Reducing Pain and Inflammation Naturally – Part 3: Improving Overall Health While Safely and Effectively Treating Musculoskeletal Pain

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Abstract: Following the optimization of diet and fatty acid balance, the next therapeutic steps in the treatment of pain and inflammation can include the use of vitamin D, chondroitin sulfate, niacinamide, and botanical medicines such as Boswellia. In direct contrast to so-called "anti-inflammatory drugs" which always have significant toxicity, each of these natural treatments has been proven in controlled clinical trials to significantly reduce pain and inflammation without major adverse effects. Chondroitin sulfate has actually been shown to reduce cardiovascular mortality in humans while it safely and effectively ameliorates the pain and inflammation of osteoarthritis. Similarly, vitamin D supplementation has been proven effective in the treatment of hypertension, depression, migraine headaches, polycystic ovary syndrome and in the prevention of type-1 diabetes. By failing to fully cover chiropractic and naturopathic healthcare services, insurance companies which comprise and contribute to the American healthcare system are losing profitability and forcing patients to use drug and surgical treatments that are commonly less effective, more dangerous, and more expensive than the natural treatments described in this paper. Services provided by chiropractic and naturopathic physicians are supported by peer-reviewed research and deserve equitable coverage and status in America's healthcare system.

INTRODUCTION

As primary care providers with specialized training in musculoskeletal medicine, chiropractic physicians typically play a dual role in clinical practice on a daily basis, generally striving to simultaneously accomplish two related goals in each patient: 1) promoting overall wellness and professionally-supervised patient-implemented preventive healthcare, and 2) alleviating acute and chronic musculoskeletal pain. Both of these goals are important given the tremendous financial and social impact of musculoskeletal pain and the progressive deterioration of Americans' health. At any given time, nearly thirty percent of the American population suffers from musculoskeletal pain, joint swelling, or limitation of movement, and approximately 1 of every 7 (14% of total) visits to a primary healthcare provider is for the treatment of musculoskeletal pain or dysfunction. Resulting in more than $100 billion in US healthcare costs each year, back pain is the most prevalent medical problem in the US, is the leading cause of long-term disability, and is the second leading cause of restricted activity and the use of prescription and non-prescription drugs.[1] The preventive healthcare and wellness promotion advocated and implemented by chiropractic and naturopathic physicians is now more important than ever since the health of the American population is consistently and progressively declining: obesity and diabetes are "ever-growing" epidemics among children and adults,[2] infant mortality has recently increased for the first time in 40 years,[3] and self-reported health status and health-related quality of life among adults are declining.[4] In the 25 years between 1975 and 2000, the incidence of cancer increased significantly, and the number of people diagnosed with cancer is expected to double in the next several decades.[5] Despite these negative health trends, America spends more on healthcare than does any other nation—an unprecedented $1.55 trillion, which is roughly 15% of the US gross domestic product.[6] From the perspective of cost-effectiveness, the medically-dominated American healthcare system delivers a very poor return on investment, and it appears that assertive wellness promotion and increased utilization of chiropractic and naturopathic healthcare may provide improved outcomes and decreased overall healthcare costs.[7,8]

Numerous adverse effects are produced as a direct result of medical/pharmaceutical management of benign musculoskeletal pain. According to a 1998 review by Singh,[9] "Conservative calculations estimate that approximately 107,000 patients are hospitalized annually for nonsteroidal anti-inflammatory drug (NSAID)-related gastrointestinal (GI) complications and at least 16,500 NSAID-related deaths occur each year among arthritis patients alone. The figures for all NSAID users would be overwhelming, yet the scope of this problem is generally under-appreciated." More recently following the withdrawal of the arthritis drug rofecoxib (Vioxx) in late September 2004, Topol[10] extrapolated that as many as 160,000 adverse cardiovascular events (including stroke, myocardial infarction, and death) may have resulted from the collusion of Merck's intentional failure to withdraw what was known for years to be a dangerous drug, the FDA's failure to enforce regulatory standards to protect the public, and the overutilization of Vioxx by the medical profession, which was well informed of the lethality of Vioxx for several years[11] before Merck's confessionary and belated withdrawal of the drug. Soon thereafter, several other so-called "anti-inflammatory drugs" such as valdecoxib (Bextra),[12] celecoxib (Celebrex),[13] and naproxen (Aleve)[14] were likewise associated with excess cardiovascular injury and death. Although the advertising-induced feeding frenzy on Celebrex made it the most successful drug launch in US history with more than 7.4 million prescriptions written within its first 6 months,[15]

within 2 years of its release, evidence linking the drug to increased cardiovascular events (including death) was accumulating,[11] and the drug has since been linked to a wide range of adverse effects such as membranous glomerulopathy and acute interstitial nephritis,[16] acute cholestatic hepatitis,[17] and toxic epidermal necrolysis.[18] When compared with placebo in cardiac surgery patients, Bextra/valdecoxib is associated with a 3-fold to 4-fold increased risk of heart attack, stroke, and death,[19] and currently 7 million arthritis patients, many of whom are already at high risk for cardiovascular disease, are being treated with this drug.[12]

Increasingly aware of the negative effects of pharmaceutical management of musculoskeletal pain, patients and healthcare providers alike are looking to natural treatments and chiropractic healthcare[20,21] with the hopes of avoiding the risks of iatrogenic disease, such as drug-induced renal failure,[22] hepatotoxicity,[23] gastrointestinal ulceration and hemorrhage,[24] osteonecrosis,[25,26] joint degeneration,[27,28] hypertension,[28] myocardial infarction,[11] and premature death[11,12] that are associated with the non-steroidal anti-inflammatory drugs ("NSAIDs"), non-NSAID analgesics such as acetaminophen, and the relatively new selective cyclooxygenase-2 inhibitors (cox-2 inhibitors, or "coxibs"). It is tragically paradoxical that many of the pharmaceutical drugs used for the suppression of arthritis symptoms and advertised as "arthritis relief" actually exacerbate joint destruction and chronic inflammation by interfering with the biosynthesis of the glycosaminoglycans that are essential components of joint cartilage while also promoting destruction of subchondral bone.[25,26,27,28] This places chiropractic physicians in an ethical dilemma when helping patients who have been prescribed potentially dangerous medications by their medical doctors. On the one hand, chiropractic physicians are aware of the research showing that, for example, coxibs provide little clinical benefit while promoting increased cardiovascular mortality and other potentially lethal adverse effects. On the other hand, if a chiropractic physician advises discontinuation of the medication, he or she may be reprimanded for "practicing medicine." It appears that chiropractic physicians will need to obtain limited prescription rights for the sake of helping protect their patients from iatrogenic and drug-induced disease. Given that chiropractic physicians are already duly trained in basic and clinical sciences sufficient for primary care, post-graduate certification courses in pharmacology would be sufficient if additional training is deemed necessary to obtain these prescription rights.

The first two articles in this series reviewed the importance of diet and fatty acids in the alleviation of pain and inflammation. This article reviews the most commonly used and well-researched nutritional and botanical interventions for the treatment of pain and inflammation, namely vitamin D, glucosamine and chondroitin sulfate, niacinamide, vitamin D, proteolytic enzymes, Devil's Claw *(Harpagophytum procumbens)*, Willow bark (*Salix* spp), and Boswellia *(Boswellia serrata)*. This review will provide chiropractic and naturopathic physicians with clinically useful information to help their patients attain improved health and well-being. Osteoarthritis and chronic low-back pain, the two most prevalent musculoskeletal afflictions, will serve as prototypes for this discussion.

SELECTED NUTRITIONAL AND BOTANICAL THERAPEUTICS FOR THE ALLEVIATION OF JOINT PAIN AND INFLAMMATION

Subsequent to the overall health improvement and anti-inflammatory benefits provided by the supplemented Paleo-Mediterranean diet described previously, many patients who require additional anti-inflammatory interventions can be safely and effectively treated with the following phytonutraceuticals, each of which is supported by experimental and clinical data in humans. Mechanism(s) of action, indications, contraindications, dosage, and common drug interactions (if any) are listed for each.

