v Molecular and Physiologic Mechanisms of Systemic Enzyme Therapy: A Review for Clinicians

By Alex Vasquez, DC, ND

For reasons that are both political and clinical, naturopathic physicians need to have a complete, and preferably molecular or genomic, understanding of the interventions they use, whether dietary, nutritional, botanical or manual/manipulative. This is important politically because we have a need to explain the mechanisms of our treatments to our patients, as well as to policymakers, researchers and other clinicians.[1] Failure to explicate and articulate the mechanisms of their treatments makes otherwise effective and brilliant clinicians appear ignorant and unprofessional.

Clinically, mechanistic and molecular understandings of our interventions help us to fine-tune and synergize our treatments for the best possible clinical outcomes by guiding which patients will be treated and which additional therapeutics will be co-administered. Given that the oral administration of pancreatic/proteolytic enzymes for systemic benefits ("systemic enzyme therapy") is one of the most common nutritional/botanical treatments used by naturopathic doctors, this article will provide a review of this treatment's clinical benefits and molecular mechanisms, with emphasis on the latter. In this discussion, systemic enzyme therapy or the use of "oral enzymes" will be specified to mean the oral, between-meal administration of supplements containing pancreatin, bromelain, papain, amylase, lipase, trypsin and alpha-chymotrypsin; according to the research literature as well as clinical experience, polyenzyme preparations are more effective than the use of single enzymes.

Past and Current Use

Systemic enzyme therapy has been clinically used for more than a century, beginning with the early publications of Beard[2] and Cutfield[3] who both showed the anti-cancer effects of orally administered enzymes in animals and patients, respectively. Although these and other early reports[4-6] showed impressive efficacy and lack of toxicity in the treatment of cancer, they were generally ignored due to enthusiasm surrounding interventional radiation, since "X-rays" had been discovered by Roentgen just a few years earlier and radiation's cancer-causing effects were then unknown.

Current clinical uses of pancreatic/proteolytic enzymes are varied, ranging from improved digestion (when taken with meals) to systemic benefits (when taken between meals). Briefly, systemic enzyme therapy commonly is used in the treatment of cellulitis, diabetic ulcers, sinusitis, bronchitis,[7-8] injury-related disorders including contusions, sprains, lacerations, and muscle injuries[9-10] and osteoarthritis (OA).[11-12] Use of systemic enzyme therapy in the treatment of cancer is well-supported by experimental and clinical studies.[13-18]

Physiologic Effects

Physiologic mechanisms of systemic enzyme therapy have been discussed in several of my recent reviews[19-21] and will briefly be listed here before advancing to the more detailed molecular mechanisms. Briefly, proteolytic enzymes are well-absorbed from the gastrointestinal tract into the systemic circulation[22-23] to exert anti-tumor, anti-inflammatory, anti-edematous and immunostimulatory actions which are the result of different and synergistic effects including: 1) dose-dependent stimulation of reactive oxygen species production and anti-cancer cytotoxicity in human neutrophils; 2) a pro-differentiative effect; 3) reduction in PG-E2 production; 4) reduction in substance P production; 5) modulation of adhesion molecules; 6) fibrinolytic effects; and 7) an anti-thrombotic effect mediated at least in part by a reduction in 2-series thromboxanes.[24-27]

Molecular Mechanisms - New Data

Patients with degenerative and inflammatory arthropathies (e.g., osteoarthritis and rheumatoid arthritis (RA)) have increased synovial concentrations of tissue-destroying proteases such as the matrix

metalloproteinases (MMP) and cathepsin B. Normally these proteolytic enzymes are inhibited by endogenous proteinase inhibitors such as alpha-1-antitrypsin and alpha-2-macroglobulin. Oral administration of pancreatic/proteolytic enzymes such as trypsin and chymotrypsin has been shown to increase serum levels of alpha-1-antitrypsin and alpha-2-macroglobulin. In this way, oral administration of therapeutic proteases/proteinases stimulates the body's production of endogenous proteinase inhibitors, which then inhibit endogenous joint-destroying proteinases. Stated more simply, systemic enzyme therapy stimulates internal defenses to protect against joint destruction. Systemic enzyme therapy also modulates cytokine levels and thereby shifts "immune balance" away from the autoreactive cell-mediated Th-1 response and more toward a Th-2 response. Significant reductions in tumor necrosis factor-alpha, interleukin-1b, and autoreactive T-cells have been reported following the administration of oral enzymes in experimental and/or clinical settings.

Importantly, systemic enzyme therapy can result in reductions in circulating immune complexes in patients with RA that are directly related to the degree of clinical improvement. The greater the enzyme-induced reduction in immune complexes, the greater the clinical response; this clearly suggests a mechanistic cause-and-effect benefit from systemic enzyme therapy in immune-complex mediated disease. However, we also know that RA is a prototype of dysbiosis-induced systemic inflammation,[28] and thus the recent article by Biziulevicius[29] proposing that the immunostimulatory action of oral enzymes may be derived from direct and indirect intra-intestinal bactericidal and antimicrobial actions, raises an alternate hypothesis that the anti-rheumatic and immune-complex-lowering benefits of systemic enzyme therapy may result, not only from intravascular proteolysis of preformed immune complexes, but primarily from a reduction in de novo immune complex formation due to antimicrobial and thus anti-dysbiotic effects. These effects of systemic enzyme therapy are summarized in **Table 1**.

