this effect in people who use thiazide diuretics long-term. We've all heard that you should eat a banana a day to get your potassium when you take diuretics. But remember, while bananas are a convenient and good source of potassium, there are plenty of other foods that supply even more potassium (e.g. cantaloupe, sweet potato, spinach). See [Appendix C](#) for a list of potassium-rich foods.

There are no studies of diabetic patients being given potassium supplements and watching their blood sugar levels drop. Instead there are observational studies of adults that eat a potassium-deficient diet and show lower serum or urinary potassium levels and increased rates of fasting glucose, insulin resistance, and type 2 diabetes.

For example, data from 84,360 women aged 34–59 years participating in the Nurses' Health Study, found that those with the highest potassium intake had a 38% lower risk of developing type 2 diabetes over 6 years of follow-up.

The only clinical trial noted was in 29 African American adults with prediabetes (define as borderline blood sugar levels), and low to low-normal serum potassium levels (3.3–4.0 mmol/L). They were given 40 mEq (1,564 mg) of

potassium (as potassium chloride) for 3 months. This dose significantly lowered their fasting glucose levels, but it did not affect glucose or insulin measures during an oral glucose tolerance test. The researchers concluded that more trials were required before potassium's link with blood glucose control and type 2 diabetes can be confirmed.

Potassium for Type 2 Diabetes - National Council on Potassium

Potassium levels should be closely monitored in patients with diabetes mellitus and potassium replacement therapy should be administered when appropriate. Data underscore the adverse effects of abnormal levels of glucose and insulin on potassium levels and the high incidence of cardiovascular and kidney complications in patients with diabetes mellitus. These factors are specific to patients with type 2 diabetes who have poorly controlled serum glucose levels.

Guidelines Beyond the NIH Recommendations

The National Council on Potassium gave the following guidelines for the treatment of CHF, cardiac arrhythmias and kidney disease beyond the *NIH* recommendations.

Potassium for Congestive Heart Failure - National Council on Potassium

Potassium replacement should be routinely considered in patients with congestive heart failure, even if the initial potassium determination appears to be normal (e.g., 4.0 mmol/L) because the majority of patients with CHF are at increased risk for hypokalemia. In patients with CHF or myocardial ischemia, mild-to-moderate hypokalemia can increase the risk of cardiac arrhythmia. In addition, diuretic-induced hypokalemia can increase the risk of digitalis intoxication and life-threatening arrhythmias.

In light of the above information and the potential for hyperkalemia to occur

secondary to drug therapy with blood pressure-lowering medications such as ACE inhibitors or angiotensin II receptor blockers, regular monitoring of the serum potassium level is essential in these patients. At any time, stress can trigger the secretion of aldosterone and the release of catecholamine in response to low cardiac output, thereby precipitating a fall in the serum potassium level.

Potassium for Cardiac Arrhythmias - National Council on Potassium

Maintenance of optimal potassium levels (at least 4.0 mmol/L) is critical in these patients and routine potassium monitoring is mandatory. Patients with heart disease are often susceptible to life-threatening ventricular arrhythmias. In particular, such arrhythmias are associated with heart failure, left ventricular hypertrophy (characterized by an abnormal QRS complex), myocardial ischemia, and myocardial infarction (both in the acute phase and after remodeling). The co-administration of magnesium should be considered to facilitate the cellular uptake of potassium.

A Doctor's Advice on Potassium for AFib

In the previous version of *Heart Health*, I had the following text at the end of the book in a Q&A Section from a Doctor's Forum. However, I think it's more appropriate to reinforce the dosing of potassium in this section of the book. The following is a practicing doctor's advice on using potassium in the treatment of Atrial Fibrillation and My Analysis directly after.

Serum potassium levels should be checked in AFib because they can be low along with magnesium. Add potassium slowly and titrate up. Most AFibbers find they need to keep the serum potassium level at least 4.5 but under 5.0. The chloride version of potassium can cause stomach and GI irritation so many of us use the bulk powder form of potassium gluconate. Potassium

citrate is also good but it's usually in capsules limited by law to 99 mg. However, adding too much potassium, too soon, will make AFib worse, not better.

But, fundamentally, once magnesium is optimized, potassium is the key nutrient because it prolongs the refractory period and that's going to provide normal sinus rhythm (NSR). So, it's important to understand that sodium competes with potassium and will want to dominate inside heart cells. The average diet is sodium-heavy. Inside heart cells, sodium is excitatory. By eliminating processed, packaged foods, a great deal of sodium is eliminated, but even then, very often AFibbers must have supplemental potassium to improve even after optimizing the intracellular magnesium.

My Analysis: I love the fact that Doctor #2 is talking about supplementing with magnesium even though he doesn't know about ReMag. I think the main reason why some doctors feel that potassium does not reach optimal levels is because magnesium cannot reach optimal levels when the wrong types of magnesium are used. If you use *ReMag*, then you can become saturated with magnesium and it makes it easier for the body to utilize other minerals. You can take *Pico Potassium*, and *ReMyte* (multiple mineral) and sea salted water to fulfill all your mineral requirements. Also, when you have the proper amounts of sea salted water, *Pico Potassium*, and *ReMyte* minerals, you will require less magnesium.

Potassium for Renal Impairment - National Council on Potassium

Data suggest a link between potassium levels and lesions of the kidneys in patients with renal disease or diabetes. Animal studies have demonstrated that potassium may offer a protective effect on the renal arterioles. The clinical implications of these findings are not yet clear.

NO CONSENSUS ON TREATING POTASSIUM DEFICIENCY

Allopathic medicine says that potassium deficiency is uncommon in people who eat lots of vegetables. However, most people do not eat lots of vegetables. Even the current "health trend" of the Keto diet may be limiting the amount of vegetables and thus the amount of potassium in this diet.

How much potassium should one take? *The Potassium and Health Conditions* section, above, gave some recommendations for supplementation to be used by doctors but the public is forced to sort through the alphabet soup of potassium recommendations.

There is the DRI (dietary reference intake) The EAR (estimated average requirement), the RDA (recommended dietary allowance, and the new kid on the block, the AI (adequate intake). The AI is based on the median (or midpoint) intakes in generally healthy people. Of course, I want to take and recommend an optimum intake not just an adequate one. And what is the definition of healthy people when 80% of the population is magnesium-deficient and 70% of the population is on at least one prescription medication? Also, you may find that various websites give different AI values.

Potassium is identified in the *2015-2020 Dietary Guidelines for Americans* as a nutrient to be increased in the diet and the Institute of Medicine (IOM) recommendation for Adequate Intake of potassium is 4700 mg per day.

To top it all off, note that a [National Survey](#) of 16,444 Americans found that 100% were not getting the estimated average requirement (EAR) of potassium. One Hundred Percent! I know a lot but I did not know the extent of the potassium deficiency in the population which makes this book and *Pico Potassium* very important.

Adequate Intake of Potassium by Age

Age (years)	Recommended potassium intake (milligrams a day)
1–3	3,000
4–8	3,800
9–13	4,500
14 and older	4,700
Breastfeeding women	5,100

There is also the DV, developed by the FDA to help consumers compare the labeled nutrient contents of foods and dietary supplements within the context of a total diet. The DV for potassium on the new *Nutrition Facts and Supplement Facts* labels is 4,700 mg for adults and children age 4 years and older. Fortunately, it's the same as the AI. Foods providing 20% or more of the DV are considered to be high sources of a nutrient, but foods providing lower percentages of the DV also contribute to a healthy diet.

Furthermore, *The Food and Nutrition Board* says there is insufficient evidence from human studies that examined potassium intakes in relation to chronic disease and mortality to advise higher levels of potassium to treat disease.

As I've stated before, the mandate of the *NIH Office of Dietary Supplements* is to study the dosage of nutrients to prevent deficiency diseases, not to treat disease. So, the *NIH* is not commissioning studies to investigate the benefits of high dose supplements on chronic disease.

Most sources say that the best way to get all the potassium you require is through your diet, especially fruits and vegetables. Green leafy vegetables are very high in potassium, as are bananas, nuts, avocados, citrus fruit, and potatoes. See

[Appendix B](#) for a list of potassium-rich foods. However, my point and the reason why I created *Pico Potassium* is because most people are not eating enough vegetables. This is especially so in a society where we eat far too many processed foods, which are high in sodium. We know that as sodium consumption rises, increased potassium is needed to cancel out the effect of sodium on blood pressure. However, instead of simply switching to sea salt, which contains some potassium, and increasing our dietary potassium, doctors tell people to avoid salt and limit their fluid intake to treat high blood pressure and edema.

Also, so-called healthy diets like Paleo, Keto, Carnivore, and Yeast-Free don't leave much room for carbohydrates, which means our potassium intake from fruits and vegetables will suffer.

Remember, potassium will also be depleted when doctors freely prescribe diuretics for high blood pressure. Prolonged periods of sweating can cause potassium deficiency along with magnesium deficiency in military personnel, sauna enthusiasts, hot yoga practitioners, kitchen workers, farmers in hot climates, and people without air conditioning in hot climates, putting them all at risk.

Thus, potassium deficiency is becoming more common. Some people have turned to folk remedies like cream of tartar, which does contain potassium, but you really aren't sure of how much potassium you are getting. Instead, I decided to create a reliable potassium supplement that is easy to take and that can be fully absorbed at the cellular level.

