Revisiting the Five-Part Nutritional Wellness Protocol: The Supplemented Paleo-Mediterranean Diet

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ABSTRACT: This article reviews the five-part nutritional protocol that incorporates a health-promoting nutrient-dense diet and essential supplementation with vitamins/minerals, specific fatty acids, probiotics, and physiologic doses of vitamin D3. This foundational nutritional protocol has proven benefits for disease treatment, disease prevention, and health maintenance and restoration. Additional treatments such as botanical medicines, additional nutritional supplements, and pharmaceutical drugs can be used atop this foundational protocol to further optimize clinical effectiveness. The rationale for this five-part protocol is presented, and consideration is given to adding iodine-iodide as the sixth component of the protocol.

INTRODUCTION:

In 2004 and 2005 I first published a "five-part nutrition protocol"[1, 2] that provides the foundational treatment plan for a wide range of health disorders. This protocol served and continues to serve as the foundation upon which other treatments are commonly added, and without which those other treatments are likely to fail, or attain suboptimal results at best.[3] Now as then, I will share with you what I consider a basic foundational protocol for wellness promotion and disease treatment. I have used this protocol in my own self-care for many years and have used it in the treatment of a wide range of health-disease conditions in clinical practice.

REVIEW:

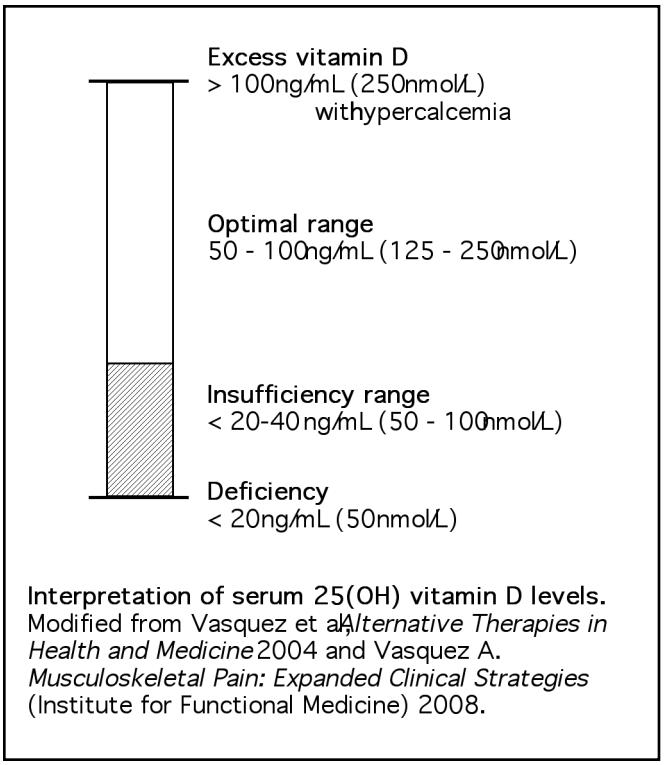
This nutritional protocol is validated by biochemistry, physiology, experimental research, peer-reviewed human trials, and the clinical application of common sense. It is the most nutrient-dense diet available, satisfying nutritional needs and thereby optimizing metabolic processes while promoting satiety and weight loss/optimization. Nutrients are required in the proper amounts, forms, and approximate ratios for critical and innumerable physiologic functions; if nutrients are lacking, the body cannot function *normally,* let alone *optimally.* Impaired function results in subjective and objective manifestations of what is eventually labeled as "disease." Thus, a powerful and effective alternative to treating diseases with drugs is to re-establish normal/optimal physiologic function by replenishing the body with essential nutrients, reestablishing hormonal balance ("orthoendocrinology"), promoting detoxification of environmental toxins, and by reestablishing the optimal microbial milieu, especially the eradication of (multifocal) dysbiosis; this multifaceted approach can be applied to several diseases, especially those of the inflammatory and autoimmune varieties.[4]

Of course, most diseases are multifactorial and therefore require multicomponent treatment plans, and some diseases actually require the use of drugs in conjunction with assertive interventional nutrition. However, while only a smaller portion of patients actually need drugs for the long-term management their problems, all clinicians should agree that everyone needs a foundational nutrition plan because nutrients—not drugs—are universally required for life and health. This five-part nutrition protocol is briefly outlined below; a much more detailed substantiation of the underlying science and clinical application of this protocol was recently published in a review of more than 650 pages and approximately 3,500 citations.[5]

1. Health-promoting Paleo-Mediterranean diet: Following an extensive review of the research literature, I developed what I call the "supplemented Paleo-Mediterranean diet." In essence, this diet plan combines the best of the Mediterranean diet with the best of the Paleolithic diet, the latter of which has been best distilled by Dr. Loren Cordain in his book "The Paleo Diet"[6] and his numerous scientific articles.[7, 8, 9] The Paleolithic diet is superior to the Mediterranean diet in nutrient density for promoting satiety, weight loss, and improvements/normalization in overall metabolic function.[10, 11] This diet places emphasis on fruits, vegetables, nuts, seeds, and berries that meet the body's needs for fiber, carbohydrates, and most importantly, the 8,000+ phytonutrients that have additive and synergistic health effects[12]—including immunomodulating, antioxidant, anti-inflammatory, and anti-cancer benefits. High-quality protein sources such as fish, poultry, eggs, and grass-fed meats are emphasized. Slightly modifying Cordain's paleo diet, I also advocate soy and whey protein isolates for their high-quality protein and their anticancer, cardioprotective, and mood-enhancing (due to the high tryptophan content) benefits. Potatoes and other starchy vegetables, wheat and other grains including rice are discouraged due to their high glycemic indexes and high glycemic loads, and their relative insufficiency of fiber and phytonutrients compared to fruits and vegetables. Grains such as wheat, barley, and rye are discouraged due to the high glycemic loads/indexes of most breads, pastries, and other grain-derived products, as well as due to the

immunogenicity of constituents such as gluten, a protein composite (consisting of a prolamin and a glutelin) that can contribute to disorders such as migraine, epilepsy, eczema, arthritis, celiac disease, psoriasis and other types of autoimmunity. Sources of simple sugars and foreign chemicals such as colas/sodas (which contain artificial colors, flavors, and high-fructose corn syrup, which contains mercury[13] and which can cause the hypertensive-diabetic metabolic syndrome[14]) and processed foods (e.g., "TV dinners" and other manufactured snacks and convenience foods) are strictly forbidden. Chemical preservatives, colorants, sweeteners, flavor-enhancers such as monosodium glutamate and carrageenan are likewise avoided. In summary, this diet plan provides plenty of variety, as most dishes comprised of poultry, fish, lean meats, soy, eggs, fruits, vegetables, nuts, berries, and seeds are allowed. The diet provides an abundance of fiber, phytonutrients, carbohydrates, potassium, and protein, while simultaneously being low in fat, sodium, arachidonic acid, and "simple sugars." The diet must be customized with regard to total protein and calorie intake, as determined by the size, status, and activity level of the patient; individual per-patient food allergens should be avoided. Regular consumption of this diet has shown the ability to reduce hypertension, alleviate diabetes, ameliorate migraine headaches, and result in improvement of overall health and a lessening of the severity of many common "diseases", particularly those with an autoimmune or inflammatory component. This Paleo-Mediterranean diet is supplemented with vitamins, minerals, fatty acids, and probiotics—making it the "supplemented Paleo-Mediterranean diet" as described below.

2. Multivitamin and multimineral supplementation: Vitamin and mineral supplementation has been advocated for decades by the chiropractic/naturopathic professions while being scorned by so-called "mainstream medicine." Vitamin and mineral supplementation finally received bipartisan endorsement when researchers from Harvard Medical School published a review article in *Journal of the American Medical Association* that concluded, "Most people do not consume an optimal amount of all vitamins by diet alone. ...it appears prudent for all adults to take vitamin supplements."[15] Long-term nutritional insufficiencies experienced by "most people" promote the development of "long-latency deficiency diseases"[16] such as cancer, neuroemotional deterioration, and cardiovascular disease. Impressively, the benefits of multivitamin/multimineral supplementation have been demonstrated in numerous clinical trials. Multivitamin/multimineral supplementation has been shown to improve nutritional status and reduce the risk for chronic diseases[17], improve mood[18], potentiate antidepressant drug treatment[19], alleviate migraine headaches (when used with diet improvement and fatty acids[20]), improve immune function and infectious disease outcomes in the elderly[21] (especially diabetics[22]), reduce morbidity and mortality in patients with HIV infection[23, 24], alleviate premenstrual syndrome[25, 26] and bipolar disorder[27], reduce violence and antisocial behavior in children[28] and incarcerated young adults (when used with essential fatty acids[29]), and improve scores of intelligence in children.[30] Multivitamin and multimineral supplementation provides anti-inflammatory benefits, as evidenced by significant reduction in C-reactive protein (CRP) in a double-blind, placebo-controlled trial.[31] The ability to safely and affordably deliver these benefits makes multimineral-multivitamin supplementation an essential component of any and all health-promoting and disease-prevention strategies. A few cautions need to be observed; for example, vitamin A can (rarely) result in liver damage with chronic consumption of 25,000 IU or more, and intake should generally not exceed 10,000 IU per day in women of childbearing age. Also, iron should not



Interpretation of serum 25(OH) vitamin D levels. Modified from Vasquez et al, *Alternative Therapies in Health and Medicine* 2004 and Vasquez A. *Musculoskeletal Pain: Expanded Clinical Strategies* (Institute for Functional Medicine) 2008.

be supplemented except in patients diagnosed with iron deficiency by a blood test (serum ferritin).

3. Physiologic doses of vitamin D3: The prevalence of vitamin D deficiency varies from 40-80 percent (general population) to almost 100 percent (patients with musculoskeletal pain) among Americans and Europeans. Vasquez, Manso, and Cannell described the many benefits of vitamin D3 supplementation in an assertive review published in 2004.[32] Our publication showed that vitamin D deficiency causes or contributes to depression, hypertension, seizures, migraine, polycystic ovary syndrome, inflammation, autoimmunity, and musculoskeletal pain, particularly low-back pain. Clinical trials using vitamin D supplementation have proven the cause-and-effect relationship between vitamin D deficiency and most of these conditions by showing that each could be cured or alleviated with vitamin D supplementation. In our review of the literature, we concluded that daily vitamin D doses should be 1,000 IU for infants, 2,000 IU for children, and 4,000 IU for adults, although some adults respond better to higher doses of 10,000 IU per day. Cautions and contraindications include the use of thiazide diuretics (e.g., hydrochlorothiazide) or any other medications that promote hypercalcemia, as well as granulomatous diseases such as sarcoidosis, tuberculosis, and certain types of cancer, especially lymphoma. Effectiveness is monitored by measuring serum 25-OH-vitamin D, and safety is monitored by measuring serum calcium. Dosing should be tailored for the attainment of optimal serum levels of 25-hydroxy-vitamin D3, generally 50-100 ng/ml (125-250 nmol/l) as illustrated.

