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Jill Carnahan, MD

Mold as an Underlying Contributor to Chronic Illness

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If one ever has a chance to meet Stephen Levine, PhD, on the conference circuit or elsewhere, it won't take more than a few moments to have a glimpse of the passion and intellect that has contributed to his name becoming synonymous with the supplement industry and the company he started, Allergy Research Group®, and the development of innovative nutritional supplements. Stephen Levine's very aura and essence carry a sense of wonder and an intellect of one whose brain and spirit ponder concepts and ideas that few but the best scientists and biochemists will easily grasp. At the same time, the innate desire to heal those who suffer and to find the next elusive turnkey for issues ranging from cognitive health to cancer to osteoporosis abound as well.

From the early days at Allergy Research and his struggles with environmental sensitivity, the power of antioxidant therapies has had a profound impact on his own restoration of health, reflected in the vast array of antioxidants and antioxidant combinations available from Allergy Research Group®. Coenzyme Q10, tocotrienols, acetyl-glutathione, buffered vitamin C, melatonin, as well as many unique botanicals with high antioxidant potential including French maritime pine bark extract, lutein, grape seed extract and *Ecklonia cava* are at the core of the supplement line. But innovation extends beyond this. Under his leadership, Allergy Research Group® was the first to introduce supplements to the US that continue to be industry leaders, such as nattokinase and artemisinin. And, as Allergy Research will soon celebrate their 40th year, be ready for much more to come.

If you have a chance to reach out, congratulate Dr. Levine for his 40 years leading innovation at Allergy Research Group®. And, tell him your story of healing, especially if he was of influence. You won't regret it! ◆

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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.

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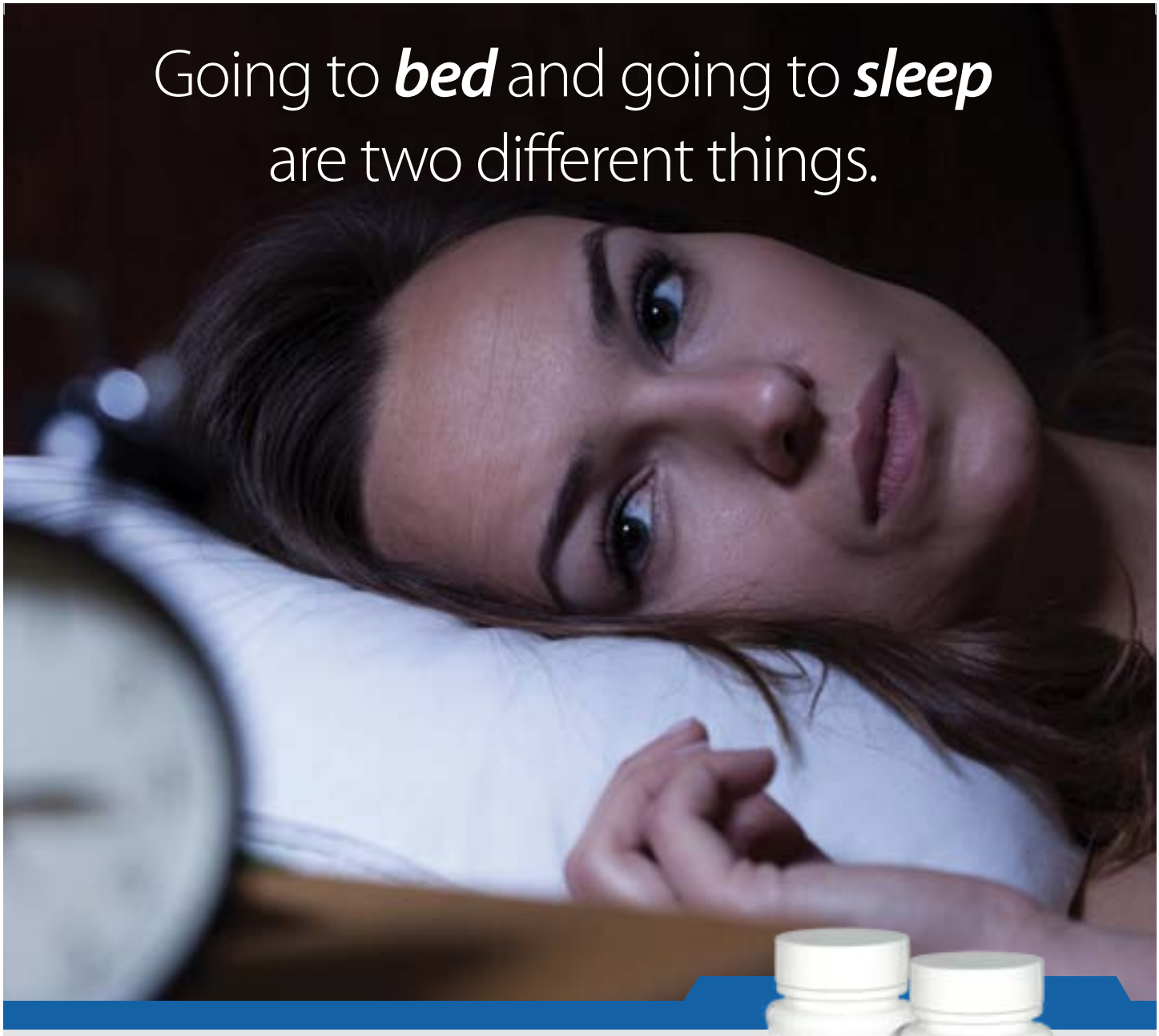

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2nd Annual International Conference on Chronic Pathologies

When: September 7–9, 2018
Where: Antwerp Belgium
Website: www.chronic-pathologies.com/en
Languages: Simultaneous translation in English, German, and French

To properly treat patients, we need a detailed understanding of the pathology of chronic disease. Whether a patient presents with Alzheimer's or autism is less important than unraveling the path that led to the development of the disease. Not every patient with Alzheimer's arrived at their diagnosis from similar causes. The 2nd Annual International Conference on Chronic Pathologies addresses the complexity and individuality of our patients in arriving at a treatment plan. The goal of the conference is an international perspective that goes beyond treatment based on a diagnosis.

Although complex disease exists across the life spectrum, as we delve into the causes of these issues, there are more similarities than differences. Inflammation appears to be universal in disease, but what does this really mean? We know that acute inflammation is beneficial. It is our immune system reacting correctly to an infection or injury. But what happens when the inflammation becomes chronic? Is it still beneficial? What we are learning is that chronic inflammation underlies many long-term illnesses.

CIRS is a term frequently used today with chronically ill patients. Chronic inflammatory response syndrome or CIRS is commonly seen as something to address in mold patients. The term describes an out-of-control inflammatory response from dysregulated immune responses. Patients present with fatigue, pain, cognitive, and digestive issues. This describes many patients presenting to an integrative practitioner, and they might all have the diagnosis of CIRS. Yet, what triggered this aberrant immune cascade will require an understanding of pathological changes from many potential triggers.

Abnormal immune responses seen in CIRS and other chronic conditions can arise from many components of the immune system. Our immune system is very complex with an elaborate set of checks and balances. One of these regulatory systems is through the T helper cells and T regulatory cells. In theory, T helper 1 cells will help fight viruses and T helper 2 cells will help fight bacteria. Unfortunately, now we have infections, such as Lyme disease, trick our immune system to increase a Th2 response that decreases the ability of the immune system to fight this infection. When T helper cells are not regulated, our immune messengers, the cytokines are out of balance. This leads to a dysregulation of other parts of the immune system such as B- cells with antibody production leading to autoimmune disease.

Integrative conferences are often based on a disease state, for example a conference on mold or dementia. By shifting the focus onto causes of disease, the 2nd Annual Conference on Chronic Pathologies will teach practitioners to approach their patients in a different manner. Instead of thinking here is a patient with mold issues, they can approach the patient thinking causes such as inflammation, immune dysregulation, gut hyperpermeability, and endocrine disruption. How are we going to treat this patient based on the causes of their symptoms? These are the skills that integrative practitioners will learn at the 2nd Annual International Conference on Chronic Pathologies to treat the myriad of complex patients that arrive at their office.

Debby Hamilton, MD, MPH

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We invite you to attend our second annual International Conference on Chronic Pathologies, September 7-9, 2018 in Antwerp, Belgium. Join practitioners from around the world as our diverse faculty presents the latest science and evidence-based functional medicine.

This year's program focuses on the key health issues leading to and shared by a host of chronic pathologies, including:

Key Health Issues	Associated Chronic Pathologies
Chronic inflammation – cytokine elevation & suppression	CIRS & Mycotoxins/Biotoxins, SIBO
Immune Imbalance Suppression (including Th1, Th2, Th17)	Electromagnetic sensitivity, Cancer, Lyme, Autism & other neurological diseases
Gut hyperpermeability	Intestinal disorders & immune suppression
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LPS-induced inflammation	Gut-Brain disruption
Neuro-inflammation	ADHD, Neurodegeneration
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From the Publisher

A Case of Bilharzia

Tropical medicine is not a routine part of the medical workup in the Pacific Northwest but one's antennae stand up when an ill patient reports recent travel overseas. An individual had recently traveled to the Philippines and Indonesia that included frequent swims in island lakes. Lurking in the warm lake water were the larvae and eggs of a parasite that also enjoy the lake's warmth. Without being aware that anything was amiss, he had occasionally swallowed some egg-containing lake water as well as larvae of *Schistosoma mansoni*. While he avoided a central nervous system infection that may occur, he became sick and turned yellow from jaundice. Lab testing revealed abnormal liver function tests with elevated bilirubin. Antibody testing for *S. mansoni* was also abnormal. He was effectively treated after a round of anti-schistosomal medication with normalization of the liver function and Schistosoma antibody tests.

Follow-up several years later was not so benign. He complained of right-sided abdominal pain and a workup revealed, once again, abnormal liver function tests. Abdominal CT scan revealed a tumor mass diagnosed as a malignancy of

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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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From the Publisher

➤ *continued from page 8*

the biliary tree. Was this the result of schisotosomiasis, or was the parasitic disorder just coincidental? Bilharzia affects nearly 200 million people in the world, killing thousands, and impairing those who are ineffectively treated. The disease is widespread in Africa, South America, and Asia. Because treatment is not always available and may be ineffective, tropical disease specialists have sought a vaccine. Despite years of research, it has only been recently that a vaccine is in the offing. Unfortunately, proving efficacy of a new vaccine in the field with a population routinely exposed to Bilharzia is quite expensive. Researchers in Holland are experimenting with volunteers who will be exposed to male Schistosoma larvae to determine if a new vaccine is effective.[1] Ethicists are concerned that despite assurances that *only* male larvae are being employed the volunteer may still develop a major infection; the objective is to create a "light" rash that should be countered by the immune system's response to the vaccination. Still, researchers at Leiden University think the risk is very small and the potential benefit is huge. Others are not so sanguine abut the process. The worms can easily survive 5-10 years if the vaccine is ineffective and may not be effectively treated by the anti-Schistosomal drug, Praziquantel. Perhaps the volunteer's pay of $1200, for taking part, is worth the risk?

Controlling Malaria by Drugging their Human Blood Feed?

Mosquito nets and pesticides have been a mainstay in limiting the Anopheles mosquito, the carrier of malaria. However, annual malaria deaths are stabilizing suggesting that these tools are becoming less effective. Researchers in Kenya have noticed an increase in mosquito death after biting an individual who is being treated with the anti-parasitic medication, ivermectin.[2] Studies done in the past twenty years demonstrated an anti-mosquito effect of ivermectin. The drug has been used primarily for parasitic disorders including river blindness and elephantiasis. However, ivermectin is also being used off-label as a treatment for many non-tropical parasite infestations.

As reported in *Lancet Infectious Diseases* in March, a three-day regimen of high-dose ivermectin was very effective in killing Anopheles mosquitoes; 600 mg of ivermectin had a high death rate, while 300 mg was ineffective. Ivermectin has been typically prescribed as a 200 mg dose once yearly as a treatment for parasitic infection. Hence, the use of ivermectin in a higher dose would serve both to treat parasites and potentially reduce the Anopheles mosquito population. However, like all therapies, mosquitoes may become resistant to the drug. In the Kenyan study, patients were already under treatment for elephantiasis or other parasitic disorder with ivermectin. Since these individuals were already ill, it is not clear if high-dose ivermectin caused adverse effects. Administering ivermectin to non-symptomatic individuals will possibly cause harsh side effects. Ultimately, a malaria vaccine would be the best prophylaxis, but no effective vaccine has yet been developed.

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From the Publisher

➤ *continued from page 10*

Simplifying the Diagnosis and Treatment of Lyme Disease by Aparna Taylor, ND

Each July issue of the *Townsend Letter* focuses on Lyme disease. Invariably the theme creates an intensive and interesting forum about Lyme among our writers, and we think you'll find the reads in this issue provocative and useful. Dr. Aparna Taylor, MSc, ND, an Alberta, Canada, practitioner has developed a local and international consultancy focusing on Lyme diagnosis and treatment. Dr. Taylor's primary message is to simplify the lab testing and reconsider whether long-term antibiotic therapy is truly necessary. As Taylor notes testing and treatment are rarely covered by insurance so it is important to consider whether the financial burden of the program will likely result in an improved status. Equally important is the consideration that a complex program may create further immunosuppression, unexpected reactions, and be very stressful to comply with.

In a few words, Aparna advises that we should always ensure that the patient is being effectively treated for unrelated hormone imbalances as well as toxic chemical and metal burdens, and abiding by a wholesome non-junk-food diet, before considering intensive Lyme disease protocols. She suggests that we limit the number of our interventions to the ones most likely to bring about improvement. As with any healing protocol, the patient needs good sleep and pain control; and if these are not being addressed, they should become primary treatment goals. Choosing between long-term antibiotics or non-pharmaceutical therapies should depend on lab testing and symptomatic status.

The Unique Challenges of Lyme Disease by Carrie Decker, ND

So, what would a non-pharmaceutical protocol for Lyme disease look like? Carrie Decker, ND, proposes that we need to consider not just *Borrelia burgdorferi*, the primary pathogen but also co-infections with Babesia, Bartonella, Ehrlichia, or Anaplasma. Trained as a mechanical and bio-medical engineer, Decker likes to consider a systems approach to countering a tick-borne infection. While Borrelia is considered a bacterial spirochete, it frequently exists in a cyst-like form or shares a defensive community as a biofilm. Switching from one form to another enables it to escape detection. Laboratory diagnostics need to look beyond simple antibody studies in assessing Lyme disease microorganisms.

Decker is a fan of *Artemisia annua* to be used as a botanical antimicrobial. She notes that it has gained recognition for its anti-parasitic activity in diseases like malaria. Artemisin also acts as an anti-bacterial, anti-fungal, and anti-viral agent. Cat's claw, also known as una de gato, is a mainstay in Lyme disease treatment. Decker cites evidence that cat's claw improves functioning of both T-helper and B-lymphocytes, an important step needed to support immune functioning. Lactoferrin, a glycoprotein found in milk and colostrum, not only has direct antimicrobial activity but works strongly against biofilms. She also emphasizes nutrient support needed to repair disrupted mitochondrial function – lipid replacement therapy with glycerolphospholipids is key to supporting cellular "fatigue."