Glucosamine and chondroitin sulfate: Glucosamine and chondroitin are the "building blocks" from which cartilage is built and oral supplementation is intended to enhance cartilage anabolism and to thus counteract the enhanced cartilage catabolism seen in destructive arthritic processes. Clinical trials with glucosamine and chondroitin sulfates have shown consistently positive results in clinical trials involving patients with osteoarthritis of the hands, hips, knees, temporomandibular joint, and low-back.[29,30,31,32,33,34] For example, glucosamine sulfate was superior to placebo for pain reduction and preservation of joint space in a 3-year clinical trial in patients with knee osteoarthritis.[36] Arguments against the use of glucosamine due to inflated concern about inefficacy or exacerbation of diabetes[37] are without scientific merit[38,39] as evidenced by a 90-day trial[40] of diabetic patients consuming 1500 mg of glucosamine hydrochloride with 1200 mg of chondroitin sulfate which showed no significant alterations in serum glucose or hemoglobin A1c and by the previously cited 3-year study which found significant clinical benefit and no adverse effects on glucose homeostasis. The adult dose of glucosamine sulfate is generally 1500-2000 mg per day in divided doses, and the dose of chondroitin sulfate is approximately 1000 mg daily. Both treatments are safe for multiyear use, and rare adverse effects include allergy and nonpathologic gastrointestinal upset. Clinical benefit is generally significant following 4-6 weeks of treatment and is maintained for the duration of treatment. In contrast to coxib and other mislabeled "anti-inflammatory " drugs that consistently elevate the incidence of cardiovascular disease,

death, and other adverse effects, supplementation with chondroitin sulfate appears to safely reduce the pain and disability associated with osteoarthritis while simultaneously reducing incidence of cardiovascular morbidity and mortality.[41,42] In a study with animals that spontaneously develop atherosclerosis,[43] administration of chondroitin sulfate appears to have induced regression of existing atherosclerosis. In a six-year study with 120 patients with established cardiovascular disease, 60 chondroitin-treated patients suffered 6 coronary events and 4 deaths compared to 42 events and 14 deaths in a comparable group of 60 patients receiving "conventional" therapy; chondroitin-treated patients reported enhancement of well-being while no adverse clinical or laboratory effects were noted during the 6 years of treatment.[44]

Vitamin D (cholecalciferol): Vitamin D insufficiency is epidemic in the United States and is extremely prevalent (>90%) among patients with chronic musculoskeletal pain[45] limb pain,[46] and low-back pain.[47] The mechanism by which this pain is produced has been clearly elucidated: 1) vitamin D deficiency causes a reduction in calcium absorption, 2) production of parathyroid hormone (PTH) is increased to maintain blood calcium levels, 3) PTH results in increased urinary excretion of phosphorus, which leads to hypophosphatemia, 4) insufficient calcium phosphate results in deposition of unmineralized collagen matrix on the endosteal (inside) and periosteal (outside) of bones, 5) when the collagen matrix hydrates and swells, it causes pressure on the sensory-innervated periosteum resulting in pain.[48] In patients with vitamin D deficiency, oral supplementation with vitamin D clearly produces anti-inflammatory benefits,[49,50] and treatment with vitamin D can safely lead to dramatic reductions in musculoskeletal pain in a large percentage of patients.[46,47] Routine annual measurement of vitamin D status should be the standard of care[51] since failure to diagnose vitamin D deficiency and to provide adequate replacement doses are both ethically questionable and scientifically unjustifiable in light of the low cost, manifold benefits, rare adverse effects, and high prevalence of vitamin D deficiency.[52,53] Physiologic requirements are approximately 4,000 IU per day in men[54] and can only be achieved with high-dose oral supplementation or full-body sun exposure on a frequent or preferably daily basis. As reviewed in the recent monograph by Vasquez et al,[55] relative contraindications include the use of thiazide diuretics or presence of a vitamin D hypersensitivity syndrome such as primary hyperparathyroidism, adrenal insufficiency, hyperthyroidism, hypothyroidism, or granulomatous disease such as sarcoidosis, Crohn's disease, or tuberculosis). Serum calcium is periodically monitored in patients receiving moderate doses of vitamin D (adult range 4,000 – 10,000 IU per day), since hypercalcemia is the best laboratory indicator of vitamin D excess. High doses of vitamin D (up to 100,000 IU per day) have been safely used during pregnancy[56,57] periodic testing of serum calcium is required to monitor and for hypercalcemia. Vitamin D supplementation has been proven effective in the treatment of hypertension, depression, migraine headaches, polycystic ovary syndrome and in the prevention of cancer and type-1 diabetes. [55]

Figure 2. Normal and optimal ranges for serum 25(OH) vitamin D levels based on current research.
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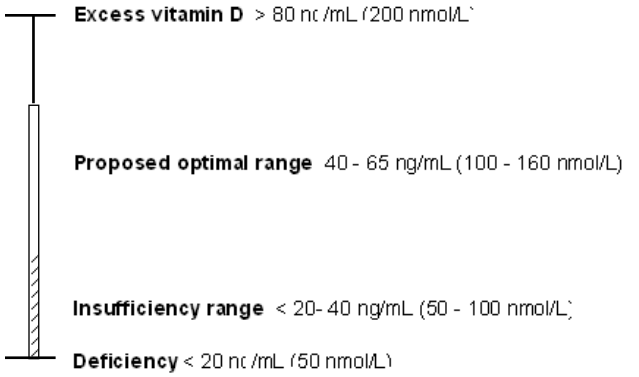

Proteolytic enzymes: Oral administration of proteolytic enzymes (such as pancreatin, bromelain, papain, trypsin and alpha-chymotrypsin) for therapeutic purposes is well established on physiologic, biochemical, and clinical grounds, and a brief review of their historical use is warranted. One of the first experimental studies was published by Beard in 1906 in the *British Medical Journal* wherein he showed that proteolytic enzymes significantly inhibited tumor growth in mice with implanted tumors,[58] and a year later in that same journal, Cutfield[59] reported tumor regression and other objective improvements in a patient treated with proteolytic enzymes. In the American research literature, anti-cancer effects of proteolytic enzymes were reported during this same time in the *Journal of the American Medical Association* in anecdotal case reports of patients with fibrosarcoma,[60] breast cancer,[61] and head and neck malignancy[62]—all of whom responded positively to the administration of proteolytic enzymes; no adverse effects were seen. Although nearly a century would pass before Beard's study and results were replicated with modern techniques,[63,64] by now it is well established that orally administered proteolytic enzymes are well absorbed from the gastrointestinal tract into the systemic circulation[65,66] and that the anti-tumor, anti-metastatic, anti-infectious, anti-inflammatory , analgesic, and anti-edematous actions result from synergism between a variety of mechanisms of action, including the dose-dependent stimulation of reactive oxygen species production and anti-cancer cytotoxicity in human neutrophils,[67] a pro-differentiative effect,[68]

reduction in PG-E2 production,[69] reduction in substance P production,[70] modulation of adhesion molecules and cytokine levels,[71] fibrinolytic effects and a anti-thrombotic effect mediated at least in part by a reduction in 2-series thromboxanes.[72] Unfortunately, enthusiasm for the enzyme treatment of cancer waned prematurely when trypsin was judged to not be a "miracle cure", when the mechanism of action could not be determined, and as enthusiasm surrounding drug and radiation treatments grabbed the attention of allopaths.[73] However, modern controlled clinical trials in cancer patients have established the value of enzyme therapy, which produces important clinical benefit (e.g., symptom reduction and prolonged survival) for little cost and with negligible adverse effects.[74,75,76] Research in other clinical applications for proteolytic enzymes has consistently shown benefit when properly formulated and manufactured preparations are administered appropriately in the treatment of cellulitis, diabetic ulcers, sinusitis, and bronchitis.[77] For example, in a double-blind placebo-controlled trial with 59 patients, Taub[78] documented that oral administration of bromelain significantly promoted the resolution of congestion, inflammation, and edema in patients with acute and chronic refractory sinusitis; no adverse effects were seen in any patient.

When not treating patients with cancer or infectious disease, chiropractic and naturopathic physicians today use these enzymes mostly for the treatment of inflammatory and injury-related disorders. Reporting from the Tulane University Health Service Center, Trickett[79] reported that a papain-containing preparation benefited 40 patients with various injuries (e.g., contusions, sprains, lacerations, strains, fracture, surgical repair, and muscle tears); no adverse effects were seen. In a recent open trial of patients with knee pain, Walker et al[80] found a dose-dependent reduction in pain and disability as well as a significant improvement in psychological well-being in patients consuming bromelain orally. Most of the studies reviewed by Brien et al[69] were suggestive of a positive benefit in patients with knee osteoarthritis, but inadequate dosing clearly prohibited the attainment of optimal results. Bromelain also attenuates experimental contraction-induced skeletal muscle injury,[81] reduces production of hyperalgesic PG-E2 and substance P, is generally effective in the amelioration of trauma-induced injury, edema, and inflammation, and is practically non-toxic.[70] Although bromelain may be used in isolation, enzyme therapy is generally delivered in the form of polyenzyme preparations containing pancreatin, bromelain, papain, trypsin and alpha-chymotrypsin.