4. Balanced and complete fatty acid supplementation: A detailed survey of the literature shows that five fatty acids have major health-promoting disease-preventing benefits and should therefore be incorporated into the daily diet and/or regularly consumed as dietary supplements.[33] These are alpha-linolenic acid (ALA; omega-3, from flaxseed oil), eicosapentaenoic acid (EPA; omega-3, from fish oil), docosahexaenoic acid (DHA; omega-3, from fish oil and algae), gamma-linolenic acid (GLA; omega-6, most concentrated in borage oil but also present in evening primrose oil, hemp seed oil, black currant seed oil), and oleic acid (omega-9, most concentrated in olive oil, which contains in addition to oleic acid many anti-inflammatory, antioxidant, and anticancer phytonutrients). Supplementing with one fatty acid can exacerbate an insufficiency of other fatty acids; hence the importance of balanced combination supplementation. Each of these fatty acids has health benefits that cannot be fully attained from supplementing a different fatty acid; hence, again, the importance of balanced combination supplementation. The benefits of GLA are not attained by consumption of EPA and DHA; in fact, consumption of fish oil can actually promote a deficiency of GLA.[34] Likewise, consumption of GLA alone can reduce EPA levels while increasing levels of proinflammatory arachidonic acid; both of these problems are avoided with co-administration of EPA any time GLA is used because EPA inhibits delta-5-desaturase, which converts dihomo-GLA into arachidonic acid. Using ALA alone only slightly increases EPA but generally leads to no improvement in DHA status and can lead to a reduction of oleic acid; thus, DHA and oleic acid should be supplemented when flaxseed oil is used.[35] Obviously, the goal here is physiologically-optimal (i.e., "balanced") intake of all of the health-promoting fatty acids; using only one or two sources of fatty acids is not balanced and results in suboptimal improvement. In clinical practice, I routinely use combination fatty acid therapy comprised of ALA, EPA, DHA, and GLA for essentially all patients; when one appreciates that the average daily Paleolithic intake of n-3 fatty acids was 7 grams per day contrasted to the average daily American intake of 1 gram per day, we can see that—by using combination fatty acid therapy emphasizing n-3 fatty acids—we are simply meeting physiologic expectations via supplementation, rather than performing an act of recklessness or heroism. The product I use also contains a modest amount of oleic acid that occurs naturally in flax and borage seed oils, and I encourage use of olive oil for salads and cooking. This approach results in complete and balanced fatty acid intake, and the clinical benefits are impressive. Benefits are to be expected in the treatment of premenstrual syndrome, diabetic neuropathy, respiratory distress syndrome, Crohn's disease, lupus, rheumatoid arthritis, cardiovascular disease, hypertension, psoriasis, eczema, migraine headaches, bipolar disorder, borderline personality disorder, mental depression, schizophrenia, osteoporosis, polycystic ovary syndrome, multiple sclerosis, and musculoskeletal pain. The discovery in September 2010 that the G protein-coupled receptor 120 (GPR120) functions as an n-3 fatty acid receptor that, when stimulated with EPA or DHA, exerts broad anti-inflammatory effects (in cell experiments) and enhances systemic insulin sensitivity (in animal study) confirms a new mechanism of action of fatty

acid supplementation and shows that we as clinician-researchers are still learning the details of the beneficial effects of commonly used treatments.[36]

5. Probiotics /gut flora modification: Proper levels of good bacteria promote intestinal health, support proper immune function, and encourage overall health. Excess bacteria or yeast, or the presence of harmful bacteria, yeast, or "parasites" such as amoebas and protozoas, can cause "leaky gut," systemic inflammation, and a wide range of clinical problems, especially autoimmunity. Intestinal flora can become imbalanced by poor diets, excess stress, immunosuppressive drugs, and antibiotics, and all of these factors are common among American patients. Thus, as a rule, I reinstate the good bacteria by the use of probiotics (good bacteria and yeast), prebiotics (fiber, arabinogalactan, and inulin), and the use of fermented foods such as kefir and yogurt for patients not allergic to milk. Harmful yeast, bacteria, and other "parasites" can be eradicated with the combination of dietary change, antimicrobial drugs, and/or herbal extracts. For example, oregano oil in an emulsified, time-released form has proven safe and effective for the elimination of various parasites encountered in clinical practice.[37] Likewise, the herb Artemisia annua (sweet wormwood) commonly is used to eradicate specific bacteria and has been used for thousands of years in Asia for the treatment and prevention of infectious diseases, including drug-resistant malaria.[38] Restoring microbial balance by providing probiotics, restoring immune function (immunorestoration) and eliminating sources of dysbiosis, especially in the gastrointestinal tract, genitourinary tract, and oropharynx, is a very important component in the treatment plan of autoimmunity and systemic inflammation.[39]

Should combinations of iodine and iodide be the Sixth Component of the Protocol?: Both iodine and iodide have biological activity in humans. An increasing number of clinicians are using combination iodine-iodide products to provide approximately 12 mg/d; this is consistent with the average daily intake of iodine-iodide in countries such as Japan with a high intake of seafood, including fish, shellfish, and seaweed. Collectively, iodine and iodide provide antioxidant, antimicrobial, mucolytic, immunosupportive, antiestrogen, and anticancer benefits that extend far beyond the mere incorporation of iodine into thyroid hormones.[5] Benefits of iodine/iodide in the treatment of asthma[40,41] and systemic fungal infections[42,43] have been documented, and many clinicians use combination iodine/iodide supplementation for the treatment of estrogen-driven conditions such as fibrocystic breast disease.[44] While additional research is needed and already underway to further establish the role of iodine-iodide as a routine component of clinical care, clinicians should begin incorporating this nutrient into their protocols based on the above-mentioned physiologic roles and clinical benefits.

SUMMARY AND CONCLUSIONS:

In this brief review, I have described and substantiated a fundamental protocol that can serve as effective therapy for patients with a wide range of diseases and health disorders. Customizing the Paleo-Mediterranean diet to avoid patient-specific food allergens, using vitamin-mineral supplements along with physiologic doses of vitamin D and broad-spectrum balanced fatty acid supplementation, and ensuring "immunomicrobial" health with the skillful use of probiotics, prebiotics, immunorestoration, and antimicrobial treatments provides an excellent health-promoting and disease-eliminating foundation and lifestyle for many patients. Often, this simple protocol is all that is needed for the effective treatment of a wide range of clinical problems, even those that have been "medical failures" for many years. For other patients with more complex illnesses, of course, additional interventions and laboratory assessments can be used to optimize and further customize the treatment plan. Clinicians should avoid seeking "silver bullet" treatments that ignore overall metabolism, immune function, and inflammatory balance, and we must always remember that the attainment and preservation of health requires that we first meet the body's basic nutritional and physiologic needs. This five-step protocol begins the process of meeting those needs. With it, health can be restored and the need for disease-specific treatment is obviated or reduced; without it, fundamental physiologic needs are not met, and health cannot be obtained and maintained. Addressing core physiologic needs empowers doctors to deliver the most effective healthcare possible, and it allows patients to benefit from such treatment.

Dr Alex Vasquez is a Director of the Medical Board of Advisors for Biotics Research Corporation and is the author of many articles and books for doctors. His professional degrees include Doctor of Chiropractic, (University of Western States, March 1996), Doctor of Naturopathic Medicine (Bastyr University, September 1999), and Doctor of Osteopathic Medicine (University of North Texas Health Science Center, May 2010).

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Curr Allergy Asthma Rep (2014) 14:454
DOI 10.1007/s11882-014-0454-4

Reply to "Role of Western Diet in Inflammatory Autoimmune Diseases" by Manzel et al. in *Current Allergy and Asthma Reports* (Volume 14, Issue 1, January 2014)

Alex Vasquez

Published online: 20 June 2014

To the Editor,

Regarding the recent review "Role of Western Diet in Inflammatory Autoimmune Diseases" [1], while I appreciate the importance of this topic and the authors' review, I noted several shortcomings in this review and have questions about the omission of certain information. The authors failed to include relevant and important human data while instead relying on animal studies (their Table 1). The authors also include erroneous information, without appropriate citation.

The authors state that "a high-fat diet is a prominent factor in promoting obesity" but failed to provide citation for this. Importantly, other researchers have shown that high-fat ketogenic diets promote weight loss rather than obesity.

I found the reliance on animal data (especially their Table 1) and the exclusion of human data inappropriate for a review article of this nature and at this time in biomedical history. Several clinical trials have already documented the effectiveness of dietary intervention in human autoimmune diseases. For example, diets which emphasize increased consumption of plant foods (excluding gluten-containing grains) and dietary alteration of gastrointestinal flora have already shown clinical benefits [2]. Exclusion of gluten is of critical importance for some patients, and well established is gluten's role in inflammation, alteration of gastrointestinal flora, increasing intestinal permeability, and direct stimulation of inflammatory pathways. The authors mentioned hypertension four times in their review but failed to mention the remarkable efficacy of therapeutic fasting for this condition [3]. Clinical trials showing the safety and efficacy of dietary fatty acid supplementation were also excluded from the review, despite showing remarkable clinical safety and antirheumatic efficacy [4]. Antiinflammatory mechanisms of dietary intervention not mentioned in their review include alleviation of oxidative stress, alleviation of dysbiosis, reduced reactivity to dietary antigens, normalization of intestinal hyperpermeability, and alleviation of proinflammatory mitochondrial dysfunction [5].

This article is part of the Topical Collection on *Autoimmunity*

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Additional articles and book excerpts have been amended to the previous publication in order to provide context and orientation to the author's main works.

BOOK EXCERPTS, CHAPTERS:

- https://www.amazon.com/Dr-Alex-Vasquez/e/B00AT5764Y
- https://www.ichnfm.org/im4
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- **Main: https://www.inflammationmastery.com/**
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  - Fibromyalgia: https://www.inflammationmastery.com/fibromyalgia
  - Migraine: https://www.inflammationmastery.com/migraine
  - Complete protocol: https://www.inflammationmastery.com/book-nutrition-functional-medicine
- **Main: https://www.ichnfm.org/ This is actually a very rich website with many blogs and videos**
  - https://www.ichnfm.org/antiviral2019 and the long series starting with https://www.ichnfm.org/antiviral, https://www.ichnfm.org/antiviral2, https://www.ichnfm.org/antiviral3, https://www.ichnfm.org/antiviral4, and continuing…
  - https://www.ichnfm.org/braininflammation

SOCIAL MEDIA UPDATES: Note that updates are made on a regular basis to the following social medial pages, with some overlap but also some topic-specific specialization, which is self-explanatory by the titles of these pages:

- **Dr Alex Vasquez 's Inflammation Mastery https://www.facebook.com/InflammationMastery**
- Migraine Headaches, Hypothyroidism, and Fibromyalgia https://www.facebook.com/MigraineHypothyroidismFibromyalgia
- International Journal of Human Nutrition and Functional Medicine https://www.facebook.com/IJHNFM
- International College of Human Nutrition and Functional Medicine (higher quality and academic news) https://www.facebook.com/IntCollHumNutrFunctMed
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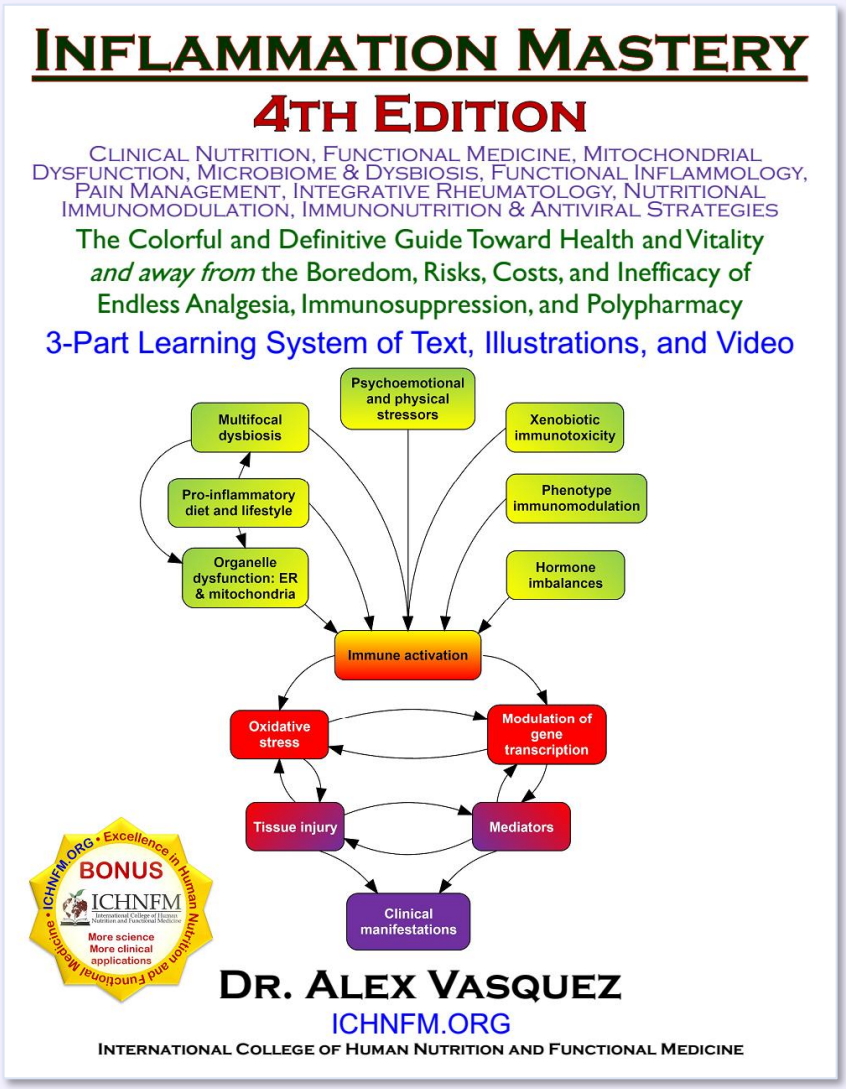
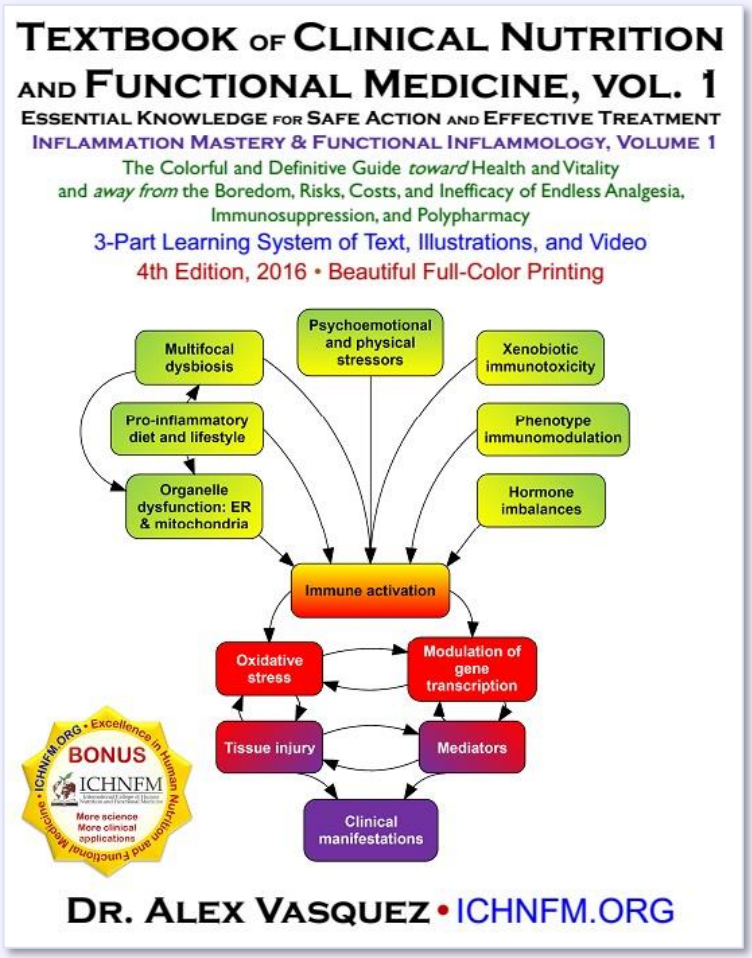
- Antiviral Nutrition https://www.facebook.com/AntiviralNutrition
- NaturopathicRheumatology https://www.facebook.com/NaturopathicRheumatology

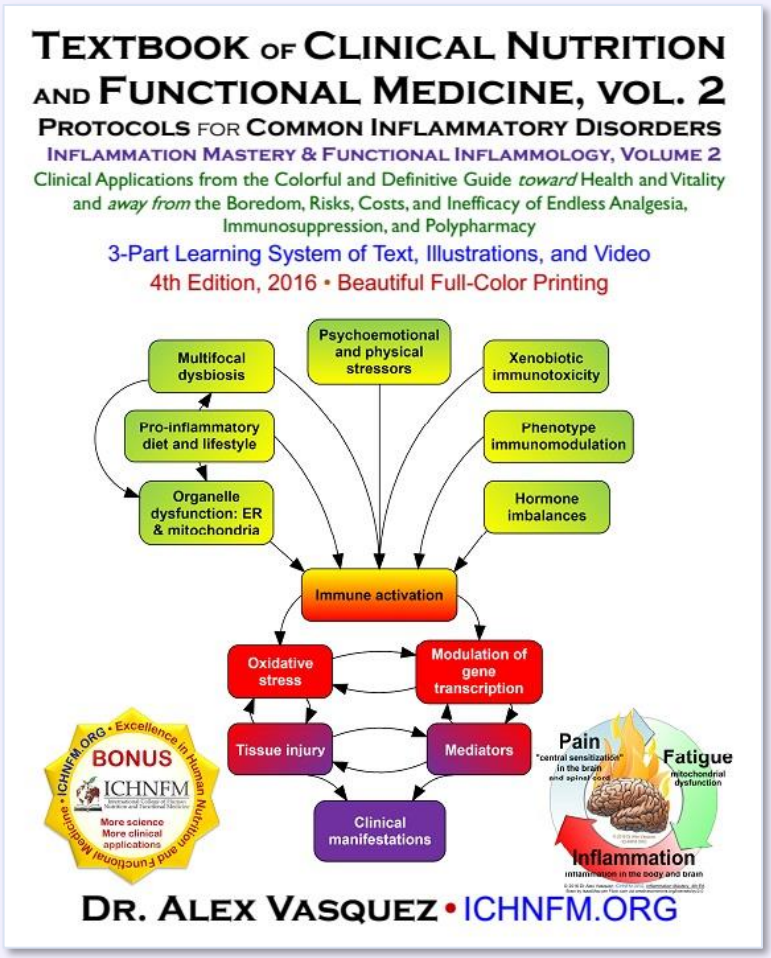
As of 2019 and for the foreseeable future, the most current versions of all major patient management and clinical treatment protocols are published in ***Inflammation Mastery, 4th Edition*** as a single volume of 1,182 pages available in full-color print at discounted pricing directly from ICHNFM from https://www.ichnfm.org/im4, while the digital formats are available via several different platforms, including Amazon's Kindle (free) software, Barnes and Noble's Nook, Apple iBook, etc as hyperlinked below. Per popular request by students who were studying (as a required textbook) only one section at a time, "IM4" was also published in two easier-to-carry separate volumes under the name ***Textbook of Clinical Nutrition and Functional Medicine***, which contain chapters 1-4 (pages 1-712+index) and 5 (713-1154+index), respectively. Video access is included with ***IM4*** and ***TCNFM,1+2***.

Availability in print and digital formats (examples):

- https://www.**ichnfm**.org/im4
- https://www.**amazon**.com/Inflammation-Mastery-4th-Immunosuppression-Polypharmacy-ebook/dp/B01KMZZLAQ
- https://books.**apple**.com/us/author/alex-vasquez/id1139497284
- https://www.**barnesandnoble**.com/w/inflammation-mastery-4th-edition-alex-vasquez/1123259586?ean=9780990620464







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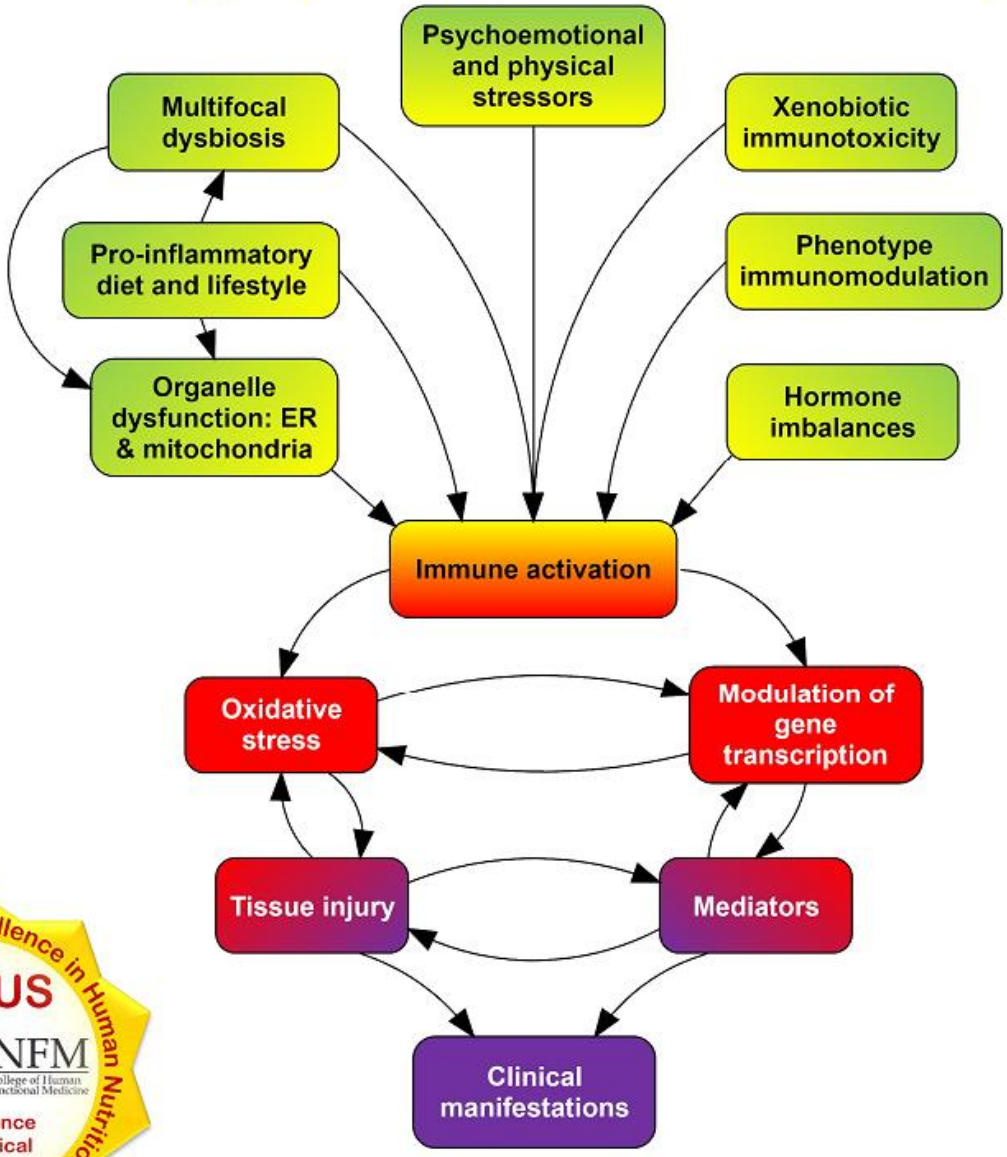