GETTING TO KNOW POTASSIUM

Potassium is the third most abundant element in the human body. Calcium is first, phosphorus is second, and magnesium is fourth. Potassium is mostly found inside the cells to the tune of 98 percent, whereas 98 percent of sodium is found outside the cells. The intracellular-to-extracellular dance of potassium and sodium helps

create and conduct electrical impulses in muscle cells and nerves. But it's important to note that magnesium controls the sodium/potassium pump.

Calcium and magnesium do a similar dance with most of the calcium outside the cells and most of the magnesium inside. Magnesium controls this pump as well.

Since potassium levels in the body are so high to begin with, the RDA of potassium is in grams (about 4-5 grams daily), not milligrams.

THE FUNCTIONS OF POTASSIUM

I often mention that magnesium is required as a cofactor to activate up to 1,000 enzymes in the body. Potassium is said to act as a cofactor in a 'limited number of enzymes' but I couldn't find a specific number.

Potassium is an important electrolyte for pH balance and fluid retention. Unlike magnesium, potassium is always measured on a blood electrolyte panel and blood testing is the most convenient way to follow your potassium levels. Even though a 24-hour urine collection is much more accurate, few doctors ever take the trouble to order it.

Potassium, along with magnesium, plays a necessary role in proper conduction of nerve and muscle cell impulses including heart muscle cells. It's also involved with kidney function, hydration, and acid/base regulation.

Potassium and sodium are required to activate the enzyme that helps make energy in the Krebs cycle. I've talked about this energy cycle many times because 6 of the 8 steps require magnesium. Now we find out that potassium and sodium are also involved. Potassium along with magnesium, is required for the activity of pyruvate kinase an important enzyme involved in the last step of the Krebs cycle producing ATP.

Let's explore a very important function of potassium as an activator of the

membrane potential of all the cells in the body. Potassium is the principal positively charged ion in the fluid inside of cells, while sodium is the principal positive ion in the fluid outside the cell. Potassium concentrations are about 30 times higher inside than outside cells, while sodium concentrations are more than 10 times lower inside than outside cells.

The different concentrations between potassium and sodium across cell membranes create an electrochemical gradient known as the membrane potential. A cell's membrane potential is maintained by ion pumps in the cell membrane, especially the Na^+/K^+ -ATPase pumps. Interestingly enough, these pumps are run by magnesium enzymes using ATP energy to pump sodium out of the cell in exchange for potassium. Their activity has been estimated to account for 20%-40% of the resting energy expenditure in a typical adult. As I've always said, if you don't have energy magnesium, your energy is compromised. Tight control of cell membrane potential is critical for nerve impulse transmission, muscle contraction, and heart function.

CAUSES OF POTASSIUM DEFICIENCY

- Potassium-wasting diuretics - thiazide or furosemide
- Prolonged vomiting or diarrhea
- Inflammatory bowel disease (Crohn's and Ulcerative Colitis)
- Overuse of enemas
- Repeated use of laxatives
- Crash diets
- Anorexia nervosa or bulimia
- Excessive sweating with physical exertion
- Kidney disease

- Excessive urination
- Abnormally high production of aldosterone (hyperaldosteronism)
- Magnesium depletion
- Prolonged undernutrition
- Cortisone
- Burn patients with fluid loss
- Edema
- Poor circulation

Drugs That Deplete Potassium

1. Potassium-wasting diuretics - thiazide or furosemide
2. Chronic use of laxatives
3. Albuterol used in nebulizers or asthma inhalers like Proair, Proventil, and their generic formulations.
4. Insulin in high doses may lower potassium levels in the blood by shifting potassium from your bloodstream into your cells.
5. Sudafed (pseudoephedrine), an OTC decongestant, pushes potassium out of your bloodstream and into your cells.
6. Risperdal and Seroquel are antipsychotic medications that may cause hypokalemia, but it's a rare complication.

DIAGNOSING POTASSIUM DEFICIENCY

Potassium deficiency leads to muscle cramps and arrhythmias, but to a lesser extent than magnesium deficiency, the reason being that potassium deficiency is

much less common than magnesium deficiency.

Low levels of potassium can be diagnosed using a simple serum potassium blood test. This is regarded as a valid test, whereas it is common knowledge, by people who follow my work, that the serum magnesium test is not valid or accurate. Further evidence of this statement is that serum magnesium is not measured on an electrolyte panel, whereas potassium, sodium, calcium, and chloride are. Not having an accurate measurement for magnesium has led to countless deaths because magnesium deficiency is a cause of many diseases.

Serum potassium testing is the standard test for potassium. However, measurement of 24-hour urinary potassium excretion is appropriate for patients who are at high risk such as those with congestive heart failure, and it's mostly done in hospital patients.

A normal potassium level is defined as between 3.5 and 5.5 millimoles per liter (mmol/L). Hypokalemia is diagnosed when potassium levels fall below 3.5 mmol/L.

Mild potassium deficiency will generally not present with symptoms, but it is important to track a low normal level for consistency or to see if it continues to drop. A potassium level lower than 2.5 mmol/L is considered extremely deficient, and symptoms will become more severe as levels reduce.

SYMPTOMS OF POTASSIUM DEFICIENCY

Potassium resides primarily inside our cells and the tissues most severely affected by potassium deficiency are muscles throughout the body and the cells lining kidney tubules.

Mild Potassium Deficiency: Below 3.5 mmol/L

No symptoms

Moderate Potassium Deficiency: 2.5-3.5mmol/L

Fatigue

Weakness

Body wide muscle weakness and pain

Constipation (Note: Potassium deficiency causes decreased intestinal motility as does magnesium deficiency.)

Heart arrhythmia

Low blood pressure

Severe Potassium Deficiency: Below 2.5 mmol/L

Muscle weakness, wasting, and paralysis

Intermittent muscle spasms

Paralysis

Respiratory failure

Painful gut obstructions

Tingling, crawling, numb, or itchy sensations-hands, feet, legs, or arms

Hypertension

Kidney stone formation

TREATING POTASSIUM DEFICIENCY

Start by Assessing Your Diet

You have to know how much potassium you are getting in your diet. Use the [Cronometer App](#) that I talked about in the Introduction. It's the best way for you

to take charge of your potassium! Remember, most farms use a potash fertilizer that is high in potassium so most plants will have potassium and the animals that eat those plants have potassium too.

Potassium Sources

Fruits – especially bananas and melons (they are actually higher in K)

Vegetables – especially potatoes (both white and sweet), spinach, tomato sauce

Dairy -especially milk and yogurt (most other dairy foods have insignificant amounts)

Protein - meat, nuts, soybeans and other legumes

Some of the best sources of potassium are fresh leafy greens, avocados, tomatoes, potatoes, and beans. However, food processing greatly reduces the amount of dietary potassium. See a list of potassium-containing foods in [Appendix B](#).

PLANT POTASSIUM

You may wonder whether potassium is deficient in the soil, like magnesium. I've reported that 100 years ago we could get 500mg of magnesium in our daily food but now we're lucky to get 200mg. Has potassium suffered the same decline? I don't believe so because potash is a commonly used fertilizer that replaces potassium in the soils. There really are no standard magnesium fertilizers.

Potassium is a nutrient that's necessary for plant growth and is taken up by plants in large quantities. It's important enough that farmers regularly test their soil for potassium, and they use a potassium fertilizer. Because if the levels are low, the plants don't grow.

In fact, there are 60 enzymes that require potassium for optimum plant

health. That may be why there is so much potassium in plants and why a few servings of vegetables and fruits every day can provide enough potassium.

What does potassium do to keep plants healthy? It protects plants from extreme temperatures. It helps plants fight disease, pests, and stress. Potassium stops wilting, strengthens roots and stems, and assists in transferring food, and producing plant ATP. It activates plant enzymes to ensure plants use water efficiently. If potassium is deficient or not supplied in adequate amounts, it stunts plant growth and reduces yield.

POTASSIUM SUPPLEMENTS

When your food intake for potassium, as indicated by the [Cronometer App](#), is below the 4,700 RDA, and/or, if your serum potassium levels are between 3.5 and 4.5 mmol, consider using potassium supplements especially if you are vulnerable to cardiac arrhythmias. This includes patients with heart disease, heart failure, taking diuretics, digoxin, and patients with a history of heart attack. If your serum potassium level is below 3.5 mmol, potassium supplementation may be necessary even if you are asymptomatic with mild-to-moderate hypertension.

Additionally, people with potassium below 3.5 mmol would benefit from lowering their dosage of diuretics, when applicable. I'm happy that *The National Council on Potassium*, echoes my sentiments. They say that repletion strategies should include eating foods high in potassium, using salt substitutes that have more potassium than sodium, or taking prescription potassium supplements for those receiving diuretic therapy. Also, an attempt should be made to reduce medication dose or to discontinue therapy but under your doctor's supervision. When diuretic therapy is necessary, potassium balance should be protected by using low-dose diuretics and by using diuretics in combination with drugs that have the potential for sparing potassium (such as β -blockers, potassium-sparing diuretics, ACE inhibitors, or angiotensin receptor blockers).

Of course, we know that low levels of potassium go hand-in-hand with low magnesium, so saturating the body with magnesium will help relieve hypertension, which may be due to magnesium deficiency in the first place. Magnesium repletion will also help alleviate low potassium levels and the two will work together to lower blood pressure.

There are various supplemental potassium salts available, including potassium chloride, potassium citrate, potassium gluconate, potassium aspartate, potassium orotate, potassium phosphate, and potassium bicarbonate. Potassium phosphate is found primarily in food, and potassium bicarbonate is typically recommended when potassium depletion occurs in the setting of metabolic acidosis (pH <7.4).