Niacinamide: Niacinamide is a form of vitamin B3 that was first shown to be highly effective in the treatment of osteoarthritis by Kaufman more than 50 years ago.[82] Furthermore, Kaufman's documentation of an "anti-aging" effect of vitamin supplementation in general and niacinamide therapy in particular[83] is consistent with recent experimental data demonstrating rapid reversion of aging phenotypes by niacinamide through possible modulation of histone acetylation.[84] A recent double-blind placebo-controlled repeat study found that niacinamide therapy improved joint mobility, reduced objective inflammation as assessed by ESR, reduced the impact of the arthritis on the activities of daily living, and allowed a reduction in medication use.[85] While the mechanism of action is probably multifaceted, inhibition of joint-destroying nitric oxide appears to be an important benefit.[86] The standard dose of 500 mg given orally 6 times per day is more effective than 1,000 mg 3 times per day. Hepatic dysfunction is rare when daily doses are kept below 3,000 mg per day, yet Gaby[87] suggests measurement of liver enzymes after 3 months of treatment and yearly thereafter. Antirheumatic benefit is generally significant following 2-6 weeks of treatment, and patients may also notice an anxiolytic benefit, which is probably due to the binding of niacinamide to GABA/benzodiazepine receptors.[88]

Boswellia (Boswellia serrata): *Boswellia* shows anti-inflammatory action via inhibition of 5-lipoxygenase with no apparent effect on cyclooxygenase. A recent clinical study showed that *Boswellia* was able to reduce pain and swelling while increasing joint flexion and walking distance in patients with osteoarthritis of the knee.[89] While reports from clinical trials published in English are relatively rare, a recent abstract from the German medical research[90] stated, "In clinical trials promising results were observed in patients with rheumatoid arthritis, chronic colitis, ulcerative colitis, Crohn's disease, bronchial asthma and peritumoral brains edemas." Additional recent studies have confirmed the effectiveness of Boswellia in the treatment of asthma[91] and ulcerative colitis.[92] Minor gastrointestinal upset has been reported. Products are generally standardized to contain 37.5–65% boswellic acids, which are currently considered the active constituents with clinical benefit. The target dose is approximately 150 mg of boswellic acids thrice daily; dose and number of capsules/tablets will vary depending upon the concentration found in differing products. Lower doses are effective when used as a part of a comprehensive, multicomponent treatment plan.

Devil's Claw (Harpagophytum procumbens): *Harpagophytum* has a long history of use in the treatment of musculoskeletal complaints, and recent clinical trials have substantiated its role as a moderately effective analgesic suitable for clinical utilization. At least 12 clinical trials have been published on the use of *Harpagophytum* in

the treatment of musculoskeletal pain, and all trials have found the botanical to be clinically valuable and with adverse effects comparable to placebo.[93] *Harpagophytum's* clinical benefit appears to derive chiefly from its analgesic effect, since administration of the herb does not alter eicosanoid production in humans. In patients with osteoarthritis of the hip and knee, *Harpagophytum* is just as effective yet safer and better tolerated than the drug diacerhein.[94,95] In a study involving 183 patients with low-back pain, *Harpagophytum* was found to be safe and moderately effective in patients with "severe and unbearable pain" and radiating pain with neurologic deficit.[96] Most recently, *Harpagophytum* was studied in a head-to-head clinical trial with the formerly popular but dangerous selective cox-2 inhibitor Vioxx (rofecoxib); the data indicate that *Harpagophytum* was safer and at least as effective.[97] About 8% of patients may experience diarrhea or other mild gastrointestinal effects, and fewer patients may experience dizziness; *Harpagophytum* may potentiate anticoagulants. Treatment should be continued for at least 4 weeks, and many patients will continue to improve after 8 weeks from the initiation of treatment.[98] Products are generally standardized for the content of harpagosides, with a target dose of at least 30 and up to 60 mg harpagoside per day. However, the whole plant is considered to contain effective constituents, not only the iridoid glycosides. Chrubasik[99] noted that while *Harpagophytum* appears to be safe and moderately effective for the treatment musculoskeletal pain, different proprietary products show significant variances in potency and clinical effectiveness. Data suggest that *Harpagophytum* is better than placebo and at least as good as commonly used NSAIDs, suggesting that Harpagophytum should be clinically preferred over NSAIDs due to the lower cost and what appears to be greater safety.

Willow bark (Salix spp): In a double-blind placebo-controlled clinical trial in 210 patients with moderate/severe low-back pain (20% of patients had positive straight-leg raising test), extract of willow bark showed a dose-dependent analgesic effect with benefits beginning in the first week of treatment.[100] In a head-to-head study of 228 patients comparing willow bark (standardized for 240 mg salicin) with Vioxx (rofecoxib), treatments were equally effective yet willow bark was safer and 40% less expensive.[101] Actions of willow bark are manifold including anti-oxidative, anti-cytokine, along with cyclooxygenase- and lipoxygenase-inhibiting effects. A non-purified extract of the phytomedicinal is required for full clinical benefit. The daily dose should not exceed 240 mg of salicin, and products should include other components of the whole plant. Except for rare allergy, no adverse effects are known, yet use during pregnancy and with anti-coagulant medication is discouraged.

SPINAL MANIPULATION: MECHANISMS OF ACTION AND SYNERGISM WITH NUTRITIONAL/BOTANICAL INTERVENTIONS

Select nutritional interventions as surveyed in this paper may have enhanced effects and benefits when combined with spinal manipulative therapy. For example, enhanced respiratory burst clearly carries both antitumor and antimicrobial benefits, and this physiologic effect can be induced by oral consumption of proteolytic enzymes as well as by chiropractic spinal manipulative therapy.[102] Likewise, we would expect synergism between spinal manipulative therapy[103] and nutritional[104] and botanical (e.g., Boswellia) interventions in the treatment of asthma, particularly since these treatments are mediated primarily via different mechanisms—namely the neurophysiologic inhibition of neurogenic inflammation and the biochemical reduction in pro-inflammatory mediators such as leukotrienes, respectively. As a final example, synergism would be expected in the treatment of low-back pain when spinal manipulation, therapeutic exercise, proprioceptive retraining, oral vitamin D supplementation, and botanical medicines such as *Harpagophytum* and Willow Bark are used together in holistic, integrative, multicomponent treatment plans.[105] Taken together, these data form an integrative model that incorporates and mechanistically validates the chiropractic "triad of health" which appreciates the interconnectedness of physical, biochemical, and neurologic aspects of human physiology.[105]

CONCLUSIONS

The chiropractic profession continues to develop and mature over time and with advances in research that further our understanding of health and disease and the value of diet, nutrition, exercise, spinal manipulation and other natural therapeutics. In contrast to our allopathic counterparts, chiropractic and naturopathic physicians are the only healthcare providers trained to consider each patient as an integrated being and to give specific attention to the physiological and biochemical aspects of health and disease, including structural, spinal, musculoskeletal, neurological, vascular, nutritional, emotional and environmental relationships.[106] The anti-inflammatory and analgesic nutritional and botanical medicines described in this review are generally appropriate for the treatment of inflammatory and degenerative musculoskeletal conditions, and they comprise an attractive alternative to the too-often lethal effects of pharmacologic anti-inflammatory and anti-rheumatic drugs.

If we consider that medical/surgical interventions result in an excess of 110,000 – 225,000 iatrogenic American deaths each year,[107,108] we could reasonably conclude that

undue restriction of chiropractic and naturopathic physicians to practice preventive healthcare and the discriminatory legal and financial barriers that inhibit patients from accessing alternatives to drugs and surgery ultimately deny patients' access to safe, effective, cost-effective, empowering, affordable healthcare by simultaneously restricting them to interventions that carry greater risk for harm and greater financial expense. With ever-increasing costs and ever-worsening health outcomes, the American healthcare system is destined for collapse unless we change the model upon which our healthcare system is founded—namely the belief that surgery and chemical drugs are the solutions to chronic diseases induced by nutritional deficiencies, oxidative stress, impaired detoxification, defects in fatty acid metabolism, altered gastrointestinal function, and neuromusculoskeletal dysfunction. We have reached an irrevocable impasse in which our current healthcare system dominated by drugs and surgery is no longer consistent with the balance of scientific research.[109] The time has come for patients and practitioners of natural healthcare to demand change and equitable access within the healthcare arena.