Casting a Broad Net to Maximize Recovery by Scott Forsgren

Scott Forsgren developed symptoms of Lyme disease more than 20 years ago. He had experienced a tick bite while hiking and within a year was plagued with a myriad of symptoms including burning pains,

continued on page 14 ➤

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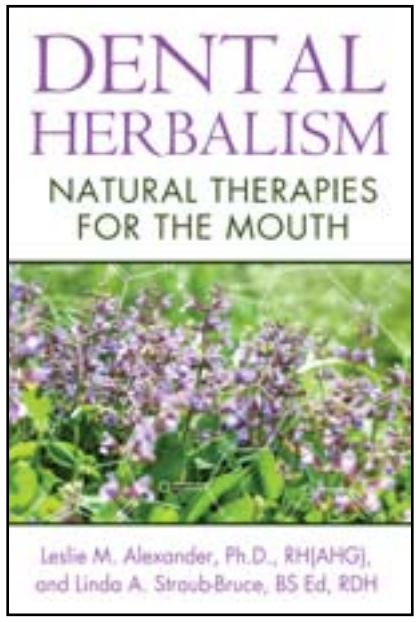
Pathways to Healing

by Elaine Zablocki

Dental Herbalism – Reliable Resource to Maintain Teeth



Recently I spoke with Linda A. Straub-Bruce, RDH, BSEd, PHDHP and Leslie M Alexander, PhD, RH (AHG), about the ways herbs can help maintain a healthy mouth. They are the authors of *Dental Herbalism: Natural Therapies for the Mouth*. This useful book includes chapters on the mouth, common dental problems, a review of helpful herbs for the mouth, and tips on ways to prepare them.

For me personally, these were probably the most informative interviews I've ever done. I realized in the past I've thought about my mouth mostly in mechanical terms. The teeth cut and grind food into smaller pieces. They're like fence posts anchored in the jawbone. When we think about maintaining a healthy mouth, we think first about mechanically scraping debris off our teeth. The dentist drills a hole, cleans it out and fills it with a special compound, using tools and methods that are similar to the tools a carpenter uses.

After talking with Straub-Bruce, I realized that in addition our mouths are constantly influenced by subtle processes that alter the teeth and gums. What we eat and drink, how and when we eat and drink, continuously affects our mouth and teeth. It's definitely not just mechanical.

If you're a gardener, you're aware that some plants, like Brussels sprouts and cabbages, prefer a neutral environment (pH around seven) while other plants such as strawberries and blueberries prefer an acid environment (pH around 5.5). It turns out there are similar processes in the mouth.

"We do not want an acidic environment in the mouth because that is what damages tooth enamel," Straub-Bruce says. "The enamel is very strong, but at the same time it is vulnerable to acid attacks. When we eat high-acid foods and consume acidic beverages, that harms the teeth."

Many healthy foods are high in acid, such as oranges and tomatoes. In addition, we know that eating sugar isn't good for our teeth, but the sugar itself isn't the problem. Bacteria living in the mouth love to consume sugar and the by-product is acid – that's the problem.

"When you think of our oral environment, we are exposing our oral tissues and bacteria living in the mouth to a variety of foods and drinks throughout the day, all day," Straub-Bruce says. "We want to

From the Publisher

➤ ***continued from page 12***

cognitive impairment, muscle and joint pains, digestive difficulties, generalized fatigue, and postural imbalance. For eight years he sought the advice of 45 physicians without being diagnosed until an acupuncturist using electroacupuncture suggested being worked up for Lyme disease. An MD did confirm the diagnosis of Lyme disease nine years after his first bite.

Forsgren's recovery from Lyme disease made him acutely aware of how many patients suffer from the illness undiagnosed and inadequately treated. He has created a blog, BetterHealthGuy.com, interviewing practitioners and researchers who focus on treating Lyme disease and chronic illness. Forsgren's interviews are a great resource for practitioners and patients.

In this issue he spells out the steps one should undertake in the recovery process. Forsgren thinks instead of looking at immediately hitting the system with antibiotic and anti-parasitic medication, the patient should investigate and remove mold and biotoxins. And this leads to this issue's cover story…

Cover Story: Mold-Related Illness and Mycotoxins
by Jill Carnahan, ND

During the early 1980s, Orian Truss, MD, and William Crook, MD, established a new paradigm called candidiasis for the treatment of patients with chronic illness. Truss's work demonstrated that the treatment of *Candida albicans* with nystatin was an effective treatment in patients with depression and other psychiatric disorders. Billy Crook observed that candidiasis was a widespread disorder not only in mental disorders, but also in many medical conditions affecting children and adults. John Trowbridge, MD, expanded our knowledge of candidiasis in his book, *The Yeast Syndrome*. While doctors were addressing yeast disorders, mold-related illness and mycotoxins were not being evaluated.

Jill Carnahan, ND, reports that mold is not something trivial – mold or mildew are found in 50% of homes. Inhalation of mycotoxins contained in dust and other particulates is a huge concern given that most individuals spend 90% of their time indoors. Complicating the exposure to inhaled mycotoxins is the consumption of mold and mycotoxins in many foods we eat. A patient suffering with symptomatic chronic illness, from Carnahan's perspective, will not heal if the individual does not remediate the moldy house or move from it. As harsh as it may seem, these patients must restrict foods known to contain mycotoxins. (There goes the peanut butter.)

Carnahan suggests we need to include mold-related illness in our workup for all patients with chronic illness.

Jonathan Collin, MD

1. Murphy, H. They're hosting parasitic worms in their bodies to help treat a neglected disease. *NY Times*. March 1, 2018
2. Whitehead, N. What if a drug could make your blood deadly to mosquitoes? *NY Times*. March 29, 2018.

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maintain a healthy oral flora with the right sorts of bacteria, and we want to make sure that we are keeping the pH in our mouth as close to neutral as possible."

Teaming Together to Create a Unique Resource

Straub-Bruce has been a clinical dental hygienist in private practice for 29 years, and she's the President-Elect of the Pennsylvania Dental Hygienists' Association. She also is a clinical faculty preceptor for fourth-year dental students at the Lake Erie College of Osteopathic Medicine Dental School.

Alexander is a professional herbalist, serving her third term on the national council of the American Herbalists Guild. They met when a friend of Straub-Bruce went to Alexander for a consultation and found that herbal information helped solve a challenging health problem. Straub-Bruce had previously discovered that herbs were helpful in dealing with a health issue of her own. They decided to team together on *Dental Herbalism* in order to create a resource for both patients and practitioners. "We realized that herbalists didn't have a great deal of reliable information to understand oral health and its systemic effects on the rest of our body," Straub-Bruce says. "As a hygienist I had patients coming into my private practice who were using herbs and I didn't understand how it affected their oral condition and my treatments. Basically, we decided to come together and blend our expertise to cover all the basics."

I found this book so useful because it offers real-life strategies. I learned how to take the flood of information about the ways various foods affect my teeth and their supporting structures and use that information to develop new habits, so I'll still have useful teeth when I grow old.

For example, you can plan to eat a meal and then stop eating for a while, instead of grazing throughout the day. "Frequency is really important," Straub-Bruce says. "If you're eating a few M&Ms every half hour you are constantly reintroducing acid into your mouth." Saliva functions to neutralize pH, and in about 30 minutes it will restore the neutral environment in your mouth. You can also use a neutral herbal mouthwash after eating to aid in this process.

Most of us are aware that sodas are high in sugar and bad for your teeth. However Straub-Bruce points out that diet sodas also tend to be highly acidic. "It's really important for someone to research food and drink and find the pH level of the foods they're consuming," she says. "The generally accepted pH level that damages enamel is 5.5. When you examine sports and energy drinks, commercial teas and juices you find many of them are under that 5.5 level."

When I looked up some of the foods and beverages I routinely consume, I was shocked to learn that many bottled waters are below 5.5. In fact, the bottled waters routinely sold in airports often have a pH level of four! (While the drinking water that flows from the tap in my kitchen is a perfect neutral seven.)

Herbal Solutions to Common Mouth Problems

Alexander has an unusual background for an herbalist. She started out as an academic, with training in environment science and biological sciences. Her PhD research focused on algae, a seaweed; and she has years of experience as an environmental epidemiologist.

Why did she decide to become a professional herbalist? "I find herbalism fascinating," she says. "I'm continually in awe of plants. I see myself now as both a researcher and a facilitator, someone who is collecting information about plants, learning how they combine to support health and wellness, and sharing this information." She speaks frequently at various public events. In addition, she is available as a face-to-face or distance consultant for people who want to use herbs to improve their health.

Alexander is particularly impressed by the special benefits we experience when using herbs. "Plants are immensely safer than pharmaceuticals when used appropriately" she says. "They offer us a phytochemical cocktail of compounds. In recent years we've learned that when treating cancer, we find a greater opportunity to support a shift in the body and less chance of adverse reactions when we use a combination of substances. We see something similar when we look at the benefits of various plants. For example, pharmaceuticals derived from the herb ephedra may lead to hypertension, but when we use the actual plant that's not a risk. Or think of aspirin – every package carries a warning about the risk of possible intestinal bleeding! Aspirin is extracted from willow bark, and when we use the plant itself there is no risk."

What are some herbs that can help us with common mouth problems? Alexander recommends replacing commercial mouthwashes with herbal infusions. Brew herbal tea, let it cool, and use that to flush the mouth on a regular basis. "Sage and thyme are antimicrobial," she says. "This mouthwash is affordable, you're not adding colorants and sugar, and you avoid alcohol which dries the mucous membranes." Stored in the refrigerator, herbal mouthwash will last for a couple of weeks. We can add peppermint and fennel, which are used to freshen the breath and also settle the stomach. "That's something else I admire about herbs," Alexander adds. "They are multifunctional."

For teething problems, she suggests chamomile tea. "For a young child, you can saturate a cloth with the tea and then offer a frozen cloth to hold inside a mouth, or as a chew. A breast-feeding mother can drink an herbal tea, such as chamomile, and it will pass through to her infant." Another way to deal with teething is to mix one drop of an essential oil, such as clove or peppermint with a bit of honey and apply this directly to the gums with a Q-tip.

Periodontitis ("gum disease") is a disease that causes inflammation in the mouth. Inflammation may also occur after someone is fitted with braces, or from various injuries. Turmeric tea mouthwash could be helpful in these situations, Alexander says. She also recommends trying prickly ash and spilanthes, two herbs traditionally used in oral care to reduce discomfort and inflammation. They would generally be used in the form of herbal tinctures. (See *Dental Herbalism* for information on preparing tinctures.)

Today we see a general trend in our society, with people seeking out fresh food and healthy vegetables. The publication of the book shows us that this trend has reached into the dental profession. "Nowadays a dental professional who stays up-to-date with continuing education and research will likely be aware of the latest information on ways to maintain dental health," Straub-Bruce says. "Dental professionals are becoming aware of the trend towards natural options and fewer chemical options. It's really exciting. We are starting to offer people more options, going beyond just buying standard commercial toothpaste. I think we're going to see more of this information entering the mainstream in the future."

Resources

Dental Herbalism: Natural Therapies for the Mouth by Leslie M. Alexander, Ph.D. RH(AHG) and Linda A. Straub-Bruce, RDH, BSEd, PHDHP. Website for the book: www.DentalHerbalism.com
Restoration Herbs: www.RestorationHerbs.com
For information about Alexander's personal consultations, see http://www.restorationherbs.com/consultation.html
For Alexander's public talks, see http://www.restorationherbs.com/calendar.html
More Resources for People Who Use Herbs: http://www.restorationherbs.com/links.html

Elaine Zablocki is the former editor of CHRF News Files.

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In this Issue

July 2018 | #420

Don't miss our next issue on
Cancer Prevention & Treatment
mailed the first week of August

ON THE COVER: Jill Carnahan, MD (pg. 72); Exercise Improves GI Microbiome (pg. 32); Beyond Antibiotic Therapy for Lyme Disease (pgs. 36, 46, 58, & 62); Anti-Microbial Botanicals for Infections (pg. 68); The Japanese Practice of Forest Bathing (78)

In Memoriam: Steve Austin, ND

May 14, 1947 – March 10, 2018

by Jacob Schor, ND, FABNO

Steve was born in Brooklyn, New York, on May 14, 1947, to Joseph and Mollie Austin. He lived in many places around the US, but northeast Portland was his home for almost 40 years. Dr. Austin received bachelor degrees in psychology and human biology from Antioch College (Class of 1969). He graduated from National College of Naturopathic Medicine in Portland, Oregon, in 1982. Their class attended their first two years of training at Kansas Newman College in Wichita.

Steve was a naturopathic physician, master teacher, musician, craftsman, and writer.

Dr. Austin served on the faculties of several naturopathic colleges in North America. He taught nutrition at the National College of Naturopathic Medicine and Western States Chiropractic College, both in Portland, Oregon. He also taught nutrition at Bastyr University in Seattle, Washington. He co-authored and contributed to several books as well as edited several medical nutrition review journals and acted as a consultant to the natural products industry.

He trained a generation of naturopathic physicians and chiropractors in nutritional science; many of us are still indebted to him for modeling a style of careful reading and data interpretation that informs our practices to this day. Many of us are past subscribers to his monthly journal *Clinical Nutrition Updates*. He went on to become a regular contributor to Don Brown's *Quarterly Review of Natural Medicine*. He was on the original editorial board of the *Natural Medicine Journal* (*NMJ*). I confess to opening and reading one of his early *NMJ* articles when I sit down to write a piece myself in the hope of better emulating his style

His 1994 book, co-authored with his wife Cathy Hitchcock, *Breast Cancer: What You Should Know (But May Not Be Told) About Prevention, Diagnosis and Treatment* recounts Cathy's encounter with breast cancer. While the science may be dated, the book retains its value as it details the emotional impact and response to the experience. The deep and lasting concern Steve expressed between the lines still reads, at least to me, like a love story.

Steve's voluminous knowledge of nutrition and his natural ability as a teacher led him to lecture at international nutrition conferences. For many years, Steve alternated with Alan Gaby to give the keynote lecture at the annual conference of the American Association of Naturopathic Physicians (AANP) to update our profession on new nutrition-related research. Steve received a two-hour slot and never had trouble filling it.

Steve was an accomplished jazz pianist and played with many musicians. I discovered his passion for the piano when he turned down our invitation to give the AANP Keynote Nutrition Review for the 2012 AANP conference in Bellevue, Washington. Arrangements were in place, but Steve called to tell me that he had decided to back out; he had recently bought a new piano and was honest enough to realize that he would rather be playing that piano than reading journal articles.

You could always engage Steve in conversations about jazz and listening to classical jazz music. He had an unsurpassed breadth of knowledge on jazz history and also old houses.

Steve and his wife Cathy had a life-long interest in historically correct house interiors. Their own homes were works of art, and they helped many other people develop a sensibility of interior house design by serving as historic consultants. Their work appeared in numerous home tours, books, and national magazines. They were featured on the television show *This Old House.*

Steve and Cathy had every intention of retiring to Galveston, Texas, and living in an immaculately restored 1907 townhouse when they drove to Texas in 2008. Their moving day unfortunately coincided with the day Hurricane Ike struck Galveston, flooding the city and their home. Luckily their belongings were locked in a moving van headed for Texas, yet the house was extensively damaged. Cathy and Steve survived and endured both the storm's aftermath and the 2008 stock market crash. Few of us were aware that our strict vegetarian professor of nutrition was forced to live on FEMA rations for a month.

Steve and Cathy did restore their Texas home to its original Victorian grandeur, even hand stenciling wallpaper, but when their task was completed they put the house on the market and moved back to Portland.

Nothing stimulated Steve more than good food and good conversation about medicine, music, and house restoration. He was a class act through and through.

Steve is survived by his wife Cathy Hitchcock; brother Jeff Austin; nieces Lisa Hagar and Stacey Crabtree; nephew Bryce Austin; niece Lyrah Bushnell.

Memorial donations can be made to Preservation Hall (www.preshallfoundation.org) or George Fendel Presents – jazz piano concerts at Classic Pianos (4320 SW Corbett Ave. #306, Portland, OR 97239) – with a note on the check "in memory of Steve Austin").

