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MAY 2019 | ISSUE #430

Townsend Letter

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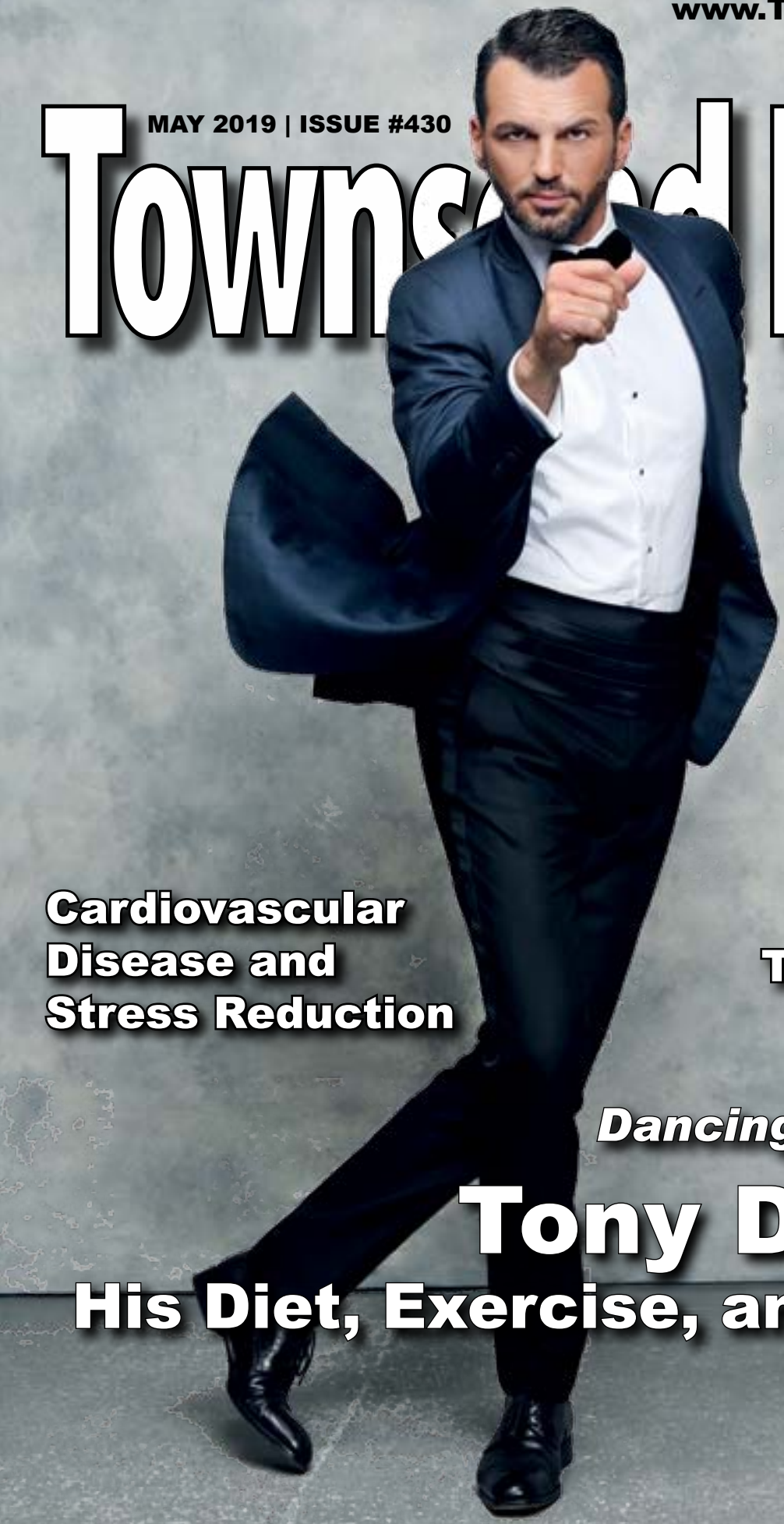

Healing Traumatic Brain Injury

Looking Beyond Cholesterol

Cardiovascular Disease and Stress Reduction

The Challenge of Serious Illness

Dancing with the Stars

Tony Dovolani

His Diet, Exercise, and Vitamins

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FSM is especially effective at reducing inflammation, dissolving scar tissue and treating nerve and muscle pain. Fibromyalgia associated with spine trauma is particularly painful and difficult to treat even with narcotics. There is one frequency combination that not only eliminates the pain, but it also reduces all of the inflammatory cytokines and substance P. Shingles responds very well to only one frequency combination that eliminates the pain in 20 minutes and causes the lesions to dry up and disappear in approximately two to three days. There is one frequency combination that so far has been 100% effective in eliminating kidney stone pain; different frequencies treat the stone. Frequencies create predictable reproducible effects in asthma, irritable bowel, ovarian cysts, abdominal adhesions and many other conditions. There is only one set of frequencies that reduces liver enzymes in patients with certain types of liver disease. Patients treated within four hours of a new injury have greatly accelerated healing and much reduced pain.

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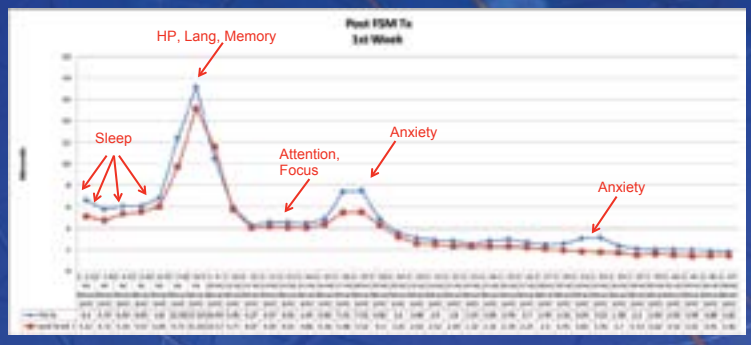
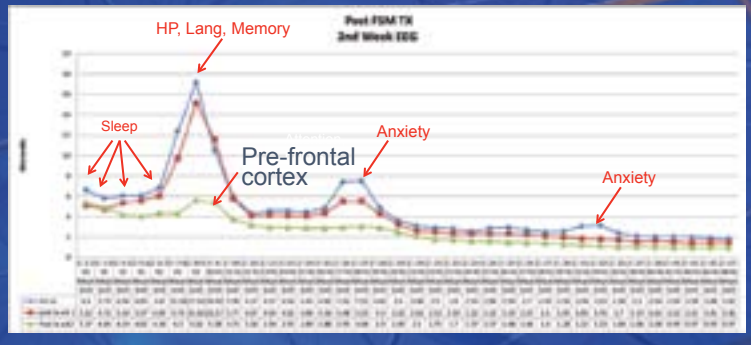
Frequencies Help Brain Injuries

Post FSM Treatment – Week 1

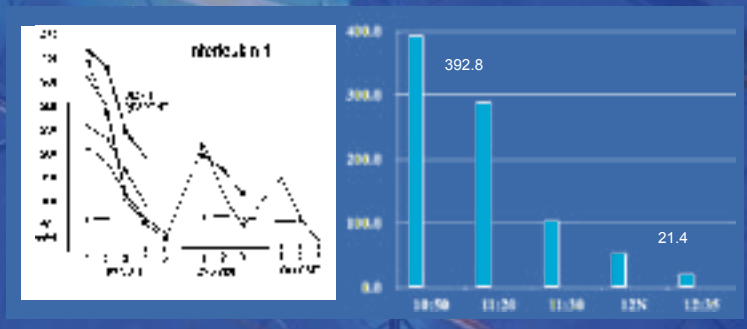


Post FSM Treatment – Week 2



The affects of FSM on treating traumatic brain injury.

Frequencies Reduce Inflammation



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by Carolyn McMakin, MA, DC

It appears that specific frequencies applied with microamperage current can change cell signaling to reduce inflammation and modify other pathologies quickly at unprecedented rates; and by so doing, they can be used reduce pain, improve health, and change neurological function.

Frequency specific microcurrent (FSM) uses frequencies found on a list that came with a machine built in 1922 that was found in a clinic in 1946. We have no idea how the frequencies were developed, and all of that history was lost when frequency therapies were outlawed in the 1920s. The frequency list was resurrected in 1995 and was first used to treat muscle and nerve pain, then the spinal cord, then diabetic wounds, insulin resistance and neuropathies, then brain injuries and PTSD, then chronic burn scars, then the liver and IBS, and cerebral palsy spasticity and much more.

The list includes a frequency, 40 Hertz, to "reduce inflammation." In a blinded animal study, 40 Hz reduced LOX inflammation by 62% in four minutes and COX inflammation by 30%, which is equivalent to injectable Toridol in the same animal model. In a human study on fibromyalgia associated with spine trauma, it reduced pain, substance-P, and all of the inflammatory cytokines by factors of 10-20 times in 90 minutes. Fifty-eight percent of the patients recovered from fibromyalgia in four months. Microamperage current increases ATP by 500%. Imagine what will change when you can reduce inflammation by 62% and increase ATP by five times?

The frequency list was first used in 1995 and first taught as FSM in 1997. The protocols used and the results achieved in 24 years of clinical research are teachable, predictable, and reproducible. The four-day FSM course lets you see cell function and structure change quickly and comfortably; you never can un-see what you saw and that changes everything. FSM is now used by over 3500 practitioners with every clinical degree in hospitals and clinics in 22 countries.* Go to www.frequencyspecific.com or read *The Resonance Effect* (Amazon) to find out why.

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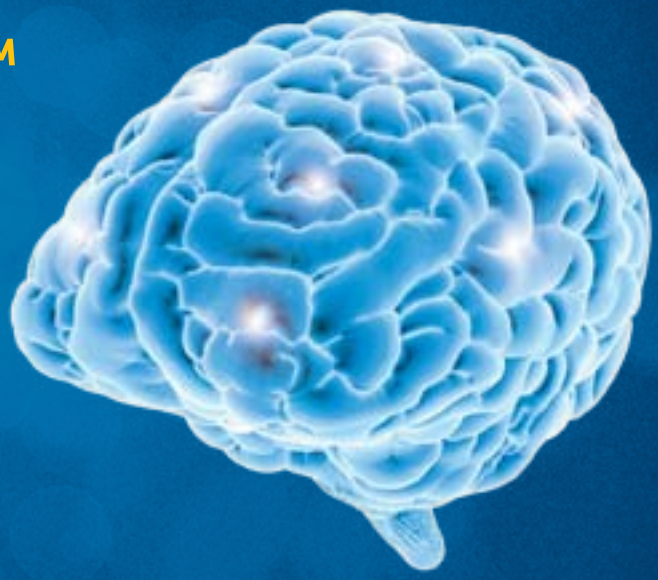

New research demonstrates the adult brain is capable of reorganizing its neural network by forming new connections —— and this is known as neuroplasticity. Neuroplasticity means the brain continues to generate new neurons & synapses throughout life, helping the brain heal from injuries.

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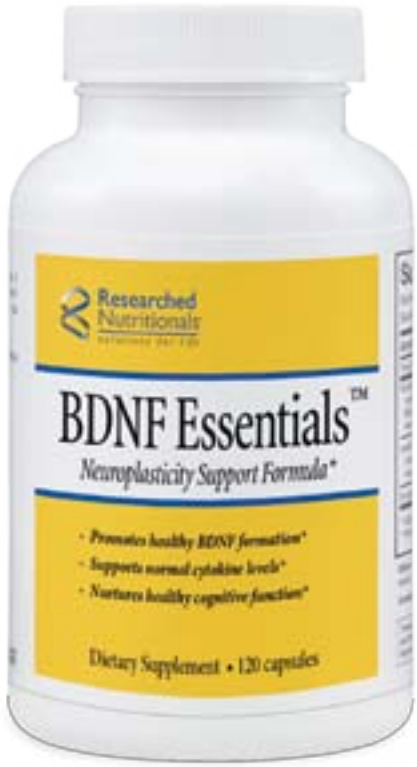

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From the Publisher

The Great American Medical Divide: Vaccinators vs Anti-Vaxxers

In the US, liberal Democrats and pro-Trump supporters remain utterly divided, disputing the outcome of the 2016 election and determined respectively to defeat or reelect the President in 2020. In Great Britain the animosity between those who support the UK leaving the EU and those who oppose it has reached a fever pitch – family members and co-workers and friends who have opposing stands refuse to speak to one another. And now, in the US and internationally, medical authorities are demanding that anti-vaxxers be silenced and their communication be blocked on social media. In late February Pinterest announced it would shut down access to articles negating vaccination. By early March Facebook agreed to limit anti-vaxxer access as well. In this issue of the *Townsend Letter*, editor Jule Klotter reviews a book detailing concerns about the HPV vaccine – you better read it while you are still permitted to do so.

Admittedly there are legitimate concerns in the vaccination debate. Dismissing *all* vaccinations as being useless and consistently causing horrendous adverse events is wrong. Vaccines are effective and by and large do not cause persistent medical problems. Yes, some vaccine programs are less effective, particularly the annual flu vaccine. Yes, a small percentage of vaccines do cause a significant medical event, but only a much tinier percentage lead to catastrophic medical development. A large epidemiologic Danish study published in March determined that autism is not related to vaccination.

On the other hand, the vaccination schedule pediatricians are now advising for infants and toddlers and adolescents is lengthy and intense. Less horrendous but discomforting adverse events post-vaccination are not infrequent. Failure of

continued on page 8 ➤

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Clinical Study #1 (1999)

In a study of 319 women visiting three medical clinics, most women's normal vaginal bacterial residents included *L. crispatus* (32%), followed by *L. jensenii* (23%), *L.* 1086V (15%), *L. gasseri* (5%), *L. fermentum* (0.3%), *L. oris* (0.3%), *L. reuteri* (0.3%), *L. ruminis* (0.3%), and *L. vaginalis* (0.3%).*

Antonio MAD, *et al. Journal of Infectious Diseases* 1999;180:1950–6.

Clinical Study #2 (2007)

In another study involving 126 healthy pregnant women, *L. crispatus* and *L. gasseri* were the most dominant species found, followed by *L. jensenii* and *L. rhamnosus*.*

Kiss H, *et al. BJOG: An International Journal of Obstetrics & Gynaecology* 2007;114: 1402-1407.

Clinical Study #3 (2014)

In a double-blind, randomized placebo-controlled trial, 1-week of oral supplementation with the four Astarte strains significantly enriched *Lactobacilli* in the vaginal tract and reduced Nugent score in the neo-vagina of post-operative transsexual women, an environment typically resistant to colonization by *Lactobacilli.*

Kaufmann U, *et al. Eur J Obstet Gynecol Reprod Biol.* 2014 Jan;172:102-5.

Clinical Study #4 (2016)

In immunosuppressed pregnant women with herpes infection, oral supplementation with the four Astarte strains significantly reduced undesirable microbes in the intestines and vagina, and simultaneously increased vaginal *Lactobacilli* 3-fold compared to placebo.* This was accompanied by reduced incidence of placental insufficiency, pre-eclampsia and fetal distress in the probiotic supplemented women.

Anoshina TM, *et al. Perinatologiya I Pediatriya* 2016;4(68):22-25.

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Letter from the Publisher

➤ *continued from page 6*

vaccines does occur and new vaccines do not get as much medical evaluation as new drugs. Undoubtedly if an Ebola virus vaccine were to be developed, its implementation would be clamored for. There would be an even greater clamor for an AIDS vaccine. Unlike the outbreak of measles among unvaccinated children this winter, there is a greater urge to address killer diseases.

Homeopathic physicians and proponents argue that vaccines interfere with our innate immune functioning, disturbing its subtle energetic, vitalistic healing. Not an insignificant part of homeopathy addresses the need to reverse the energetic disturbance of vaccination. Concern about carrier agents in vaccines, including so-called adjuvants, is also warranted. Mercury, thimerosal, has largely been removed from vaccines only because anti-vaxxers decried its use. Other foreign substances in vaccines, reported adulterants such as residual material from non-human tissue cell cultures, deserve medical study and scrutiny. However, the allopathic medical community denigrates any research that may impugn the safety and validity of vaccination. This is the dark and dictatorial aspect of vaccination research; it is unwilling to thoroughly scrutinize every aspect of vaccination.

The *Townsend Letter* will continue to carry evidence-based articles and information about vaccination even if it supports an anti-vaxxer position.

Dr. David Musnick on Healing Traumatic Brain Injury

Over the past decade traumatic brain injury (TBI), which has been largely ignored by sport franchises, has been recognized as a medical condition responsible for causing long-term neuropathology including Parkinsonism-like disorders and dementia. Case reports of TBI in professional football players, previously denied by the NFL, have led to disability compensation settlements as well as required medical monitoring for diagnosis and treatment of concussion injuries. Of course, TBI is not limited to football – the well-publicized cognitive decline of Muhammad Ali confirms the risks of repeated concussive injury in boxing. In fact, TBI is possible in all competitive sports; women "heading" a soccer ball are particularly subject to concussion and subsequent TBI. The need to manage TBI for an athlete or an individual who has sustained a head-on motor vehicle accident is apparent. In this issue, David Musnick, MD, offers a comprehensive functional medicine approach to healing the brain for *mild* TBI, diagnostics and treatments equally appropriate for chronic TBI

Yes, there is much integrative and naturopathic physicians can offer the individual who has sustained a TBI. As Musnick explains in reviewing pathophysiology, an injured brain leads to excessive anti-brain antibodies and neurotoxins permeating the blood brain barrier. Testing for BBB and anti-gastrointestinal antibodies is vital in TBI diagnosis. Abnormal blood brain autoimmunity must be addressed while pursuing the complex task of treating a permeable BBB.

Musnick employs neuro-psychiatric testing to evaluate cognitive functioning. Assessment of brain tissue injury by CT and MRI imaging is unhelpful with mild TBI; instead, he suggests the QEEG test to more sensitively assess brain function activity. Musnick follows a naturopathic dietary approach prohibiting gluten and dairy. To encourage brain recovery he suggests a "brain smoothie" made from blueberries and cranberry juice with the addition of

continued on page 10 ➤

Dr. Iichiroh Ohhira: A Pioneering Genius in Probiotic Science

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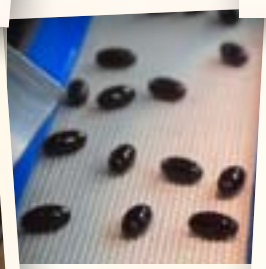

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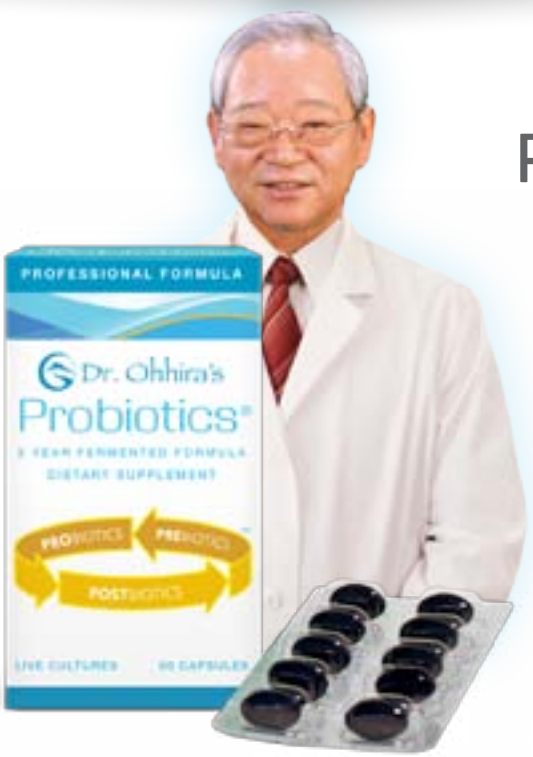

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Letter from the Publisher

➤ *continued from page 8*

hemp or pea protein powder. He strongly encourages consumption of choline-rich foods.

Musnick's protocol includes major supplementation beyond basics like a multi-vitamin and minerals. Frequency specific microcurrent and neurofeedback are vital for brain healing. And hyperbaric oxygen therapy is the secret sauce for TBI recovery.

Dancing with the Stars

Our cover story this issue is an interview of Emmy-nominated choreographer and *Dancing with the Stars* Mirrorball champion, Tony Dovolani. Our interviewer, writer Karina Gordin, has written a two-part series entitled "Dance Your Way to Health." The breathtaking performances of Dovolani and his co-stars requires grueling practice and rehearsal that occupies much of the day with very few breaks. Without exercise preparation, pristine nutrition, and mindfulness activity, Tony admits that he would be subject to frequent injury, an absolute no-no for his profession. He talks to Karina about his stretching routines, his clean diet, and meditation that he partakes in each day.

Tony thinks that everyone, especially those of us who are sedentary, should engage in stretching routines, then do a series of sit-ups and pushups. If we do these activities, our circulation will improve and we will have the muscular tone to engage in dance, something he encourages us to consider doing daily. Ensuring flexibility is the key to reducing muscular stress, essential as well to reducing mental stress. Tony engages in his own form of hydrotherapy: when he finishes a preparatory routine, he heads to the bathroom and runs cold water and then hot water over his feet. He calls it a contrast foot bath.

He likes using homeopathy and receiving acupuncture treatment. For him mindfulness, such as meditation and learning to breathe during the day, is primary in keeping himself centered and functioning well. Dietarily he avoids eating food before 11 a.m. and tries to have his final meal by 6 p.m. He avoids sugar and dairy and limits his intake of grains and carbohydrates. He has found fish oil supplementation to be very helpful but does not supplement with protein powders or hormones.

Tony ends with his advice for all of us to dance; it will keep us limber, strong, and tall.

Cardiovascular Status and Event Risk by Fraser Smith, ND and Jocelyn Faydenko

Our May issue focuses on cardiovascular disease. Dr. Lai Chim Chan, ND, reviews strategies we should include in preventive cardiology assessments and programs. Terry Chappell, MD, outlines approaches we must address in managing stress necessary to avert cardiac events. In this issue Fraser Smith, ND, Assistant Dean of Naturopathic Medicine and professor at NUHS in Lombard, Illinois, and Jocelyn Faydenko examine cardiac biomarkers. Conventional medicine assesses the lipid panel, the simple panel from the 1970s and the more advanced panel now available to closely examine lipid particles. But medicine largely ignores evaluation of inflammation and lipid peroxidation. Smith and Faydenko review the markers that enable a functional assessment of one's cardiovascular health or lack thereof. They recommend testing of inflammatory markers annually; abnormal findings deserve naturopathic intervention and frequent monitoring.

Jonathan Collin, MD

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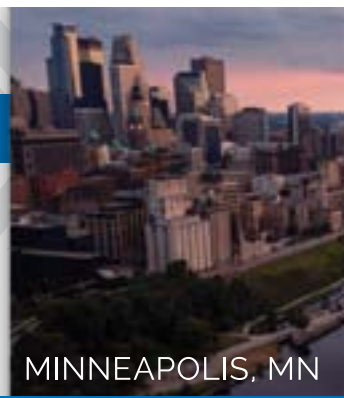

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OncANP 2019

by Jacob Schor, ND, FABNO

The Eighth Annual Conference of the Oncology Association of Naturopathic Physicians (OncANP) was held in mid-February in San Diego. The weather was terrible. Dr. Jonathan Collin, the publisher of the *Townsend Letter*, had promised to attend but was forced to cancel his trip last second. He had some excuse about snow and not being able to get his car out of the driveway. I was disappointed both because I had looked forward to meeting him in person, but also because he could have written about the conference, leaving me off the hook.

It's a challenge for me to write about the OncANP conference and be objective. I am tempted to be both hypercritical or too kind. This is my first year not serving on the group's board of directors in a decade, though I remain on the speaker selection committee. As I am still partly responsible for the conference, I am somewhat obligated to say nice things and hope more of you will attend next year.

This year's lectures were all pretty decent. Even the worst was not an outright stinker. Many of the presentations were actually quite good, putting the mean quality level at way more than good. This conservative evaluation may do little to convince those who didn't attend to come next year. Some people who don't know me well may not realize how close to empty the cup of my life looks; I'm not prone to ebullient lecture evaluations. On a really good day, my opinions lean toward lukewarm. When I talked to colleagues who were there, they employ superlatives, "the best lecture" or "the best conference ever" – those sorts of descriptions.

But that's life isn't it? Not everyone sees things the same way. One either learns to accept disagreement and a diversity of opinions or has to go through life thinking everyone around you is an idiot. Remember that Dr. Collin, named my monthly column "The Curmudgeon's Corner," a name that some find appropriate.

OncANP requires our presenters to submit their lecture PowerPoints months before the conference. These go through peer review by conference committee members who then work with the speakers to improve their lectures. The final presentations delivered at the conference are often significantly improved over the early drafts.

One of our goals is to provide information that will be immediately relevant to attendees. We ask ourselves whether hearing a speaker will make a difference "Monday morning" when back in the office.

This proved an especially apt way to describe the material Lise Alschuler presented in her lecture on lifestyle modifications that lower breast cancer recurrence risk. Sitting with my very first patient upon arrival back at our clinic, I paused partway through the visit and pulled up Dr. Alschuler's lecture PowerPoint on my computer and went through it slide by slide with the patient. I found this strategy effective and may make a habit of keeping Alschuler's slides handy on my desktop.

This modern business of computers and my ability to take home copies of all the conference lecture slides has been an adjustment. I'm old school enough to believe that by listening hard I'll remember all the important points; this idea is probably as antiquated as my paying for my landline telephone. Lecturers now include so much information that it is not humanly possible for someone my age to keep track of it all. Yet the search feature on the computer allows me to find the things I vaguely remember hearing and want to chew over more slowly. In fact, let me share a few tidbits of info that I am still ruminating on.

Ralph Kleef, MD, from Vienna, Austria, shared information about his approach to immunotherapy, and in particular, about patients described as hyperprogressors. These are the patients for whom the new immunotherapy drugs backfire in a terrible way, that is the PD-1 and PDL-1 inhibitor drugs trigger the tumors to grow incredibly fast. Approximately 9% of patients respond this way. Playing Russian roulette with a six-shot revolver has only slightly worse odds, as deciding to take these drugs. Age seems to be the biggest predictor of hyperprogression; the older a patient is, the more likely this will happen.[1] Kleef explained that hyperprogression is related to amplification of the MDM2 gene that regulates p53. This gene's action may increase five to forty-fold compared to normal.[2] MDM2 encodes for a protein that suppresses p53 expression: "p53 is the guardian of the genome… is responsible for pausing replication so that DNA repair can take place, and if repair is not possible, p53 invokes apoptosis. MDM2 amplification deprives cancer cells of this safeguard."[3] Amplification of MDM2 is a bad thing.

We may soon be able to test for MDM2 amplification allowing prediction whether particular patients are at greater risk of hyperprogression on these immunotherapy treatments.

At the same time, we must acknowledge these immunotherapy drugs may work so well they seem miraculous. These good cases are associated with JAK3 activation.[4] We in the audience sat upright and paid close attention to every word Dr. Kleef said here, hoping to go home with the secret that might increase the odds of favorable responses. Dr. Kleef listed several compounds that activate JAK3 including the following:

- Curcumin,[5]
- Parthenolides from feverfew,[6]
- Guggulsterones from myrrh,[7]
- Piceatannol (a relative of resveratrol),[8]
- Ursolic acid (a wax from apple skins and other fruits),[9]
- Epimedium (Goat weed),[10]
- *Serenoa repens*,[11]
- Ginseng's compound K,[12] and
- Honokiol (magnolia extract).[13]

While thinking about PDL-1 inhibitors and how to increase the odds they will work, let me open Judy Fulop's PowerPoint. Dr. Fulop does yearly updates for us on biome and cancer. The amount of newly published data that comes out each year on this topic is overwhelming; I feel guilty for originally asking Judy to volunteer to do this.

In January 2018, Gopalakrishnan reported on the oral and gut microbiomes of melanoma patients undergoing PD-1 immunotherapy and told us there are significant differences between responders and non-responders. Analysis of fecal samples suggests more *Ruminococcaceae* in responding patients. Giving fecal transplants from responding patients to germ-free mice enhanced their antitumor response to these drugs.[14] Also, this past year, Matson et al reported that patients with melanoma who responded to PDl-1 therapy had higher levels of *Bifidobacterium longum, Collinsella aerofaciens,* and *Enterococcus faecium*.[15] In the near future we may be listing what bacteria we want in probiotic supplements for patients taking these drugs.

Knowledge on biome and cancer has reached the point that researchers claim they can distinguish between types of leukemia simply by looking at the patient's gut biome.[16]

Dr. Fulop was able to take these ideas a step further this year. While we can't buy probiotics with the specified bacteria in them just yet, certain foods favor the growth of desirable bacteria. Research tells us not just which general dietary patterns to favor but even specific foods that we should tell patients to eat. Laura Soldati et al compared the effect of various dietary types on gut microflora and suggested several specific supplements that encourage these population shifts including curcumin, green tea, quercetin, vitamins A, D, and E. In particular she emphasized the phenol- and polyphenol-containing foods.[17]

Curcumin appears to shift the gut microbiome in a favorable direction.[18]

Gao suggested last year that gut bacteria may have such a large influence in part because they affect tryptophan metabolism and by extension melatonin levels in the body.[19] New research this year confirmed that eating walnuts has a positive impact on the gut biome. Walnut consumption resulted in higher relative abundance of three bacteria of interest: *Faecalibacterium, Roseburia,* and *Clostridium*. [20] While we have told cancer patients for years to eat more broccoli to increase sulforaphane in the body, in the past year research suggested that part of broccoli's anticancer action is mediated by shifts in the gut biome.[21]

Tomato powder,[22] navy beans,[23] and black raspberries[24] all alter the gut biome in ways that might explain their anticancer effects. Black raspberries look more intriguing as time goes on.[25] The idea that the science has come so far that we can suggest specific foods to patients based

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Oncology Association of Naturopathic Physicians Releases Principles of Care Guidelines

The Oncology Association of Naturopathic Physicians (OncANP) announced, on February 28, 2019, the publication of its Principles of Care (POC) Guidelines for integrative cancer care. Disseminated through *Current Oncology,* this POC is a welcome addition to medical literature.

The POC Guidelines provides a safe and effective, evidence-informed approach for naturopathic doctors (NDs) who focus on the care of patients diagnosed with cancer. It details what should be present in naturopathic oncology patient management, but it is not meant to be prescriptive or to provide instructive advice on therapeutic options. Instead, it recommends how best to deliver patient-centered care in the areas of assessment, treatment planning, care management, interprofessional collaboration, and survivorship care.

The POC also serves as a valuable resource for conventional oncology providers seeking to understand the naturopathic and integrative oncology care model and potential for collaboration. In fact, it is designed to support NDs, oncologists, surgeons, and all health care practitioners as they work together to help transform care patients receive in the treatment of their cancer.

What is driving this transformation of care? Some studies show up to 87% of cancer patients are choosing integrative oncology, or non-conventional treatments, alongside conventional standard care. Patients are demanding integrative cancer treatment options, and there is an increase in published research documenting the safety and efficacy of natural and supportive therapies.

Dr. Heather Wright, ND, FABNO, president of OncANP explains: "ND oncology providers play a very important role in cancer care. They are trained to employ a wide range of natural therapeutics and supportive strategies to help achieve positive patient outcomes based on scientific evidence, long-standing traditional use, and patient preference. Our newly published guiding principles reflect the expertise and thought leadership of OncANP and naturopathic oncology providers." Wright adds, "As our profession continues to grow, standard principles are needed in order for NDs to be effective providers in the larger care team for cancer patients."

"The Principles of Care Guidelines were developed by a varied group of leading experts and are based on the most current and relevant evidence," said Dr. Eric Marsden, ND, founder of the Marsden Centre for Excellence in Integrative Medicine, and chair of the OncANP POC Committee. "It has been reviewed by NDs, medical and radiation oncologists, surgeons, policy experts, and OncANP membership. Now ready for dissemination, our goal is to achieve broad adoption by NDs practicing integrative cancer care, and to help support ALL clinicians, serving patients with cancer."

"What binds all providers together is the goal of delivering the best care for patients in a manner that is multidisciplinary, honours patient choice, is scientifically sound, supports the whole person, and achieves the best quality of life for patients," said Dr. Dugald Seely, ND, FABNO founder and executive director of the Ottawa Integrative Cancer Centre, and Dr. Shailendra Verma, MD (retired oncologist of The Ottawa Hospital).

Marsden E, et al. Oncology Association of Naturopathic Physicians: Principles of Care Guidelines. *Current Oncology.* 2019;26(1).
Seely D, Verma S. The Oncology Association of Naturopathic Physicians Principles of Care Guidelines (editorial). *Current Oncology.* 2019;26(1).

About OncANP

The Oncology Association of Naturopathic Physicians (OncANP) is dedicated to education and research in naturopathic oncology. It advocates for collaboration with conventional providers and is committed to advancing the science and application of naturopathic medicine alongside standard cancer care and treatment. The vision of OncANP is to enhance survival and quality of life for people living with cancer through the integration of naturopathic medicine into cancer care. The American Board of Naturopathic Oncology (ABNO), the certification branch of the OncANP, supports advanced training in oncology for naturopathic doctors, awarding board-certified members the status of Fellow by the American Board of Naturopathic Oncology (FABNO). Established in 2004, the OncANP is a recognized affiliate of the American Association of Naturopathic Physicians (AANP). www.oncanp.org

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on their mechanism of action mediating the biome is exciting.

Returning to Ralph Kleef's lecture, he pointed out that the neutrophil-lymphocyte ratio (NLR) is also prognostic for immunotherapy responses. Dr. Jen Green brought this NLR business to our attention a few years back.[26] If NLR improves, patients are more likely to be positive responders to immunotherapy. High ratios though are bad news. For example, an NLR ≥ 5 is associated with inferior overall survival in nivolumab-treated patients with lung cancer.[27] A simple approach would be to try to improve the NLR ratio in patients being treated with immunotherapy drugs.

Many of our presenters now suggest particular supplements because they target specific pathways identified in individual tumors. My colleague and regular conference roommate, Davis Lamson, convened a meeting one night in our bedroom to discuss creating a database that would match specific nutrients and supplements with specific pathways in tumors in a manner similar to the way new chemotherapy drugs are matched through tumor genetic testing via 'liquid biopsies'. This is both an exciting and contentious idea, so much so that I had better not take it up here. Tumor cells evolve so quickly and work around blocked pathways so reliably that at this point in time, these targeted drugs have not been nearly as successful as was hoped. The unknown is whether our natural therapies will fail in a similar manner or whether they will preserve drug sensitivity or hinder development of drug resistance in these patients.

Discussions like this might be too geeky for the general reader of the *Townsend Letter*. But that's part of the value of in-person meetings, they allow the opportunity to pursue such ideas and advance our understanding.

Immunotherapy seemed to be a recurring theme in this year's lectures. Kleef employs a combination of hyperthermia and low-dosed immunotherapy drugs with his patients. Gurdev Parmer, ND, FABNO from British Columbia uses a combination of hyperthermia and naturopathic therapies, including IV-C and mistletoe, with his patients. He reviewed his clinic's patient outcome data collected over the past eight years. Kaplan-Meier charts of patient survivorship suggest that his patients do strikingly better than the SEER data would suggest they should, so much so that he is having difficulty finding a journal to publish this data.

Dr. Jen Green departed from the immunotherapy theme to review how to prevent and treat cardiovascular injury in cancer patients. Between heart toxic chemotherapy agents (doxorubicin, cisplatin, and trastuzumab), hormone blocking therapies (tamoxifen, aromatase inhibitors, and androgen deprivation), and radiation therapies, it is surprising how little we talk about this. For cancer survivors, heart problems are still their leading cause of morbidity and mortality.[28] Not their cancers. Yet we tend to focus on the cancer. Thus Dr. Green's lecture was a timely reminder to not overlook the hearts of our patients and instead to be vigilant to address their increased risks. Dr. Green set a precedent by providing conference attendees a printable summary that some of us will keep on our desks as a cheat sheet.

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I remain disappointed that Dr. Collin couldn't make it to OncANP this year as I would like to have seen how he reported on it. I have touched on only a fraction of the ideas from a fraction of the lectures. That whole proverbial tip of the iceberg thing. I am hoping that both Dr. Collin and more of you join us at next year's conference.

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2019 Chelation Conference in Malaysia

by E. Blaurock-Busch, PhD

The 2nd Malaysian Conference on Clinical Metal Toxicology and Antidotes was held February 22-24, 2019, at the Flamingo Hotel in Kuala Lumpur. In attendance were 79 mostly Malay physicians, but also doctors from India, Indonesia, and Thailand.

Group photo of Prof. Sulaiman and lecturers plus staff with some attending physicians

The conference was organized by Prof. Hj Mohd Ebrahim Sulaiman, MD; and when I was asked to participate in the conference as a keynote speaker, I hesitated. Long flights and time changes are becoming more of a barrier these days, and Malaysia is about 12 hours of flight time away from Germany where I now live and work.

I had met Dr. Sulaiman at the 2006 Malaysian conference. Thereafter, Dr. Sulaiman invited me to visit his clinic and was most courteous in creating a positive dialogue. His sharp mind combined with kindness, his scientific approach to chelation therapy and other methods such as the hyperbaric oxygen treatment made a lasting impression.

Like all the pioneers of chelation therapy, Dr. Sulaiman is getting on in age, but he is still active and his approach to medicine has not changed. He teaches chelation therapy as it applies to chronic metal toxicology and his disciples greatly respect him.