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

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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**
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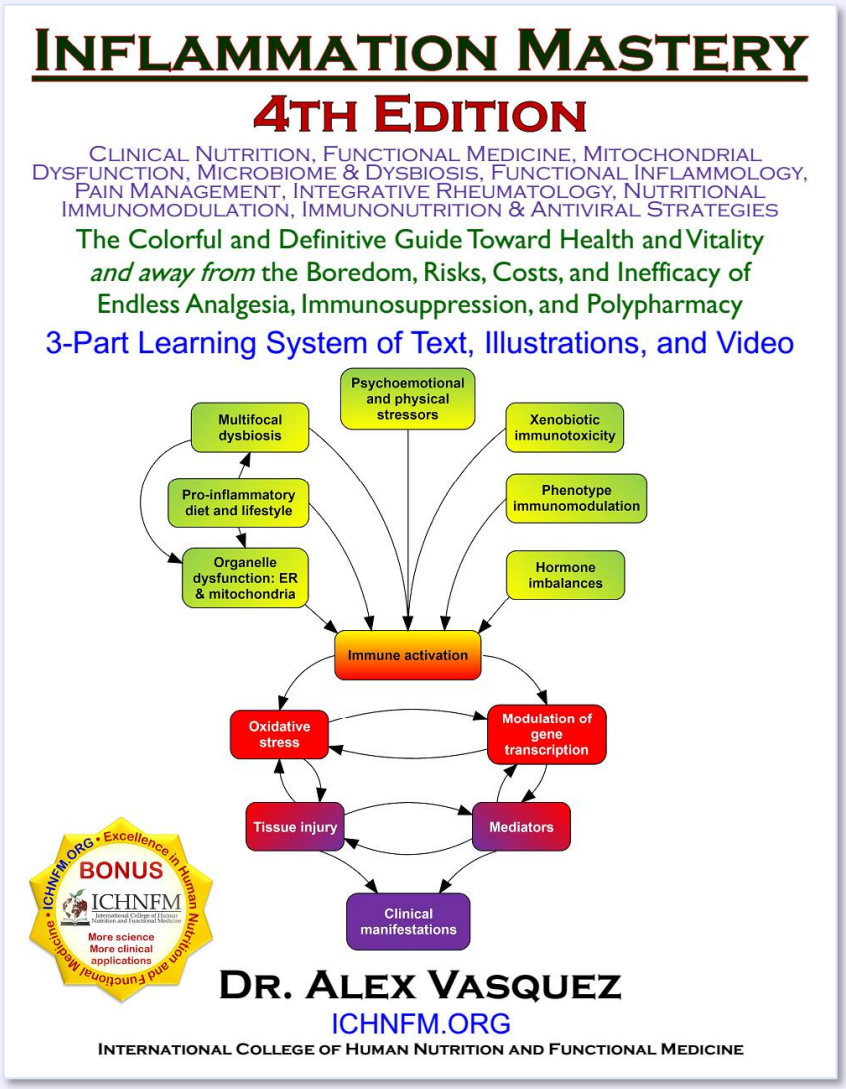

