

Introduction to Cardionutrition (#1): Kidney Stones and the Ketogenic Diet

INTRODUCTION TO CARDIONUTRITION (#1): KIDNEY STONES AND THE KETOGENIC DIET

Kidney Stones and the Ketogenic Diet: Risk Factors and Prevention

Amitha Sampath, BA, Eric H. Kossoff, MD, Susan L. Furth, MD,
Paula L. Pyzik, BS, and Eileen P. G. Vining, MD



A cohort study was performed of children started on the ketogenic diet for intractable epilepsy from 2000 to 2005 (n = 195). Children who developed kidney stones were compared with those without in terms of demographics, urine laboratory markers, and intervention with urine alkalization (potassium citrate). Thirteen children (6.7%) developed kidney stones. The use of oral potassium citrate significantly decreased the prevalence of stones (3.2% vs 10.0%, $P = .049$) and increased the mean time on the ketogenic diet before a stone was first noted (260 vs 149 patient-months, $P = .29$). The prevalence of kidney stones did

not increase with the use of potassium citrate. Higher correlation with the presence of hypercalciuria (92% vs 71%, $P = .08$). No child stopped the diet due to stones; in fact, the total diet duration was longer (median 26 vs 12 months, $P < .001$). Kidney stones continue to occur in approximately 1 in 20 children on the ketogenic diet, and no statistically significant risk factors were identified in this cohort. As oral potassium citrate was preventative, prospective studies using this medication empirically are warranted.



ALEX VASQUEZ DO DC ND FACN

Clinician, Researcher, Lecturer, Academician, Consultant, Author



Major books include *Inflammation Mastery 4th Edition* (and any later versions) printed also in separate and progressive volumes as *Textbook of Clinical Nutrition and Functional Medicine* (2016), with excerpts published as *Brain Inflammation* (2016), *Human Microbiome and Dysbiosis in Clinical Disease* (2015); anticipated new books include *Deciphering the Gut-Brain Axis in Clinical Practice* (2018) from which *Autism, Dysbiosis, and the Gut-Brain Axis* (2017) has been prereleased.

Peer-reviewed/independent publications include: *The Lancet.com*, *British Medical Journal (BMJ)*, *Annals of Pharmacotherapy*, *Nutritional Perspectives*, *Journal of Manipulative and Physiological Therapeutics (JMPT)*, *Journal of the American Medical Association (JAMA)*, *Original Internist*, *Integrative Medicine*, *Holistic Primary Care*, *Alternative Therapies in Health and Medicine*, *Journal of the American Osteopathic Association (JAOA)*, *Dynamic Chiropractic*, *Journal of Clinical Endocrinology and Metabolism*, *Current Asthma and Allergy Reports*, *Complementary Therapies in Clinical Practice*, *Nature Reviews Rheumatology*, *Annals of the New York Academy of Sciences*, and *Arthritis & Rheumatism*, the Official Journal of the American College of Rheumatology.

The video of this presentation is archived at ichnfm.org/18, and the transcript in PDF format—which is considered the final and citable version—is archived at academia.edu/36947369; any corrections or updates will be made to the PDF file. The video contains citations which are not replicated in the PDF document; both the video and the PDF transcript should be reviewed for a complete representation of the information. This version was updated on June 30, 2018.

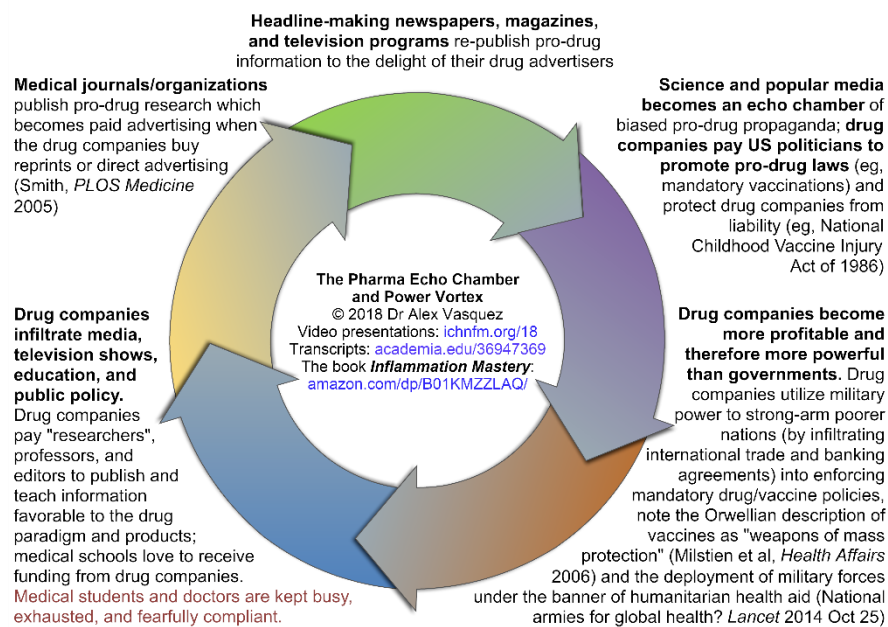
Introduction: Hello everyone. Dr. Alex Vasquez here to introduce the topic of cardionutrition. Today, will be number one in this series focusing on kidney stones and the ketogenic diet, but first, we're going to talk about some problems that have been published lately especially related to cardiology and cardiovascular nutrition.

Recent publications in *JAMA*, *JAMA Cardiology* and *Journal of the American College of Cardiology* have created confusion among clinicians due to poor methodology and blatant misrepresentation of data. The organizations that publish these journals are largely funded by drug companies and drug sales, and as such, they are highly biased in favor of drugs while also being desirous of publishing a news that makes the competition such as nutrition look mysterious, inefficacious, and dangerous.

Basically, what we see here is the exploitation and perpetuation of ignorance on the topic of nutrition among medical physicians. Ultimately, what this creates is an **echo chamber of pro-pharma propaganda**. Major media outlets such as magazines, newspapers and television are likewise favorable toward their multi-million-dollar drug company advertisers. As such, they are quick to pick up pro-pharma news from biased journals and

then disseminate this "news," which at this point simply becomes advertising propaganda via headlines and major stories again in newspapers, magazines and television.

The solution to this problem, at least in part, is education. For this reason, I am going to start this video and review series on the topic specifically of **cardionutrition**. Major considerations in cardionutrition are the same as those in clinical considerations of cardiology and clinical cardiology, and that is we focus on the myocardium, coronary arteries, electroconduction, systemic contributions and complications, and, of course, that especially means renal considerations.