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https://www.**amazon**.com/Inflammation-Mastery-4th-Immunosuppression-Polypharmacy-ebook/dp/B01KMZZLAQ
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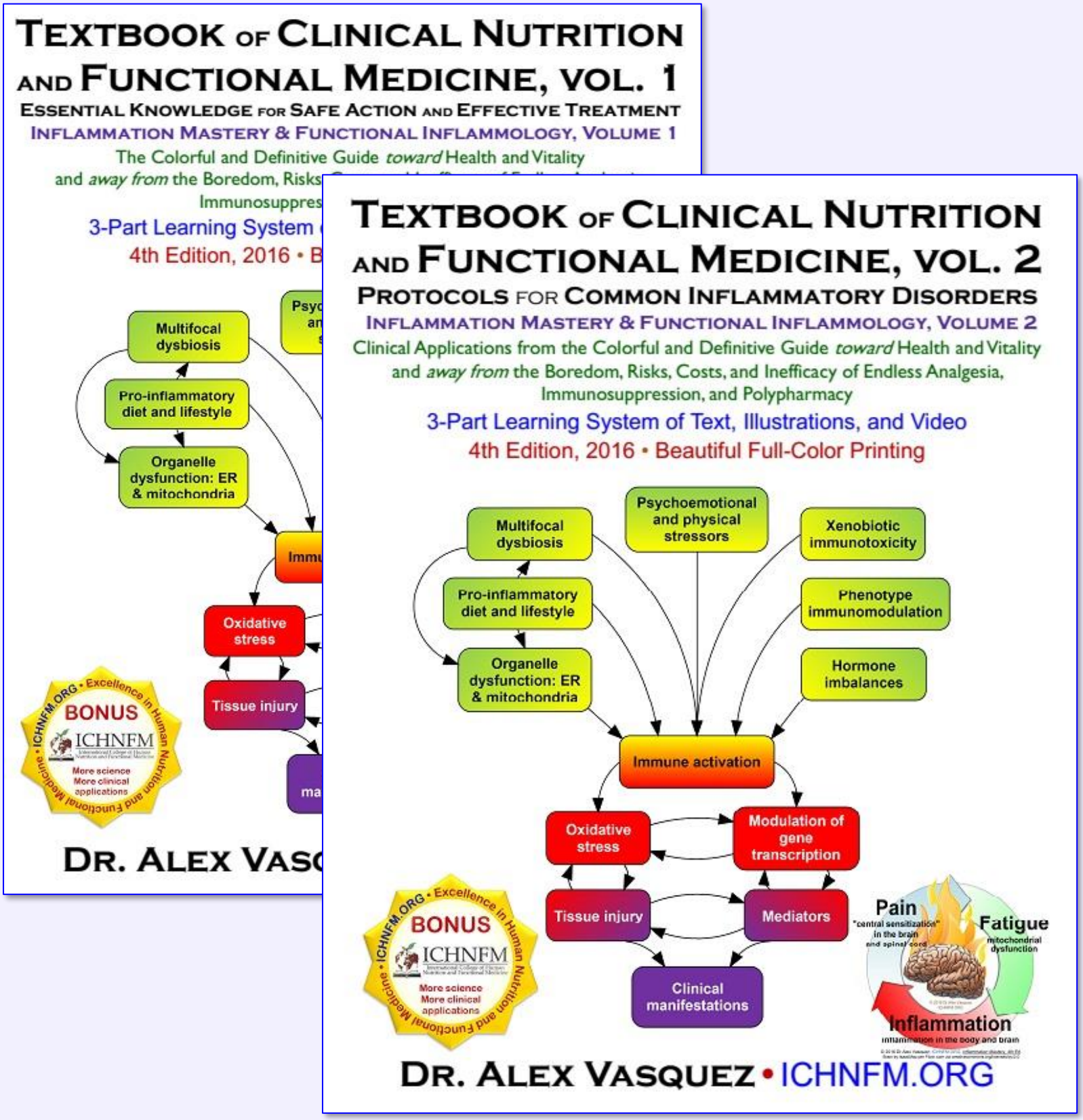

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- Doctor of Naturopathic Medicine, graduate of Bastyr University (1999)
- Doctor of Chiropractic, graduate of University of Western States (1996)
- Fellow of the American College of Nutrition (2013-present)
- Former Overseas Fellow of the Royal Society of Medicine
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- Private practice of integrative and functional medicine in Seattle, Washington (2000-2001), Houston, Texas (2001-2006), Portland, Oregon (2011-2013), consulting practice (present)
- Consultant Researcher and Lecturer (2004-present), Biotics Research Corporation
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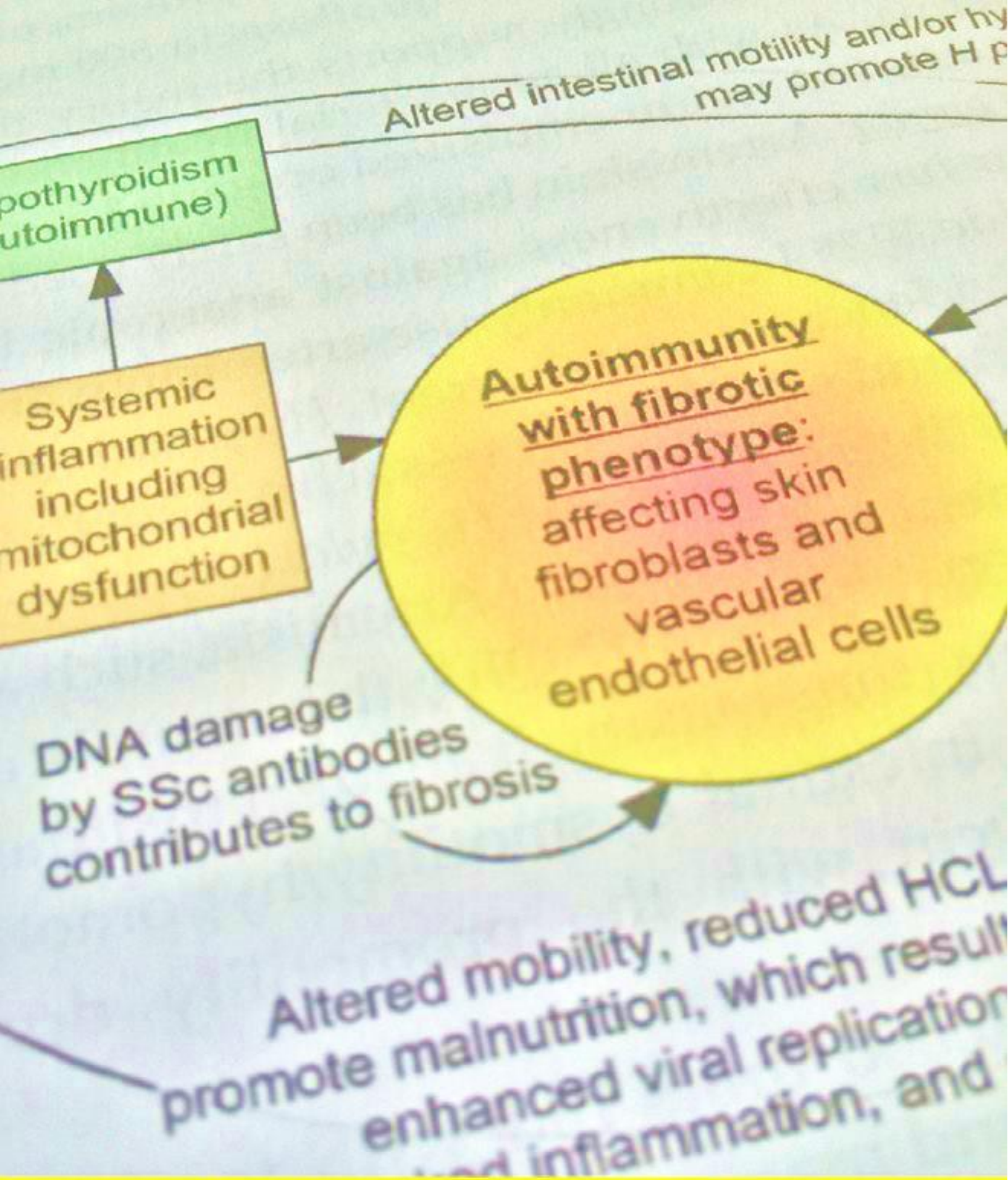
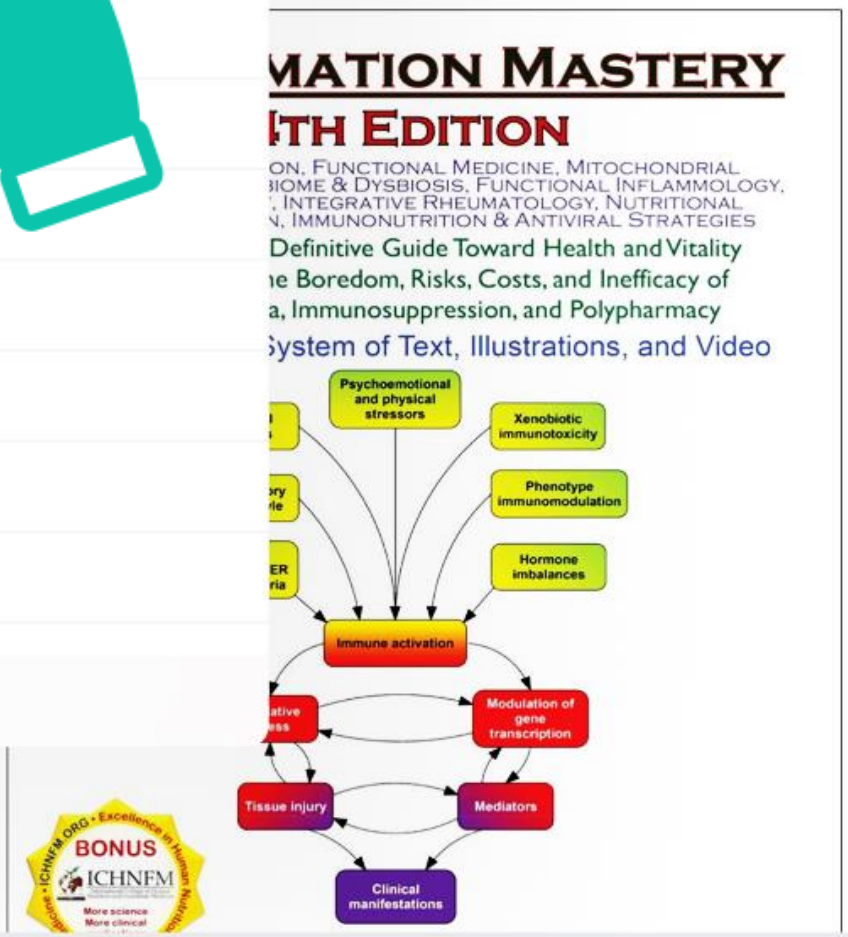
    - Director of Programs, International College/Conference on Human Nutrition and Functional Medicine ICHNFM.org
    - Founder and Former Program Director of the world's first accredited university-affiliated graduate-level program in Functional Medicine
    - Adjunct Professor, Integrative and Functional Nutrition in Immune Health, Doctor of Clinical Nutrition program at Maryland University of Integrative Health
    - Former Adjunct Professor (2009-2013) of Laboratory Medicine, Master of Science in Advanced Clinical Practice
    - Former Faculty (2004-2005, 2010-2013) and Forum Consultant (2003-2007), The Institute for Functional Medicine
    - Former Adjunct Professor (2011-2013) of Pharmacology, Evidence-Based Nutrition, Immune and Inflammatory Imbalances, Principles of Functional Medicine, Psychology of Wellness
    - Former Adjunct Professor of Orthopedics (2000), Radiographic Interpretation (2000), and Rheumatology (2001), Naturopathic Medicine Program, Bastyr University
- Author of more than 100 articles and letters published in *JAMA—Journal of the American Medical Association*, *BMJ—British Medical Journal*, *TheLancet.com*, *JAOA—Journal of the American Osteopathic Association*, *Annals of Pharmacotherapy*, *Journal of Clinical Endocrinology and Metabolism*, *Alternative Therapies in Health and Medicine*, *Nutritional Perspectives*, *Journal of Manipulative and Physiological Therapeutics*, *Integrative Medicine*, *Current Allergy and Asthma Reports*, *Nutritional Wellness*, *Evidence-based Complementary and Alternative Medicine*, and *Arthritis & Rheumatism*: Official Journal of the American College of Rheumatology