In his lectures, Dr. Sulaiman reflected on protocols and the need to follow them. It was refreshing to hear him stress NaMgEDTA for the treatment of vascular disease. He provided detailed instructions on the preparation and application of antidotes and instructed about the need for proper diagnostics. Among the many interesting lectures was the talk by Professor Dr. Suresh Kumar of the University of Malaysia, concerning toxic parasites and cancer. Dr. Zawawi Bin Abdullah's lecture focused on cadmium poisoning, and Dr. Nor'ashikin Binti Othman, head of the drug and research unit and clinical toxicology unit of the department of pathology, Hospital Kuala Lumpur, instructed about mandatory laboratory testing in clinical toxicology. Natural methods of detoxification were presented by Dr. Paramijt Kaur.

Government officials attended my lectures on diagnosing acute versus chronic metal (over) exposure, including gadolinium, a sign that clinical toxicology has received official recognition in Malaysia, which is largely due to the efforts and teachings of Prof. Ebrahim Sulaiman.

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Is Functional Medicine Dysfunctional?

by Savely Yurkovsky, MD

Since last month's article on this subject, I came across other authors who either questioned the true validity of functional medicine or of the biochemical/pharmaceutical approach on a whole that functional medicine represents. Among these, the editor of *The American Journal of Medicine*, Professor Joseph Alpert, MD, who asked for proof of "quality" concerning medical treatments in his sharp editorial, "Socrates On Quality," (*AJM*, August 2018;131(8)). This very issue concerning absent evidence of quality of functional medicine, mentioned in my April 2018 article, was also noted by a medical doctor on the internet**;** just as correctly, he also commented that proponents of functional medicine refuse to conduct clinical trials to produce such proof. The reason for this, that clinical trials are an allegedly unfit common methodology, is a cop out, in my opinion, since other existing methodologies can and must be chosen for any medical approach to either establish its legitimacy or worthlessness. Looking for an excuse constitutes an insult to what makes science different from "take my word for it" stories. For the record, Field Control Therapy® (FCT) has been seeking clinical trials; please help if you can. So far, no bites.

Interestingly, a recently published good book, *Can Medicine Be Cured? The Corruption of a Profession*, reverberates the same reasons for the failure and deceit of biochemical-pharmaceutical medicine, which also concerns functional medicine. This book was written by a competent British medical researcher who also worked for many years for the British equivalent of our NIH, National Health Science Service, Seamus O'Mahony, MD. Dr. O'Mahony describes how "scientific medicine," exploiting impressive scientific verbiage, has destroyed both the medical profession and the entire modern healthcare.

The main means for this destruction was the creation of Big Data, through Big Research into the biochemical human ocean. These data were matched with any tests and pharmaceuticals one wished to sell. These matches were then dragged through some formal "clinical trials," using shady statistical manipulations to "prove" the necessity of these interventions. In the process, Big Data and Big Research have created a "convincing" Big Science. However, what stayed under the rug is that Big Data and Science lacked real clinical significance and, therefore, cured no one.

Functional medicine, short of clinical trials, uses the same recipe to impress with its validity. Among the impressive moves are many sophisticated lab tests to collect Big Data, as if really getting to the bottom of it, that makes it look like Big Science. Quoting the aforementioned doctor online: "One of the most prominent identifying features of FM is its reliance on laboratory tests, lots and lots and lots of laboratory tests. They use these laboratory tests to seek out each patient's "biochemical" individuality and analyze his systems in these areas:

- Assimilation: digestion, absorption, microbiota/GI respiration;
- Defense and repair: immune, inflammation, infection/ microbiota;
- Energy: energy regulation, mitochondrial function;
- Biotransformation and elimination: toxicity, detoxification;
- Transport: cardiovascular and lymphatic systems;
- Communication: endocrine, neurotransmitters, immune messengers;
- Structural integrity: subcellular membranes to musculoskeletal integrity."

Also, among these is the "king" of all tests, genomics, to tell us "exactly" why we don't detox or get sick. Certainly, it only makes sense that individual biochemical profiles are necessary in medicine and so are individual treatments. Yet, while both make sense, "individual" represents just another mirage in this case.

Throughout the history of science and medicine, "make sense" theories have failed so many times that science prefers only the actual results**.** It would make a lot of sense if vaccines were primarily responsible for a significant mortality drop from those noxious infections that they were to prevent. However, the actual data that was presented in October 1970 by a no less than Harvard infectious disease professor and the president of the Infectious Disease Society of America, Edward H. Kass, MD, stated that the largest drop in mortality occurred before vaccines were available. Likewise, reducing the main source of mortality – cardiac arrhythmia – in the first year following myocardial infarction by placing these patients on antiarrhythmic drugs was "making sense" too. Yet, the major Cardiac Arrythmia Suppression Trial, started in 1987, indicated that the drugs only produced more deaths. Since fat deposits are a big part of coronary artery disease leading to myocardial infarctions, to reduce cholesterol-rich foods and blood cholesterol through cholesterol-lowering drugs was making sense as well. The end result of many studies: numerous side effects of drugs with hardly any benefit, at a staggering cost. Since excessive free radicals are common to virtually all degenerative diseases, it made much sense to recommend supplements – antioxidants – as functional medicine does to reduce these diseases. However, several major trials have showed just the opposite results.

Homeopathy is widely considered a make-no-sense, overdiluted, energized water; yet when its containing 'nothing' vaccine was tested on 2.5 million people against a deadly leptospirosis infection in Cuba, it fared even better than a conventional 'real' vaccine that cost 10 times more. Ideas deemed

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*Dys*functional Medicine?

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not to make sense in biology and medicine such as jumping genes, bacteria causing stomach ulcers, proteins infecting and destroying the brain, (prions in Mad Cow disease) have ended up earning Nobel prizes for their previously widely ridiculed scientists. The bottom line: Functional medicine, where is your real proof that all of these "make-sense" scientific profiles and treatments aren't just a big mirage and total waste? Considering that selling these fancy lab profiles generates 110 million dollars annually, for which we all pay indirectly through astronomical health insurance premiums, this may not be an idle question.

These photos add to the obvious answer too. The first shows copies of the tests brought to me by a patient who has been treated based on these and very similar other tests and remained just as sick for over a dozen years. The second photo reflects a number of nutraceuticals consumed by another patient based on the same type of tests and similar "make-sense" information. She has remained just as sick for 34 years, until she started FCT.

These tests and treatments cannot possibly address the 'promised land' of functional medicine, "biochemical individuality," to unlock chronic diseases. No one has ever seen such a land, and it represents only a speck, above far-deeper entities. Among these entities is genetic individuality, which no one at this time in medicine well understands and can do much about, to indirectly quote geneticists from Dr. O'Mahony's book. Two, all the biochemical markers originate from internal organs and tissues, which these tests cannot access. Three, true individuality is not biochemical but energetic since according to physics all body chemistry is run by energy fields. Thus, strictly scientifically speaking, a more correct term would not be biochemical, but energetic individuality. But since these individualities cannot be altered, they only carry unnecessary clinical meaning and distraction.

Real science abhors unnecessary fancy verbiage, which only detracts from the real issues. That's why Einstein despised such empty talking as superfluous erudition. Also, biochemical or energetic profiles can fluctuate on a 24/7 basis as the result of toxicological, electromagnetic, and infectious agents, and even mood, affecting organs and genes themselves. From here it is obvious that these tests can neither provide any semblance of biochemical individuality nor can the pharmaceutical treatments they call for change anything of essence. True, the idea of detoxification is important. But as promoted by functional medicine, to carry it out, through folic acid and other pills to allegedly promote DNA methylation for gene detoxification from mercury and other toxins, is at best a shot in the dark, at worst, playing Russian roulette with cancer. Firstly, methylation is not the only mechanism that protects DNA; RNA and histone are related too, but how to control these remains unknown. Concerning methylation, the scientific literature states that excessive methylation causes cancer, once a fine line is crossed. Lab tests or doctors cannot determine this fine line.

After years of testing folic acid, other B vitamins and pills as unnecessary through bioresonance testing (at least with FCT treatment), I contacted a national expert in methylation and epigenetics, Professor Michael K. Skinner, PhD. He has conducted dozens of scientific studies and stated that folic acid might offer some protective effect only in folate-deficient populations and in the process of acute exposure to chemicals: "Outside of this, folate is harmful if given in high doses. The epigenetic programming we see is permanent and cannot be modified with any dietary supplement, even folate. I would be cautious about recommending folate as [such] high levels are likely more harmful than the original situation."

All in all, the best kept secret in medicine is that the real reasons for so many tests and treatments under Big Science has been reiterated by physics professor David Deutsch, PhD. It is that the important problem-solving tool in science is not the data itself but understanding the key principles that run it. In this way, one accomplishes far more with knowing factually far less and vice versa. He specifically stated that if medicine used physics to get to the depth or real causes of diseases, it would need far fewer specialists and accomplish much more. (*The Fabric of Reality: The Science of Parallel Universes – and Its Implications)*

So, instead of pursuing the impossible through all of these unnecessary immune, detoxification, hormone, neurotransmitter and other profiles, FCT simply goes to the very depth – internal organs – to find the main causes of their illness. It accomplishes this through the existing energetic communication between the organs and muscles.

Savely Yurkovsky, MD, is internationally known as an author and teacher with an extensive background in the thorough study of scientific principles behind the numerous alternative and conventional approaches. Having realized that the primary source of health and disease, according to physics, stems from the corresponding cellular energy fields, he adopted a revolutionary new medical model, one that interfaces the theories of biology and physics established by his mentor, Professor Emeritus William A. Tiller, PhD, of Stanford University.

Having evolved a unique bio-energetic medical system that integrates a great deal of pertinent but, until now, underused knowledge from medical and non-medical sciences, Dr. Yurkovsky's system has been able to transform the often-vague nature of medical specialties from "hit and miss" paradigms into a far more effective, exact, and predictable science. Dr. Yurkovsky has founded a teaching organization, "*SYY Integrated Health Systems, Ltd.*," which is dedicated to sharing his medical system under the concept of FCT – Field Control Therapy® or Guided Digital Medicine™. Since 1999, he has taught this curriculum to medical doctors and licensed health care professionals with special emphasis on energy-based diagnostic and therapeutic modalities aimed particularly at toxicological, biological or nuclear agents. These, as a rule, elude conventional and most of the alternative diagnostic methods yet represent the primary source of all chronic diseases. His book *Biological, Chemical, and Nuclear Warfare – Protecting Yourself and Your Loved Ones: The Power of Digital Medicine* is an excellent illustration of both the scientific basis and effective practical means to combat the ravages of acute and chronic diseases in our toxic world. His system is the only alternative medical modality that has drawn attention from one of the departments of the Homeland Security Office. This year, along with several other doctors from premier medical schools in the US, he has been nominated for the prestigious Bravewell Leadership Award for "*significant contributions to the field of medicine*" and "*compelling vision for the future of medicine*."

Dr. Yurkovsky offers training to capable health care professionals. For enrollment, contact: "SYY Integrated Health Systems, Ltd.," web site: www.yurkovsky.com, e-mail: info@yurkovsky.com, phone: 914-861-9161, fax: 914-861-9160.

*Dys*functional Medicine?

Please, read this email that I have just received from a total stranger who compares the findings between FCT and functional medicine tests:

> FROM: .....@YMAIL.COM
> SENT: WEDNESDAY, MARCH 06, 2019 5:06 PM
> TO: INFO@YURKOVSKY.COM
> SUBJECT: INTERESTED IN BECOMING AN FCT PRACTITIONER
>
> WE'VE USED A VARIETY OF FUNCTIONAL MEDICINE PROGRAMS AND TOOLS AND IT ALWAYS AMAZES ME THAT FCT TESTING RESULTS CONSISTENTLY MATCH WITH OUR VERY EXPENSIVE FUNCTIONAL MEDICINE LABS!

However, FCT testing is far more informative because besides detecting malfunctioned organs, it also determines the main causes of these malfunctions.

One of many concrete examples from FCT practice reflects how its depth makes it easy, while biochemical-pharmaceutical medicine is hard.

Several years ago, I saw a new patient who had developed a severe neurological disease right in a bath tub while using some detox powder. She was hospitalized for two-to-three weeks, seen by many specialists, 14 doctors in total, and had undergone endless batteries of tests and treatments. Her hospital bill was $296,000 with more charges to come. I did not believe the figure until she showed me the copy of the bill. Nevertheless, following all of this impressive Big Science care, the real cause of her disease remained unknown with its symptoms just covered up with high doses of prednisone and other drugs; and she still felt very sick.

Going right to the depth level of her disease – nerves, immune, and other organs – FCT bioresonance testing determined that the detox powder was the offender as it contained mercury. After only a single treatment, with energetically programmed water to expel it, she reported a substantial improvement in her condition, while a prednisone dose was significantly reduced.

Conclusion

While both conventional and alternative health practitioners continue looking to new research and treatments to end failures, the real answer paradoxically comes from a far simpler and seemingly unscientific solution. Quoting a kaballic rabbi that "God's main tool for obtaining high knowledge is a bulldozer to the walls which block it," it seems necessary to do the same in medicine. FCT has evolved by tearing down such walls, which functional and pharmaceutical medicine represent.

Bastyr University San Diego Clinic: Student Case Reports

edited by Baljit Khamba, ND, MPH

Fourth-year interns at Bastyr University are actively developing their clinical skills through treating patients at the school's clinic. They engage their didactic skills in rigorous case taking, examinations, evaluation, and a naturopathic-focused treatment plan under the supervision of their attending doctor. The interns are able to gain experience in areas such as mental health, mind-body medicine, oncology, hydrotherapy, physical medicine, out-reach community care, IV treatment, biofeedback, and so on. Each one of these opportunities presents a prime opportunity for the students to enrich their knowledge about conditions and approaches to care. In efforts to fortify their understanding, the students write case reports under the supervision of Dr. Baljit Khamba in their course "Advanced Case Studies." By completing these reports, future practitioners gain a valuable skill that they can then utilize once they graduate.

Comparative Literature Review – Sauna Therapy for Cardiovascular Diseases Due to Heavy Metal Accumulation

by Dr. Hanisha Patel, ND

Abstract

Background: Cardiovascular diseases (CVD) are the leading cause of death in the United States and are increasingly becoming more prevalent throughout the world. Although conventional treatments have reduced mortality in CVD patients, the quality of life (QOL) is not statistically significantly improved with these treatments.[1] An overlooked cause of CVD is accumulation of heavy metals such as cadmium, lead, arsenic, and mercury.[2-5]

Methods: The author searched for studies on cardiovascular disease and sauna therapy, cardiovascular disease and cadmium toxicity, cardiovascular disease and lead, cardiovascular disease and arsenic, and cardiovascular disease and mercury toxicity using PubMed, ClinicalKey, and the Science Direct databases.

Results: The search methods used yielded three randomized controlled trials (RCTs) on congestive heart failure (CHF) and peripheral artery disease (PAD) that utilized sauna therapy concurrently with conventional treatment. Four studies were reviews on cadmium, arsenic, lead, and mercury toxicity and cardiovascular disease that revealed patients with CHF and cardiovascular diseases have higher levels of serum cadmium, lead, arsenic, and mercury than the general population. One review revealed the main mode of excretion of cadmium, arsenic, lead, and mercury is via sweat.

Conclusion: This review contains critically examined evidence for sauna therapy as related to heavy metal exposure in relation to CVD. The literature suggests that sauna therapy for three to six weeks can be an effective therapy for treating CVD and preventing complications of cardiovascular disease. Cadmium, lead, arsenic, and mercury toxicities are common in patients with cardiovascular disease because these non-essential toxic metals lead to endothelial dysfunction, reduced nitric oxide (NO) production, oxidative stress, and inflammation. Sauna therapy used in conjunction with conventional pharmaceutical therapeutics has been shown to decrease the toxin-load and improve the adverse effects of heavy metal accumulation leading to improvement in cardiovascular disease.

Introduction

About 25% of Americans die of cardiovascular diseases (CVD) every year. Heart failure is responsible for 11 million physician visits each year and more hospitalizations than all forms of cancer combined (CDC, 2013). High blood pressure, high cholesterol, and smoking are all risk factors of cardiovascular diseases. Diseases that are considered cardiovascular diseases include but are not limited to hypertension, pulmonary hypertension, chronic heart failure, coronary artery disease, peripheral artery disease, atrial fibrillation, aortic aneurysm, cardiomyopathy, myocardial infarcts, hypercholesterolemia, and stroke. Thirty percent of patients with acute heart failure

are re-hospitalized within 60-90 days.[6] Given the scope of this problem, it would be of great benefit to widen our array of interventions to aid this large population of people.

Cadmium, lead, and arsenic are toxic metals that are non-essential to human existence. Cadmium has been shown to be associated with increased risk of renal dysfunction, osteoporosis, cancer, and cardiovascular diseases. There is an increased level of cadmium in smokers because tobacco accumulates cadmium from soil.[2] Lead is a toxic metal that is still ubiquitous in our world today. Lead accumulation has been shown to be associated with an increased risk of elevated systolic blood pressure, coronary heart disease (CHD), stroke, and PAD.[4] Inorganic arsenic is a naturally occurring toxic metal that can be found in chicken, rice, and groundwater. In epidemiologic studies, high-chronic arsenic exposure has been linked to CVD, including CHD, stroke, and PAD.[3]

Many toxic metals, including cadmium, lead, arsenic, and mercury, are excreted via sweat. Circulation can be enhanced by increasing the thermal load on the body allowing sweating to occur.[7] Waon therapy (WT), a form of sauna therapy that translates to soothing warmth in Japanese, is a far infrared-ray dry sauna. WT is where the entire body is warmed in an evenly heated chamber for 15 min at a temperature that soothes mind and body, allowing the body temperature to increase 1.0-1.2 °C. Following the heated chamber, soothing warmth is sustained by maintaining warmth at rest for an additional 30 min. Fluids are supplied at the end to replace loss from perspiration.[1] Another method of sauna therapy researched for patients with CHF included 10 far-infrared (FIR) sauna sessions over 14 days for 15 minutes at 60 °C followed by 30 minutes of bed rest covered by a blanket.[8]

This literature review will discuss the potential therapeutic benefits of sauna therapy for patients with CVD due to heavy metal exposure.

Methods

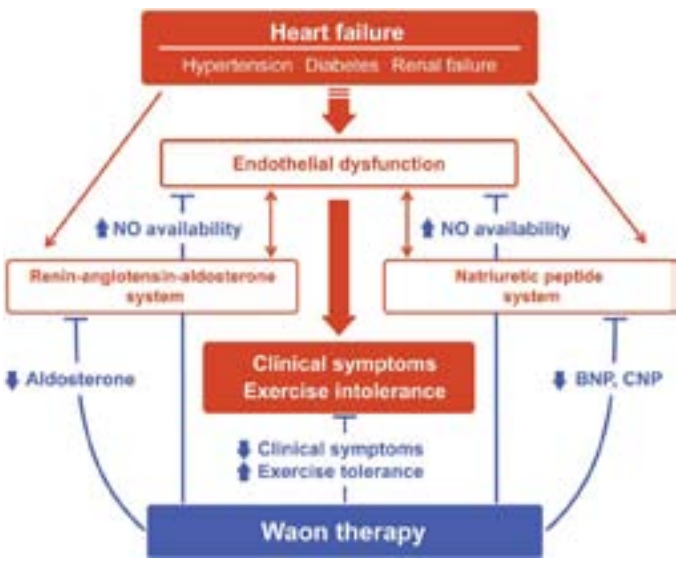
PubMed, ClinicalKey, and Science Direct were the databases utilized for this search with no restriction on date, type of study, nationality, or language. The initial search terms included "cardiovascular disease AND sauna." The following search terms included "cadmium in sweat," "cadmium and cardiovascular disease," "lead and cardiovascular disease," "heavy metals in sweat," and "arsenic and cardiovascular disease." These items were searched due to the relevance of this review having to do with heavy metal exposure in relation to CVD and diminishing risk with sauna therapy. The resulting 30 studies were narrowed down to 17 by language, availability, and relevance.

Six of the articles found in the search were systematic reviews of previous studies. Five of the articles included studies done with patients with CHF, two of the articles were about studies done on PAD, and one of the articles was on a study with patients with hypertension. Four of the articles were on cadmium, lead, arsenic, and mercury. One of the articles consisted of a case study. One article in this review disputes the hypothesis that toxic elements can be excreted via sweat. Two of the articles included mice in their studies and the rest were done on human subjects. The two articles found on mice studies were discarded for this review. All of the articles in this review were done on human subjects with CVD and included patients who were concurrently on conventional therapy and had been diagnosed with a cardiovascular condition by a physician.

Results on Heavy Metals and CVD

Borné et al discussed cadmium exposure and its effects on cardiovascular health leading to CHF and atrial fibrillation (AF). Blood samples were donated, and cadmium could be measured in 4378 people with conventional cardiovascular risk factors and biomarkers. Patients were followed from baseline examination between March 1991 and September 1996 in Malmö, Sweden until death, emigration from Sweden, or December 2010. Cadmium toxicity was found to be associated with CHF but not AF.[2]

One systematic review discussed lead exposure and its effects on CVD. This review included studies that used biomarkers to determine lead levels in blood, bone, or other specimens, environmental measures, or indirect measures such as living, job exposure, etc. Cardiovascular risk factors included those with reported clinical cardiovascular end points such as BP, CHD, stroke, or PAD and intermediate cardiovascular end points such as left ventricular mass, heart rate, heart rate variability, or electrocardiographic abnormality. In general populations, lead exposure was positively associated with clinical cardiovascular endpoints in all studies reviewed. In occupational populations, including those who work in battery, ceramic, pigment, and smelter industries, mortality was higher among workers with a greater number of years of employment. However, relative risk estimates across occupational studies varied widely, with positive, inverse, and null associations. This review found an association between lead exposure and blood pressure with populations in different geographic, ethnic, and socioeconomic backgrounds.[4]



*Waon therapy is the type of sauna therapy studied in Japan

➤

One systematic review discussed arsenic exposure and its effects on CVD. Pooled relative CVD risk estimates were calculated separately for those with high levels of arsenic exposure. For CHD, stroke, and PAD, dose-response trends were evaluated in each study. Most studies were conducted in high arsenic exposure areas of Taiwan, Bangladesh, Chile, Inner Mongolia, and Pakistan. Most studies were assessed using indirect measures or using environmental measures.

Cadmium, lead, arsenic, and mercury have been shown to depress nitric oxide (NO) availability, increase oxidation and inflammation, increase endothelial dysfunction, and induce cell death. These are all significant findings in CVD.

Most studies used CVD mortality endpoints to assess CVD outcomes. This review found an association between high arsenic exposure areas and CVD, CHD, PAD, and stroke.[3]

Sjögren et al discussed a case-controlled study involving mercury exposure and its effects on CVD. The case included a comprehensive study of 6784 male and 265 female workers from four mercury mines and mills in Spain, Slovenia, Italy, and Ukraine. Findings in Slovenia revealed increase in mortality due to ischemic heart disease among men. Duration of employment was positively correlated with mortality from ischemic heart disease.[5]

One systematic review discussed excretion of arsenic, cadmium, lead, and mercury via sweat. Studies included workers with occupational exposures and populations with no occupational exposures who were experiencing chronic ill health or were in good health. Arsenic was found to be higher in sweat than in blood plasma. Cadmium excretion was noted to be higher in sweat than in urine. Lead excretion was found to be higher in sweat than in urine. When measuring levels of mercury, sweat mercury levels varied; but there was no correlation with mercury urine levels.[7]

CVD and Sauna Therapy

Two of the articles found were randomized controlled trials (RCT) of patients with CHF.[1,9] Fujita et al included 40 patients with symptomatic CHF, left ventricular ejection fraction (LVEF) <50% on echocardiography, and New York Heart Association (NYHA) functional classes II or III. Patients were split into two groups, one of which did sauna therapy once a day, five days a week, for four weeks. The populations assessed by the articles were adults (18+) diagnosed with either CHF and/or PAD with no significant differences in body weight, heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), cardiothoracic ratio (CTR), LVEF, BNP, and uric acid between groups. There was significant improvement in body weight, CTR, and BNP and echocardiography revealed an increase LVEF following four weeks of sauna therapy. These changes were not seen in the control group.[9]

Sobajima et al included 49 patients with previous hospitalization due to worsening of CHF, NYHA functional class ? II, or both. Patients were split into two groups, one of which completed sauna therapy once a day for three weeks. Results were based on evaluation of cardiac function and specific activity scale (SAS) which included brain natriuretic peptide (BNP), NYHA, and 6-minute walk distance (6MWD), flow-mediated vasodilation (FMD), natural killer (NK) cell activity, and SF-36 QOL scores. Sauna therapy improved NYHA functional class, SAS, and 6MWD, LVEF, NK cell activity, FMD, plasma BNP levels, and SF-QOL scores.[1]

The Shinsato study revealed sauna therapy improvement in leg pain, exercise performance, ABPI, circulating CD34+ cell numbers, and serum nitrate and nitrite levels. There were no significant changes in VEGF.[10] Shinsato et al's RCT included 21 patients with PAD. Inclusion criteria were intermittent claudication for a minimum of four weeks with no improvement with conventional treatment, resting ankle-brachial pressure index (ABPI) <0.75 in the affected limb on two consecutive examinations done weekly, and lower limb artery lesions detected with computed tomographic angiography (CTA, magnetic resonance angiography) or color duplex ultrasound. The patients were randomly divided into groups, one of which completed sauna therapy once a day, five days a week, for a total of six weeks. Results were based on evaluation of in leg pain, exercise performance, ABPI, circulating CD34+ cell numbers, serum nitrate and nitrite levels, and vascular endothelial growth factor (VEGF).[10]

There were very few adverse effects of sauna therapy and they were considered minor. In the Shinsato et al study, patients reported transient leg pain that subsided after a few sessions of sauna therapy.

Discussion

The articles discussed in this literature review provide sufficient evidence to suggest sauna therapy in adjunct to conventional pharmaceutical therapeutics can be an effective form of treatment for reducing cardiovascular risk due to cadmium, lead, arsenic, and/or mercury exposure. This review provides some meaningful insights to guide future research and clinical practice. These articles reveal great promise in sauna therapy for the treatment and prevention of cardiovascular diseases such as CHF, PAD, high blood pressure, and stroke by reducing heavy metal accumulation.

Heavy metals such as cadmium, lead, arsenic, and mercury can have a significant physiologic effect. Cadmium increases the permeability of vascular endothelial monolayers by inhibiting cell proliferation and promoting cell death.[11] It has also been shown to down-regulate nitric oxide (NO) mediated vasodilation.[2] Lead accumulation has been shown to have an inverse relationship with estimated glomerular filtration rate (eGFR) indicating higher levels of lead can lead to reduced renal function. It has also been shown to enhance oxidative stress and impair NO-mediated vasodilation leading to increased vascular tone and peripheral vascular resistance.[4] Arsenic exposure has been shown to increase inflammation, enhance

continued on page 26 ➤

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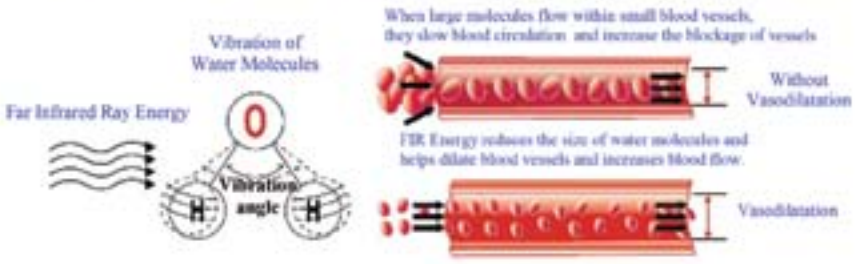

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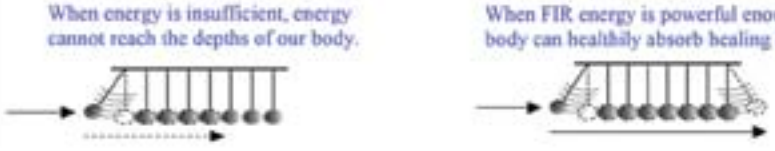

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➤ *continued from page 24*

oxidative stress, and endothelial and smooth muscle cell proliferation, vessel remodeling, and apoptosis.[3] Mercury has been shown to increase endothelial dysfunction and reduce NO synthesis, increase oxidative stress and inflammation, and enhance mitochondrial and immune dysfunction.[5] All of these mechanisms can lead to the progression of CVD.[2-5]

The renin angiotensin aldosterone system (RAAS) and natriuretic peptides (NPs) play key roles in the pathophysiology of CVD and CHF in particular. CHF progression leads to constant activation of the RAAS and a diminished response of NPs. This leads to increase in angiotensin II and aldosterone levels. This causes sodium reabsorption, which leads to hypertrophy and fibrosis in the heart and vasculature. Activation of the RAAS and NPs may be due to impaired NO-mediated vasodilation.

Many conventional therapies for CHF target the renin-angiotensin-aldosterone system (RAAS). Medications like angiotensin-converting enzyme inhibitors (ACEIs), angiotensin II receptor blockers (ARBs), and aldosterone-receptor blockers have significantly reduced mortality in CHF patients. Sauna therapy has been shown to enhance nitric oxide (NO) availability, decrease aldosterone, and decrease BNP and CNP activity.[12] Due to these factors and the success of sauna therapy in the RCTs discussed in this review, it can be hypothesized that sauna therapy can be an effective form of treatment for CVD with concurrent use of conventional pharmaceutical therapeutics.[12]

Complications of Studies

Borne et al utilized a self-administered questionnaire on current use of conventional CVD medications, smoking habits, and educational status. This could lead to false information due to variability in patient's ability to remember their medications and willingness to reveal truthful information.[2] The articles systematically reviewed in Navas-Acien et al did not sufficiently differentiate between classification of lead exposure and outcome and did not fully define what cardiovascular risk factors were and what other occupational exposures may have contributed to the findings.[4] The articles systematically reviewed in Manuscript et al., 2013 did not include proper internal comparisons between high and low arsenic exposure.[3] Both of these systematic reviews only included exact measurements of lead and arsenic levels within each individual for a few of the articles.[3,11] Sjögren et al only discussed one case report on mercury exposure leading to the progression of CVD and therefore cannot be used as a sufficient source to prove this correlation.[5]

Shinsato et al's RCTs may have some semblance of a placebo effect due to the inability to create a double-blinded RCT considering the nature of the intervention.[10] All of these RCTs were conducted in conjunction with conventional

pharmaceutical therapeutics that were not standardized therefore outcomes could differ based on medications. No studies were conducted without the use of conventional pharmaceutical therapeutics, which may hinder the ability to understand the full efficacy of sauna therapy as an intervention.

Based on this discussion, the conclusion can be made that cadmium, lead, arsenic and/or mercury toxicity are among the factors that contribute to cardiovascular disease; and since it appears these heavy metals are predominantly excreted through sweat, sauna therapy can be effective in reducing the amount of heavy metals circulating in the bloodstream.[7] More research would need to be conducted on heavy metal toxicant levels in patients before and after receiving sauna therapy to definitively make this claim.

Future studies should include research with larger populations with more specific age groups. Conventional therapies were taken simultaneously, and it would be interesting to see the effects of sauna therapy while decreasing the dose of conventional treatment to see if there can be therapeutic benefit without conventional treatment. Follow up on these studies were also short, and long-term effects would need to be monitored.

This therapy should be done concurrently with modifying lifestyle factors such as diet, exercise routine, and smoking cessation. The research was all done on patients who were concurrently using conventional treatment, and this must be taken into consideration as well.

There were no conflicts of interest reported in any of the articles in this review.

Conclusion

The studies found using these search methods indicate that sauna therapy may be an appropriate form of treatment for patients with CVD and in preventing CVD from advancing to complications such as CHF and PAD.

Cadmium, lead, arsenic, and mercury have been shown to depress nitric oxide (NO) availability, increase oxidation and inflammation, increase endothelial dysfunction, and induce cell death. These are all significant findings in CVD.[2-5,7] These toxic metals can be excreted via sweat and therefore excessive sweating may help to reduce the amount of these metals circulating in the bloodstream.[2,7]

It is evident from the studies reviewed that 15 minutes of sauna therapy for at least five days a week for three to six weeks is able to reverse the adverse effects of heavy metal toxicity by enhancing nitric oxide (NO) availability, decreasing aldosterone, decreasing oxidation and inflammation, reducing endothelial dysfunction, and assisting with mitochondrial function.[6,7,12] Considering heavy metal toxicity can play a role in the development of these conditions, it can be concluded that sauna therapy can help decrease levels of heavy metals such as cadmium, arsenic, lead, and mercury, and therefore improve prognosis of patients with cardiovascular diseases.

Acknowledgements

This literature review was edited by Dr. Debrah Harding and Dr. Baljit Khamba.

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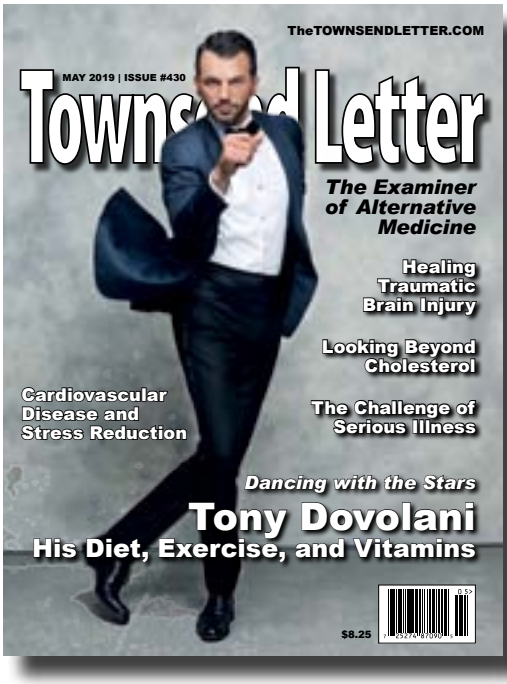
Dr. Hanisha Patel received a Bachelor of Science degree in pharmaceutical sciences at the Ohio State University. Following her undergraduate career, she worked for an NGO in Pune, India, where she worked with women in rural and slum areas. She then received her degree in naturopathic medicine from Bastyr University California where she continued to work with underserved communities locally and globally. As a naturopathic doctor, she specializes in cardiovascular diseases, diabetes, women's health, and neurodegenerative diseases. When she is not working with patients, she enjoys traveling, dancing, hiking, HIIT workouts, yoga, and watching sunsets.



On the cover

Dance Your Way to Health

by Karina Gordin

"I am a dancing machine and clean fuel keeps me on my feet," notes Emmy-nominated choreographer and *Dancing with the Stars* Mirrorball champion, Tony Dovolani. With a demanding training and performance schedule, Tony understands firsthand the importance of optimal nutrition and exercise in maintaining peak fitness and health. "My lifestyle can apply to most anyone, not just professional athletes like football players, golfers, or competitive dancers," Tony adds, suggesting that a regimented diet and lifestyle approach is surprisingly approachable – regardless of whether you work on the field, in the office, or even on the dance floor.

KG: I would like to begin by discussing your typical warmup routine, and how you prepare for long hours of training and performing.

TD: Preparation for the long day ahead is key and that includes getting sufficient sleep. First thing in the morning, I perform a 10-minute stretch routine, which involves reactivating all the firing muscles in my body. Oftentimes people end up only stretching the big muscles like the biceps, calves, shoulder, and chest muscles. I cannot stress this enough – upon waking you need to stimulate blood flow to the firing muscles. One of the most common injuries sustained during workouts or during those grueling months of training involve firing muscles, which are not getting enough blood to them. Like I said, preparation is key, and we often use the firing muscles without first getting them prepared for the day.

KG: I suspect this routine can apply to both professional and hobby athletes alike?

TD: Absolutely. This mindset and approach can help anybody, in any profession. For example, if you're sitting for most of your day, you have to make sure your back stays activated. *Schedule stretching into your workday.* I would even suggest performing 20 pushups and 20 sit-ups twice per day if you're able. Twenty pushups and 20 sit-ups are actually not a lot of work, you know, especially if your job is largely sedentary. These basic exercises stimulate blood to every part of your body and help keep the muscles around your spine and legs activated.

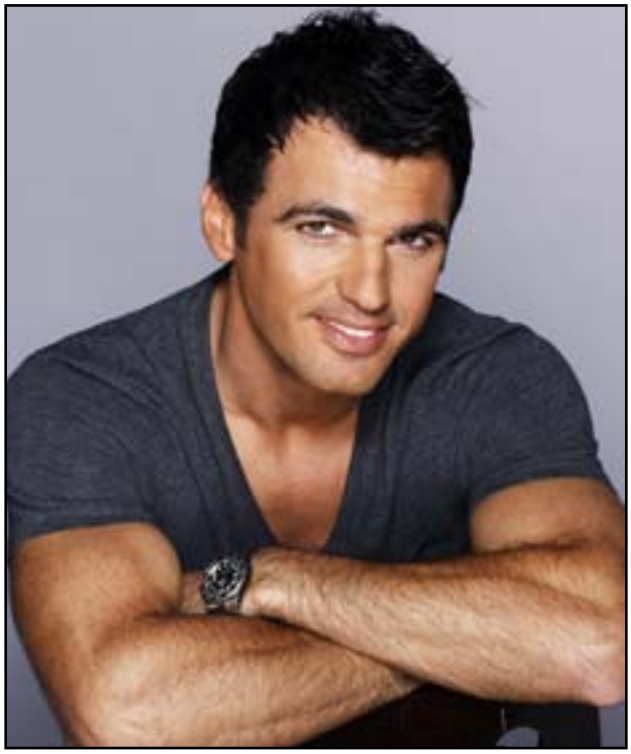
KG: Ultimately, you don't have to be a professional athlete to think like one.