Appreciating the importance of this conversation requires an appreciation of, number one, the lack of nutrition training in medical school and residency (see excerpt from *Inflammation Mastery, 4th Edition* for citations). Number two, the exploitation of this systematic ignorance by medical societies, journals, drug companies and the processed food industry to **keep doctors busy** and **thereby turn their haste and confusion into indifference**. If you think nutritional ignorance among physicians is "*the problem*," then in my opinion, you really don't understand the situation. Systematic and perpetuated problems always serve the dominant power structure, and these are interests generally other than yours and mine and generally opposite to yours and mine. I have talked about these problems recently in some video reviews, which you can see at ichnfm.org/18—those are the PDF transcripts and the videos for 2018. Previously, I looked at this article, "Associations of omega-3 fatty acid supplement use with cardiovascular disease risks", and I noted several problems with this article including:

1. Unjustified selective exclusion of data,
2. Inclusion of studies that employed sub-therapeutic or non-therapeutic dosing. Again, this article really took under dosing to the extreme and completely ignored the omega-3 index, which has been established and validated now for more than 20 years—note review "Omega-3 fatty acids and cardiovascular disease: a case for omega-3 index as a new risk factor" published in *Pharmacology Research* by Harris in 2017.¹
3. Nine of the 10 studies used in this meta-analysis used the synthetic ester form of n3 fatty acids. This is in contrast to the natural and easier-to-digest triglyceride form.
4. The stated conclusion was at odds with the data that was presented.
5. The pro-pharma conflicts of interests among the authors and the publishing organization are also worthy of note.

Then they basically recycled their own information in this *JAMA* article "Another nail in the coffin for fish oil supplements." In this case, speaking of the *JAMA* journals. They published this kind of commentary, which was basically unnecessary. Basically, what they did here is they just recycled their own bad information in another journal and then republished it as if it were something new (e.g., dual publication to gain more media attention) when, number one, it had already been published. Number two, it really shouldn't have been published in the first place. The data and conclusions in the first meta-analysis really were not worthy of publication.

I also talked a little bit about my own publication experience with *JAMA* and that is publishing this letter back in 2004 where they basically eviscerated the article that I wrote and replaced it with one that was inefficacious

¹ Harris WS. Omega-3 fatty acids and cardiovascular disease: a case for omega-3 index as a new risk factor. *Pharmacol Res.* 2007 Mar;55(3):217-23

and pointing at some of the errors in their previously published information.² The result of all this is that the science was obscured and this helped to maintain pharmaceutical dominance.

As I've said before, these so-called mainstream medical journals love to publish articles showing that nutrition doesn't work or that nutrition is dangerous or even just publishing *doubt*. Doubt is enough to discourage people from being interested in the topic and discourage them from looking into and utilizing whatever that therapeutic happens to be.

What I notice by looking at the research is a pattern of negative reviews published in these medical journals. They usually disseminate the articles for free in contrast to the pro-drug articles that they write—those usually are usually pay-per-view. The ones that are negative about nutrition are usually provided for free and that's because they're trying to make their pharmaceutical advertisers happy.

I also recently presented a video review on this article published by the American College of Cardiology. This was titled, "Supplemental vitamins and minerals for cardiovascular disease prevention and treatment." What I noted here in my previous review is:

1. The problematic bias of the journal,
2. The problematic bias of the editors (who receive payments from the drug industry),
3. The problematic bias of the authors who were funded by the drug and process food industry,
4. Unscientific exclusion of data, specifically the failure to include non-English research, which has no scientific basis. When a study is funded by several multimillion dollar companies, you can be very sure that they have the resources to translate that research if they want to look at it and if they want to include it. Their exclusion of what they called non-English research had no scientific basis and they we're obviously trying to avoid information that they did not want to include in their meta-analysis.
5. To make the situation even worse, they specifically extracted the information they had previously reviewed that was favorable showing that selenium actually provided benefit. When they analyzed the data based on their own criteria for the meta-analysis, they looked at the studies on selenium. They found that the studies on selenium were favorable and then they excluded those studies. The only reason they gave is because of the data was favorable.
6. Problem number six that I noticed with this article was failure to maintain any clinical or pharmacologic standard. You can see, I've itemized quotes from that article so that you can see them here.
7. Finally, the last problem that I pointed out is that they tried to analyze all this data together and they really can't do that when they're looking at so many different treatments with so many different formulations in different dosages. They really can't put all that data together for a meta-analysis, but that's what they did and that's what they published. **My position from my expertise in nutrition is that what they did in this review is completely unscientific and completely ignorant of any standard that should apply to the study of pharmacologic therapeutics.** They cannot take all vitamins and minerals, lump them together, not appreciating the differences among various formulations and dosages and then say, "All vitamins *do this* or all vitamins *don't do this*." They really can't do that legitimately from a scientific, ethical and intellectual standpoint based on the way that they collected the data and the way that they presented the data.

As I mentioned previously, all of these news outlets including medical journals, television shows, newspapers, magazines—all of these media outlets take millions of dollars per year from the pharmaceutical industry. As a result, **of course, they want to please their advertisers by presenting a consistent story that helps their advertisers make profit on their advertising dollar.** They try to present several different stories consistently and those are, number one, **diseases are mysterious and we can't understand them.** Number two, **we have to rely on drugs for our salvation.** Number three, **nutrition either doesn't work or it's confusing and the data is conflicted.** Those are the consistent stories published in mainstream medical journals, television, magazines, newspapers.

1. **Number one, we don't understand disease.**
2. Number two, we need drugs. **Even though we don't understand disease, we still need drugs, because somehow drugs solve the problems that we don't understand.**
3. Then the third story that gets headlined all the time is that nutrition is confusing.