Table 1: Molecular and Physiologic Mechanisms of Systemic Enzyme Therapy

Dose-dependent stimulation of reactive oxygen species production and anti-cancer cytotoxicity in human neutrophils
A pro-differentiative effect
Reduction in PG-E2 production
Reduction in substance P production
Fibrinolytic effect
Anti-thrombotic effect, mediated at least in part by a reduction in 2-series thromboxanes
Modulation of adhesion molecules
Modulation of cytokine balance
Induction of endogenous proteinase inhibitors (e.g., alpha-1-antitrypsin and alpha-2-macroglobulin)
Reduction in circulating immune complexes
Possible antimicrobial effect in the gastrointestinal tract, thereby alleviating dysbiosis and reducing de novo immune complex formation

Conclusions

The molecular and physiologic mechanisms of action by which systemic enzyme therapy exerts its numerous safe and significant benefits are numerous and are increasingly well-defined. Armed with this understanding, clinicians can more effectively treat their patients and more convincingly explain the mechanisms and merits of their treatments to policymakers, researchers and other clinicians. Clinicians are wise to avail themselves of the benefits of proteolytic/pancreatic enzymes, which deserve - based on impressive safety and diverse clinical applications - to be a routine component of patient care.

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http://www.naturopathydigest.com/archives/2007/feb/vasquez.php

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.

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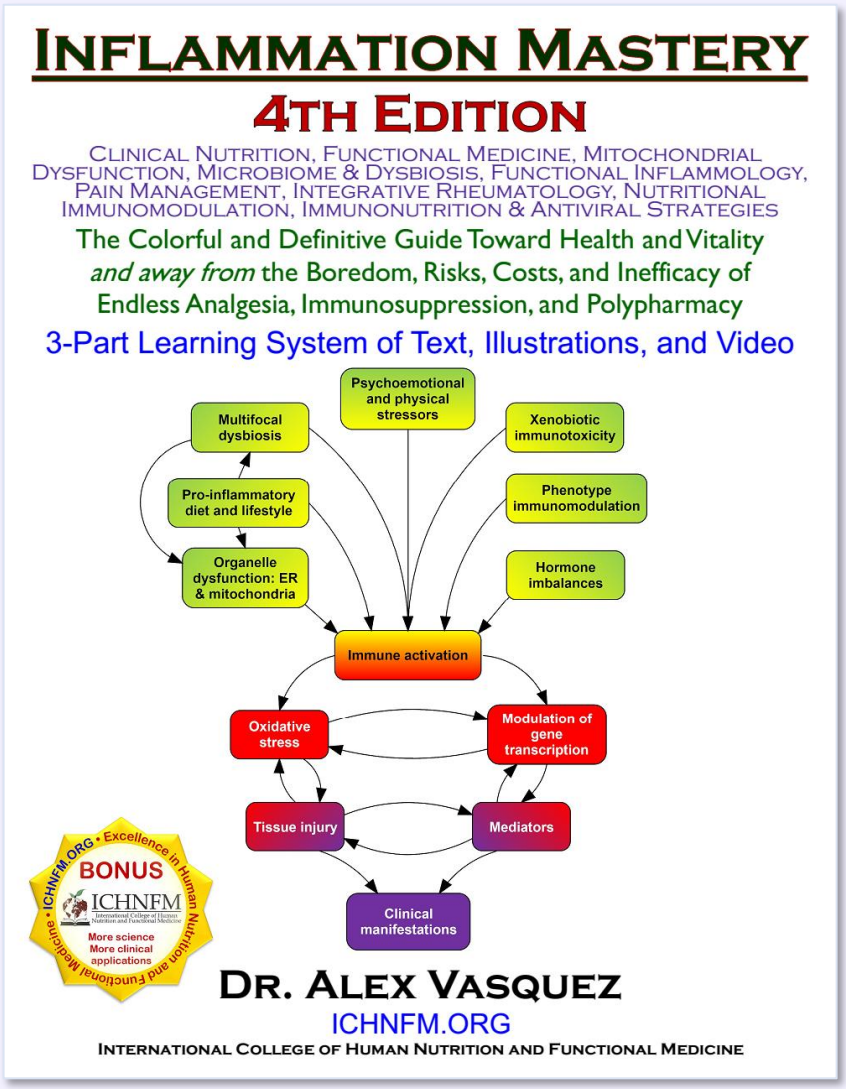