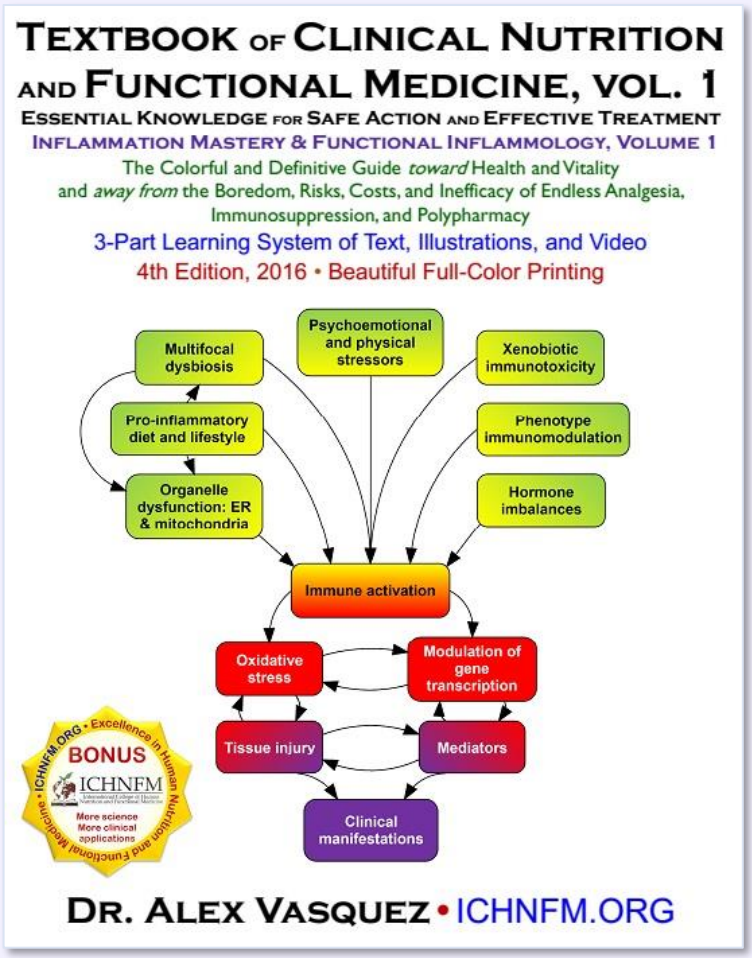

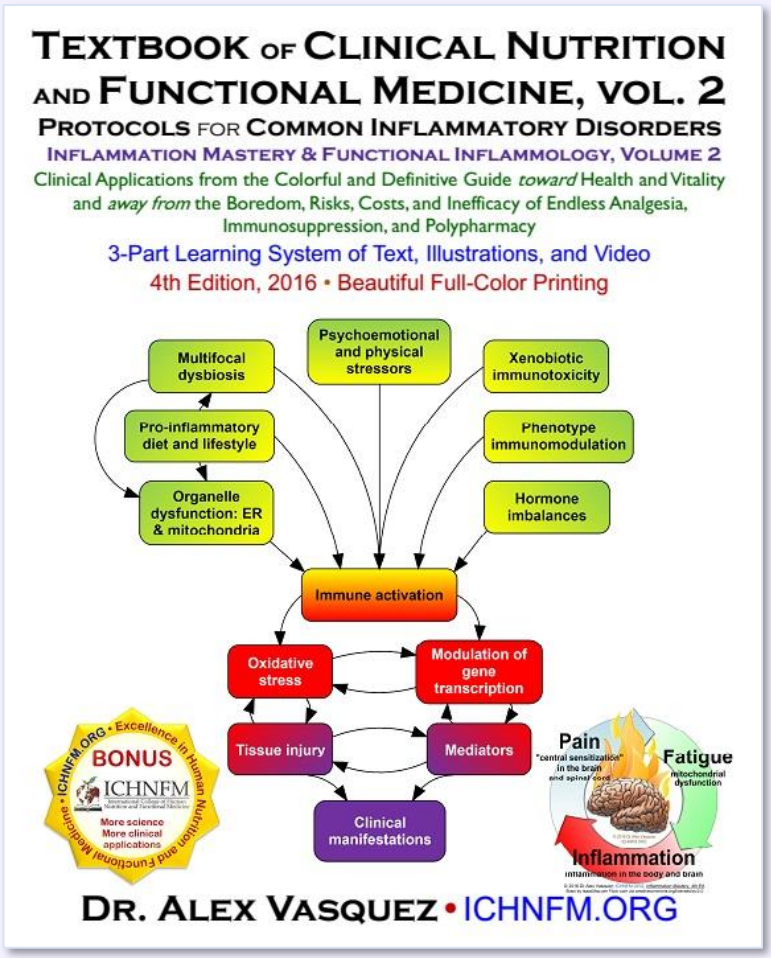

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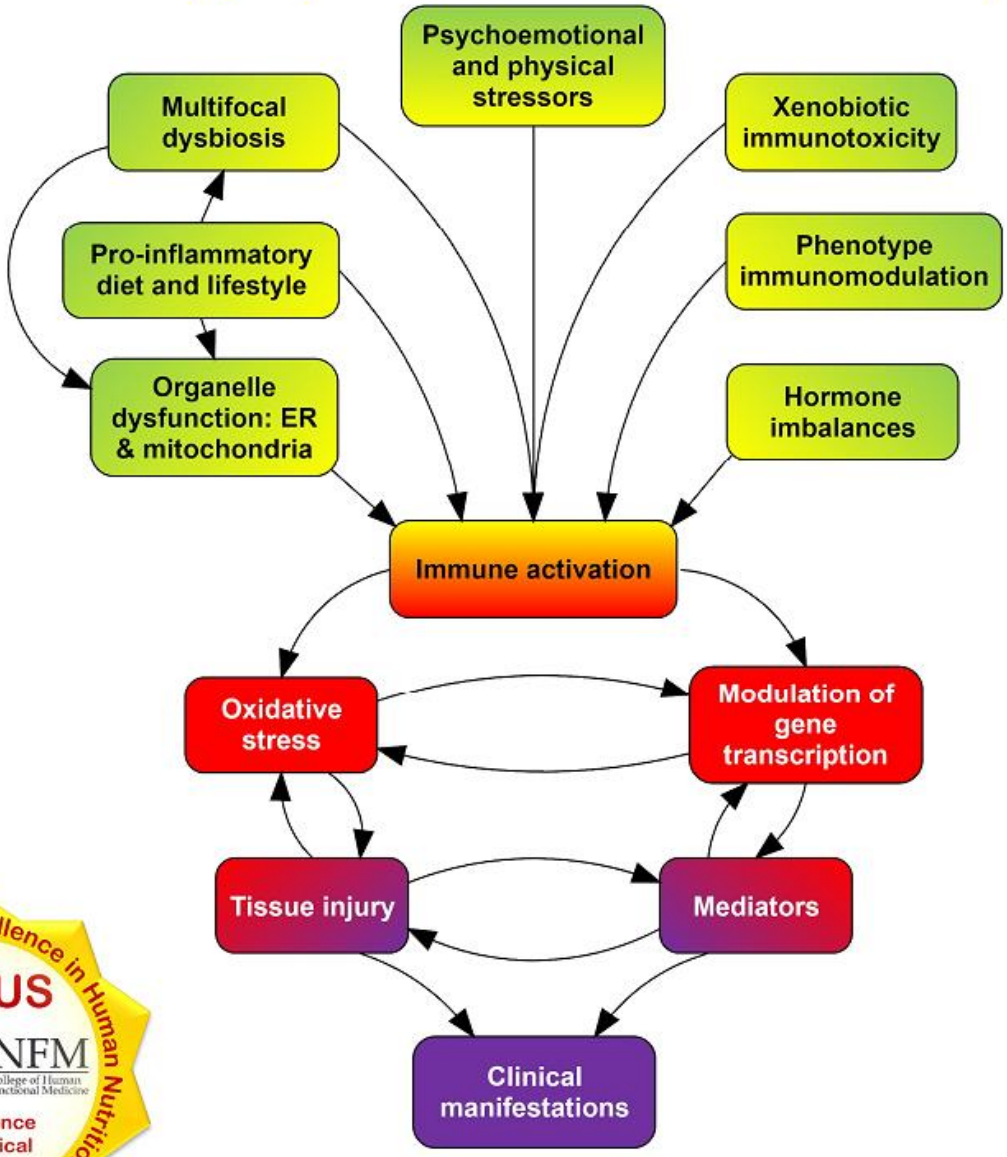

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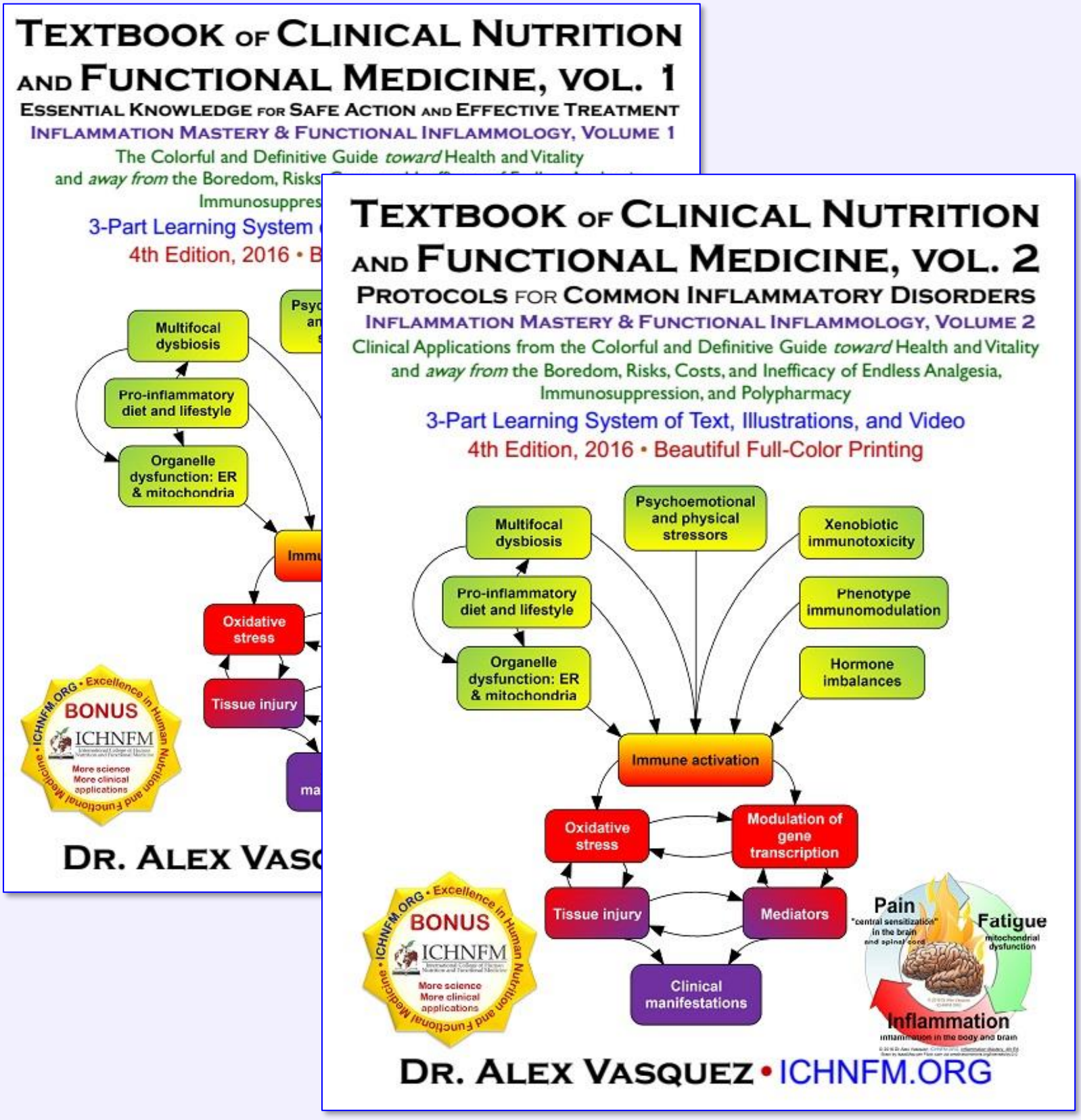

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    - Former Adjunct Professor of Orthopedics (2000), Radiographic Interpretation (2000), and Rheumatology (2001), Naturopathic Medicine Program, Bastyr University
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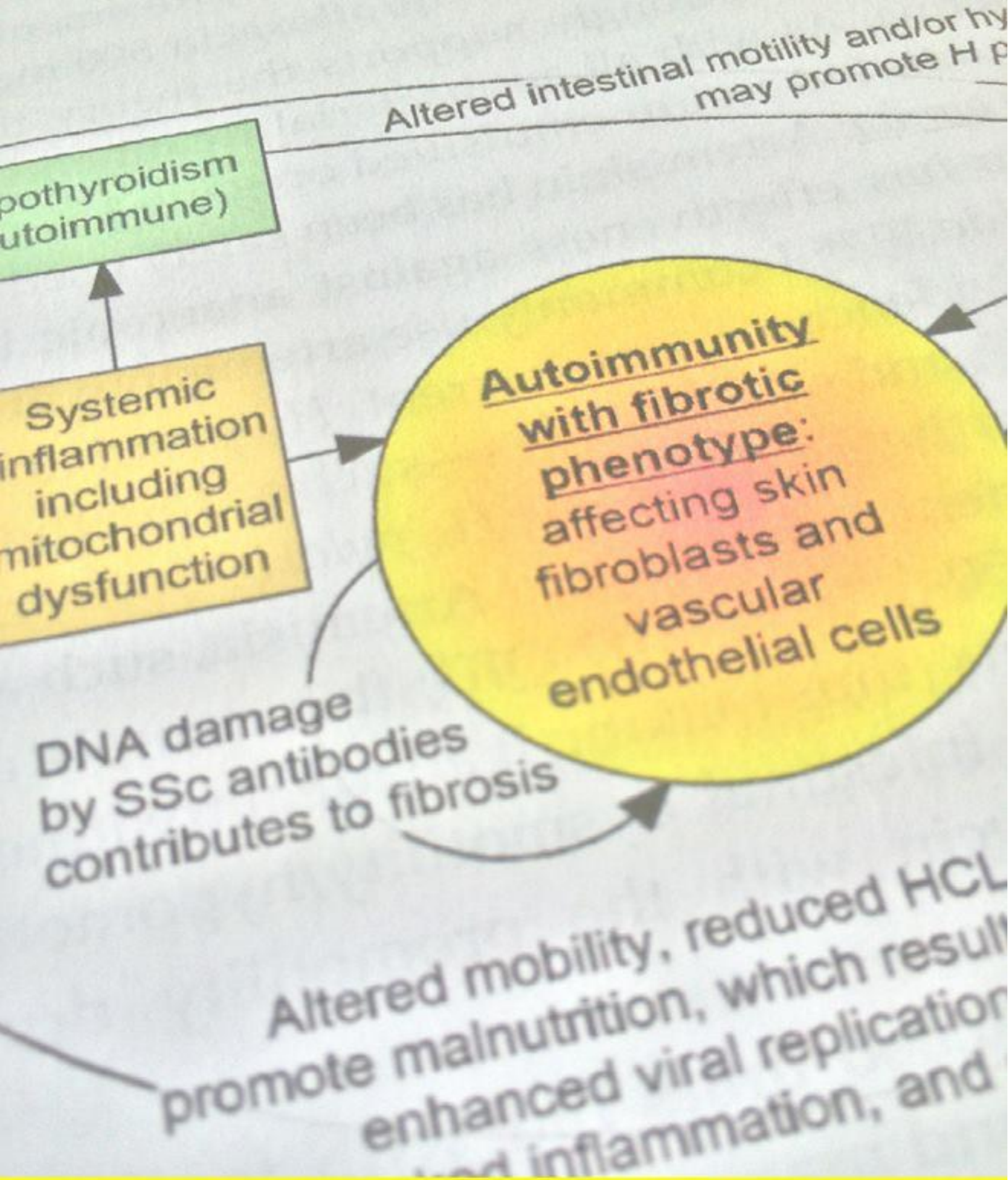