² Muanza DN, Vasquez A, Cannell J, Grant WP. Isoflavones and postmenopausal women. *JAMA*. 2004 Nov 17;292(19):2337. For comparison, see: Vasquez A, Manso G, Cannell J. The clinical importance of vitamin D (cholecalciferol): a paradigm shift with implications for all healthcare providers. *Altern Ther Health Med*. 2004 Sep. Download this article in a PDF compilation of all of Dr Vasquez's articles on vitamin D at <http://www.ichnfm.org/d3>

I'm here to tell you several things, one of which is that *nutrition is not confusing* and it can be understood and applied clinically. Let's look at how we might apply nutrition in this topic of cardionutrition. Again, we focus in on the same considerations that you'd focus in on if you were studying Cardiology or Cardiovascular Physiology or Pathology. You would look at diseases of the heart muscle itself, the myocardium. Coronary arteries of course are a major concern because if the blood supply gets blocked, the myocardium can't function. Electroconduction, systemic contributions and complications such as diabetes and insulin resistance, and then renal considerations. I'll itemize a few of those here:

1. **Myocardium:** Let's look at the myocardium. The heart is a muscle and so it is therefore sensitive to nutritional insufficiencies such as vitamin D, magnesium and potassium. The high metabolic demand should make you think of mitochondria and you also, of course, have to think outside of the heart to include hormones such as thyroid and insulin and afterload such as peripheral resistance. We'll talk more about those things in another video.
2. **Oxygenation:** With the coronary arteries, we're mostly concerned about atherosclerosis, also vasospasm, which can be induced by magnesium deficiency or food allergies. I'll discuss this in another video.
3. **Electroconduction,** we think about arrhythmias, afib and, of course, electrolytes.
4. **Systems:** Systemic contributions and complications, hyperinsulinemia and hyperglycemia, of course, are very important. Lipid disorders, hormones such as insulin, cortisol, thyroid, testosterone, estrogen, etc. Also, systemic resistance, endothelial dysfunction, of course, afterload. We also have to think of hypertension-induced gut disorders and nutritional consequences of conditions such as congestive heart failure.
5. **Kidneys:** For the kidneys, we, of course want to think about those kidneys because they are potentially damaged by hypertension and damaged kidneys also perpetuate cardiovascular disease. Kidneys are both the target of cardiovascular disease and, in some cases, a potential or leading cause of cardiovascular disease. For that reason, we have to talk about the kidneys anytime we talk about cardiovascular health.

Again, here, the main topics in cardio nutrition are listed here, one through six. *Let's talk about some topics that touch on all of those and, of course, that's diet.* The most popular diet today is arguably the low-carb paleo diet or a ketogenic diet. The most obvious nutritional imbalances and deficiencies caused by a typical example of this diet are deficiencies of **fiber** and **phytochemicals**—everything from **polyphenols** to **folates**, and this is due, of course, to the low intake of fruits and vegetables. With that, we also see reduced intake of **potassium** and a reduced intake of **citrate**. I know that a lot of **people don't think about citrate as being a nutrient, but of course it is.** A lot of times, when we think about nutrition, we think of macronutrients such as fats, carbohydrates, protein, which of course gets broken down into its amino acids. We think of vitamins, we think of minerals; but a lot of times, we don't think of phytochemicals, polyphenols and organic acids such as citrate.

On the following slide, I'm going to introduce what I call “action topic number one.” We've already talked about the importance of overpowering this systematic ignorance that pervades cardiology and, for that matter, pervades nutrition education throughout medical school. For that matter, pervades all of society because certainly most of society doesn't understand basic nutrition let alone advanced, interventional, functional nutrition. For this reason, I'm going to try to focus in on what I call here an action topic, which I'm about to introduce. Then I'll throw in a few key ways to understand nutrition toward the end of this video.

The situation is this: low carbohydrate paleo or ketogenic diet is the most popular diet today, and for good reason. It's the best diet solution to the epidemics of obesity and diabetes. A potential problem that we see with low carbohydrate ketogenic diet is that they are commonly higher in protein and that's generally fine, but we're going to talk about an important exception in just a moment. They are notoriously deficient in potassium and citrate along with some other nutrients that I mentioned previously like phytochemicals and fiber. Adding sodium chloride on top of a ketogenic diet can certainly make things worse.

When we talk about dietary protein, for example, I'm certainly in favor of a robust quantity of protein in the diet. However, dietary protein, especially from animal sources is the major source of sulfur containing amino acids, which are partly converted into sulfuric acid, which is an acid that has to be either excreted with some effort by the kidneys. **Renal excretion of protons or hydrogen ions is not a free service.** You pay for that. The way that you pay for that is through extra work performed by the kidneys. A high-protein diet, for example, does make the kidneys work a little harder. Let's just accept that for what it is. Those animal-based proteins have more sulfur-containing amino acids. Some of that sulfur gets converted into sulfuric acid. That acid has to get either excreted or

buffered, but when it's excreted by the kidneys, that forces the kidneys to work a little harder and that, of course, has consequences in the long term. If it's not excreted, then of course those acids can be buffered, but they have to be buffered by mechanisms which of course come with a price as well. One of those mechanisms is to use bicarbonate and the body creates bicarbonate from citric acid.

When we talk about fruits and vegetables being a source of citric acid, the relevance of that, the physiologic relevance of that isn't simply for mineral absorption because, of course, citric acid helps in that regard, but **citric acid is also what the body uses to directly produce bicarbonate and the body uses bicarbonate to neutralize these acids.** Again, physiologically produced acids either have to be **excreted** with some effort by the kidneys or they have to be **buffered**. One of the main mechanisms for buffering acid is the conversion of citrate into bicarbonate. Well, if the diet is inadequate in its intake of fruits and vegetables, it's probably going to be inadequate in its intake of citric acid. The body is not going to have the precursor that it needs for producing bicarbonate to neutralize and buffer these acids.

If the diet happens to be higher in salt, that sodium also increases excretion of calcium promoting osteoporosis and kidney stones. Sodium, we now know, also promotes inflammation and it also promotes tissue hypoxia. The chloride anion, that's the other side let's say or the other part of sodium chloride. The chloride part is also acidogenic. It increases the body's acidic load as well.

To balance some of these effects, we have potassium. Most people don't consume enough potassium. The recommended intake for potassium for teens and adults is 4.7 grams per day. Typical intake in the United States is deficient either by 25% or up to 50% of that.

Citrate also functions to enhance mineral absorption, create bicarbonate and thereby buffer acid and protect the bones and kidneys and protect against the formation of urate and calcium kidney stones.

As I just mentioned, the recommended intake for potassium is 4.7 g of potassium per day for teens and adults. Typical potassium intake is deficient by 1 to 2 g. That is 25% to 50%, and that insufficiency is exacerbated by dietary sodium, especially sodium chloride, also psychoemotional stress and some drugs.