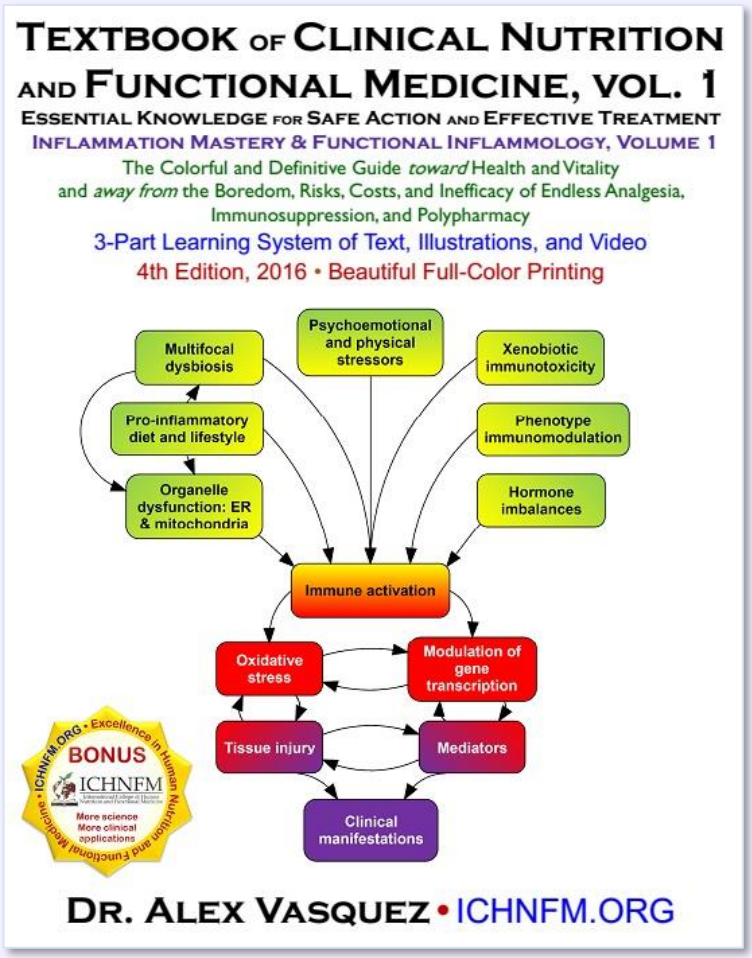

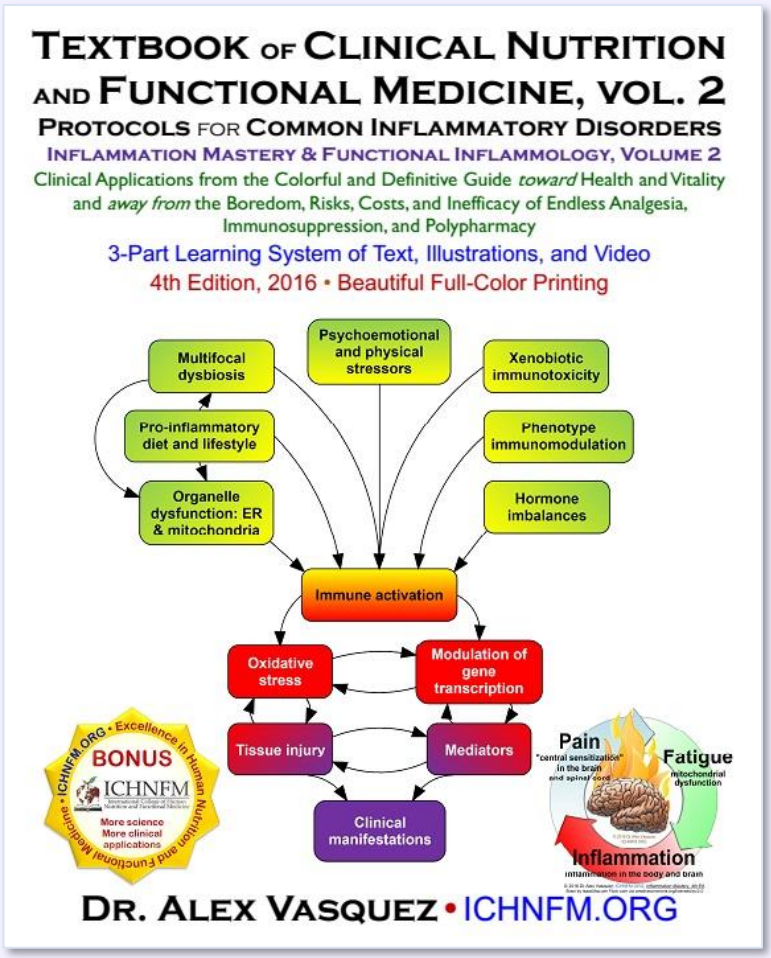

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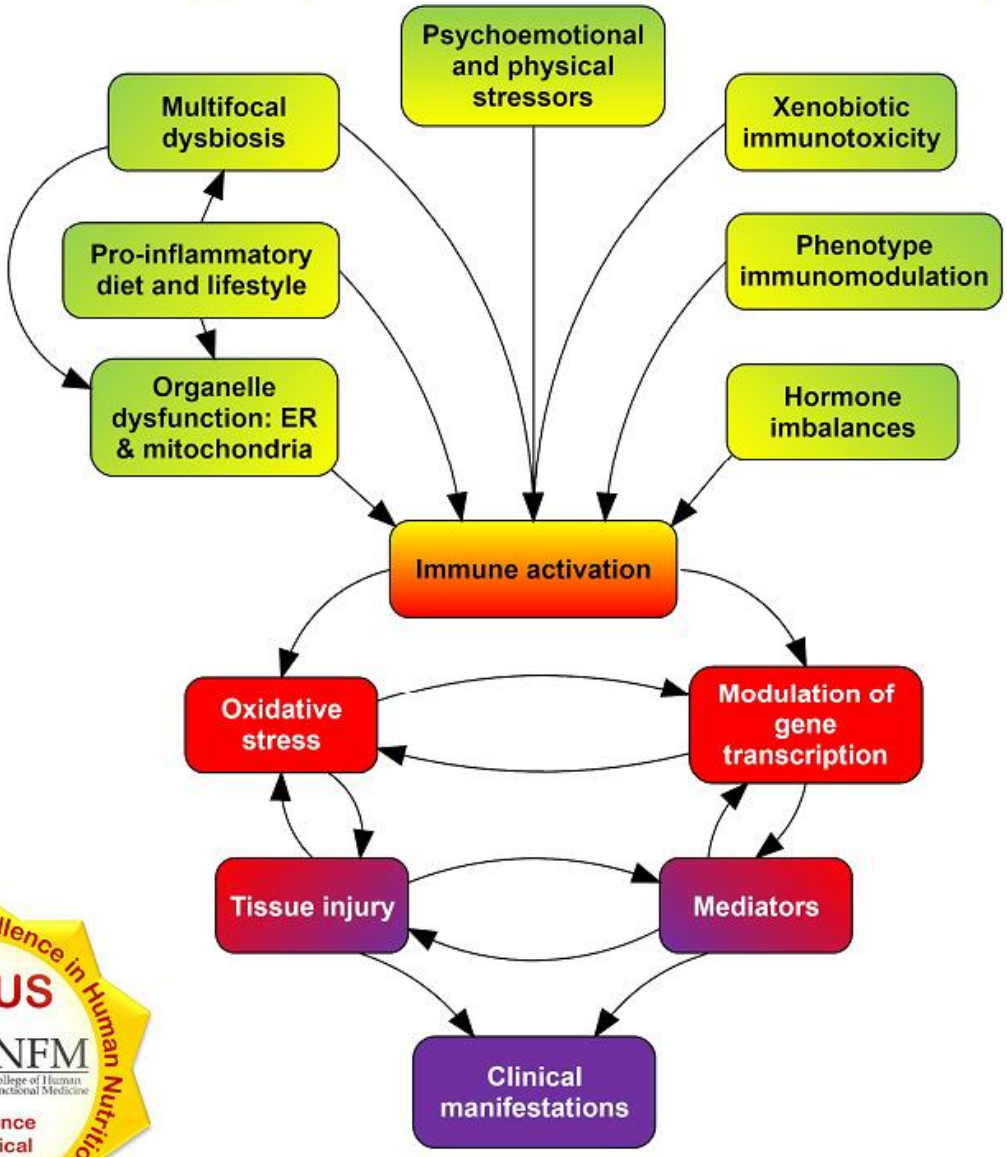