TD: It's a lifestyle choice, that's what it comes down to. And like an athlete, you have to just keep at it and continue moving forward, whether it's reaching your goal of 40 pushups per day or fueling your body with whole foods. Thinking and eating like an athlete might sound intimidating, but it's about improving your overall performance, no matter what you do. That said, don't over-push yourself doing those pushups (even athletes get injured), just take it step-by-step.

KG: Speaking of over-pushing yourself, I understand you sustained a severe back sprain in 2012 while performing with Melissa Rycroft on *Dancing with the Stars*. In retrospect, did insufficient muscle activation perhaps play a role in the injury?

TD: The *Dancing with the Stars* schedule is very fast-paced, and we literally don't get any breaks at all. As a choreographer on a fast-paced show, you simply don't have time to think things through, so I ended up performing a lift without a proper warmup. Believe it or not, I tweaked my firing muscle because it wasn't warmed-up; I pulled it out of place.

KG: The fast-paced environment took a toll on you physically, but is there a psychological component to injury? I have read that stress affects microcirculation, which may in turn predispose athletes to injury.



Tony Dovolani

TD: Stress is the cause of many different conditions, but when it comes to physicality, stress can create emotion-bound tension in your muscles. In other words, your muscles lose flexibility. It's almost like making a fist – your muscles are bound. Now imagine you're doing exercises, which require full stretch and flexibility of your muscles…. Injury is almost inevitable if your muscles are bound like a fist. In this case you have to start thinking about introducing a breathing system that allows your bound muscles to relax. Granted, you might still be stressed, and it's easy to say "just relax," but breathing exercises improve blood oxygen and ultimately help the muscles start relaxing.

KG: A mental warmup before the physical warmup, so-to-speak.

TD: That's right. Slow, deep breathing promotes relaxation of bound muscles and can ease the stress response that predisposes you to injury.

KG: As a dancer, can your shoes cause bound muscles? More generally speaking, is footwear an important consideration in muscle pain and injury?

TD: Constrictive and rigid footwear definitely does make you more vulnerable to injury. Just think about it – if the foot is constrained then the blood flow is constrained. So, what I always do is encourage all the dancers to flex their feet when they have a five-minute break, or even if it's a one-minute break. Take your shoes off. Between the grueling dance schedule and being on my feet all day, what really helps with preventing foot pain and reducing inflammation is contrast hydrotherapy. On *Dancing with the Stars*, for instance, at the first opportunity I would head directly to the bathroom and run hot water over my feet, after which I'd switch to cold water. Just go back and forth between hot and cold water. At the end of a long day, a contrast foot bath is helpful for just about anyone, not just athletes.

KG: That's a perfect segue to my next question regarding your treatment approach for musculoskeletal injuries. I recently spoke with your fellow *Dancing with the Stars* cast member Maksim Chmerkovskiy, and he mentioned responding well to alternative treatment modalities like platelet rich plasma (PRP) prolotherapy and stem cell injections. Have you experimented with similar therapies, as part of your treatment protocol?

TD: I have not, though I do believe in those therapies because I've seen results. Fortunately, I haven't needed to use them because my injuries are relatively minimal. Maks called me recently, and he goes, "You know Tony, it is pretty amazing – you're 45 and have not had a single major injury." And I said, "Max, the thing is, I dance every day. I dance literally every single day. I never stop. My body is never inactive. More importantly, I always stretch and make sure to massage my muscles." That said, PRP and stem cells are wonderful therapies, I think it's great to help your body heal itself.

KG: Have you experimented with acupuncture, cupping, or even homeopathy?

TD: Yes, I have used homeopathy, cupping, and acupuncture. I like to experiment just to see what works for me and what doesn't. I have to say those particular natural therapies work well, but I find that meditation and breathing exercises are *primary*. Even the most natural therapy cannot truly work until you first learn how to listen to your body, breathe, and harness your body's natural healing processes. When you're injured or stressed, tuning into your body through breathwork and awareness are the first-line therapy.

KG: And by extension, awareness of posture and body alignment play a role in injury treatment and prevention?

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TD: Yes, why not? Self-awareness should include being mindful of your posture and balance. No matter whether you're sitting, standing, jogging, dancing, meditating, or picking something up, correct posture will result in fewer injuries and greater gains. Good balance – or what I call "zero balance barrier" – involves centering your weight right in the middle of your foot. So, to get a sense of correct weight distribution, rock back and forth and then naturally reposition back to the middle of your foot. Long term, "zero balance barrier" can help relieve stress on the lower back – a region where we tend to carry a lot of stress. Because we're not always mindful of posture and balance (we tend to push our hips forward or arch our back) it's important to stretch the lower back throughout the day. What I do is I stand with my back flat against the wall – it's a simple and effective stretch. So those are the things that I constantly keep in mind. And if I may add, that's what kept me the same height.

Dancing actually activates every single muscle in your body and that's the thing that dancing has over most any other sport.

KG: Whereas poor posture can weaken the spine, compress disks, and contribute to height loss with age.

TD: I may have actually gotten about a quarter to a half-an-inch taller because I constantly stretch those muscles. So, recently I was talking to one of my students – he is 47-years-old and he said to me, "Tony, I used to be taller." He goes, "I wrote 5'9" on a license form because that's what I always was. And then the administrator measured me and said I was actually 5'8". Tony, I shrunk an inch!" No problem. We went through this whole stretch routine where I started realigning his back and before you know it, he was back to 5'9"! It was simply a matter of realigning his body and understanding where the pressure points are. Remember to constantly keep stretching, I cannot emphasize that enough.

KG: Nutrition may likewise prevent height loss with age, i.e. "feeding your bones." As an elite athlete, what is your approach to diet and nutrition?

TD: I allow my body to use its own resources. This morning, for example, I got up at 6:00 am and had one cup of coffee, black. I don't take sugar or milk. I also had water, but I don't eat anything until about 11:00 am. Why? Because I want my body to use its reserves. Five to six hours after waking up, the body starts going into storage mode, so that's when you eat. In my case, because I woke up at 6:00 am, I had my first meal of the day around 11:00 am – right when my body is going into storage mode. I like being able to recycle whatever the body is starting to store. You know "love handles"? Those are fat storage areas. So, not eating from about 6:00 am until 10:00 am, the body is using stored fat to activate. And then by 11:00 am I eat, which signals to the body that I'm not starving.

KG: What is a typical meal?

TD: First of all, *I only eat as much as I think my body is going to use that day.* But generally, I eat a heftier breakfast. In the afternoon I make sure to eat a fresh salad with protein, like chicken or tuna. As for dinner, I eat early – typically no later than 6:00 pm. Dinners usually consist of two food groups: meat and vegetables or fish and vegetables. Always vegetables. I don't eat after 6:00 pm because that's the time when your metabolism starts slowing down. You don't want to put stress on the stomach muscles in order to digest. Also, that's when the body starts storing for the evening.

KG: Do you use protein powders, for instance?

TD: I do not. I'm not a big believer in protein powders. A healthy, balanced diet will give your body everything it needs. In fact, your body will take only what it needs. Obviously, you need to make the nutrients available to your body, that's why I always say that food variety is the spice of life. Eating a wide variety of healthy, balanced food groups ensures that your body can naturally extract the nutrients directly from the foods, without needing to over-supplement. I know people who take 15 vitamins in the morning. It's important to get tested for vitamin deficiencies and supplement accordingly, but I'm simply saying that things like protein powders should not replace a well-balanced, nutritious, varied diet.

KG: Are food restrictions as important as food variety? For instance, earlier you mentioned taking your coffee black, as such limiting sugar and dairy.

TD: I don't want to restrict sugar and dairy altogether, but I definitely limit them. I also try to stay away from certain food groups like processed grains. Oftentimes breads are made with dough conditioners and the flour is bleached and bromated. So, I stay away from breads but recommend whole grains like millet, quinoa, oatmeal, buckwheat. Many of these grains are rich in fiber, protein, and minerals like iron and calcium. As for fats, I restrict my intake to healthy fats like olive oil and avocado oil – great on salad to help with the absorption of fat-soluble vitamins in vegetables. I also take Omega XL fish oil every day – a very important source of omega-3 fatty acids.

KG: So, in terms of supplements, you do take fish oil regularly?

TD: I do actually take it regularly and I'll explain why. Quite a few supplement brands have approached me to endorse them. You know, I live in a world of endorsements. I get that. But I told every one of them that I'd test out the products and if they work, I'll endorse them. If they don't work, I won't say anything, but I just won't endorse them. Having personally looked into Omega XL, their fish oil is extracted from clams raised in pristine waters in New Zealand. No matter what brand of fish oil you take, make sure it's sourced from deep, clean water. With mislabeling and poor regulations, fish oil can be sold contaminated or even rancid. That's a pity because omega-3 fatty acid is so important for heart health, and especially for athletes because of its anti-inflammatory properties. Anyways, so I just took a few boxes of Omega XL and what I found is that it really helped my joints. I started forgetting about pain. As you know I hurt my lower back on *Dancing with the Stars* and taking omega-3 fish oil literally helps with pain relief, naturally. I don't need to take anything else for back pain relief. I will tell you this right now. It has helped me so much as an anti-inflammatory. And incidentally, it's been great for my skin.

Tony Dovolani

KG: Being on TV and all, that's equally important!

TD: Fish oil hydrates the skin. But also, fish oil supports healthy circulation from head to toe. I believe 100 percent that the only reason I still dance *to the fullest capacity* is because of fish oil. I'm in a business. I'm in a dance business. My livelihood revolves around physicality and fitness. For me, as long as I could keep my dancers happy and healthy, that's all that matters to me.

KG: Considering your philosophy is to largely extract nutrients from food, I suspect you likewise enjoy fish, and seafood in general – a good natural source of essential fatty acids.

TD: Absolutely. The seafood cannot be farm raised first of all, it has to be wild caught. Often, farm-raised fish are also subject to overcrowding and are even medicated with antibiotics. I recently read that pesticides are used in aquaculture to control sea lice. I am very lucky in a sense because my entire family are hobby fishermen. I have a reservoir next to my house, and we fish for trout. We also enjoy going up to upstate New York. We go to Pulaski for king salmon, lake trout, things like that. And whenever we catch fish, we literally clean and store it right there and then. I got to say the wild fish that we eat is the best food you can ever have! New York has some of the best fishing east of the Rockies.

KG: Speaking of New York, I understand the New York Rangers, in fact, took lessons with you. What can elite athletes like hockey players, or even golfers, basketball, and football players learn from dance?

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TD: Dancing works our rotational muscles. Dancing actually activates every single muscle in your body and that's the thing that dancing has over most any other sport. Dancing activates your entire body, and that keeps you agile, it keeps you young, it keeps you healthy. All of your joints are being used when you dance. Not in an impactful way mind you, but in a stretching, rebound-style motion. A lot of times, when you look at the New York Rangers and you look at basketball players, football players, golfers, most of them use the same muscle groups. Dancing on the other hand actually works on the opposite muscles, which keep those muscles you're using healthy. The more muscle groups you use, the more successful you'll be in achieving athleticism, flexibility, agility, height, strength. If you look at the workout regimens of the world's top athletes, you'll notice they make sure to use their entire body. When you look at Dustin Johnson – one of the world's top golfers – he literally might as well start dancing. You know, dancing would give him many of those exercises that he's doing and more.

Karina Gordin and Tony Dovolani

KG: You golf, so dancing must boost your performance on the course.

TD: I can get more distance, speed, and power in my golf swing thanks to dance. You see, golfers often suffer from back injuries because of core weakness and inactive firing muscles in their back. Golfers use the big muscles (instead of engaging the firing muscles) to swing the golf club and rotate the ball. Limited hip mobility – or stiff hips – are often a source of pain and injury because the firing muscles in the hips aren't activated. Firing muscles are also in areas like your lower back and shoulders, and dancing effectively stretches them. Dancing keeps you elongated, limber, strong – for many, many years to come. I like to say, it's never too late to start dancing.

KG: In that case most anyone can dance at any age, from one to 100?

TD: Yes. At any age. I've taught people from three-years-old all the way to, well, as a matter of fact, I had a student that was 98-years-old. Within the first couple of months of teaching her, she admitted to me that she was able to do things that she hadn't been able to do for the past 20 years. Isn't that amazing? It was a slow process no doubt, but step-by-step, if you dance properly, you should start feeling a difference within a month, just as she did.

KG: That's key – to dance properly. So, a good dance instructor makes a big difference, much like a good football coach or fitness trainer, I suppose.

TD: A good dance instructor definitely does make a difference. I honestly think that you need to ensure that your teacher is certified and knows how the body functions, right? Dance is often used in physical therapy and rehabilitation, so you want to make sure that you're using your muscles correctly and don't get injured. Ultimately, dance helps keep you balanced and limber long into your old age, so together let us dance to health and longevity.

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Katrina Gordin is a medical journalist and currently writes for a variety of commercial and peer-reviewed health publications. She would like to thank her father, Dr. Leonid Gordin, for advocating the importance of meditation and mindfulness, which has informed her writing and research.

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Shorts

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Carbohydrate Restriction for Type 2 Diabetes

Researchers affiliated with Virta Health (San Fransciso, California) have published results from a year-long study of its comprehensive care program that supports people with type 2 diabetes (T2D) as they maintain nutritional ketosis with a low-carbohydrate diet. Nutritional ketosis is defined as a serum beta-hydroxybutyrate (BOHB) level between 0.5 and 3.0 mmol/L^{-1} The program includes education about diabetes, managing carbohydrate restriction while consuming protein in moderation and increasing fat intake, and behavior change techniques. Nutritional programs were individualized with the goal of maintaining nutritional ketosis with satiety. Patients were advised to consume a variety of fats, including omega-3 fatty acids (EPA and DHA), omega-6 fatty acids (linoleic acid), monounsaturated and saturated food sources. In addition to supplemental omega-3 (up to 1000 mg/day), a multivitamin and vitamin D3 (1000-2000 IU) were recommended.

Regular communication between patients and the health care team is a key part of this program. Upon admission, patients received digital biomarker tracking tools, including a cellular-connected weight scale, a finger-stick blood glucose and ketone meter, and a blood pressure cuff for those with hypertension. Participants provided ketone measures daily and glucose measures one to three times a day so that medical providers, trained in nutritional ketosis, could adjust diabetes medications as needed. Medication status was reviewed weekly. In addition, patients had daily support from health coaches via text messaging to address any questions or concerns and from peers via online communication.

The researchers have published three studies so far about this program. All three studies follow a group of 262 volunteers with T2D (mean age 54, SD 8 years; mean body mass index 41; 66.8% women), recruited from greater Lafayette, Indiana. Most subjects were taking at least one diabetes medication (234/262, 89.3%). "Exclusion criteria included advanced renal, cardiac, and hepatic dysfunction, history of ketoacidosis, dietary fat intolerance, or pregnancy or planned pregnancy."

The first study, published in 2017, sought to determine whether it made a difference if participants received the education content during weekly on-site sessions or via web-based recorded videos. Patients were able to self-select their preference. In addition, T2D-related biomarkers were recorded at baseline and at ten weeks. At 10 weeks, 238 participants remained. One person withdrew in the first 70 days because of diarrhea due to fat intolerance; no information was given on the others.

Both the on-site and the remote groups showed significant improvement in biomarkers, indicating that both education venues were effective. HbA1c levels (a measure of average blood sugar) significantly declined. Only 52/262 (19.8%) had an HbA1c level of <6.5% at baseline, compared to 147/262 of the patients (56.1%) after 10 weeks. In addition, 133/234 individuals had one or more diabetes medications reduced or eliminated. During those 10 weeks, participants maintained consistent carbohydrate restriction, indicated by a mean BOHB of 0.6 (SD 0.6) mmol/L^{-1}.

A second study, published in 2018, looked at results of the Virta intervention after one year, using data from the same cohort. HbA1c, weight, and medication use were the primary outcomes. Fasting serum glucose and insulin, HOMA-IR, blood lipids and lipoproteins, liver and kidney function markers, and high-sensitivity C-reactive protein (hsCRP) were secondary outcomes. In addition, the Virta cohort was compared to a control group of 87 patients with T2D, who were counseled about nutrition, lifestyle, and self-management as part of a local diabetes education program with registered dietitians (usual care).

Eighty-three percent (n=218) of the original Virta enrollees (n=262) completed the full year. After one year, HbA1c had declined from a baseline of 7.6 ± 0.09% to 6.3 ± 0.07%, ($P<1.0 \times 10^{-16}$), and weight declined 13.8 ± 0.71 kg ($P<1.0 \times 10^{-16}$). In addition, 94% of patients who were prescribed insulin either reduced or stopped their insulin use, and sulfonylurea use was discontinued in all patients. The usual-care, control group had no significant changes in biomarkers or in T2D medication use.

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Despite the low-carb, high-fat diet, measures for liver, kidney, and thyroid function showed either improvement or no change. Also, no Virta patients experienced ketoacidosis or episodes of hypo- or hyper-glycemia that required assistance. The authors say, "The absence of hypoglycemic events requiring assistance despite relatively tight glucose control may be due to the careful medical provider prescription management, especially rapid downward titration of insulin and sulfonylurea preventing hypoglycemia following dietary changes."

Despite the increased dietary fat consumed by the Virta patients, dyslipidemia and markers of inflammation and liver function were generally improved at one year. A third study, published in *Cardiovascular Diabetology,* focused on the intervention's effect on cardiovascular disease risk biomarkers in the 218 participants who remained. All measured biomarkers, except LDL-C, showed improvement: "Intention-to-treat analysis (% change) revealed the following at 1-year: total LDL-particles (LDL-P) (-4.9%, P=0.02), small LDL-P (-20.8%, P=1.2 x 10^{-12}), LDL-P size (+1.1%), ApoB (-1.6%), ApoA1 (+9.8%), ApoB/ApoA1 ratio (-9.5%), triglyceride/HDL-C ratio (-29.1%), large VLDL-P (-38.9%), and LDL-C (+9.9%)." The authors note that LDL-C, regarded as a CVD risk factor, has also been inversely correlated with mortality in two large prospective studies. Blood pressure, hsCRP, and white blood cell count also declined. Carotid intima media thickness (cIMT) remained unchanged. The usual-care control group showed no significant changes.

The authors give several limitations of these studies, notably, the lack of randomization between the Virta and usual care groups. Also, the amount of attention and support given to patients in the Virta group was much greater – which, in itself, could be a factor. Participants were primarily Caucasians living in the Midwest; the results cannot be generalized to other regions or races. Finally, measuring cardiovascular biomarkers is not the same as looking at actual CVD events or deaths: "The study was not of sufficient size and duration to determine significant differences in CVD morbidity or mortality."

Virta Health, "founded in 2014 with the goal of reversing type 2 diabetes in 100 million people by 2025," has several short videos about this program on YouTube as well as information on its website, www.virtahealth.com. The program emphasizes that it works with patients' primary care practitioner in offering this care.

Bhanpuri NH, et al. Cardiovascular disease risk factor responses to a type 2 diabetes care model including nutritional ketosis induced by sustained carbohydrate restriction at 1 year: an open label, non-randomized, controlled study. *Cardiovasc Diabetol.* 2018;17:56

Hallberg SJ, et al. Effectiveness and Safety of a Novel Care Model for the Management of Type 2 Diabetes at 1 Year: An Open-Label, Non-randomized, Controlled Study. *Diabetes Ther.* 2018;9: 583-612.

McKenzie AL, et al. A Novel Intervention Including Individualized Nutritional Recommendations Reduces Hemoglobin A1c Level, Medication Use, and Weight in Type 2 Diabetes. *JMIR Diabetes.* 2017;2(1):e5.

Chocolate and CVD

Chocolate, made from the seeds of the cocoa tree (*Theobroma cacao*), is a rich source of flavonoids that benefit the cardiovascular system, according to multiple studies. An Italian review and meta-analysis of 16 studies with a total of 344,453 participants reported that most of the studies found "a significant reduction of CVD risk in association with higher levels of chocolate intake after adjustment for potential confounders, including age, physical activity, BMI, smoking status, dietary factor, education, and drug use." The meta-analysis reported an overall risk ratio of cardiovascular disease for the highest vs. the lowest category of chocolate consumption as being 0.77 (95% confidence interval [CI], 0.71-0.84; P= 0.000). In addition, the meta-analysis showed chocolate consumption was associated with reduced risk for coronary heart disease (47%), stroke (30%), acute myocardial infarction (22%), and heart failure (17%). The data in the reviewed epidemiological studies was derived from food frequency questionnaires or self-reports. The type(s) of chocolate (milk, dark, white) providing benefit was unclear from the data.

A 2018 review, led by Sergio Davinelli, reported on the many known effects of cocoa's flavonols and suggested that using cocoa with omega-three fatty acids might enhance the cardiovascular benefits synergistically. Flavonol-rich cocoa increases antioxidant activity. The flavonols also increase bioavailability of nitric oxide (NO) in the endothelium, preventing leukocyte adhesion and migration, smooth muscle cell proliferation, platelet adhesion, and aggregation. Moreover, increased NO bioavailability promotes relaxation of vascular smooth muscle cells, leading to vasodilation. Cocoa flavonols may also reduce inflammation by suppressing the production of inflammatory eicosanoid metabolites. Davinelli et al say that "the ongoing Cocoa Supplement and Multivitamin Outcomes Study (COSMOS), which aims to determine the efficacy of a flavonol-rich cocoa using a 5-year randomized trial among 18,000 healthy men and women, may provide definitive evidence on the health benefits of cocoa on cardiovascular outcomes."

People who are consuming chocolate for its health benefits may want to check the website by As You Sow. This non-profit organization strives to promote environmental and social corporate responsibility. Since 2014, As You Sow has commissioned independent state-certified laboratories to measure lead and cadmium levels in chocolate products sold in California. Most products (96 of 127 tested products) have higher lead and/or cadmium levels than allowed by the California Safe Drinking Water and Toxic Enforcement Act of 1986. The organization works with manufacturers to reduce heavy metal content.

Contamination can come from several sources. Pervasive industrial pollution contaminating soil and water used in growing cacao is one source, but growing practices that use pesticides (lead and cadmium), phosphate fertilizers (cadmium), and sewage sludge (lead and cadmium) can also affect cocoa's heavy metal content. Equipment used to ship and process the cocoa beans is also an important source of contamination.

As You Sow lists results from tested chocolate products at its website: www.asyousow.org.

Davinelli S, et al. Cardioprotection by Cocoa Polyphenols and ω-3 Fatty Acids: A Disease-Prevention Perspective on Aging-Associated Cardiovascular Risk. *J Medicinal Food.* 2018; 21(10): 1060-1069.
Gianfredi V, et al. Can Chocolate consumption reduce cardio-cerebrovascular risk? A systematic review and meta-analysis. *Nutrition.* 2018;46:103-114.

Kefir for Metabolic Diseases

Kefir, which originated in the northern area of the Caucasus Mountains, is a traditional fermented milk product. Kefir grains, used to make the beverage, consist of a symbiotic mix of lactic and acetic acid bacteria (eg *Lactobacillus, Lactococcus, Leuconostoc,* and *Streptococcus* spp.) and yeasts (eg *Kluyveromyces, Saccharomyces,* and *Torula*).

A 2018 review article from Brazil suggests that kefir may provide benefits for people with cardiovascular and metabolic diseases. Kefir has antioxidative properties, according to multiple studies. Some kefir bacteria synthesize antioxidant enzymes, such as peroxidase, superoxide dismutase, and glutathione reductase, as well as producing other substances that reduce oxidative stress. Daily consumption of kefir has also produced immunomodulatory and hypocholesterolemic effects.

Experiments with spontaneously hypertensive rats found that kefir, consumed for at least 30 days, produced a significant reduction in blood pressure levels as well as reduction in tachycardia and left ventricular hypertrophy, characteristic of these rats. Several species of Lactobacillus – *L. fermentum, L. coryniformis, L. gasseri, L. helveticus, L. paracasei,* and *L. lactis* – are among the probiotic bacteria found in kefir grains that have these hypotensive effects. Animal experiments have also shown that kefir restores balanced parasympathetic and sympathetic activity to the heart.

The microbial composition of kefir grains varies from region to region. Brazilian kefir grains, for example, contain *Lactobacillus kefiranofaciens,* Bifidobacterium, and the yeast *Candida kefir.* A Chinese study that analyzed kefir grains taken from three Tibetan households determined *Pseudomonas* sp. *Leuconostoc mesenteroides, L. helveticus, L. kefiranofaciens, Lactococcus lactis, Lactobacillus kefiri, Lactobacillus casei, Kazachstania unispora, Kluyveromyces marxianus, Saccharomyces cerevisiae, and Kazachstania exigua* to be the primary organisms. I don't know if the kefir beverages sold in US supermarkets have anything close to the microbial complexity or composition of traditional sources. The Brazilian authors say that "additional studies are required to verify if milk fermented by kefir grains from different origins and production processes could have similar beneficial effects."

Pimenta FS, et al. Mechanisms of Action of Kefir in Chronic Cardiovascular and Metabolic Diseases. *Cell Physiol Biochem.* 2018;48:1901-1914.
Zhou J, et al. Analysis of the microflora in Tibetan kefir grains using denaturing gradient gel electrophoresis. *Food Microbiology.* 2009;26:770-775.

Hypertension and "Om"

The meditative practice of chanting "Om" reduces blood pressure (BP), according to studies by Indian researchers. A 2018 study, involving 50 people with hypertension, showed blood pressure reduction with five minutes of Om chanting. The participants, between ages 40-60 years old, had poorly controlled, mild or moderate hypertension despite being on pharmaceutical treatment. After recording baseline BP, a facilitator instructed each subject to gently close their eyes, inhale gently and deeply and then produce the sound "Omm..." as they exhaled, concentrating on the sound and its effect on their belly. This chanting continued for five minutes, after which blood pressure was re-taken. Mean blood pressure dropped 14 mmHg for systolic BP ($P < 0.001$) and 5 mmHg for diastolic ($P < 0.05$). Mean pulse rate also declined by six beats.

The authors report that Om chanting stimulates the vagus nerve and deactivates the limbic system. The resulting parasympathetic predominance and cortico-hypothalamo-medullary inhibition may explain why the chanting had a greater effect on systolic BP, which reacts to stress, and less effect on the diastolic, which indicates arteriolar resistance.

Blood pressure also declined in a 2016 randomized study, involving 40 women, age 50-60 years, with blood pressure values of 120-179/≤109 mmHg. Twenty women chanted Om once a day as a group at Sattva Cultural Space and Research Centre for six months while the remainder acted as the control. Systolic and diastolic pressure, pulse rate, as well as depression, anxiety and stress measures decreased significantly in the Om group.

A 2011 study, led by Bangalore G. Kalyani, used functional magnetic resonance imaging (fMRI) to track neurohemodynamic effects of chanting Om compared to making an "sss" sound or simply being in a state of rest. Nine healthy men took part in the study. They were taught to chant Om "without distress and interruption," sounding the vowel (O) for five seconds and continuing into the consonant (M) for the next 10 seconds. After a baseline high-resolution structural brain scan, echoplanar scans were taken as the participants engaged in 15 seconds of Om chanting, 15 seconds of rest, and 15 seconds of making an "sss" sound for a total of ten minutes. Although it required the same exhalation length, the "sss" sound, unlike Om, does not produce a vibration around the ears that is thought to affect the auricular branch of the vagus nerve.

Compared to the rest periods, the "sss" sound did not produce any significant activation/deactivation in any brain area. Om, however, produced significant deactivation in the amygdala, anterior cingulated gyrus, hippocampus, insula, orbitofrontal cortex, parahippocampal gyrus, and thalamus.

According to yoga practice, Om represents "the force behind all thoughts, and chanting or thinking about Om will cause quiet mental state." Possibly, the effect of Om chanting may be stronger among people who ascribed to Vedic spirituality. Or, it could be that the vagus nerve, responsible for parasympathetic control of the heart, is just truly responsive to sound vibrations.

Amin A, et al. Beneficial effects of OM chanting on depression, anxiety, stress and cognition in elderly women with hypertension (abstract). *Indian J Clin Anatomy and Physiol.* July-september 2016;3(3):253-255.
Arora J, Dubey N. Immediate benefits of "Om" chanting on blood pressure and pulse rate in uncomplicated moderate hypertensive subjects. *National J Physiol, Pharmacy, and Pharmacology.* 2018.
Kalyani BG, et al. Neurohemodynamic correlates of 'OM' chanting: A pilot functional magnetic resonance imaging study. *International J Yoga.* Jan-Jun 2011; 4(1): 3-6.

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Literature Review & Commentary

by Alan R. Gaby, MD
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Fried Foods and Cardiovascular Disease

The association between consumption of fried foods and mortality due to cardiovascular disease was examined in a prospective cohort study of 106,966 postmenopausal women (aged 50-79 years) in the United States who were participating in the Women's Health Initiative study. During a mean follow-up period of 17.9 years, after adjustment for potential confounding variables, mortality due to cardiovascular disease was significantly higher by 8% in women consuming at least one serving per day of any fried food than in those consuming no fried foods. Consumption of fried chicken at least once a week, as compared with no consumption, was associated with a significant 12% increase in cardiovascular mortality. Consumption of fried fish or fried shellfish at least once a week, as compared with no consumption, was associated with a significant 13% increase in cardiovascular mortality. Consumption of other fried foods was not associated with cardiovascular mortality.

Comment: Heating animal foods to high temperatures results in the formation of oxidized cholesterol and advanced glycation end products, each of which can promote the development of cardiovascular disease. The concentration of advanced glycation end products in animal foods may be decreased by up to 50% if the food is boiled, poached, or stewed instead of fried, broiled, roasted, or grilled.

Heating of frying oil to high temperatures may also produce atherogenic compounds such as lipid peroxides. The formation of lipid peroxides during cooking is substantially less with saturated and monounsaturated fatty acids than with polyunsaturated fatty acids. For that reason, it would appear to be safer to cook with olive oil or peanut oil (which have a relatively high content of monounsaturated fatty acids) than with corn, soybean, sunflower, or safflower oil (which have a relatively high content of polyunsaturated fatty acids). Canola oil has a high content of monounsaturated fatty acids, but it also contains a moderately large amount of alpha-linolenic acid. Alpha-linolenic acid is an unstable molecule that may be converted to mutagenic and carcinogenic compounds when heated to high temperatures.

Sun Y, et al. Association of fried food consumption with all cause, cardiovascular, and cancer mortality: prospective cohort study. *BMJ*. 2019;364:k5420.

Can Aortic Aneurysms Be Prevented with Diet?

Dietary intake was assessed by a 66-item food-frequency questionnaire at baseline (1987-1989) and again in 1993-1995 in 13,496 individuals (mean age, 54 years) enrolled in the Atherosclerosis Risk in Communities study who did not have clinical evidence of an abdominal aortic aneurysm. During a median follow-up period of 23 years, 517 abdominal aortic aneurysms were diagnosed. Individuals with a Dietary Approaches to Stop Hypertension diet score in the highest quintile had a 40% lower risk of hospitalization for abdominal aortic aneurysm than those in the lowest quintile (p for trend = 0.002). Higher consumption of fruits, vegetables, whole grains, low-fat dairy products, and nuts and legumes (as a group) was each significantly associated with a lower risk for abdominal aortic aneurysm.

Comment: The Dietary Approaches to Stop Hypertension (DASH) diet was designed to provide abundant amounts of various nutrients that play a role in blood pressure regulation. The diet is rich in fruits, vegetables, and low-fat dairy products; contains moderate amounts of nuts, seeds, and legumes; and is relatively low in saturated fat, total fat, and refined sugar.

Circumstantial evidence suggests that certain micronutrients may help prevent or slow the progression of aortic aneurysms

by enhancing tissue integrity. These nutrients include copper, zinc, vitamin C, and B vitamins, all of which are present in larger amounts in a DASH diet than in a typical Western diet. Observational studies cannot prove causation. However, the results of the present study raise the possibility that consuming a healthful diet can help prevent aortic aneurysm, which is a potentially life-threatening condition.

Haring B, et al. Adherence to the Dietary Approaches to Stop Hypertension dietary pattern and risk of abdominal aortic aneurysm: results from the ARIC study. *J Am Heart Assoc*. 2018;7:e009340.

Red Yeast Rice: Quality Control Issues

The authors of this study measured the monacolin K content of 28 brands of red yeast rice supplements purchased from mainstream US retailers. Monacolin K was not detected in two brands. In the other 26 brands, the quantity varied more than 60-fold, from 0.09 to 5.48 mg per 1,200 mg of red yeast rice. By following the manufacturers' recommendations for daily servings, the quantity of monacolin K consumed per day would vary more than 120-fold, from 0.09 to 10.94 mg, and six brands provided more than 4 mg per day of monacolin K.

Background: Monacolin K is another term for lovastatin, which is a prescription statin drug used to lower serum cholesterol levels. Traditional Chinese red yeast rice contains only small amounts of monacolin K. In contrast, some genetically modified strains of red yeast rice contain much higher amounts, and those strains have been shown to be effective for decreasing serum cholesterol levels. Interestingly, the amount of monacolin K present in clinically effective red yeast rice products is substantially lower than the amount of prescription lovastatin that is typically needed to reduce cholesterol levels. The higher potency of red yeast rice-derived lovastatin might be explainable by the fact that red yeast rice also contains a number of other monacolins, as well as other compounds that may work synergistically with monacolin K. In addition, the incidence of myalgia and other side effects is much lower with red yeast rice than with statin drugs.

The United States Food and Drug Administration (FDA), in keeping with its unfortunate habit of blocking the availability of safe and effective natural substances, has ruled that red yeast rice products that provide 4 mg per day or more of lovastatin are unapproved drugs, rather than dietary supplements. It is therefore illegal to sell these products in the US. Despite the FDA ban, some products still contain clinically effective amounts of lovastatin and other monacolins, although other products contain only negligible amounts. Consumerlab.com has periodically analyzed commercial brands of red yeast rice, and the monacolin content of these brands is provided to paid subscribers on their website.

Cohen PA, et al. Variability in strength of red yeast rice supplements purchased from mainstream retailers. *Eur J Prev Cardiol*. 2017;24:1431-1434.

Vitamin D and Postoperative Atrial Fibrillation

Of 328 patients living in Cypress who underwent coronary artery bypass graft surgery, 24.3% had vitamin D insufficiency preoperatively (serum 25-hydroxyvitamin D level of 20-29 ng/ml; mean, 24.8 ng/ml) and 17% had vitamin D deficiency preoperatively (25-hydroxyvitamin D level below 20 ng/ml; mean, 11.2 ng/ml). The patients with vitamin D insufficiency or deficiency were randomly assigned to receive or not to receive (control group) a single dose of 50,000 IU of vitamin D (not specified whether this was vitamin D_3 or D_2) 48 hours before surgery. Among the patients with vitamin D insufficiency, the incidence of postoperative atrial fibrillation was nonsignificantly lower in the vitamin D group than in the control group (31% vs. 33%; p = 0.54). Among the patients with vitamin D deficiency, the incidence of postoperative atrial fibrillation was significantly lower in the vitamin D group than in the control group (18% vs. 29%; p = 0.02).

Comment: Postoperative atrial fibrillation occurs frequently in patients undergoing cardiac surgery. Although it is usually self-limited, postoperative atrial fibrillation is associated with increased one- and six-month mortality rates and other adverse outcomes. Previous studies have suggested that perioperative administration of magnesium or vitamin C can decrease the incidence of postoperative atrial fibrillation. In the present study, perioperative vitamin D supplementation prevented postoperative atrial fibrillation in patients whose serum 25-hydroxyvitamin D level was below 20 ng/ml, but not in patients who had higher levels.

Cerit L, et al. Preventive effect of preoperative vitamin D supplementation on postoperative atrial fibrillation. *Braz J Cardiovasc Surg*. 2018;33:347-352.

Folic Acid, Homocysteine, and Genetic Polymorphisms

In the China Stroke Primary Prevention Trial, 16,867 individuals with hypertension were randomly assigned to receive, in double-blind fashion, 10 mg per day of enalapril (control group) or enalapril plus 0.8 mg per day of folic acid for a median duration of 4.5 years. At the end of the treatment period, the mean plasma homocysteine concentration was significantly lower by 1.6 µmol/L in the folic acid group than in the control group. After adjustment for baseline homocysteine concentrations, the homocysteine-lowering effect of folic acid was significantly greater in patients who were homozygous for the 677C→T genotype of the methylenetetrahydrofolate reductase (MTHFR) gene than in those with the CC or CT genotype.

Comment: Some practitioners and researchers have argued that individuals who are homozygous for the 677C→T genotype of the MTHFR gene have an impaired capacity to convert folic acid to one of its biologically active forms, 5-methyltetrahydrofolate (5-MTHF), and that these individuals should supplement with 5-MTHF instead of folic acid. I have previously challenged this argument on a number of different grounds. One point to consider is that, among people who are homozygous for the MTHFR 677C→T genotype, the impaired conversion of folic acid to its biologically active form is relative rather than absolute, and can be overcome in most cases by supplementing with a modest dose of folic acid.[1] In addition, folic acid may actually be *more* effective than 5-MTHF for lowering homocysteine levels in MTHFR 677C→T homozygotes.[2] The results of the present study indicate that the homocysteine-lowering effect of folic acid is greater in MTHFR 677C→T homozygotes than in other people. This finding further discredits the claim that MTHFR 677C→T homozygotes cannot benefit from folic acid supplementation.