We have to be a little careful sometimes with potassium especially in patients who have renal insufficiency or patients, for example, who are taking potassium-sparing diuretics such as spironolactone. Those can cause elevated blood levels of potassium and, of course, that can be dangerous. If the patient is not taking a potassium-retaining drug and the kidneys are functioning fine, then the patient shouldn't have any problem with this recommended intake of 4.7 g per day of potassium.

On the following page, I provide another table, this time from another source also showing the recommended intakes per age for potassium per day. You can see for infants up to six months of age: 400 mg; up to 12 months: 700 mg. Then at one to three years, they can tolerate 3000 mg a little bit more from four to eight years. Then once kids start getting into their teen years, they can tolerate an adult dose. From 9 to 13 years, 4500 mg and then from 14 years on into adulthood 4700 mg per day—that's 4.7 g per day. We noticed that the dose is the same for pregnant women, but the dose increases for women who are lactating up to 5100 mg per day—or 5.1 g per day.

DR VASQUEZ'S
RESEARCH
REVIEW

Potassium target intake for >13yo = 4.7 GRAMS/d

Table 1: Adequate Intakes (AIs) for Potassium: The AIs do not apply to individuals with impaired potassium excretion because of medical conditions (e.g., kidney disease) or the use of medications that impair potassium excretion.

Age	Male & Female	Pregnancy	Lactation
Birth to 6 months	400 mg		
7–12 months	700 mg		
1–3 years	3,000 mg		
4–8 years	3,800 mg		
9–13 years	4,500 mg		
14–18 years	4,700 mg	4,700 mg	5,100 mg
19–50 years	4,700 mg	4,700 mg	5,100 mg
51+ years	4,700 mg		

ods.od.nih.gov/factsheets/Potassium-HealthProfessional/ 2018 Jun

Potassium citrate is naturally found in fruits and vegetables. However, most people's intake is either inadequate or at best inconsistent. Potassium citrate is also available as a powder supplement, non-caloric powder supplement that can be mixed in water or any other beverage. The advantage, of course, to a powder supplement is that it provides stability and portability, which is good when people have to go to work or when they're traveling. Nearly everybody, as I've already said, needs more potassium and certainly most people can benefit from more citrate as well. The nice thing about citrate is that your body uses **citrate to enhance the absorption of minerals**. It also helps to dilute or bind certain substances in the urine to **prevent the formation of kidney stones**. Also, as I've already said, the body can use citrate to create bicarbonate and therefore buffer the effects of either excess sodium chloride or excess protein and thereby protect the bones and kidneys and other structures and physiologic processes.

As I stated at the start, the ketogenic diet, which is very popular these days increases the need for both potassium and citrate. **The incidence of renal stones in children on a ketogenic diet is 6.7%, which is proximally 1 per 15 patients, or in this case, 1 per 15 kids. The empiric use of potassium citrate reduces the incidence of kidney stones to less than 1%.**

On the following page, I want to present to you a table that I just finished creating yesterday. What this does in the sections that are highlighted is it shows you the doses that are used in clinical studies using potassium citrate specifically so that you get a feel for what's been done in the research literature and therefore some idea of what you can do clinically. When we talk about dosing potassium, I think most of us are more comfortable using grams and milligrams than we are with using millimoles and milliequivalents. What I've done in this table is convert millimoles to milliequivalents and ultimately into milligrams so that we can all work with a unit of measure that we're comfortable with. Again, in this case, I'm prioritizing milligrams. Again, in summary, 1 mmol equals 1 mEq and each of those is equal to 39.1 mg of potassium.

Conclusions: This video serves as a quick introduction into the upcoming topic of cardio nutrition. Again, medical physicians are typically under-trained in nutrition. Medical journals and organizations are paid by drug companies in various ways and they have an inherent bias toward promoting drugs. These drug companies pay medical journals and medical organizations through advertisements, research and education "donations," direct payments to editors, purchases of reprints, either pro-drug or anti-nutrition. **These medical journals and organizations also promote ignorance and confusion in nutrition by publishing utterly retarded editorials and review articles on nutrition that would never pass minimal competence in a graduate nutrition course.**

1. Two recent examples are the article "Associations of omega-3 fatty acids supplement use with cardiovascular disease risk." This was published in *JAMA Cardiology* and I have already reviewed that article in video format with a PDF transcript also available.
2. Number two here for another example, "Supplemental vitamins and minerals for cardiovascular disease prevention and treatment." This was recently published in the *Journal of the American College of Cardiology* and likewise I critique that in video and transcript format.

The action topic for today is that of the low-carb paleo or ketogenic diet, which I think is great for many reasons, but it's inherently deficient in both potassium and citrate. The empiric use of potassium citrate reduces kidney stone incidents with the use of the ketogenic diet. This was published in *Pediatrics* 2009 July.

In the next video, we'll get into more detail and I'll talk about risks, implementation and optimization of potassium citrate intake. I'll focus a bit more on pH and magnesium intake, because we all need to appreciate the importance of urine pH and the relationships between urine pH, magnesium and potassium.

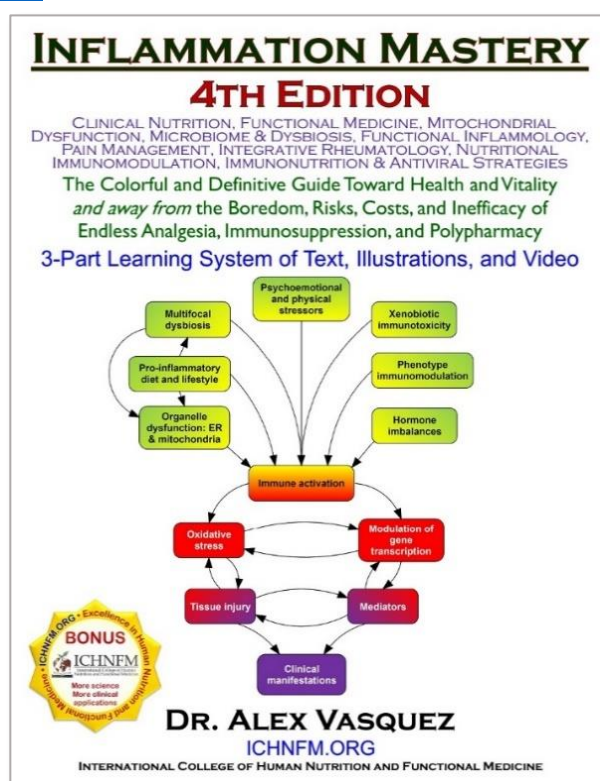
Thank you very much for your attention. This is introduction to cardionutrition. I'm calling this number one in that series and I touched briefly on kidney stones and the ketogenic diet. I'll get into more detail in the upcoming video. I needed to clear a few topics out of the way so that we can focus more on therapeutics in the next video. Again, I appreciate your attention and look forward to presenting that new information to you in the next video. ☒