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Shorts

briefed by Jule Klotter
jule@townsendletter.com

EMF Immunosuppression

Electromagnetic fields (EMFs) can stimulate or inhibit the immune system, depending upon the exposure quality, duration, frequency, power density, and the state of the cell or organism. P.R. Doyon and O. Johansson present a possible explanation for EMF immune suppression found in multiple laboratory and epidemiological studies in their 2017 *Medical Hypotheses* article. Federal regulations only look at the thermal effects of EMF. As a result, non-thermal effects, which have been documented for decades, are largely ignored. For example, Doyon and Johansson cite research by K.S. Nageswari and colleagues who, back in the 1980s, exposed rabbits to chronic low-power microwave radiation (2.1 GHz @ 5 mW/cm^2 for 3 hours daily, 6 days a week for 3 months). Nageswari et al, according to Doyon and Johansson, reported "significant suppression of T-lymphocyte numbers; lymphoid cell depletion in lymph node, spleen, and appendix; recurrent infections; an increased susceptibility to bacterial infection; an increase in the number of large leukocytes; a decrease in the number of small leukocytes, neutrophils, and erythrocytes; [and] leukocytosis" in the exposed animals. Studies involving people exposed to various EMFs during work also show decreases in total lymphocytes and in T-lymphocytes (T8, CD4, and CD3), as well as other markers of immune function.

Doyon and Johansson hypothesize that EMF exposure that leads to immune suppression is due to calcineurin inhibition. Calcineurin is an enzyme involved in numerous cellular development and cell cycle progression pathways. It also activates T-lymphocytes. High production of reactive oxygen species (i.e., nitric oxide, superoxide, and hydrogen peroxide), leading to oxidative stress, is known to inhibit calcineurin. Radio frequency electromagnetic fields (RF EMF) (e.g., from WiFi, cell phones, smart meters, television and radio transmission) are known to increase oxidative stress. Doyon and Johansson cite a 2016 review by I. Yakymenko and colleagues that found 93 out of 100 peer-reviewed studies found oxidative stress in biological systems exposed to low-intensity RF EMF.

EMFs – depending on the frequency, power density, and modulation – open voltage-gated calcium channels (VGCCs) in cell outer membranes, causing a "pathological" flow of extracellular calcium ions into the cell. The calcium ions stimulate the enzyme nitric oxide syntase and affect superoxide dismutase, causing a buildup of reactive oxygen species and oxidative stress that inhibit calcineurin and, thereby, suppress the immune system.

Pharmaceutical calcineurin inhibitors, such as cyclosporine, pimecrolimus, and tacrolimus, suppress the immune system in order to prevent organ rejection in transplant recipients. Doyon and Johansson point out that opportunistic infections (i.e., fungal, viral, atypical bacterial, and parasitic) are a major side effect of immune-suppressing drugs. They say:

> The same opportunistic infections induced as side effects in transplant recipients taking immunosuppressant calcineurin inhibitors to prevent organ rejection – reactivated viral (EBV, CMB, coxsackie, etc.), candida, mold, bacterial (mycoplasma), and parasitic (toxoplasmosis) infections – have also been uncovered in a number of what have been described as neuro-immune dysfunction syndromes....eg, CFS, ASD, ADHD, and Alzheimer's disease.

Doyon and Johansson say that two research avenues need to be conducted to prove or negate their hypothesis. First, researchers need to see whether EMFs decrease calcineurin levels in immune cells like they do in muscle and bone cells. Second, experiments (not epidemiology) need to show whether long-term low-level EMF exposure causes immunosuppression and increased opportunistic infections. Given the push for 5G technology and the increase in WiFi devices, identifying the parameters (frequencies, etc.) that suppress the immune system seems urgent, to me.

Whether or not the hypothesis offered by Doyon and Johansson proves to be totally accurate, decreasing EMF exposure is prudent advice for anyone who is dealing with chronic infectious disease.

Doyon PR, Johansson O. Electromagnetic fields may act via calcineurin inhibition to suppress immunity, thereby increasing risk for opportunistic infection: Conceivable mechanisms of action. *Medical Hypotheses.* 2017;106:71-87.

continued on page 21 ➤

COMPOUNDED BIOIDENTICAL HORMONES MAY DISAPPEAR WITHOUT YOUR HELP!

In 2013, Congress passed a law to tighten regulations on compounding pharmacies. As part of the implementation of that law, the FDA began accepting nominations to the "Difficult to Compound List." When finalized, compounding pharmacies will no longer be able to make items that appear on this list. Bioidentical estriol, estradiol, and progesterone are currently nominated for the Difficult to Compound List. In the case of compounded bioidentical hormones not otherwise available as commercial drugs, such as estriol, consumer access would be completely eliminated if the agency places them on the final list.

The Alliance for Natural Health USA is mounting a public campaign to draw attention to this crucial issue, so the FDA hears from the millions of doctors and patients who rely on compounded bioidentical hormones. The FDA must preserve consumer access to these medicines!

Visit the link below to send a message to the FDA and Congress, urging the federal government to retain consumer access to these crucial medications.

SaveBioidenticals.com

alliance for natural health USA

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Suite 310, Atlanta, GA 30305
WWW.ANH-USA.ORG

SAVEBIOIDENTICALS.COM

➤ *continued from page 19*

Ozone Without Borders

In response to his experience during the 2014 Ebola outbreak in Sierra Leone, Robert Jay Rowen, MD, has co-founded Ozone Without Borders (https://ozonewithoutborders.ngo; www.ozonewithoutborders.com). This non-profit humanitarian international organization aims to unify the bio-oxidative therapy community and encourage the use of oxygen therapies and related non-pharmaceutical treatments internationally.

Medical ozone has been used to treat infectious, immunological, and circulatory conditions for about 100 years. Like the ozone naturally generated by immune cells, medical ozone kills pathogens. It also inactivates many viruses, preventing their entry into cells where they reproduce. In addition to fighting pathogens, medical ozone modulates the immune system, balancing inflammatory/anti-inflammatory cytokines; elevates antioxidant enzymes such as SOD; increases glutathione; increases red blood cell flexibility; and improves oxygen delivery to tissue.

When the Ebola crisis made headlines in 2014, Dr. Rowen and Dr. Howard Robins took 10 ozone generators, donated by manufacturer Longevity Resources, Inc. (Vancouver, BC), and buffered vitamin C and Thiodox, donated by Allergy Research Group (California), to Sierra Leone with the intention of training medical personnel to treat Ebola patients. Overall, about 60% of the people infected with Ebola die. During the 2014 outbreak, conventional treatment consisted of an extremely expensive, experimental drug called ZMapp. Pharmaceutical makers were also trying to develop a vaccine. Ozone therapy cost about $5 per person.

During staff training at the Freetown Hastings Ebola Center, Sierra Leone's Minister of Health called the clinic and ordered the training to stop.

Despite the health ministry's ban, five people were treated with ozone at the clinic, using a protocol developed by Rowen and Robins. Four were health care workers at the clinic, and the fifth was the female companion of a physician who had died from the disease. Rowen, Robins, and Sierra Leone colleagues described these cases in a 2016 article, published in the *African Journal of Infectious Diseases*. Four patients, three of whom tested positive for Ebola virus, had symptoms. The five received direct intravenous gas administration, rectal gas administration, and/or ozonized water along with vitamin C and glutathione as support. Although treatment was given for up to 10 days, the authors were surprised at how quickly symptoms resolved: "within a few days and with limited treatments." Recovery began with the first treatment.

Death from Ebola is actually due to a cytokine storm, the immune system's hyperactive response to the virus' rapid reproduction. It is the cytokine storm that damages the vascular system and tissues, resulting in hemorrhage and organ failure. Ozone oxidizes sulfhydryl groups, found on the lipid envelope glycoproteins of some viruses such as cytomegalovirus; sulfhydryl groups are the means by which the virus enters cells to replicate. Oxidation of the sulfhydryl groups prevents the virus from entering a cell; consequently, it cannot reproduce. The authors believe that this is how ozone therapy inactivates Ebola virus. In addition, ozone, especially with high-dose vitamin C, modulates the damaging high levels of NO, TNF-alpha, and inflammatory cytokines that occur with Ebola virus disease.

Survival rate at the Freetown Hastings Ebola Center was 40%, yet all five of the ozone-treated patients survived. The authors note that all five were in early stages of the disease; the effect on critically ill patients is unknown.

Case reports have historically been the basis for defining possible research topics. Given the severity of this infection, wouldn't it make sense to follow up? Even though ozone, vitamin C, and glutathione will never cost what a new drug will?

Fassa P. American Doctor Kicked out of Africa for Healing Ebola with Ozone Therapy Instrumental in Creating Internation "Ozone Without Borders." *Health Impact News.* April 23, 2018.

Rowen RJ, et al. Rapid Resolution of Hemorrhagic Fever (Ebola) in Sierra Leone with Ozone Therapy. *Afr J Infect Dis.* 2016;10(1):49-54.

Herbicides and Antibiotic Resistance

The overuse of antibiotics in agriculture is not the only factor causing pathogens' resistance to antibiotics. Other chemicals, including herbicides, can induce antibiotic resistance. In a 2015 study, Brigitta Kurenbach and colleagues tested pathogen response to antibiotics after herbicide exposure. They exposed colonies of *Escherichia coli* and *Salmonella enterica* serova Typhimurium to one of three common herbicides and to combinations of the herbicides: Kamba (active ingredient dicamba), 2,4-D, or Roundup (active ingredient glyphosate). They then measured the bacterial response to five different types of antibiotics: ampicillin, ciprofloxacin, chloramphenicol, kanamycin, and tetracycline.

The authors found that the magnitude of response varied by bacterial species, antibiotic, and herbicide. The salmonella bacterium become more resistant to ampicillin, ciprofloxacin, chloramphenicol, and tetracycline but more susceptible to kanamycin after being exposed to non-lethal doses of 2,4-D or dicamba. Roundup significantly increased the salmonella's tolerance to kanamycin and ciprofloxacin but had no effect on or increased salmonella's susceptibility to ampicillin, chloramphenicol, and tetracycline. *E. coli* had a similar response to Kamba and 2,4-D except it did not show more tolerance to ampicillin. While Roundup also increased *E. coli*'s tolerance to kanamycin and ciprofloxacin, it had no effect or increased susceptibility to ampicillin, chloramphenicol, and tetracycline. The authors noted that all herbicide exposures to both species increased resistance to ciprofloxacin.

When herbicides that caused similar changes were combined, the effect increased. While the amount of herbicide needed to cause a *maximum* response was above residue limits allowed under international trading laws, the amount needed to cause a detectable change was lower than the label-specified herbicide application rate.

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The observed bacteria responses to the antibiotics in this study have real world consequences. The minimum concentration of an antibiotic in an agar plate at which no growth was observed when about 10^8 CFUs of bacterium was applied to the plate surface (MIC) increased three-fold or more with some herbicides. Kurenbach et al cite a 2013 study in which a majority of hospitalized patients did not get high enough doses to affect cipro-susceptible strains of *E. coli, Klebsiella ispp., Enterobacteriaceae, Proteus* spp., and *Pseudomonas aeruginosa*: "A 2-fold change in the MIC of infecting strains...was enough to cause 21% of patients to get a lower-than-target dose of the antibiotic, and when the MIC reached a 4-fold increase...75% of patients failed to received the target dose."

Kurenbach and colleagues state: "This increasingly chemically potent world necessitates a rethinking of how we measure and regulate exposures to common products. Testing each compound in isolation and only for severe effects on microbes, as is done during risk evaluation of herbicides, may underestimate its role in the emergence of antibiotic resistance phenotypes."

Kurenbach B, et al. Sublethal Exposure to Commercial Formulations of the Herbicides Dicamba, 2,4-Dichlorophenoxyacetic Acid, and Glyphosate Cause Changes in Antibiotic Susceptibility in *Escherichia coli* and *Salmonella enterica* serovar Typhimurium. *mBio.* March/April 2015; 6(2).

Roundworms (Toxocara)

Roundworms, parasites that live in the intestines of cats and dogs, made headlines in the *New York Times* earlier this year. Toxocariasis is one of the most overlooked but prevalent parasitic infections. Areas with a large number of stray animals or where pets do not get regular veterinary care and worming have higher levels of roundworm eggs in the soil. Once in the soil, these eggs, containing infective third-stage larvae, can be ingested by humans or other non-host animals via contaminated food, water, soil, utensils, or unwashed hands. A 2018 review, led by Guangxu Ma, explains that, once ingested, the larvae do not mature in non-host animals or humans; but they do enter the circulatory system through the small intestinal wall. Once in circulation, the larvae travel to the lungs, liver, muscles, and central nervous system where they can remain for years.

While asymptomatic infection is common and usually self-limiting, roundworm infection can produce a diverse – and sometime serious – range of symptoms. The most common clinical signs include coughing, wheezing, myalgia, itching, rashes, panniculitis, and vasculitis. Ma et al say that lymphadenopathy, granulomatous hepatitis, myocarditis, nephritis, and arthritis have also been observed. Infection of the eye is common in children, ages 3-16 years, impairing sight and causing chronic inflammation of the inner eye and retina. ELISA and immunoblot testing criteria are available for toxocariasis, but the tests will not determine whether the infection is still active.

Albendazole is the preferred anthelmintic for acute toxocariasis because it, like the larvae, distributes throughout the body once metabolized. Prevention consists of thorough hand-washing, preventing children from eating possibly contaminated dirt, and avoiding raw or undercooked meat of any kind. Cows, sheep, chicken, and rabbits – like humans – can be infected with roundworm eggs. Prevention strategies are particularly important in areas of high poverty or areas that have a large number of stray dogs.

Beil L. The Parasite on the Playground. *The New York Times.* January 16, 2018.
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Vitamin D Deficiency Increases Risk of Chronic Headache

Vitamin D deficiency may increase the risk of chronic headache, according to a new study from the University of Eastern Finland. The findings were published in *Scientific Reports*.

The Kuopio Ischaemic Heart Disease Risk Factor Study, KIHD, analyzed the serum vitamin D levels and occurrence of headache in approximately 2,600 men aged between 42 and 60 years in 1984–1989. In 68% of these men, the serum vitamin D level was below 50 nmol/l, which is generally considered the threshold for vitamin D deficiency. Chronic headache occurring at least on a weekly basis was reported by 250 men, and men reporting chronic headache had lower serum vitamin D levels than others.

When the study population was divided into four groups based on their serum vitamin D levels, the group with the lowest levels had over a twofold risk of chronic headache in comparison to the group with the highest levels. Chronic headache was also more frequently reported by men who were examined outside the summer months of June through September. Thanks to UVB radiation from the sun, the average serum vitamin D levels are higher during the summer months.

The study adds to the accumulating body of evidence linking a low intake of vitamin D to an increased risk of chronic diseases. Low vitamin D levels have also been associated with the risk of headache by some earlier, mainly considerably smaller, studies.

In Finland and in other countries far from the equator, UVB radiation from the sun is a sufficient source of vitamin D during the summer months; but outside the summer season, people need to make sure that they get sufficient vitamin D from food or from vitamin D supplements.

No scientific evidence relating to the benefits and possible adverse effects of long-term use in higher doses yet exists. The Finnish Vitamin D Trial, FIND, currently ongoing at the University of Eastern Finland will shed light on the question, as the five-year trial analyzes the effects of high daily doses of vitamin D on the risk factors and development of diseases. The trial participants are taking a vitamin D supplement of 40 or 80 micrograms per day. The trial also investigates the effects of vitamin D supplementation on various pain conditions.