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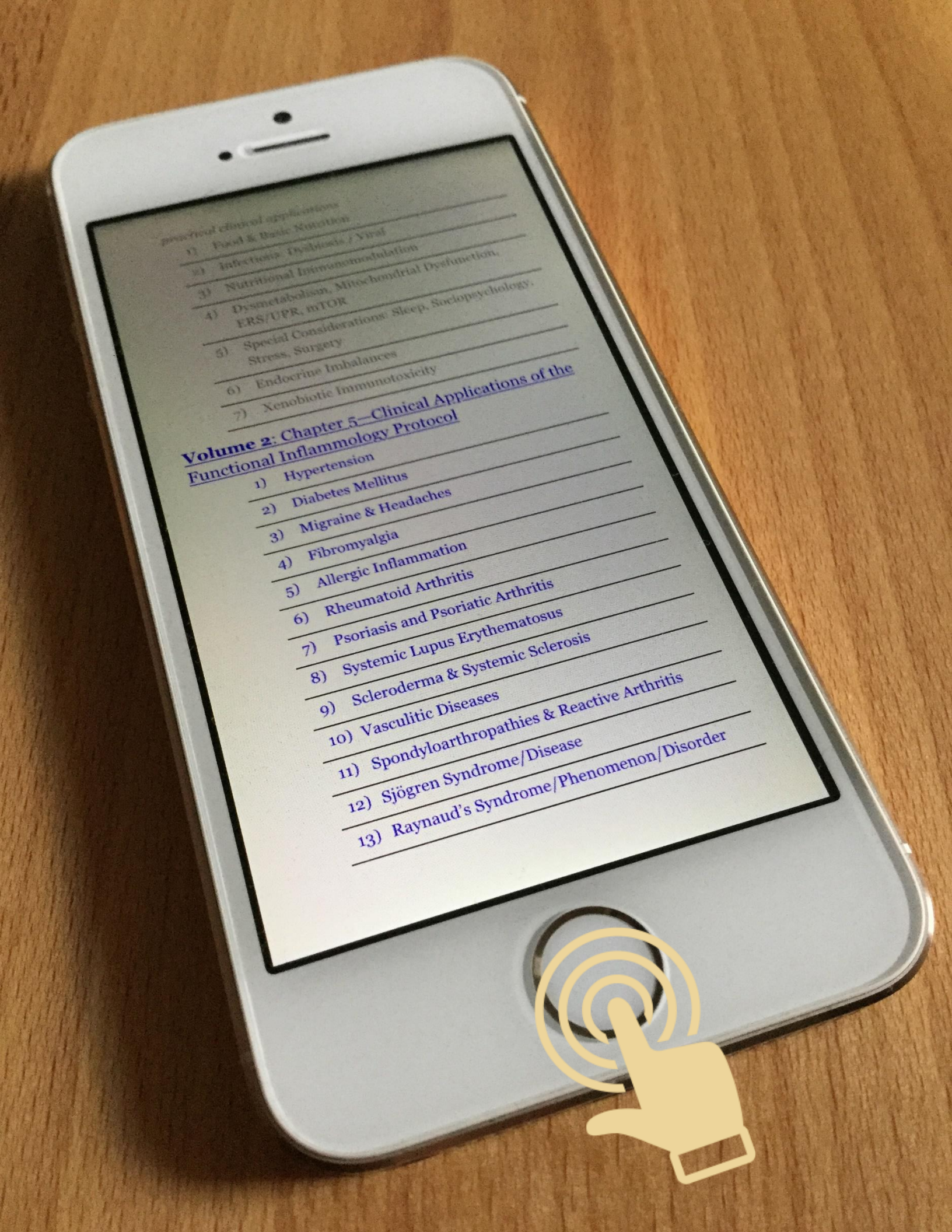
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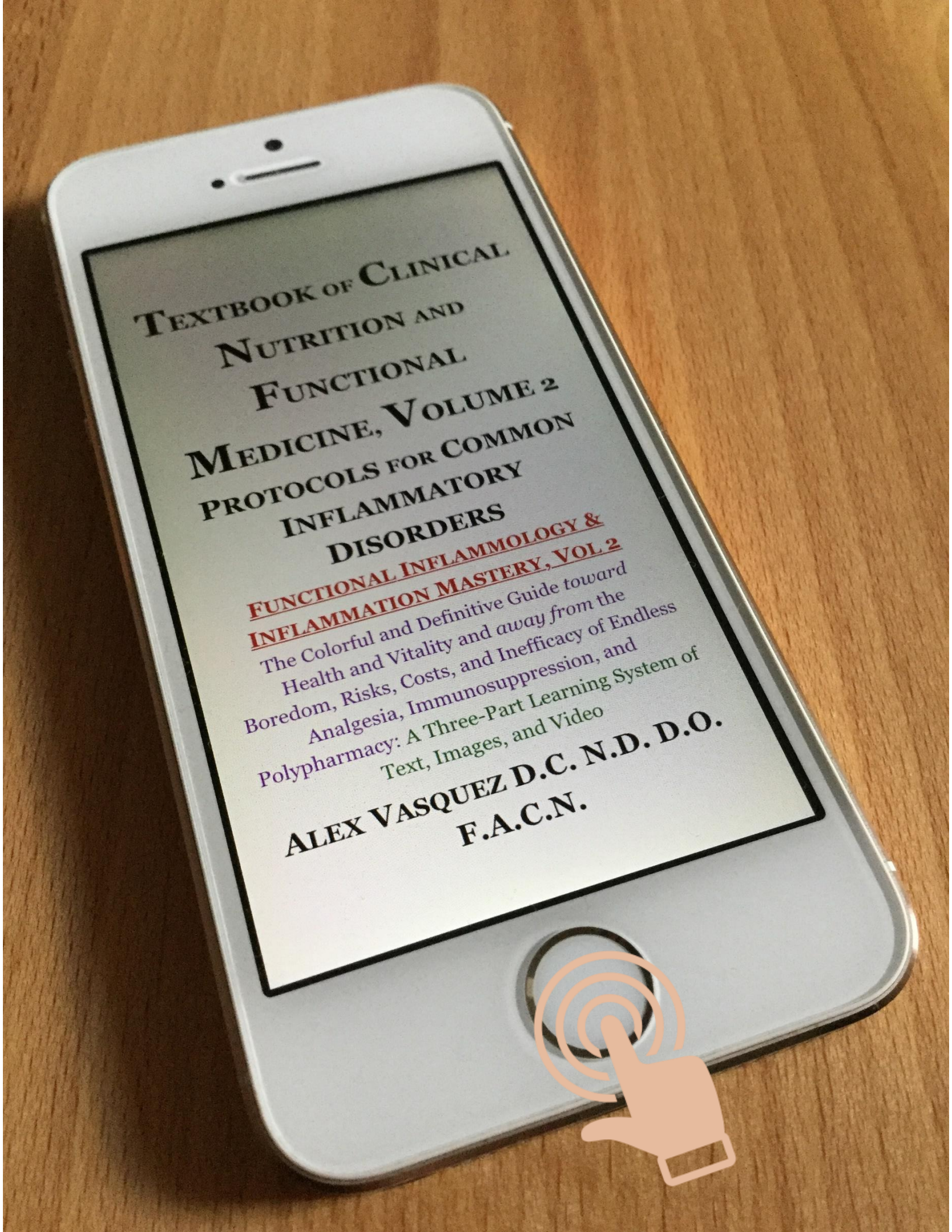
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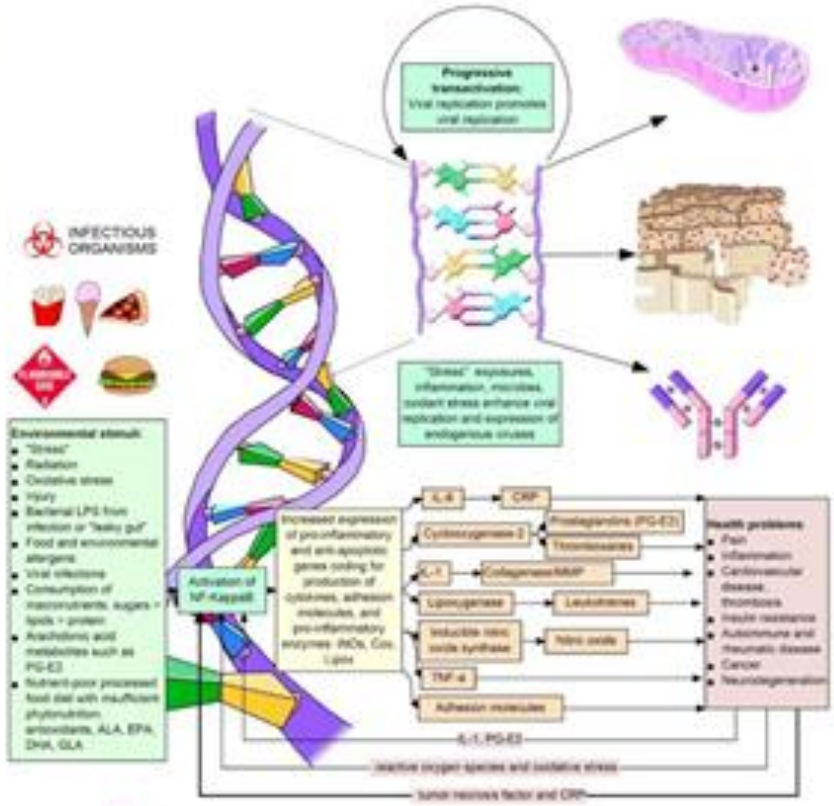

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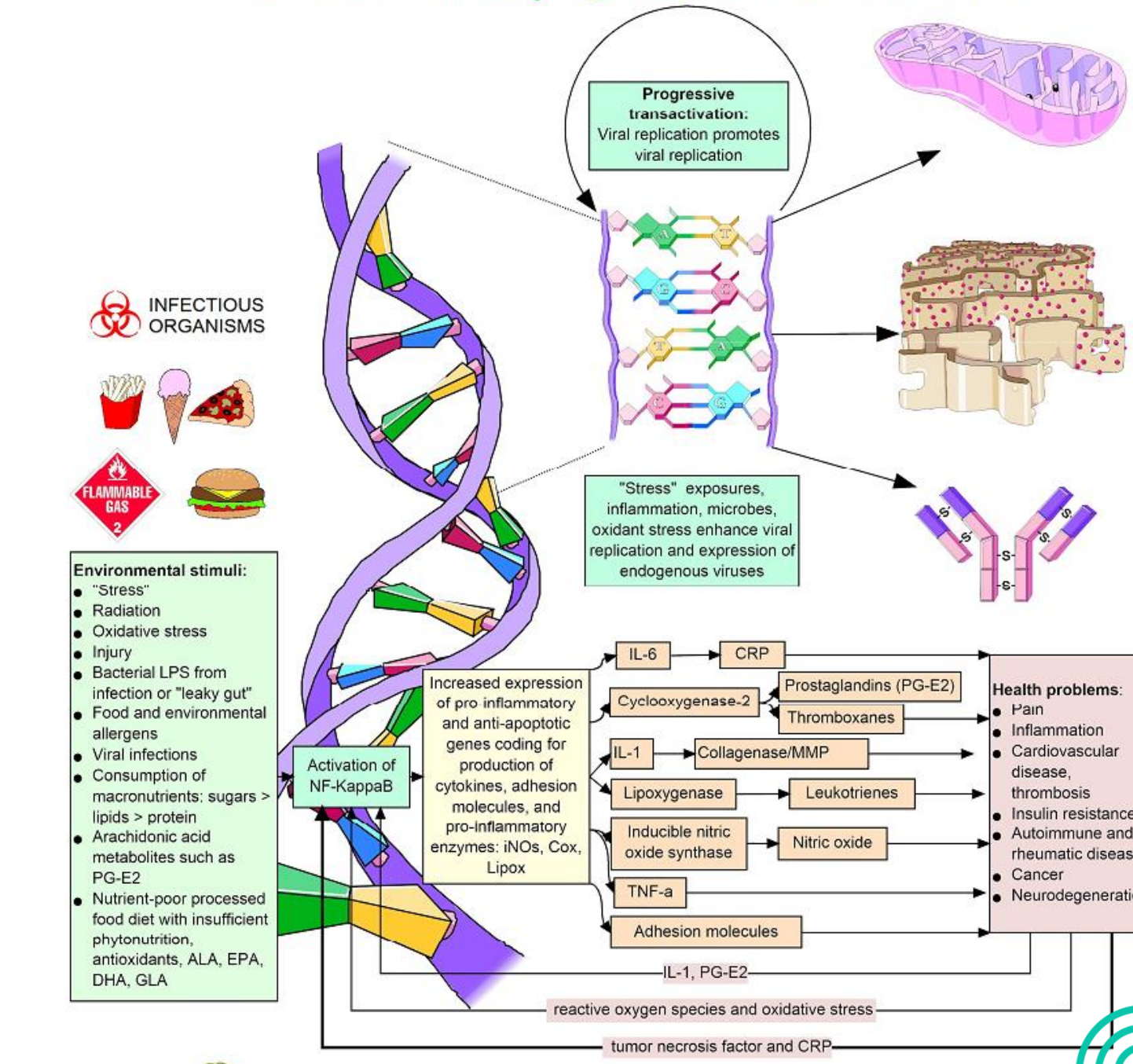

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THE PATH AHEAD

Concerns About The Integrity of The Scientific Research Process—Focus On Recent Negative Publications Regarding Nutrition, Multivitamins, Fish Oil And Cardiovascular Disease

Alex Vasquez, DC, ND, DO; Joseph Pizzorno, ND, Editor in Chief

Abstract

The next step in reestablishing credibility seems to us honesty and recognizing we all share a common goal of the health and wellness of the human community and the planet. Everyone agrees that the current healthcare system, despite its many incredible successes, is also showing its limitations and is no longer sustainable. We believe the solution starts with us the researchers and editors. A good first step might be formally recognizing the errors and showing how we can and *intend* to get better.