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About the author: Dr Vasquez holds three doctoral degrees and has completed hundreds of hours of post-graduate and continuing education in subjects including Obstetrics, Pediatrics, Basic and Advanced Disaster Life Support, Nutrition and Functional Medicine; while in the final year of medical school, Dr Vasquez completed a Pre-Doctoral Research Fellowship in Complementary and Alternative Medicine Research hosted by the US National Institutes of Health (NIH). Dr Vasquez is the author of many textbooks, including the 1200-page [*Inflammation Mastery, 4th Edition*](#). (2016) also published (by popular student request) as a two-volume set titled [*Textbook of Clinical Nutrition and Functional Medicine*](#). "DrV" has also written approximately 100 letters and articles for professional magazines and medical journals such as *TheLancet.com*, *British Medical Journal (BMJ)*, *Annals of Pharmacotherapy*, *Nutritional Perspectives*, *Journal of Manipulative and Physiological Therapeutics (JMPT)*, *Journal of the American Medical Association (JAMA)*, *Original Internist*, *Integrative Medicine*, *Holistic Primary Care*, *Alternative Therapies in Health and Medicine*, *Journal of the American Osteopathic Association (JAOA)*, *Dynamic Chiropractic*, *Journal of Clinical Endocrinology and Metabolism*, *Current Asthma and Allergy Reports*, *Complementary Therapies in Clinical Practice*, *Nature Reviews Rheumatology*, *Annals of the New York Academy of Sciences*, and *Arthritis & Rheumatism*, the Official Journal of the American College of Rheumatology. Dr Vasquez lectures internationally to healthcare professionals and has a consulting practice and service for doctors and patients. Having served on the Review Boards for *Journal of Pain Research*, *Autoimmune Diseases*, *PLOS One*, *Alternative Therapies in Health and Medicine*, *Neuropeptides*, *International Journal of Clinical Medicine*, *Journal of Inflammation Research* (all PubMed/Medline indexed), *Integrated Blood Pressure Control*, *Journal of Biological Physics and Chemistry*, and *Journal of Naturopathic Medicine* and as the founding Editor of *Naturopathy Digest*, Dr Vasquez is currently the Editor of *International Journal of Human Nutrition and Functional Medicine* and the Director for International Conference on Human Nutrition and Functional Medicine. Dr Vasquez has also served as a consultant researcher and lecturer for Biotics Research Corporation.

Contextualizing resource—same information in different formats and contexts:

- *Inflammation Mastery, 4th Edition* <https://www.amazon.com/dp/B01KMZZLAQ/> and
- *Textbook of Clinical Nutrition and Functional Medicine, vol. 1: Essential Knowledge for Safe Action and Effective Treatment* <https://www.amazon.com/dp/B01JDIOHR6/>



Introductory videos:

- Video introduction to books: <http://www.ichnfm.org/im4> and other videos: <http://www.ichnfm.org/18>
- Conference presentation—introducing the clinical protocol: <http://www.ichnfm.org/video-funct-inflam-1>

Persistent inadequacies in nutrition education/training among physicians

Introduction: Despite the acknowledged importance of diet in the prevention of obesity, diabetes, hypertension and other components of cardiometabolic syndrome/disease, physicians are consistently and systematically untrained in nutrition. A few exemplary citations are summarized per the following:

- What do resident physicians know about nutrition? (J Am Coll Nutr 2008 Apr²⁹): "OBJECTIVE: Despite the increased emphasis on obesity and diet-related diseases, nutrition education remains lacking in many internal medicine training programs. We evaluated the attitudes, self-perceived proficiency, and knowledge related to clinical nutrition among a cohort of internal medicine interns. METHODS: Nutrition attitudes and self-perceived proficiency were measured using previously validated questionnaires. Knowledge was assessed with a multiple-choice quiz. ... RESULTS: Of the 114 participants, 61 (54%) completed the survey. Although 77% agreed that nutrition assessment should be included in routine primary care visits, and 94% agreed that it was their obligation to discuss nutrition with patients, only 14% felt physicians were adequately trained to provide nutrition counseling. ... CONCLUSIONS: Internal medicine interns' perceive nutrition counseling as a priority, but lack the confidence and knowledge to effectively provide adequate nutrition education." These are impressive results showing that internal medicine doctors—specialists who commonly deal with diabetes, hypertension, obesity, and metabolic syndrome—do not have competence in nutrition, even by weak and basic standards.
- Relevance of clinical nutrition education and role models to the practice of medicine (Eur J Clin Nutr. 1999 May³⁰): "Yet, despite the prevalence of nutritional disorders in clinical medicine and increasing scientific evidence on the significance of dietary modification to disease prevention, present day practitioners of medicine are typically untrained in the relationship of diet to health and disease."
- How much do gastroenterology fellows know about nutrition? (J Clin Gastroenterol. 2009 Jul³¹): "The mean total test score was 50.04%. ...CONCLUSIONS: Gastroenterology fellows think their knowledge of nutrition is suboptimal; objective evaluation of nutrition knowledge in this cohort confirmed this belief. A formal component of nutrition education could be developed in the context of GI fellowship education and continuing medical education as necessary."

In sum: The data consistently demonstrate that healthcare providers at the doctorate level are untrained in nutrition when assessed by rather simple standards; their knowledge of functional nutrition at the level of clinical intervention in the treatment of serious disease would reasonably be expected to be approximately zero. Thus, given that doctors are trained neither in musculoskeletal systems and that related disorders represent no less than 20% of general practice) nor nutrition (despite the fact that all patients eat food and that such dietary habits (and/or the use of nutritional interventions) impact nearly all known diseases in the known universe), one might wonder as to the cause and perpetuation of this *systematically imposed ignorance* on such topics of major importance. Consistent faults in medical education are not accidental.

Dumbing Us Down: The Hidden Curriculum of Educational Systems

"Look again at the seven lessons of school teaching: confusion, class position, indifference, emotional and intellectual dependency, conditional self-esteem, and surveillance. All of these lessons are prime training for permanent underclasses, people deprived forever of finding the center of their own special genius."