Wang B, et al. Effect of long-term low-dose folic acid supplementation on degree of total homocysteine-lowering: major effect modifiers. *Br J Nutr*. 2018;120:1122-1130.

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Gaby's Literature Review

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Vitamin B6 Toxicity: High Doses Are Not Always Toxic

A 30-year-old patient with homocystinuria developed progressive sensory neuropathy with ataxia and impaired sensation in the extremities after receiving 1,250-1,750 mg per day of pyridoxine for 20 years. Electrodiagnostic testing demonstrated abnormalities of sensory nerve potentials, and sensory ganglionopathy was diagnosed. The pyridoxine dosage was reduced to 500 mg per day, which resulted in the disappearance of sensory symptoms and ataxia, and normalization of sensory nerve potentials.

Comment: Vitamin B6 in dosages of 500 mg per day or higher has been reported to cause a sensory neuropathy in a stocking-and-glove distribution. Most patients with vitamin B6 toxicity improve after discontinuing the vitamin, although subtle neurological dysfunction has persisted for years in some cases. Some patients with schizophrenia or with the rare genetic disease, homocystinuria, seem to need vitamin B6 in dosages well above 500 mg per day in order to obtain the maximum benefit. Practitioners are understandably reluctant to prescribe such high doses, because of the potential for neurotoxicity. However, the present case report suggests that 500 mg of pyridoxine is safe for some patients. Individuals receiving high-dose vitamin B6 should have periodic neurologic examinations to monitor for adverse effects, and the lowest effective dose should be used.

Echaniz-Laguna A, et al. Regressive pyridoxine-induced sensory neuronopathy in a patient with homocystinuria. *BMJ Case Rep*. 2018;2018:bcr-2018-225059.

Digestive Enzymes for Functional Dyspepsia

Forty patients (mean age, 42 years) in India who had functional dyspepsia were randomly assigned to receive, in double-blind fashion, a proprietary multi-enzyme complex (DigeZyme; containing alpha-amylase, protease, cellulase, lactase, and lipase) at a dose of one capsule (50 mg) three times per day or placebo for 60 days. Compared with placebo, the enzyme product resulted in significantly greater mean percent improvement in all efficacy measures, including Short-Form Leeds Dyspepsia Questionnaire (27% vs. 14%; $p < 0.01$), Nepean Dyspepsia Index-Short Form (41% vs. 20%; $p < 0.01$), and Glasgow Dyspepsia Severity Score (44% vs. 20%; $p < 0.01$). No adverse effects were reported.

Comment: Various enzymes secreted by the salivary glands, stomach, small intestine, and pancreas play a role in the digestion of protein, carbohydrates, and fat. Enzyme preparations have been used empirically for decades to improve digestion, but there is not a great deal of research on their effectiveness (with the exception of lactase for lactose intolerance). In the present double-blind trial, a multi-enzyme formulation was found to relieve symptoms in adults with functional dyspepsia.

Majeed M, et al. Evaluation of the safety and efficacy of a multienzyme complex in patients with functional dyspepsia: a randomized, double-blind, placebo-controlled study. *J Med Food*. 2018;21:1120-1128.

Vitamin C as a Treatment for Shock: Clues from Animal Research

Hemorrhagic shock was induced in rats by withdrawing blood into a heparinized syringe until the mean arterial pressure fell to 35 mm Hg, and then maintaining this pressure for one hour by withdrawing or reinfusing blood. Compared with no vitamin C treatment, intravenous administration of vitamin C (100 or 500 mg per kg of body weight) decreased the severity of renal injury induced by hemorrhagic shock. Both doses were similarly effective. Induction of hemorrhagic shock did not decrease plasma vitamin C levels.

Comment: In 2017, Dr. Paul Marik and associates at the Sentara Norfolk General Hospital (which is affiliated with Eastern Virginia Medical School) reported that intravenous administration of vitamin C (6 g per day) in combination with thiamine and hydrocortisone reduced the mortality rate by 79% in patients with septic shock.[3] It was thought that thiamine and hydrocortisone enhanced the effect of vitamin C, but that vitamin C was the key component of the treatment regimen. The effectiveness of vitamin C was believed to be due mainly to the correction of vitamin C deficiency. Serum levels of vitamin C are typically very low in patients with sepsis, and as much as 3 g per day of intravenous vitamin C is needed to bring those levels up to normal.

The results of the present animal study suggest that vitamin C may have an anti-shock effect that is unrelated to the correction of a deficiency. Rats are capable of synthesizing vitamin C in the liver, and they are known to produce large amounts of the vitamin under conditions of stress. For that reason, rats typically do not develop vitamin C deficiency. The fact that serum vitamin C levels did not decline after the induction of hemorrhagic shock suggests that the rats were not vitamin C-deficient.

These findings raise the possibility that the benefits of high-dose vitamin C observed in patients with septic shock are due in part to a pharmacological effect, as opposed to simply correcting a deficiency. If that is the case, then doses even higher than 6 g per day might result in an even greater reduction in mortality. However, that possibility must be balanced against the concern that excessive vitamin C doses could cause the deposition of oxalate in soft tissues of patients with compromised renal function, potentially resulting in worsening renal function and damage to other tissues. That concern is why Marik limited the dose of intravenous vitamin C to 6 g per day, even though some practitioners have used much higher doses to treat burns, viral illnesses, and other conditions.

Qi MZ, et al. Intravenous vitamin C attenuates hemorrhagic shock-related renal injury through the induction of SIRT1 in rats. *Biochem Biophys Res Commun*. 2018;501:358-364.

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Concussion and Mild Traumatic Brain Injury: A Functional Medicine Approach to Healing the Brain

by David Musnick, MD

The treatment of concussions and mild traumatic brain injury (mTBI) has been primarily based on the conventional medical model – the diagnosis and monitor symptoms method – and is basically a label. This conventional method of "treating" individuals with head injury does not treat most of the underlying pathophysiology, can lead to loss of brain reserve and can fail to treat troublesome and ongoing symptoms. An individual "treated" with this method likely would have suffered loss of neuronal tissue and synaptic networks and thus have lost brain reserve. They can have persistent brain, gastrointestinal, and mood dysfunctions. They would then be more susceptible to more significant effects from another head injury or other brain-damaging factors.

An effective approach to healing the brain must be based on the pathophysiology of the head injury. This article will focus on the functional medicine and pathophysiology approach to healing the brain. This article focuses on mild traumatic brain injury but can also be applied to moderate traumatic brain injury. It is not focused on severe traumatic brain injury as this type of injury will often require surgical intervention. Also, details on specific treatment protocols or supplement dosing may not be covered as this article is meant to be an introduction. The author is working on a Kindle eBook that will cover specifics in exhaustive detail.

Children, Adolescents, and Head Injury

Children and adolescents have very high levels of brain reserve. They can have one concussion or repeated concussions, as can athletes. Children and teenagers can have head injuries from having their head hit another child's head, from falling, and from balls hitting their heads. They can manifest with headaches as well as poor attention, poor balance, and difficulty doing their school work. They can also have symptoms of exertional headaches. The treatments discussed below apply to children, adolescents, and adults although the author does not usually use HBOT for children. Also, children and adolescents usually respond remarkable well to frequency specific microcurrent. Children are more likely to take brain healing supplements if they are in liquid, are chewable, or emptied into applesauce.

Pathophysiology of Concussion and Traumatic Brain Injury

The mechanisms of injury and pathophysiology that have been determined to be important after head injury are listed below. Addressing the pathophysiology is extremely important to the functional medicine approach. The following is the known pathophysiological mechanisms and treatment targets after concussion.

There is mechanical shearing with hypoxia and a loss of neuronal structure and synaptic connections. The treatment approach to this is to limit neuronal damage, to improve oxygenation, and to stimulate trophic factors like BDNF to stimulate neurogenesis. There is membrane damage of mitochondrial and neuronal membranes. The treatment approach to this is to support neuronal and mitochondrial membranes.

There is a loss of synaptic connections and synaptic networks. The treatment target is to stimulate new synaptic connections and networks i.e. synaptogenesis. There are deficits in regional blood flow in injured areas. The treatment approach is to improve regional blood flow. There is excessive excitotoxicity leading to influxes of intracellular calcium in neurons and microglia. The treatment approach is to decrease excitotoxicity.

There is excessive free radical and oxidative stress. The treatment approach is to increase antioxidant support and to activate the NRF2 response. There is excessive neural inflammation of the neurons and the microglia cells. The treatment approach is to decrease neural inflammation. There may be damage and autoimmunity of the blood brain barrier (BBB) and brain tissues. The treatment approach is to heal the blood brain barrier and address the autoimmunity. There is mitochondrial dysfunction in the neurons in the brain. The treatment approach is to support mitochondrial membranes and energy production.

There may be injury to the pituitary gland and or dysfunction of hormone production especially of cortisol, thyroid, adrenaline and sex hormones. The treatment approach is to support hormone production. There may be intestinal permeability, small intestinal bacterial overgrowth, changes in the microbiome, vagus nerve dysfunction, and dysbiosis. The treatment approach is to heal intestinal permeability, heal

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small intestinal bacterial overgrowth, restore motility, and normalize the microbiome.

Stages of Head Injury

The treatment of head injury and traumatic brain injury can be related to the stage of the head injury and might be classified as acute, subacute, or chronic. This is based on the time from the head injury. In the acute stage the pathology is more axonal shearing, decreased oxygenation and inadequate blood flow, congestion and poor nutrient delivery. In the subacute stage there is a loss of neurons and synaptic connections and BBB autoimmunity may develop. In the chronic stage there may be more hormone dysfunction, BBB autoimmunity, GI dysfunction, and mood dysregulation. In the chronic stage one must focus on stimulating neurogenesis and synaptogenesis. In all stages, neuroprotection is very important.

The Blood Brain Barrier

The blood brain barrier is a network of blood vessels and capillaries that surrounds the brain. It usually has limited permeability and lets certain nutrients in and keeps many toxins and other substances out. It allows wastes to go back into the blood stream. There are many things that can damage the blood brain barrier, and one major one is a head injury. Antibodies can form to structural membranes in the BBB and if formed can lead to microglial activation and breakdown of the BBB.[1]

If the BBB becomes excessively permeable, antibodies can develop to brain tissue and neurotoxins can get into brain tissue leading to further brain tissue damage. The author advocates testing every patient with an antibody test for BBB antibodies. If the test returns with positive antibodies, the clinician should consider ordering further antibody testing for the intestinal lining and neural tissue; and a treatment plan should be instituted to treat the BBB.

Treating a permeable BBB is a complex task and will be outlined here briefly. The clinician should start neuroprotection strategies and treat the GI tract in the setting of BBB permeability. Ensuring eight-to-nine-plus hours of sleep is essential because insufficient quantity of sleep can damage the BBB.[2] In addition to the above the author uses melatonin,[3] r-alpha lipoic acid, and frequency specific microcurrent to heal the blood brain barrier. A clinician should retest the BBB test within about four months of the original test to document that the test becomes negative.

It is very common for a patient with a concussion to develop gastrointestinal dysfunction in multiple parts of the GI tract…. Common GI problems can be small intestinal bacterial overgrowth, intestinal permeability, large intestinal dysbiosis, and microbiome dysbiosis.

The Brain Injury-Gut Connection

It is very common for a patient with a concussion to develop gastrointestinal dysfunction in multiple parts of the GI tract. The GI tract may be adversely altered by a number of mechanisms.[4] The vagus nerve can be damaged and can adversely affect motility.[5] Common GI problems can be small intestinal bacterial overgrowth, intestinal permeability, large intestinal dysbiosis, and microbiome dysbiosis.[5] It can be helpful to check for antibodies to the small intestine (zonulin and occludin) and to treat intestinal permeability if it is present. The combination of leaky gut and increased blood brain barrier permeability can lead to more brain tissue damage and may lead to autoimmunity to brain tissue. If SIBO is present, it is important to treat it as it can lead to mood instability. Dysbiosis may increase endotoxins from gut bacteria. Endotoxins may get into the blood stream and may increase neural inflammation especially in the setting of a leaky blood brain barrier.

Assessment

The author advocates a complete orthopedic and neurological exam as well as serum testing of hormone levels and BBB antibodies. It is important to assess cognitive function with questionnaires and other tools. One of the gold standards is an in-depth neuro-psych test done by a neuropsychologist. This type of test is expensive and likely would not be repeated. It is important in any medical legal case or any case in which there are cognitive deficits that need to be better defined.

There are functional tests that are less expensive and less time consuming. These tests include the Cambridge Brain Sciences test, the CNS Vital Signs test, and the ImPACT test. These tests can then be repeated after 8-12 weeks of treatment, and functional status can be reassessed. If the patient is seeing a functional or chiropractic neurologist, specialized functional neurology testing and treatment can be done.

A test that can assess brain region dysfunction is the QEEG. This test is moderately expensive and shows brain wave activity (under and over function) from different areas of the brain. It can then be reassessed after 12-16 weeks to determine if there is improvement.

SPECT scanning can dramatically show under and over functioning brain areas but is more costly than a QEEG and uses a dye that goes into the brain. In a center that does this test, it can show head injury areas quite dramatically along with patterns of brain activity that can lead to emotional lability. CT and MRI scans usually do not show areas of brain injury, especially in mild traumatic brain injury. A CT can be useful to rule out a brain bleed acutely but is not useful after the acute stage.

Functional Neurology

An assessment with a functional neurologist who is trained by either the Carrick Institute or with functional neurology seminars would be appropriate for any brain-injured individual, especially if they have dizziness, balance problems or visual

problems. A functional neurologist with this training can determine functional deficits in the brain and design exercises to rehabilitate the patient.

Neuroprotection

Neuroprotection (NP) includes strategies that may protect the central and peripheral nervous system tissues. Neuroprotection strategies may slow or decrease damage to and loss of neurological tissue. These strategies should be introduced immediately upon diagnosis of concussion and maintained as long as possible to protect and preserve brain tissue. The following neuroprotection strategies are good to start after a concussion and are good to do in general to protect the nervous system.

Limit electromagnetic fields (EMF) exposure by limiting WIFI and turning WIFI routers off at night. It is desirable to limit radio frequency fields from cell phones by turning them to airplane mode and use **blue tube** ear sets or the speaker phone. It is good to opt out of smart meters from the power company or at least place a smart meter shield on the smart meter. It can be very helpful to turn off Alexa, Google, and Apple devices that work on WiFi. It is important to turn off the power to electric beds, smart beds, and electric blankets. Use organic foods whenever possible to limit neurotoxins and GMOs.

The Brain Injury Diet

The brain injury diet designed by this author is gluten and dairy free. It is rich in polyphenols, low in toxins, and low in GMOs. It is adequate in protein, high in choline, and moderate to high in vegetables that aid in detoxification. The diet should be primarily organic to be low in toxins. The diet should be low in foods that might contain heavy metals such as chocolate and seafood (shellfish and large fish). This diet should be low in browned proteins, coffee, crackers and chips to minimize acrylamide and AGEs (advanced glycosylated end products). Acrylamide is a neurotoxin. AGEs may break down the BBB.

It is important to activate the NRF2 factor by drinking green tea and using turmeric as a spice. Consuming broccoli and broccoli sprouts is also encouraged to activate NRF2. Blueberry, especially wild blueberries, are rich in polyphenols (anthocyanins and flavanols) and appear to have neuroprotective and antioxidant effects in the brain to combat oxidative stress.[6,7]

Other fruits that are high in anthocyanins are black and red raspberries, blackberries, black currents, and acai. Anthocyanins are also found in cloves, eggplant, purple corn, and black rice. All of these foods are good choices after a head injury. Blueberries have been studied the most in regard to their role in slowing neurodegeneration. It is reasonable after a head injury to have wild blueberries or other fruits high in anthocyanins almost daily. A practical way to do this is to make a brain-healthy smoothie.

A good starting recipe for a brain smoothie is one-fourth to one-third cup of wild frozen blueberries with 8 to 10 ounces of organic cranberry juice or pomegranate juice. One should add one to two scoops of an organic hemp protein or pea protein powder. One should also add leucine powder to equal 2.5 or more grams of leucine to help to prevent muscle loss. One can then add watercress or microgreens to aid in detoxification. For more smoothness and flavor, one can add half a banana.

After a brain injury an individual can mount immune responses to brain tissue related to molecular mimicry in regard to amino acids in gluten and dairy even if the patient did not have a prior problem with gluten or dairy. This may also be true with corn, soy, spinach, and tomato. Antibodies may be formed against certain dietary aquaporins and may potentially cross-react with brain aquaporin in astrocytes.[8]

Gliadin from gluten can cross react with Asialoganglioside, myelin basic protein, synapsin and cerebellar tissues. Milk butyrophilin can react with cerebellar tissue. Dairy casein can react

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with synuclein and oligodendrocytes.[8, 9] Choline-rich foods can provide choline for acetyl choline for neurotransmitter support and phosphatidyl choline for membrane support. One should try and consume 2000-3000 mg a day of choline by consuming a few servings of choline-rich foods. Foods rich in choline are the following: chicken, turkey, collard greens, brussels sprouts, broccoli, swiss chard, cauliflower, and asparagus. A brain injury diet is also low in sugar, and patients should minimize sweets and processed foods.

After a brain injury an individual can mount immune responses to brain tissue related to molecular mimicry in regard to amino acids in gluten and dairy even if the patient did not have a prior problem with gluten or dairy. This may also be true with corn, soy, spinach, and tomato.

Physical Exercise

Aerobic exercise can increase brain derived nerve growth factor (BDNF), which is a very important trophic factor for the brain.[10] The brain exercise prescription would be 40 minutes of aerobic activity in the patient's training heart rate zone. This would be a zone of 70-80% of their maximum heart rate, which is calculated as 220 minus age. It is beneficial to start off with shorter time periods of exercise, like 15 minutes, and gradually to increase the duration by one to two minutes each exercise session until reaching the 40 minutes. Strength training two to three days per week can be introduced to maintain and build muscle mass. These activities should ideally be done without pain and should not precipitate headaches. If balance is a problem, the patient should start with stationary bike and balance exercises.

Supplements for Brain Healing

Certain supplements appear to have multiple pathophysiological benefits. These are taurine, curcumin, lithium, and DHA. This section will briefly address pathophysiology and some supplements. There are many more supplements that may be helpful but coverage of them is beyond the scope of this article.

It is quite challenging to choose a dose for a supplement for brain injury because most studies have been done on rats and mice and many times the supplement was not given orally. Some supplements have mechanisms that make physiological sense for brain injury but have not been studied specifically for brain injury. Doses have to be chosen based on extrapolation from the mice and rat studies or from a dose that can, at a minimum, achieve a serum level of the supplement. Because of the complex issues that must be taken into account to arrive at a dose, the author will not provide exact doses in this article but will be doing so in a future Kindle ebook and in future products.

Vinpocetine and ginkgo have been used to increase brain oxygenation and are reasonable to use especially for the first eight weeks after a head injury. DHA is an important fatty acid to supplement, starting about a few days from the head injury and during all stages of head injury. It may also have anti-inflammatory and anti-apoptotic effects.[11]

It is important to activate nuclear factor-erythroid 2-related factor (NRF2) to improve anti-inflammatory and antioxidant mechanisms. NRF2 is a transcription factor that can bind to DNA and lead to the production of the person's own antioxidants. These are glutathione, SOD, and catalase; and they can bind free radicals and thus decrease free radical damage to neuronal and other tissue. NRF2 coordinates expression of genes required for free radical scavenging and helps to regulate inflammation. Tecfidera (dimethyl fumarate) is the only known drug that may upregulate NRF2. Tecfidera has only been FDA approved for relapsing MS and thus the author has used natural activators of NRF2. There are a number of natural products that can activate NRF2, including curcumin, DHA (omega 3s), and green tea. Curcumin is best given in the Longvida form as this form best passes the BBB into the brain. Melatonin is also used by the author to decrease neural inflammation.

Avoid all supplements with calcium and all foods with MSG and with hidden MSG during the first eight weeks after a head injury to decrease excitotoxicity. Taurine is a conditionally essential amino acid that may be able to provide some protection against excitotoxicity. Taurine appears to have a number of beneficial mechanisms in treatment of traumatic brain injury. These mechanisms include decreasing excitotoxicity, protection of cells from osmolar changes (important within the first few weeks), improvement of blood flow, enhancement of neurite growth, and triggering new brain cells to grow in the hippocampus. It is for this reason that the author advocates the use of taurine in all stages of head injury.

Neurogenesis is the process by which adult neural stem cells differentiate into nerve cells. This has been shown to happen in adults in the dentate gyrus of the hippocampus.[12] Neurogenesis may be mediated by trophic factors like BDNF. Aerobic exercise can stimulate the production of BDNF, and certain supplements may stimulate neurogenesis, like melatonin, taurine, and lithium.

Lithium is a mineral and appears to have multifocal neuroprotective benefits for the brain.[13] Lithium has been shown to increase nerve growth factor in the frontal cortex and hippocampus and may increase brain derived nerve growth factor.[13] Lithium can be protective for the BBB. Lithium may induce nerve stem cells and neurogenesis of hippocampal neurons.[14] Lithium is used to treat bipolar depression in doses of 300-600 mg twice a day. If a patient has bipolar depression, then this dose will be continued or started. The author uses doses ranging from low dose lithium at 20 mg per day to bipolar dosing to treat head injury. Dosing levels for

lithium have not been well established in humans for treatment of traumatic brain injury.

Mitochondria support of brain neurons is best accomplished with a mix of activated B vitamins, CoQ10, and with nicotinamide riboside (NAD).[15]

Brain Training and Synaptogenesis

Brain training is very important in healing the brain after head injury to create new synaptic connections i.e. synaptogenesis. This type of training should challenge the patient, and it should be slightly difficult in order to maximally stimulate new synaptic connections and to build synaptic density. I recommend multiple types of brain training that challenge thinking and the brain. Physical activities can be incorporated to do this, including dance lessons, Simon games, and ping pong. Mental activities of different types should be encouraged. Crossword puzzles and brain games are helpful but often are not enough. Patients are encouraged to join an online personalized brain training like BrainHQ and to do both the personalized program and specific courses to address their deficits. If an individual has had a QEEG, then they may be a candidate for neurofeedback training to train deficient brain areas.

There are a number of very helpful treatments that aid brain healing that the author has used, and these include frequency specific microcurrent, neurofeedback, audio visual entrainment, HBOT, counseling, and Brainspotting. Physical therapy, craniosacral therapy, and chiropractic care can be useful for balance, vestibular, and spinal problems. Working on sleep, vision, and hormone health are very important but beyond the scope of this article.

Frequency specific microcurrent (FSM) is a type of microcurrent that can be used to aid in healing different brain areas as well as headaches. In this author's experience, FSM has been very valuable in helping patients heal their musculoskeletal and brain injuries. It may address the following pathophysiology: decreasing congestion, increasing ATP and mitochondrial function, decreasing neural inflammation, and in healing the blood brain barrier.

Neurofeedback is a treatment that can be helpful to restore brain function. It is best used after a QEEG to enable the practitioner to design specific treatment for areas that are under or over functioning.

Audio visual entrainment (AVE) is a type of treatment that can be especially helpful for patients having difficulty with concentration or depression after a head injury. The treatments are administered via a unit that generates visual and sound signals at certain frequencies. If it is helpful, home units are not very expensive and can be administered by a patient or family member.

Pulsed light emitting diodes in the red and near infrared spectrum applied

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to the head and neck may increase regional blood flow and may also stimulate ATP production.[16]

Certain forms of counseling may be helpful for patients. A cognitively trained speech therapist can be valuable for someone with moderate to more severe deficits who would have trouble doing the brain training on their own. Brainspotting is a technique that might help patients with anxiety, fear, PTSD, stress, and insomnia. EMDR counseling would be helpful for patients with PTSD. EFT tapping would be helpful to do for self-care for anxiety and stress related to the injury. Cognitive behavioral therapy can also be quite helpful.

Hyperbaric Oxygen

Hyperbaric oxygen therapy (HBOT) has been used for years for wound care and diving injuries. Mechanisms of action of HBOT are primarily to improve oxygenation in congested or poorly oxygenated areas. There has been a number of studies evaluating the role of HBOT in treating patients with mild traumatic brain injury. Of interest is that these studies use variable pressures from 1.5 to 2 ATMs and there are no other interventions that are being used at the same time. The HBOT studies evaluate only an increase in oxygen delivery. In a Department of Defense study, only one of the groups showed improvement in symptoms when being treated with 2 ATM.[17] In a review of five studies only one study showed efficacy.[18] None of the studies showed any side effects.

In the author's experience, about two-thirds of patients with head injuries referred for HBOT demonstrate a clinical benefit. It must be understood that this author has patients on a full program of supplements, brain injury diet, exercise, and brain training before referring for HBOT. HBOT can be used very soon after the head injury, as one of the main problems in early concussion is low oxygenation in certain injured areas of the brain. It can also be used after four weeks, but I would say that patients should only do this if they are doing a complete brain healing program to achieve maximum benefit. HBOT is usually prescribed as 1.5 – 2 ATM for 10 sessions. If there are no results after 10 sessions, no more sessions would be recommended. If there is benefit, another 10 sessions could be considered.

Conclusion

Concussion and traumatic brain injury are common and inadequately treated by the conventional medical system. Neuroprotection should be started and continued throughout the program. It is important to start with a brain injury diet and certain supplements like Longvida® curcumin, taurine, and lithium. Once the person is able to do some exercise, aerobic exercise should be started. Counseling and various types of brain healing modalities can be added to the program. The patient should have a team of clinicians to carry out the brain healing plan and should be periodically evaluated by a functional medicine clinician. The program as outlined above has the ability to significantly improve brain reserve and decrease symptoms after concussion and traumatic brain injury.

Resources

AVE equipment and information: https://mindalive.com
BBB antibody testing: ARUP Labs (New York), Mayo Clinic Labs, or Cyrex Labs (Arizona; Array 20)
EFT tapping: https://www.thetappingsolution.com
Frequency specific microcurrent: https://frequencyspecific.com and https://mendtechnology.com/
Functional neurology: https://functionalneurologyseminars.com; https://carrickinstitute.com
Headsets: https://www.smart-safe.com/collections/radiation-free-headsets; https://products.mercola.com/blue-tube-headset
SPECT Scans: Amen Clinics

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What is Preventive Cardiology?

by Lai Chim Chan, ND

Heart disease remains the leading cause of death in the United States (US). By heart disease we mean coronary heart disease (CHD), which accounts for 43.8% of deaths attributable to cardiovascular disease in the US.[1]

Heart disease places a significant economic burden on the United States as well as globally. US annual direct and indirect costs of cardiovascular disease and stroke in 2013-2014 were an estimated $329.7 billion, which accounts for 14% of total health expenditures.[1] This is more than any major diagnostic group.

If coronary heart disease is the number one killer in this country, it certainly would be wise to focus our efforts on preventing this condition. So, the million-dollar question is how do we prevent heart disease?

We would think that cardiologists want to not only answer this million-dollar question but to make efforts to practice preventive cardiology. The title of a recent Medscape commentary by Melissa Walton-Shirley, MD, "Do Cardiologists Care About CV Prevention?" argues otherwise. Walton-Shirley states "unarguable data reveal that most of us do not offer our patients what will ultimately save them from myocardial infarction, stroke, heart failure, and death: prevention strategies."[2]

At the European Society of Cardiology (ESC) 2018 session "Implementation of Cardiovascular Disease Prevention in Daily Practice – Insights From EUROASPIRE V," the first talk centered on a survey assessing cardiovascular disease prevention. Greater than 8000 patients in 27 countries were surveyed after being hospitalized for acute coronary syndrome, elective coronary artery bypass grafting, or percutaneous coronary intervention more than six months prior and no longer than two years prior. In regard to smoking cessation, only 12% of smokers became abstinent, 4% were attending smoking cessation clinics, 8% were using nicotine replacement, and 4% were using smoking cessation drugs. 57% had reduced smoking. Walton-Shirley comments "Whatever smokers are being advised, it isn't working."[2]

At the end of this presentation of the ESC 2018 session, a German doctor, Stephan Jacob, stepped to the microphone and stated, "I came late and I thought I would not find a place to sit, but look. This is a shame," he said, indicating a number of emptying seats.[2] He states, "We are not really focusing on what's important. Yes, we need emergent care, but the follow-up is horrible."[2]

David Allan Wood in his presentation "How to Improve Implementation of Guidelines in Daily Practice" concluded:

> All over Europe, our patients receive the highest level of acute coronary care, but dilating a segment of a coronary artery and implanting a stent is not addressing the disease as a whole…and it is naïve to believe that interventional cardiology on its own can significantly impact the overall chances for survival without addressing lifestyle and risk factors that brought the patients into the hospital in the first place…We need to match high-quality intervention with high-quality preventative cardiology.[2]

Walton-Shirley concludes "That is the crux of the matter, and there has been no truer statement in the entirety of the ESC 2018 meeting. It's a pity there weren't more attendees in the room to hear it."[2]

Over and over again I see patients in the clinic, who despite pharmaceutical medications receive a second, third or a fourth stent due to recurrent symptoms of angina. It makes me wonder, if modern medicine is so great, why do people keep getting sick?

I realized the reason why people keep getting sick is because the treatments don't directly address the underlying cause of heart disease. To prevent recurrent disease, we need to identify what the underlying cause of heart disease is and treat it.

The following excerpt from the classic cardiovascular textbook *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* explains how we went from infectious disease as the major cause of death to cardiovascular disease being the major cause of death:

> The overall increase in the global burden of CVD and the distinct regional patterns result in part from the epidemiologic transition, which includes four basic stages: pestilence and famine, receding pandemics, degenerative and manmade diseases, and delayed degenerative diseases. Progression through these stages has dramatically shifted the predominant causes of death over the past two centuries, from infectious diseases and malnutrition in the first stage to CVD and cancer in the third and fourth stages.[3]

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Preventive Cardiology

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Before 1900, infectious diseases and malnutrition constituted the most common causes of death in every part of the world. The emergence of public health systems and improved food production and distribution reduced deaths from infectious disease and malnutrition. During the stage of degenerative and man-made diseases, urbanization led to dramatic changes in diet, activity levels, and behaviors such as smoking. The increased availability of foods high in calories, coupled with decreased physical activity, contributes to an increase in atherosclerosis. We may be advancing into a newer phase of epidemiologic transition, the age of Inactivity and Obesity with rising rates of type 2 diabetes, hypertension, and dyslipidemia.[3]

We are recognizing that behaviors increase the risk of heart disease and lifestyle modifications can reduce risk.[4] Public health campaigns for smoking cessation and detection and treatment of hypertension have contributed to the reduction of mortality from heart disease.

Mortality from coronary heart disease have been declining since the 1960s due to improvements in risk factors and treatments.[5] Advances in acute care has attributed much to the decline in mortality from heart disease with the development of emergency medical systems, coronary care units and the widespread use of diagnostic and therapeutic technologies such as echocardiography, cardiac catheterization, percutaneous coronary intervention, bypass surgery, and implantation of pacemakers and defibrillators.[3] Advances in drug development has also improved acute care with beta blockers, aspirin, statins, and angiotensin-converting enzyme inhibitors being commonly prescribed medications in patients with heart disease as well as patients having risk factors for heart disease.[3]

Perhaps the reason for why preventive strategies are often dismissed in the medical community is because "both the glamour (and reimbursement) favored the diagnosis and management of acute illness over the more mundane (and poorly reimbursed) efforts required to maintain patients – particularly those who had no overt cardiovascular disease – on diet and other lifestyle measures…."[4] Despite the development of guidelines that support prevention strategies, adherence and implementation is suboptimal. Too many of our health care dollars are spent on end-stage complications of heart disease such as stents, devices such as cardioverter-defibrillators, and coronary artery bypass surgeries rather than on prevention.

Too many of our health care dollars are spent on end-stage complications of heart disease such as stents, devices such as cardioverter-defibrillators, and coronary artery bypass surgeries rather than on prevention.

Secondary prevention, or the prevention of a myocardial infarction in those with documented heart disease, is of even more importance as these individuals have a much higher risk than those in whom we are carrying out primary prevention; or the prevention of a myocardial infarction in someone without known heart disease. It is estimated that in 2018, about 720,000 Americans will have a new coronary event (first hospitalized myocardial infarction or coronary heart disease death) and about 335,000 will have a recurrent event.[1] Rather than treating events when they occur when death is imminent, I would argue that we should focus more of our efforts on preventing these events in the first place.

What Are Risk Factors?

Unfortunately, heart disease is often clinically silent until one suffers from an acute coronary syndrome or sudden cardiac death.[4] These events often strike otherwise healthy appearing individuals without warning. This then leads to the question of how we are to predict whether someone has a high or low risk of suffering from such an event. Risk factors, or factors that increase one's risk for developing heart disease were identified by the prospective Framingham Heart Study.[4] Identifying and managing risk factors then became the mainstay of preventive cardiology.

Classically, we have used the Framingham Risk Calculator to determine whether one is high risk for heart disease or not. More recently we have turned to using the 2013 ACC/AHA Atherosclerotic Cardiovascular Disease (ASCVD) Risk Estimator as it includes studies from pooled cohorts with nonwhite populations. This risk estimator has limitations, and there are efforts to improve risk stratification; but it is the best tool that we have by far, and the lipid and hypertension guidelines rely on it to determine whether an individual qualifies for lipid-lowering or blood pressure-lowering medication.

There are also biomarkers such as high-sensitivity C-reactive protein and imaging modalities such as CT coronary artery calcium being studied to improve risk stratification. The majority of these lab and imaging markers have weaker or limited evidence for widespread use in comparison to the ASCVD Risk Estimator; so, for the purposes of risk stratification, we shall focus our efforts on using the ASCVD Risk Estimator.

Preventive cardiology can be followed using the ABCDE framework. **A**ssessment of risk from a clinical and genetic perspective, **A**ntiplatelet therapy, **B**lood pressure management, **C**holesterol, **D**iet and lifestyle issues (**D**iabetes mellitus, **D**isparities in care, **D**iagnostic testing to improve risk prediction), **E**xercise prescriptions, and **E**motional aspects of preventive cardiology.[4]

Risk factors are modifiable or nonmodifiable. The nonmodifiable risk factors include age and family history. In 2011, the American Heart Association introduced a new concept of cardiovascular health that includes the modifiable risk factors.[1] Life's Simple 7 includes core health behaviors (smoking, physical activity, diet, and weight) and health factors (cholesterol, blood pressure, and glucose control) that contribute to cardiovascular health.[1] Each of these health behaviors and factors are independently associated with cardiovascular disease risk.[1] Poor levels of each of the seven health factors

and behaviors resulted in substantial mortality and morbidity in the United States in 2010.[1]

Ideal cardiovascular health is defined by the absence of clinically manifested cardiovascular disease together with the simultaneous presence of optimal levels of all seven metrics, in the absence of drug treatment.[1]

Only 17% of US adults have ≥5 metrics at ideal levels.[1] Approximately 13% of US adults have five criteria, 5% have six criteria, and virtually 0% have seven criteria at ideal levels.[1] Arguably we are failing to meet the recommended guidelines, and "the medical community needs to promote guideline adherence and reduce the gap in use of proven medical and lifestyle therapies."[4] If we have a desire to practice preventive cardiology, our number one priority is to optimize these seven core behaviors and health factors.

For example, if we want to focus on blood pressure management (one of the health factors of Life's Simple 7), nonpharmacological health behaviors should be recommended for every single patient, and pharmacologic management should be considered in high-risk patients.[6]

The metrics with the greatest potential for improvement in the United States are health behaviors including diet quality, physical activity, and body weight.[1] In addition to using pharmaceuticals as needed, naturopathic physicians are trained to use diet and exercise counseling as first-line approaches for risk reduction and management of disease. For this, I truly believe in integrative medicine, and there are numerous books titled "Integrative Cardiology" that champion a whole-person approach for the prevention and management of cardiovascular disease.

Inflammation

Experimental and clinical data have suggested that inflammation plays a role in atherosclerosis. This theory largely remained unproved until the Canakinumab Antiinflammatory Thrombosis Outcome Study (CANTOS) trial was published in 2017.[7] The trial suggests that reducing inflammation independent of reducing lipid levels further reduced risk of nonfatal myocardial infarction, nonfatal stroke, or cardiovascular death in patients with a previous myocardial infarction and elevated high-sensitivity C-reactive protein (defined as ≥ 2 mg/L).[8] The intervention involved the use of canakinumab, a therapeutic monoclonal antibody targeting interleukin-1-ß that was administered subcutaneously every three months compared to a placebo.

At 48 months, the intervention reduced high-sensitivity C-reactive protein from baseline compared to placebo.[7] The hazard ratio was 0.83 for the 150-mg dose of canakinumab compared to placebo.[7] The intervention was associated with a higher incidence of fatal infection than was placebo.[7] This trial is important and will pave the way for future trials that will assess the effectiveness of interventions aimed at reducing inflammation. Indeed, one of the mechanisms that statins are believed to reduce the risk of heart disease is by reducing inflammation.