Evidence-based medicine—by definition—requires objective, reliable and accurate research and reviews from which to make the best decisions in patient care and public policy. The causes of inaccurate information, ranging from presumably innocent mistakes all the way to apparently intentional fraud, affect all scientific and biomedical disciplines.[1] While these accidental and intentional errors can derail our understanding of diseases and impact tens of thousands of affected patients, such inaccuracies in the field of nutrition c… worldwide.[2] While… a specific disease… human populatio… nutrition researcl… particularly conte… nutrition researcl… healthcare profess… nutrition. Clinical… vast majority of … medical training p… are obviously i… gastroenterology[7]… training in clini… proclaims itself a… including the entire territory of clinical nutrition.[10] A major and serious problem arises when unskilled and invalid research is published by authors (including nonphysician journalists[11]) in major journals which mischaracterizes the validity of nutrition interventions (e.g., essentially always concluding that nutritional interventions are inefficacious or potentially hazardous) and then such research is used politically and in the media to disparage, restrict and regulate practitoners and nutrition supplement industry[12] to the detriment of human health.

Several factors disrupting the integrity of nutrition research are commonly found in studies published by "elite" universities in "top-tier" journals, which are then republished and distributed as "headlining news" in newspapers, magazines, and television via which they …ent policy and …ons of people. … examples of …lications, lists …sed solutions. …pendent upon …stigative and …s of clinical …rovements are … ignorance in …

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…eview recent examples of questionable or inaccurate publications related to nutrition. Perceived shortcomings are documented with both citations here and links to more detailed and authoritative reviews and video presentations. In some instances, speculations regarding the cause and consequences of identified errors are provided.

PDF articles: Full-text archives of the author's articles are available per the following:

- https://ichnfm.academia.edu/AlexVasquez
- https://www.ichnfm.org/public
- **VIDEO**: BRIEF Critique of "Effects of n−3 Fatty Acid Supplements in Diabetes Mellitus: ASCEND Study" https://vimeo.com/287650812
- **VIDEO:** Bad Science in Medical Nutrition: Politics of Fish Oil https://vimeo.com/314997927

JOURNAL OF ORTHOMOLECULAR MEDICINE

OPEN ACCESS
VOLUME 34, NUMBER 1
PUBLISHED: MARCH 2019

Editorial

Misrepresentations of Clinical Nutrition in Mainstream Medical Media: Growing Importance of Legitimate Expertise in Independent Peer-Reviewed Publications - Part 1

2018 As a Milestone in the Post-Truth Era

Among the various topics that have either interested or fascinated me throughout my youth and well into my adult years, Nutrition has certainly reigned supreme. My personal routine has been to read as much as reasonably and practically possible on the topic, while not doing so to the exclusion of other topics in biomedicine, psychosociology and philosophy. Thus, with roughly 30 years of experience in reading books and primary research in the field of Nutrition, I could not help but notice the radical departures that occurred in 2018 from the previous norms to which I had grown accustomed.

Of course, 2018 was not the first year during which "bad research" was published in mainstream medical journals and then replicated throughout the echo chamber of mass media; one could observe this periodically occurring throughout the past 50 years, starting not at least with the demonization of dietary cholesterol and the glorification of processed foods, especially refined grains and so-called vegetable oils. But in 2018 what many of us observed was not simply poorly performed research but, in s
es, radical departures from any attempt to pre
descriptions that could be considered "reason
previous standard.[1] Especially related to the
trition, mainstream medical journals and the
which parrots their conclusions have begun
overt misrepresentations of Nutrition with re
gard for science, logic, biomedical history and

One has to be aware of a few key ironies
terize mainstream medical discussions of nutri
that 1) medical physicians receive essentially
in clinical nutrition in their graduate school e
in their post-graduate residency training[2], 2)
sicians and organizations publish "research"
commentaries (both of which commonly conc
tritional interventions are inefficacious or unsafe), despite their lack of formal education on the topic, and then 3) mainstream medical voices consistently call for "regulating the nutrition supplement industry" despite their lack of training on the topic and because of negative conclusions based on their own poorly conducted research and self-serving conclusions. As such, not only are the map-makers blind, but they mislead their blind followers, and then both groups promote themselves as expert cartographers and guides when advising the public on an area that none of them have studied or understood. We should have no surprise whatsoever when the "medical community" publishes poorly conducted and self-serving "research" on the topic of nutrition, to reach their desired conclusion that nutrition is unsafe and inefficacious, and that the profitable market needs to be managed of course by the selfsame "medical community" that is never received a decent 15 minutes on the topic of therapeutic nutrition. Pervasive and persistent ignorance on the topic of nutrition among medical physicians must be understood as intentional and strategic, because otherwise this problem would have been solved 30 years ago when it was first discussed during what was called at the time the "golden age of nutrition."[3] The easiest way to manipulate people and to keep them in a perpetual state of confusion, ineffectiveness, and dependency is to

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when pondering the probable future of intellectual integrity and the products of education.

 ISSN 0317-0209

JOURNAL OF ORTHOMOLECULAR MEDICINE

OPEN ACCESS
VOLUME 33, NUMBER 6
PUBLISHED: DECEMBER 2018

Editorial

Orthomolecular Medicine, Catalytic Creativity, and the Psychosocial Ecosystem

Transitioning From One Year to the Next

Various cultures since time immemorial have marked and celebrated the winter solstice with celebrations, meals with friends and family, and time away from work; transitioning from one calendar year to the next has given people pause and a moment to reflect on the events that happened in the past year and what might be anticipated in the next. Reflection with anticipation along with the realization that the future is somewhat malleable inclines people to imagine how the future might be shaped by the exertion of some modicum of creativity and effort. Any realistic conception of how we might improve the near future must segue from our recent past; we must have an awareness of what is going on around us as we look toward the future to visualize ourselves living within it and also acting upon it. What is going on in the world and how might I act upon that trend and flow in order to improve both its transition and its destination? What should each of us do on a personal level to (in the words of Mahatma Gandhi) be, embody, and materialize the change(s) that we want to see in the world?

Salutation and Introduction From the Journal's New Editor

Over the past few years I have reflected on several occasions how much I enjoy editing, and so I was correspondingly surprised and pleased when I was offered the opportunity to be the next Editor for the *Journal of Orthomolecular Medicine.* I began studying nutrition and orthomolecular concepts in my teen years and more diligently as I entered graduate school in the early 199 trition" book that I reac *Your Nerves* (1975) by this was followed imm tures of Jonathan V Wr of whom would later b University. By the mid- Jeffrey Bland PhD had tional medicine, which and personal[3] reasons. By this time my own personal library contained several hundred books, mostly dedicated to nutrition and health with another large section on philosophy and psychology. In 1994, I joined the Review Staff of the *Journal of Naturopathic Medicine,* and I started publishing nutrition articles, perhaps most of which might be seen as practice in preparation of an important letter published in 1996 by the American College of Rheumatology in their journal *Arthritis and Rheumatism.* Since those early years and during the course of three doctorate degrees and teaching thousands of students/attendees internationally, I have reviewed for[4] and published in[5] a wide range of refereed journals in addition to publishing commissioned books, chapters, and independent publications and videos. Being an author and reviewer for many different publications—along with my experiences teaching internationally, treating patients in various settings, designing and directing academic programs, and producing educational videos—has given me a wide range of experiences and insights that I hope to bring to the benefit of the *Journal of Orthomolecular Medicine.*

We Must Work Together if We Are Going to Succeed

I have to start this conversation with a few hopes, assumptions, and beliefs, namely that you (the reader) and I (the author and new Editor) have a few things in common. On a professional level, by virtue of the fact that you are reading this essay, I will assume that you are interested or actively engaged in healthcare, medicine, nutrition, research and/or public health. I might also imagine that some smaller percentage of our new and established readers are perhaps less inclined toward the mechanisms and more drawn to the *Journal of Orthomolecular Medicine* for its potential humanistic insights and social contributions; we can reasonably competent healthcare ate nutrition) are basic mit a counterargument of my assertions, they more to the point, my rdless of personal po- share some common the following:

- We each want to receive and deliver the best healthcare possible: If we have a problem, then we each want the best possible solution. Efficiency of time or money is not the top priority when we are seeking solutions

International Journal of Human Nutrition and Functional Medicine www.ICHNFM.org

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Mini-Review • Continuing Education • Microbiome • Dysbiosis • Infectious Disease

Translating Microbiome (Microbiota) and Dysbiosis Research into Clinical Practice: The 20-Year Development of a Structured Approach that Gives Actionable Form to Intellectual Concepts

Alex Vasquez DC ND DO FACN

Experience and Perspectives

Many years ago when I published my first books[1,2] and articles[3] detailing "dysbiosis", the word could hardly be found in the Medline index, the topic was controversial at best and ethereal at worst, the term "microbiome" (first published in French in 1949 and in English in 1988) was virtually unknown, and I spent most of the time and space in my lectures and articles substantiating and defending the condition's existence. These days, everyone is talking about microbiome, dysbiosis, "leaky gut" (thanks largely to Leo Galland MD), and my 1996 article on "Silent Infections and Gastrointestinal Dysbiosis" has been downloaded at least 4,000 times and is one of the top 1% most popular articles on Academia.edu.[4] In the preparation of my dysbiosis lecture at a major functional medicine conference in 2010, I found that only 180 Medline articles indexed the term "dysbiosis", and now—slightly less than five years later—more than 1,200 articles index that term. Obviously, the dysbiosis concept has

"Dysbiosis" is an important concept, but doctors cannot treat concepts.

We have to define, describe, and deconstruct the microbes, molecules, and mechanisms into their components, then rebuild a conceptual scaffold and intellectual structure that becomes a useful tool that, with study and experience, can be used in a clinical setting to effective benefit.

practical application is a bit indelicate and cumbersome beyond the most commonly repeated advice of advocating probiotics, avoiding antibiotics, perhaps delving into using botanical antimicrobials and laboratory testing. Breath testing (an insensitive test for only one subtype of gastrointestinal dysbiosis) and microbiologic testing have become popular to the point of overuse as doctors grapple for clinical clues. (Noteworthy in the conversation on functional laboratory testing is that one functional medicine laboratory in particular used inaccurate proprietary microbe-identification methods to extract

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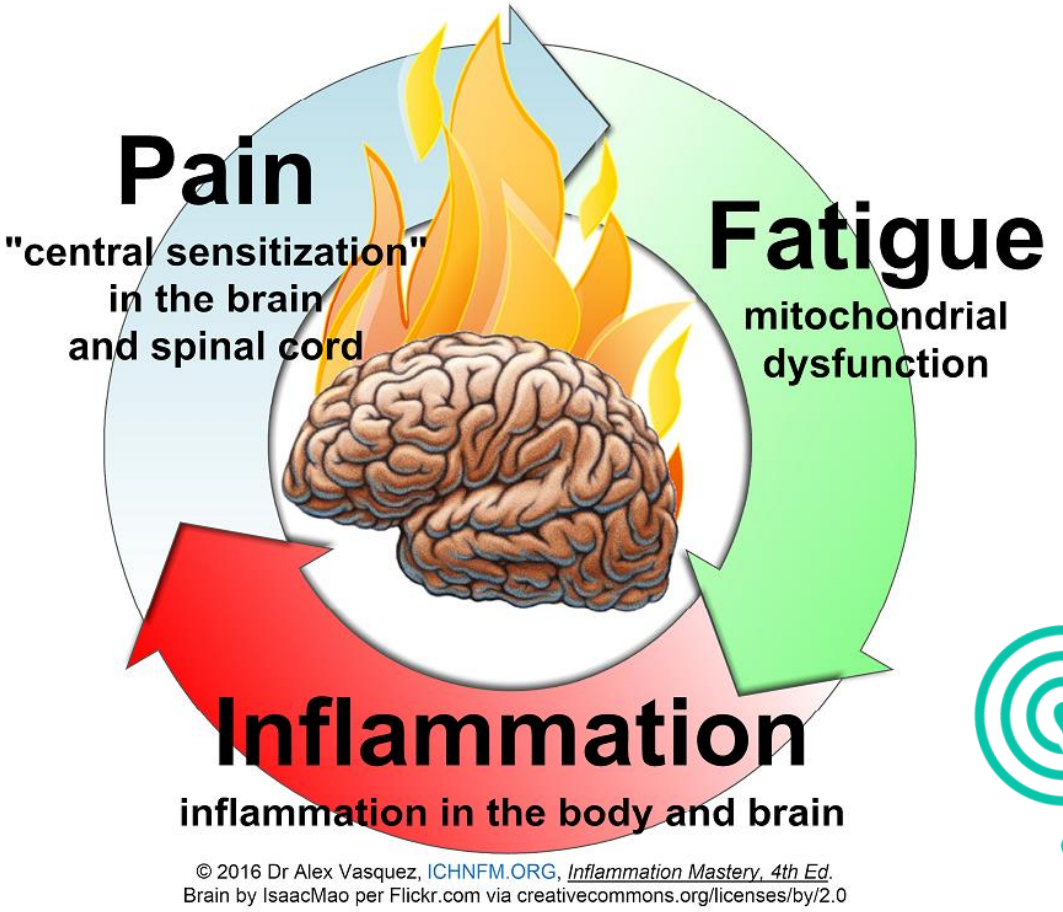