Such a curriculum produces physical, moral, and intellectual paralysis, and no curriculum of content will be sufficient to reverse its hideous effects. ... Schools teach exactly what they are intended to teach and they do it well."

Gatto JT. *Dumbing Us Down: The Hidden Curriculum of Compulsory Schooling*, p. 16

Adverse effects of nonsteroidal anti-inflammatory drugs (NSAIDs), COX-2 inhibitors (coxibs)

Introduction: Nonsteroidal anti-inflammatory drugs (NSAIDs) have many common and serious adverse effects, including the promotion of joint destruction. Paradoxically, these drugs *cause* or *exacerbate* the very symptoms and disease they are supposed to treat: joint pain and destruction. In a tragic exemplification of Orwellian newspeak³²,

²⁹ Vetter et al. What do resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. *J Am Coll Nutr*. 2008 Apr;27(2):287-98

³⁰ Halsted CH. The relevance of clinical nutrition education and role models to the practice of medicine. *Eur J Clin Nutr*. 1999 May;53 Suppl 2:S29-34

³¹ Raman M, Violato C, Coderre S. How much do gastroenterology fellows know about nutrition? *J Clin Gastroenterol*. 2009 Jul;43(6):559-64

³² Orwell G. 1984. Harcourt Brace Jovanovich: 1949. "Newspeak" is defined by the Merriam-Webster Dictionary (m-w.com) as "propagandistic language marked by euphemism, circumlocution, and the inversion of customary meanings" and as "a language designed to diminish the range of thought," in the novel *1984* (1949) by George Orwell.

Associations of Omega-3 Fatty Acid Supplement Use With Cardiovascular Disease Risks

Meta-analysis of 10 Trials Involving 77 917 Individuals

Theingi Aung, MBBS, FRCP^{1,2,3}; Jim Halsey, PhD^{1,2,3}; Peter D. Jacobson, PhD^{1,2,3}

► Author Affiliations | Article Information

JAMA Cardiol. Published online January 31, 2018

Key Points

Question Does supplementation with omega-3 fatty acids reduce the risk of nonfatal coronary heart disease in people with no history of cardiovascular disease?

Findings This meta-analysis of 10 trials involving 77 917 individuals found that omega-3 fatty acid supplementation did not significantly reduce the risk of coronary heart disease or any major vascular event.

Meaning The results provide no support for the use of omega-3 fatty acid supplementation for the prevention of fatal coronary heart disease in people with no history of cardiovascular disease.

See other recent videos and PDF transcripts at: ichnfm.org/18

► Problems with this publication:

1. Unjustified selective exclusion of data
2. Inclusion of studies that employed sub-/non-therapeutic dosing
 1. This article took “underdosing” to the extreme and completely ignored a foundationally important advance in cardiology/science, ie, the omega-3 index.
3. 9 of the 10 studies used in this meta-analysis used synthetic “ester” form of n3 fatty acids; this is in contrast to the natural easier-to-digest triglyceride form
4. Stated conclusion at odds with data
5. Pro-pharma conflicts of interest among the authors and the publishing organization

DR VASQUEZ'S
RESEARCH
REVIEW

Context

Article

Corrections

Review of JAMA's “Omega-3 Fatty Acid Supplement Use With Cardiovascular Disease Risks”

► JAMA is notorious for publishing pro-drug and anti-nutrition articles; big medical journals/organizations make multimillion \$\$\$ profits from their pro-drug stance; massive inherent conflict-of-interest includes:

Medical Journals Are an Extension of the Marketing Arm of Pharmaceutical Companies

Richard Smith

“Journals have devolved into information laundering operations for the pharmaceutical industry”, wrote Richard Horton, editor of the *Lancet*, in March 2004 [1]. In the same year, Marcia Angell, former editor of the *New England Journal of Medicine*, lambasted the industry for becoming “primarily a marketing machine” and co-opting “every institution that might stand in its way” [2]. Medical journals were conspicuously absent from her list of co-opted institutions, but she and Horton are not the only editors who have become increasingly uneasy about the power and influence of the industry. Jerry Kassirer, another former editor of the *New England Journal of Medicine*, argues that the industry has deflected the moral compasses of many physicians [3], and the editors of *PLoS Medicine* have declared that they will not become “part of the cycle of dependency...between journals and the pharmaceutical industry” [4]. Something is clearly up.

The Problem: Less to Do with Advertising, More to Do with Sponsored Trials

The most conspicuous example of medical journals' dependence on

randomised controlled trials as one of the highest forms of evidence. A large trial published in a major journal has the journal's stamp of approval (unlike the advertising), will be distributed around the world, and may well receive global media coverage, particularly if promoted simultaneously by press releases from both the journal and the expensive public relations firm hired by the pharmaceutical company that sponsored the trial. For a drug company, a favourable trial is worth thousands of pages of advertising, which is why a company will sometimes spend upwards of a million dollars on reprints of the trial for worldwide distribution. The doctors receiving the reprints may not read them, but they will be impressed by the name of the journal from which they come. The quality of the journal will bless the quality of the drug.

Fortunately from the point of view of the companies funding these trials—but unfortunately for the credibility of the journals who publish them—these trials rarely produce results that are unfavourable to the companies' products [7,8]. Paula Rochon and others examined in 1994 all the trials funded by manufacturers of nonsteroidal anti-inflammatory drugs for arthritis that they could find [7]. They found 56 trials, and not one of the published trials presented results that were unfavourable to the company that sponsored the trial. Every trial showed the company's drug to be as good as or better than the comparison treatment.