Physical Activity

An exercise prescription can be written according to the FITT mnemonic including the four dimensions of physical activity (Frequency, Intensity, Type, Time (duration)).[1] The American Heart Association guidelines recommends >150 minutes per week of moderate-intensity or 75 minutes per week of vigorous-intensity physical activity and muscle-strengthening activities at least two days per week.[1] Physical activity improves risk factors for cardiovascular disease (such as high blood pressure and high cholesterol) and reduces the likelihood of diseases related to cardiovascular disease including coronary heart disease, stroke, type 2 diabetes mellitus, and sudden heart attacks. Benefits from physical activity are seen for all ages and groups including older adults, pregnant females, and people with disabilities and chronic conditions.[1]

Only 21.5% of adults met the 2008 federal physical activity guidelines for both aerobic and strengthening activity,[1] and 30.4% do not engage in any leisure-time physical activity. ("No leisure time physical activity/inactivity" refers to no sessions of light/moderate or vigorous physical activity of ≥10 minutes' duration).[1]

Community-level interventions have been shown to be effective at promoting increased physical activity as well as being cost effective.[1] Nearly $3 in medical cost savings is realized for every $1 invested in building bike and walking trails.[1] Worksites can also offer access to on-site exercise facilities or employer-subsidized off-site exercise facilities to encourage physical activity among employees.[1]

Healthy Dietary Pattern

Patients frequently ask the elusive question of "What is the best diet for (fill in the blank with a medical condition)?" In this instance, we fill in the blank with heart disease or preventing heart disease. The American Heart Association's dietary metric is targeted in the context of a healthy diet pattern consistent with a Dietary Approaches to Stop Hypertension (DASH)-type eating pattern.[1] This is defined by consuming ≥4.5 cups per day of fruits and vegetables, ≥2 servings per week of fish, ≥3 servings per day of whole grains and no more than 36 oz per week of sugar-sweetened beverages and 1500 mg per day of sodium.[1] The DASH-type eating pattern has been demonstrated to reduce blood pressure and LDL levels and may reduce risk of heart disease.[8]

A review of evidence-based healthy dietary patterns conclude that they are generally high in fruits, vegetables, ➤

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whole grains and legumes with nuts consumed in moderation.[8] Some may include limited quantities of lean meats in the form of poultry and seafood as well as low-fat dairy products and liquid vegetable oils.[8] These dietary patterns tend to be low in saturated fats, trans fats, solid fats, refined grains, added sugars, and sodium.[8]

By far the dietary pattern with the most evidence for prevention of heart disease is the Mediterranean diet as demonstrated by the Primary Prevention of Cardiovascular Disease with a Mediterranean Diet (PREDIMED) study.[9] The Mediterranean Diet consists of high intakes of olive oil, fruit, nuts, vegetables, and cereals with moderate intake of fish and poultry.[9] Intake of dairy products, meat, processed meats, and sweets are low with wine consumed with meals in moderation.[9]

The study was conducted in Spain with males and females at high cardiovascular risk randomized to a control, the Mediterranean Diet supplemented with extra-virgin olive oil, or the Mediterranean Diet supplemented with mixed nuts. Study subjects were followed up for a median of 4.8 years and the primary end point was the composite rate of cardiovascular events (myocardial infarction, stroke, and death from cardiovascular cause). The hazard ratio of the Mediterranean Diet with extra-virgin olive oil and of that with nuts were 0.70 and 0.72 respectively with a relative risk reduction of 30%.[9]

Epidemiological studies and randomized controlled trials indicate that plant-based diets are associated with improvement in heart disease risk factors and a decreased risk in heart disease.[8] Of note is the Lifestyle Heart Trial conducted in 1986-1992 by Dean Ornish. Patients with moderate to severe coronary artery disease were randomized to either a control or the intervention. Subjects randomized to the intervention not only followed a 10% fat, whole foods vegetarian diet but participated in a comprehensive program including moderate aerobic exercise, stress management training, and group psychological support.[10]

The most impressive outcome of the study was that diameter stenosis was shown to be reduced; suggesting that heart disease was reversed.[10] Additionally, the number of cardiac events defined as myocardial infarction, coronary angioplasty, coronary artery bypass surgery, cardiac-related hospitalizations, and cardiac-related deaths were reduced.[10] There were 0.89 events per patient in the intervention compared to 2.25 events per patient in the control group.[10] The Ornish program highlights the effectiveness of an integrative approach to secondary prevention of heart disease.

At the ESC 2018 session mentioned above, David Allan Wood gave a firm recommendation for preventive cardiology programs to integrate nurses, dietitians, physiotherapists, occupational therapists, pharmacists, and psychologists to work alongside cardiologists to address lifestyle and measure, monitor, and manage blood pressure, lipids, and glucose.[2] I would add that naturopathic physicians and other complementary care providers should be included in these programs. Equally important, these programs should monitor adherence.

When six of nine risk factors were addressed in a rehab and prevention setting (including smoking, diet, physical activity, blood pressure, cholesterol, glucose, cardiovascular drug use, and stress management), all-cause mortality decreased 37% compared with traditional programs.[2] Programs that measured, monitored, and managed risk factors by prescribing, up-titrating, and monitoring adherence to medications also reduced all-cause mortality.[2] If this is what is effective, why isn't this type of program the standard of care and made widely available for patients? This type of program would presumably reduce healthcare costs.

This type of program wouldn't necessarily need to be in a cardiology clinic and can be implemented in patient-centered primary care facilities. "Prevention of cardiovascular disease is too important to leave to a relatively small group of experts, but instead must be carried out by all physicians, regardless of specialty, as well as by nurses and other health care professionals who care for patients with, or at risk of developing cardiovascular disease."[4]

This is a brief review of preventive cardiology and entire textbooks have been written on this topic as well as the individual risk factors. Hopefully this brief review will help you get your patients on the first step to improved heart health.

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The Campaign to Save a Million Hearts Is Stressed Out

by L. Terry Chappell, MD

In 2012, the Centers for Disease Control (CDC) joined with major cardiovascular medical societies to attempt to save a million hearts over the ensuing five years. These groups targeted the risk factors of blood pressure elevation, high sodium consumption, inadequate exercise, cholesterol management with statin drugs, and smoking cessation (the so-called ABCs) and encouraged aspirin use when indicated to reduce emergency room visits and hospitalizations, myocardial infarctions, heart failure, strokes, and deaths due to cardiovascular events.[1] They omitted excessive stress as a risk factor.

During the last year of the five-year target, cardiovascular events accounted for 2.2 million hospitalizations and 415,480 deaths. Attempts to identify and modify the ABCs, were "frustratingly slow." From 2011 to 2016, appropriate aspirin use actually decreased. No significant modifications occurred in blood pressure control or statin use (guidelines for BP control actually became more strict, and the use of statins applied to fewer people during the five-year period). Too much sodium continued. There were small but statistically significant improvements in both smoking cessation and exercise. In addition, high rates of diabetes, metabolic syndrome, and obesity persisted. Either the risk factors chosen for modification were inadequate or the efforts made to modify them were insufficient. The cardiology community chose the latter path. In 2017, another five-year program was established, attacking essentially the same risk factors that were targeted in the 2012 program. Again, excessive stress was not considered to be a major risk factor.

Cardiologist Robert Eliot warned us decades ago in his classic book, *Is It Worth Dying For?* (1989):

> The major traditional risk factors—high blood pressure, high cholesterol, diabetes, obesity, and smoking—fail to explain approximately half of the worldwide cases of coronary heart disease. There is good reason to believe that stress is a major missing piece in this puzzle. Moreover, researchers are increasingly recognizing not only that stress is an independent contributor to heart disease, but also that it is closely interwoven with the five traditional risk factors. Controlling unnecessary stress may therefore be the single most important key to preventing heart attacks. Realizing this has led medical researchers to look beyond the heart and blood vessels to the brain.

In 2012, the International College of Integrative Medicine (ICIM) conducted a symposium, which predicted that the effort to save a million hearts was likely to fail because many prevention efforts that are recommended by alternative doctors were not included. Many alternative interventions relate to reduction of stress. The omission of excessive stress as a major risk factor must be recognized and dealt with. This includes anxiety, depression, post-traumatic stress (PTSD), and situational factors such as marital, health concerns, financial, work-related, and other forms of stress.

Many other factors increase cardiovascular risk. Any comprehensive program to reduce risk factors for cardiovascular events should include one of the most important factors of all, the appropriate management of stress. If stress is not addressed effectively, it has the potential to overcome all other risk factors, reduce performance of body functions, and result in major cardiac event(s). Avoiding control of stress as a major treatable risk factor in the Million Hearts program is a big reason why more hearts have not been saved thus far. This article explores ways to identify and manage stress for cardiovascular patients, as well as other patients, in an integrative outpatient practice.

Recognizing Stress as a Risk Factor

The first clue that stress is either a cause or a result for the presenting complaint is a thorough history and physical. The clinician must inquire about the quality and quantity of sleep. Sleep apnea is a common condition that can usually be addressed with a C-pap or other procedures. Depression can be linked to insomnia. Supplements such as SAMe, L-tryptophan, and GABA are useful treatments for depression-related insomnia. Melatonin is often employed to treat insomnia. If in doubt about depression, the PHQ-9 is a useful, quick questionnaire that is very helpful in the office. A score >4 might detect a problem that is not apparent in the

early stages of depression. Frequent wakening is a clue from the history. The resulting reduction of rapid-eye movements interferes with the restorative function of sleep.

Recent evidence has shown that too much sleep can also be a risk factor for cardiovascular and all-cause mortality.[2] Patients who sleep too little or too much have been associated with diabetes mellitus, lower physical activity, depression, hypertension, and smoking.

Basic personality types uncover a patient's response to stress. Type A tends to be aggressive and combative, a so-called "hot reactor," while Type B is a more mellow "cold reactor." Blood pressures and pulses of hot reactors rapidly increase in response to stress. Those who are Type A must develop ways to diffuse stressful situations, or they will become a powder-keg for coronary artery attacks.

Family physicians and other specialists have contributed to the opioid crisis in their attempts to relieve stress and pain.[3] Family docs prescribe opioids more frequently than other physicians, but they rarely offer buprenorphine or naloxone to help prevent abuse. Physicians now sometimes find that treating an opioid addiction has become more difficult than treating an underlying cancer.

A heart rate variability (HRV) test is a good way to evaluate sympathetic and parasympathetic activity. Sufficient amounts of the latter are needed to deal with the sympathetic outflow that is encountered daily. A Max Pulse test contains a HRV assessment along with other cardiovascular functions. Especially when the patient reports late afternoon fatigue, a salivary cortisol test will detect exhausted adrenal function. A urine test for neurotransmitters is also available. However, one must be careful to do follow-up serial testing to interpret the relative effect of GI neurotransmitters. An important test is the adrenal stress index (ASI), which consists of salivary cortisol measurements throughout the day to detect adrenal exhaustion in response to stress.

Mark Hyman explains in his book, *Ultra-Metabolism*, why some people gain weight, even though they are under considerable stress.[4] The opposite would be expected. What actually happens is that cortisol is excessively released from the adrenal glands, which reduces the body's metabolism. Thus, calories are not burned off and fat accumulates. Each patient needs to find effective tools to deal with the stress encountered in his or her situation. Hyman also describes how food allergies, toxic foods such as sugar, and menopausal hormone changes all can drastically affect metabolism. Obesity, the metabolic syndrome, and diabetes can then develop into substantial risk factors for cardiovascular disease.

One must also keep in mind that stress can be beneficial.[5] McDonigal and others have shown that short-term bursts of moderate stress during the day can improve alertness, cognitive function, performance, and memory. Growth of stem cells in the hippocampus and nerve cells in the brain are thereby enhanced. Good social support, establishing control of one's situation, regular exercise, and the relaxation response are ways that regular stress can be utilized to reduce cardiovascular risk.

Goals for Treatment of Stress

Increased stress relates to many functions in the body. Treatment of those areas might reduce stress indirectly. Producing increased energy by improving mitochondrial function can reduce stress. Improved immunity and memory are often noticed. Various anti-aging measures for both treatment and prevention are useful, since most chronic illnesses relate to aging. Certainly, a primary successful outcome is improved longevity. Pain relief reduces stress. Detoxification cleanses the body. Strengthening ligaments and muscles with exercise and prolotherapy injections makes joint and body functions less stressful. Overall, improved performance of all body activities is a goal. Most body activities relate to stress in one form or another.

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The American Heart Association Recommendations for Reducing Stress

The American Heart Association offers an array of strategies for reducing stress, particularly if you have cardiovascular disease. They include the following:

- Talk with family, friends, clergy, or other trusted advisors about your concerns and stresses, and ask for their support.
- Learn to accept things you cannot change. You don't have to solve all of life's problems.
- Count to ten before answering or responding when you feel angry.
- Don't use smoking, drinking, overeating, drugs, or caffeine to cope with stress. They make things worse.
- Look for the good in situations instead of the bad.
- Exercise regularly. Do something you enjoy. Check with your doctor to determine what activity level is right for you.
- Be an animal caregiver. Elderly individuals with animal companions make fewer visits to doctors than non-owners and do much better following heart attacks. They have lower blood pressure.
- Think about what might upset you and try to avoid it. Avoid people who bother you. Try to avoid rush hour traffic.
- Plan productive solutions to problems. Seek clear limits on how much you will do for family members.
- Learn to say no. Don't promise too much. Give yourself enough time to get things done.
- Join a support group – maybe for people with heart disease, for women, for men, for retired persons, or some other group with which you identify.
- Practice altruism. By giving we don't necessarily mean money, but kind deeds that help the lives of others.

From *Reverse Heart Disease Now* by Sinatra and Roberts[6]

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Stress reduction should be a major goal for treatment of cardiovascular disease.

Therapies to Address Stress

Top-notch rehab centers employ health coaches to maximize the mind/body connection, especially with relaxation and biofeedback exercises. Such centers are aware that chronic anger increases blood pressure, makes strokes much more likely, and enlarges the heart. Excessive stress can act as glue that holds other risk factors together to create a greater risk. If a patient adds smoking to depression, for example, the risk triples. Constant stress in the workplace increases the viscosity of the blood. Inadequate family and social support in stressful situations can increase the death rate by three to fourfold. A successful health coach will emphasize lots of laughter, doing volunteer work, giving and receiving affection, a optimistic attitude, the relaxation response, and a religious faith as effective tools and skills. The American Heart Association offers added strategies (see Table 1) that might empower the mind over the body if practiced daily.

A successful health coach will emphasize lots of laughter, doing volunteer work, giving and receiving affection, a optimistic attitude, the relaxation response, and a religious faith as effective tools and skills.

Benson described many positive techniques that he combined into the "relaxation response," including meditation, progressive relaxation, prayer, visualization, yoga, music therapy, and breathing techniques. Practicing whatever works best for the patient on a regular basis enables him or her to achieve a state of relaxation that can counteract potentially harmful episodes of stress.

There are many therapies available that professionals use to protect patients from harmful effects of stress. The techniques listed below are often helpful. They change the body's physiology in various ways to develop normal patterns, which can promote healing. Most of these therapies are not considered "proven" by the FDA due to the lack of large clinical trials. However, there is little doubt that patients who actively learn to manage excessive stress feel better, live longer, and function better, based on the experience of many trained clinicians. Much research needs to be done, but many tools are already in the hands of therapists. They are safe and often effective. Stress can be a massive factor in our lives. We need multiple therapies to help us succeed against a powerful enemy.

Various nutrient IV therapies act synergistically with other techniques to lessen stress. High-dose nutrients such as the Super-immuno IV developed by Shrader might reduce stress and enhance normal function. IV Phosphatidyl choline with glutathione improves neurotransmitters. Serial measurements of urine neurotransmitters followed by amino acids by mouth can correct an imbalance of neurotransmitters. Mineral IVs, amino acids, high-dose vitamin C, magnesium by IV, and variations of the famous Myer's cocktail all can improve performance. Nutrient adjuncts can convert harmful stress into managed stress.

Two other IV therapies might be utilized by alternative physicians to enhance normal function. EDTA chelation removes toxic metals and enhances circulation. A series of Nicotinamide Adenide Dinucleotide (NAD+) IVs were used initially to treat addictions and alcoholism, and now are also employed as a powerful tool to treat anxiety and depression.

Neuro-feedback detects abnormal brain waves and converts them into normal patterns. Many patients feel dramatically better after a series of this mini-electrical stimulation. Headaches, migraines, anxiety, depression, and PTSD all frequently respond with long-term benefit. The micro-current version of this therapy might be easier to use than earlier versions, while maintaining good results.

NanoVi Eng3 device reduces oxidative stress. It helps to make up for what you eat, what you breathe, and what you are exposed to. It reduces stress and inflammation as one ages by generating antioxidants. Increased performance commonly results.

Psychotherapy, otherwise known as talk therapy guided by a counselor, utilizes various techniques to treat anxiety, depression, and PTSD. Two of the most popular are cognitive behavioral therapy (CBT), which modifies harmful thought patterns to change moods and behaviors, and mindfulness therapy, which utilizes active listening and meditation. Hypnosis and self-hypnosis can also be utilized by trained clinicians.

Pulsed electromagnetic field (PEMF) is a series of targeted exercise of cell function. Tiny pulsations of magnetic fields stimulate healing, energy, and relaxation simultaneously. This is a powerful way to reduce pain and manage stress with lasting effects.

The *Zona-plus device* detects micro nerve patterns that lead to hypertension. Suggested isometric responses are relayed to the patient. Using these exercises relaxes the surrounding muscles, relieves tension, and reduces BP.

Stem cells injected into the nose has been modestly successful in improving memory. As memory improves, so does reduction of stress and quality of life.

Hyperbaric oxygen has been used extensively for wound healing. Treatment of wounds serves as a model for treating various inflammatory conditions and diseases in the body. Concentrated oxygen can improve impaired brain function resulting from strokes and PTSD. Autistic children often improve with HBOT.

The combination of ultraviolet light and ozone exposure to a large syringe of blood that is then re-injected into a vein can boost the immune system and increase energy. This improves performance of the circulatory and

musculoskeletal systems and thus reduces stress. Ozone by itself can promote healing for many conditions.

Low dose immunity (LDI) is a very low-dose treatment to desensitize allergies and autoimmune problems over a period of time. As the patient feels better, harmful stress becomes much less of a factor. Food sensitivities can produce pain and stress. Shrader and Vincent were pioneers that taught LDA and LDI in conjunction with AAEM meetings.

Neural therapy by Klinghardt and *pain neutralization* by Kauffman are dramatic healing procedures that instantly relieve pain and increase parasympathetic activity to balance the "fight or flight" response. These techniques are taught in workshops and DVDs.

Acupuncture has been around for 5000 years and still works today. In the 1980s the electro-acuscope and myopulse machines were introduced for both pain and stress.

Low level lasers of various strengths and TENS units treat around the areas of pain. *The BioMat, the BEMER, and the InfraRed sauna* are great for relaxation therapy. These devices can be purchased for home use.

Tenpenny sensitivity reduction (SRT–tapping), *NAET*, and the *Emotional Freedom Technique* (EFT) are treatments for allergies and stress. EFT is a technique you learn to use at home.

HeartMath offers a relatively inexpensive biofeedback device you can use at home to melt away harmful stress. This procedure was developed and recommended by conventional medicine.

Massage therapy is also an approved therapy. Chiropractic and osteopathic adjustments can be very useful.

Oral supplements that are especially helpful for stress include the following:

- Combination of l-tryptophan and melatonin for sleep problems and depression;
- d-Ribose, CoQ10, l- carnitine, Mg, taurine for cardiac strength (recommended by Sinatra, Roberts, Whitaker);[6]
- Vitamins D3, K2, tocotrienols;
- Antioxidants such as vitamins A, C, E, selenium, and glutathione to quench free radicals;
- Peptides, amino acids;
- Adrenal glandulars, along with pantothenic acid, for stress and fatigue;
- Oral supplements for stress (valerian, passaflora, SAMe, others);
- Alpha lipoic acid orally for detoxification (helps remove toxic metals);
- Fish oils and nattokinase to reduce platelet adhesiveness;
- Strong multivitamin (usually requires 4-6 pills a day);
- Magnesium (the anti-stress mineral), perhaps the most important nutrient to treat and prevent coronary artery disease;
- Anti-yeast/ program/ ketogenic diet (Trowbridge), DASH, or Mediterranean diet;
- Essential oils, CBD, and hemp oils; and
- Homeopathics.

Conclusion

Every clinician who treats cardiovascular disease should have multiple modalities at his or her disposal to deal with stress. These measures should include some form of relaxation response. The modalities chosen must be used regularly and supported by the entire office staff. Casual suggestions rarely are effective. Relapses are common. Different patients respond to different entities. Maintenance is required to be sure that treatments are continued.

Keep in mind that small amounts of controlled stress are beneficial to the body, as long as they are managed carefully. Chronic uncontrolled stress is a major risk factor that must be dealt with and treated effectively. Stress management should be made a priority, along with diet, exercise, smoking cessation, BP control, and chelation of metals. Financial considerations must be addressed. Everyone, especially those with cardiac risk factors, should actively deal with excessive stress. Otherwise, many will fall short in their efforts to avoid damage to their hearts. Stress is a powerful risk factor that affects the body in many different ways.

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Cardiac Biomarkers: A Well Validated Clinical Management Tool

by Fraser Smith, ND, and Jocelyn Faydenko

Introduction

Cardiovascular disease (CVD) is the leading cause of mortality in the United States.[1] Physicians recommend the classic lipid panel, which is certainly a valid predictor of cardiac risk in general. However, it does not give information about real-time events in the lining (intima and more precisely the "endothelium") of the inside of the artery. Most patients don't know of any other possible way to predict risk. Many will never be told by their physician that a relatively inexpensive panel can provide information about shorter term risk and that the rate and stability of the plaques are a sign but not the root cause of cardiovascular disease.

Atherosclerosis is an inflammatory disease, and it is critical for prevention-oriented physicians to obtain information about the state of arterial inflammation and stability of focal plaques of their patients.[2] There are new tools to track this inflammation and the impact on the inner lining of our arteries and these are collectively known as cardiac biomarkers. In understanding how inflammatory biomarkers are indicative of cardiovascular risk, healthcare practitioners can better inform their patients of the potential risks they may face and prevent cardiac events from occurring.[3]

The use of advanced cardiac biomarkers is an emerging, yet, well-validated clinical tool that may be a better predictor of short-term risk than the classic lipid panel.[3] Half of all patients who have experienced a cardiac event had cholesterol within proper guidelines at the time.[4] As evidenced in the JUPITER trial, statin drugs such as Rosuvastatin lower C-reactive protein; thus, this function may be as important as their total effect on circulating lipid levels.[5]

Unlike the traditional lipid panel, cardiac biomarker testing provides information about inflammation. Let's examine a few of the many biomarkers that have had very extensive research behind them. Note that obtaining this information does not and should not preclude the annual lipid panel, and these authors stress the importance of patients sitting with their physician and calculating their risk including family history, body mass index, diet etc. Some of the biomarkers we'll explore here tell us about oxidative stress within the endothelium, oxidized LDL (OxLDL), C-reactive protein (CRP), and plaque (atherosclerotic) growth and stability.

A Brief Gallery of Cardiac Biomarkers

F_2-Isoprostanes (IsoPs) are a measure of lipid peroxidation (whereby oxygen and other molecules render a fat damaged, rancid essentially) due to the metabolism of arachidonic acid, (an extremely common compound necessary for mediating basic bodily functions, such as building muscle tissue). In a number of clinical trials, this inexpensive marker that comes from a urine test can tell very precisely how much free radical activity is going on in the artery.[6] IsoPs have since become recognized as one of the most reliable biomarkers for lipid peroxidation and how it corresponds to disease. They've been linked to hypertension and tend to rise when other signs of inflammation rise. People whose hearts are aging and who take time to recover from states of lower oxygen (like during snow shoveling or running) have significantly elevated IsoPs.[7] Individuals with the highest IsoP levels have a thirty-fold increased risk for developing coronary heart disease (CHD).[8,9] An increase in IsoPs has been associated with increased intake of red meat, smoking, burnt foods and extreme (think marathon runner) exercise.[10] IsoPs not only indicate an increase in arterial oxidative stress, they also tighten up arteries and encourage blood clots.[6,7]

Oxidized LDL (OxLDL) measures LDL cholesterol that has been attacked and damaged by reactive oxygen species. OxLDL is the perfect weapon to damage the arteries, and it can kick off the vascular inflammation that will lead to long-term damage. It has been associated with an increased risk of atherosclerotic coronary heart disease, metabolic syndrome, cardiovascular disease, and worsening complications of diabetes mellitus.[6,11] Individuals who have increased levels of OxLDL are four times more likely to develop metabolic syndrome, the pre-diabetic condition that so many people suffer from; and in healthy middle-aged males, high OxLDL relates to a four times greater risk for developing coronary heart disease. It seems that the higher the OxLDL, the more severe the cardiovascular disease progression.[9,12]

C-reactive protein (*CRP or hsCRP*, named after the test method**)** is an acute phase protein released by the liver during inflammation and plays a major role in the innate human immune response; in other words, it is a natural event when the body is challenged. Thanks to decades

of research it is well associated with heart disease because it gets released within diseased atherosclerotic arteries in smooth muscle cells and is an indicator for low-grade systemic inflammation.[13] Remember that inflammation is driving this damage, with many local events helping to keep the inflammation going. Elevated levels of hsCRP may indicate an increased risk for plaque growth in the arteries; and for someone who already has established coronary artery disease and angina pectoris (pain in the chest and elsewhere from bursts of low oxygen to the heart), a high hsCRP test spells trouble. It means they are in danger of near-term cardiovascular events, in other words, a myocardial infraction or ischemic stroke.[6] hsCRP has also been relevant in the use of primary prevention; future stroke, myocardial infarction, incident peripheral arterial disease, and cardiovascular death have been predicted independently by baseline hsCRP levels in two studies.[14,15] Many MD family practitioners, internists, and cardiologists are beginning to simply order this routinely. Naturopathic doctors are acutely interested in these kinds of early detection methods and have been including this in their patients' care for years.[9]

Urinary microalbumin measures very small amounts of albumin that leaks into the urine; albumin is the most common protein in the blood. In persons with an increased risk for cardiovascular events, such as those with hypertension or diabetes mellitus, microalbuminuria (the presence of very small amounts of this protein in the urine) is an established risk factor for cardiovascular disease and death, as well as end-stage renal disease.[16,17] This test shows vascular damage in the kidneys and essentially aging of the vascular system (the kidney has a large amount of blood vessel network), and microalbumin tests have been suggested as a marker for increased risk of all-cause and CVD mortality and elevated incidence of coronary heart disease events.[16,17] The higher the microalbumin level, the higher the risk for heart attack, stroke, and death.[9,16]

Myeloperoxidase (MPO) is secreted by white blood cells when arteries are under attack due to the inflammatory events that create atherosclerosis. Evidence suggests MPO may play a role in plaque vulnerability, an increased risk for cardiovascular disease, coronary heart disease, and possibly heart attack.[6,18] By plaque vulnerability we mean the risk for a plaque that is partially blocking an artery to grow weak and then suddenly rupture. That event, like all wounds, leads to a blood clot, which spells trouble for the heart. One study showed that MPO was literally found "at the scene of the crime" by being plentiful at plaque rupture sites in human atherosclerotic plaques taken from patients with sudden cardiac death.[19] In another study, patients who came to the hospital with heart symptoms but whose standard blood work didn't look too bad, had a greater risk for future cardiovascular events upon six-month follow-up due to MPO prediction. If someone has both a high MPO and hsCRP and they have proven plaques in their arteries, their chances of dying from this condition are significantly higher.[6] In spite of the fact that MPO can go up due to things like gum disease, ➤

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it is still a specific marker of vascular inflammation and vulnerable plaque, erosions, or fissures. [9]

Lipoprotein associated phospholipase A_2 (Lp-PLA_2) is an inflammatory enzyme that can turn a normal molecule in the body that comprises the cell membrane into two dangerous particles. For those with established CVD, Lp-PLA_2 can predict the risk of future adverse events.[6] In one study, both Lp-PLA_2 and CRP were independently and significantly associated with CHD in patients who had LDL cholesterol levels that seemed safe, below 130 mg/dL.[6] A separate study showed elevated Lp-PLA_2 levels were predictive for hard coronary events in a 14-year follow-up of middle-aged men who had elevated choleserol.[6] Lp-PLA_2 has also been suggested as an independent predictor of incident type 2 diabetes due to its positive association with insulin resistance among older adults.[9,20]

Relevance to Patients

The question remains, how relevant is this practice both for the naturopathic medicine field of the authors, and for medical practice in general? If the lifestyle measures that patients need to embark on are obvious, and the medical alternatives are clear, what is the need for these tests? The answer is fourfold:

1. The biomarkers can predict risk in the short-term and while still very important, the standard lipid panel speaks to long-term risk, even decades.
2. The biomarkers provide vastly more information about actual events than a standard lipid panel, including inflammation, endothelial dysfunction, changes to apoA on LDL particles, immune activation, and plaque progression and plaque instability; therefore, they can help us target what physiological processes are dysfunctional and what needs to be changed with plant extracts, nutritional therapy, and other intervention.
3. The biomarkers can be used for patient education; for instance, a young patient with high F2-isoprostanes can see that they have oxidative stress in their arteries, or a 13-year-old with dysfunctional HDL due to high myeloperoxidase can be shown to be at a significant risk for metabolic syndrome.
4. Of paramount importance, we can gauge if nutritional, herbal, lifestyle, and other approaches are working. Is there a change in inflammation? Is that patient's risk of a cardiac event actually decreasing? These questions can be given clear answers by the testing outlined in this article.

What can people do in general? Eating a diet with a high amount of plant foods, fiber, health fats like omega-3s, and very low amounts of damaged (think store-bought vegetable oil and deep fryer oil) polyunsaturated fats, trans fats, burnt foods, and sugars. Obtaining sufficient vitamin C (which a plant-based diet should provide and possibly with supplementation) is a good idea as the late and great Linus Pauling showed us with his research. Dark chocolate, preferable organic and ethically harvested, has been shown to lower the MPO enzyme mentioned above. We hope to share a heart and vascular system support protocol in future articles; but knowing your risk, beyond the basic lipid panel, is of the utmost importance for millions of people.

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The Gadolinium Controversy – An Update

by E. Blaurock-Busch, PhD

Introduction

Gadolinium-based contrast agents (GBCA) are intravenously-administered drugs used in diagnostic imaging procedures to enhance the quality of magnetic resonance imaging (MRI) and are commonly used for enhancement of vessels as in MR angiography (MRA) or for solid tumor enhancement, including brain tumors associated with the degradation of the blood-brain barrier.

Gadolinium (Gd)-based contrast agents have not proved safer than the iodinated hydrophilic radiocontrast agents used in X-ray radiography or computed tomography; and because these gadolinium contrast agents pass the blood-brain barrier, increased awareness has focused on their toxicity. According to the FDA, patients who have received four or more MRIs involving Gd-based contrast agents showed traces of Gd in brain tissue. Consequently, the FDA revised its class warnings for all gadolinium-based contrast media and advised that the use of gadolinium-contrast agents must be based on careful consideration. As of now, extra care must be taken with patients requiring multiple doses, including pregnant and pediatric patients, and those with inflammatory conditions.

The FDA (Food and Drug Administration) updated its Medication Guide, May 16, 2018, stating that all MRI centers should provide a Medication Guide the first time an outpatient receives a GBCA injection or when the information is substantially changed. However, hospital inpatients are not required to receive a Medication Guide unless the patient or caregiver requests it. A health care professional who determines that it is not in a patient's best interest to receive a Medication Guide because of significant concerns about its effects may direct that it not be provided to that patient; however, the Medication Guide should be provided to any patient who requests the information. FDA also states:

> Health care professionals should consider the retention characteristics of each agent when choosing a GBCA for patients who may be at higher risk for gadolinium retention. These patients include those requiring multiple lifetime doses, pregnant women, children, and patients with inflammatory conditions. Minimize repeated GBCA imaging studies when possible, particularly closely spaced MRI studies. However, do not avoid or defer necessary GBCA MRI scans.

Chemical Structure and Use of Gd-Contrast Agents

According to their chemical structure, Gd-based contrast agents are subdivided into ionic and nonionic, macrocyclic and linear contrast agents (see Table 1). The cyclic structure creates a stronger bond to gadolinium. Macrocyclic agents have a cage-like structure that is less likely to release the Gd(III) ion. In contrast, linear agents have an elongated molecular structure, making them more likely to release gadolinium. Linear contrast agents are so-called Gd chelates with open, mobile chains that have no strong binding to the toxic Gd3+ ion. (Hemsen 2012, Marckmann 2006).

Table 1: Linear vs Macrocyclic Agents

Linear Agents	**Macrocyclic Agents**
Linear agents do not fully surround the gadolinium (Gd) ions.	Macrocyclic molecules fully enclose gadolinium (Gd) ions with nitrogen (N).

Source: Rogosnitzky M, Branch S. Gadolinium-based contrast agent toxicity: a review of known and proposed mechanisms. *Biometals*.2016; 29:365-376

Risks and Side Effects

According to information from the European Medicines Agency (EMA) and the Federal Institute for Drugs and Medical Devices (January 2018), the long-term risks of gadolinium contrast agent administration are still unknown. In the EU, the intravenous use of specific linear gadolinium-containing contrast agents has been suspended (see Table 2). The linear agents in question are gadobenic acid, gadodiamide, gadopentetic acid and gadoversetamide. In lieu of the information available, it would seem reasonable to delay the use of any linear GBCA. However, after gadolinium producers and imaging societies raised objections, the EMA will re-examine its decision regarding these agents.

"While there is clear evidence that all types of [gadolinium contrast agents], both linear and macrocyclic, may result

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in trace amounts of gadolinium in the brain, there exists no clinical evidence that this leads to an increase in risk or harm to patients," a press release from GE Healthcare defended the company's MRI contrast agent Omniscan; and continued stating that "Omniscan has a specific cardiac indication in several European Member States; removing it would limit clinical choice."

In patients with impaired renal function (i.e. an impaired elimination of the drug), gadolinium-based contrast agents (GBCAs) may increase the risk for nephrogenic systemic fibrosis (NSF), a rare and serious syndrome involving fibrosis of skin, joints, eyes and internal organs. In these patients, the use of GBCAs must be avoided unless the diagnostic information is essential and not available with non-contrasted MRI or other modalities. The risk for NSF appears highest among patients with chronic, severe kidney disease (GFR <30 mL/min/1.73m2) or acute kidney injury. Before GBCAs are administered to patients with chronically reduced renal function, including diabetics, hypertensive and older patients (>60 years), the estimation of the glomerular filtration rate (GFR) is essential.

GBCAs were first considered as a cause of NSF as early as 2006 (Agarwal 2009, Grobner 2006). Reports indicated that NSF developed within days or months after administration in patients with renal insufficiency (Dawson 2008).

Prof. Detlef Moka, MD, and Chief Executive Officer of BDN stated in interview: "If gadolinium stays in the body longer in patient with renal insufficiency, Gd can accumulate in the skin and organs and cause the severe connective tissue disease NSF."

Toxicity

Gadolinium(III) ions occurring in water-soluble salts are toxic to mammals. Chelated gadolinium(III) compounds (i.e. gadolinium bound to a chelate) are far less toxic because the chelate carries the tightly bound gadolinium ions through the kidneys and out of the body before free ions can be released. Because of its paramagnetic properties, solutions of chelated gadolinium complexes are used intravenously in magnetic resonance imaging.

Theory and Practice

With healthy kidney function, Gd contrast agents should be excreted within a short time. Gadodiamite, for example, is a linear and thus less stable Gd chelate. One milliliter of gadodiamide contains 287 mg (0.5 mmol) of the Gd drug. The pharmaceutical manufacturer GE Healthcare states, "the recommended dose is usually 0.1 mmol / kg BW (equivalent to 0.2 ml / kg BW) up to a body weight (BW) of 100 kg. If the body weight is more than 100 kg, then 20 ml is usually sufficient to obtain a desired contrast for diagnosis."

Table 2: Overview of Gadolinium-based Contrast Agents

Product	Structure/Application	Indication
Artirem/Dotarem/Dotarem Arthro (Gadoterate meglumine)	Macrocyclic / intra-articular	For MRI in brain (intracranial), spine and associated tissues in adult and pediatric patients (including term neonates) to detect and visualize areas with disruption of the blood brain barrier (BBB) and/or abnormal vascularity.
Gadovist (Gadobutrol)	Macrocyclic / i.v.	For adults and children of all ages including full-term newborns for contrast enhancement in cranial and spinal MRI. This includes differentiation of intra- and extramedullary tumors, demonstration of solid tumor areas in known syrinx, determination of intramedullary tumor spread.
Prohance (Gadoteridol)	Macrocyclic / i.v.	For use in MRI in adults and children over 2 years of age to visualize lesions with abnormal vascularity in the brain (intracranial lesions), spine and associated tissues, including lesions in the head and neck.
Magnevist (Gd-DTPA)	Linear / intra-articular	Used for MRI in adults, and pediatric patients (2 years of age and older) to visualize lesions with abnormal vascularity in the brain (intracranial lesions), spine and associated tissues. Contraindicated in patients with severe kidney disease
Magnevist (Gd-DTPA)	Linear / i.v.	**Use suspended in EU.** Contraindicated in patients with severe kidney disease
Multihance (Gadobenat dimeglumine)	Linear / i.v.	**Use suspended in EU.** In USA, used for MRI of CNS in adults and pediatric patients to visualize abnormal blood-brain barrier or abnormal vascularity of brain, spine and associated tissue. Also used in adults with known or suspected renal or aorto-ilio-femoral occlusive vascular disease
Omniscan (Gadodiamid)	Linear / i.v.	**Use suspended in EU.** Can cause spurious hypocalcemia, particularly at doses of 0.2 mmol/kg or higher in patients with renal insufficiency. Used in MRI to visualize lesions with abnormal vascularity (or those thought to cause abnormalities in the blood-brain barrier) in the brain (intracranial lesions), spine, and associated tissues, also used to facilitate the visualization of lesions with abnormal vascularity within the thoracic (noncardiac), abdominal, pelvic cavities, and the retroperitoneal space (FDA)
Optimark (Gadoversetamide)	Linear / i.v.	**Use suspended in EU.**
Primovist or Eovist (GdDTPA)	Linear / i.v.	To diagnose certain liver disorders and to visualize blood vessels, organs, and other non-bony tissues

Consider the theoretical reduction of contrast agent after administration of 20 ml gadodiamide as shown in Table 3. About 32.5 hours after the intravenous injection of 20 ml Omniscan, only 0.2 µg gadodiamide should remain in the system. After three days, no gadolinium should be detected in urine.