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- **INFO**: https://www.inflammationmastery.com/fibromyalgia
- **INFO**: https://www.inflammationmastery.com/migraine
- From ***Inflammation Mastery, chapter 5***, the two sections specific to migraine and fibromyalgia were also published separately as ***Pain Revolution*** (full-color printing; https://www.amazon.com/dp/B01AR3NX0S) and ***Brain Inflammation in Chronic Pain, Migraine and Fibromyalgia: The Paradigm-Shifting Guide for Doctors and Patients Dealing with Chronic Pain*** (black-and-white printing; https://www.amazon.com/dp/B01EQ9KMH6/); both versions are also available in digital ebook format for phone, computer, iPad via the free Kindle software

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COMMENTARY

Biological plausibility of the gut–brain axis in autism

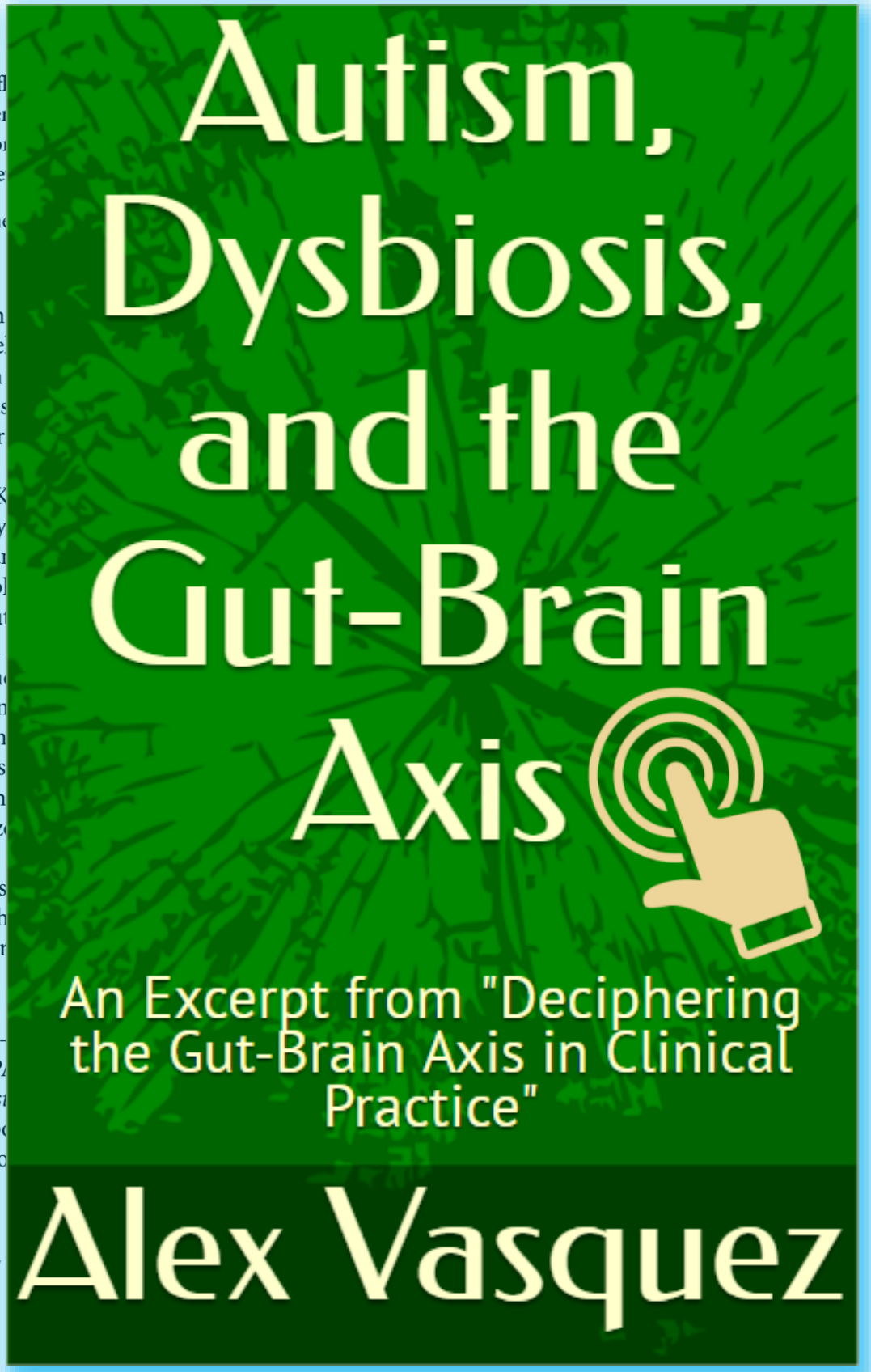
Alex Vasquez

**Organic abnormalities with neuroinfl
purine metabolism, neurotransmitte
noted in autism, and many of these ab
metabolites, and heightened serum le**

Keywords: gut–brain axis; autism; m

In their recent review, Sherwin
among many other issues, the re
gut microbiome–brain axis with
section subtitled "Microbiota-bas
the treatment of autism: hype or
et al.[1] largely discuss preclinical
the 2017 open-label study by K
used a sequence of oral vancomy
polyethylene glycol laxative, a
human fecal microbiota transpl
clinical benefit in subjects with au

Readers will likely benefit from
tional relevant clinical studies, in
lication by Sandler *et al.*[3] showin
of autistic manifestations followin
oral vancomycin, as well as cas
ing positive impact of various an
apies (metronidazole, ketoconaz
cillin) in patients with autism.[4,5]
have been shown to have gut dys
as well as *Clostridia* species,[6] th
group of bacteria noted for their pr
rotoxic substances. International
consistently demonstrated that
have heighted production of 3-(3-
3-hydroxypropionic acid (HPHP
phenylalanine metabolite of *Clos*
trointestinal tract.[7,8] HPHPA rep
with the conversion of dopamine to



doi: 10.1111/nyas.13516
Ann. N.Y. Acad. Sci. 0 (2017) 1–2 © 2017 New

Scotland's public health campaigns to improve vitamin D nutriture occurred within the same timeframe as HVP vaccination

In April 2019, Palmer et al [1] published a retrospective population study crediting vaccination against human papilloma virus (HPV) with reduction in HPV prevalence in Scotland, and the authors attributed a reduction in HPV prevalence among unvaccinated women with "herd protection." However the authors did not mention Scotland's population-wide public health campaigns to address endemic vitamin D deficiency. The Scottish Government recognized the high prevalence of vitamin D deficiency in its population and began recommending vitamin D supplementation not later than 2006. Vitamin D deficiency results in impaired mucosal and immune defenses and correlates in a dose-dependent manner with increased cervicovaginal HPV infection [2]. By 2009, coincident with the start of the HPV vaccination campaign in 2008, numerous vitamin D supplementation (and sun exposure) campaigns were being implemented throughout Scotland to combat the documented population-wide problem of vitamin D deficiency.

Our views of vitamin D experienced a paradigm shift in the early part of this century with landmark publications such as Vieth's authoritative documentation of safety in 1999 [3], Zittermann's "Vitamin D in

preventive medicine" in British Journal of Nutrition in 2003 [4], and Vasquez's "Clinical importance of vitamin D (cholecalciferol): a paradigm shift with implications for all healthcare providers" in 2004 [5] followed by an important partial summary of vitamin D usage guidelines in British Medical Journal in 2005 [6]. These and similarly themed articles have contributed to increased awareness of vitamin D's safety and roles in preventive medicine and public health, including reducing the burden of infectious diseases such as viral infections and various types of cancer. Consistent with this evidence of safety and benefit, along with evidence that the human daily requirement is an order of magnitude greater than previously believed [7], use of vitamin D supplementation began to increase slowly and then exponentially in the United States [8] and other countries, especially English-speaking societies, most notably the United Kingdom. Indeed, according to the Scottish Health Survey 2003 [9], use of dietary supplements such as vitamins (including vitamin D), fish oils (a source of vitamin D) and minerals (magnesium supplementation improves vitamin D status and is necessary for vitamin D activation, binding, transport, metabolism, and gene expression [10]) had already begun to increase between 1998 and 2003. Certainly not later than 2006, the Scottish Government was already recommending widespread use of vitamin D supplements to combat the high prevalence of vitamin D deficiency in Scotland [11].

Widespread vitamin D deficiency in Scotland was followed by widespread recommendations for vitamin D supplementation starting in 2006 and 2009. In 2006, Burleigh and Potter published in Scottish Medical Journal [12] stating that, "The prevalence of vitamin D deficiency is high in older outpatients in this geographical area." In 2007, Hyppönen and Power [13] showed that among British adults "Prevalence of hypovitaminosis D in the general population was alarmingly high during the winter and spring, which warrants action at a population level rather than at a risk group level." In 2008, Rhein [14] further specified that "Vitamin D deficiency is widespread in Scotland." In 2009, the Scottish Government acknowledged the need to educate its population about the importance of vitamin D3 supplementation [15]. From that time until the present, the Scottish Government, United Kingdom National Health Services, and various advocacy groups and programs (e.g., ScotsNeedVitaminD.com[16], Healthy Start, which provides vitamin D supplements to all children and pregnant women in Scotland [17]) continue assertive public health campaigns recommending vitamin D supplementation and increased vitamin D production via sun exposure via the "Shine on Scotland" program initiated in 2009 [18] for all of its citizens [19-23].

Vitamin D supplementation has been the subject of many clinical trials documenting anti-inflammatory, antiviral, and anticancer benefits. Correction of vitamin D deficiency has significant anti-inflammatory [24] and immunomodulatory [25] benefits. Vitamin D and its direct metabolites promote production of antimicrobial peptides which have antibacterial and antiviral properties, while also reducing viral replication by inhibiting the NF-kappaB pathway. Consistent with these immunomodulatory and antiviral mechanisms, data from several placebo-controlled trials shows that vitamin D provides benefit in a variety of infectious conditions including human immunodeficiency virus (HIV) [26], hepatitis C virus [27-29] and upper respiratory infections [30-31]. Vitamin D administration displays impressive clinical effectiveness against dermal HPV as shown in case reports, clinical series, and placebo-controlled trials, with remarkable safety, high efficacy, and a consistent trend toward complete resolution of lesions [32-36]. In 2014, Schulte-Uebbing et al [37] published "Chronical cervical infections and dysplasia (cervical intraepithelial neoplasia [CIN] 1-2): vaginal vitamin D treatment" showing that among 200 women with cervical dysplasia, vitamin D vaginal suppositories (12,500 IU, 3 nights per week, for 6 weeks) provided "very good anti-inflammatory effects" and "good antidysplastic effects" in women with CIN 1. In 2017, Vahedpoor and colleagues [38] published a double-blind placebo-controlled trial of vitamin D in women with HPV, in which they found that vitamin D3 administration for 6 months among women with CIN1 resulted in its regression and had beneficial effects on markers of insulin metabolism and antioxidant status. In 2018, Vahedpoor and colleagues [39] published a

double-blind placebo-controlled trial of vitamin D in women with HPV, in which they observed, "The recurrence rate of CIN1/2/3 was 18.5 and 48.1% in the vitamin D and placebo groups respectively", thereby clearly favoring treatment with vitamin D over placebo.