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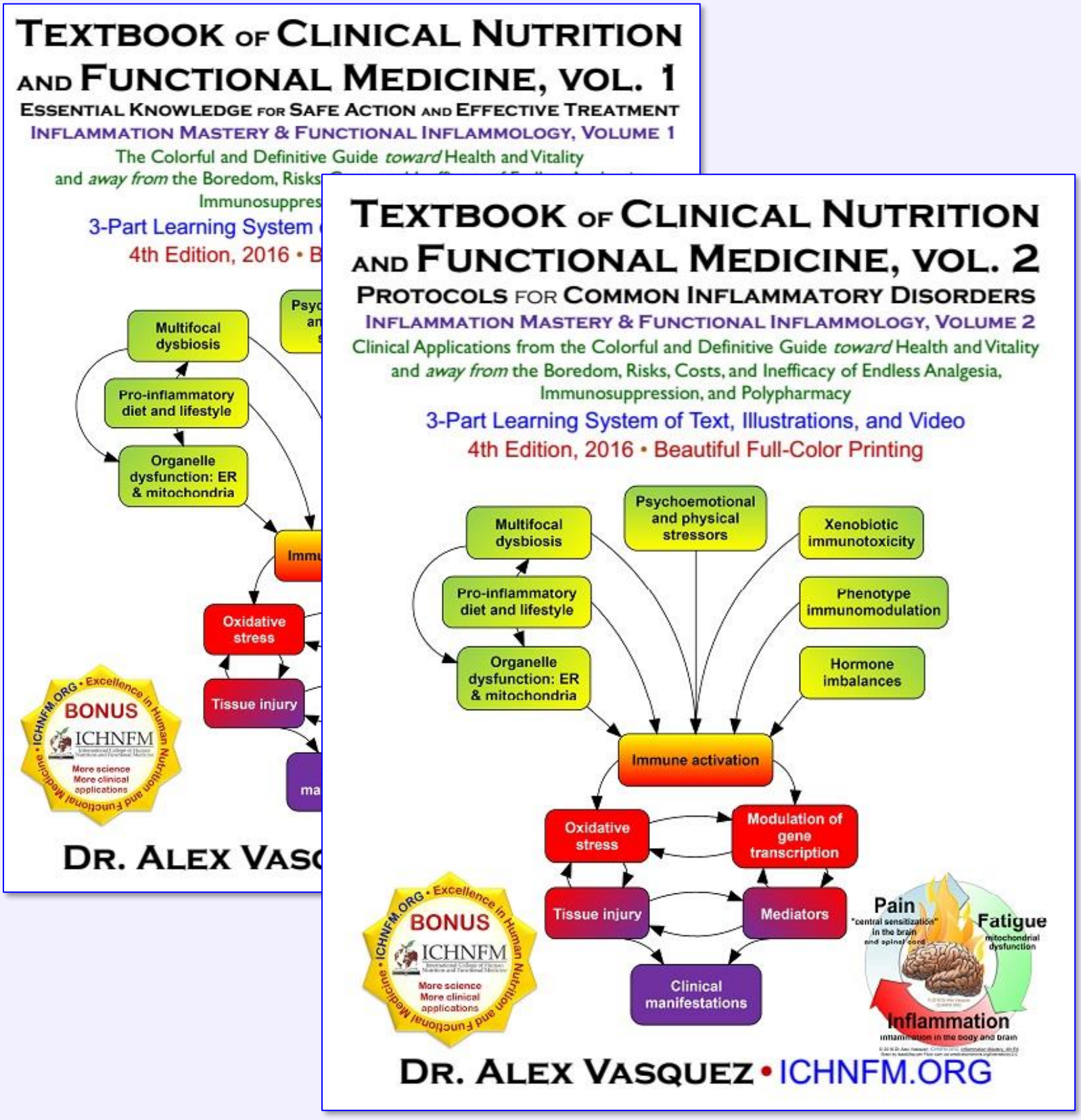