Reference: Virtanen JK, et al. Low serum 25-hydroxyvitamin D is associated with higher risk of frequent headache in middle-aged and older men. *Scientific Reports.* 2017. http://rdcu.be/ogtQ (open access)

Coffee and Your Heart

by Steven Helschien, DC

Introduction

Years ago, research studies linked coffee to dozens of diseases and disorders. Subsequent studies published by reputable sources, such as the *New England Journal of Medicine*, the *Journal of the American Medical Association*, and others, have shown significant flaws in the original research. These new studies considered factors such as smoking, excessive alcohol consumption, and lack of physical activity of participants; and the original findings were essentially reversed. Since then, the research has overwhelmingly pointed to the fact that daily coffee consumption can have a vast array of health benefits. Studies have shown that coffee is rich in antioxidants – phytochemicals, polyphenols and other nutrients that reduce inflammation by neutralizing harmful free radicals and, therefore, reduce the risk of diseases related to inflammation, including cardiovascular disease.[1]

The Healthiest Coffee

The best quality coffee yields the greatest potential health benefits. The way coffee is grown, handled, and roasted has a direct effect on its quality. Where it is grown (high altitudes are best), how it is farmed (is it organic or are pesticides used?), and whether mold or mycotoxins (toxins produced by mold) are present, all affect the quality of the coffee. The healthiest brew also requires pure, good quality water.

Coffee's Antioxidants

Some of the powerful antioxidants found in coffee are as follows:

- Chlorogenic Acid: A compound that plays an integral role in antioxidant, anti-inflammatory, and anti-bacterial activities in the body.
- Quinine: An antioxidant known for its ability to kill off diseases, Quinine becomes more potent after coffee beans are roasted. It has a positive effect on blood sugar levels and boosts athletic performance.
- Plant Phenols: Similar to the antioxidants found in berries, plant phenols are responsible for protecting the body from cellular damage, certain types of cancer, and cardiovascular disease.
- Cafestol: An antioxidant found in decaffeinated coffee, cafestol acts as an anti-inflammatory substance in the brain and also as a modulator for bile acid in the intestines.
- Melanoidins: Responsible for coffee's enticing aroma when it's roasted, melanoidin compounds are formed during the roasting process. They have anti-bacterial and anti-inflammatory properties.
- Trigonelline: The bitter alkaloid compound found in coffee, trigonelline is responsible for coffee's unique aroma. It has anti-bacterial properties that support oral health and help kill bacteria that cause gum disease and cavities.

The Best Cup of Antioxidants You Can Get

Two sources of rich antioxidants that you can use to boost your healthy coffee are EGCG and L-theanine. Epigallocatechin gallate (EGCG) is the major polyphenol and flavonoid in green tea. EGCG is high in antioxidants with many proven health benefits, especially for the cardiovascular system.[2] The extract, used as a supplement with coffee, produces the healthiest drink you can make. The combination of coffee and L-theanine boosts concentration, focus (it is being used to help with ADHD), creativity, memory, and relaxation. L-theanine is a non-essential amino acid that is found in the leaves of black, oolong, and green tea. The combination is a powerful antioxidant source and brain booster.

Cardiovascular Disease Statistics for the United States[3]

- Every 38 seconds a person dies from a heart attack.
- Around one million lives are lost per year from cardiovascular disease.
- Cardiovascular disease claims more lives than all cancers combined.

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Coffee and Your Heart

- Around 92 million Americans have some form of cardiovascular disease.
- Every year, more than 795,000 people in the United States have a stroke.
- Stroke kills more than 130,000 Americans each year. Every four minutes, someone dies of stroke.

Cardiovascular Disease, Inflammation, and Atherosclerosis

Heart disease is the leading cause of death in the US for both men and women and is also the leading cause of death worldwide. We now know that inflammation is a major factor in the development of heart disease. Numerous studies have shown that inflammation plays a key role in the development of atherosclerosis.[4] Risk factors that trigger an inflammation response in the body, such as cigarette smoking, high blood pressure, LDL cholesterol, hyperglycemia, obesity, or insulin resistance, can initiate atherosclerosis. The buildup of fatty deposits and calcium in the inner walls of the arteries narrows the arteries, making the heart work harder, and increasing the risk of a blockage leading to a heart attack or stroke.

The Role of Inflammation in Heart Attack and Stroke

"Exactly how inflammation plays a role in heart attack and stroke remains a topic of ongoing research," according to Deepak Bhatt, M.D. "It appears that the inciting event in many heart attacks and some forms of stroke is the buildup of fatty, cholesterol-rich plaque in blood vessels."

Bhatt is chief of cardiology for the VA Boston Healthcare System, director of the Integrated Interventional Cardiovascular Program at Brigham and Women's Hospital & VA Boston Healthcare System, and associate professor of medicine at Harvard Medical School. "The body perceives this plaque as abnormal and foreign — it does not belong in a healthy blood vessel," he said. "In response, the body tries to wall off the plaque from the flowing blood. However, under the wrong set of circumstances, that plaque may rupture, and its walled-off contents can come into contact with blood and trigger a blood clot formation. This combination of plaque and blood clots is what causes the majority of heart attacks and certain types of stroke, if the blood clot obstructs blood flow to the heart or brain."[5]

Coffee Protects the Heart and Cardiovascular System

An analysis of 36 studies on coffee, included more than one million

study subjects, found that those who regularly drank coffee were less likely to develop heart disease.[1] It was concluded that coffee protects the heart and cardiovascular system. Many diseases relating to the heart are caused by inflammatory conditions, including atherosclerotic blockages and heart disease. Antioxidants have been shown to reduce the incidence of death in these cases.

Coffee Reduces Risk of Heart Attack and Strokes

A team of researchers gathered data from the Framingham Heart Study, which includes information about the participants' diet and their cardiovascular health, to look for a possible link between coffee and the risk of heart failure and stroke.[6] Machine learning was used to analyze the data, which works by finding associations, similar to the way that online sites can use a person's history to predict which other sites or products you may be interested in.

The preliminary research showed, that compared with non-coffee drinkers, drinking coffee was associated with a lower risk of developing heart disease and a lower risk of having a stroke. The risk lowered with every additional cup of coffee consumed per week.

The team checked the validity of the machine learning analysis by using traditional analysis in two studies with similar sets of data, the Cardiovascular Heart Study and the Atherosclerosis Risk in Communities Study. The results confirmed what the machine learning analysis had found, that drinking coffee had a decreased risk of heart failure and stroke, which was consistently noted in all three studies.

Coffee Reduces the Risk of Atrial Fibrillation

Drinking coffee moderately every day may reduce the risk of developing coronary atherosclerosis, which could reduce the risk of atrial fibrillation or stroke, according to a study by a professor from the department of epidemiology and medicine at the Johns Hopkins Bloomberg School of Public Health in Baltimore.[7] Eliseo Guallar, MD, and colleagues collected information on 25,138 men and women in South Korea. Their average age was 41, and none had evident cardiovascular disease. The participants had a yearly health exam when they were asked what they ate and drank. They all were given computed tomography scans to determine the amount of coronary artery calcium. The researchers then compared the participants' calcium build-up with how much coffee they drank.

The investigators found a direct correlation between coffee and calcium. **As coffee consumption rose, the amount of calcium build-up declined.** Those who drank three to five cups a day had the least amount of calcium build-up. The association between higher coffee consumption and lower calcium build-up stayed the same when the study looked at age, sex, smoking, alcohol consumption, diabetes, obesity, hypertension, and hypercholesterolemia. They also took into account factors such as education, physical activity, family history of cardiovascular disease, and diet.

The Nurses' Health Study

The Nurses' Health Study, a long-running study of more than 80,000 women, found a reduction in stroke risk among women who drank two to three cups of coffee a week (a 19 percent reduction) and those who drank four or more cups per week (a 20 percent reduction).[8]

The combination of coffee and L-theanine boosts concentration, focus (it is being used to help with ADHD), creativity, memory, and relaxation.

Conclusion

In the past, coffee was thought to be an unhealthy substance. But recent studies have brought to light that coffee contains numerous rich sources of antioxidants that contain anti-inflammatory properties that fight cardiovascular disease by protecting against calcium build-up and atherosclerotic plaque in blood vessels. Look for our next article on how coffee's anti-inflammatory properties also protect against many different types of cancer.

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Dr. Steven Helschien (a.k.a. Dr. Coffee) is a coffee aficionado and believes that coffee is a powerhouse superfood. He is the founder of Level 1 Diagnostics (a cardiovascular testing program that uses advanced, noninvasive technology to detect and prevent cardiovascular disease), and Level 1 Therapeutics (a health and wellness program dedicated to supporting optimal health). Dr. Helschien is passionate about progressive health issues and encouraging people toward greater health and wellbeing.

Why This Finnish Doctor Believes in Herbs

by Marjo Valonen, MD

From an early age, I had a great interest in medicine. When I was young, I thought I wanted to be a brain surgeon. Later, in medical school at the University of Turku, Finland, *everything* interested me. I was also lucky enough to study a course on acupuncture, something that is not normally taught in Finnish medical schools.

After obtaining my medical license, I first went to work as a surgeon. However, I soon realized that I wanted to pursue other areas of medicine as well. I wanted to consider and treat the whole human being, not just a part of that whole.

My Own Illness

Later, after giving birth to twins and to a daughter soon thereafter, I fell seriously ill following a difficult childbirth. I was bedridden, and nobody could figure out what was wrong with me. I asked many colleagues for their counsel and submitted to various tests. The conclusion was always the same: "No, nothing is wrong with you."

My symptoms included extreme fatigue, so that even keeping my eyes open felt like too much work. Any physical activity was followed by a worsening of symptoms. My husband caught me two times after I fainted trying to get to the bathroom by myself. Confined to my bed, I relied on my husband for everything. He brought me my food, carried me to the bathroom, took care of our three small children, and maintained his own work outside the home. He is the real hero of this story!

However, when doctors couldn't find anything wrong with my lab tests, they told me that I was just imagining it all, that it was all in my head, and that I was causing myself to be ill. One colleague even said to me, "You're just lazy; you don't want to work."

The Search for a Cure

The worst of it lasted for two years or so. After all that, I was able to sit and walk a bit. I was fairly functional, but I couldn't do much. I realized there were still pieces missing in my health puzzle, so I started searching for answers in books and on the internet, reading everything I could find. That's how I began learning more about functional and integrative medicine. I did everything I could think of: I healed my gut, I found my food intolerances, measured and corrected deficiencies, addressed hormonal issues, worked with stress management, started detox, and so on. My ability to function was better but still only halfway there. That's when I ran into the chronic infections. I ran various tests on myself and confirmed having Lyme disease, discovering that I had other active infections as well. Those discoveries started me on the next step of my journey back to health: to find out how to treat those infections.

Initially, I was told that I had to treat them with antibiotics. From previous experience I knew that they would wreak havoc on my gut – but I decided to go with them since that was the conventional procedure. ILADS is doing great work regarding *Borrelia*, and I tried the combination of antibiotics they encourage; but – as I had feared – my gut could handle the treatment only for so long. In a case like mine, where the illness has had a long time to establish itself, a short course has a limited effect. At the same time, there were patients desperately seeking help and I went with the knowledge I had. I was working on a part-time basis looking for the next pieces of the puzzle.

The Cowden Support Program

So, I started looking at herbal solutions, trying different protocols. But none of them worked very well for me. Then I heard from my colleague Dr. Armin Schwarzbach in Germany about the support program developed by Dr. Lee Cowden, using Nutramedix products. I contacted them and gave the program a try. Within a few months I had real progress, gaining more functionality, and with my lab results also showing a positive impact.

Sharing My Own Healing with Others

I was able to do more and see more patients. As I encountered people who had the same problems that I had, I started using the Cowden Support Program with these patients. We're still amazed at how well it works; we have validated results in terms of patients' subjective scoring and laboratory analyses. We also apply integrative approaches to help patients in other ways.

Typically, many chronic patients don't have many positive test results at baseline. This often leads to a conclusion that the patient is not suffering from an infection. I was working with a university research group at that time, and we found that controls for a chronic dying patient also came back negative, proving that the immune system was not able to create antibodies. The idea of the Cowden Support Program is to get the immune system working again, while helping it fight infections. This is why I like the Elispot test we have available in Europe. It doesn't just measure whether you have antibodies: it also indicates how well your immune system is fighting. Many patients are so sick when they first come to my office that their immune system is almost shut down and can't fight effectively. So, if you only look at lab results in the beginning of treatment, then you might arrive at a false negative. As treatment progresses, the immune system becomes stronger; and the test results turn positive,

continued on page 28 ➤

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➤ *continued from page 26*

until turning back to negative at the end of the treatment.

With all our patients, we compare their lab results with their symptoms. Pain and fatigue are typically the worst part of being ill. We do this at the beginning of treatment, and we then follow their self-assessments. Sometimes, both objective lab results and self-assessments improve at more or less the same rate. When that happens, we're happy. One or the other isn't enough. If the lab results are great, but the patient is fatigued and in pain, then you need to continue. You are not treating lab tests; you are treating the patient.

Cure or Remission?

Can Lyme disease and other infections be fully cured? Or, must we be content with tolerable remission of active symptoms? These are good questions. I think that we can get our patients cured in such a way that Lyme or its co-infections don't affect their life anymore because their immune system is in charge. We *all* carry *all sorts* of microbes and parasites and viruses within us *at all times*. In the infectious disease study, we saw that chronic people could have ten or more infections. That's life. The question is, "Who is in charge: you, or the microbes within you?"

I would agree with the assessment of the American cardiologist Dr. Thomas Levy: namely, that *Borrelia* is normally a commensal bug, requiring an already compromised autonomic nervous system to become infectious. I contracted Lyme already in the womb, from my mother. And, I carried it within me throughout my early years without noticing it. I became seriously ill only after the twin pregnancy and the birth of my daughter, during which I had many complications, when my immune system took a hard hit. And, that's when "the enemies" got the upper hand, moving from the merely incubational state to the acute one.

I am convinced that my role as a doctor is fundamentally to support my patients' immune systems. Only then can these microbes be defeated. Sometimes my patients express their concerns about ticks being everywhere. I remind them at those times that we can't live in a bubble. Some have famously tried it, but it isn't a very good solution. We neither can nor should stop our children from running and playing in the woods. The best thing is to take care of our own body and immune system, so that we are strong enough to resist all of this.

This leads to the whole idea of preventative wellness, where medicine is seen not so much as treating diseases as helping and strengthening people, and in such a way that they do not become ill in the first place. That's one of the reasons why I think Dr. Cowden's program is so effective, because the use of antimicrobial herbs is constantly changing, affecting different kinds of microbes – not just *Borrelia*, but also the co-infectors. The antimicrobial herbs are complemented by detoxifying and anti-inflammatory ones, as well as herbs that support energy production. Some people think it's enough to take antibiotics, or even antimicrobial herbs. But, that's just killing pathogens. I advocate a much wider approach, one that supports the whole system. Uprooting is not enough. You also have to replant.

What Happens After Symptoms Disappear?

All our patients receive an ongoing maintenance program from us, some for the rest of their lives. By the time that they are fully functional again, we've known them for several months or, in the harder cases, several years. We usually have acquired a good idea of their genetic composition and their ability to withstand these things on their own. So, someone who has a good, robust constitution may need only a basic multi-vitamin and some detox and supporting herbs. On the other hand, a very fragile person might need other things to support them. I myself am a person who genetically has lots of problems with my immune and detox systems, but I'm doing fine with herbs. I continue taking products like Samento and Takuna every day, morning and evening, and I'll never give them up! By taking care of myself, I'm able to live a normal life.

My mission, the reason why I'm talking about herbs, is to teach other professionals how to help others in the same way, so that more and more people can benefit. I've been invited to speak about my experiences in ten countries in the last couple of years. People are interested.