Data from 550 randomized urinary specimens before chelation showed a mean Gd concentration of 5.76 µg/l with a standard deviation of 128 µg/l. The maximum value was 2990 µg/l (Source: Micro Trace Minerals Laboratory (MTM 2006). The detection limit for gadolinium in urine is currently 0.05 µg/l.

Further surveillance carried out in 2011, 2017, and 2018, showed a similar Gd mean concentration, and again a high standard deviation. In 2018, another statistical evaluation of more than 12,000 baseline urine measurements showed a mean gadolinium concentration below the detection limit with a high standard deviation of 2605 µg/l, indicating the presence of some urine samples with very high gadolinium concentrations. Of the 12,000 baseline urines tested, 80 urine samples showed a Gd concentration of more than 100 µgGd/l. In 11 of these samples, Gd values greater than 1000 µg/l were detected.

The highest gadolinium concentration was 290,000 µg/l (two-hundred and ninety-thousand). The urine creatinine value of this sample was inconspicuous, reflecting normal renal function. The second-highest Gd urine concentration was 57,000 µg/l with a urine creatinine value of 2.56 g/l, indicating renal stress. In both cases, available patient information did not provide information regarding the time the contrast agent was administered, nor did we receive the contrast agent's product name.

It is of specific interest that none of the extreme values outlined above came from a urine sample following chelation. This demonstrates that the renal clearance of the above-mentioned urine tests is due to the body's own excretion mechanism. It shows that gadolinium is continuously eliminated over a given time without the use of chelating agents.

Table 3: Theoretical Reduction after Administration of 20 ml Omniscan (Gadodiamide)

Hours after iv-admin	µg Contrast agent
0.0	5740000
1.3	287000
2.6	1435000
3.9	717500
5.2	358750
6.5	179375
7.8	89687.5
9.1	44843.8
10.4	22421.9
11.7	11210.9
13.0	5605.5
14.3	2802.7
15.6	1401.4
16.9	700.7
18.2	350.3
19.5	175.2
20.8	87.6
22.1	43.8
23.4	21.9
24.7	10.9
26.0	5.5
27.3	2.7
28.6	1.4
29.9	0.7
31.2	0.3
32.5	0.2

Chelation

Chelation therapists debate if chelating agents such as DMPS, DTPA, EDTA, or DMSA are useful in de-chelating GBCAs. Our evaluation of data suggests otherwise. The problem we noticed is that provocation urine test results were not compared with urine test results of unprovoked (baseline) urines, leading to misinterpretation.

The contrast agent's molecular structure determines its stability and if it can be re-chelated by a given chelating agent. ➤

Table 4: Gadolinium in Urine Before and After Chelation with DMPS iv, 250 mg (1 Ampule)

Urine Test Value before Chelation in mcg/g Creatinine	Urine concentration after DMPS iv, 250 mg in mcg/g Creatinine	Chelation Assessment
3096	2340	unsuccessful
563	536	ditto
525	507	ditto
766	574	ditto
3703	2186	ditto
238	63	ditto
11	10	ditto
97	97	ditto
91	65	ditto
40	35	ditto
112	76	ditto
230	138	ditto
31	32	ditto
74	52	ditto
21	20	ditto
189	178	ditto
21	21	ditto
109	101	ditto
77	60	ditto
15	13	ditto
494	449	ditto
383	318	ditto
63	29	ditto
11	10	ditto
97	97	ditto

➤

The molecular formula of GdDTPA and ZnDTPA are similar, as is the Log K (thermodynamic stability constant). For ZnDTPA the stability constant is 18.40 and for GdDTPA it is 18.25 (at pH 7.4), which indicates that binding ability and stability constant of DTPA with Zn and Gd are similar. Whether ZnDTPA is a suitable chelating agent for GBCAs is to be determined.

We compared the gadolinium concentration of urine samples before and after chelation. Selected pairs came from the same patient and had been taken at the same day. Samples were submitted by various clinics and the results, as shown in Table 4, seem to indicate that chelation is not as successful as proclaimed.

Most importantly, if the gadolinium excretion value before and after provocation are not compared, post chelation results are most likely misinterpreted.

We evaluated data received from chelation with Dimaval (DMPS, Sodium 2,3-dimercaptopropane-l-sulfonate), the chelator of choice for many European physicians. Dimaval is produced by Heyl, Berlin, and in talking with the responsible scientist Dr. J. Ruprecht, we learned that this chelator is not likely to bind gadolinium. Our evaluation of available data confirmed his statement (see Table 4).

Some physicians claim treatment success by using combination treatments such as DMPS+CaEDTA or DMPS+ZnDTPA. In our database, we could find few pairs of pre and post chelation samples involving such pre and post test results. Those located did not prove that gadolinium binding happened with chelation (Table 5 and 6).

We also evaluated the binding ability of the oral chelator DMSA with gadolinium. Of the 34 pairs, 24 of the unchallenged urine samples showed slightly higher Gd concentrations than the samples after chelation.

Table 5: Gd in Urine Before and After Chelation with DMPS+CaEDTA

Urine Test Value before Chelation in mcg/g Creatinine	Urine concentration after DMPS iv, 250 mg + CaEDTA, 1.9 g iv in mcg/g Creatinine	Assessment
189	178	Unsuccessful
1424	1284	ditto
46	29	ditto
586	281	ditto
1865	1788	ditto
189	178	ditto

Table 6: Gd in Urine Before and After Chelation with DMPS+ZnDTPA

Urine Test Value before Chelation in mcg/g Creatinine	Urine concentration after DMPS+ZnDTPA, 1 Amp, each iv in mcg/g Creatinine	Assessment
696	512	Unsuccessful
8	5	ditto

Note: Urine creatinine levels are used to mathematically convert mcg/l values to mcg/g creatinine. This conversion is commonly used today because it reduces the potentially great margin of error that result from an incorrect sample volume given. A low urine creatinine level of 0.3 g/l or less affects the mathematical conversion factor, elevating test results. Low urine creatinine levels are generally the result of overhydration. High urine creatinine levels above 2 g/l are either due to dehydration or renal stress.

Summary

Our data clearly indicates that a Gd provocation urine test value can only be judged after it has been compared with a Gd-test result from an unprovoked urine.

As expected, DMPS is not able to bind and detoxify gadolinium compounds, and our data indicates that combination treatments involving the chelating agents DMPS,

Table 7: Gd in Urine Before and After Chelation with DMSA

Urine Test Value before Chelation in mcg/g Creatinine	Urine concentration after DMSA oral, 500-1000 mg in mcg/g Creatinine	Assessment
696	550	Unsuccessful
735	552	Ditto
768	610	Ditto
37	11	Ditto
9	5	Ditto
20	21	See note
24	19	Unsuccessful
6	6	Ditto
13	8	Ditto
293	187	Ditto
40	30	Ditto
108	80	Ditto
9	9	Ditto
29	30	Ditto
195	174	Ditto
696	551	Ditto
303	317	See note
104	87	Unsuccessful
93	97	See note
9	7	Unsuccessful
344	328	Ditto
23	17	Ditto
9	10	See note
9	10	See note
16	17	See note
11	12	See note
10	7	Unsuccessful
9	10	See note
189	217	See note
13	8	Unsuccessful
8	6	Ditto
21	17	Ditto
18	11	Ditto
7	8	See note

DTPA, EDTA or DMSA seem equally unsuccessful in increasing the elimination of gadolinium via the renal system. The use of oral DMSA may support the thought that Gd-binding could possibly happen, leading to increased renal elimination, but this is highly unlikely as DMSA is a chelator that is chemically similar to, but much weaker than DMPS.

Our data indicates that none of the chelating agents discussed here sufficiently binds and eliminates gadolinium via the renal system. However, just recently, a preliminary case report on 25 patients demonstrated that CaDTPA and ZnDTPA may be useful for the treatment of patients with gadolinium deposition disease (Semelka RC 2018). For that study, 24-hour urine samples were analyzed before and after chelation treatment, showing treatment success. However, not all pre-urine samples were taken immediately prior to treatment. Urine creatinine levels were not specified, which could lead to misinterpretation of results.

Our results are based on urine creatinine levels, but chelation treatment protocols did not involve a 24-hour urine collection. Instead, urine collection was based on the chelator's half-life plus time of administration. For a ZnDTPA injection or an EDTA infusion, that would be 45 minutes plus time of administration.

Clearly, more studies are needed. In future studies, test results should be supported by precise clinical information regarding the contrast agent name, the amount and time of the GBCA given, plus the amount and time of chelating agent administration. Protocols must be determined and followed, including urine collection times.

It would be of interest to find out if linear *and* macrocyclic GBCAs are retained, and if chelation treatment is an option for linear and macrocyclic GBCAs. Furthermore, it should be cleared if patient reactions are due to gadolinium toxicity or immune reactions, or both, and to which degree renal support such as orthomolecular treatments increase the body's own detoxification ability.

For more information, contact ebb@microtrace.de.

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Practical Nutritional Supplement De-Prescribing

by Dr. Douglas Lobay, BSc, ND

I attended the University of British Columbia Therapeutics Initiative Course: Bringing Best Evidence to Clinicians in October 2018 at Surrey Memorial Hospital. It was a wonderful course; it was honest and sharp in its evaluation of drug-based therapy. It presented many popular contemporary prescription practices and evaluated them with the keen precision of a razor's edge. It used empirical evidence and the power of statistics to cut through the pharmaceutical chaff and present the truth about certain drugs. As Mark Twain once said, "There are three kinds of lies: lies, damned lies and statistics."

If you are trying an individual nutritional supplement for a specific condition, try it for a while and see if it helps. Do not just blindly consume it continuously without a re-evaluation.

The course provided algorithms to help get people off unnecessary poly-pharmacy.[1,2] It showed ways to help decrease and stop certain drugs including anti-depressants, anti-anxiety drugs, anti-cholinergics, anti-psychotics, and proton-pump inhibitors.[3-5] It gave practical examples and videos of real patients. Although it was funny to watch at the time, it was also sad in retrospect. It is bittersweet to think that we live in a society that has seen incredible advances in medicine and the treatment of disease. And yet, we are overwhelmed by a culture of addiction to the power of unnecessary pills. By the end of the day I was thinking about my practice and the over-use of vitamin and nutritional supplements.

Draga was a listless Slavic lady who frequently stopped by my office with punctuality of a Swiss clock. She spent a lot of time in health food stores and read a lot of health magazines. She was constantly bringing in different vitamins and nutritional supplements that she had just purchased. She wanted my opinion to see if they were okay to take or not. Many times, I lost track and inventory of what supplements she was taking and for what purpose. She occasionally made appointments to do a nutritional supplement review and update. I must admit that after several years of this folly I had developed a simple and quick method of analysis for her. She would stop by the office with a bag of her new supplements. She would show me what she had purchased, and I would have a quick scan of the products. I would then give her a thumbs up, thumbs down, or thumbs sideways for the relevancy and possible effectiveness of what she was going to take.

John was an old Russian gentleman who came to my office one day with a badly swollen and obviously infected finger. He had been pruning his roses when one of the thorns lanced his outstretched finger. I said that we needed to lance the appendage and give him some antibiotics to take. He said obstinately no. I paused and there was silence. He brought out his briefcase and opened it. There in its interior was every vitamin from A to Z in alphabetical order. He was a big believer in Earl Mindell and the Vitamin Bible. John told me that Earl Mindell recommended this and that vitamin for his condition, and he was going to cure it naturally. I said I would give some natural antibiotics. He vehemently said no. He thanked me and went on his way back to Kootenays. I later heard that he was later hospitalized and was treated for sepsis.

Olivia was an eloquent English lady struggling with cancer. She had exhausted conventional medical therapy unsuccessfully. She was taking a plethora of vitamins and nutritional supplements from at least five different clinics. She was feeling ill and nauseous most of the time. I did an inventory of her daily nutritional supplement regime and discovered she was taking upwards of 50 different pills per day. In addition, I reviewed what pharmaceutical medicines she was taking and for what purpose. After a period of willful deliberation, I revised and reduced her list of supplements and medicines to a more manageable number. Her nausea reduced, and she felt some better.

Sophia was a vibrant German lady suffering from chronic insomnia. She had tried an innumerable of nutritional supplements that were supposed to help improve sleep. She was also taking several pharmaceutical medications that were supposed to induce and maintain sleep. She was routinely mixing different supplements, herbs, and drugs for her intractable insomnia. I did a vitamin,

nutrient, and drug inventory of what she was and had been taking and what stuff she currently had at home. I helped her reduce her list of supplement intake in the hope of minimizing duplicity and side effects. She still suffers with bouts of insomnia but doesn't feel overwhelmed or hopeless in terms of nutritional interventions.

I reflected back on my practice of nutritional medicine. It seemed I was spending an inordinate amount of energy and time on nutritional supplement de-prescribing. It appeared to me that many ill-informed and well-intentioned individuals were taking too many vitamins, minerals, and other nutritional supplements in the hopes of curing their ailments and achieving optimal health. Many people would read something in a health magazine or on the internet and become persuaded that they needed to take this supplement. Long ago I stopped reading over-the-counter lay health nutritional magazines. If I believed everything I read, I probably would be taking a whole whack of stuff. I pondered this conundrum and became convinced there was some method to this madness. I believe there is a logical and systematic way to review nutritional supplement intake and make simple and practical suggestions to manage daily intake.

Here are some simple and practical things I've learned about taking vitamins and nutritional supplements. Obviously, they won't apply to everybody and there are exceptions to the rules. Keep things simple and don't get over-whelmed. Take a multiple vitamin and mineral supplement and/or a B-complex before taking an individual vitamin or nutritional supplement. There may be times when you need an individual vitamin or mineral or have a health condition where it is recommended. If low in food calcium intake, take a moderate amount of a calcium supplement. If low in magnesium food intake, you can add a magnesium supplement. If taken together, a 2 to 1 ratio of calcium to magnesium is recommended for most people. If vitamin D is a concern, you can take supplement vitamin D, especially if there is no sunshine or you have a condition where it is required. Vitamin C and/or vitamin E, especially naturally sourced, may be recommended for a specific health condition. If you think you need an individual B-vitamin, like B12, try it for a while and see if notice a benefit. This same advice may be true for other individual vitamin and minerals. Fish oils may be recommended, especially if you don't consume fish more than three times per week. Probiotics may be recommended, especially if you don't consume probiotic foods or have a condition whereby your intestinal micro-flora is reduced. Other nutritional supplements may be recommended and/or consumed in addition to your core program if indicated.

If you are trying an individual nutritional supplement for a specific condition, try it for a while and see if it helps. Do not just blindly consume it continuously without a re-evaluation. I am surprised at how many people take a supplement that was recommended years ago. They take it usually on blind faith and are not even sure it if does anything. Don't be afraid to cut things out and eliminate them for a while. I usually have a day off and don't take any vitamin or nutritional supplements on one day of the week, usually Sunday. Remember to have a logical core program of vitamins and nutritional supplements to begin with.

To recapitulate: take a core group of vitamin, mineral and nutritional supplements, perhaps consisting of a decent multiple vitamin and mineral supplement, possibly extra calcium, magnesium and vitamin D and possibly the antioxidant vitamins C and E. Additional nutritional supplements such as fish oils and probiotics may be recommended as part of a core program. Obviously, the addition of other individual nutrients and/or supplements may be based on a specific health condition or a unique individual requirement. Re-evaluate your nutritional supplement intake periodically to see if you are achieving your goals. Read labels and try not to duplicate things. And, sometimes I recommend a nutritional supplement detox, whereby you don't take anything for a while.

I often tell patients, if they are taking more supplements that the sum of the number of their fingers and toes, they are taking too much stuff. Remember, the old adage, "if it sounds too good to be true, it probably is." In summary, keep your nutritional supplement program simple, logical, and practical.

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Glandulars in Nutritional Supplements

by Robert Thiel, PhD
Nutrition Scientist and Clinician

Some natural health products contain glandular ingredients, and many doctors have used glandulars for years with great success. Glandular organs, such as heart, aorta, and liver, have been a food source in the human diet for centuries. The consumption of glandulars is believed to provide nutritional support to the corresponding gland in the human body. Glandular organs contain food vitamins and minerals and were often used in the past to supply various nutrients.

Glandulars also contain nutritional peptides, enzymes, and substances believed to be hormone precursors. However, it is unclear precisely how these substances may affect energy levels, health, and/or mental function. Glandular therapy has alternative names such as organotherapy, cell therapy (where extracts are injected), and live cell therapy, which normally uses extracts orally or intravenously.

Unlike plants, fauna have most of the same biological materials (like enzymes and other peptides) that humans do.[1] While it was once believed that there were 7,000-9,000 enzymes in the human body, it is now believed that there are as many as 75,000.[2]

Consuming glandulars helps directly supply enzymes. Enzymes are biological catalysts that encourage metabolic, catabolic, and digestive processes in the body. They help rebuild and detoxify. Enzymes tend to be specific, such as eye enzymes tend to help the eyes, but are ignored in the ear. Enzymes help the respective organs they are involved with function better. Vastly more enzymes humans use are in glandulars than in plants.

Adrenal glandular support is often used by people who are under stress, fatigued, having difficulty getting up in the morning, who have adrenal stress headaches, or have an abnormal craving for salts.[3] Adrenal tissue is normally taken with meals.

Brain glandulars contain "specific brain cell activators"[4] and have been advised for slowness of thought, loss of memory, uncontrolled mental activity, nightmares, mental retardation, and epilepsy.[5,6] A double-blind study involving bovine-brain-derived phosphatidylserine found it was able to improve both behavior and cognition in elderly people with cognitive decline.[7] Phosphatidylserine enhances the ability of enzymes in membranes of nerve cells to relay messages in and out of the cells. Research suggests that the glandular source phosphatidylserine is more effective than soy isolate sources.[8]

Cardiovascular glandulars are normally made from bovine heart. This tissue is sometimes used by people with low blood pressure, overwhelming fatigue, people who need strength, people who feel cold, and athletes interested in improved performance. It is normally best not to take heart tissue late in the day (at breakfast and lunchtime is best for most people), as any heart glandular support product can affect sleep if taken late in the day.[9] Heart tissue, if appropriate, tends to show its benefits rather quickly (within a week or two for most people), though this varies. Heart tissue has historically also been used as an aid in glucose uptake and the manufacture of ATPs.[6]

Eye glandular tissue, if available, is often taken for eye and vision issues, including macular degeneration.

Liver is probably the most widely used glandular supplements. The liver is the chemical factory of the body and feeding the liver can help when other approaches have not been effective. Historically, bovine liver has also been used for some enlarged livers, forms of anemia, and for support when chronic degenerative diseases are encountered.[6] Clinically, it seems helpful for many who have raised liver enzymes, especially if given with detoxifying herbs like silymarin, red beet, and garlic.

Bovine lung tissue has historically been used by those with respiratory disorders (such as bronchitis, asthma, chronic coughs, chest colds), convalescent stages (of pneumonia, colds, flu), and pulmonary involvements (including accidents, industrial fumes, dust inhalation, and even adrenal insufficiency).[10]

Some women take bovine mammary tissue. The breasts are involved in lactation, sexual attraction, and sexual response. Bovine mammary tissue has been sometimes advised for disorders related to female breasts such as nipple pain, lymph node enlargement, breast underdevelopment, mastitis, menstrual pain, nipple inflammation, congestion, and lactation difficulties.[11] It may be of interest to note that the National Cancer Institute has studied bovine mammary tissue to find out what may be in it that helps prevent cows from getting breast cancer.

The ovaries are involved in female reproduction. Bovine ovarian tissue is sometimes advised to help some woman sleep at night, reduce the production of acne, improve mood, sometimes aid

in menopausal issues, and for some women, increase fertility.[12] As it has effects that differ from thyroid support, it is often advised to take ovarian tissue before bed.

The pancreas is instrumental in the regulation of blood sugar and is one of the most important organs related to a healthy digestive system. The pancreas produces trypsin and is operational in intermediate protein metabolism.[6] Bovine pancreas is often used to assist in the digestion of grains and other foods.

Cytotrophic bovine extracts have historically been taken by people with allergic reactions (hives, canker sores, cold blisters), lymph node swelling, blood concerns (anemia, lymphocytosis), demineralization accompanied by hyperirritability, as well as those with lowered resistance to infections and boils.[13] Some have suggested that bovine spleen "may aid in the elimination of allergic breakouts."[6]

Bovine thymus tissue is often used for immune system support. It is sometimes taken by people with staph, strep, and other bacterial concerns. Because it has few ingredients, it is useful to consider for those with other allergies, young children, and even pregnant women when they need immune system support. Bovine thymus has also been historically recommended when hyperglandular conditions, like hyperthyroid, hyperadrenal, etc., are encountered.[14] Oral supplementation with bovine thymus has been shown to be capable of enhancing T-lymphocyte activity, probably due to a thymosin-like activity.[15]

Bovine thyroid tissue (note: bovine thyroid glands are thyroxine-free, thus do not result in a shutting down of the thyroid gland when taken). Thyroid tissue is used by people with symptoms associated with low thyroid such as afternoon tiredness, poor circulation, poor temperature tolerance, headaches, low metabolism, diminished female libido, weight concerns, and sometimes dry skin.[16] It is normally best not to take thyroid tissue late in the day (at breakfast and lunchtime is best for most people), as any thyroid support product can affect sleep if taken late in the day. Some people will find that their appetite will temporarily increase when taking it, but not only does this tend to normalize, it normalizes to the point that most people will find that they crave junk food, caffeine, and similar items less, but water, fruits, and even vegetables more.

General Information on Glandulars

Glandulars contain nutritional peptides, enzymes, and substances believed to be hormone precursors. Although some believe that oral consumption of dried glandulars is no different than consuming any other protein-containing food, this belief appears to be based on the fact that the stomach breaks down proteins into their constituent amino acids and that there is no benefit from consuming foods containing specific peptides. However, this belief ignores the fact that some ingested protein is not broken down into its constituent amino acids.

Evidence suggests that with oral consumption of glandular extracts, a small percentage (5-10%) of their peptides are not broken down into their constituent amino acids but are available for intact absorption in the small intestine.[17-20] A small amount of these absorbed peptides then circulate and some of them appear to assist the human body (especially for ill persons) in performing various anabolic and catabolic processes.[16-20] Howell and others have reported that the amount of enzymes that pass through the stomach is even higher (nearly 50%).[21] Howell has also reported that individuals with significant health problems have been found to have lower levels of enzymes than healthy individuals and that oral enzyme supplementation has been helpful for many such people.[20] Although this position is not universally accepted,[22] a study in the *Journal of Surgery* showed that oral pancreatic supplementation resulted in improved enzyme and growth levels for children who had a pancreaticoduodenectomy.[23] Research has suggested that bovine glandulars may be helpful for thyroid support,[24] myoclonic seizures,[25] and even CHARGE syndrome.[26]

Some glandular extracts also contain small, safe amounts of hormones that may contribute to their possible effectiveness. The thymus gland contains thymic hormones, which Schulof found may enhance immune response for people with HIV.[15] It should be noted that many substances contained within animal tissues are similar or identical to their human counterparts,[1,27-29] including certain enzymes[27] and even T cell gene regions.[28] One advantage of glandulars over herbs is that raw ovine (sheep) and bovine (cow) glandulars often contain enzymes that are identical to those in the human body, while herbs rarely do.

Some research indicates that protein contained within cow's milk appears to slow the growth of certain human toxic cells[26]; also, cows do not appear to be that susceptible to getting breast cancer.[30] Thus, it may be reasonable to conclude that other substances contained within or derived from bovine/ovine sources may be helpful for other human diseases.

Harrower, a pioneering researcher of oral glandulars, believed glandulars were effective because endocrine glands experienced something he referred to as "hormone hunger."[31] Harrower wrote:

> The practical application of this idea concerns the administration of combinations of glands in presumed pluriglandular disturbances. If, for instance, in the conditions mentioned above there is a noticeable deficiency in several of the glands of internal secretion, the thyroid, ovaries and pituitary gland for instance, there may be varying degrees of hormone hunger on the part of the organs involved, and this will influence very definitely the amount of hormones that may be missing or needed by the glands to be stimulated.

It should be noted that when Harrower used the term "hormone" this probably should be interpreted to also include nutrients, both known and unknown, including enzymes, peptides, and hormone precursors. Harrower referred to vitamins (then newly discovered) as "plant hormones," and he called hormones the "active principles obtained from certain glands."[31] ➤

Glandulars

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There is a lot of controversy about the activity of glandulars given orally...It appears the effectiveness of glandulars comes in a multi-facteted way. These facets may be grouped into three basic categories: A. Hormonal; B. Enzymatic; C. Nutritive….

Any gland given for therapeutic use should contain the whole nondenatured gland....The hormones are at the same strength as those found in the natural organ, except that the water has been removed leaving only the dried concentrated tissue. These hormones fall into various categories and forms: 1. Steroids; 2. Peptides; 3. Catecholamines; 4. Amino Acids; 5. Prostaglandins; 6. Nucleotides. Their hormonal factors can be broken down into two categories: A. Lipid soluble hormones; B. Water soluble amino bases and acids….

The problem with steroid or prostaglandin therapy is that the medical sciences have removed them from the naturally occurring matrix which has a fine balance of steroids and prostaglandins. There is a natural law which applies in the universe and even more so in biochemistry. For every biochemical reaction or mechanism, there is an opposing 'feedback' mechanism. For this reason, the balance must be maintained and taking glandulars are both therapeutic and very safe since this balance is maintained. It is only when the hormones are isolated and given in large doses that side effects take place, such as ulcers in steroid therapy or liver destruction in synthetic testosterone therapy. The second class of hormones is more diverse, but just as effective and important. These are the polypeptides and phyiogenic amines such as neurotransmitters and catecholamines ….

And the incredible thing about these peptides is that they become more active upon digestion. They are normally secreted in long chain proteins which are then broken down into endorphins which are then digested by specific proteases into the active hormones …Therefore, most of the protein is assimilated in peptide form not amino acid form. What this means is that glandulars can actually be activated by digestion.[32]

It should be noted again that bovine thyroid does not itself contain substantial amounts of thyroxin, which is why it is appropriate to feed the human thyroid gland. Many raw glandular preparations contain substances that can facilitate the conversion of various susbtrates into hormones.

Cooking destroys enzymes.[21] The primary difference between raw and desiccated glandulars is the enzyme content.[32]

1. Processing is very important in maintaining enzyme activity; 2. Digestion is required to activate enzymes and peptides…how are they absorbed? ...they are absorbed through standard biological processes. Up to a third of your food is absorbed through the lymph system. This is basically an open portal system which permeates through the entire digestive tract allowing large molecules such as fat micelles, enzymes, and other molecules to pass into the blood stream. Other routes of absorption are active transport mechanisms such as chemotaxis…another route is immune-absorption where the protein or molecule combines with another protein and is carried in piggy back…The third category for glandular therapy is as a food…They are rich in protein and minerals and B-complex.[32]

It should be noted that when, for example, an adrenal enzyme reaches the toes basically nothing happens as the adrenal enzymes (as well as others) are specific to, in this case, the adrenal glands. Once reaching the adrenal glands, they help the adrenal glands through various anabolic and catabolic reactions.

Animal glands have been consumed since the beginning of history,[33] and even now scientific studies involving them are being published.[34] "Glandular products have been produced and used in the U.S. for over 60 years with absolutely no reports of microbial contamination or resultant illness."[35] They are consumed in many countries, including the US as food[33,36]; they may even contain substances to reverse diseases associated with Western diets.[33] Regarding glandulars, it has been reported that "overdosing is not a concern. Even when excess amounts have been ingested, the body can easily deaminize them."[33] A search of the literature found one report (in a letter to the editor) of a single, temporary complaint; the glandular raised thyroid hormones levels which normalized when consumption was discontinued, from using a thyroid glandular product combined with lithium, but the daily consumption (45 tablets) was in excess of any reasonable consumption (daily quantity of thyroid hormones present (0.5 mg T4 and .09 mg of T3).[36]

No long-term, negative side effects from taking glandular supplements are known.[35]

Non-Heat Drying vs. Desiccation

Glandulars supplements can be made in several ways. The cheapest way is through desiccation, which essentially dries the glandular at high temperatures. The biggest problem with desiccation is that it destroys all the enzymes that are in the tissue. Desiccation may also destroy other active substances contained within the gland. Some companies use a salt-drying process, but this tends to result in glands

with a high sodium content which can cause digestive complaints for adrenal-containing products. One of the most expensive ways to produce glandulars is through a non-heat, vacuum-drying process ("freeze-drying"). This low temperature process helps preserve many of the naturally-present enzymes. Natural health doctors generally prefer non-heat drying methods to desiccation even though that does increase the cost of the product. Non-heat drying results in a glandular that is the closest to 'whole food.'

New Zealand and Argentine Glandulars

New Zealand and Argentinean farmers tend to raise their cows and sheep more naturally than those raised in places like the USA. The animals almost exclusively consume unfertilized natural grasses as are found in the pastures of those lands. Neither New Zealand nor Argentina has ever had a case of BSE (bovine spongiform encephalopathy) nor scrapie, a similar disease found in sheep.[36-39]

Ovine, Bovine, and Goat

Many of the pioneering glandular researchers[40] prefer ruminant source [bovine (cow), goat, or ovine (sheep)] glandulars to glandulars from other animals for many reasons:

1. Doctors using them have a history of receiving positive results from people with a wide variety of disorders.
2. Bovine/ovine tissues are the most commercially available.
3. Ruminant glandulars have a long history of being safe to consume.
4. Ruminant tissues are considered to be dietary supplements under the Dietary Supplement Health and Education Act of 1994 (DSHEA) and as such are not considered to be food additives.
5. Earlier research has demonstrated that heterologous tissues (such as bovine/ovine for humans) do not produce the adverse and possibly toxic side effects that more homologous tissues can (such as simian for humans).[40]
6. Some earlier research suggested that immune response in humans was improved at a much greater rate with the use of substances from ruminant sources as opposed to non-ruminant sources (simian and feline).[41] At least one researcher reported long ago that rat tissue extracts also appear to cause a variety of problems when forced into some animals.[40]

Clinically, ovine, goat, and bovine glandulars are also preferable to porcine (pork) glandulars as followers of many religious faiths (Islam, Judaism, Seventh Day Adventists, and various Churches of God) will not consume pork, but will consume meat extracts from sheep, goats, or cows.

Why Aren't They Used More?

Since glandulars combined with herbs tend to work faster and sometimes better than herbs alone, why aren't glandulars used more? One reason is that, generally speaking, glandular ingredients cost more money than herbal ingredients. Many companies simply will not use them for that reason. Another reason is many people believe that plants are always the answer. And although for some problems they are, they are not always the best choice as plants almost never contain identical glandular enzymes.

Glandulars can help replenish enzymes, peptides, and other nutrients for the body in ways vegan supplements cannot not. Glandulars should be considered more by health care professionals.

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To Know Thyself: The Discovery Process

by Robert Kellum, ND, PhD, LAc, LMT

Healing any serious illness is never about going back to the way things used to be. It always occurs at a point of crisis, a "trial," in which *the patient is both plaintiff AND defendant*, and some kind of transformation is required for "winning the case," for which the illness, in its danger, provides an authentic opportunity. In true healing, the "plaintiff" and "defendant" have to find a "settlement" and come together again on new redemptive ground as one. There is no healing if one is simply victorious at the "other's" expense. There is no healing if one is invested in maintaining the complaint. There is no healing if one is defended against doing anything about it.

In a lawsuit, there is a procedure in which each party obtains evidence from the other party by means of "discovery," such as by interrogation, production of documents, physical/mental exams, etc. This process can go on for months as the discovery evolves. While the term "discovery" is not typically used in medicine, I want to show here that there are important benefits to be gained from consciously integrating it into a treatment approach, with the doctor playing much the part of *both* lawyers, and the developing higher "I" of the patient being the final judge.

Most of us don't make major life changes unless we have to, and some of us would even like to pay doctors to heal us with a pill or a knife so that we, as the plaintiff, don't have to make the needed changes we are invested in defending. If doctors can't do that, we might ask, what CAN they do?

The gift of disease is that it potentially alters our relationship with everyone, including ourselves. To paraphrase Hafiz, we don't necessarily want to give up our illnesses too quickly, but rather let them cut deep, because they can open our souls to new portals of being. In this trial of change, we may suddenly find ourselves in new situations that empower us and give us new insights about ourselves, not visible initially. This has to evolve, and as we make decisions and choices, we evolve with it, and more discoveries come. Many of us may not think of sharing this with our physicians, or anyone. There can be important trust issues around sharing ourselves, which can be part of the disease and also just good common sense in being careful to whom we give our trust. We ourselves may not even be fully conscious of the depths buried within us, of the shifts that are occurring, that we could reinforce if we were aware of their significance. In this sense, an important opportunity can be lost for lack of having recognized space for developing the "I."

The problem with diagnosis is that it is static, perpetuating the mindset of disease. It can give clarity of focus and impress upon us the importance of acting. At the same time, it also "names" the wound of being human, making it a now detached and alienable burden from which professionals might relieve us. Yet it can also often become an identity in itself, detaching us from ourselves in a "pre-judicial sentence," not negotiated with the higher I. Once it is made, it can weigh heavily upon the present, and determine the future; yet immediately upon its inception, it is an element of the past. I struggle regularly to release my patients from the paralyzing grip of diagnostic fear that can continually raise its head. In the present, even if labs and imaging today are exactly the same as a year ago, nevertheless the disease you had then is NOT the disease you have now, because YOU are not the same. For better or worse, you have evolved and changed, your relationships have evolved and changed, some may even have "died," with perhaps now new ones. It is the ongoing deeper interactions with the faces and voices of the important people in our lives, evolving over time, that can ultimately shape our future in relationship to the diagnosis.

Consider a patient who comes to me with a diagnosis of lung cancer. Based upon this, we develop a treatment plan. But her *underlying* issue, to be more deeply plumbed, is that now at 64 she can no longer easily provide the round-the-clock care needed by her mentally/physically disabled 36-year-old son to whom she's devoted her life and who is totally dependent upon her. She feels she will die if she has to put what is still an innocent child in a care facility, where his decline, in the absence of her loving care and connection, will be quick. She also feels she will die if she does NOT, leaving him essentially then in the same position. In this case, as in so many patients (from the Latin "patiens" – "to suffer, or bear"), *the evolving narrative itself is the diagnosis*.

Consider a 45-year-old ovarian cancer patient who early in life rebuffs the love of her life because of his immaturity, unhappily marries a man she discovers is an alcoholic, goes through a painful divorce, and after just becoming intimately involved in another relationship, unexpectedly is contacted by her earlier lover again, also divorced and wanting her, whom she painfully rebuffs yet again, and now must wrestle with his related suicide.

Consider a 35-year-old kidney cancer patient, abused by an aunt as a child,

struggling with gender, sexually unhappy in marriage, who begins platonically writing poetry to a younger, enamored, co-worker, realizes his mistake, tells her he has to stop, and confesses to his wife, only to have his wife divorce him, and the younger woman smear his reputation and have him removed from his position for sexual harassment.

Consider a 52-year-old breast cancer patient whose husband tells her he is taking a live-in mistress, and when she balks, divorces her, and convinces their two adult children that SHE has been unfaithful to him. Consider a 47-year-old malignant hypertensive patient, repeatedly sexually abused by an uncle as a child for many years, who now uses her morbid obesity as a protective shield from both any further potential abuse and the confusion of her own conflicting emotions. These are all lives needing *deeper structures of healing* than a "treatment plan." Countless stories like these are really more the norm than the exception, and a testament to the pain of human existence that today's materialist-based medicine has little to offer. Every one of us has a karmic knot like one of these, lurking under the surface of our lives, waiting for the disease that will launch us into discovery.