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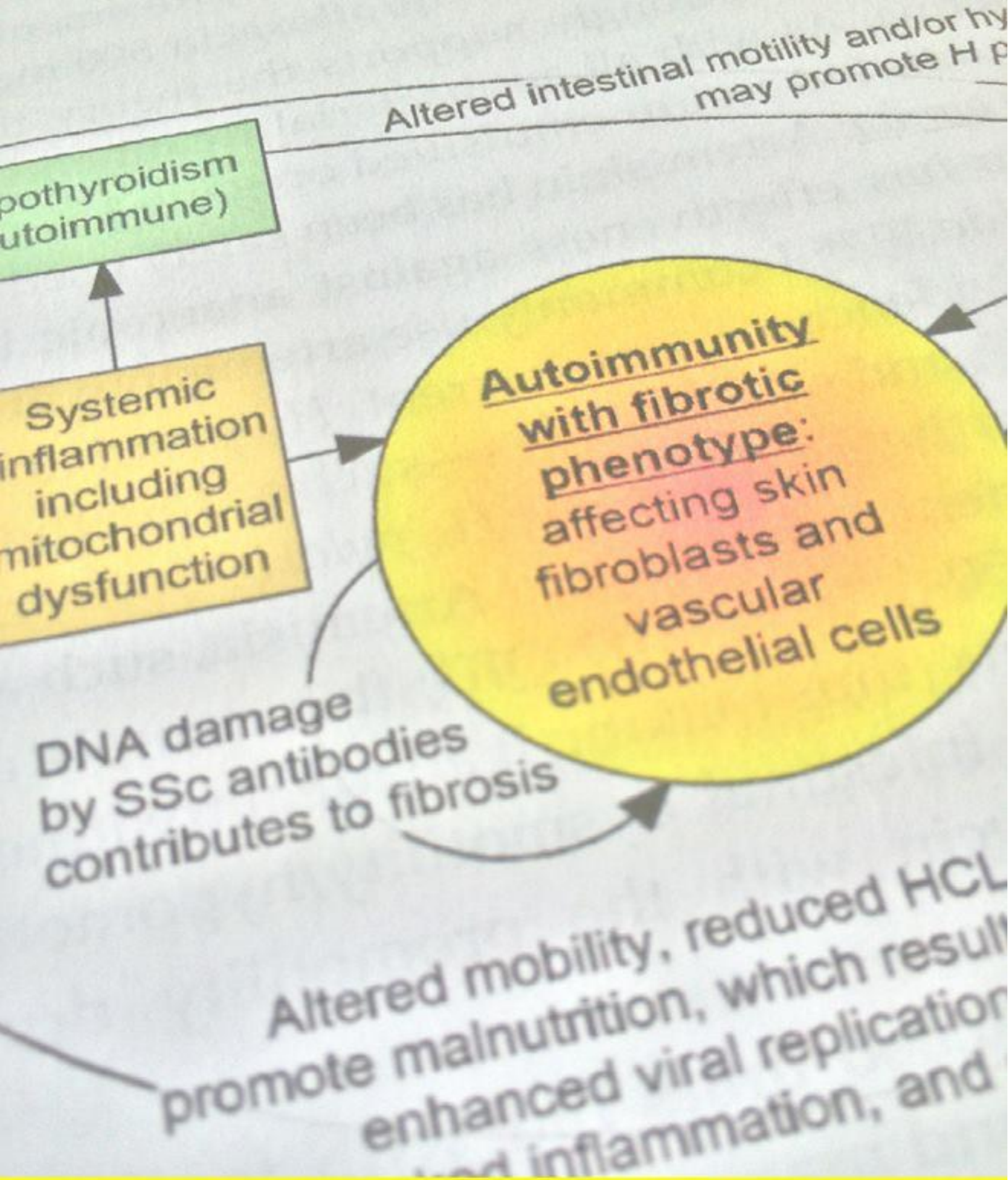