Of course, I'm going to recommend our *Pico Potassium* where the potassium chloride has been treated to create a stabilized ion of potassium that is fully absorbed at the cellular level.

The National Council on Potassium agrees with my potassium chloride recommendation and says it should be used in all other settings because of its unique effectiveness against the most common causes of potassium depletion. Moreover, hypochloremia (an electrolyte imbalance characterized by unusually low levels of chloride in the blood) may develop if citrate, bicarbonate, gluconate, or another alkalinizing salt are administered, particularly in patients adhering to diets that restrict the intake of chloride.

Why Only 99mg Per Dose?

With an abundance of caution, the FDA has ruled that potassium supplements cannot exceed 99mg of potassium per dose, which is only 2% of the 4,700mg Adequate Intake (AI) of potassium.

The reason given for these concerns can be found on the *NIH* webpage about potassium. They say that some oral drug products that contain potassium chloride

providing more than 99mg potassium are not safe because they have been associated with small-bowel lesions. As far as I can tell the original article about "Potassium-induced Lesions of the Small Bowel" was published in 1965 and said:

Enteric-coated potassium chloride is responsible for a striking increase in ulcerative lesions of the small intestine. Pathologically these lesions are venous infarctions of varying severity; patients present with obstruction or signs of perforation, or both, and rarely with bleeding. Roentgenologic studies demonstrate partial intestinal obstruction. Careful investigation of drug ingestion is essential in making the diagnosis. Based on clinical, experimental, and pathological studies, aggressive surgical therapy is recommended. Because irreversible damage may have occurred by the time symptoms appear, medications containing enteric-coated potassium should be limited to patients who require thiazides and whose potassium requirements cannot be met by dietary means.

Back in 1965, there wasn't even a dietary supplement industry. I know because I was on the cutting edge of natural medicine in the late 1970's. When I went to medical school in the mid 70s, there wasn't even a health food store in Halifax, Nova Scotia. Which means that these enteric-coated potassium pills would have to be a medical prescription from your doctor. The coating – often comprised of shellac – would wear off and dump potassium on your intestinal lining, causing the ulceration.

Today, there are no enteric coated potassium dietary supplements. But there is K-TAB a potassium chloride extended-release tablet containing 750 mg of potassium. It's touted as being film-coated with a waxy substance but not enteric-coated. This formulation is intended to give a slow release of potassium so that a high localized concentration of potassium chloride within the intestine is reduced. The inert wax/polymer matrix is not absorbed and may be excreted intact in the stool. Here are the inert ingredients of K-TAB: Castor oil, cellulosic polymers,

colloidal silicon dioxide, D&C Yellow No. 10, magnesium stearate, paraffin, polyvinyl acetate, titanium dioxide, vanillin, and vitamin E. My technical editor and proofreader typed EGADS in the margin when she read this list.

PICO POTASSIUM DOSAGE

Since 98 percent of potassium is found inside the cells, measuring potassium in the blood can be misleading. However, regular blood testing and comparing those values, along with clinical symptoms, and the knowledge that you have to use magnesium and potassium together can serve as your guide.

In order to support our customers, who require more potassium, as evidenced by low levels of potassium intake as show by the [Cronometer App](#) and low to mid-range potassium blood tests, we created *Pico Potassium* a highly concentrated potassium formula with an individual dose of 99mg per ¼ tsp. Thus, if you require 400-800mg of potassium, you can take 1-2 tsp of *Pico Potassium*. Remember that our stabilized ion minerals are fully absorbed and you will feel the benefits of a much lower dose than other potassium products.

Because of the FDA 99mg ruling on potassium, my company, RnA ReSet is going to proceed with an abundance of caution regarding the dosing of *Pico Potassium*. I and my customer service team are not going to tell you how much *Pico Potassium* to take. Because the symptoms of potassium deficiency and magnesium deficiency are very similar, my recommendation is to saturate with magnesium and follow your potassium food intake and blood levels. If after saturating with magnesium, you still have symptoms that could be magnesium deficiency and/or potassium deficiency, check your blood potassium levels and potassium food intake.

Personally, if my potassium food intake was low, for example by 1,600 mg, I would take half that amount in *Pico Potassium* – 800mg or 2 tsp. I would start with

1 tsp per day and take 2 tsp after one week.

If your potassium blood test is low your doctor might give you a prescription, which will give you a dose of potassium in milliequivalents. Here is the conversion of mEq to mg if you wish to take *Pico Potassium* instead.

8 mEq equals 600mg and 10 mEq equals 750mg of potassium chloride.

If you are prescribed 8 mEq of potassium, you can slowly build up to 1 tsp of *Pico Potassium*, which equals ~400mg, which considering the high absorption is probably sufficient. That's why I recommend you increase your *Pico Potassium* slowly because you may find that at 1 tsp your symptoms are abating and that may be the dose you require.

Note: I could not find the percent absorption of potassium from foods or supplements. One paper said the range was from 10-90%, which was less than helpful. So, we don't know how much potassium you are absorbing from your food or other supplements, but what we do know is that *Pico Potassium* is fully absorbed at the cellular level, so if you are used to taking a certain brand of potassium then you are not going to require as much *Pico Potassium*.

Adult Dosage: Personally, I take 1 tsp of *Pico Potassium* a day and put it in with my *ReMag*, *ReMyte*, and *Pico Silver*. I take several big swallows about 6 times a day followed by a long drink of my sea-salted water.

The average dose of *Pico Potassium* will be from 1-3 tsp per day.

Children's Dosage

There are no guidelines for children's dosage of potassium supplements. There are Adequate Intake dietary recommendations, which you can follow.

CAN YOU TAKE TOO MUCH POTASSIUM?

I'll go to my magnesium/potassium comparison again and remind you that if you take too much magnesium, it will give you the laxative effect, which makes it a very safe supplement. Potassium will be eliminated in the urine and the stool as well but not give the laxative effect.

If you have good kidney function, you can efficiently get rid of excess amounts of potassium in the urine, however, with a lot of effort, you can take too much and get into trouble. However, most of the cases of hyperkalemia are caused in the hospital with overdoses of potassium given intravenously. There have been a few reports of potassium toxicity caused by an extremely high intake of potassium supplements. No food-related potassium toxicity has ever been reported.

Because clearing excess potassium depends on kidney function, consuming too much potassium can be harmful to people with under functioning kidneys. Unfortunately, too many people today are being told they have underfunctioning kidneys and are told to stay away from potassium and magnesium.

Inability to clear potassium can cause elevation of blood potassium and side effects. Blood potassium levels are followed when in the hospital and levels of 3.6-5.2 mmol/L are considered normal. From 5.3-6 they say you have mild hyperkalemia and need to be monitored and managed. Levels higher than 6.0 mmol/L are dangerous.

It's difficult to diagnose hyperkalemia without a blood test because there may be very few and even no symptoms. And, if there are symptoms, they are similar to hypokalemia. Severe or sudden hyperkalemia, such as you would get with an overdose of intravenous potassium can cause heart palpitations, shortness of breath, and chest pain, and requires immediately medical intervention.

High potassium levels in people taking potassium supplements have been associated with only two cases of non-fatal cardiac arrest. While certainly a terrible thing to have happened, it shows that it can occur.

The report was in the *American Journal of Emergency Medicine*, 2011 and titled: "Life-threatening Hyperkalemia from Nutritional Supplements: Uncommon or Undiagnosed?"³ From the title you can surmise the allopathic aversion to dietary supplements and rest assured that if there were more cases of hyperkalemia with potassium supplements, they would be in this report.

What caused the high potassium level in these two individuals? One person used too much potassium salt substitute, and another took too much of a high dose muscle building supplement. This report is a reminder to use potassium as directed on the label or by your doctor.

Both patients suffered cardiac arrest but were successfully resuscitated and survived. The acuity of intake and excessive quantity overwhelmed the kidneys' ability to clear the excess.

The following answer to the first FAQ will help answer the question of taking *Pico Potassium* if you have reduced kidney function.

FREQUENTLY ASKED QUESTIONS

Question 1.

Can someone with poor kidney function, kidney disease, or kidney failure use *Pico Potassium*?

Answer:

This is such a difficult question to answer because doctors have scared their patients into thinking that "poor kidney function" is somehow equivalent to kidney failure.

I think the misunderstanding comes from doctors ordering a kidney function blood test called the glomerular filtration rate (GFR). It's a measurement of the volume of fluid filtered from the blood vessels in the kidneys into the Bowman's

capsule. Bowman's capsule is the structure that gathers urine to be eliminated through the bladder.

When you get a GFR test result back it's graded in Stages of Chronic Kidney Disease. Normal GFR is 90 or greater, yet they say there is a Stage 1 of Kidney disease that has normal kidney function with a GFR of 90 or higher. So, here you are at the doctor's office and they tell you that you have Stage 1 of kidney disease – it's enough to make you sick!

CHRONIC KIDNEY DISEASE AND GFR

CKD stage	Description	Possible signs & symptoms	GFR
Stage 1	Kidney damage with normal kidney function	High blood pressure, swelling in legs	90 or higher
Stage 2	Mild loss of kidney function	High blood pressure, swelling in legs	89–60
Stage 3	3a: Mild to moderate loss of kidney function	Low blood count, malnutrition, bone pain	3a: 59–45 3b: 44–30
Stage 4	Severe loss of kidney function	Anemia, decreased appetite, bone disease	29–15

Next comes the doctor's knowledge of kidney disease and the complete lack of knowledge about nutrients. All they know about kidney failure is that you shouldn't take potassium or magnesium if you have kidney failure – but they extend the ban to kidney disease and they think Stage 1 is kidney disease and they have some misguided notion that if they stop potassium and magnesium in the early stages of kidney disease, they will somehow prevent more disease. They do not realize that they are preventing the cells of the kidneys, and the whole body, from receiving minerals crucial to their patient's health. They are hastening the disease instead of helping it.