I believe we're living already the future of medicine. It's so great that we have researchers like Professor Eva Sapi, of the University of New Haven, moving on to in vivo research. So, we're getting more information on how herbs work. Of course, there are always those people who think that herbs can't possibly be that effective. They need to be reminded that the Nobel Prize for Medicine was given in 2015 to Professor Youyou Tu, a pharmacologist at the China Academy of Chinese Medical Sciences in Beijing, in recognition of her work with the herb *Artemisia annua.* Also, many conventional medicines are developed from natural substances, including herbs. Since you can't patent something derived from nature, the medical companies have to change or break these substances in order to obtain patents.

Concluding Thoughts

Returning to the question of antibiotics, I think we're using too much of them, which leads to the loss of their efficacy. Bacterial resistance has become a big problem. It is much more difficult for bacteria to develop resistance to an herb, which may have tens or even hundreds of different substances with which it fights bacteria. It's quite easy for a bacterium to develop resistance to an antibiotic since it is just this one thing against which it has to fight. But when you send tens or hundreds of things against that bacterium, it has a much harder time developing effective resistance. We haven't even touched situations with heavy viral loads.

Of course, I don't think it's wrong to use antibiotics in serious situations, like acute pneumonia. The real problem is that we are using them to treat very minor conditions. We're also giving them to our livestock, which results in indirect antibiotic exposure for us. These are the real problems, not acute treatments. What was designed to help us is really hurting us.

So, I think herbs are the way of the future.

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Marjo Valonen, MD, has been medical director of Astris Medical Center (Helsinki, Finland), a clinic that specializes in tick-borne and other chronic infectious illnesses, since 2014. In addition to patient care, Dr. Valonen has presented workshops and spoken at Lyme-focused conferences throughout Europe. She is also a member of the University of Jyväskylä Lyme and co-infections research team.

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Poria, the Most Famous Mushroom You've Never Heard Of

by Mark J. Kaylor

Poria is a mushroom that goes by many names: Wolfiporia, Hoelen, Tuckahoe, Indian Bread and Fu ling, in traditional Chinese medicine (TCM), to name a few. The irony of poria is that it is one of the most widely utilized natural remedies in Asia while it is virtually unknown outside of traditional Chinese medicine practitioners in the West.

Research on this long-used traditional remedy has focused primarily on its kidney and immune activities. A growing number of studies have reported a range of immune actions, including immuno-modulatory, anti-inflammatory (inhibiting 5-LOX, elastase, and leukotriene B4), anti-cancer, anti-tumor, and anti-bacterial. Poria's specific immune actions include macrophage activation, increasing T-cell count, and stimulating interferon production. Much of the most recent research has looked at the effects of the terpenes found in poria that are responsible for anti-viral and anti-proliferative activity.

Exploration of poria's kidney-related actions confirm its traditional TCM use as a kidney tonic. Research with chronic kidney disease has found it to be a diuretic and kidney protective (primarily by reducing oxidative stress and inflammation in the kidneys) while helping to maintain overall kidney function. One study, using poria as part of the TCM formula *Wu Ling San*, found it inhibited the formation and aggregation of calcium oxalate, the most common type of kidney stone.[1] A nephritis rat study reported poria prevented protein excretion and elevated cholesterol as well as reduced antibody buildup and inflammation in glomerulonephritis.[2]

Where poria may hold its greatest promise is for its traditional use in treating what is referred to as "damp" in TCM. Damp can best be visualized a thick foggy, humid, slow-moving day. In the brain, damp manifests as "brain fog," kidney as water retention, respiratory tract as excess mucus and phlegm, digestive tract as bloating and poor digestion, and edema and swelling anywhere in the body. Our modern fast-paced stressful lifestyle of multi-tasking and prepared foods is a major contributor to this buildup, leading to widespread health issues and much needed rescue with poria.

When considering a poria mushroom product there are several things to look for:

1) Grown in a manner that mirrors nature, in the case of poria, grown on pine logs;
2) Utilizes the sclerotium, the part used traditionally and most widely research; and
3) Extracted properly using hot water as well as alcohol to extract the polysaccharides and triterpenes respectively.

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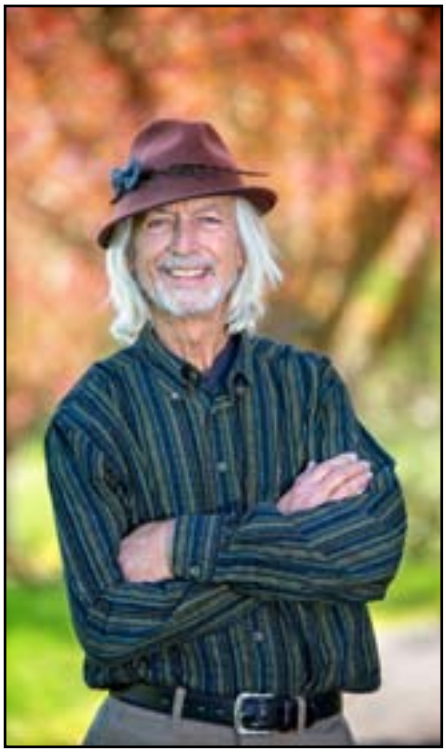
Mark J. Kaylor has been exploring holistic health and healing for close to four decades and is the founder and director of the not-for-profit Radiant Health Project. Mark can be contacted at his website: www.RadiantHealthProject.com.



Remembering Ed Alstat, RPh, ND

On January 26, 2018, the naturopathic community lost one of its brightest and most innovative leaders. Dr. Ed Alstat, founder of Eclectic Institute, will long be remembered for his commitment to preserving and advancing naturopathic medicine.

Professionally, Ed self-identified as a farmer, pharmacist, and naturopath. His roots were from a southern Illinois farming family, then as a pharmacist in the Bay-area. In the late 1970s, Ed's desire to get people well and off the cycle of lifetime dependency on medications prompted him to enroll at the National College of Naturopathic Medicine (Portland, Oregon).

Ed founded Eclectic Institute within the clinic dispensary of the school in 1982 with Dr. Michael Ancharski. Inspired by the Eclectic physicians, they recreated traditional formulas and provided high-quality herbal supplements to the growing naturopathic profession.

Ed delighted in sharing his knowledge and skills with others. When the first natural pharmacy was opened in a hospital, he donated supplements to support it. When his alma mater, NCNM, was preparing to close its doors due to financial hardship, Ed tirelessly worked with creditors to prevent the foreclosure. As Dr. Les Moore said, "When he bailed out NCNM, he bailed out the entire profession."

One of Ed's greatest discoveries was the use of freeze-dried stinging nettles for seasonal allergies. He was also the first to bring to market grain-free organic alcohol extracts, alcohol-free extracts, and to apply the technology of freeze-drying to botanical medicines. He re-published rare medical journals and other important works under Eclectic Medical Publications, and supported naturopathic students by donating his farm's use for revitalization retreats aimed at preserving the nature-cure tradition. Attendees experientially learned about time-honored therapies such as clay packs, mud baths, and hydrotherapy.

Ed will be missed by many people, and his impact on the naturopathic profession will be felt for many years. Ed used to famously say, "We must keep the flame alive," and did an exemplary job of fanning the flames lit by naturopathic elders for future naturopaths to use as a source of light. ◆

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Favorably Altering the GI Microbiome with Exercise

by David M. Brady, ND, DC, CCN, DACBN, IFMCP

As preventative health continues to be a primary focus, we continue to seek out ways to improve health through diet and lifestyle changes. At the same time, research continues to call our attention toward our gut and the microbes that reside within, as a primary influencer of our health.

Integrative and functional medicine clinicians are keenly aware of the importance of optimizing the gut microbiome as a foundational step toward tackling nearly any health condition. With its immense contributions toward immunomodulation, inflammation, gene expression, neurotransmitter production, endocrine function, detoxification, and nutrient metabolism, the microbiome can easily become a tool in redirecting many biological processes toward homeostasis and health. We are also mindful of the fact that poor diet, chronic stress, age, disease, antibiotic use, and unhealthy lifestyle choices have wreaked havoc on the microbiome of many individuals. Therefore, dysbiosis, SIBO, and other microbiome disturbances seem to be the rule, rather than the exception.

While no two individuals will ever possess identical microbiomes, research has told us that healthy individuals possess greater amounts of specific types of bacteria that impart important health benefits. On the other hand, other species of microbes are associated with specific health problems as they alter our immunity, increase inflammation, and even turn on genes that may cause health problems in the future. If we can alter the balance of microbes in the gut to favor the health-promoting species, we can prevent chronic inflammatory and metabolic disorders that are common in developed nations. These conditions include cardiovascular disease, diabetes, cancer, gastrointestinal conditions, autoimmunity, mental health conditions, and chronic pain syndromes.

Short-Chain Fatty Acids and Health

More recent literature is focusing on the health benefits of bacterial phyla that produce short-chain fatty acids (SCFAs) as byproducts of carbohydrate fermentation. SCFAs are common ligands to multiple receptors on a variety of cell and tissue types and are important signaling molecules between the gut microbiome and the host. They are also key regulators in human metabolism and, more notably, vital contributors to maintaining healthy colonic epithelium and gut integrity. Formate, acetate, propionate, and butyrate are the chief SCFAs. Butyrate, particularly, is the preferred fuel of colonocytes, but all SCFAs help regulate the epithelial barrier by regulating tight junction proteins. Additionally, SCFAs play roles in glucose homeostasis, lipid metabolism, appetite regulation, immune function, and inflammatory pathways.[1]

Microbiome diversity is key for maximizing the production of SCFAs. To date, most studies have focused on dietary interventions for reestablishing microbiome diversity and SCFA production. High-fiber diets are especially useful for rebuilding SCFA-producing microbes, but emerging studies have made yet another discovery. Diet may not be the only method of diversifying the microbiome to favor SCFA production. Exercise, alone, may alter the microbiome.

Exercise and the Microbiome

Exercise has long been recognized as an effective way to modulate human metabolism in various ways and improve health outcomes. The benefits of exercise are similar to those of altering the microbiome toward a more favorable composition of SCFA-producing microbes. So the question is raised, "Does exercise potentially exert its positive effects by altering the microbiome?"

Very few studies have sought to establish a direct link between exercise and the gut microbiome. One of the first of such studies looked at a group of Irish International rugby players during a pre-World Cup training camp in which dietary intake and physical activity were monitored. Researchers compared their activity level, body composition, creatine kinase, inflammatory cytokine markers, and composition of fecal microbiota with a control group of nonprofessional athletes of both high and low BMI. Professional rugby athletes had lower inflammatory cytokines, higher creatine kinase levels (corresponding to exercise intensity), and a significantly more diverse population of microbes in their gut. In fact, 22 different phyla of bacteria were identified in the professional athletes, but only 11 and 9 phyla were identified in average athletes with a low and high body mass index (BMI), respectively.[2]

Although it is possible to suggest that these differences could be due to the increased food intake of the professional athletes, researchers proposed many mechanisms by which

intense physical activity could favorably alter the microbiome, independent of diet. Regular exercise suppresses pro-inflammatory cytokines and increases anti-inflammatory modulators. These effects have also been noted in intestinal lymphocytes of mice and may contribute to a reduction in oxidative insult in the gut, creating an environment that favors healthy microbes. Regular, moderate exercise also reduces stress-induced intestinal barrier dysfunction in the areas of permeability, mucous thickness, and bacterial translocation, all of which modulate the microbiome.

A similar study was conducted on rats who were divided into three activity groups: sedentary, forced exercise on a treadmill for 40 min/day, or voluntary access to a treadmill all day. After six weeks, fecal pellets and cecal content was evaluated using 16S rRNA gene sequencing for bacterial identification. Results showed that both forms of exercise altered the gut microbiome, but the changes were different based on activity level. Both groups altered the composition of bacterial phyla, but voluntary exercise yielded less bacterial richness compared to forced exercise, and yet, forced exercise produced greater clustering of bacterial colonies. This study gives evidence to the fact that exercise can alter the microbiome.[3]

Most data showing a relationship between exercise and gut microbiota have come from animal studies, but more recently, research is confirming these observations in humans, too. A recent study sought to observe the effect of exercise on composition, functional capacity, and metabolic output of the gut microbiota in lean and obese adults. Diet was controlled so the effects could not be associated with dietary changes that often accompany exercise. After six weeks of supervised, endurance-based exercise training (3 days/week) that progressed from 30 to 60 minutes/day and from moderate (60% of heart rate reserve) to vigorous intensity (75%), the diversity of gut bacteria had changed significantly. Further, the genetic expression of the bacteria changed so the bacteria produced more short-chain fatty acids, which reduces inflammation in the body and enhances metabolism. However, these changes were most notable among those who were lean, rather than the obese subjects, suggesting exercise can more favorably alter the microbiome in lean individuals. This study was unique in that the microbiome of all subjects was again evaluated six weeks after participants refrained from any exercise. The favorable changes originally induced by the exercise were completely obliterated. Favorable, exercise-induced changes in gut microbes appear to endure only as long as exercise continues.[4]

Obesity

Exercise has long been recommended for losing weight, but burning calories and enhancing your metabolism may not be the only reason exercise promotes a better

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body composition. If we can validate the hypothesis that exercise, alone, can alter the gut microbiome to favor weight loss, it may be logical to infer that these changes are partially responsible for positive effects of exercise on obesity. In fact, fecal transplants from obese and lean rats have been used to change body composition in germ-free rats, further supporting this idea. It is already well-established that the microbiome of obese individuals contains a lesser variety of microbes compared to lean individuals and the microbes present do not positively impact metabolism and, instead, promote energy reservation and fat accumulation.

The ratio of Bacteroidetes and Firmicutes, the two most common bacterial phyla in the gut microbiota, is directly associated with body composition. Obese individuals have significantly higher levels of Firmicutes and lower levels of Bacteroidetes compared to normal-weight and lean adults. Animal studies have confirmed that repeated exercise can increase Bacteroidetes and decrease Firmicutes which favorably alters the microbiome to support a healthier body composition.[5] Furthermore, this change is independent of dietary patterns since it has been noted in studies of rats consuming a standard diet, high-fat diet, or chow. Additionally, exercise (and high intensity interval training, specifically) induces genetic changes within the microbes to more efficiently use metabolic pathways such as the TCA cycle to help the microbes metabolize energy from food.[5]

In another study, the gut microbiome of obese, hypertensive, and control rats were identified using 16S rRNA gene sequencing before and after a testing period during which the animals trained on a treadmill for 30 min per day, five days per week for four weeks. After the testing period, not only did the ratio of Firmicutes to Bacteroidetes improve as expected, but also the number of health-promoting microbes including *Streptococcus alactolyticus*, *Bifidobacterium animalis*, *Ruminococcus gnavus*, *Aggregatibacter pneumotropica*, and *Bifidobacterium pseudolongum*, and other bacteria from the Pseudomonas and Lactobacillus families. Favorable microbial alterations were noted in all rat genotypes, though not all genotypes represented the same degree of microbial variations across all bacteria phyla.[6] Overall, the changes in microbial diversity resulted in greater production of fermentation byproducts including butyrate, lactic acid, CO_2, acetic acid and/or ethanol to maintain a more acidic environment conducive to digestion, gut epithelial health, and the exclusion of pathogens.

Establishing a healthy microbiome is vital for launching and maintaining good health. Emerging research is showing us that not only are dietary changes an effective means of altering the gut microbiome, but exercise also is an independent modifier. If exercise can help alter the diversity and the activity of health-promoting microbes in the gut, then it should be embraced as a critical aspect of a healthy lifestyle.