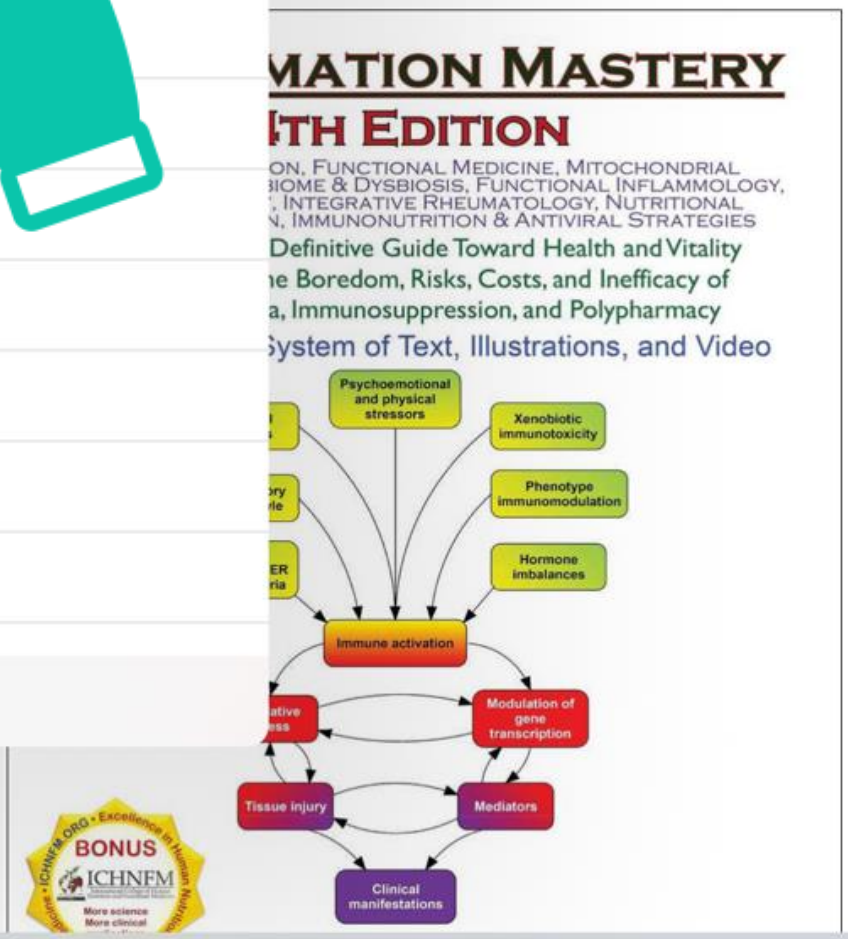

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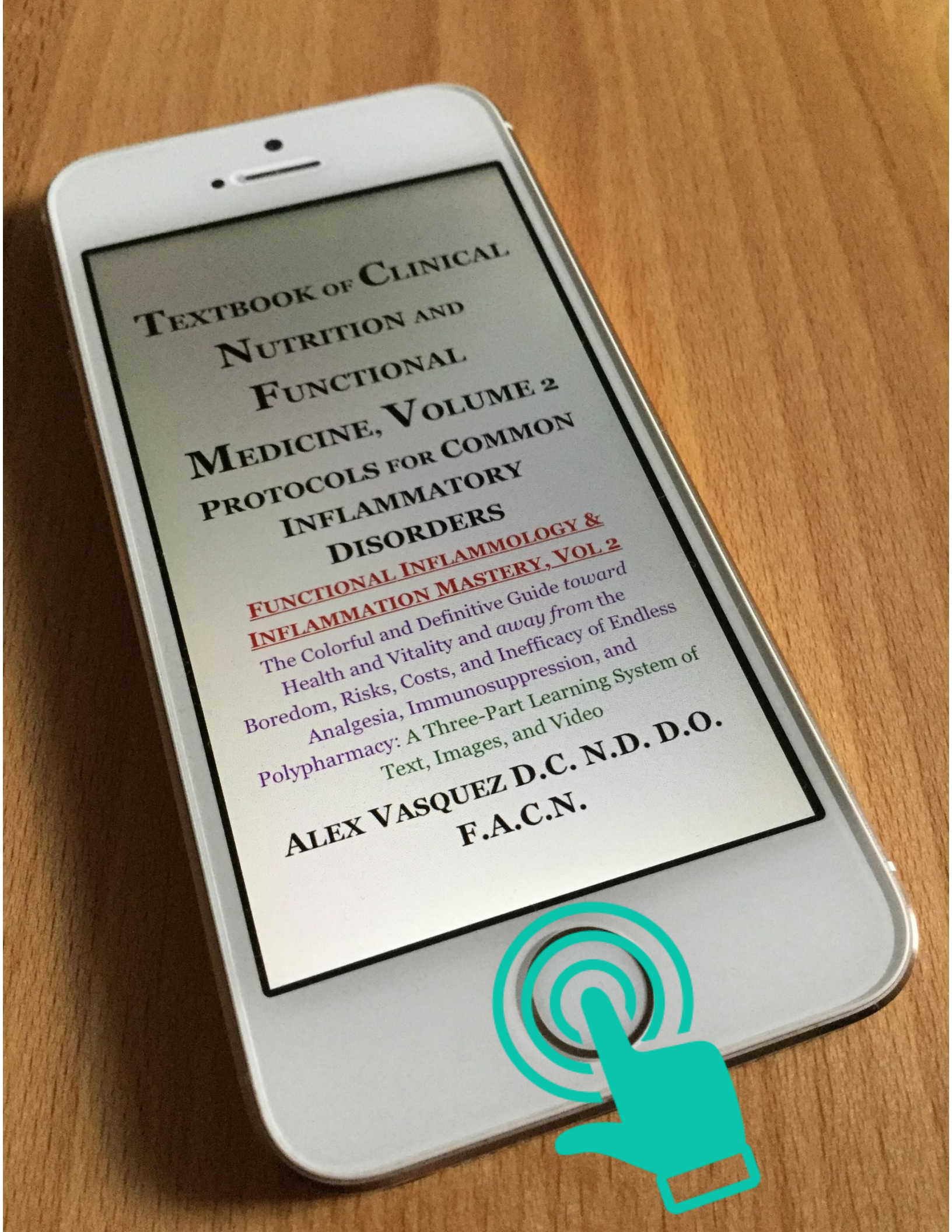
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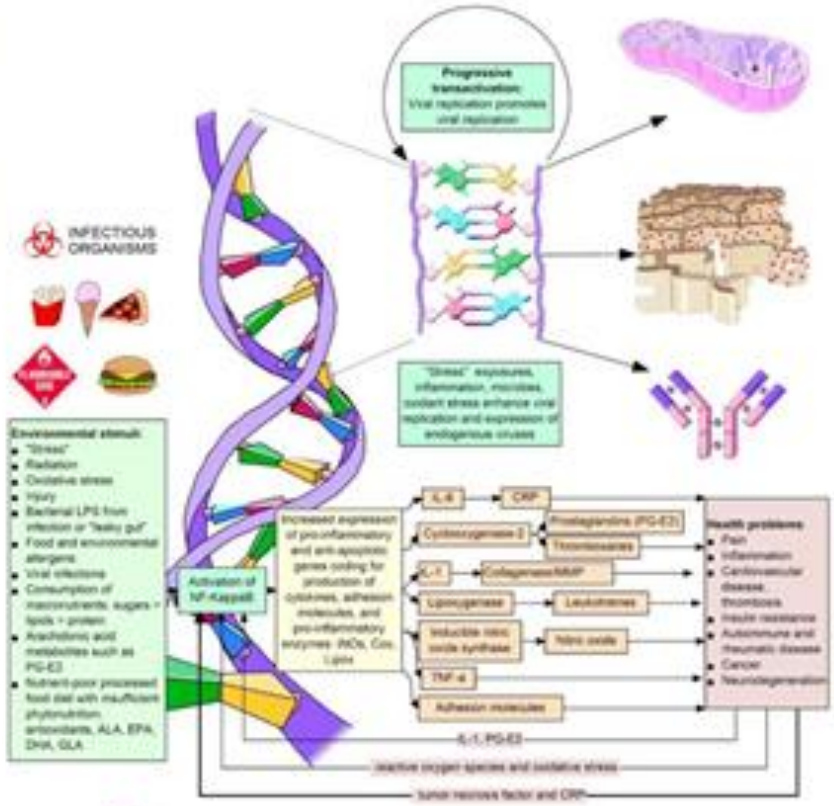