Kidney Calcification

What is really happening in the kidneys is calcification of the kidney arteries. Artery calcification is not just confined to the coronary arteries or carotid – that wouldn't make sense. Vascular calcification is a sign of progressive kidney disease. I found a paper by Demer and Tintut in the journal *Circulation* that discusses a complication of chronic kidney disease called vascular calcification that is causing widespread problems.⁴ Here is how the authors categorize this condition:

Most individuals aged over 60 years have progressively enlarging deposits of calcium mineral in their major arteries. This vascular calcification reduces aortic and arterial elastance, which impairs cardiovascular hemodynamics, resulting in substantial morbidity and mortality in the form of hypertension, aortic stenosis, cardiac hypertrophy, myocardial and lower-limb ischemia, congestive heart failure, and compromised structural integrity. The severity and extent of mineralization reflect atherosclerotic plaque burden and strongly and independently predict cardiovascular morbidity and mortality.

I was shocked with the admission in this paper that "Most individuals aged over 60 years have progressively enlarging deposits of calcium mineral in their major arteries." Such a declaration goes hand-in-hand with the knowledge that most individuals over 60 years have magnesium deficiency and the inability to keep calcium in solution!

Vascular calcification is gaining more recognition, but investigators are trying to distinguish it from atherosclerosis (hardening of the arteries), which is calcified fatty plaque that clogs up arteries. Personally, I think it's just another theory that keeps researchers funded while ignoring the fact that calcium buildup in the arteries in any form is a serious health problem and magnesium is the solution.

A 2014 study found that magnesium minimizes the buildup of vascular calcification by directly antagonizing phosphate and also by suppressing absorption of dietary phosphate.⁵ The investigators suggest this action of magnesium allows it to act as a phosphate binder, which would be very helpful in dialysis patients who

suffer excess phosphate levels. They do not mention the direct effects of magnesium on calcium – to keep it dissolved in solution in the body.

Personally, if I was told I had any stage of kidney disease, I'd saturate with *ReMag*, take *ReMyte*, and get my blood tested for potassium and take *Pico Potassium* if it was mid-range or low normal.

Question 2:

Do I add *Pico Potassium* slowly like I did with *ReMag* and *ReMyte*?

Answer:

The FDA dosage of potassium is 99mg, but instead of putting 99mg in a one teaspoon dose, *Pico Potassium* is highly concentrated with ¼ tsp being equal to 99mg. So, as you do with *ReMag* and *ReMyte*, you can begin with ¼ tsp and slowly work up to higher doses, which may be 400mg twice daily – depending on your blood tests, what your doctor prescribes, and how you feel.

Question 3:

Do we have suggestions as to a maximum dose for someone in this situation?

Answer:

According to FDA guidelines, I cannot give out specific dosages, I would have to refer you back to your blood tests and doctor's recommendations.

Question 4:

Can *Pico Potassium* be added to the quart of sea-salted water that you sip through the day and that also contains *ReMag*, *ReMyte*, and, *ReCalcia*.

Answer:

Yes, but sipping a quart of water with 3 or 4 added pico-minerals might not be too palatable without some sort of juice, or essential oil flavoring, or Stevia sweetening

because it's going to be strong. What I do is take a few gulps every couple of hours and follow with several swallows of plain sea salted water to clear the taste.

Question 5:

Is Pico Potassium gluten-free corn-free, soy-free, and dairy-free?

Answer:

Yes, to all of the above.

APPENDIX A

TOTAL BODY PROTOCOLS

There are now two Total Body Protocols: *Total Body ReSet* and *Total Body Immunity*.

1. Total Body ReSet contains:

ReMag, ReMyte, ReAline, ReStructure, RnA ReSet Drops

The Total Body ReSet Protocol can be paired with Total Body Immunity.

2. Total Body Immunity contains:

ReMag, D3-K2 ReSet, Whole C ReSet, Flora ReVive, Pico Silver, Pico Zinc

3. Additional recommendations include:

ReMag Lotion, ReCalcia, Pico Potassium, ReNew Serum, ReNew Face Cream, Blue Ice Royal, Mighty Mash

TOTAL BODY PROTOCOLS

The *Total Body ReSet Protocol* was devised to give hope to people suffering from what I term *Total Body Meltdown*. The protocol provides an effective starting point to put you on the path to wellness, but it can also keep you healthy and prevent any sort of "meltdown."

I will begin with *Total Body ReSet (TBR)* giving detailed, step-by-step guidelines for implementing the protocol. Then I'll outline the dosage instructions for *Total Body Immunity (TBI)*. Below these two protocols are *Additional Recommendations* that may be helpful for certain individuals as outlined in the Product Descriptions.

My basic theory is that most chronic disease is a combination of mineral deficiencies (mostly magnesium) and yeast overgrowth, and my *TBR Protocol* supports the structure and function of the body to overcome these conditions.

Currently, in 2020, we have come face-to-face with a breakdown in humanity's immunity and have become increasingly susceptible to viral assaults. As a result, I have implemented a *Total Body Immunity* protocol to address this assault using the following layers of protection: *Pico Silver, Whole C ReSet, Pico Zinc, and D3-K2 ReSet*.

I have written many in-depth books about various Completement Formulas and they are available for immediate download at DrCarolynDeanLive.

You can read more about these formulas in the (over) one-dozen free eBooks available for immediate download at DrCarolynDeanLive.

TOTAL BODY RESET

Implementing the Protocol

1. Hydration Guidelines

Hydration is key to allowing your new minerals to work optimally in your cells. Our stabilized ionic minerals are fully absorbed into cells and they pull water in after them. This extra water is necessary for metabolic functions. Therefore, while waiting for your *ReSet Formulas* to arrive, begin hydrating your body by increasing your water intake and adding sea salt, Celtic salt, or Himalayan salt – choose a salt that retains the color of the minerals – not a pure white refined sea salt.

Water Intake Guidelines: Drink $\frac{1}{2}$ your body weight (in pounds) in ounces of water. If you weigh 150 lbs, you will drink 75 ounces per day.

Sea salt or Himalayan salt: Add $\frac{1}{4}$ tsp to every quart of drinking water – to one of those bottles, you will later add *ReMag* and *ReMyte*. Note: You can also add *Pico Silver*, *Pico Potassium* to that same water, but *Pico Zinc* should be taken alone in water and with food.

2. ReAline®

When your bundle of products arrives, begin taking your *ReAline* capsules to assist in “taking out the trash” because as you begin changing your diet and taking *ReMag* and *ReMyte*, your body will begin to detox creating detoxification end products that have to be cleared.

Dosage: 1 per day with or without meals for 1 week, then take 1 capsule twice per day.

Note: If you are already taking *ReMag*, don't worry, just continue to take it as you begin adding the other formulas.

Product Description: L-methionine and L-taurine are sulfur-based amino acids that lend their sulfur molecules to the liver's sulfation detox pathways. The B vitamins in *ReAline* work synergistically with *ReMag*, methionine, and taurine. Four of the B vitamins are methylated and transfer methyl groups to the liver's methyl detox pathways. The rest of the B vitamins are food-based, which makes them easily absorbed and highly effective. They are essential to support our neurological health, the adrenal glands, sugar metabolism, and much more. Don't be concerned that these are not high dose B vitamins. Most B vitamins are synthetic and have to be high dose to force their way into vitamin receptor sites. Methylated and food-based B vitamins have no such issues. An in-depth discussion of *ReAline* and all its benefits can be found in my free eBook [ReAline: Building Blocks to Detox](#).

3. ReStructure®

You can start to take *ReStructure* as soon as it arrives. It comes in a pouch that contains 22 servings. We also carry convenient individual packets for the gym, for traveling, or to determine if you love the product enough to purchase the pouch. Simply shake one scoop or one packet of *ReStructure* into 8 ounces of the liquid of your choice and drink to your health. I swallow my *ReAlign*, *Whole C ReSet*, and *Flora ReVive* capsules, with my *ReStructure* drink.

Product Description: *ReStructure* is a highly digestible energy boosting protein powder for athletes. It's also compatible with Paleo, Keto, and Yeast Free diets, as well as a meal replacement for losing weight and balancing blood sugar. Protein is the main ingredient, but carbs and fats are part of the formula for the appropriate macronutrient balance. Add raw eggs for more Paleo protein; blend in nuts or add heavy whipping cream to make it Keto. If you are looking to increase your vegetable intake, blend in one or two handfuls of greens such as spinach, chard, kale, arugula, etc. *ReStructure* contains a "secret ingredient": the concentrated, dehydrated *RnA ReSet Drops (AKA RnA Powder)* that makes *ReStructure* the most unique meal replacement you will ever find. We think it's the *RnA Powder* that makes customers feel they are getting much more protein than is disclosed on the label because it's so easily digested. Mix with water, coconut milk, or almond milk for a delicious, healthy beverage charged with the power of *RnA Powder*. More information can be found in my free eBook, [*ReStructure – A Formula to ReSet Your Body*](#).

4. RnA ReSet Drops®

You can add *RnA ReSet Drops* at any time in your protocol; you may already be enjoying them.