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Dr. David M. Brady has 26 years of experience as an integrative medicine practitioner and over 22 years in health sciences academia. He is a licensed naturopathic medical physician in Connecticut and Vermont, is board certified in functional medicine and clinical nutrition, and completed his initial clinical training as a doctor of chiropractic in 1991. He currently serves as Vice President for Health Sciences, Director of the Human Nutrition Institute, and an associate professor of clinical sciences at the University of Bridgeport in Connecticut. He maintains a private practice, Whole Body Medicine, in Fairfield, Connecticut. Dr. Brady is also an expert consultant to the professional nutraceutical and nutritional supplement and clinical medical laboratory industries, serving as Chief Medical Officer for Designs for Health, Inc. and Diagnostic Solutions Labs, LLC. He is an internationally sought-after presenter on nutritional, functional and integrative medicine. He has appeared on the speaking panel of some of the largest and most prestigious conferences in the field including IFM, ACAM, A4M, IHS, AANP, and many more. Dr. Brady has published a multitude of peer-reviewed scientific papers and textbooks related to chronic pain, autoimmunity, and functional gastroenterology and is a featured contributing author in the medical textbooks *Advancing Medicine with Food and Nutrients* - 2nd Ed. (edited by Kohlstadt I-Johns Hopkins Univ.), *Integrative Gastroenterology* (edited by Mullin G-Johns Hopkins Hospital) and *Laboratory Evaluations for Integrative and Functional Medicine* - 2nd Ed. (edited by Bralley & Lord). His latest popular book, *The Fibro-Fix*, was published by Rodale and released July of 2016. You can learn more at DrDavidBrady.com and FibroFix.com.

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Casting a Broad Net to Maximize Lyme Disease Recovery

by Scott Forsgren, FDN-P

After a tick bite in Northern California in 1996, I became mysteriously ill in early 1997 with a myriad of symptoms including full-body burning sensations, flu-like symptoms, cognitive issues, difficulty walking, balance issues, visual disturbances, gastrointestinal distress, muscle and joint pain, numbness and tingling, crawling sensations, air hunger, light sensitivity, anxiety, depression, OCD, and more.

Over the next eight years, I had seen 45 doctors and specialists of all kinds and still had no explanation for my failing health. In 2005, an MD referred me to an acupuncturist doing electrodermal screening (EAV/EDS) to explore food sensitivities. It was only then that I was told to have my doctor run tests for *Borrelia*, *Bartonella*, *Babesia*, and *Ehrlichia*. Fortunately, the doctor was able to confirm that these were in fact issues, and I was diagnosed with Lyme disease in July 2005.

My initial approach to recovery was to first "kill the bugs," then detoxify, and finally consider mental and emotional factors that may have contributed to what I was experiencing. After having studied the work of Dietrich Klinghardt, MD, PhD, and the "Klinghardt Axiom," my understanding of the priorities for regaining wellness was turned on its head. Today, my belief is that exploring mental and emotional health is a top priority, followed by detoxification, and lastly supporting the body against microbial overgrowths. Nonetheless, all three of these must be explored and addressed simultaneously in order to make lasting progress. This axiom was one of the concepts that led me to consider broader models of healing early on.

In the realm of Lyme disease treatment, it is easy to fall into the belief that health would be restored if only the bugs could somehow be eradicated. The focus often entirely becomes eliminating the organisms involved in Lyme disease and its coinfections, particularly *Borrelia*, *Bartonella*, and *Babesia*. While these, no doubt, play a role in the struggles of those dealing with Lyme disease, they represent only a portion of the many factors that must be explored to regain optimal health. In my personal experience and that of many others, I have engaged with over the years, casting a broad net is often the best way to maximize Lyme disease recovery.

Casting a broad net may include the following:

- Reducing the impact of negative thought patterns and past **emotional traumas** and conflicts,
- Eliminating environmental **mold and biotoxin exposures,**
- Optimizing **nutrition** and improving GI health,
- Stabilizing **mast cell activation syndrome** (MCAS),
- **Detoxifying** the body and improving the terrain,
- Reducing exposure to **EMR/EMFs,**
- Supporting **kryptopyrroluria** (KPU),
- Addressing **parasites**,
- Supporting the body against other **microbial overgrowths**,
- Identifying **dental contributors** to chronic illness, and
- Rewiring **limbic system impairment.**

Reducing the Impact of Negative Thought Patterns and Past Emotional Traumas and Conflicts

Based on my personal experience and observation of people with Lyme disease over many years, there seems to be a common pattern where many are Type A (or Type A+) personalities, often perfectionists, and often not feeling deserving of or worthy of wellness. Very little with Lyme disease is black and white; and while this may not apply to everyone, it does seem to represent a pattern which may have been a contributor to setting the stage for health challenges in the first place.

Emotional traumas and conflicts do not necessarily have to be personally experienced; they may be inherited from our ancestors or even past lives (if one believes in this possibility). Further, if emotional contributors did not play a role prior to illness, the process of going through something as invalidating as one's Lyme experience often can itself create a PTSD-like condition, which could then benefit from work in this realm.

continued on page 38 ➤

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Lyme Disease Recovery

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Family constellation therapy, applied psycho-neurobiology (APN), eye movement desensitization and reprocessing (EMDR), BodyTalk, the Emotion Code, EFT, and related techniques may be very helpful in exploring this realm.

I highly recommend the book *How to Heal Yourself When No One Else Can: A Total Self-Healing Approach for Mind, Body, and Spirit* by Amy B. Scher.

Creating a healthier environment in which we exist on a daily basis creates a healthier body and a healthier person. With many modern-day illnesses being viewed as environmental illnesses, recovery without an environmental focus may remain elusive.

Eliminating Environmental Mold and Biotoxin Exposures

Looking back on my recovery journey, I recognize the significant role that living in a moldy home played in my downward spiral and inability to regain balance for many years. If someone has "Lyme disease," I cannot stress enough the importance of ensuring that your environment is supportive of healing. From my perspective, it is nearly impossible to regain health from a chronic condition if one is surrounded by their kryptonite on a daily basis.

While it may be true that only about 25% of the population are genetically predisposed to biotoxin illness resulting from exposure to water-damaged buildings, in the chronically ill population, this number is much higher. It is uncommon to find someone that is struggling with Lyme or a similar condition that is not predisposed to some form of biotoxin illness.

The environment around us is not separate from us, and we must optimize our environment in order to optimize our health. One of the most important explorations in this realm is mold and related environmental exposures from water-damaged buildings. This may include the home, work, school, church, or even one's car.

While very few tests are perfect, the Mycometrics ERMI is a tool I have benefited from and recommend. It is a test performed on a dust sample taken from the environment which then identifies and quantifies various molds and provides an ERMI score. In genetically-susceptible individuals, the ERMI score should be < 2 (in some cases even lower). An ERMI result can be used to calculate a HERTSMI-2 score (or the more limited HERTSMI-2 test can be ordered rather than the ERMI; some practitioners use this as an initial screening tool though I personally prefer the full ERMI for initial testing purposes), which can provide additional insights as to the potential for a chronic inflammatory condition with exposure to a given environment. In some cases, an indoor environmental professional (IEP) may be the only way to identify an environmental problem.

Once identified, necessary action may include remediation or moving to a new environment. In many cases, if the problem is not severe, remediation may be the best way to address the exposure. Incorporating air filtration devices such as IQAir, Air Oasis, IntelliPure, and others may be helpful; however, these should not be viewed as entire solutions to the problem alone – the source of the problem must be addressed.

When mold exposure has been ruled out or addressed, a significant roadblock to recovery has been removed. I cannot stress enough how important this area is to explore as it can be one of the most significant impedances to overall progress. Don't miss this important issue; it may save you years of struggle in your recovery from Lyme disease.

Optimizing Nutrition and Improving GI Health

The majority of the immune system originates in the gut. Thus, optimizing GI health can have far-reaching effects within the body.

There are many different diets that have been found helpful. However, these are highly individualized and may be best identified by a nutritionist for one's unique needs. These may include Paleo, Autoimmune Paleo (AIP), Ketogenic, GAPS, SCD, low FODMAP, low histamine, and many others.

The first step is to remove any foods that are stressful to the body. For many, a good starting point is to eliminate gluten, cow dairy, and sugar. Food sensitivity testing can be performed by a doctor. Foods that are stressful to the system should also be avoided.

The next step is to incorporate nutritionally-dense, real foods in the diet. This may include the following:

- Incorporating as much organic food as possible;
- Eliminating GMO foods and restricting processed foods;
- Consuming organic grass-fed meats, organic pasture-raised poultry, or wild-caught seafood;
- Adding healthy fats such as butter, ghee, chia seeds, coconut oil, olive and other healthful oils; and
- Introducing bone broth and fermented foods (only if tolerated).

I am personally a big fan of a daily "Power Shake," which includes high-quality protein, collagen powder, a fiber blend, phospholipids, healthy fats, chia seeds, and an organic nut milk.

In terms of supporting the health of the GI tract and minimizing intestinal hyperpermeability (leaky gut), one may benefit from exploring MegaSporeBiotic or RESTORE for Gut Health.

In many cases, it may be important to consider and address dysbiosis, including SIBO/SIFO, to improve overall GI health.

Stabilizing Mast Cell Activation Syndrome (MCAS)

Mast cell activation syndrome and overproduction of histamine and other mediators has emerged in the realm of

Lyme disease most notably very recently. Mast cells are part of the immune system that are intended to protect us, but they can become activated by triggers that lead to an over-activation and release of histamine and other substances resulting in increased inflammation throughout the body.

Symptoms may include rashes, hives, flushing, itching, nausea, diarrhea, low blood pressure, shortness of breath, heart palpitations, headaches, brain fog, anxiety, fatigue, weight loss, weakness, dizziness, osteoporosis, and many others.

A primary trigger for mast cell activation is mold exposure, but there are many other triggers such as parasites, Lyme disease, environmental toxins, medications, foods, supplements, temperature changes, physical and/or emotional stress, EMFs, and more.

Consideration should be given to mast cell activation and histamine overproduction early in the treatment process in order to reduce inflammation, and thus symptoms, but also to allow other treatment options to be easier to tolerate. Treating MCAS often leads to notable shifts in how people feel – while simultaneously working to remove or minimize the underlying triggers in support of longer-term improvement.

When MCAS is an issue, a low histamine diet may be helpful. While a low histamine diet is not easy, notable shifts in overall symptoms may be observed. There are many low histamine food lists online; and while they don't all agree on what is or is not allowed, incorporating a low histamine diet may be a very helpful step. It is worth noting that fermented foods are one of the key items to remove when mast cell activation plays a role.

Treatment options may consist of Ketotifen, Cromolyn, DAO (Diamine Oxidase), Algonot NeuroProtek, Seeking Health HistaminX, Seeking Health Probiota HistaminX, Integrative Therapeutics AllQlear, quercetin, vitamin C, and various other mast cell stabilizers or histamine reducers.

Detoxifying the Body and Improving the Terrain

Detoxification is one of the keys to recovering from a condition such as Lyme disease. Microbes thrive in a toxic terrain with a dysregulated immune system. Cleaning up the inner terrain makes one a less-hospitable host. Further, various microbes such as Candida and parasites may actually be present in the body, in part, to serve us in that they hold or concentrate heavy metals in order to protect us from their deleterious effects.

Detoxification should first and foremost consider toxin avoidance. If one does not encounter toxins in the environment, there is far less of a burden that must then be detoxified. This includes toxins in our food, water, air, personal care products, cleaning supplies, cookware, and almost anything that we come in contact with.

Heavy metals, pesticides, chemicals, and mycotoxins are key considerations in a comprehensive detoxification strategy. One must also consider that there are toxins produced by the microbes within us and by our own metabolic processes.

A well-planned foundation for detoxification generally includes binders, drainage remedies and organ support, and trace minerals. Once the foundation is in place, individualized strategies may be needed to support detoxification of specific toxins such as aluminum, glyphosate, or other common environmental toxins.

Binders may include Supreme Nutrition Takesumi Supreme, BioPure ZeoBind, CellCore Biosciences Biotoxin Binder or HM-ET Binder, Beyond Balance TOX-EASE BIND, Bio-Botanical Research GI Detox, QuickSilver Scientific Ultra Binder, chlorella, and others.

Drainage remedies and organ support products are available from PEKANA, Energetix, Physica Energetics, DesBio, BioRay, Viatrexx, and others.

Additional tools which may be helpful in supporting detoxification may include colonics, coffee enemas, castor oil packs, infrared sauna, ionic footbaths, oil pulling, and more.

Detoxification is a primary strategy for regaining wellness long-term.

Reducing Exposure to EMR/EMFs

In my personal journey, I became aware of the impact of exposure to electromagnetic fields through Dr. Klinghardt's work. Based on his recommendations, I have slept in a Faraday cage using silver-lined cloth since 2006. At the time, his position was not taken seriously by many; but today, there is more consensus as to how harmful living in a soup of invisible electromagnetic fields can really be.

While it is not possible to avoid EMFs entirely, the focus should be on reducing exposure while sleeping as this is when the body is regenerating and repairing. During the day, avoiding obvious exposures is a logical step, but not always practical.

I personally eliminated all cordless phones, limit my cell phone use to speakerphone or texting and utilize a protective case (SafeSleeve, Pong, or DefenderShield), turn off my Wi-Fi automatically during the day when I work at my desk or during the night and use hard-wired devices when possible, and implemented Stetzer filters in my office to reduce dirty electricity.

For my sleeping environment, I use the silver-lined cloth, have nothing plugged into the wall in my bedroom, and don't have any technology in my sleep location. For years, I went as far as to turn off the circuit breaker to the bedroom entirely each night when I was recovering from Lyme.

While various meters are readily available, it takes several different meters to measure all of the potential stressors in this realm. I ultimately hired a building biologist to evaluate my home and make recommendations for reducing exposures, and I recommend others do this as well.

EMF sensitivity is correlated to the level of heavy metal toxicity in the body, and thus, a focus on detoxification and removal of heavy metals may reduce symptoms of electromagnetic hypersensitivity (EHS). Dr. Klinghardt has suggested that propolis and rosemary taken orally may help support the body against the harmful effects of EMFs, but this does not replace the need for focused exposure reduction. ➤

Lyme Disease Recovery

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Creating a healthier environment in which we exist on a daily basis creates a healthier body and a healthier person. With many modern-day illnesses being viewed as environmental illnesses, recovery without an environmental focus may remain elusive.

Supporting Kryptopyrroluria (KPU)

KPU may be an inherited condition, but it can also be induced by psychological trauma or chronic infections. Epigenetic influences such as intrauterine, birth, childhood, or transgenerational trauma may trigger KPU; other triggers may include a car accident, divorce or emotional trauma, and physical or sexual abuse. Chronic infections, such as Lyme disease, may themselves serve as a trigger for the condition. Common symptoms include white spots on the nails, poor dream recall, and depression.

The KPU condition results in a significant loss of zinc, vitamin B6, biotin, manganese, arachidonic acid, and other nutrients from the body.

Dr. Klinghardt has found a high correlation between patients with chronic Lyme disease and those with KPU; four of five patients with chronic or persistent Lyme disease test highly positive for this condition. That suggests that 80% or more of patients with symptoms of chronic Lyme disease may benefit from a treatment protocol that addresses KPU. KPU may lead, in part, to a higher burden of heavy metal toxicity. Addressing KPU may lead to stabilization of mast cells and lowered responses to relative rises in histamine.

Testing is available from DHA Labs, Health Diagnostics and Research Institute, and Great Plains Laboratory.

Treatment is to supplement zinc, vitamin B6 (or P5P), biotin, manganese, arachidonic acid, and other co-factors. BioPure CORE and CORE-S are products particularly formulated by Dr. Klinghardt and are options I have personally used in my own recovery from Lyme disease for over a decade.

Addressing Parasites

It is no longer the case that foreign travel is a pre-requisite for acquiring parasitic infestation. In one urban area, every salad bar tested was positive for parasite eggs and protozoa. Sushi is another common source of living parasites.