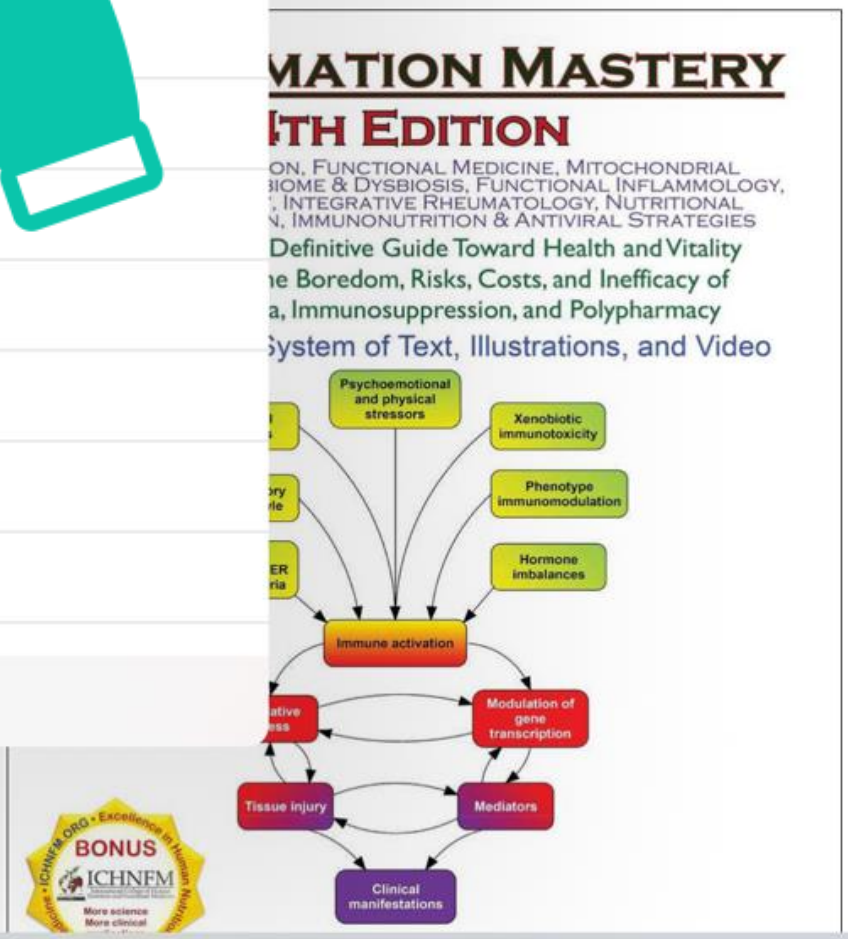

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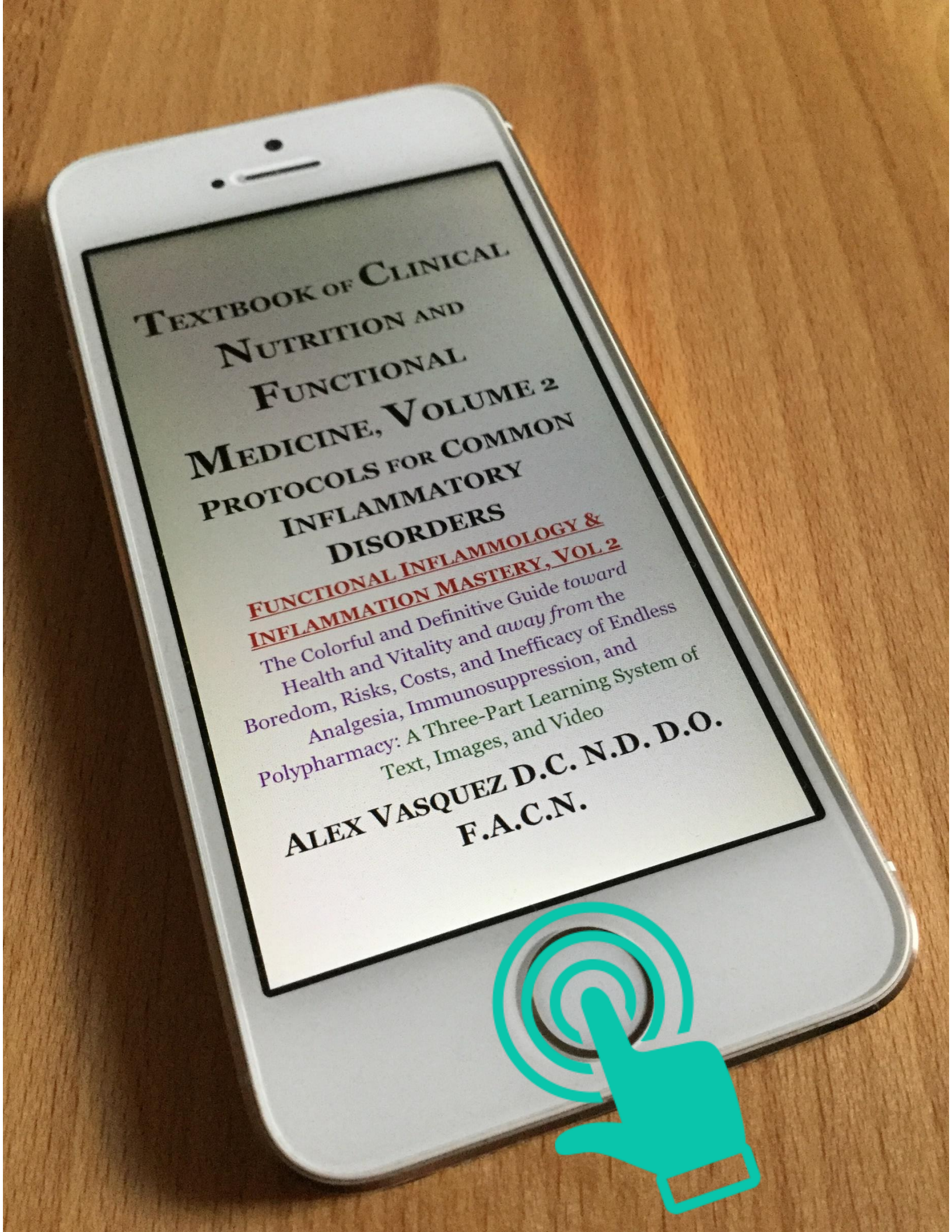
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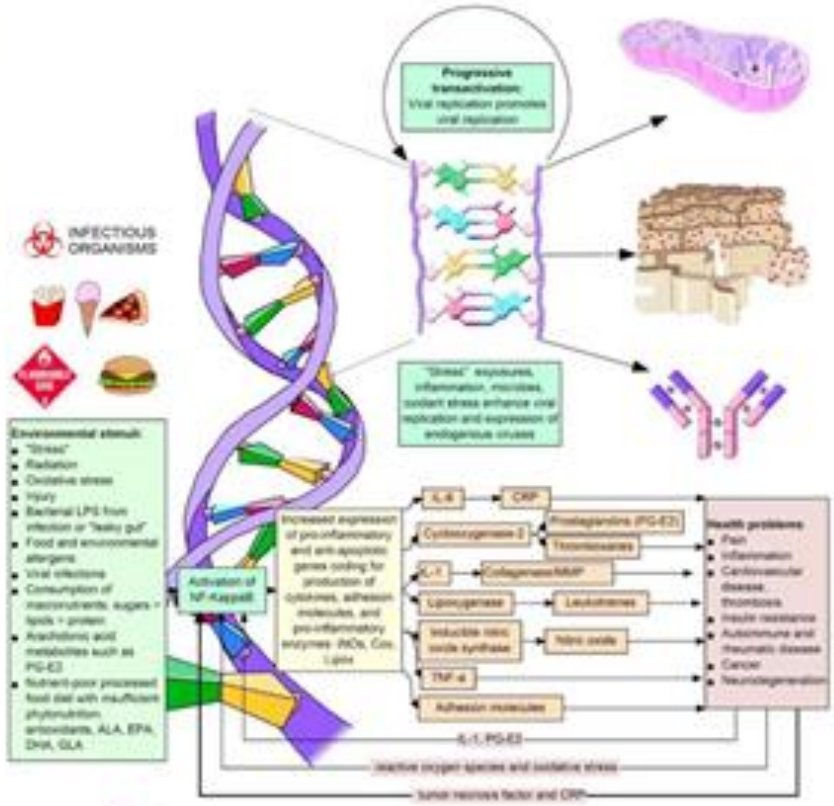