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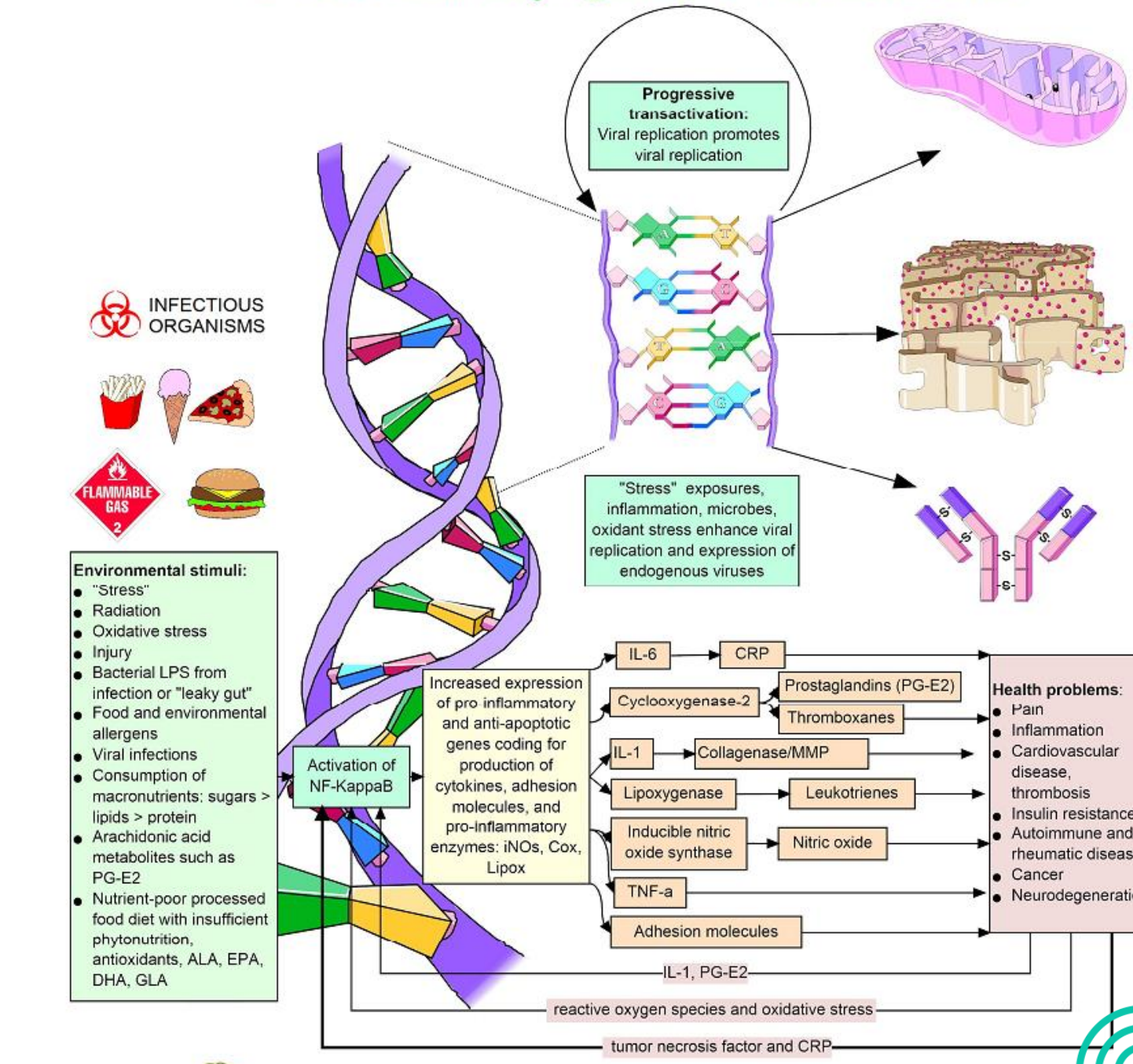

Dr. Alex Vasquez

InflammationMastery.com

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 ent policy and worldwide.[2] While ons of people. a specific disease examples of human populatio lications, lists nutrition researcl sed solutions. particularly conte pendent upon nutrition researcl stigative and healthcare profess s of clinical nutrition. Clinical rovements are vast majority of ignorance in medical training p are obviously i gastroenterology[7] tion training in clini proclaims itself a eview recent including the enti publications 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 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.

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- **VIDEO**: BRIEF Critique of "Effects of n−3 Fatty Acid Supplements in Diabetes Mellitus: ASCEND Study" https://vimeo.com/287650812
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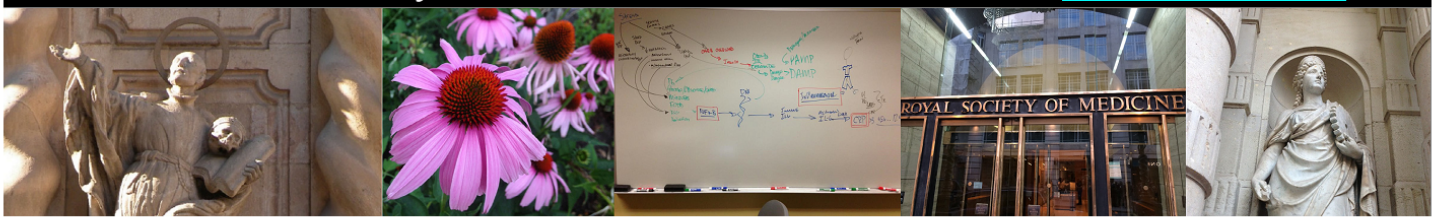

Perspective, Opinion, Editorial • Education • Academia • Wage Theft • Corruption

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 Academia, "nonprofits", and "

I would be happiest to tel
Administrators are vanguard
support for fellow Professors, a
commitment is to truth and rea
setting ablaze the passions of t
they teach, lead, and supervise
in flower fields like a professo

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

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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 1

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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Source: *International Journal of Human*
International College of Human Nutritio
Citation: Vasquez A. How to Improve S
Med 2019;7:1 https://www.ichnfm.org/jo Externally archived at https://www.academia.edu/38426978

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 some instances, 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 uns their lack of formal education on the topic, and stream 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 keep them ignorant on important topics; our educational sys-

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 ISSN 0317-0209

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

Nutrition and Functional Medicine[1] in Portland, Oregon, in September 2013, we have collectively arrived at a time when mitochondrial therapeutics and the contribution of 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

passive transport systems for select molecules that need to enter and exit the mitochondria. Clinicians need to appreciate that mitochondrial membrane integrity is of the highest importance; just as we have come to appreciate the

JOURNAL OF ORTHOMOLECULAR MEDICINE

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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 mo school in the early 1990s. trition" book that I read as *Your Nerves* (1975) by me this was followed immedi tures of Jonathan V Wrigh of whom would later be m University. By the mid-199 Jeffrey Bland PhD had int tional medicine, which I and personal[3] reasons. By contained several hundred tion 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 human- utions; we can reasonably and competent healthcare dequate nutrition) are basic submit a counterargument r all of my assertions, they and more to the point, my regardless of personal po- —we share some common uding the following:

nd deliver the best health- roblem, then we each want the best possible solution. Efficiency of time or money is not the top priority when we are seeking solutions

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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 art… dysbiosis le… 2010, I fou… "dysbiosis" … than 1,200 … concept has … popular, bu… to do with it … *Medicine* … microbiota … *the comple… Project, the number of scientific papers linking the microbes that live in our gut to diseases ranging from diabetes and colitis to anxiety and depression has grown exponentially. Yet, these tantalizing connections have yielded few benefits from a therapeutics standpoint*."[5] To the extent that this information is being integrated into clinical practice at all, the current level of 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 …opular to the …nical clues. …ratory testing …rticular used …ods to extract …ney only to …uffering and

"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.