Without support and education in the importance of such discovery, any one of these patients could easily believe their "journey" with a doctor is to receive a treatment plan, meds/remedies, perhaps some suggested lifestyle changes ("exercise," "eat better"), check in with questions/problems as needed, from time to time have labs/imaging done, periodically have a session to make sure they're on track, and reassess if things need to be changed ("Do I really need to go back there again?"). While all of this has an important place, with this alone, the underlying structures of their illnesses remain invisible – in part by their *own* hesitancy/complicity. But, also, there is no ICD-10 code for "husband takes live-in mistress." "Devastated by lover's suicide" is not covered by insurance; "guilt over being sexually abused" has little recognized institutional presence in an electronic chart, whether allopathic or naturopathic. Such patients may be on conventional medications to treat symptoms, engaged in detox programs, taking various supplements/herbs/remedies to address deficiencies and imbalances, receiving acupuncture, body work, IV infusions, etc. All of this is helpful and important. But none of it is *enough* to begin healing these deeper karmic knots. None of it *reflects* the deeper patient in the room. By engaging in such lesser truths alone, such approaches in fact can even keep the patient from the important work needed.

The gift of disease is that it potentially alters our relationship with everyone, including ourselves.

A doctor's role is not simply to dispense medicines to extend the patient's life or help them cope. If a patient is experiencing distress because of an irreconcilable conflict that is the underlying basis of their disease, a doctor does no service by facilitating their unchangingly living through it longer, particularly if it means their quality of life suffers. But a person's life situation may not provide them with the needed resources, or even motivation, to find a way out, because it's never just about one person – healing always involves a constellation of relationships, and typically a person's disease is a *functional* phenomenon that actually *serves* them and others in their social constellation, and which now with the manifestation of life-threatening disease threatens everyone, and calls for a change in the entire constellation, for real healing for ALL involved to occur.

But there are unknowns here: life habits that don't change easily, and dictates of culture and historical time that often press upon us, for survival, to wear a different outer shell than that of our inner being. ("Coming out" is a condition of healing for ALL of us.) "Testing" by loved ones and oneself, can occur repeatedly to assess if the resultant disease is really that dangerous, if changes/revelations really do need to occur. Often the test "result" is based upon no more than the *complicity* of the person manifesting disease. If they are the rock for everyone that never breaks down, for example, they may well try to be that rock for as long as they can; their identity is bound up in it, their loved ones rely upon them for it, and so they not only remain complicit, but those who love them most may *also* have an unconscious investment in keeping them in their disease. In a parallel way, sometimes the disease itself becomes an empowerment. Suddenly a life-threatening condition can motivate loved ones to make behavioral changes or start listening in ways they didn't before, and the ill person can become invested in their disease because it is helping to bring about healing changes in their social constellation that otherwise would not occur.

In a different vein, being stigmatized in our culture is but another type of prison restraining people's lives. If your heart is saddled with the burden of feeling you've caused someone's suicide, of being *defined* as sexually immoral, or of enjoying and thus feeling complicit in your own past sexual abuse, etc., in each case you are cast into the darkness of a double bind, for which the struggle to rise out can but dig you into deeper hell. Each case is different. But it is only when the patient, armed with the "evidence" of disease, is in a position to send a message LOUD ENOUGH, by way of their actions, or inactions, that they can no longer continue in a way of life, that their social constellation may then begin to shift, and they may be authentically able to make somatic connections, and *feel* the illness as truly theirs, as a great and long unfathomed burden of heroic effort to be lifted, opening a path to act IN THE WAYS *TRULY* NEEDED. Even as this often can be at a late stage, when the challenge is more demanding, when the momentum of change needed to occur is more overwhelming, with everything else the doctor has to offer, s/he can also help in "crafting" this message. In many situations, the doctor may be the patient's *only* support for doing this.

Doctors usually can't change a person's life situation, and if we could see the path for ourselves there likely wouldn't be disease, and no need for a doctor. But as a disease progresses, while the restraining/sustaining life condition within which it exists may not change initially, the people, under pain around it, can and do. It is the pain and suffering that carves out a deeper soul space of interiority in which new ways of being can be conceived and carried. Consider the 47-year-old accountant with colon cancer who hates who he is ➤

➤

in his job but has been tied to its golden chain for the past 25 years. Now under pressure of his disease, he is let go by his firm and for the first time in his life finds the courage to express that he doesn't want to go back, that he would like to find a way to make music the center of his life instead. Or consider the liver cancer patient who for her entire life has felt devalued and unappreciated by her high school sweetheart husband, who now begins to realize just what she means to him as he faces losing her. She lives considerably longer than expected but also finds herself going through a very painful estrangement, dredging up deep wounds of its own.

Clearly there are times when we all may have to assess if the healing is better or worse than the disease – not always an easy decision. Yet beyond the suppressive actions and divisive emotions to which we all succumb, the suffering of our illness can also better open a portal for us to a higher unified identity, through which our interactions and intentions have the potential to change – opening transcendent possibilities we might not even have considered if left to algorithms determined from existing "facts" alone. We can't do this rationally because it isn't a rational computation. It is a discovery process yet unknown. We would be something much less if we were limited to just our rationality in making life decisions. The only straight path in life's evolution is the one we see when looking backward.

With the evolution of a disease, people can be seen in new ways. Loved ones can step up and take more responsibility, people can learn to give up control and trust more, power shifts occur. Life events may also present important metaphors that can provide empowering social theaters. A 47-year-old medical secretary who witnesses the psychiatrist she worked with for 24 years now dying of cancer, yet still having undying faith in conventional medicine, pulls herself out of a debilitating EBV/chronic fatigue condition by diving into a more spiritual career in craniosacral therapy that begins to heal the wound of her mother being taken from her when she was five years old, based upon a psychiatrist's diagnosis of schizophrenia (for talking with angels). Life's ongoing theater provides paths. The imperfectness of the *parallel* psychiatrists is exposed, and a new career path now helps her to listen to the voices of her interior dialogue with new ears, voices that are healing for her mother as much as for her. Capacities to deal with situations for which we had no facility in the past can develop, out of struggle, out of inner cultivation, with the arousal of greater will forces and awareness, more resilience, and greater harmony with the spiritual world.

As changes occur, new discoveries can come, leading to more changes, and the possibility of a new path to reveal itself. Even the same question asked a year ago can be different today, now in a *new* context, a place of deeper penetration. There can and will be major "ahas!"; but the process typically unfolds within a series of small incremental discoveries, found and affirmed in the faces/voices of others. The doctor then is in a unique position to be an advocate for the patient, as well as an interested outside witness, on the cutting edge of helping the patient reflect upon their biography in new ways, reinforcing healing insights, helping turn negative self-talk or one-sided understandings around, avoiding cul-de-sacs of comfort or hopelessness, and providing a face/voice that is not bound up with the patient's diseased life….offering support for new ways of seeing and being that the patient can hold onto as they courageously negotiate moving forward.

To achieve this, an important dimension is how the doctor comprehensively encourages and engages the seven life processes (warmth, respiration, nutrition, secretion, maintenance, growth, reproduction) to help effect this healing and, in particular in this context, we need to speak about the often-overlooked process of *secretion** as part of that healing. It is no accident that "secretion" occurs at the "turning point," as fourth of the seven life processes. Coming into a physical body is a falling, or separating out (from the Latin *secretus, secretionem*, "a dividing, separation…to set apart"; Genesis 3:9, "and God called out to Adam and said unto him, "Where are you?") from the spiritual world, that each of us carries as a private wound – our own karmic version of this "secret," uniquely shaping each of our lives. To heal, we must find our way back to spirit, by illuminating our secret – "secreting the secretion," as it were – but we must do it in a way that allows maintaining this illumination within a larger redemptive light that heals others around us as well, thereby manifesting the goodness of even our innermost darkness. This is a major life challenge for all of us. Few of us reach a level of "stardom" that radiates out light to everyone and is blessed with an equal

* See Rudolf Steiner, See https://wn.rsarchive.org/Lectures/GA170/English/RSP1990/19160812p01.html

Allegorical Painting – 17th Century

https://sfswedenborgian.org/know-thyself/ Rafael's "The School at Athens" https://en.wikipedia.org/wiki/Know_thyself

love back. Most of us aspire toward some semblance of this amongst family and friends, at best bringing our secret forth in parceled installments as we're able. This desire to shine forth one's inner light and have it be wanted and loved is a strong drive behind social media today.

Currently, this secretory process occurs primarily in the form of profit accumulation, where the secretion is monetized as a measurable embodiment of light (e.g., gold/nuclear power) to be privately accumulated on the basis of a commodity or service that fills/creates a need, but via a social alchemy where people are continually cast down into poverty for the sake of others rising – an economic cycle that recurrently must have devastating falls (crashes) as healing opportunities. "Wealth" here is the light that shines out and separates itself from the dark. The sacrifice needed for this is made and taken but not fully reflected back by those who take it. We all want to extinguish the darkness, to be seen only as the light, and this is why the darkness of disease is a "corrective" and a gift. In the alchemical refinement of our being which is the healing challenge of life, again and again we must learn how to illuminate that part of ourselves that has had to fall out into darkness, secreted away from spirit, in order for another part of us to rise up into light and touch spirit once more. We are beings of perpetual death – it is the only way we can have a soul and carry a spirit. This act of resurrection is a moment to moment reality that exists right down into the physiology of the rhythmic secretions of our endocrine system--to regulate our metabolism in greater health and balance, to open and engage our chakras to new perceptions, every day, every moment, we must struggle to bring our darkness, and the darkness we take in in order to survive, into ever greater light – becoming more conscious of what we take in for nutrition, of how to redeem/recycle the "ponderables" that we cast off.

In a patient/doctor relationship, the doctor can both receive and reflect the secret(s) from the patient as s/he struggles to attain light, *and* continually help the patient confront and rework their darkness on new levels – helping the plaintiff and defendant wade through the chaos, take up a new soul healing pattern to be secreted into their being, and discover some place of higher love. The secret, and the revelation, are two necessary halves, intrinsically bound together in an ongoing evolutionary dynamic struggling toward higher consciousness.

For any of this to happen effectively, there needs to be a conscious *rhythm* (a "breathing") of regular interaction in the doctor/patient relationship, with a doctor truly interested in the patient's life, *carrying* it in themselves, holding a space of *warmth* for it with genuine caring and concern, *nurturing* the discovery process, learning *with* the patient, witnessing their dark side, offering challenges *at the patient's pace*, as a proactive force within a deeper structure of healing. Years ago, Elizabeth Kubler-Ross discerned Five Stages of Death and Dying: Denial, Anger, Bargaining, Depression, Acceptance. Many models have revised this since, usually having in common the notion of "Acceptance" as being not simply an end, but also the prospect for a new beginning. We might conceive it like this:

DENIAL	SURRENDER
ANGER	HARMONIZATION
BARGAINING	REVERENCE
DEPRESSION	WONDER
ACCEPTANCE	

"Acceptance," the bottom step of a downward spiral, when all seems lost, where the mood is one of resignation, can, with a doctor's help, actually be the tipping point at which necessary changes can occur, where people, having evolved to a place of being able to carry the full weight of their condition, are thus able to take on seeing themselves and others in life-shifting and powerfully different ways, such that healing not previously possible can begin to wash over them. Each step of the descent downward has its polar rising counterpart.

Thus, with a certain detachment from one's past life that comes with acceptance, depression can become, *with support,* a stimulus for deeper investigation, a genuine *wonder* as to how and why one got into this place, and an openness to experiment with possible ways out. The mindset of "bargaining" with the condition, where one has not yet fully plumbed the depths of its seriousness, perhaps selecting therapies only based upon convenience or avoidance, can give way to a complete respect for the "teacher" that the disease is, and in this place of reverence discover greater opening to the ever-deeper meanings of its manifestation. Being in this position allows anger – anger whose expression is often an important part of healing – to eventually give way to harmonization, to finding a path of forgiveness, and aligning oneself with one's selfhood in a deeper, more coherent, and more integrative way. And when one is here, in this place, the possibility of surrender, true surrender that only comes with suffering, allows going to a place of deeper spiritual understanding, and achieving a new being, tempered in sacrifice, and grounded by the higher judgment of a stronger "I," which could only arise with the surrender of the old self.

With compassionate conscious support, with the vehicles of warmth, breathwork, nutrition, energetic remedies, bodywork/eurythmy, biography work, and other supportive therapies, the doctor can coordinate an important role in facilitating the life process along each step of the path. This is ultimately how the healing occurs, NOT in the necessary vehicles of therapies/remedies themselves, but in the evolving deeper *narrative of a discovery* process that radiates *through* them. ◆

Robert Kellum, ND, PhD, LAc, LMT, is a board-licensed naturopathic physician. A Kolisko-trained and board-certified IPMT graduate of anthroposophic medicine, Dr. Kellum spearheaded the development of the Society for Physicians of Anthroposophic Naturopathy (SPAN), in 2012 (with other colleagues). Part of an umbrella group of practitioners within AAMTA, SPAN offers a five-year naturopathic training for certification in anthroposophic naturopathic medicine.

Letters to the Editor

Coronary Occlusion Secondary to Trauma

An 81-year-old retired MD of Northern European descent was walking briskly along a path near a beach. He turned to his right to wave to a couple on the beach. His left toe contacted a tuft of grass, and he went down in an arc, landing only on his left chest, with a little protection for his face from his upraised left arm. He jumped up and walked on, not wanting to frighten the couple who were running over to see if he was all right.

For the next 10 days he was aware of a modest pain in the ribs, and of a specific point of tenderness in the middle of his left chest. He also experienced a slowing down and a shortness of breath that came on almost imperceptibly.

One Sunday morning, about one month after the fall, he was performing a Sun Salutation and decided to stop. He sat down, and then a crushing feeling began in his left chest. He lay on the floor breathing heavily for 30 minutes before he was able to get to a bottle of nitroglycerin tablets and slide one under his tongue. He alerted his stepson who drove him directly to Harrison Hospital.

A coronary angiogram was performed on him two and a half hours after the attack began. A one-inch clot was removed from the start of the left anterior descending coronary artery, *the exact point of the chest pain he had been experiencing for 10 days beginning one month earlier.* A 4.5mm x 18mm Multi-link Ultra Stent was placed. Recovery was without incident.

His coronary arteries showed little narrowing, due in part to a series of chelation therapies 20 years earlier.

The sequence of events is a one-inch bruise to the coronary artery caused by the adjacent rib upon impact with the ground. During healing the artery lining was not smooth, and a clot was able to form. When the clot occluded the left anterior descending branch, a crushing feeling occurred, and help was sought.

Conclusion: It is likely that more coronary occlusions occur following trauma than is generally recognized. Especially in young people with healthy hearts, a trauma one month earlier could be the cause of sudden death. Awareness of this sequence of events could prevent an unknown number of premature deaths, thanks to the availability of cardiac catheterization.

George Denniston

Effects of Homeopathy

I am writing about a rebuttal by Judyth Reichenberg-Ullman regarding a letter criticizing homeopathy written by Dr. Douglas Lobay. Dr. Lobay described homeopathy as "psychotherapy with props." When I graduated from pharmacy school, I too had a similar opinion. There is just nothing in the homeopathic tablets or liquids. How could it do anything?

A few years later I married, and my wife delivered a son. A few months later we had left our home, 12 miles from the Mexican border, in El Centro, California, on our way to central California at 7:00 pm. About 45 minutes into our 10-hour journey, our son started to fuss and cry. His diaper was dry, and he refused to nurse. We soon determined that he was teething. I knew that I could not find a pharmacy that carried Hyland's teething tablets. Every 30-40 minutes the child would awaken and fuss but then go back to sleep. I tried some Benadryl syrup that helped a little due to its local analgesic and sedative properties. When we got to Stockton, the private pharmacies were just opening for the day, and I got the homeopathic teething tablets. I put two in his mouth, and in 15 minutes or less, he went to sleep and slept for six hours free from pain.

Was this a psychological effect? You cannot convince me that this baby could psych himself into being pain free. I noticed that when the pain was coming back, he drooled a great deal, but when he took the homeopathic the drooling stopped. Through watching his drooling, we adjusted the dosage upwards as he grew. The drooling came before the pain. It was a great indicator that allowed us to keep ahead of the pain.

I have another problem with Dr. Lobay's comments. He does not seem to know that allergy shots are pure homeopathy. My friend spent 15 years in medical training to become an allergist/immunologist. Dr. Lobay calls this "psychotherapy with props." He should write a letter along the same line and send it to the allergist's association, American Academy of Allergy & Immunology. They would help educate him on the subject of homeopathy.

I learned a lot from my baby son's teething incident. I learned not to be so critical of things I knew nothing about. My dad was 52 when I was born, and he always said to my older brothers before they went out to public gatherings, "Keep your mouths shut so you do not show your ignorance."

I have tried to live by his sage wisdom.

Noel Carrico, RPh
Community Pharmacy
Imperial, California

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Guest Editorial

Is CAM Under Stealth Attack by the Monopoly Internet Megacompanies?

CAM (Complementary and alternative medicine, now more commonly known as integrative medine) has always been polarizing in the medical community and has consistently come under attack by conventional medicine advocates. In the time since I became active, it was the quackbusters, then the sceptics who evolved into the bloggers who attack all things CAM. Heretofore, they have had a relatively small impact on the CAM community.

However, there might be a new threat developing which could have a much more serious impact on the CAM community.

I've only heard about a few specific cases, so it's far too early to say it's a trend, plan or a concerted effort. Here is what I've heard: Amazon has recently stopped marketing a homeopathic line because of the products' claims, which, according to Amazon, make them unapproved new drugs and hence illegal to market on Amazon. This may or may not have something to do with the FDA draft guidance document on homeopathic products published in late 2017. To my way of thinking, the draft states that essentially all homeopathic products are illegal new drugs, but that the FDA would only actively pursue those products which posed a substantial risk to consumers based on its published criteria. (Depending on who you ask, this is either a new position by the FDA, or the same position which the FDA always had on homeopathic remedies.) The draft guidance document is at https://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM589373.pdf.

The company is contesting Amazon's determination. We'll have to see how this shakes out.

Second, periodically, Google updates its search algorithms. Its most recent update was on August 1, 2018. As part of the update, it does a medic update, which among other things updates the algorithms for searches for health problems and clinics offering treatment for medical conditions. There are at least three CAM clinics whose organic searches have dropped precipitously, and heretofore successful AdWords have stopped producing eyeballs.

Is this an intentional effort to stifle CAM therapies, or is it just an unintended consequence from a global medical update?

It's too early to tell. There are not enough data points and there's no smoking gun (yet). But it's worth keeping an eye on the situation and see how many CAM places and products are adversely impacted.

Is the Amazon thing connected to the Google thing? Again, way too early to tell. But again, it's worth keeping an eye on.

Rick Jaffe, Esq.
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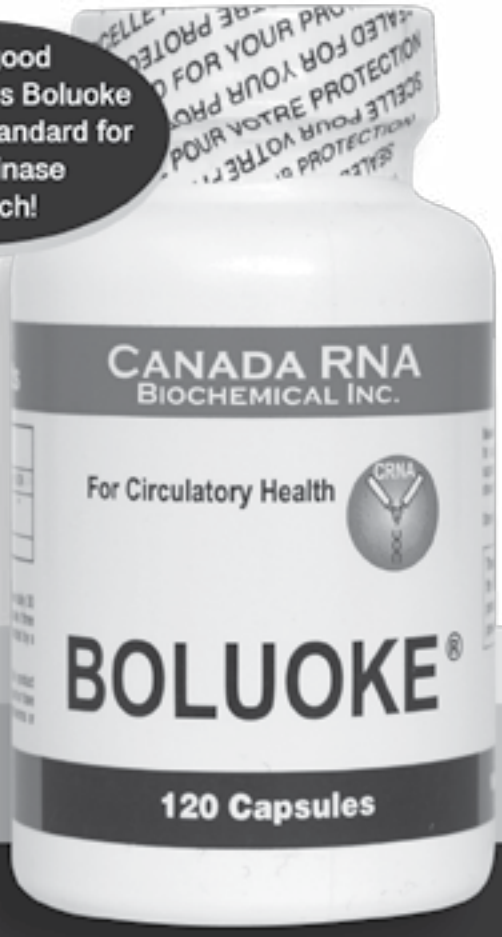
HYPERCOAGULATION

It's so good that FDA uses Boluoke as the gold standard for lumbrokinase research!



A central issue in:

- conditions with a poor circulation
- growth and spread of malignant cells
- chronic infections with biofilm
- poor tissue healing due to hypoxia

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So Where Are the Bodies THIS Year?

by Andrew W. Saul, Editor, Orthomolecular Medicine News Service

The 35th annual report from the American Association of Poison Control Centers[1] shows **zero deaths** from vitamin A, vitamin C, vitamin E, niacin, pyridoxine (B-6), or from any other B-vitamin. There were no deaths from multiple vitamins, adult or pediatric.

One single allegation of death from chronic vitamin D overdose is listed in Table 21 (p 170) and then repeated in Table 22-B (p 203). It is described as "AR-D," an Adverse Reaction, Drug. The Relative Contribution to Fatality (RCF) is 3 (on a 6-point scale where 1 is highest), which means "contributory." Although details are not provided, it appears that the individual took vitamin D long-term and died but causality could not be established.

There were zero deaths from any dietary mineral supplement. This means there were no fatalities from calcium, magnesium, chromium, zinc, colloidal silver, selenium, iron, or multimineral supplements.

The AAPCC report shows no deaths from amino acids, creatine, blue-green algae, glucosamine, or chondroitin. There were no deaths from herbs. This means *no deaths at all* from blue cohosh, echinacea, ginkgo biloba, ginseng, kava kava, St. John's wort, valerian, yohimbe, ma huang/ephedra, guarana, kola nut, or yerba mate. While the *Orthomolecular Medicine News Service* does not consider a number of these to rightly be dietary supplements, they are included by AAPCC as causing zero fatalities.

There were no deaths from any homeopathic remedy, Asian medicine, or ayurvedic medicine. None.

A fatality from some "Unknown Single Ingredient Botanical" and a single death from an "Unknown Energy Drink" are both reported on page 197. The obvious uncertainty of such listings diminishes any claim of validity.

One unsubstantiated death attributed to melatonin is also reported. Melatonin toxicity is low. For mice, the oral dose that would kill half the animals receiving it (LD 50) is 1,250 milligrams per kilogram body weight.[2] For a human, this would amount to consuming around 10 or more entire ***bottles*** of melatonin, all at one time.

If nutritional supplements are allegedly so "dangerous," as the FDA, the news media, and even some physicians still claim, then ***where are all those bodies?***

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When Marketing Trumps Science

review by Jule Klotter

The HPV Vaccine on Trial by Mary Holland, JD, Kim Mack Rosenberg, JD, and Eileen Iorio
Foreword by Dr. Luc Montagnier
Skyhorse Publishing, New York, New York; www.skyhorsepublishing.com
Softbound; 461 pp; 2018; $19.99 (US)

"Because vaccines are administered to healthy individuals, 'the highest standards of safety are [rightly] expected of them.'" (p. 98)

In September 2005, seven months before FDA approval of its Gardasil vaccine, Merck commenced a direct-to-consumer marketing campaign that connected the human papilloma virus (HPV) to cervical cancer. Once that connection was widely accepted and their HPV vaccine had been approved, the company played on cancer fear and parental guilt, advocating that young women "Be One Less." Merck gained endorsements from multiple medical associations, women's health groups, and government agencies for its campaign and even lobbied state legislators to make the vaccine mandatory for all sixth-grade girls. As a result, Gardasil has become a huge money maker for the company: global sales were $2.3 billion for the first nine months of 2018.[1]

Of course, marketing in itself is not evil. But in the arena of public health, one hopes that products offered for sale provide more benefit than risks. In reading *The HPV Vaccine on Trial,* it is difficult to believe that general welfare and reducing cancer is Merck's primary goal – especially when it is clear that Merck continually asserts safety without *ever* using a saline placebo in its original clinical trials, as the book's authors explain at length and members of the Cochrane Collaboration described in the *British Medical Journal* last year.[2]

The HPV Vaccine on Trial is a thorough, well-documented examination of the conflicts of interest, compromised research, and marketing strategies that have allowed HPV vaccination to be widely promoted. The case presented by Mary Holland, JD, research scholar and director of the Graduate Legal Skills Program at New York University School of Law; Kim Mack Rosenberg, JD, a private practice attorney; and writer Eileen Iorio raises compelling questions about the safety and effectiveness of this type of vaccine, in particular Merck's Gardasil.

As the authors point out, many factors contribute to the development of cervical cancer – as is true of other cancers. Certain strains of HPV have been associated with cervical cancer, but several other factors also increase cancer risk, including immunosuppression, early sexual activity, tobacco smoking, nutrient-poor diet, and being a DES daughter. A healthy immune system successfully combats HPV infections in most people; and Pap screening (in countries where it is available) has been very effective in greatly reducing the incidence of cervical cancer. Only 0.6 percent of US women will receive a cervical cancer diagnosis in their lifetimes, and survival rate is over 90 percent when caught early. Even before a vaccine came on the market, low-resource countries like Colombia have seen a decline in cervical cancer as socioeconomic conditions improve and new methods for screening become available.

Despite widespread belief that HPV vaccines prevent cervical cancer, that has yet to be proven. It takes years for cervical cancer to develop. Historically, it has affected older women (median age 50 years, according to the National Cancer Institute). The vaccine clinical trials used cervical lesions, abnormal tissue called CIN2 and CIN3, as a surrogate for actual cervical cancer. As the authors point out, these lesions do not necessarily lead to cancer – in fact, most do *not* lead to cancer: "The NCI reports that 50 percent or less, and perhaps as low as 30 percent, of CIN3 lesions progress to cervical cancer. Cochrane Collaboration recently assessed the probability of CIN3 progression to cervical cancer to be as low as 12 percent (may depend on location and other risk factors)." So, the vaccine's actual effectiveness in reducing cervical cancer is still unknown; it hasn't been on the market long enough to see if the cancer rate among older women will decline.

While the vaccine benefit is unknown at this point, reports of adverse effects associated with these vaccines are very troubling. Using data from the Gardasil package insert, the authors say the rate of serious adverse reactions during clinical trials was 81.49/10,000 (128/15,706 participants), and the death rate was 13.3/10,000 (21/15706). In contrast, the cervical cancer rate in East Africa, which has the highest incidence in the world, is 4.27/10,000 (2012 IARC figures) and the death rate is 2.76/10,000. The death rate among those receiving the vaccine was nearly five times higher than the death rate from cervical cancer in East Africa.

Now granted, not all of the adverse reactions may have been due to the vaccine, but the lack of an inert placebo clouds the issue. All but one Gardasil trials used AAHS, Merck's aluminum-containing adjuvant, as the control, making it impossible to compare the incidence of adverse events in treated to untreated girls. Tables in a 2006 FDA review document, obtained by the authors, showed that about 50 percent of the trial participants reported having "new medical conditions" arise after receiving the vaccine: "Gardasil: 5842 out of 11778 (49.6%) 'Placebo' 4750 out of 9686 (49%), Day 1 through Month 7." These medical conditions include thyroiditis, arthritis, multiple sclerosis, other diagnosed autoimmune disorders, neurological disorders, immune, reproductive, cardiac disorders, and psychological problems. What would the numbers look like if a saline placebo had been used? Unfortunately, FDA did not ask the manufacturer to conduct such studies.

During HPV vaccine trials in India, the high numbers of adverse events, including deaths, loss of menstrual cycles, depression, and anxiety led to a Parliamentary investigation into clinical trial laws and rebukes against the country's medical agencies. The high number of adverse reactions in Japan led that country's Ministry of Health, Labor, and Welfare to withdraw its recommendation to add the HPV vaccine to its vaccine schedule, "due to 'an undeniable causal relationship between persistent pain and the vaccination.'" In Columbia hundreds of girls reacted to a second dose given in 2014, some severely; they experienced severe headaches, convulsions, fainting, and paralysis. Government officials ascribed the reports to mass hysteria without ever having examined the girls. In the US, 57,620 reports of injury, including 420 deaths from HPV vaccine, were recorded by the voluntary US Vaccine Adverse Event Reporting System (VAERS) as of May 2018.

Merck asserts that the adverse events are not related to the vaccine. Yet, information about the known effects of the vaccine ingredients suggest the potential for its causing diverse symptoms, including postural orthostatic tachycardia syndrome, small fiber neuropathy, complex regional pain syndrome, and chronic fatigue syndrome. Holland et al point out that AAHS is a nanoscale adjuvant that has 'enhanced binding capacity' to antigens. Its small size allows macrophages to carry the AAHS nanoparticles across the blood-brain barrier and, possibly, cause inflammation and neurological effects. In addition to AAHS, the vaccine contains polysorbate 80, which is known to aid delivery of active ingredients to the brain. A study back in 1984 showed that polysorbate 80 caused steep blood pressure drops and decreased heart rate in dogs. Also, injecting polysorbate 80 in mammals has produced ovary damage. Since none of these ingredients have been tested in humans against a saline control (FDA does not require such testing), it is impossible to say if they are safe or are causing harm.

Despite the numerous reports of adverse effects and the lack of saline placebo safety studies, the CDC›s Advisory Committee on Immunization Practice (ACIP), the expert committee that makes federal vaccine recommendations, added Gardasil and, later Gardasil 9 (which has more HPV strains) to the vaccine schedule. Many ACIP members have financial ties to industry. ACIP approval means vaccine manufacturers have tort liability protection, provided by the 1986 National Childhood Vaccine Injury Act. People injured by a vaccine cannot sue the manufacturer. Instead, they must sue the US Department of Health and Human Services for compensation. In 2011, the Supreme Court case Bruesewitz v. Wyeth determined that only the FDA has the authority to decide if a vaccine design is defective. Jennifer Robi v. Merck and Kaiser Permanente, now being heard in Los Angeles Superior Court, will consider whether Merck committed fraud during its clinical trials, bypassing the issue of safety.[3]

FDA recently approved Gardasil's use in adults (male and female), age 27-45,[4] even though Merck's own data found that women who had evidence of current or past HPV 16 or 18 infection before getting the vaccine were 44.6 percent more likely to develop CIN2, CIN3 lesions, or worse compared to the control group. In addition, clinical studies have shown that pregnant women receiving the new Gardasil 9 within 30 days of conception had over twice the miscarriage rate of those who received Gardasil: 28.4 percent in Gardasil 9 vs 12.7 percent in Gardasil control. Again, no saline placebo or untreated group was used as a control. Apparently, the agency does not ascribe to the precautionary principle.

The HPV Vaccine on Trial provides documentation that regulators and manufacturers are downplaying safety issues. Vaccines, by definition, are given to *healthy* people in order to prevent illness. As Nobel Prize winner Dr. Luc Montagnier states in his Preface to the book: "Historically, vaccines have protected many people. Presently, over these last many years, too many vaccines, HPV and others, have harmed and killed so many people. Let us mandate that ALL vaccines be safe for everyone." But this is only possible when government agencies and manufacturers have higher standards for clinical trials; and that requires educated medical professionals and consumers who demand a change.

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Mental Health with Naturopathic Medicine

review by Dr. Lachlan Crawford, ND

Beyond the Label: 10 Steps to Improve Your Mental Health with Naturopathic Medicine by Dr. Christina Bjorndal, ND
Natural Terrain Inc., Edmonton, Alberta, Canada
Paperback; c.2017; 397 pp; $18.95

Beyond the Label is at once a deeply intimate offering of personal struggle and growth, and a rousing "how-to" instructional guide for cultivating one's own internal peace. Cutting-edge research and resources abound in this book to galvanize those with mental illness and their loved ones.

The ambitious book begins with stories of the author's early-life struggles, but with a unique and deeply honest narration of the universal voice of the inner critic. This self-critical attitude she traces back to her childhood and adoption. Despite being loved and supported by her adoptive parents, she, like so many of us, nevertheless shouldered the burden of destructive and false beliefs about her own self-worth. Her attempts to control these unbearable thoughts ranged from over-achievement and perfectionism to bulimia, over-exercise, and, finally, an attempt to take her own life. At the bottom, she came to a profound moment of reckoning and miraculously survived.

The topic of suicide is close to the bone for Dr. Bjorndal, one that she teaches on widely. After her own journey to the edge and back, she learned something worth sharing in *Beyond the Label*. After the attempt, she learned how to meet devastation with acceptance and commit to life and health. Under the care of Dr. Abram Hoffer in 1999, she not only rebuilt her mental health with naturopathic modalities, but she also made a career change and became a naturopathic doctor with the goal of helping others who struggle in a similar way.

She owes much of her recovery to the skill of Dr. Abram Hoffer and the field of orthomolecular medicine, which is the practice of using optimal doses of natural nutrients and vitamins for health. Since her initial treatment almost 30 years ago, the science of orthomolecular medicine has blossomed to develop effective treatments for a vast number of chronic and acute conditions. This wealth of scientific orthomolecular and naturopathic knowledge is a strong framework for *Beyond the Label*.

The second half of the book reads as a manual to the life-saving lessons she learned through years of self-work and her rigorous medical education. *Beyond the Label* transitions into a revelatory handbook for mental wellness, working from the wider perspective down to the individual level. Dr. Bjorndal's approach illustrates the necessity of a truly integrative approach for all levels: the physical, mental, emotional and spiritual. Instructions for targeted nutritional interventions, sleep hygiene, exercise prioritization, and stress minimization form a strong scaffolding of health, upon which the emotional work builds. From there, she dives into the deeper tasks of confronting faulty core beliefs, developmental trauma, attachment disorders, and other psychological limitations.

Like the pinnacle at the top of Maslow's pyramid, spiritual exploration has a place of honour and necessity in Dr. Bjorndal's naturopathic approach to mental wellness. Guidance comes from Eckhart Tolle, Tara Brach, Byron Katie, Louise Hay, Nancy Levin, Deepak Chopra, and other enlightening experts to awaken the desire for wellness.

Dr. Bjorndal has also created "The Essential Diet: Eating for Mental Health," a helpful clinical tool that clinicians use with their patients. It answers the question "How should I eat?" that patients often have when they need to make diet changes to support their health. It is primarily free of gluten, dairy, and sugar, and emphasizes the essential nutrients that are required to support neurotransmitter and hormone function, as well as the detoxification pathways of the body. It provides a two-week meal plan, grocery shopping lists, recipes, and a nutritional analysis.

For years, Dr. Christina Bjorndal struggled with the difficulties of bipolar depression and manic episodes, anxiety, addiction, an eating disorder, and suicidal ideation. Her honest recount of these lifelong trials illuminates the two-fold struggle of mental illness in our modern culture: the difficulties of trying to live a life constantly derailed by paralytic depressive phases and life-altering manic episodes, and the isolating rejection by society on those with mental illness. *Beyond the Label* is part wisdom, part compassion, but there's no mistake about it; it is also part battle cry to stomp out stigma and build cultural empathy for those with mental health issues. Dr Jonathan Prousky, ND, praises *Beyond the Label*, "This book should be on the shelves of every person struggling with their moods".

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Ask Dr. J

by Jim Cross, ND, LAc
thias1020@yahoo.com

Heart of the Science or Science of the Heart?

So, which is correct: Is the heart mainly just a pump to support the cellular activity of the body, or is it a pump with semi-magical powers? Most indigenous peoples of the earth believe the spirit resides in the heart, which gives credence to the latter idea. I was also taught that concept in Chinese medicine. So, after my father had his aortic valve replaced, was my mother suffering a steroid-induced break from reality due to excessive cortisone intake for her rheumatoid arthritis or was she in an altered state sensing that there was an energetic difference in my father due to his newly installed pig valve when she claimed he was somehow a different person?

Is it possible that the heart has its own form of intelligence that we are just not yet sensitive to because of our unparalleled dependence on the brain for its narrow interpretation of our everyday experiences? Unfortunately, our clinical brains demand more physically solid evidence, but that evidence is now beginning to slowly emerge from the shadows.

Traditional medicine has been largely reluctant to take the basic physics of electroencephalograms (EEGs) and electrocardiograms (ECGs) to their obviously logical conclusion: they are measured outside of the body! This translates to the fact that the heart's and the brain's biophysical information and energy move from the interior of the body to the external world. This is also true of the sounds generated by the closing of the heart's various valves. The heart and brain waves are also a source of information and energy, making their way through the fluids of the body to the skin and to the outside world. So, the first $64 question is what happens to this measurable energy and information once it reaches the external world? Physics tells us that this energy extends out into space traveling at the speed of light, 186,000 miles per second.[1] The next $64 question is then what is its purpose out there?

Einstein famously once said, "Concerning matter we have been all wrong. What we call matter is actually energy. This vibration has been so lowered as to be perceptible to the senses. There is, in fact, no such thing as matter. It's just a condensation of energy."[2]

Jim Oschman, PhD, in biophysics and biology, in his article "The Heart as a Bi-directional Scalar Field Antenna," presents compelling evidence that the heart's energy field is connected to external fields of information and energy that are not bound by the limits of time and space. He further suggests that the heart is entangled with and interacts with these subtle energetic fields of information in which the body is embedded.[3]

Oschman also states in his article that the heart is a bi-directional scalar field antenna that can simultaneously broadcast and receive information because of its unique helical structure. He claims this propagation and reception of information occurs continuously in both directions without stopping. Our hearts then are repeatedly being bathed by the

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subtle energies of the quantum realm and lending their unique dynamic energy to this same realm.[3]

HeartMath is a very interesting group of individuals outside of Santa Cruz, California. Their goal is to incorporate this innate intelligence of the heart into people's day-to-day life experiences so people can develop innovative solutions to life's unique challenges, can increase cooperation among human beings, and live healthier and more fulfilling lives by integrating this heart energy into their lives.