In Scotland, programs advocating HPV vaccination (started in 2008) and vitamin D supplementation (started not later than 2006 and again in 2009) occurred in close chronologic proximity. Crediting the reduction in HPV-related disease solely to vaccination via retrospective population study is potentially invalid and misleading, especially when the authors make no account whatsoever of the national program for vitamin D supplementation which started in the same timeframe. Numerous studies have shown that vitamin D provides immunomodulatory, anti-inflammatory, microbiome-modifying, antiviral and anti-HPV benefits with high safety, good efficacy, low cost, wide availability, and clinically important collateral benefits.

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13 April 2019

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Competing interests: Dr Alex Vasquez is a lecturer and author of numerous articles, letters, and books related to topics of nutrition, clinical medicine, neuroinflammation, and the human microbiome. Dr Vasquez has served as a consultant to Biotics Research Corporation.

International Journal of Human Nutrition and Functional Medicine (ISSN 2378-4881) ICHNFM.ORG/journal

Barceloneta sunset © 2019 by Dr Vasquez

Tutorial & Editorial • Scientific Writing • Journal Editing • Professional Experience • Video

How to Improve Scientific Writing and Journal Editing: A Short Narrative-Video Guide, Part I

Alex Vasquez DO ND DC FACN

Introduction

"Hello everyone, Dr. Alex Vasquez here, and today I'm going to start a different series of videos, and this time the conversation is going to focus around journal editing and writing. I'm calling this "*Editing and Writing Tips #1*", and I'm going to start with a few of my own perspectives and experiences, then I'll talk about a few basics, and a few influential ideas. In later videos, I will talk about some more specific examples, and then perhaps at some point we will have a review and conclusion.

Early Experiences and Influences

Very briefly I'll talk about some of my own experiences, and the reason for my doing this is to share with you and segue into some examples that I think are very important. Basic though they might be, a lot of our success in various fields of life actually comes from respecting and appreciating and utilizing those basic concepts.

Let us start here with some of my initial experiences. I started becoming aware of language and the fact that I had some facility for it, first, when I was about 12 years old. I remember writing a poem in class, and again this is somewhat peripheral to the main topic of today, but I do remember that e
kind of my entryway, I think, i
that our assignment was to wr
remember writing this poem in cl
on and on, and—compared with s
I just realized that writing for me

Then again, when I wa
military school, I remember in ou

being asked questions, and I remember just how the answers to understanding grammar and language just came very easy to me, and I do remember feeling like I had some facility for the structure of language.

Another influential experience I had when I was about 11 years old, totally unrelated to language, is that we took, in the late 1970s or early '80s, a Computer Science class in our elementary school, and I remember that class also specifically having some influence on me, in terms of structuring logic. We basically had to write our own computer programs and this was back when computers were very new. Obviously today everybody has computers; back in the late '70s, computers were a novelty. I consider myself lucky to have taken this Computer Science class; it was obviously extremely basic, but we did have to write some code and what I remember from that is just the sequential manner in which communication has to take place in order to be successful. In this case, we were writing programs for computers and doing basic

> "Writing comes from the entirety of one's experience."
> Dr Alex Vasquez

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Citation: Vasquez A. How to Improve Scientific Writing and Journal Editing: A Short Narrative-Video Guide, Part 1. *Int J Hum Nutr Funct Med* 2019;7:1 https://www.ichnfm.org/journal2019a Externally archived at https://www.academia.edu/38426918

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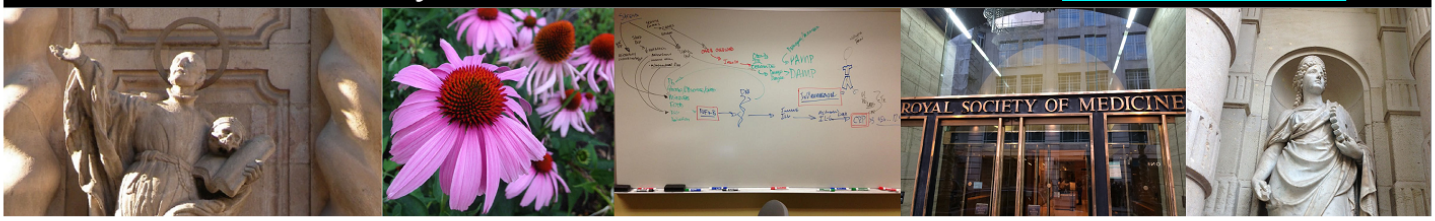

Perspective, Opinion, Editorial • Education • Academia • Wage Theft • Corruption

Ending the Exploitation of Experts Begins with Educating Them about Employment, Curbing Enthusiasm to Preserve Enthusiasm

Alex Vasquez DC ND DO FACN

My own paths toward and perspectives on Education

My passion for teaching and education began "formally" when I was about 9 years of age, sitting on the floor of Ms Hall's 4th grade classroom; from that vantage as I sat somewhat near my best friend Robert, I saw the destructive power of bad teaching and discrimination, and from that day I started analyzing teachers, teaching methods, educational and social structures, and ways to convey knowledge and inspire students. Additionally inspired by my teacher of English and Literature in my final years at Riverside Military Academy, I began college with the plan of eventually teaching "something—most likely English and Literature" because I appreciated and valued teaching, proper grammatical structure, and nuanced use of language; I later developed and interconnected my interests in teaching, writing, language, physiology, medicine, and nutrition to complete three doctorate degrees in the health sciences and publish more than 120 articles, letters, rebuttals, monographs, and books on a wide range of topics, with those publications ranging from dense 1-page Letters and Responses to published research up to single-author textbooks of more than 1,180 pages. I have taught at various colleges and universities at the undergraduate, graduate/Masters, and Doctorate levels and have lectured internationally for post-graduate medical education. I see teaching not simply as effective transferal of information, but also as a means to interconnect and inspire generations of people, notably in a reciprocal manner. At its best, teaching and learning are activities that reflect and support love for life itself.

Oh, the stories I could tell you about the innards of Academia, "nonprofits", and "accredited" schools

I would be happiest to tell you that Academics and Administrators are vanguards
support for fellow Professors, and
commitment is to truth and realit
setting ablaze the passions of the
they teach, lead, and supervise; I'
in flower fields like a professoria
singing a rhythmical rendition of "*The Hills are Alive…with the…Passions of Education and Intellectual Integrity*." But a pollyannic representation of my observations would be a misrepresentation of the realities I have seen and experienced. I have seen university presidents lie to their students, expel experts for the sake of maintaining their own petty powers and preferences, and I have seen entire academic administrations lie (misrepresent) in unison to their boards of trustees and their accreditation commissions. I have seen stand-alone academic programs make millions of dollars in profit, while its administrators refuse to pay a living wage to doctorate-level infrastructure and while allowing themselves 6-week European vacations during major institutional initiatives. I have seen administrators lie to accreditors and allow students to cheat their way through graduate programs (by bypassing faulty examination software in online programs), and I have seen accreditors turn a blind eye to obvious university corruption, made worse when the accreditation commission is infiltrated by university administrators—thus did "accreditation" come to lose its value. I have seen "nonprofit educational institutions" underpay their faculty, plagiarize from their faculty, resell the work of other professionals without notice or compensation, and then pay their upper administrators in excess of US$160,000 for less than part-time work—thus did "nonprofit organization" come to lose its value. I have seen schools blackmail excellent professors and leaders in education with gag orders, legal threats, and financial bribery (range US$25,000 up to $250,000) to buy their silence about institutional corruption. I have corresponded with employment attorneys, State Attorneys General, and US Department of Education, most of whom shrugged their shoulders and said, "That's the way it is in academia." Sorry

PDF articles: Full-text archives of the author's articles are available:

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Citation: Vasquez A. Ending the Exploitation of Experts Begins with Educating Them about Employment, Curbing Enthusiasm to Preserve Enthusiasm. *Int J Hum Nutr Funct Med* 2016; epub in press

Mitochondrial Medicine Arrives to Prime Time in Clinical Care: Nutritional Biochemistry and Mitochondrial Hyperpermeability ("Leaky Mitochondria") Meet Disease Pathogenesis and Clinical Interventions

Alex Vasquez, DC, ND, DO, FACN

Alex Vasquez, DC, ND, DO, FACN, is director of programs at the International College of Human Nutrition and Functional Medicine in Barcelona, Spain and online at ICHNFM.org. (*Altern Ther Health Med.* 2014;20(suppl 1):26-30.)

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MITOCHONDRIAL MEDICINE ARRIVES TO GENERAL PRACTICE AND ROUTINE PATIENT CARE

Mitochondrial disorders were once relegated to "orphan" status as topics for small paragraphs in pathology textbooks and the hospital-based practices of subspecialists. With the increasing appreciation of the high frequency and ease of treatment of mitochondrial dysfunction, this common cause and consequence of many conditions seen in both primary and specialty care deserves the attention of all practicing clinicians.

We all know that mitochondria are the intracellular organelles responsible for the production of the currency of cellular energy in the form of the molecule adenosine triphosphate (ATP); by this time, contemporary clinicians should be developing an awareness of the other roles that mitochondria play in (patho)physiology and clinical practice. Beyond being simple organelles that make ATP, mitochondria play clini… ce—contains inflammati… kinase and disease such… omparatively disorders su… n) and—like stated durin… h active and Nutrition a… that need to September … to appreciate mitochond… the highest mitochondrial dysfunction to clinical diseases must be considered on a routine basis in clinical practice. *Mitochondrial medicine* is no longer an orphan topic, nor is it a superfluous consideration relegated to boutique practices. Mitochondrial medicine is ready for prime time—now—both in the general practice of primary care as well as in specialty and subspecialty medicine. What I describe here as the "new" mitochondrial medicine is the application of assessments and treatments to routine clinical practice primarily for the treatment of secondary/acquired forms of mitochondrial impairment that contribute to common conditions such as fatigue, depression, fibromyalgia, diabetes mellitus, hypertension, neuropsychiatric and neurodegenerative conditions, and other inflammatory and dysmetabolic conditions such as allergy and autoimmunity.

BEYOND BIOCHEMISTRY

Structure and function are of course intimately related and must be appreciated before clinical implications can be understood and interventions thereafter applied with practical precision. The 4 main structures and spaces of the mitochondria are (1) intramitochondrial matrix—the innermost/interior aspect of the mitochondria containing various proteins, enzymes of the Krebs cycle, and mitochondrial DNA; (2) inner membrane—the largely impermeable lipid-rich convoluted/invaginated membrane that envelopes and defines the matrix and which is the structural home of many enzymes, transport systems, and important structures such as cardiolipin and the electron

importance; just as we have come to appreciate the

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THE CLINICAL IMPORTANCE OF VITAMIN D (CHOLECALCIFEROL): A PARADIGM SHIFT WITH IMPLICATIONS FOR ALL HEALTHCARE PROVIDERS

Alex Vasquez, DC, ND, Gilbert Manso, MD, John Cannell, MD

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OBJECTIVES

Upon completion of this article, participants should be able to do the following:

1. Appreciate and identify the manifold clinical presentations and consequences of vitamin D deficiency
2. Identify patient groups that are predisposed to vitamin D hypersensitivity
3. Know how to imple
proper doses and wi

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While we are all familiar with the important role of vitamin D in calcium absorption and bone metabolism, many doctors and patients are not aware of the recent research on vitamin D and the widening range of therapeutic applications available for cholecalciferol, which can be classified as both a vitamin and a pro-hormone. Additionally, we also now realize that the Food and Nutrition Board's previously defined Upper Limit (UL) for safe intake at 2,000 IU/day was set far too low and that the physiologic requirement for vitamin D in adults may be as high as 5,000 IU/day, which is less than half of the >10,000 IU that can be produced endogenously with full-body sun exposure.[1,2] With the discovery of vitamin D receptors in tissues other than the gut and bone—especially the brain, breast, prostate, and lymphocytes—and the recent research suggesting