Dosage: 1 drop under the tongue twice a day. Add 1-2 drops every week until you reach 15 drops twice a day, which is the average dose. Take *RnA ReSet Drops* 15 minutes away from food or drink.

Product Description: *RnA ReSet Drops* are the catalyst included in several of the *Completement Formulas*. They provide the impetus for RNA to make perfect copies of DNA for new cell development using the ionized minerals in *ReMag* and *ReMyte* as building blocks. Each batch of the *Drops* is tested through FDA-certified 3rd party labs, which provide our Certificates of Analyses that reveal the quality and consistency of our product. We ensure that each batch is free of organisms, allergens, and heavy metals and reflects the beneficial nutritional assets of biological sugars, amino acids, and stabilized ionic phosphorus.

The Radish Experiment below describes the power and potential of the *RnA ReSet Drops*.

The Radish Experiment

It's been difficult to explain the *RnA ReSet Drops*, so difficult that I haven't been able to write a book about them like I have for most of our other products. So, in order to satisfy our scientific curiosity, we funded the [Radish Experiment](#). You can click on the link to see our *RnA ReSet Drops* Webinar that shows the video of our experiment using *Mighty Mash* the "waste" product of the *Drops*.

Let me explain the process of making the *RnA ReSet Drops* and how we obtain the *Mighty Mash*. Our *RnA ReSet Drops* are extracted from a few hundred pounds of barley seeds that are germinated in huge rotating drums for several days. There's a lot more going on, but that's the basic process. The leftover barley sprouts, after squeezing out the *Drops*, when dried look and feel like straw. We call this straw *Mighty Mash*, and we've been experimenting with as a living fertilizer.

The Radish Experiment consisted of digging the *Mighty Mash* into the soil and planting radish seeds. One plot used the *Mash* while the other had no additions. Both plots were watered daily. The *Mash* plot was also sprayed with *Mash* tea twice a week. The tea consists of *Mash* soaked in a drum of water.

On Day 25, both plots were harvested. We were shocked to find that the *Mash* plot produced 85 pounds of large, beautiful bright red radishes. The non-*Mash* plot only produced 3 pounds of radishes that passed inspection. The majority were wormy, small, and deformed!

Here's what I realized from this amazing experiment. Insects, worms, bacteria, and weeds are only programmed to "attack" weak, dying, or dead life forms. It's their prime directive – to take out the trash. Humans, animals, and plants are surrounded by similar invaders and only succumb when they are in a weakened state. *RnA ReSet Mash* infused the radishes with life and energy and made them incompatible with the organisms looking to cull out the weak plants.

I say the same happens with humans and is abundantly clear that is happening with our current viral pandemic. We weaken ourselves with a poor diet, bad lifestyle, drugs, and negative emotions and then we easily succumb to infections.

If we have the right building blocks from *ReMag*, *ReMyte*, and *ReAline*, and an infusion of life force from *RnA ReSet Drops*, we are no longer victims to predators. To me, it's that simple, and that's why I created the *Completement Formulas*.

5. ReMag®

You may already be taking *ReMag*, but if not, after 4 days of *ReAline* and *ReStructure*, add *ReMag*, starting with ¼ tsp per day in a quart of water and sipping it throughout the day. By doing this you allow a slow infusion of *ReMag* into the cells, not an overload that may not enter into the cells but could be lost

in the urine or through the bowels. Every 2 days, add another ¼ tsp. Work up to a saturation dose of 2-4 tsp a day if you are trying to overcome a magnesium deficiency, if you are on medications, or if you are participating in athletic and/or work activities where you sweat out your minerals yet you need to keep working.

Note: If you are already taking *ReMag*, remind yourself of the dosage instructions and move on to #6 and begin adding *ReMyte*.

Product Description: Magnesium is required in 1,000 enzyme processes in the body and is responsible for 80% of known metabolic functions. *ReMag* is a unique, non-laxative, 60,000 ppm-concentrate of stabilized magnesium ions where 1 tsp equals 300mg of elemental magnesium. *ReMag* works synergistically with *ReMyte*. For more information, read my free eBook, [ReMag: Invisible Minerals Part I](#). You can use *ReMag Lotion*, described below, to help boost your magnesium levels.

6. ReMyte®

After a week of slowly building up *ReMag*, add ¼ tsp of *ReMyte* into the same quart of water and sip it through the day. Every 2 days, add another ¼ tsp. Work up to 1½ tsp a day. However, if you are taking 4 tsp a day of *ReMag*, take 2 tsp a day of *ReMyte* to balance the minerals.

Product Description: Every enzyme reaction in the body requires a vitamin or a mineral as a participating cofactor. *ReMyte* is a multiple mineral made by the same process as *ReMag*, which stabilizes the minerals as ions. While all the minerals in *ReMyte* support hundreds of enzyme processes and are necessary for countless body processes, 9 of the 12 minerals specifically improve the structure and function of the thyroid and are required to make thyroid hormones. Instead of purchasing a dozen different bottles of minerals, you just need one bottle of *ReMyte*.

Note: When you take *ReMyte*, it can “wake up” your thyroid and improve your metabolism. However, be aware that if you are on thyroid medication, you may find yourself a bit hyperactive or a little bit warm because you no longer need as much thyroid medication as you are taking. Be sure to check with your doctor about reducing your medication. For more information, read my free eBook [ReMyte & ReCalcina: Invisible Minerals Part II](#).

TOTAL BODY IMMUNITY

The following abstract, from the journal *Nutrients*, defines the importance of nutrients in supporting the structure and function of the immune system against viruses as indicated by the title: “Optimal Nutritional Status for a Well-Functioning

Immune System is an Important Factor to Protect against Viral Infections.”⁶ This article completely validates the use of all our *Completement Formulas* and *Total Body Immunity Formulas* to maintain your health.

Public health practices including handwashing and vaccinations help reduce the spread and impact of infections. Nevertheless, the global burden of infection is high, and additional measures are necessary. Acute respiratory tract infections, for example, were responsible for approximately 2.38 million deaths worldwide in 2016.

The role nutrition plays in supporting the immune system is well-established. A wealth of mechanistic and clinical data show that vitamins, including vitamins A, B₆, B₁₂, C, D, E, and folate; trace elements, including zinc, iron, selenium, magnesium, and copper; and the omega-3 fatty acids eicosapentaenoic acid and docosahexaenoic acid play important and complementary roles in supporting the immune system. Inadequate intake and status of these nutrients are widespread, leading to a decrease in resistance to infections and as a consequence an increase in disease burden. Against this background the following conclusions are made: (1) supplementation with the above micronutrients and omega-3 fatty acids is a safe, effective, and low-cost strategy to help support optimal immune function; (2) supplementation above the Recommended Dietary Allowance (RDA), but within recommended upper safety limits, for specific nutrients such as vitamins C and D is warranted; and (3) public health officials are encouraged to include nutritional strategies in their recommendations to improve public health.

Note: I do not endorse the use of vaccinations for viral influenza. A 2018 Cochrane Report⁷ concluded that in a series of 52 studies, there was only a 1-2% benefit from taking a flu vaccine. This is a scientific fact that is being ignored.

The above abstract says that we can be supplementing nutrients above the RDA and even up to the upper limits of safety for vitamins C and D. Note that all of the nutrients mentioned (except iron) are in our *Total Body ReSet Formulas* and *Total Body Immunity Formulas*.

Our Total Immunity Formulas include: *Pico Silver*, *Whole C ReSet*, and *D3-K2 ReSet* and are taken along with our Total Body ReSet formulas *ReMag*, *ReMyte*, *ReAline*, *ReStructure* and *RnA ReSet drops*).

My research and experience tells me that you shouldn't need any other supplements. Practitioners try to promote many high dose antioxidants, but each of the products I'm recommending has antioxidant, anti-inflammatory, and anti-infective properties and they give you ample protection and support

1. ReMag

I include ReMag in the *Total Body Immunity Protocol* because it controls 80% of known metabolic processes, which means it probably controls 80% of the immune system. The description of *ReMag* can be found above or in my [ReMag](#) book or in *The Magnesium Miracle*.

2. D3-K2 ReSet™

Vitamin D3 has emerged as an important addition to our anti-viral protocol to support the structure and function of the immune system.

Dosage: Take one capsule per day. If you are exposed to a possible viral infection, take 2 per day. If infected with a virus, take 3-4 per day, depending on your blood levels. See the information about GrassrootsHealth In Home Lab Testing on our website under [Research Project](#).

Product Description: It may be a surprise that I'm manufacturing a vitamin D3 dietary supplement because for many years I've spoken out against high dose vitamin D because in order to metabolize this vitamin into the active form you need more magnesium. Too much vitamin D can deplete magnesium and cause magnesium deficiency symptoms.

However, I've been exposed to the vitamin D research at GrassrootsHealth and became involved when they declared they wanted to learn more about the role of magnesium in vitamin D metabolism, just as I wanted to learn more available vitamin D. The In Home blood testing kit from GrassrootsHealth tests for magnesium, vitamin D, omega-3 fatty acids, and TSH so that we can learn whether we are taking enough of these nutrients to support the structure and function of our body and support our immune system.

Magnesium is so important in vitamin D metabolism that saturation levels of magnesium may be more effective in producing active vitamin D than high dose vitamin D. In fact, magnesium is required in 8 crucial steps of vitamin D metabolism. We will be able to answer this question with the research we are undertaking with GrassrootsHealth. Mainstream research is catching on. An *American Journal of Clinical Nutrition* trial concluded: "Our findings suggest that optimal magnesium status may be important for optimizing 25(OH)D status."⁸

Based on their testing, the GrassrootsHealth Scientific Panel recommends a level of 40-60 ng/mL (100-150 nmol/L). I've been recommending 30-40ng/mL. However, the testing we are doing with GrassrootsHealth will determine if we need to recommend higher levels of vitamin D.