Two of the leaders in this realm are Simon Yu, MD, and Dietrich Klinghardt, MD, PhD. Both aggressively treat parasites in their patients when necessary and have found that this is best done very early in the treatment of microbial contributors to "dis-ease."

Sadly, this topic is widely ignored, as finding evidence of parasites in most available laboratory testing is difficult at best. Often, various forms of energetic testing may be the only way to get some insight into the potential for parasites, or a practitioner may need to empirically treat and monitor patient response.

Laboratory testing may include Diagnos-Techs Expanded GI Health Panel, GI MAP (Microbial Assay Plus), BioHealth GI Screen, Genova Comprehensive Digestive Stool Analysis, and Doctor's Data Comprehensive Stool Analysis with Parasitology. ParaWellness Research offers microscopic evaluations of both stool and urine to identify parasites.

Energetic testing may include Autonomic Response Testing (ART) or device-based testing such as with ZYTO, ASYRA/QEST4, Kindling, MORA, Acupuncture Meridian Assessment (AMA), and others.

Treatment of parasites may be approached with pharmaceutical and natural options. Pharmaceutical protocols are often based on the work of Simon Yu, MD, and may include medications such as ivermectin, nitazoxanide, praziquantel, albendazole, pyrantel pamoate, and others.

Natural options may include Beyond Balance MC-PZ, PARAZOMIN, or PARALLEVIARE; Supreme Nutrition Mimosa Supreme or BioPure Mimosa Pudica; BioPure NEXUS Suppositories; Byron White Formulas A-P; Jernigan Paragen; CellCore Biosciences Para 1; Energetix Core Para-V; and others. Incorporating a frequency-based homeopathic option such as Pekana HELMIN, Viatrexx Amoebas or Parasites, Energetix Para-Chord, or DesBio Amoeba or VER may also be very helpful.

It is important to remember that killing parasites in the body can result in a release of heavy metals, and thus, detoxification support is critical. While detoxification support should be an ongoing part of any Lyme recovery protocol, it is particularly important when addressing parasites.

Supporting the Body Against Other Microbial Overgrowths

While battling with microbes is likely not the ideal focus of a treatment protocol, it does need to be given consideration and appropriate supportive measures incorporated. While there may be a place for antibiotics, many do quite well with natural protocols; and many very effective natural options have emerged in the realm of Lyme disease since my initial diagnosis over ten years ago.

In many cases, the Lyme co-infections *Bartonella* and *Babesia* may be more symptom-producing and require more focus than *Borrelia* itself.

It is important to consider that symptoms resulting from these Lyme-related pathogens may not be entirely from the microbes, but they may instead be the result of the interplay between the immune system of the host and the microbe, resulting in high levels of inflammation and thus symptoms. Modulating the immune response and creating tolerance or integration of the host with its microbiome is a key strategy. This may be approached with tools such as low-dose immunotherapy, low-dose naltrexone, and homeopathy.

Some options to explore in the realm of natural treatments for Lyme and co-infections may include Beyond Balance, BioPure, Byron White Formulas, Maypa Herbals, NutraMedix, Researched Nutritionals, Supreme Nutrition, Vital Plan, and others.

continued on page 42 ➤

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Lyme Disease Recovery

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It is important to consider that many with chronic Lyme may also need to explore chronic viruses, fungal overgrowths, and bacteria such as *Rickettsia, Ehrlichia, Anaplasma, Mycoplasma, Chlamydia pneumoniae*, and others.

Identifying Dental Contributors to Chronic Illness

Dental issues can be a major player and possibly even a factor in setting the stage for illness in the first place. In my personal journey, I had my wisdom teeth removed as a teenager, had a dry-socket, and years later needed to address two cavitations as part of my journey through Lyme disease.

Amalgams may contribute to our body burden of mercury and other heavy metals. While these would ideally be removed (by a biological dentist skilled in safe removal), timing of dental procedures should be discussed with one's doctor as to when any interventions may be most appropriate and tolerated by the body.

Every time a burden is identified and lifted, the body is better able to regain balance and do what it was designed to do – not to only survive, but to thrive!

Root canals may have far-reaching implications within the body as a dead tooth left in the mouth may impact the organs and meridians associated with the tooth and be an ongoing source of infection within the body.

Cavitations are infections in the jaw-bone often in areas of prior tooth extraction, but these can occur elsewhere. Those with Lyme-related co-infections may be at higher risk for dental cavitations, and these may require surgical interventions to remove the stressor from the body. Dr. Klinghardt has suggested that cavitations are an issue in nearly all of his patients with chronic Lyme disease.

The tonsils are another area that may warrant exploration in some cases; particularly in those with a history of strep or in those with a PANDAS-like condition.

While significant dental issues will require a biological dentist or oral surgeon to address, self-care for optimizing general oral health may include Supreme Nutrition Oral Defense, Bio-Botanical Research DentalCidin and Biocidin LSF, essential oils, and oil pulling.

Rewiring Limbic System Impairment

The limbic system includes the hypothalamus, hippocampus, amygdala, and cingulate cortex. It is the "feeling and reacting brain" and is involved in determining our level of safety in terms of those things one may smell, see, hear, taste, and feel. The limbic system is thought of as the body's "alarm center" or "anxiety switch." The limbic system impacts the functioning of the immune system, endocrine system, and the autonomic nervous system (which controls blood pressure, heart rate, breathing, digestion, and more).

Many different triggers can lead to limbic system impairment. These may include exposure to mold in a water-damaged building, chemical or pesticide exposure, bacteria, viruses, other microbial overgrowths, physical, mental, or emotional trauma, and more.

At one time, the limbic system's efforts to protect the body from a significant stressor may have been perfectly appropriate. However, later, it may react with the same vigilance to a stimulus that is no longer an actual threat. The body may at one point react appropriately to a tiger, and later, may react in the same stressful manner to a cute kitten outside the window. This inappropriate response may continue to negatively impact the immune, endocrine, and autonomic nervous systems and lead to the body continuing to express a wide array of symptoms.

Programs such as DNRS (Dynamic Neural Retraining System; https://retrainingthebrain.com), created by Annie Hopper, incorporate numerous components to "rewire" or "reboot" the limbic system such that it no longer has a stress response to nonthreatening stimuli. For many, this work has been profound.

Final Thoughts

While there are certainly additional considerations in recovering from Lyme disease not covered in this article, the key takeaway is to cast the broadest net possible to ensure that key contributors to illness are considered and addressed. Every time a burden is identified and lifted, the body is better able to regain balance and do what it was designed to do – not to only survive, but to thrive! Here's to your health!

Disclaimer

Nothing in this article is intended to serve as medical advice. Lyme disease is a complex condition which requires medical guidance and should not be approached from a self-treatment perspective. Always consult with your medical authority before making any changes to your health optimization protocol.

Resources

The resources below contain items mentioned in the article above or are recent podcasts of *BetterHealthGuy Blogcasts* where these topics were discussed.

Emotional Trauma

Microbes, Toxins, Unresolved Emotional Conflicts: A Unifying Theory – Scott Forsgren – http://www.betterhealthguy.com/axiom

Reducing the Impact of Negative Thought Patterns and Past Emotional Traumas and Conflicts

Podcast: *Whole Life Health* with Dawn DeSylvia, MD – http://www.betterhealthguy.com/episode33

Podcast: *Optimizing Wellness with Energy Therapy* with Amy B. Scher – http://www.betterhealthguy.com/episode11

Eliminating Environmental Mold and Biotoxin Exposures
Surviving Mold – http://www.survivingmold.com
International Society for Environmentally Acquired Illness – http://www.iseai.org
Mycometrics – http://www.mycometrics.com
Paradigm Change – http://paradigmchange.me
It Takes Time – http://it-takes-time.com

Mold & Mycotoxins: Current Evaluation and Treatment 2016, Neil Nathan MD – http://www.neilnathanmd.com
Mold and Mycotoxins: Often Overlooked Factors in Chronic Lyme Disease – Scott Forsgren with Neil Nathan, MD, and Wayne Anderson, ND – http://betterhealthguy.com/mycotoxins
Jill Carnahan's Free Mold Guide – https://www.jillcarnahan.com/exposed-to-mold-now-what

Podcast: *Toxicity Testing* with William Shaw, PhD – http://betterhealthguy.com/episode62
Podcast: *Brain on Fire* with Mary Ackerley, MD – http://www.betterhealthguy.com/episode49
Podcast: *Is Your House Making You Sick* with Andrea Fabry – http://betterhealthguy.com/episode48
Podcast: *CIRS Update* with Keith Berndtson, MD – http://betterhealthguy.com/episode37
Podcast: *Beyond Lyme* with Raj Patel, MD – http://betterhealthguy.com/episode26
Podcast: *Cutting Edge Medicine* with Neil Nathan, MD – http://betterhealthguy.com/episode19
Podcast: *CIRS Down Under* with Sandeep Gupta, MD – http://betterhealthguy.com/episode17
Podcast: *It's Mold I'm Told* with John Banta – http://betterhealthguy.com/episode14

Lyme Disease Recovery

Optimizing Nutrition and Improving GI Health
MegaSporeBiotic – http://microbiomelabs.com
RESTORE for Gut Health – http://restore4life.com

Stabilizing Mast Cell Activation Syndrome (MCAS)
Jill Carnahan, MD: https://www.jillcarnahan.com/2016/10/31/mast-cell-activation-syndrome-mcas-when-histamine-goes-haywire
Jill Carnahan, MD: https://www.jillcarnahan.com/2018/03/12/mold-is-a-major-trigger-of-mast-activation-cell-syndrome
T.C. Theoharides, PhD, MD – http://www.mastcellmaster.com

Food List: https://healinghistamine.com/histamine-in-food-lists
Food List: http://alisonvickery.com.au
Food List: https://www.mindbodygreen.com/0-11175/everything-you-need-to-know-about-histamine-intolerance.html

Podcast: *Mast Cell Master* with T.C. Theoharides, PhD, MD – http://www.betterhealthguy.com/episode58
Podcast: *Mast Cell Activation Syndrome* with Jill Carnahan, MD – http://www.betterhealthguy.com/episode20

Detoxifying the Body and Improving the Terrain
Podcast: *Toxicity Testing* with William Shaw, PhD – http://www.betterhealthguy.com/episode62
Podcast: *Detoxification and Liposomes* with Christopher Shade, PhD – http://www.betterhealthguy.com/episode57

Lyme Disease Recovery

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Podcast: *Detoxification* with Wendy Myers, FDN-P – http://www.betterhealthguy.com/episode56

Reducing Exposure to EMR/EMFs

Podcast: *Exploring EMFs* with Peter Sullivan – http://www.betterhealthguy.com/episode40

Supporting Kryptopyrroluria (KPU)

Kryptopyrroluria (aka Hemopyrrollactamuria) 2017: A Major Piece of the Puzzle in Overcoming Chronic Lyme Disease by Scott Forsgren, FDN-P and Dietrich Klinghardt, MD, PhD – http://www.betterhealthguy.com/kpu-2017

Addressing Parasites

Podcast: *Parasites in Chronic Illness* with Todd Watts, DC – http://www.betterhealthguy.com/episode25

Podcast: *Pondering Parasites* with Raphael d'Angelo, MD – http://www.betterhealthguy.com/episode9

Podcast: *Debugging Your Health* with Susan Luschas, PhD – http://www.betterhealthguy.com/episode6

Supporting the Body Against Other Microbial Overgrowths

Podcast: *LymeStop* with Tony Smith, DC – http://www.betterhealthguy.com/episode64

Podcast: *Beating Bartonella* with Evan Hirsch, MD – http://www.betterhealthguy.com/episode38

Podcast: *Low Dose Immunotherapy* with Ty Vincent, MD – http://www.betterhealthguy.com/episode27

Podcast: *Healing Lyme* with Stephen Buhner – http://www.betterhealthguy.com/episode22

Podcast: *How Can I Get Better?* with Richard Horowitz, MD – http://www.betterhealthguy.com/episode21

Podcast: *Restoring Your Health from Lyme Disease* with Bill Rawls, MD – http://www.betterhealthguy.com/episode4

Podcast: *Pearls from a Master: Approaching Lyme Disease and Chronic Illness Recovery* with Dr. Michael Lebowitz, DC – http://www.betterhealthguy.com/episode3

Identifying Dental Contributors to Chronic Illness

Podcast: *Biological Dentistry* with Stuart Nunnally, DDS – http://www.betterhealthguy.com/episode51

Rewiring Limbic System Impairment

Podcast: *DNRS* with Annie Hopper – http://www.betterhealthguy.com/episode42

Additional Resources

Podcast: *Goodbye Lyme* with Greg Lee, LAc – http://www.betterhealthguy.com/episode65

Podcast: *Fixing Lyme Disease* with Jay Davidson, DC – http://www.betterhealthguy.com/episode52

Podcast: *Lyme-Ed* with Nicola McFadzean Ducharme, ND – http://www.betterhealthguy.com/episode47

Podcast: *Pregnancy in Lyme* with Ann Corson, MD – http://www.betterhealthguy.com/episode46

Podcast: *New Paradigms in Lyme Disease Treatment* with Connie Strasheim – http://www.betterhealthguy.com/episode45

Podcast: *Overcoming Lyme* with Darin Ingels, ND – http://www.betterhealthguy.com/episode43

Podcast: *First Lady of Nutrition* with Ann Louise Gittleman, PhD, CNS – http://www.betterhealthguy.com/episode36

Podcast: *Unique Approaches to Lyme Disease Treatment* with Shawn Naylor, DO – http://www.betterhealthguy.com/episode32

Podcast: *Approaches to Autism* with Amy Derksen, ND – http://www.betterhealthguy.com/episode30

Podcast: *Effective Treatment of Lyme Disease* with Lee Cowden, MD – http://www.betterhealthguy.com/episode29

Podcast: *Beating Lyme Disease* with David Jernigan, DC – http://www.betterhealthguy.com/episode24

Podcast: *Klinghardt Conversations* with Dietrich Klinghardt, MD, PhD – http://www.betterhealthguy.com/episode15

Podcast: *Navigating Chronic Illness* with Christine Schaffner, ND – http://www.betterhealthguy.com/episode13

Podcast: A Naturopathic Approach to Recovering from Chronic "Dise-Ease" with Katie Dahlgren, ND – http://www.betterhealthguy.com/episode8

Podcast: *Recovering from Lyme Disease and Mold Illness* with Dave Ou, MD – http://www.betterhealthguy.com/episode7

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Scott Forsgren, FDN-P, is a health coach, blogger, podcaster, health writer, and advocate. He is the editor and founder of BetterHealthGuy.com, where he shares his 21-year journey through the world of Lyme disease, mold illness, and the myriad of factors that chronic illness often entails.

His podcast "BetterHealthGuy Blogcast" interviews many of the leaders in the field and is available on his web site, YouTube, iTunes, Google Play, Stitcher, and Spotify. He has been interviewed on numerous podcasts and has lectured on his recovery from chronic illness as an invited speaker of the Klinghardt Academy, at AutismOne, and on three Chronic Lyme Disease Summits. He has written for the *Townsend Letter* and other publications.

He is the co-founder of The Forum for Integrative Medicine, which hosts an annual conference bringing together some of the top integrative practitioners to share practical tools for treating complex, chronic illness.

He serves on the Board of Directors of LymeLight Foundation which provides treatment grants to children and young adults dealing with Lyme disease.

Today, Scott is grateful for his current state of health and all that he has learned on this life-changing journey.