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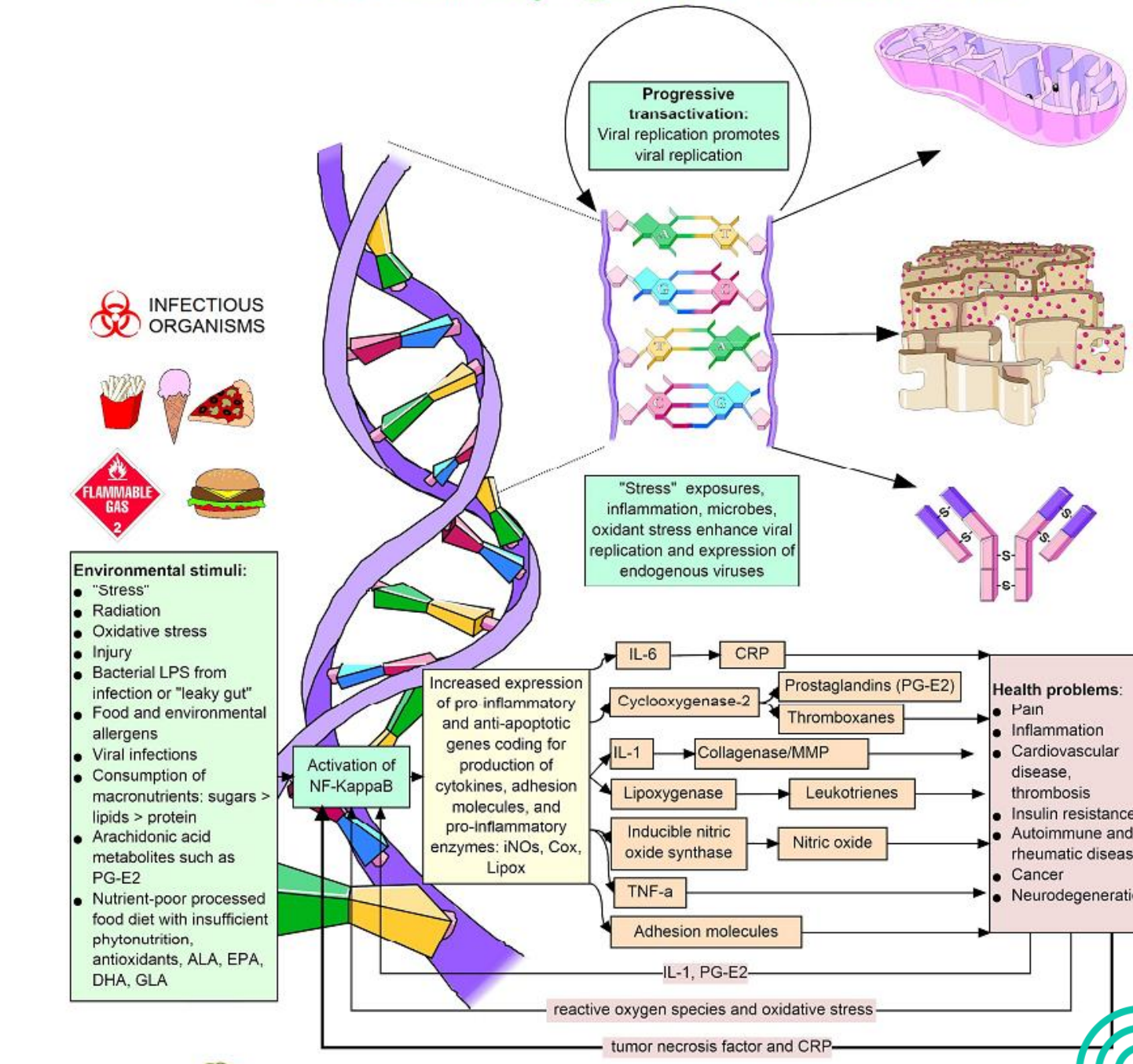

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Concerns About The Integrity of The Scientific Research Process—Focus On Recent Negative Publications Regarding Nutrition, Multivitamins, Fish Oil And Cardiovascular Disease

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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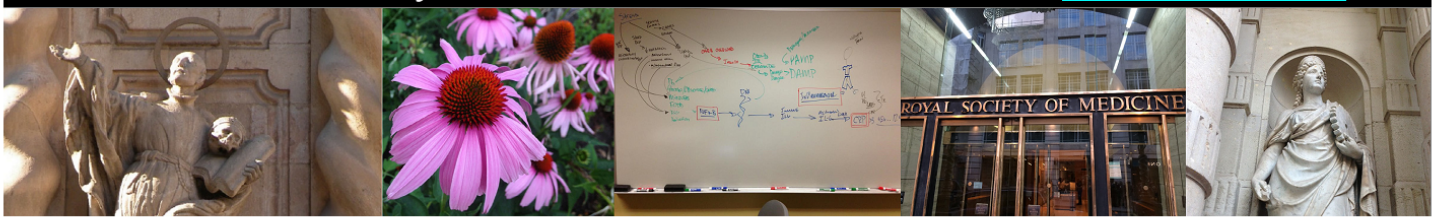

Perspective, Opinion, Editorial • Education • Academia • Wage Theft • Corruption

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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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 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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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
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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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- **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