D3-K2 ReSet contains 5,000iu of vitamin D3, 100mcg of Vitamin K2, and

11mg of *RnA Powder*, the catalyst that powers many of our *Completement Formulas*.

The K2 component in D3-K2 ReSet is K2-MK7, which is the most active form of K2 that works to increase bone density, decrease fracture risk, increase heart health by reducing artery calcification. It actively directs calcium to the bones and teeth and along with magnesium keeps calcium out of soft tissues. It has a positive effect on testosterone and fertility in men and conversely decreases androgens that create polycystic ovarian syndrome (PCOS) in women. It helps in the production of insulin, suppresses genes that can promote cancer, and help exercise endurance by enhancing energy utilization.

All these functions remind me of what magnesium can do: supporting bone health, reversing calcification, enhancing hormone production, including insulin, and Krebs cycle energy production. It's not that one or the other is the major factor in these functions but that magnesium, vitamin K2, and vitamin D all work together synergistically. In fact, I'd say that some of the activities of vitamins D and K2 may occur because of magnesium. I'll go into these functions in more detail in a book I'm writing called [*Total Body Immunity*](#).

3. Whole C ReSet™

This formula is an organic Vitamin C complex comprised of acerola, tart cherry, whole fruit complex, and *RnA Powder*. Each capsule provides 250mg of vitamin C and 1,346 mg of Vita-C Fruit Blend.

Dosage: Take 1 capsule twice daily with or without food. If exposed to viral infection, increase your dosage to 2 capsules 4 times per day.

Product Description: Vitamin C is still the most popular vitamin in the world. However, most vitamin C supplements consist of one ingredient, ascorbic acid, which is printed plainly on the supplement label. *Whole C ReSet* is an organic Vitamin C complex contains natural ascorbates, all of which occur in food, but only 8 of which have been identified. There is a synergistic effect of the multiple ascorbates working together with a number of inseparable phytochemicals and co-factors such as polyphenols, including, anthocyanins, proanthocyanins, ellagic acid, chlorogenic acid, resveratrol, quinic acid, rutin, bioflavonoids including vitamin P, Factor K, Factor J, Factor P, ascorbinogen, and certain structural proteins, and various enzymes like tyrosinase. Thus, a Vitamin C complex formula is much more inclusive than a simple ascorbic acid ingredient.

Vitamin C complex is essential to 8 enzyme processes in the body. It assists in the growth, maintenance, and repair of tissues, including skin, blood vessels, bones, and teeth. It is a powerful antioxidant necessary for wound healing and it helps eliminate bruising. High amounts of vitamin C complex are found in the adrenal glands and in the eyes.

In the book *Sugar Crush* by Dr. Jacoby I learned how Vitamin C complex specifically helps stabilize blood vessels and consequently prevent heart disease. Dr. Jacoby says:

Dr. John Ely developed the glucose-ascorbate antagonism theory. This theory stated that glucose and vitamin C compete against one another for the insulin they need to migrate into your cells and do their jobs. In that competition, glucose trumps vitamin C. This means that the more glucose circulating in the blood, the less vitamin C will enter the cells. When vitamin C is missing, your body will not convert L'arginine (an amino acid) to nitric oxide (a blood vessel vasodilator). Instead, it will convert to peroxynitrite, causing excessive constriction of the endothelium (in blood vessels) and reduction in blood flow (leading to hypertension).

Ascorbic Acid Antiviral Mechanisms:

Direct antiviral mechanisms

1. Disruption of viral capsid by structurally interfering with the sugar part of its glycoprotein envelope.
2. Damage of the viral capsid due to ascorbic acid's redox 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

1. Increases cellular Immunity (White blood cells, neutrophils, macrophages, lymphocytes, NK cells).
2. increases humoral immunity (B cells, antibodies).
3. Increases antiviral proteins (Interferon).
4. Increases energy by providing necessary electrons and electron movement for mitochondrial ATP generation.
5. Limits the main source of fuel of pathogenic organisms, sugar, when provided in pharmacological doses.
6. Potent, quick antioxidant action when provided in proper doses to prevent the dangerous and severe pathological cascade of the cytokine storm.
7. Maintains structural integrity of cells by favoring collagen formation.

4. Flora ReVive™

This product is our soil-based probiotic/prebiotic formula and is an important part of our *Yeast Detox Protocol*.

Dosage: 1 capsule twice a day taken with or without food. The ingredients in *Flora ReVive* do not require refrigeration. If you have a sensitive gut, you may begin by taking one per day for one week before adding the second capsule.

Product Description: Each veggie cap of *Flora ReVive* contains:

- 1) *Saccharomyces Boulardii* – 5 billion CFU (colony forming units) per capsule. *S. Boulardii* is a type of yeast that helps keep *Candida albicans* and gut bacteria in balance. This is a hardy probiotic that survives stomach acid and does not require refrigeration.
- 2) Humic-Fulvic Acid (325mg), derived from high-carbon humus found in ancient compacted plant material that is broken down by soil bacteria. This rich plant material contains probiotics, prebiotics, phytochemicals, enzymes, and minerals, and is the basis for all soil-based probiotics. Humic-Fulvic acid is high in oxygen and antagonistic to *Candida albicans* and biofilms.
- 3) Inulin (100mg), a complex sugar from plant roots. This prebiotic stimulates the growth of beneficial bacteria, which helps improve digestion, immunity, and overall health.

I have written an eBook called [Flora ReVive](#) that will give you a tremendous amount of information about your intestinal microflora and how to bring it back into balance.

5. Pico Silver™

Pico Silver supports the structure and function of the immune system against any type of infectious organism – bacteria, virus, or fungus.

Dosage: Varies from 1 tsp a day for maintenance up to 6 tsp a day for an acute infection. *Pico Silver* can be taken directly off the spoon or in sea-salted water, or mixed in with juice, or a smoothie along with *ReMag* and *ReMyte*. It is the only pico mineral that is tasteless.

Product Description: I decided to have *Pico Silver* made with the same stabilized ion technology as *ReMag*, *ReMyte*, and *ReCalcium* so that all of our minerals would be compatible. I was thrilled that the first time I used it for an "airplane cold," 6 tsp throughout the day knocked it out overnight.

The silver ions that make up *Pico Silver* attach to WBCs to seek and destroy bacteria, viruses, and fungi and augment the myriad of other functions of WBCs. *Pico Silver* ions can safely detoxify the debris from dying organisms, thus curtailing the Herxheimer reaction as they fight infection. *Pico Silver* stimulates stem cell production enhancing all cell tissue types in the body and participating in tissue regeneration including remarkable wound healing. *Pico Silver* does not build up in tissues and it does not kill off good bacteria; instead, it balances the intestinal microbiome.

Read my booklet [Pico Silver: Clearing up the Controversy](#) for a good overview and [The Silver Report](#) for a more in-depth report on the power of our silver ions.

6. Pico Zinc™

Zinc supports the structure and function of the immune system and has become more relevant in the current requirement for us to have a valid viral defense. We learned that clinically hydroxychloroquine acts as an ionophore that allows zinc to enter into the cells where it is an effective anti-viral. However, *Pico Zinc* is a stabilized ion of zinc which is its own ionophore and readily enters into cells without needing any help.

Zinc-containing enzymes are involved in many aspects of metabolism, many of them overlapping and intersecting with magnesium enzymes. Here are a few activities that relate to the immune system. For a more complete list, see my book [Total Body Immunity](#).

1. Blood formation
2. Vitamin A metabolism
3. Wound healing (zinc travels to wound sites: burns, abscesses, injury, and surgery)
4. Free radical protection with superoxide dismutase with zinc as a cofactor
5. Sensory functions (vision, hearing, smell, and taste)
6. Immune defense (cellular and antibody immunity)

Dosage: One tsp of *Pico Zinc* contains 20 mg of elemental, stable ionic zinc in a very absorbable form. For some people, zinc might cause nausea, so I recommend that you take it with a meal as one dose and not mix it with *ReMag* and *ReMyte*, which you drink in sea-salted water throughout the day. I recommend taking 1 tsp daily, for one week per month to build up your zinc stores. If you are exposed to a viral infection, take 2 tsp a day for 2 weeks. If you still have symptoms, take 1 tsp per day for another 2 weeks, then go back to one

tsp a day for one week per month. Remember, you will be taking your other immune boosting supplements *Pico Silver*, *Whole C ReSet*, and *D3-K2 ReSet* and won't have to rely entirely on *Pico Zinc*.

Product Description:

Zinc, according to the NIH Office of Dietary Supplements, plays an important role in the structure and function of the immune system. It is cofactor for nearly 100 enzymes in the body. Zinc has a role in:

1. Protein synthesis
2. Wound healing
3. DNA synthesis
4. Cell division
5. Supporting normal growth and development during pregnancy, childhood, and adolescence
6. The sense of taste and smell.

Unlike many other minerals, daily intake of zinc is required to maintain these functions because the body has no specialized zinc storage system.

Pico Zinc[™] follows the tradition of our *ReMag*®, *ReMyte*®, *ReCalcia*®, and *Pico Silver*[™] as a stabilized picometer-ion of zinc. The source of *Pico Zinc*[™] is a pure zinc lactate.