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…M
International College of Human Nutrition and Functional Medicine

ICHNFM has many videos on the topics of dysbiosis, persistent infections, and dysbiotic clinical conditions such as fibromyalgia at www.Vimeo.com/ICHNFM

Citation: Vasquez A. Translating Microbiome (Microbiota) and Dysbiosis Research into Clinical Practice: The 20-Year Development of a Structured Approach that Gives Actionable Form to Intellectual Concepts. *Int J Hum Nutr Funct Med* 2015;v3(q2):p1

CME
CONTINUING MEDICAL EDUCATION

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

Alex Vasquez, DC, ND is a licensed naturopathic physician in Washington and Oregon, and licensed chiropractic doctor in Texas, where he maintains a private practice and is a member of the Research Team at Biotics Research Corporation. He is a former Adjunct Professor of Orthopedics and Rheumatology for the Naturopathic Medicine Program at Bastyr University. Gilbert Manso, MD, is a medical doctor practicing integrative medicine in Houston, Texas. In practice for more than 35 years, he is Board Certified in Family Practice and is Associate Professor of Family Medicine at University of Texas Medical School in Houston. John Cannell, MD, is a medical physician practicing in Atascadero, California, and is president of the Vitamin D Council (Cholecalciferol-Council.com), a non-profit, tax-exempt organization working to promote awareness of the manifold adverse effects of vitamin D deficiency.

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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 consequen
2. Identify patient grou
hypersensitivity
3. Know how to imple
proper doses and wi

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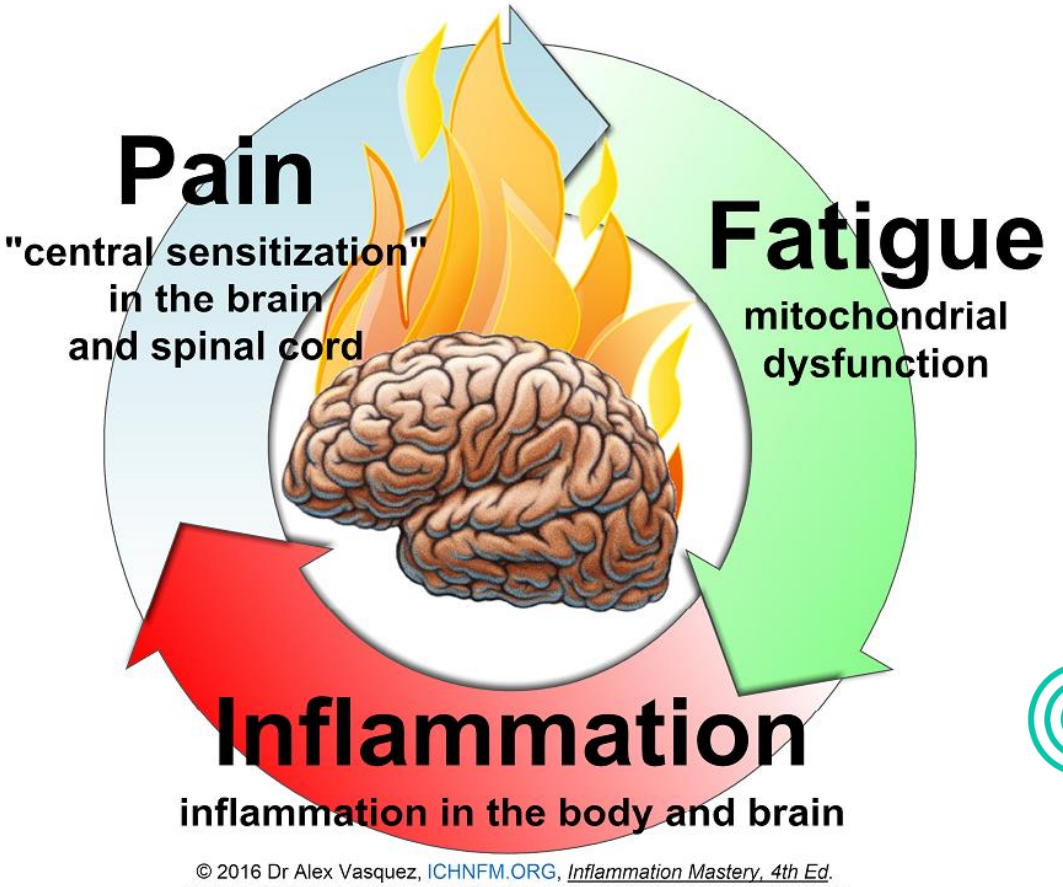
-therapies.com and selecting the Continu

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 tis-

Brain Inflammation
in Chronic Pain, Migraine and Fibromyalgia
The Paradigm-Shifting Guide for Doctors and Patients Dealing with Chronic Pain



Alex Vasquez, D.C., N.D., D.O., F.A.C.N.
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- **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

The New York Academy of Sciences 200 Years

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES
Issue: Annals *Reports*
COMMENTARY

Biological plausibility of the gut–brain axis in autism

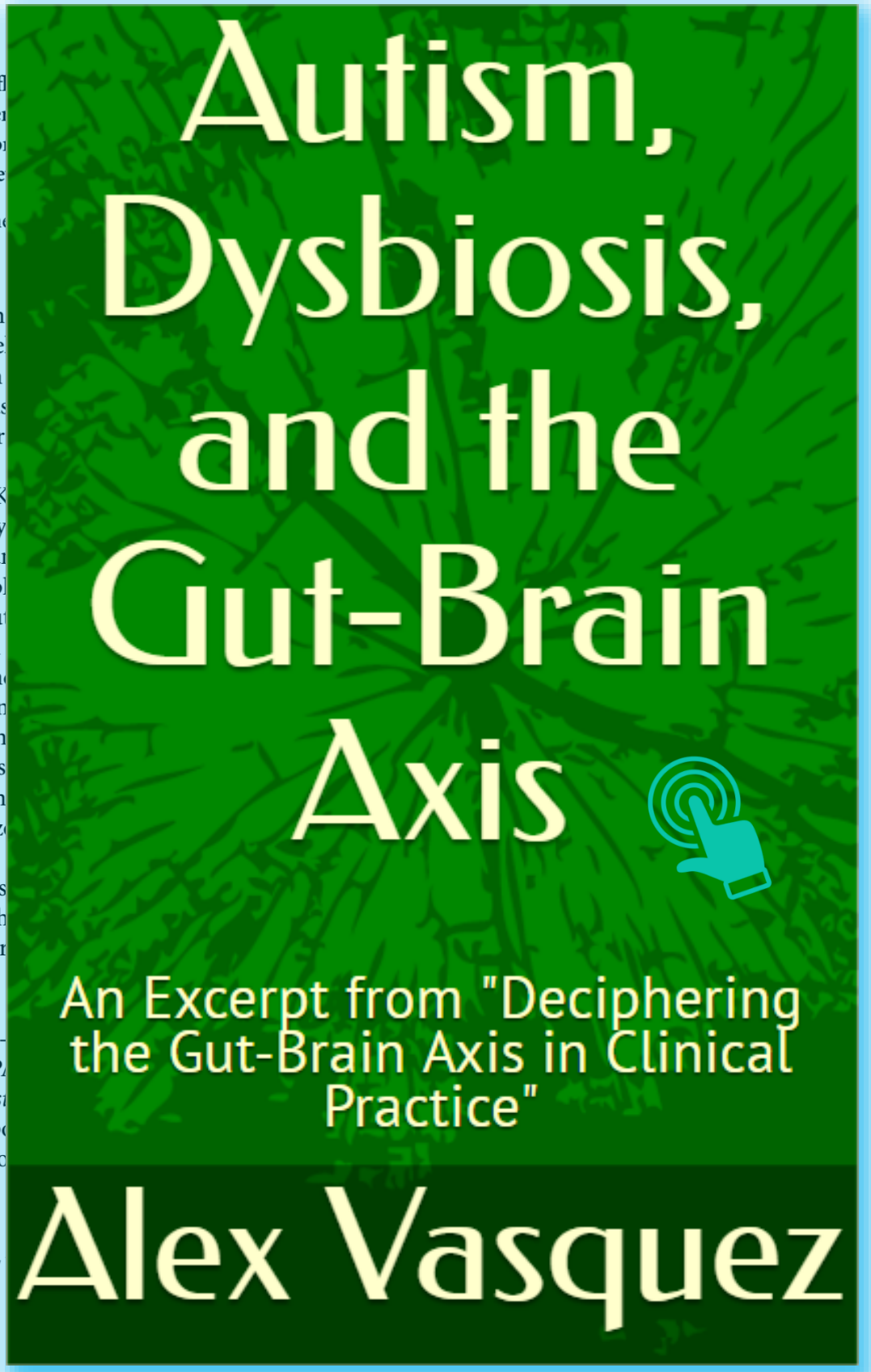
Alex Vasquez

**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



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Ann. N.Y. Acad. Sci. 0 (2017) 1–2

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