 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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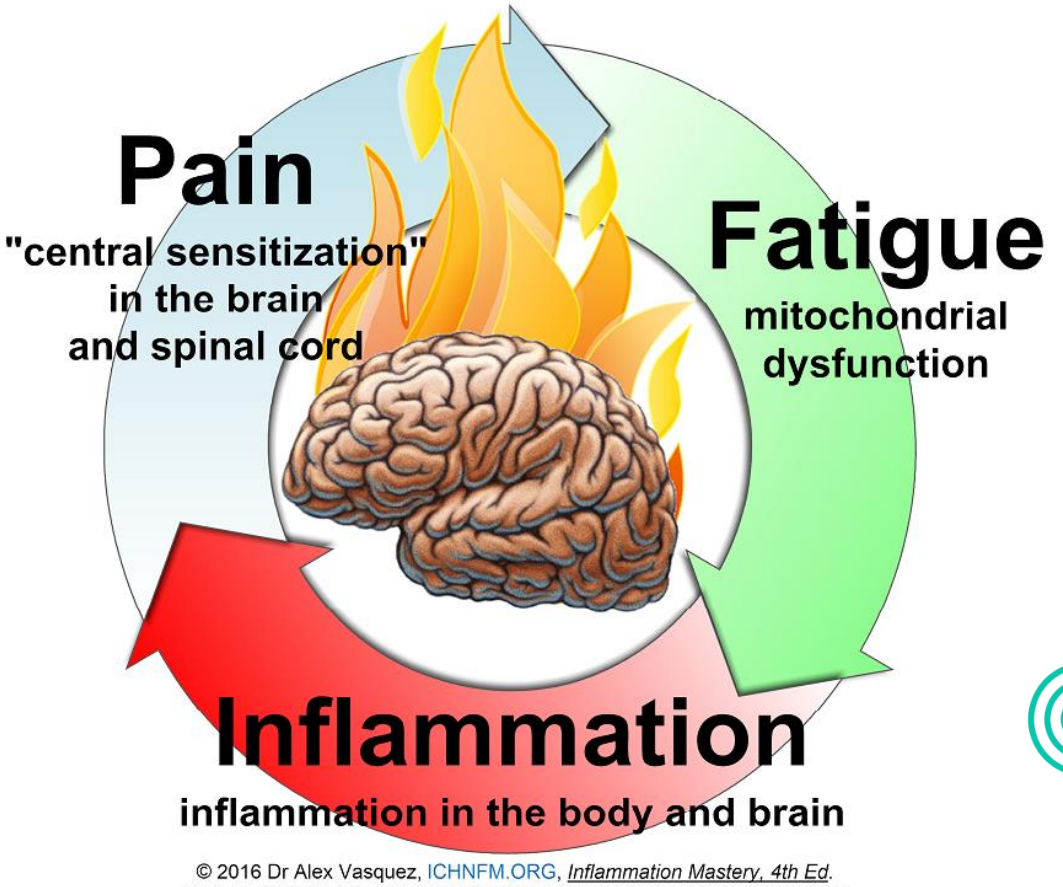
-therapies.com and selecting the Continu

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

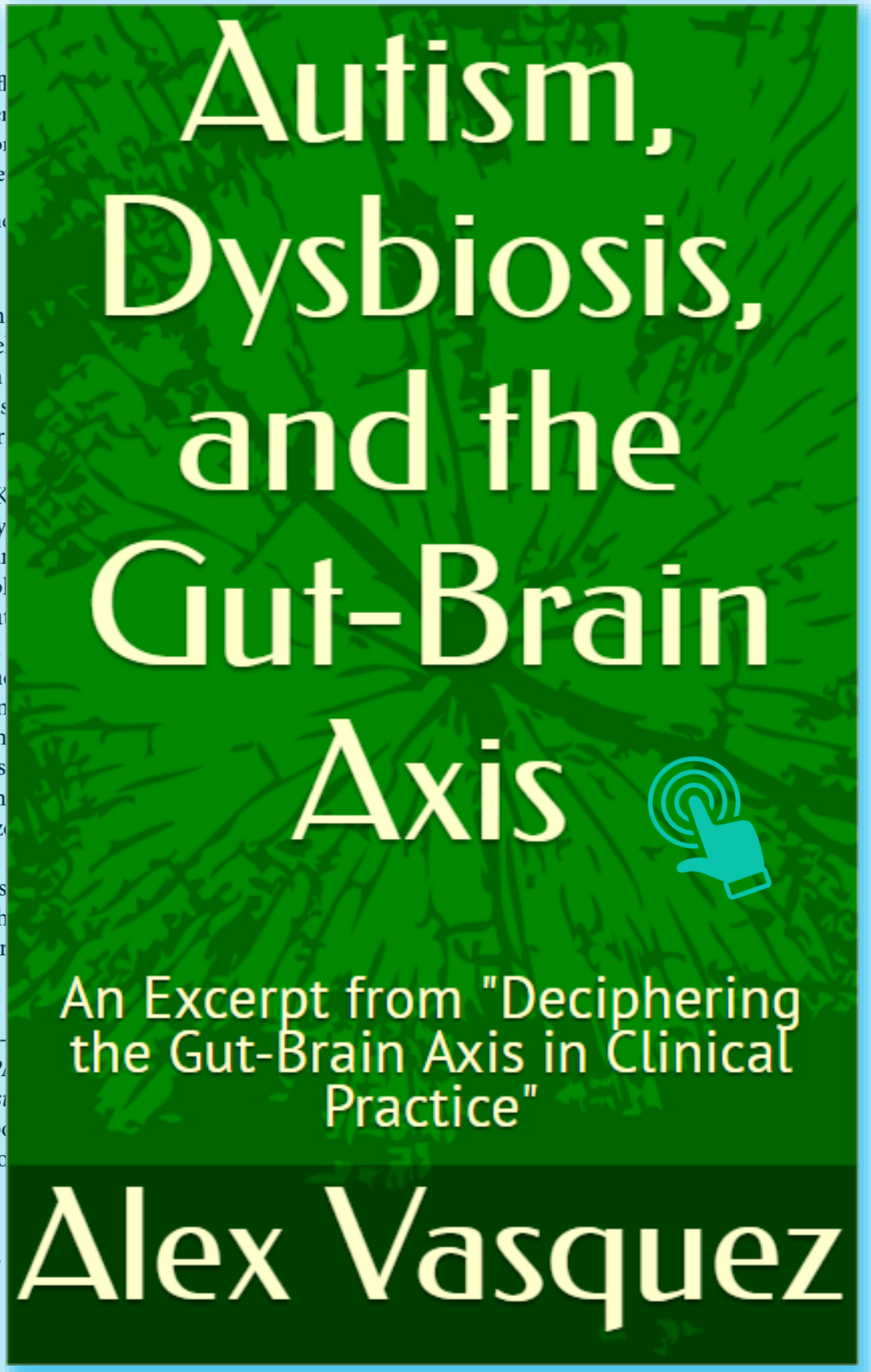
Alex Vasquez

**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



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

Textbook of Clinical Nutrition and Functional Medicine, Vol. 2

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Inflammation Mastery & Functional Inflammology, Volume II

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