I've known for decades of the importance of zinc but it recently came to public attention because of its interaction with hydroxychloroquine. This decades-old malaria drug acts as an ionophore, which opens up mineral channels in the cells allowing zinc entry into the cells to kill viruses! Because our stabilized zinc ions are smaller in diameter than the body's cell mineral ion channels, *Pico Zinc* is readily absorbed and acts as its own ionophore and doesn't require hydroxychloroquine or the 6 transporter proteins that normally facilitate the movement of zinc.

One of the cautions about zinc is that if it is taken long term (for several months) and in high doses (over 40mg per day) it can cause copper deficiency. My *ReMyte* is low dose zinc and low dose copper to avoid even the most remote chance of having zinc lower copper levels.

ADDITIONAL RECOMMENDATIONS

The following products can be added to the *Total Body ReSet* or the *Total Body Immunity Protocols* according to individual requirements. They will all definitely

help in supporting the structure and function of your body as it overcomes *Total Body Meltdown*.

1. ReMag Lotion

ReMag Lotion is a superior hydrator that smooths and softens the skin. The skin is hydrated from inside-out by drinking enough water with sea salt and *ReMag*. And from outside-in with *ReMag Lotion*. Together they support the structure and function of the skin – the biggest detox organ in the body.

Before I began using *ReMag Lotion* as a body cream, I had keratosis pilaris – that's a very fancy name for a common, harmless skin condition that causes dry rough patches and tiny bumps, mostly on the upper arms. The ability of *ReMag Lotion* to clear this decades-old condition proved to me its value in healing the skin.

ReMag Lotion can also clear, lighten, and brighten the skin, reducing redness, acne spots and blocked pores as it improves the function of skin cells. Magnesium help balance hormones that can affect the skin, including lowering the stress hormone, cortisol.

Many people use *ReMag Lotion* either for themselves or for their children to improve their magnesium levels.

2. ReCalcium®

ReCalcium is our calcium formula that you may want to add to your program if you are not obtaining sufficient calcium in your diet. I recommend 600 mg daily. See the calcium food list in my eBook, [ReMyte & ReCalcium: Invisible Minerals Part II](#).

Dosage: On the days you are not getting 600mg of calcium, you can take *ReCalcium* (1-2 tsp per day, the equivalent of 300-600mg per day). Also, pay attention to your intake of *ReMag*. Magnesium intake should be 1:1 with calcium. However, if you are very magnesium-deficient or if your body is trying to break down calcified soft tissues, you may require more magnesium and less calcium in the first several months of treatment. During this time your magnesium to calcium ratio may be 2:1 or even 3:1.

3. Pico Potassium

Pico Potassium is a stabilized ionic form of potassium that is fully absorbed at the cellular level.

Product Description: I hesitated for years to make a stabilized picometer, ionic form of potassium because the FDA advises only 99mg per dose. With the RDA at 4,700, it made more sense to tell people to eat lots of potassium-rich foods. However, the recent diet fads of Paleo, Keto, and Carnivore mean a lot less

vegetables and a lot less potassium. You can track your potassium intake with the [Cronometer App](#) and if you aren't getting 4,700mg per day, then you can take *Pico Potassium* to make up the difference. But since *Pico Potassium* has superior absorption you likely only need half of the amount indicated. Consult my *Pico Potassium* booklet for more information about the drugs, like diuretics, that deplete potassium and how you can also follow your blood tests to determine your potassium requirements.

Dosage: One 99mg dose of *Pico Potassium* is in ¼ tsp.

Remember, potassium and magnesium go together so you must continue to saturate with ReMag so that potassium can be properly absorbed and utilized.

4. ReNew Serum

ReNew Serum provides you with leading-edge skin enrichment. A labor-intensive process creates a 25X concentration of our *RnA ReSet Drops* formula. *ReNew* is superior to any serum presently on the market because it contains the unique and newly created iCell. Like the *RnA ReSet Drops*, it directs RNA to make perfect DNA copies in perfect cells.

ReNew benefits from having all of the previous generations of Drops blended together. We are now in our 170th generation of *RnA ReSet Drops*, which means no other formula will ever duplicate its properties. By using *ReNew* transdermally you will absorb the benefits of the *RnA ReSet Drops* through the skin – especially if you have any concerns about taking *RnA ReSet Drops* orally.

5. ReNew Face Cream

ReNew Face Cream is a unique cosmetic formula that is a synergistic blend of our healing *ReNew Serum*, our hydrating *ReMag Lotion*, and our antioxidant *Whole C ReSet*. It's a formula that I developed out of my personal desire to have a powerful face cream. I've been using *ReNew Serum* on my face for years but found it too heavy and flaky when it dries so I began mixing it with *ReMag Lotion*. When we developed *Whole C ReSet*, with its 8 Vitamin C Complex elements, I decided to include that as a potent antioxidant that goes far beyond the synthetic ascorbic acid that is in most high-end face creams.

Here are the ingredients of *ReNew Face Cream*:

- a. *ReNew Serum* has the *RnA ReSet Drops* property of directing RNA to make flawless copies of DNA and create perfect cells. View our *RnA ReSet Drops* Webinar [Radish Experiment](#) for a glimpse at the life force that emanates from the iCells in the *Drops*.
- b. *ReMag Lotion* is a superior hydrator that smooths and softens the skin.

The skin is hydrated from inside-out as well as outside-in, therefore oral *ReMag* Liquid and transdermal *ReMag Lotion* doubly support the structure and function of the skin – the biggest detox organ in the body. *ReMag Lotion* can also clear, lighten, and brighten the skin, reducing redness, acne spots and blocked pores as it improves the function of skin cells. Magnesium help balance hormones that can affect the skin, including lowering the stress hormone, cortisol.

- c. *Whole C ReSet*, in addition to its antioxidant functions, regulates the synthesis of the structural protein collagen, which repairs damaged skin. How do we damage our skin? Let me count the ways: sun, chemicals in cosmetics, chemicals in our air, food, and water, lack of proper sleep, exercise. Poor diet and lack of proper hydration that includes sea salt.

ReNew Face Cream can be used on a daily basis to revive, restore, and brighten your precious skin.

6. Blue Ice Royal – Vitamin A, D3, K2

We do not make this product because Green Pasture has done such a great job of creating a food-based supplement that provides you with Vitamins A, D3, K2, and fish oil. It's food-based, made from fermented cod liver oil and butter oil. For additional Vitamin D, try to get 20-30 minutes of sun exposure per day. You can obtain *Blue Ice Royal* on our website, [RnA ReSet](#).

Dosage: One capsule twice per day.

Note: We are learning from our GrassrootsHealth research project that myself and many of our customers are below the optimum levels of vitamin D. Therefore, I recommend taking *D3-K2 ReSet* along with *Blue Ice Royal*.

7. Mighty Mash

Might Mash (MM) is a soil amendment formula that supports the structure and function of soil bacteria and the life and vitality of the soil. MM will help to reclaim the soil that has been depleted for a century. MM is composed of dried barley sprouts that are left over after we extract the *RnA ReSet Drops*. The Mash still contains the iCell and provides living nutrients to the soil. You can see the wonders of Mighty Mash by viewing our webinar called *RnA ReSet Drops*. At the 18-minute mark I describe the results of the [Radish Experiment](#), which used MM to produce amazing results. You can also read the description of the Radish Experiment under the [RnA ReSet Drops](#).

RESOURCES:

- For free eBooks visit [DrCarolynDeanLive](#).
- My live, 2-hour, call-in radio show is Monday's at 4pm Pacific Time on <https://dreamvisions7radio.com/dr-carolyn-dean/>
- You can listen to a live stream of my previously recorded shows on <http://achieveradio.com/carolyn-dean-radio/> or search my radio show archives by subject at DrCarolynDeanLive.com.
- For RnA ReSet Customer Support: Call 1-888-577-3703 or Email support@rnareset.com.

APPENDIX B**The Potassium Content of Foods**

This is an important list to consult to find out what foods you can add for more of a potassium punch, and you can have your potassium intake calculated from the [Cronometer App](#).

Hearts of palm, raw (1/2 cup) 75 g	1806mg
Beet greens cooked (1cup) 145g	1309mg
Chili with beans (1 cup)	913mg
Pineapple juice (6oz) 175g	826mg
Halibut (1/2 fillet) 150g	792mg
French Beans raw (1 cup) 200g	740mg
Passion Fruit Juice (1 cup) 250ml	726mg
Sweet Potato (1/2 cup) 150g	713mg
Prune Juice, Canned (1 cup) 250g	707mg
Chili con Carne with Beans canned (1 cup) 250g	660mg
Clam cooked (4oz) 100g	628mg
Wild Salmon (100g)	628mg
Adzuki Beans, cooked (1/2 cup)	611mg
Plain yogurt (non-fat) (1 cup) 250g	579mg
Yellow Beans cooked (1 cup) 175g	569mg
Boiled Pinto Beans (1/2 cup) 85g	549mg
Tomato puree (1/2 cup)	549mg
Soybeans cooked (1/2 cup) 85g	458mg
Pomegranate juice (1 cup) 250g	535mg
Clams, canned (8 oz)	534mg
Plain Yogurt, low fat (1 cup) 250g	531mg
Albacore Tuna (3.5oz) 100g	527mg