By 2003 it was possible to do a systematic review of 30 studies comparing the outcomes of studies funded by the pharmaceutical industry with those of studies funded from other sources [8]. Some 16 of the studies looked at clinical trials or meta-analyses, and 13 had outcomes favourable to the sponsoring companies. Overall, studies funded by a company were four times more likely to have results favourable to the company than studies funded from other sources. In the case of the five studies that looked at economic evaluations,

1. **Reprints:** Selling reprints of pro-drug articles to drug companies (*PLoS Med* 2005 May)
2. **Advertisements:** Publicizing pro-drug advertisements
3. **Endorsing pro-drug treatment protocols:** These benefit drug companies
4. **Financial reciprocation:** Drug companies reciprocate with donations, advertisements, reprint purchases, pro-medical legislation

Video gallery: ichnfm.org/18

<p>DR VASQUEZ'S RESEARCH REVIEW</p>	<h2>Problems with this headline-making “research”</h2>																							
<p>1. Context</p>	<p>1. Problematic bias of journal: All medical journals and societies receive millions of dollars from drug companies; in fact, some “medical societies” are nothing more than front groups for drug sales.</p>																							
<p>2. Article, design</p>	<p>2. Problematic bias of editors: Note that this same journal was recently described as the most corrupt medical journal in terms of editors receiving massive and powerful* payments from drug companies: "Worst on that list is the <i>Journal of the American College of Cardiology</i> (JACC), where 19 of its editors received, on average, US\$475,072 personally and another US\$119,407 for 'research'." sciencealert.com/how-much-top-journal-editors-get-paid-by-big-pharma-corrupt 2018 Apr *Experts deserve to be paid for their expertise; but “getting paid for honest work” is quite different from “getting paid an exorbitant amount to leverage and influence from positional power.”</p>																							
<p>3. Errors / major problems in this article</p>	<p>3. Problematic bias of authors funded by drug /processed food industry</p>																							
<p>4. Exemplification</p>	<table border="1"> <tr> <td>1. Agricultural Bioproducts Innovation Program</td> <td>11. Haine</td> </tr> <tr> <td>2. Unilever = processed foods</td> <td>12. Canola and Flax Councils of Canada</td> </tr> <tr> <td>3. Barilla = processed foods</td> <td>13. Danone</td> </tr> <tr> <td>4. Kellogg's Company</td> <td>14. Abbott Laboratories</td> </tr> <tr> <td>5. Quaker Oats</td> <td>15. DuPont Nutrition and Health,</td> </tr> <tr> <td>6. Procter & Gamble Technical Centre Ltd.</td> <td>16. United States Department of Agriculture</td> </tr> <tr> <td>7. Bayer Consumer Care</td> <td>17. Bristol-Myers Squibb.</td> </tr> <tr> <td>8. Pepsi/Quaker</td> <td>18. General Mills</td> </tr> <tr> <td>9. Soy Foods Association of North America,</td> <td>19. International Sweeteners Association</td> </tr> <tr> <td>10. Coca-Cola Company <i>investigator-initiated, unrestricted grant</i></td> <td>20. Nestlé Nutrition Institute</td> </tr> <tr> <td></td> <td>21. ...his wife is an employee of Unilever Canada</td> </tr> </table>		1. Agricultural Bioproducts Innovation Program	11. Haine	2. Unilever = processed foods	12. Canola and Flax Councils of Canada	3. Barilla = processed foods	13. Danone	4. Kellogg's Company	14. Abbott Laboratories	5. Quaker Oats	15. DuPont Nutrition and Health,	6. Procter & Gamble Technical Centre Ltd.	16. United States Department of Agriculture	7. Bayer Consumer Care	17. Bristol-Myers Squibb.	8. Pepsi/Quaker	18. General Mills	9. Soy Foods Association of North America,	19. International Sweeteners Association	10. Coca-Cola Company <i>investigator-initiated, unrestricted grant</i>	20. Nestlé Nutrition Institute		21. ...his wife is an employee of Unilever Canada
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<p>1. Context</p>		
<p>2. Article, design</p>		
<p>3. Errors / major problems in this article</p>	<p>4. Unscientific exclusion of data, e.g. failure to include non-English research: In addition to the obvious ethnocentrism, ignoring non-English research simply because it was published in a different language is obviously unscientific.</p>	
<p>4. Exemplification</p>	<p>▶ They are intentionally excluding data [that counters their pre-determined narrative?] (#1): The idea that this article and its attendant ~40 authors, numerous international institutions, and millions of dollars in available funding could not translate 2 papers for inclusion in this analysis is overtly absurd.</p>	
<p>5. How to improve this line of research</p>	<p>▶ Social hypocrisy: These major journals influence news/indoctrination internationally, and as such, ignoring international research is overtly hypocritical, in essence stating, “We will influence your news, healthcare, and policy but we will not be influenced by the scientific research that your/other countries have produced.”</p>	
	<p>▶ Litmus test for wakefulness (and minimal competence among readers and editors): Wake up, people. This is 2018. These days, any document can be translated by Google, or they could have paid less than minimum wage (I am not advocating that, but merely showing how easy it could have been) for a translation.</p>	
	<p>▶ Beyond stupidity: You can be very sure that when these multinational corporations want to sell drugs and processed foods, they have no problem coordinating a team of multilanguage authors and editors.</p>	
<p>“Supplemental Vitamins and Minerals for CVD Prevention and Treatment” <i>Journal of the American College of Cardiology</i> 2018</p>		

DR VASQUEZ'S RESEARCH REVIEW	<u>Problems with this headline-making “research”</u>
1. Context	
2. Article, design	
3. Errors / major problems in this article	<p>5. <u>They are intentionally excluding data that counters their pre-determined narrative (#2):</u> Data on selenium was excluded from the analysis because the data was favorable.</p>
4. Exemplification	
5. How to improve this line of research	<p>▶ “Studies containing selenium were removed from the meta-analysis of antioxidants due to the high percentage of these studies on the left side of the unity line versus the right side of the unity line in the antioxidant forest plot (83% vs. 7%) compared with the other components of antioxidant mixtures (Figure 9). Removal of the selenium studies resulted in a significant increase in all-cause mortality.”</p>
<p>“Supplemental Vitamins and Minerals for CVD Prevention and Treatment” <i>Journal of the American College of Cardiology</i> 2018</p>	<p>6. <u>Failure to maintain any clinical or pharmacologic standard:</u></p>
	<p>▶ <u>Failed to assess for use of treatment:</u> “Adherence to and persistence with supplement use were also an issue.</p>
	<p>▶ <u>Failed to determine any relationship between treatment and outcomes:</u> “Furthermore, dose-response data were not usually available.”</p> <p>▶ <u>Failed to standardize treatment, but then concludes with sweeping statements against use of “vitamin and mineral supplementation”:</u> “Supplement differences might also have influenced outcomes.”</p>