HeartMath is also conducting numerous studies so that the scientific evidence I mentioned above will emerge from the fringe it has been lurking in for so many centuries. They are re-thinking some ideas from the late German biophysicist Fritz Albert Popp and making them more applicable to modern ideas and heart-centered activities. Dr. Popp demonstrated the concept of a coherent, endogenous electromagnetic field within the body.[4] In two different studies, HeartMath demonstrated Popp's coherence in ECGs of individuals whose focus was centered on the external area of their heart while contemplating positive emotions such as love, care, or appreciation. They established a correlation between the ECG's coherent patterns and other patterns generated by the brain and additional parts of the body.[5,6]

The results from those two studies further solidifies Oschman's, Popp's, and HeartMath's hypothesis that the heart is a master electronic manipulator capable of radiating coherent electromagnetic frequencies that promote the health and vitality of every system in our body as a result of positive emotional states.[7] The term "energy cardiology" was coined by Russek and Schwartz in 1996 in response to the generation of the above theory.[8]

This brings to mind a quote by functional cardiologist Mimi Guarneri in her wonderful book *The Heart Speaks*: "gratitude has no side effects." I think her intuitive grasp of cardiac health has been explained by the information above.[9]

So, what can we, as clinicians, incorporate into our patients' lives to help them reestablish coherence in their bodies? First, I always remind my patients that their bodies are smarter than them. Try not to get in their body's natural maintenance of homeostasis. The simplest way to master this seemingly impossible, for many people, task is to learn how to breath limbically. By this I mean slowly and deeply. Majid Ali, MD, has an exercise called Limbic Breathing. I have listed it here before. It's a very simple, yet powerful way to control excess stress in a person's life and allow the innate intelligence of their heart to restore coherence. If you wish a copy of this simple exercise, please e-mail me.

HeartMath also has a number of simple, quick techniques for damping down the stress response that we all experience every day. One is the quick coherence technique for adults. It consists of two parts. Step one is heart-focused breathing. Start limbic breathing (from the abdomen) but focus your attention onto your heart area. Imagine your inhalation and exhalation are originating from here. Next, purposefully initiate a positive feeling for someone or something in your life. Continue this exercise until you feel your stress level begins to dampen. This technique, like limbic breathing, is especially valuable as it is free and can be practiced anywhere![10]

I could continue on with more fascinating studies but due to time, space, and boredom constraints I want to end this article on a slightly different note. This is a direct quote by the physicist James Oschman that I referenced above:

> …new vistas in **biology** and **medicine** lie before us if we are willing to recognize our biases, blind spots, and unsolved problems. Science and medicine cannot progress when new ideas are rejected without thorough and appropriate **investigation**. Simply denying the existence of unfamiliar phenomena is a much easier path to follow and is often the method of choice of the professional skeptics.[3]

So, to truly advance medicine in a functional, integrative, restorative manner, we have to be able to most definitely think outside of the present-day, limited box. We can't just accept what any person says as gospel, though. Medical journalist Robert Whitaker exemplifies this concept in his under-read book, *Mad In America*. He shows the three mainstays of schizophrenia treatment in the 1930-1950s – electric shock, lobotomy, and high-dose insulin – were not based on the scientific method. People would just make exuberant claims about their success without any scientific backing and everyone just jumped onto their unproven treatment bandwagon.[11] The above studies, though, and many others demonstrate to us that it is possible to apply the scientific method to innovative thinking in cardiology and other areas of present-day medicine.

Intuitive spirits have almost always encountered violent opposition from greedy, mediocre minds. That is my take on Einstein's quote. Unfortunately, any new idea or discovery will, by definition, be at odds with existing knowledge. It requires perseverance, a thick skin, and above all a large energetic heart to be able to withstand the barrage of needless attacks that will come your way. It's not easy but then what hugely positive aspect of your life ever came without a large, strenuous effort! Lastly, maybe this should be the warning that we give to all of our patients in order to optimize their cardiovascular system and, truthfully, all the systems of their bodies: Have a heart.

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Curmudgeon's Corner

by Jacob Schor, ND, FABNO
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Hansel, Gretel, et al

Many myths and stories tell us of protagonists who had the foresight to leave a trail behind them that allows them to escape their fate or perhaps find their way home.

Theseus kills the Minotaur of Crete and escapes its maze thanks to a ball of yarn that Ariadne has given him.[1] Hansel and Gretel find their way home with white pebbles that reflect the moonlight. An attempt to use a breadcrumb trail instead proves less effective due to avian consumption.[2] (We should note that neither story ends quite happily ever after: Theseus abandons Ariadne after discovering she's already married, and Hansel and Gretel find their way home but are again abandoned in the forest by the woodcutter and his wife the very next day.)

In our modern world and in our pursuit of evidence-based medicine, we also try to leave a trail behind us, not so much to find our way back but to understand how we got to where we are. We do this via citations; we reference the study or source of our assumptions and so leave a link to the ideas that have led us to believe what we do and the conclusions we have reached.

Practicing medicine is itself an odyssey and an exploration; often someone's life depends on the decisions we make. We must traverse a maze of knowledge that is made more complicated by constantly evolving science. In a way, truth shifts with time. If we were still part of a Greek myth, it would be like sailing an Aegean archipelago of free-floating islands, which drift about shifting positions over time. Citations anchor ideas in time and place while at the same time acknowledging the possibility that these beliefs may change.

Two things have pushed me to ponder all this. First, lab work a patient brought in has left me perplexed how to interpret it, and second, there are several books sitting on my nightstand that I've been wanting to write about.

My patient's report was from a well-known company back East that specializes in cardiac risk assessment. Their panel includes a measurement of myeloperoxidase enzyme, a value that the lab suggests is strongly correlated with risk of cardiac events. My patient's levels tripled over the past 12 months and are well above what the lab considers acceptable values.

Such an augur of ill health should ethically require me to share the information with the patient's other health caregivers. My long habit when communicating with other providers is to include citations to justify any 'facts' I report. This habit of justifying beliefs is no doubt the result of my practicing naturopathic medicine in Colorado decades before it was legal to do so. When practicing medicine without a license, one needs not just to look smart, or at least not appear to be making stuff up, but also to be somewhat persnickety about being on the EBM side of the line between quacks and legitimate practitioners.

Pubmed.gov quickly provided me with a recent study on myeloperoxidase as a CVD risk factor; Oyenuga et al's study was just published in October 2018. Abayomi Oyenuga from the University of Minnesota, along with collaborators from Chapel Hill, Johns Hopkins, and the University of Texas, measured myeloperoxidase levels in the Atherosclerosis Risk in Communities (ARIC) cohort that included 1,465 participants and examined the risk of cardiovascular disease, coronary artery disease, heart failure, peripheral artery disease and cardiovascular mortality for a period just less than ten years long. Unfortunately, they found no association between myeloperoxidase measures and any of these conditions.[3]

The patient was sitting with me watching as I read (and then read again) this information, I was at a loss of what to say. The lab report claims a five-fold increase in risk for individuals with elevated myeloperoxidase enzymes. For obvious reasons I would have liked to compare the Oyenuga study with those upon which the lab based their claim.

The lab report itself cited a 2013 paper by Tang et al to justify their claim, though the citation was incomplete. I had to search for "Tang and myeloperoxidase and 2013," a search that yielded about 80 citations. The 2013 paper by Tang that I think the lab was alluding to turned out to be W. H. Wilson Tang from the Cleveland Clinic and the paper, I think is, "Usefulness of cardiac biomarker score for risk stratification in stable patients undergoing elective cardiac evaluation across glycemic status." I found this one near the bottom of my list of PubMed search results.

Tang's study team asked if B-type natriuretic peptide, myeloperoxidase, and HS C-reactive protein either alone or in combination could be used as prognostic markers for heart disease. They followed 3,635 stable patients who had had angiography for three years. Using a score based on this combination of markers they

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were able to predict those who were at high risk for major adverse heart events (HR 7.61, p <0.001).[4]

My patient was long gone (as in, she had left the office) before I found this study. I'm still debating how to interpret her lab results. Her other risk markers were normal range. All this would have been simpler if there had been a complete citation that included the study title or one of the simple identifiers such as a PMID number or a doi. If there had been a thread to follow back to where they came up with this idea, my task would have been simpler. Now I need to follow up with the patient and see if we have values for these other possible markers. Perhaps if Ariadne had cut the strand of yarn, Theseus would have figured out that something was wrong with the relationship early on?

The second thing that has me obsessing about references today is that I've been working my way through *The Oxford Textbook of Nature and Public Health: the role of nature in improving the health of a population*.[5] Edited by Matilda van den Bosch and William Bird, this is probably the most significant scholarly treatise written yet about nature and medicine. Its target audience is MPH students or perhaps more advanced sorts: it probably should be required reading for every naturopathic doctor in practice. It is heavily referenced, long sentenced, filled with long strings of multisyllabic word, a true textbook printed in an impressively small font. In other words, it's not easy reading.

Yet, much of the information is brilliant and the words (recall that phenomenon where you hit one tuning fork and another nearby fork of the same frequency begins to vibrate, a phenomenon called resonance.) resonate in my naturopathic soul. Here is the opening paragraph from the forward:

> For virtually all our development, humans have been totally dependent on nature. With increasing industrialization and urbanization, human beings have become partly disconnected from natural environments, both physically and mentally. The disconnection is now being viewed as a threat to health and this book explains how this disconnection displays through several pathways and eventually defined health outcomes. Equally, contact with natural environments may serve as a remedy for many contemporary health issues.

It's not just slow reading. Like many textbooks it is a collaborative effort of multiple contributors, and each chapter has been written by a different committee. The resultant text can feel choppy, an ad hoc choir made up of multiple voices attempting to sing the same song. But that's often the nature of textbooks.

This would be a perfect textbook for a naturopathic school class learning how to employ nature to promote health. I would suggest it as required reading except that few students will have the time or attention span to get through it. They will complain about the price (The softcover version is $75 on Amazon). For doctors in practice, reading it would be an even bigger stretch. Who will make the time?

It's the sort of book you think you should read and wish you had read but likely never will.

So, is there an easier way? I picked up a copy of *Your Brain on Nature* by Eva Selhub, MD, and Alan Logan, ND.[6] The book's website refers to Dr Logan as a biophilosopher, which I'll assume is a cool new euphemism for naturopath. The book nicely reviews the scientific studies that have demonstrated the beneficial effects that exposure to nature has on many aspects of health, in particular mental health. It's a comprehensive review and more important a fast and easy read. I would be writing a glowing review here, telling all of you to go out and buy this book and read it this weekend, except for one thing. There are no citations, no bibliography, no way to find the way back to any study the authors summarize, and pretty much the entire book reviews the scientific literature. It's that Theseus problem again… you need that ball of yarn before entering this maze.

Let me open the book randomly:

> In a 2011 study of over 4,500 adults followed for several years, total screen time was associated with a higher risk of death. And the risk increase was not small: it was 52 percent higher versus those with the least screen time. Surprisingly, exercise or lack thereof wasn't the mediating factor. Among those who logged the highest amount of screen time, being physically active reduced their risk of dying from any cause by a mere 4 percent (to 48 percent higher risk of dying!) compared with those who exercised and had the least screen time.

This sounds like incredible information. This is the sort of stuff you might want to quote to a patient. The book is packed with interesting data summaries all put into context by an excellent narrative. Yet never is there enough clarifying information on any study being described to allow the reader to actually locate it. It feels as if the book was originally written with endnotes ending each paragraph but that some editor along the way did a copy and paste selecting the "text only" tab, deleting all the little footnote superscripts.

The Oxford textbook on the one hand is almost too thick with citations as there is a lot of theory and debate about mechanisms of action and heady subjects I had little interest in. The Logan - Selhub entry lacks references altogether. It's like in the Goldilocks story. "This chair is too big and this chair is too small….. This book is too referenced, and this book not referenced at all."

I contacted Dr. Logan about this and he responded with an interesting explanation: he tells me that I was correct; it was the publisher, Wiley & Co, who did not want to include the references. Doing so, they insisted, would increase the weight of the book and so increase the cost to consumers. Unhappy with this Dr. Logan went ahead and posted all of the citations online: http://www.yourbrainonnature.com/references-from-the-book.html.

That's far better than no citations, and perhaps it is the solution for Goldilocks; you can read the text without the clutter of footnotes, but you can still find the source of the information when and if you have the need.

It's a compromise, of course, but it's better than nothing. It's essential for NDs to be publishing books. This is a good book. The world should recognize NDs as experts on natural health. At the same time, we do not want to be unprofessional about it; our books need to be referenced. The old method of using unidentifiable anecdotal stories about individual patients to prove the efficacy of a treatment, is just that, old, out of date, and should be unacceptable in modern naturopathic medicine.

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Women's Health Update

by Tori Hudson, ND
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Conjugated Linolenic Acid from Pomegranate May Improve Healing After Facial Laser Resurfacing

It is not uncommon for women (and some men likely as well) to seek dermatology procedures to stave off the effects of aging and/or skin damage from sun or conditions such as severe acne. One such procedure is ablative fractional skin resurfacing. Some of the problems that occur after the procedure include erythema, edema, and crusting, which can last from 5 to 14 days. The market place offers attempts at remedying these post-procedure issues. One such item is conjugated linolenic acid (CLA). Pomegranate seed oil is a rich source of conjugated linolenic acid (CLA) and has been shown to promote keratinocyte proliferation and epidermal regeneration. A topical proprietary product, PomegaMD, was used in a prospective, randomized, controlled, evaluator-blind clinical trial to assess the safety and efficacy of Pomega topical CLA treatment to promote healing and improve skin quality following ablative laser resurfacing of the face.

The study included 34 healthy subjects aged 18 to 74 years who had undergone any ablative or non-ablative energy treatment in the last three months or had a history of hypertrophic or keloidal scarring. All participants underwent a standard fractionated carbon dioxide laser resurfacing treatment to the face. The resurfaced areas were treated with either the test regimen (n=24) or 1% dimethicone ointment the standard-of-care control (n=10) for 28 days. During the first 14 days after the procedure, a thick occlusive ointment was applied to the face. During the next 14 days, a concentrated repair serum and healing cream of PomegaMD were applied. In the control group, dimethicone ointment was applied throughout the 28-day trial.

In the abstract, it is stated that the Pomega group had "significantly reduced edema on post-procedure day 3 and itching on days 1 and 3." However, in the results section it is stated that there was no significant difference between groups for any of the investigator ratings including edema. And, it appears the report in the results section noted that aside from significant reductions in itching on day 1 post-procedure in the Pomega group, there were no statistical differences between the treatment and control groups.

At day 14, improvements in wrinkling were greater in the Pomega group compared with the control group; however, at day 30, no between-group differences were observed.

Commentary: The authors reported that they demonstrated the safety and efficacy of this anti-oxidant topical regimen of conjugated linolenic acid derived from pomegranate oil extract, but the results are not exactly clear that was the case. Despite the confusion, I think it is a safe option for this circumstance of post-laser ablative therapy to the face.

Wu DC, Goldman MP. A topical anti-inflammatory healing regimen utilizing conjugated linolenic acid for use post-ablative laser resurfacing of the face: a randomized, controlled trial. *J Clin Aesthet Dermatol*. October 2017;10(10):12-17.

Topical Polyphenols May Improve Acne Rosacea Symptoms

Acne rosacea is a chronic inflammatory skin condition of the face that presents with persistent redness and is often also associated with telangiectasia, edema, pustules, papules, burning, and stinging. The cause of acne rosacea is not well understood but is thought to be associated with immune dysregulation, impaired function of the skin barrier, and a vascular hyper-reactivity. Acne rosacea can sometimes be triggered by sun exposure, stress, diet, cosmetics, microbes and hormonal changes. Topical metronidazole or oral antibiotic tetracycline are the most common conventional prescriptions, although it is not always a satisfactory solution. Botanical treatments should be considered, although they can be more unsatisfactory all too often. This systematic review of human clinical trials evaluated the effectiveness of polyphenol-based therapies in treating rosacea.

The research methodology included a search of PubMed, EMBASE, AGRICOLA, BIOSIS, Web of Knowledge, and Scopus databases for English-language articles published up to September 2016. Of the 814 articles that resulted from the search, six met all of the inclusion criteria for review. All these studies reported on topical rosacea treatments and included the following polyphenols: silymarin from milk thistle; licochalcone from Chinese licorice; an extract from quassia; and flavonoids from *Chrysanthellum indicum*. ➤

Women's Health Update

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Select studies stand out. The first was an eight-week, parallel group study between patients with facial erythema caused by erythematotelangiectatic rosacea and patients with non-rosacea erythema. Both groups used a combination of licochalcone A-containing products including a cleanser, cream, moisturizer, and concealer at least once daily. The non-rosacea patients had a statistically significant improvement in erythema at four and eight weeks. The rosacea group had statistically significant but modest improvement only at week eight.

Another study was on the use of licochalcone A-containing products as an adjunct to metronidazole 0.75%; 33 patients with either erythematotelangiectatic (ET) rosacea or papulopustular (PP) rosacea were treated. Patients used metronidazole and their own products for the first two weeks of the study, and then used metronidazole and licochalcone A-containing products for the last two weeks. The ET patients showed significant improvement in erythema at two and four weeks. There was a small decrease in papule count after weeks two and four but no significant decrease in pustules after two weeks, but there was at week four.

A 30-day randomized, double-blind, placebo-controlled trial of silymarin-methylsulfonylmethane (SMSM) was conducted on patients with ET or inflammatory rosacea. The SMSM group experienced a significant improvement in both the erythema score and the erythema index when compared to baseline and placebo. Patients had a significant reduction in papules and pustules for both the treatment group and the placebo group. Another trial was done using a silymarin cream twice daily for 12 weeks. Patients experienced a 58% decrease in erythema over the 12-week period, but half of the patients were also using various prescription rosacea treatments during the trial, and all the patients were using a sunscreen.

Other studies showed some improvement in erythema, telangiectasias, papules and pustules with a 4% quassia extract gel twice daily. Ferrari and Diehl conducted a 45-day, open-label, single-group trial of a 4% quassia extract gel applied twice daily.

Commentary: One of the challenges of topical agents for acne rosacea, whether pharmaceutical or botanical or nutrient bases, is that they can be drying or irritating. In this systematic review, polyphenols had some potential in treating acne rosacea, but there certainly weren't any home runs. Since acne rosacea occurs mostly in women, it is suspect that we look for more underlying mechanisms in the realm of hormonal influences and microbiota influences.

Saric S, et al. The role of polyphenols in rosacea treatment: A systematic review. *J Altern Complement Med*. December 2017;23(12):920-929.

Compounded Medications

Here are a few selections from my clinical recipe book of compounded medications for select skin conditions, that I've collected – thanks to trial and error and the skills of your reliable and smart compounding pharmacist.

Acne vulgaris

- Azelaic acid 10%, green tea 2%, niacinamide 4%, saw palmetto 5%, tea tree oil 5%, ascorbic acid 10%. Apply to involved area once daily.
- Ascorbic acid 1%, azelaic acid 10%, salicylic acid 2%. Apply once daily to face.

Acne rosacea

- Niacinamide 4%, biotin 0.1%, ALA 0.5% gel. Apply once daily to face.
- Metronidazole 1%, azeleic acid 1%. Apply once to twice daily.

Atopic dermatitis

- Vitamin B12 0.7% in Xematop. Apply twice daily.
- Beta glucan 0.5%, green tea 0.5%, milk thistle 10%, MSM 5% in Xematop. Apply twice daily.

Vulvar non-specific dermatitis

- Glutamine 10 mg/gm, tranilast 20 mg/gm, aloe 20 mg/gm. Apply ½-1 gm daily to vulva.

Antifungal nail cream

- Ketoconazole 2%, terbinafine 2%, ibuprofen 2% in DMSO benzyol alcohol solutions. Apply to affected nails twice daily.

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American Nutriceuticals Natural Supplement Company Celebrates Its 20th Anniversary

American Nutriceuticals (Vancouver, Washington) is proud to announce its 20th anniversary. Founded in 1999 by the late Bill Coury, a bone cancer survivor who researched innovative therapies and supplementations, American Nutriceuticals started as a health and integrative wellness center. For the past 10 years it has been dedicated to supporting health practitioners. Chairman Rob Coury says, "It's so rewarding to see my father's work continued by outstanding doctors and clinics."

American Nutriceuticals' success is based on providing the highest-quality, proven, physician-grade supplements and protocols with unsurpassed customer service for leading health professionals nationally.

For more information on American Nutriceuticals and their products please visit www.888vitality.com.

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Calendar

Please submit an announcement of your event 90 days in advance.
Event publication must be limited to 25 words or less. Multiple event listings require paid advertising.
Contact calendar@townsendletter.com for details.

APRIL 25-28: ACUPUNCTURE MERIDIAN ASSESSMENT (AMA) TRAINING For Doctors, Dentists & Health Professionals: Detecting Parasites, Dental & Fungal with Simon, Yu, MD, in St. Louis, Missouri. **CONTACT:** 314-432-7802; http://www.preventionandhealing.com/pah-training.php

APRIL 26-27: THE GREAT PLAINS LABORATORY, INC. presents GPL ACADEMY PRACTITIONER WORKSHOPS in San Francisco, California. Organic acids testing, toxic chemical testing, and mycotoxin testing, among others. CONTACT: http://www.GPLWorkshops.com

APRIL 26-28: MENOPAUSE MANAGEMENT: ADVANCING YOUR EXPERTISE – Hormone Boot Camp Research Update in Portland, Oregon. CEUs available. CONTACT: http://instituteofwomenshealth.com/

APRIL 27-28: PEDIATRIC UPDATE FOR NATUROPATHIC DOCTORS in Toronto, Ontario, Canada. On-line & in person registration. Earn up to 12 CE Credits. CONTACT: info@collaborativeeducation.ca; http://www.collaborativeeducation.ca/toronto-naturopathic-conference/

APRIL 27-29: SUNIL ANAND ON HOMEOPATHIC CASETAKING FOR ADULTS AND PRE-VERBAL CHILDREN in Vancouver, BC. CONTACT: West Coast Homeopathic Society www.wchs.info

APRIL 27-30: WALSH RESEARCH INSTITUTE presents MASTERING BRAIN CHEMISTRY PHYSICIAN EDUCATION WORKSHOP in Evanston, Illinois. CONTACT: https://www.walshinstitute.org/

MAY 2-4: AMERICAN ACADEMY OF OZONOTHERAPY 8th ANNUAL MEETING in Denver, Colorado. Pre-conference on May 1. CONTACT: https://aaot.us/page/2019MeetingSchedule

MAY 3-4: 1st ANNUAL EPIC FUNCTIONAL MEDICINE CONFERENCE in Houston, Texas. Precision and personalized cardiovascular medicine with Mark Houston, MD. CONTACT: https://epicfmconference.com/

MAY 3-5: INTERNATIONAL SOCIETY FOR ENVIRONMENTALLY ACQUIRED ILLNESS CONFERENCE – Healing Complex Patients in a Toxic World near Phoenix, Arizona. CONTACT: https://iseai.org/2019-conference/

MAY 3-5: KLINGHARDT BRAIN MASTERS – Science and Solutions in Morristown, New Jersey. Neuro Lyme, Autism, MS, ALS, Parkinson's, Retrovirus with Dr. Judy Mikovits, Boyd Haley, PhD, Dietrich Klinghardt, MD, PhD. CONTACT: 908-414-0769; info@klinghardtacademy.com; www.klinghardtacademy.com

MAY 11: MATRIX REFLEX TESTING BASIC COURSE, MODULE 2 with Louisa Williams, ND, in Austin, Texas. CONTACT: http://www.cecruncher.com/search_res.cfm

MAY 14: RESTORATIVE MEDICINE HERBAL CERTIFICATION PROGRAM for clinicians begins. 60 CME. Multiple dates, 12 months. Online and in-person learning. CONTACT: Jen@Restorativemedicine.com; https://restorativemedicine.org/herbal/

MAY 14-16: MIAMI HERB SEMINAR in Coral Gables, Florida. Herbal medicine for cardiology, neurology, immunology, and autoimmune conditions, and gastroenterology. 17 CMEs. CONTACT: https://restorativemedicine.org/herbal/events/miami-seminar/

MAY 16-19: NATIONAL ASSOCIATION OF NUTRITION PROFESSIONALS (NANP) 13th ANNUAL CONFERENCE AND EXPO – Ancestral Path to Modern Healing in Tucson, Arizona. CONTACT: https://www.nanpconference.com/

MAY 17-19: A4M ANNUAL SPRING CONGRESS in Orlando, Florida. CONTACT: https://www.a4m.com/

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Disclosure: The *Townsend Letter for Doctors & Patients* publishes information about alternative medicine written by researchers, health practitioners, and patients. As a forum for the entire alternative medicine community, we present information discussing a wide variety of alternative and integrative medicine practices. In addition to publishing original research and literature abstracts and reviews, we encourage case studies and anecdotal reports. Detailed anecdotal reports are not viewed as proof but as possibilities that need further investigation. All authors are required to submit their reports to other professionals for review and include proof of peer-review with article submission.

The editors of the *Townsend Letter* recommend that all patients (and physicians) review further reports provided in the article's references and investigate the practitioner's techniques before undertaking an alternative diagnosis, examination, or treatment. Please discuss such treatments and examinations with a reputable health practitioner in your community. If you do use an alternative treatment discussed in the *Townsend Letter*, we would appreciate your report of the outcome, any side effects, and costs.

Calendar

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MAY 17-19: ADVANCED APPLICATIONS IN MEDICAL PRACTICE (AAMP) SPRING EVENT in Scottsdale, Arizona. CONTACT: 954 540 1896; https://aampconferences.com/

MAY 25-26: KOREN SPECIFIC TECHNIQUE (KST) in Stockholm, Sweden. Locate and release physical and emotional stresses. Also, **JUNE 14-16** in Denver, Colorado; **SEPTEMBER 13-15** in Detroit, Michigan. CONTACT: www.korenspecifictechnique.com; phone 267-498-0071.

MAY 31-JUNE 2: 48th ANNUAL INTERNATIONAL ORTHOMOLECULAR MEDICINE TODAY CONFERENCE in Vancouver, Canada. Sessions on orthomolecular oncology, immunology, and general medicine. CONTACT: https://isom.ca/event/omt2019/

MAY 31 – JUNE 3: MEDICINES FROM THE EARTH HERB SYMPOSIUM in Black Mountain, North Carolina. CEs available. CONTACT: 541-482-3016 or www.botanicalmedicine.org.

JUNE 7-9: LDN 2019 CONFERENCE in Portland, Oregon. CONTACT: https://www.ldnresearchtrust.org/conference-2019

JUNE 7-9: COLLEGE OF NATUROPATHIC DOCTORS OF SASKATCHEWAN HEALING SKIES CONFERENCE in Saskatoon, Saskatchewan, Canada. CONTACT: http://sanp.ca/healing-skies-conference.html

JUNE 14-16: 4th HRI INTERNATIONAL HOMEOPATHY RESEARCH CONFERENCE in London, United Kingdom. CONTACT: https://www.hrilondon2019.org/

JUNE 21-22: THE GREAT PLAINS LABORATORY, INC. presents GPL ACADEMY PRACTITIONER WORKSHOPS in Minneapolis, Minnesota. Organic acids testing, toxic chemical testing, and mycotoxin testing, among others. CONTACT: http://www.GPLWorkshops.com

JUNE 22-29: ALLEN COLLEGE OF HOMOEOPATHY SUMMER SCHOOL in Chelmsford, Essex, United Kingdom and online. CONTACT: https://homoeopathy-course.com/images/pdf/reasons-to-join-summerschool.pdf

JUNE 28-30: THEORETICAL AND PRACTICAL COURSE IN NEURAL THERAPY in New York, New York with David Vinves Catalonia, MD (Spain). Organized by Dr. Gurevich. CONTACT: www.HolisticMD.org; 516-674-9489.

JUNE 28-30: 14th ANNUAL JOINT HOMEOPATHIC CONFERENCE – Homeopathy and Brain Health in Baltimore, Maryland. CONTACT: https://www.homeopathycenter.org/2019-joint-american-homeopathic-conference

JULY 12-13: THE GREAT PLAINS LABORATORY, INC. presents GPL ACADEMY PRACTITIONER WORKSHOPS in Boston, Massachusetts. Organic acids testing, toxic chemical testing, and mycotoxin testing, among others. CONTACT: http://www.GPLWorkshops.com

AUGUST 15-17: AMERICAN ASSOCIATION OF NATUROPATHIC PHYSICIANS 2019 ANNUAL CONVENTION in Portland, Oregon. CONTACT: https://www.naturopathic.org/

AUGUST 15-18: 10th ANNUAL INTEGRATIVE MEDICINE FOR MENTAL HEALTH (IMMH) CONFERENCE in San Diego, California. CMEs available. CONTACT: https://www.immh2019.com/

AUGUST 22-25: ACUPUNCTURE MERIDIAN ASSESSMENT (AMA) TRAINING For Doctors, Dentists & Health Professionals: Detecting Parasites, Dental & Fungal with Simon, Yu, MD, in St. Louis, Missouri. **CONTACT:** 314-432-7802; http://www.preventionandhealing.com/pah-training.php

SEPTEMBER 4-7: 20th ANNUAL FALL CONFERENCE ON INTEGRATIVE MEDICINE IN WOMEN'S HEALTH in Napa, California. CONTACT: http://www.symposiamedicus.org/

SEPTEMBER 12-15: 17th ANNUAL RESTORATIVE MEDICINE CONFERENCE in San Diego, California with Tieraona Low Dog, MD. CONTACT: https://restorativemedicine.org/conferences/2019-annual-conference/

SEPTEMBER 20-22: NEURAL THERAPY HANDS ON in New York, New York with David Vinves Catalonia, MD (Spain). Fascia, ANS, palpation, autonomic ganglia. Organizer Dr. Gurevich. CONTACT: www.HolisticMD.org; 516-674-9489.

SEPTEMBER 20-29: KLINGHARDT IMMERSION WEEK – Injection Techniques, Neural Therapy, and Autonomic Response Testing Workshops in Kenmore, Washington. CONTACT: 908-414-0769; info@klinghardtacademy.com; www.klinghardtacademy.com

OCTOBER 10-13: AMERICAN ACADEMY OF ENVIRONMENTAL MEDICINE FALL CONFERENCE – Fatigue: A Complex Diagnosis and Treatment Dilemma in Louisville, Kentucky. CMEs available. CONTACT: http://www.aaemconference.com/fall/

OCTOBER 12-14: FIELD CONTROL THERAPY® (FCT) INTENSIVE TRAINING with Savely Yurkovsky, MD, in White Plains, New York. CONTACT: 914-861-9161; http://www.yurkovsky.com

OCTOBER 23-27: INTERNATIONAL COLLEGE OF INTEGRATIVE MEDICINE (ICIM) – Healthy Parents, Healthy Children in Toronto, Ontario. CONTACT: https://icimed.com/

OCTOBER 25-26: ANNUAL MICROCURRENT CONFERENCE in Scottsdale, Arizona. CONTACT: http://microcurrentconference.org/ ◆

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499 mg/dl and an LDL-cholesterol level of 41-100 mg/dl. The patients were randomly assigned to receive, in double-blind fashion, an ethyl ester of EPA (icosapent ethyl) at a dose of 2 g twice a day with food or placebo (mineral oil) for a median duration of 4.9 years. The primary endpoint was a composite of cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, coronary revascularization, or unstable angina. The proportion of patients who had a primary endpoint event was significantly lower by 25% in the icosapent ethyl group than in the placebo group ($p < 0.001$).

Making Sense of the New Studies

The authors of the VITAL and ASCEND trials concluded that omega-3 fatty acids did not decrease the incidence of serious cardiovascular events. In contrast, the authors of the REDUCE-IT trial concluded that a relatively large dose of a highly purified EPA ethyl ester substantially decreased serious cardiovascular events in a specific type of patient (i.e., individuals with cardiovascular disease or with diabetes and other cardiovascular disease risk factors who had hypertriglyceridemia despite receiving statin therapy). However, each of these conclusions should be interpreted with caution. In both the VITAL and ASCEND trials, omega-3 fatty acids decreased the incidence of various endpoints by 3-8% compared with placebo. While these decreases were not statistically significant, the results were consistent with previous studies that demonstrated a modest benefit. In addition, in both of these studies, the "placebo" was olive oil, which has been shown to help prevent cardiovascular disease. The dosage of olive oil was only 1 g per day, so the effect was likely very small. Nevertheless, the use of an active placebo may have made omega-3 fatty acids appear slightly less effective than they actually were.

The mineral oil "placebo" in the REDUCE-IT trial, on the other hand, may have had adverse effects, and thereby made the active treatment appear to be more effective than it really was. Treatment with mineral oil was associated with an increase in the median concentration of LDL cholesterol ($p < 0.001$ compared with the change in the icosapent ethyl group), an increase in the median C-reactive protein concentration ($p < 0.001$ compared with baseline and compared with the change in the icosapent ethyl group), and an increase in the incidence of anemia ($p = 0.03$ compared with icosapent ethyl). Based on what is currently known about the biochemical actions of mineral oil and EPA (for example, mineral oil inhibits the absorption of fat-soluble vitamins), each of these findings was more likely due to an adverse effect of mineral oil than to a beneficial effect of icosapent ethyl.

As an aside, the $300 million REDUCE-IT trial was funded by Amarin Pharma, which hopes to make billions of dollars by persuading doctors to prescribe its $10-a-day drug, Vascepa (icosapent ethyl). Cardiologists were initially excited about what appeared to be impressive results in the REDUCE-IT trial, but when they discovered that the placebo was potentially harmful their enthusiasm for prescribing Vascepa waned considerably.

Conclusion

There have been many randomized controlled trials on the use of EPA or EPA+DHA in patients who had or were at risk of developing cardiovascular disease. While the results have been conflicting, they are consistent with a modest benefit from taking fish oil or the omega-3 fatty acids present in fish oil. Cardiovascular disease is a complex, multifactorial disease, of which nutrition is only one of many components. Furthermore, omega-3 fatty acids are only one of many dietary factors and nutrients that play a role in the prevention and treatment of heart disease. Eating fish or taking omega-3 capsules is not the "magic bullet" answer to heart disease. But we should not ignore the evidence that omega-3 fatty acids can provide a modest benefit. These fatty acids should be viewed as just one component of a comprehensive program that includes diet, exercise, micronutrient supplementation, stress reduction, and avoidance of toxic exposures.

Alan R. Gaby, MD

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What's Going on with Fish Oil and Heart Disease?

The omega-3 fatty acids present in fish oil (eicosapentaenoic acid [EPA] and docosahexaenoic acid [DHA]) have many effects that might be useful for preventing and treating cardiovascular disease. One or both of these fatty acids can lower triglyceride levels, inhibit platelet aggregation, decrease blood pressure and blood viscosity, exert an anti-inflammatory and an antiarrhythmic effect, and improve endothelial function.[1]

Most of the early randomized controlled trials on fish oil and heart disease produced positive results, which led to the consensus opinion that eating fatty fish or supplementing with fish oil is worthwhile for both primary and secondary prevention of cardiovascular disease. However, more recent clinical trials have been mostly negative, leading many investigators to question the value of fish oil. It could be argued that these negative results were due in part to the more widespread use of statin drugs since the mid-1990s. A subgroup analysis of a secondary prevention trial suggested that omega-3 fatty acids are less effective in people using statin drugs than in those not using these medications.[2] That suggestion is biologically plausible, since statins and omega-3 fatty acids work in part by a similar mechanism (an anti-inflammatory effect). In addition, because fish oil inhibits platelet aggregation, it is possible that more widespread use of antiplatelet drugs in recent years has blunted the beneficial effect of fish oil.

Three large-scale clinical trials recently published in the *New England Journal of Medicine* have provided additional data regarding the effectiveness of omega-3 fatty acids. Unfortunately, even though each of these trials enrolled many thousands of participants, none of them were able to provide definitive evidence.

The VITAL Trial

In the Vitamin D and Omega-3 Trial (VITAL) 25,871 men and women (mean age, 67 years) in the United States who did not have cardiovascular disease at baseline were randomly assigned to receive, in double-blind fashion, 2,000 IU per day of vitamin D, 1 g per day of fish oil (Omacor; providing daily 460 mg of EPA and 380 mg of DHA), both treatments, or placebo (olive oil) for a median duration of 5.3 years. This article reported the results of the omega-3 fatty acid arm of the study.[3] The primary endpoint was major cardiovascular events (a composite of myocardial infarction, stroke, or death from cardiovascular causes). The incidence of the primary endpoint was nonsignificantly lower by 8% in the omega-3 group than in the placebo group ($p = 0.24$).

The ASCEND Trial

In the ASCEND trial (A Study of Cardiovascular Events in Diabetes), 15,480 patients over age 40 (mean age, 63 years) with type 1 or type 2 diabetes who had no evidence of atherosclerotic cardiovascular were randomly assigned to receive omega-3 fatty acids (460 mg per day of EPA and 380 mg per day of DHA) or placebo (1 g per day of olive oil). During a mean follow-up period of 7.4 years, compared with placebo, omega-3 fatty acids nonsignificantly decreased the incidence of a serious vascular event (nonfatal myocardial infarction or stroke, transient ischemic attack, or vascular death excluding intracranial hemorrhage) by 3%, and nonsignificantly decreased all-cause mortality by 5%.[4]

The REDUCE-IT Trial

The Reduction of Cardiovascular Events with Icosapent Ethyl-Intervention Trial (REDUCE-IT) enrolled 8,179 patients (median age, 64 years) with cardiovascular disease or with diabetes and other cardiovascular disease risk factors, who had been receiving statin therapy and who had a fasting triglyceride level of 135-

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