Tomato juice, canned (1 cup) 250g	527mg
Goat Milk (1 cup) 250ml	526mg
Orange juice, fresh (1 cup) 250ml	524mg
Pacific Mackerel (3.5oz) 100g	521mg
Hot Chocolate (homemade)(1 cup)250ml	520mg
Yam (1/2 cup) 75g	503mg
White Beans, cooked (1/2 cup)	502mg
Banana (medium) 140g	501mg
au gratin potatoes (1/2 cup) 125g	495mg
Avocado ½ (100g)	485mg
Lima Beans cooked (1/2 cup)	485mg
Vegetable juice, canned (1/2 cup) 125g	468mg
Cooked Plantain (1/2 cup) 100g	460mg
Acorn squash, cooked (1/2 cup) 100g	448mg
Chocolate milk (1% 2% or whole) (1 cup) 250g	418mg
Cantaloupe Raw (1 cup) 150g	401mg
Peaches, dried, uncooked (1/4 cup) 40g	399mg
Prunes, stewed (1/2 cup) 125g	398mg
Skim milk (non-fat) (1 cup) 250g	382mg
Rainbow trout, wild or farmed, cooked 3 oz	381mg
Refried beans, canned, traditional (1/2 cup) 120g	380mg
Apricots, dried, uncooked (1/4 cup) 34g	378mg
Canned Navy Beans (1/2 cup)	377mg
Pinto Beans, cooked (1/2 cup)	372mg
French Beans cooked (1 cup) 175g	370mg
Spinach, cooked from fresh or canned (1/2 cup) 90g	370mg
Carrot juice (250ml) 125g	365mg
Tomato Sauce, Canned (1/2 cup) 125g	364mg

Pico Potassium: Magnesium's Best Friend

Nachos with cheese (7 chips) 100g	362mg
Split Peas, cooked (1/2 cup)	362mg
Baked Beans (1/2 cup)	358mg
Lentils (1/2 cup)	355mg
Black Beans cooked (1/2 cup) 100g	355mg
Kidney Beans, cooked (1/2 cup)	348mg
Guava (1/2 cup) 80g	334mg
Kidney Beans, canned (1/2 cup) 125g	325mg
Mushrooms cooked (1/2 cup) 72g	303mg
Garbanzo beans (1/2 cup) 100g	291mg
Tomato Raw (1 medium) 100g	237mg

APPENDIX C

Potassium Broth

To 2 quarts of water add:

2 large potatoes, chopped into 1/2 inch cubes

1 cup carrots, sliced or shredded

1 cup celery, chopped, leaves and all

1 handful of beet tops

1 handful turnip tops

1 handful parsley

1 medium onion

Herbs for seasoning: garlic, thyme, sage, rosemary

You can add a teaspoon of miso or beef bouillon after straining off the liquid for some extra flavor and extra sodium.

Directions:

Cover and cook slowly for about 1/2 hour, using stainless steel, glass, or earthenware utensils only.

Strain the broth off and cool.

Serve warm or cold. Keep refrigerated.

Discard the cooked vegetables or put them on your compost pile.

This is the type of broth favored in "fasting" clinics. It's a mineral-rich, alkalizing, cleansing drink.

APPENDIX D

MANUFACTURER'S NOTES ON PICOMETER MINERALS

To understand how our minerals are created requires a basic knowledge of the chemistry of ions, ionization, ionization potential, and mineral absorption. Some basic Google searches using the above key words will provide the necessary background information.

The minerals in our products are in the same form as found naturally in our food. All these minerals are liquid, ionic, monatomic (individual ions of minerals in solution) and can be described as picometer in size. There is no nanotechnology involved. Picometers are units of measurement, nothing else. (There are one quadrillion, 1,000,000,000,000 picometers in a meter.)

Our minerals are not just ionic solutions. Ions are a charge, not a size. Ions in solution can still form large complexes or lattice structures, which increases their size beyond that of an individual ion. They also have the tendency to bond with hydrogen and oxygen to form magnesium oxides and hydroxides, both of which act as antacids neutralizing stomach acid. These compounds are also laxatives and difficult to digest, requiring digestive energy to be absorbed.

Our technology ensures individual ions in solution remain individual (monoatomic) and thus we distinguish them from weak complex ionic solutions by calling them picometer minerals. The size of an individual ion, when ionic and not bound as a compound or to other ions, falls in the picometer units of measurement. The size of the individual ion is determined by the nature of the element in question and its atomic weight. An ion of magnesium for example can only be as small as is allowed by the laws of Nature. For example, we cannot make a single atom of magnesium smaller; we can only ensure that the atom does not combine with other atoms to form larger groups of atoms. It's the same with ions. The size of a single monoatomic ion of magnesium is approximately 86 picometers. Our process ensures magnesium stays picometer-sized for maximum absorption.

The real secret of our process is that we control all the factors in the ionization process so that the finished product is a monoatomic picometer-sized ionic form of magnesium (as absorbed by roots systems of plants through picometer-sized gradients, and released in our digestive system and absorbed into cells through picometer-sized ionic mineral channels). The ionization process itself is complex but is no different than what occurs in nature every minute of the day.

To repeat, we don't allow the ions to bond into complex ionic groups or compounds that required digestive energy to break down.

How does nature provide minerals to the human body? When we eat food (the ideal most natural source of minerals) minerals are released from our food by the action of

hydrochloric acid and gastric juices in the stomach. Essentially the digestive juices ionize the minerals in the food forming individual ions, not chelates or compounds or large clusters of ions. Ions are the basis of biological energy and function. After the minerals are freed from food as ionized minerals, which carry a positive electrical charge, they will attach themselves to a very strong negatively charged carrier, via chelation, or a carrier protein. This complex is then either passed through the body or absorbed by the protein sites. Or it can pass into the intestine as an unattached, positively charged mineral ion for absorption by mineral ion receptor sites.

An ion is any atom or group of atoms that holds a positive or negative electrical charge. Positively charged ions are known as cations (minerals form cations) while negatively charged ions are called anions. Ions are formed by the addition of electrons to, or the removal of electrons from, neutral atoms or molecules or other ions. It is generally known that in order for a body to effectively and completely absorb minerals, they must be electrically charged in order to penetrate cellular barriers. We want the mineral to be absorbed into the cell, not just into the blood stream. This electrical charge exists surrounding the atom because the atom is either missing an electron or has additional electrons within its surrounding area (it's outer ring). This charge causes the ions to interact, attracting or repelling each other in a search for another ion to contribute or remove additional electrons. It is the charge on the particle that allows minerals to activate the many functions they carry out within the body. But remember, an ionically charged mineral can still be in a complex that makes it too big to enter into cells.

Minerals are fundamentally catalysts, (reaction starters) and cofactors in metabolic processes because of their electrical charge. The fluid surrounding our cells is saturated with both cations and anions, as is the fluid inside our cells. Because of this separation of atoms with specific electrical charges, an electrical gradient, or current, is formed across the cell membrane. Because of this current the charged mineral IONIC particles can flow more easily across the cell membrane. The mineral must be in an ionic state for this to happen!

Ionic monoatomic minerals, of picometer size, already have a charge and size that the body recognizes and understands so they can be easily assimilated through the selectively permeable cell membranes from head to toe. Ionic monoatomic minerals are also easily transported across the highly selective cell membranes of the human digestive tract. Because ionic minerals are charged, the body has to employ less energy in order to absorb these minerals. However, some ions are bound to carrier proteins, or chelated, or complexed to amino acids and must be dismantled into smaller parts and then obtain an electrical charge in order to cross the intestinal membrane.

The electrical (charged ions) gradient allows for the easy flow of ionic minerals from an area of higher concentration (digestive tract from mouth to intestines) to an area of lesser concentration (cells of the body).

The body absorbs monoatomic picometer ionic minerals with greater efficacy than other

forms of minerals, as most other minerals must undergo the complete processes of digestion into smaller charged particles. In fact, the membranes lining our digestive tract maintain their own specific electrical charge in the form of ionic receptors. The body maintains this charge on the lining of membranes in order to facilitate the absorption of nutrients. Different receptor areas maintain different charge qualities, allowing for the attraction of the multitudes of nutrients that pass through the digestive tract.

It is our belief that supplying the body with minerals in the form that is equivalent to minerals in food makes the most sense since the stomach makes ionic minerals from food.

REFERENCES

- 1 <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/485434>
- 2 Whang, Whang, Ryan. "Refractory potassium repletion: a consequence of magnesium deficiency." *Arch Intern Med.* 1992;15240- 45
- 3 John, SK, et al. *Am J Emerg Medicine.* 2011 Nov;29(9): 1237.
- 4 Demer LL, Tintut Y. "Vascular calcification: pathobiology of a multifaceted disease." *Circulation.* 2008 Jun 3;117(22):2938-48.
- 5 McCarty MF, Dinicolantonio JJ, "The molecular biology and pathophysiology of vascular calcification." *Postgrad Med.* 2014 Mar;126(2):54-64.
- 6 Calder PC, et al. "Optimal Nutritional Status for a Well-Functioning Immune System Is an Important Factor to Protect against Viral Infections." *Nutrients.* Apr 23, 2020, 12 (4), 1181.
- 7 https://www.cochrane.org/CD001269/ARI_vaccines-prevent-influenza-healthy-adults
- 8 Dai Q, et al. "Magnesium status and supplementation influence vitamin D status and metabolism: results from a randomized trial." *The American Journal of Clinical Nutrition,* Volume 108, Issue 6, December 2018, Pages 1249–1258.

THE DOCTOR OF THE FUTURE



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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*, *ReAlign*, *ReCalcia*, *Pico Potassium*, *ReStructure*, *Pico Silver*, *Pico Zinc*, *Flora ReVive*, *Whole C ReSet*, *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.