DR VASQUEZ'S RESEARCH REVIEW	<u>Problems with this headline-making “research”</u>
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5. How to improve this line of research	
<p>“Supplemental Vitamins and Minerals for CVD Prevention and Treatment” <i>Journal of the American College of Cardiology</i> 2018</p>	<p>7. <u>Nutritional pseudoequivocation:</u> Perhaps the biggest, most obvious, and most incompetent error in this publication is the equivocation of these various studies, regardless of the quality of nutritional supplements used. Mainstream medical journals—written and edited by and targeted toward doctors that have zero training in nutrition—commonly discuss “nutritional supplements”, “vitamins and minerals” in categorical terms without discussing any difference, combinatorial effects, dosing, or “real world” considerations that are obvious to those of us who have spent our careers studying nutrition.</p>
	<p>▶ “Finally, combining different types of antioxidants might be suboptimal, because their mechanisms of action might also be different.”</p>
	<p>▶ The lack of intellectual consistency is quite obvious when these authors/organizations/schools master pathology and pharmacology down to electrostatic interactions, but then completely fail to differentiate entire categories of elements and effects when discussing nutrition.</p>

Today's review:
Empiric use of
potassium
citrate reduces
kidney-stone
incidence with
the ketogenic
diet.
Pediatrics 2009

Potassium target intake for adults = 4.7 GRAMS/d

Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate
<http://books.nap.edu/catalog/10925.html>

Adequate Intake
(AI)

SUMMARY

9

chloride forms of potassium—the forms found naturally in fruits, vegetables, and other potassium-rich foods.

An EAR could not be set for potassium because the data currently available do not provide multiple dose levels within the range to determine the point at which the diet of approximately *half* of those evaluated would be inadequate for potassium. Thus an AI is given.

The AI for potassium is set at 4.7 g (120 mmol) per day for adults (see Table S-3). Available evidence indicates that this level of potassium intake should lower blood pressure, blunt the adverse effects of sodium chloride on blood pressure, reduce the risk of kidney stones, and possibly reduce bone loss. It is important to note that the beneficial effects of potassium in these studies appear to be mainly from the forms of potassium that are associated with bicarbonate precursors—the forms found naturally in foods such as fruits and vegetables, ie, citrate

At present, dietary intakes of potassium by all groups in the United States and Canada are considerably lower than the AI. In recent surveys, the median intake of potassium by adults in the United States was approximately 2.9 to 3.2 g³ (74 to 82 mmol)/day for men and 2.1 to 2.3 g (54 to 59 mmol)/day for women; in Canada, the median intakes ranged from 3.2 to 3.4 g (82 to 87 mmol)/day for men and 2.4 to 2.6 g (62 to 67 mmol)/day for women. Because African Americans have lower intakes of potassium and a higher prevalence of elevated blood pressure and salt sensitivity, this subgroup of the population would especially benefit from an increased intake of potassium.

It should be noted that individuals with chronic renal insufficiency, who may be taking angiotensin-converting enzyme (ACE) inhibitors, certain diuretics, individuals with type 1 diabetes, and those taking cyclo-oxygenase-2 (COX 2) inhibitors or other nonsteroidal anti-inflammatory (NSAID) drugs, should consume levels of potassium recommended by their health care professional, which may well be lower than the AI.

4.7 grams of
potassium per day is
the goal for teens and
adults

Typical potassium
intake is deficient by
1-2 grams = 25%-50%
and that insufficiency
is exacerbated by
sodium, stress, drugs,
etc

Respect the cautions

1. The
importance of
this topic /
overpowering
systematic
ignorance
2. Action topic
3. How to
understand
nutrition

Introduction to Action Topic #1

▶ Potassium citrate

- ▶ Available in variable quantities from fruits and vegetables—obviously most people's intake is **inconsistent** and/or **inadequate**
- ▶ Available as a powder supplement that can be mixed in water or any other beverage; **stability** and **portability** is perfect for transport and travel
- ▶ Nearly everyone needs more potassium
- ▶ Nearly everyone can benefit from more citrate
- ▶ **Ketogenic diet increases need for both potassium and citrate**
 - ▶ Incidence of renal stones in children on ketogenic diet is 6.7% which is one per 15.
 - ▶ Empiric use of potassium citrate reduces incidence of kidney stones to less than 1%.

Empiric Use of Potassium Citrate Reduces Kidney-Stone Incidence
with the Ketogenic Diet. *Pediatrics* 2009 Jul

1. The importance of this topic / overpowering systematic ignorance
2. Action topic
3. How to understand nutrition—study it every day of your life

Summary and Forecast

1. Medical physicians are undertrained in nutrition
2. Medical journals and organizations are paid by drug companies in various ways—they have an inherent bias toward
 1. Promoting drugs
 1. Advertisements
 2. Research and education “donations”
 3. Direct payments to editors
 4. Purchase of reprints, either pro-drug or anti-nutrition
 2. Promoting ignorance and confusion in nutrition
 1. Medical journals commonly publish utterly retarded Editorials and reviews on nutrition that would never pass minimal competence in a graduate nutrition course; examples:
 1. Review of “Associations of Omega-3 Fatty Acid Supplement Use With Cardiovascular Disease Risks” *JAMA Cardiology* 2018 ichnfm.org/18
 2. Short review of “Supplemental Vitamins and Minerals for CVD Prevention and Treatment” in *Journal of American College of Cardiology* 2018 ichnfm.org/18
3. Low-carb Paleo / Ketogenic diet is great for many reasons, but it is inherently deficient in potassium citrate
4. Empiric Use of Potassium Citrate Reduces Kidney-Stone Incidence with the Ketogenic Diet. *Pediatrics* 2009 Jul—next video in this series will discuss risks, implementation, optimization (ie, pH and Mg)

“A clinician who is unaware of the political forces that shape healthcare policy and research is analogous to a captain of an oceangoing ship not knowing how to use a compass, sextant, or coastline map. Medical science and healthcare policy are influenced by a myriad of powerful private interests motivated by their own goals, at times different from the stated goal of medicine, which purports to hold paramount the patients' welfare. Scientific objectivity and the guiding ethical principles of informed consent, beneficence, autonomy, and non-maleficence are subject to different interpretations depending on the lens through which a dilemma is viewed. This gives rise to a disarrayed tug-of-war between factions and private interests, with paradigmatic victory often being awarded to those with the best marketing campaigns and political influence while less importance is given to safety, efficacy, and the economic burden to consumers. To be ignorant of such considerations is to be blind to the nature of research, policy, and our own biased inclinations for and against particular paradigms, assessments, and interventions. Research articles and sources of authority must be approached with an artist's delicacy and with a willingness to consider new information that may contradict deeply rooted beliefs.” Dr Alex Vasquez
Inflammation Mastery 4th Edition aka Textbook of Clinical Nutrition and Functional Medicine



Video gallery: ichnfm.org/18

See video at <http://www.ichnfm.org/18>