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How FCT® Cured Me from Devastating Lyme Disease Without a Single Antibiotic: A Patient Report

by Helen Baldwin

In December of 2010, I developed swollen painful joints, fatigue, headaches, brain fog, and was diagnosed with Lyme disease through a blood test. After receiving for a month an oral antibiotic, doxycycline, I felt only partial relief and had developed chemical sensitivities. I refused intravenous antibiotics and, instead, took herbal Lyme protocol and acupuncture treatments. These helped a little, but when I was having my periods, all of the symptoms would return with even worse headaches. I went to see Savely Yurkovsky, MD, in Chappaqua, New York, who practices FCT (Field Control Therapy®) and who, through his bio-resonance testing, confirmed that I still had Lyme infection. But the main problem, he said, was not Lyme but that my immune system couldn't fight it due to mercury and electromagnetic radiation poisonings. I did have mercury fillings in the past.

The best way to treat Lyme, he said, was not through antibiotics or alternative pills and electrocutions to kill chronic Lyme infection, because this is not possible for as long as the immune system remains poisoned and unable to control an infection. Besides, he said, all of these treatments to kill Lyme only make it worse because this bacterium has an uncanny ability to mutate and turn into even worse, more aggressive forms. That is why the goal was to turn my own immune system, by depoisoning and strengthening its organs, into the strongest antibiotic against Lyme.

This sounded too good to be true, that some homeopathic water drops would do what strong antibiotics and herbs couldn't, but to my surprise and joy, following just two treatments, with these drops for mercury, Lyme, electromagnetic radiation and strengthening my immune and other weak organs, as well as acquiring EMF protective devices, Memon, all of my Lyme symptoms were gone for almost four years. During that time, I stopped health maintenance visits, which Dr. Yurkovsky recommended, and likely because of that I got re-infected with Lyme in December of 2015.

…the goal was to turn my own immune system, by depoisoning and strengthening its organs, into the strongest antibiotic against Lyme.

This time around it made me much sicker where I became disabled and quit my job. I had many and severe symptoms: migraine headaches, brain fog, poor memory and concentration, anxiety and panic attacks, heart palpitations, imbalance, popping in the ears, jaw and multiple joints pain, allergies to foods and chemicals, gastrointestinal symptoms with mucus in the bowels, shortness of breath, blurry vision, severe fatigue, and extreme electromagnetic sensitivity where computer and even shopping, under fluorescent lights, made me feel like I was dissolving and dying.

I tried several alternative treatments, including those to desensitize me from allergic foods and chemicals, which used applied kinesiology and Bio-set, but some symptoms would improve while others, worsen, and after more than a year I realized that I was getting nowhere. I traveled back to Dr. Yurkovsky in February of 2016. Based on his bio-resonance testing, he told me that I must have gotten re-poisoned with mercury and other toxic metals either from seafood or other sources, which poisoned and suppressed my immune and other organs, leading to many other infections besides Lyme. These were Babesia, parasites, herpes and flu viruses, candidiasis, molds. All of these were all over my body, including the brain, and on top of it were attracting, like magnets, electromagnetic radiation, from all over.

He told me to stay away from electronics and to stop all of the supplements for Lyme because a poisoned and infected body has unpredictable reactions to any treatment, and these won't get through to the poisons anyway. I went on his homeopathic drops again to de-poison, disinfect, and revitalize, virtually, all of my organs from head to toe. Fortunately, and, again, I began making progress immediately, with each treatment. My mother said, "Helen, your voice is different, it is more coherent." I literally felt something was

draining, pouring out from my brain into my ears and down my spine for weeks after I took just a drop of a remedy for mutated Lyme. I had my life back and I was almost a different person. After other drops, I felt things coming out of my head too. After Head I + Metals remedy, mucus was pouring out of my sinuses and caustic tasting saliva from my mouth; my jaw ached with a liquid coming out of my gums for days. All in all, my head became so much better that, even, electronics and fluorescent lights stopped bothering me that much, which was a proof that I was not crazy, as my conventional doctor thought. My mental clarity became almost normal; it hasn't been like that for thirty years and, especially, last five years. No headaches for months. My skin became remarkably better and, completely different, too. Wow! It became much smoother, with all the bumps, scales and redness of thirty years gone. I always thought it was allergies. People have said, "You look fabulous." Dr. Yurkovsky's bio-resonance testing kept finding mercury and toxic metals in my body, even after I discontinued all seafood, which he said was bothering him; but since May of 2017, after receiving the last remedy for Lyme, I never had Lyme symptoms or had to take the remedy again and consider myself cured from it.

Later on, Dr. Yurkovsky solved my mercury and toxic metal re-poisoning mystery, which were causing me periodic stomach upset, through testing by bio-resonance my spring water and Himalayan sea salt. Interestingly, internet has confirmed that this salt does contain mercury and that, many spring waters are, often, contaminated with toxic metals. I've been looking to return to work, for quite a while by now, and all I can say is that FCT has saved my life, as I stated the same on YouTube, too. ◆

Savely Yurkovsky, MD, a pediatrician, internist, and cardiologist, has evolved a novel medical model that interfaces important knowledge from biology, medicine, toxicology, and physics. Its primary focus is on the most important aspect of chronic diseases – its causes – along with the most effective diagnostic and therapeutic means to address these. This has transformed the often-imprecise medical interventions into a far more effective, exact, and predictable science. He has founded a teaching organization, SYY Integrated Health Systems, Ltd., which provides training in this medical system under the concept of FCT®, Field Control Therapy. This concept as medicine of the future was suggested by Professor Emeritus of Materials Science at Stanford University, William A Tiller, PhD. Dr. Yurkovksy has presented FCT at many professional symposia in both the US and Europe, including the annual Bio-terrorism 2005 conference: "Unified Science & Technology for Reducing Biological Threats & Countering Terrorism" with affiliation to the Homeland Security Office and Harvard Medical School, among others.

Dr. Yurkovsky 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" in 2005. He has authored numerous articles and the book, *The Power of Digital Medicine* that was endorsed by prominent scientists from MIT, Columbia, and Stanford Universities and contributed a chapter on homeopathy to the textbook of *Integrative Gastroenterology*, edited by the chief of integrative gastroenterology at Johns Hopkins University medical school, Gerard Mullin, MD.

Dr. Yurkovsky maintains a private practice with a cause-based approach to diseases, covering from pediatrics to geriatrics, located in Chappaqua, New York.

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Insights from the International Center for Cannabis Therapy Part 3:

Reviewing the Many Applications of Cannabinoid-Rich Hemp Oil and the Role of the Gut-Brain Axis

by Chris D. Meletis, ND, and Kimberly Wilkes

This is the third and final installment of a series of articles discussing cannabinoid-rich hemp oil and a new certification program for dietary supplement manufacturers and healthcare practitioners offered by the International Center for Cannabis Therapy (ICCT). As Chief Medical Officer–USA of the ICCT, a Czech Republic-based partnership of qualified doctors and scientists who specialize in the medical application of cannabis, Dr. Meletis is an expert on the clinical applications and research supporting the use of cannabinoid-rich hemp oil and its effects on the endocannabinoid system. Last month, we discussed the endocannabinoid system, its role in health, and how the endocannabinoid system interacts with the adrenals, sex hormones, and gut. We also shared pre-clinical and clinical research and Dr. Meletis' observations about the use of cannabinoid-rich hemp oil in clinical practice, with an emphasis on the management of pain and inflammation and how to balance the endocannabinoid system without overwhelming its receptors. In this article, we'll address the use of cannabinoid-rich hemp oil in applications such as Alzheimer's disease, depression, anxiety, irritable bowel syndrome, stroke, schizophrenia, autoimmunity, and epilepsy, among other uses. We'll also discuss the role of cannabinoids in the gut-brain axis.

Healthcare practitioners who want to delve deeper into the benefits of cannabinoid-rich hemp oil, understand the legal ramifications of prescribing it, and become certified as a respected hemp oil expert who understands proper dosing and other nuances of hemp oil use, can sign up for the ICCT online medical certification program at www.icctcertification.com.

A Brief Review of the Endocannabinoid System

Endogenous endocannabinoids that are produced within the body including anandamide (arachi-donylethanolamide) and 2-arachidonylglycerol (2-AG) are able to activate receptors in the endocannabinoid system. Phytocannabinoids such as Δ^9-tetrahydrocannabinol (THC), the psychoactive component of *Cannabis sativa*, and cannabidiol (CBD), a non-psychoactive component, are also able to activate endocannabinoid receptors. Two of the main receptors in the endocannabinoid system are CB_1 and CB_2. CB_1 is the primary receptor in the nervous system. It is also found in the adrenal gland, adipose tissue, heart, liver, lungs, prostate, uterus, ovary, testis, bone marrow, thymus, and tonsils. CB_2 is primarily expressed in the immune system. Endocannabinoids and phytocannabinoids also act upon other receptors to achieve some of their beneficial effects. When the endocannabinoid system is stressed, there is a loss of homeostasis; and a number of diseases can result. For more detail about endocannabinoids and their receptors as well as supporting references, we recommend you read part two of this article.

The Endocannabinoid System and Neurological Diseases

An impaired endocannabinoid system may play a role in neurodegenerative disorders including Alzheimer's, Parkinson's, and Huntington's disease. Endogenous cannabinoid signaling performs many functions in the central nervous system (CNS), such as modulating neuroinflammation and neurogenesis, as well as regulating synaptic plasticity, and the response to stress.[1,2] Furthermore, upregulation of type-2 cannabinoid (CB_2) receptors is associated with many neurodegenerative disorders. Consequently, influencing CB_2 receptor signaling may be neuroprotective.[2]

Endocannabinoids possess a broad-spectrum of activity,[2] which is advantageous in neurodegenerative diseases where neural dysfunction is caused by a combination of different factors including protein misfolding, neuroinflammation, excitotoxicity, oxidative stress, and mitochondrial dysfunction.[2] The endocannabinoid signaling system is thought to regulate each of these factors.[2] The endocannabinoid system also modulates brain tissue homeostasis during aging and/or neuroinflammation.[2]

CB_2 receptors exert neuroprotective properties through their ability to suppress inflammation.[3] Activation of CB_2 receptors regulates the production of cytokines, proteins that play a significant role in immune function and inflammatory responses.[4] Conversely, rather than inhibiting neurodegenerative

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diseases via an immunological pathway, the CB_1 receptor suppresses cell death through protecting against excitotoxicity, overstimulation of excitatory receptors and simultaneous calcium release.[2]

In the neurons of healthy brains, there is a lower expression of CB_2 receptors. However, a significant increase in expression of these receptors is noted in reactive microglia and activated astrocytes during neuroinflammation.[5,6] Microglia are cells in the brain and spinal cord. When they become reactive, it is associated with neurodegenerative diseases. Activated microglia modulate inflammatory responses to pathogens and injury by signaling the synthesis of pro-inflammatory cytokines. Similarly, diseases that impact the central nervous system activate astrocytes. The fact that CB_2 receptors are highly expressed when both these types of cells are activated may indicate they are needed to combat inflammation. This led researchers to conclude, "Therefore, the CB_2 receptors have the potential to restrain the inflammatory processes that contribute to the declines in neural function occurring in a number of neurodegenerative disorders."[2]

The involvement of CB_2 receptors in Alzheimer's disease was demonstrated in a number of human studies. Inspections of postmortem brains from individuals with Alzheimer's disease showed that CB_2 receptors are upregulated in cells that are linked to amyloid beta (Aβ)-enriched neuritic plaques.[7-10] The deposition of amyloid beta plaques in the brain are involved in Alzheimer's disease pathology. Other researchers found markedly higher CB_2 receptor levels in individuals with severe Alzheimer's disease compared with age-matched controls or people with moderate Alzheimer's.[11] Activation of the CB_2 receptor has resulted in beneficial effects in Alzheimer's disease, including the inhibition of microglial activation in mice.[12]

Further support for the role of the endocannabinoid system in Alzheimer's is provided by preclinical studies showing that cannabidiol, the non-psychoactive component of *Cannabis sativa*, may be beneficial in Alzheimer's. In one of these studies, mice inoculated with Aβ then injected with CBD (2.5 or 10 mg/kg) for seven days had anti-inflammatory and neuroprotective effects as evidenced by its ability to suppress a marker of activated astrocytes.[13] A rat model of Alzheimer's-related neuroinflammation further elucidated the role CBD may play in Alzheimer's. In this study, adult male rats were inoculated with human $A\beta_{42}$ in the hippocampus.[14] Then, for 15 days, they were given 10 mg/kg CBD either with or without a PPAR-γ or PPAR-α receptor antagonist. CBD counteracted many of the pathogenic mechanisms of Aβ, and its effects involved the regulation of PPAR-γ. This makes sense since PPAR-γ receptors are increased in people with Alzheimer's disease.

Parkinson's Disease

The progressive loss of dopaminergic neurons primarily in the substantia nigra (SN) is the distinguishing characteristic of Parkinson's disease. This dopaminergic neuron loss impairs the basal ganglia leading to bradykinesia (slowness of movement), rigidity, and tremors. Inflammation is a prominent player in Parkinson's disease pathogenesis. Post-mortem evaluations of Parkinson's disease patients observed microglia activation in the SN.[15] Structural brain imaging studies have also shown that activated microglia and an increase of proinflammatory cytokines occur in the nigrostriatal system of Parkinson's disease patients.[16,17]A post-mortem study indicated that individuals with Parkinson's disease have increased expression of CB_2 receptors in microglial cells of the SN.[18] This and other evidence suggests that targeting the CB_2 receptor may serve as an anti-inflammatory approach in Parkinson's.[2]

In support of the idea that modulating the endocannabinoid system is beneficial in Parkinson's disease are a number of small studies investigating the use of cannabidiol in this group of patients. In a double-blind, placebo-controlled study of 21 Parkinson's patients without dementia or comorbid psychiatric conditions, 300 mg/day cannabidiol enhanced well-being and quality of life.[19] In an open-label pilot study, six Parkinson's disease outpatients (four men and two women) who suffered from psychosis for at least three months received CBD starting with an oral dose of 150 mg/day for four weeks combined with their usual therapy.[20] CBD intervention resulted in a marked decline in psychotic symptoms as measured by the Brief Psychiatric Rating Scale and the Parkinson Psychosis Questionnaire. CBD also lowered the total scores of the Unified Parkinson's Disease Rating Scale. Furthermore, cannabidiol significantly reduced the frequency of sleep behavior disorder (RBD) in four patients with Parkinson's disease.[21]

Anxiety and Post-Traumatic Stress Disorder

The endocannabinoid system regulates stress and anxiety, and modulation of the endocannabinoid system has been found to reduce anxiety. Repeated injections of cannabidiol to mice exposed to chronic unpredictable stress reduced anxiety in the animals.[22] This effect was mediated by CB_1, CB_2, and serotonin ($5HT_{1A}$) receptors. In a double-blind randomized trial investigating subjects with generalized social anxiety disorder not receiving medication, 600 mg of cannabidiol reduced anxiety and cognitive impairment caused by simulated public speaking and improved the participants' comfort level in their speech performance.[23] Another study of 10 individuals with generalized social anxiety disorder observed that 400 mg of cannabidiol was associated with markedly reduced subjective anxiety.[24] Furthermore, advanced imaging studies indicate that the endocannabinoid system is underactive in post-traumatic stress disorder.[25] Preliminary studies in humans have observed that cannabinoids may improve PTSD symptoms such as sleep quality and hyperarousal.[26] Nabilone, a synthetic cannabinoid, reduced PTSD-related nightmares in a small group of Canadian military personnel.[27] In an animal model, cannabinoids given shortly after experiencing a traumatic event blocked the development of a PTSD-like phenotype.[26]

For more information about the interaction between the endocannabinoid system and anxiety, we recommend you enroll in the ICCT medical certification program at www.icctcertification.com. This is a vast topic that cannot be addressed in one article alone.

Depression

Dysregulation of the endocannabinoid system may be involved in the development of depression. Suppressing the CB_1 receptor results in a phenotypic state that is comparable to melancholic depression, with identical symptoms such as decreased appetite, increased anxiety, arousal, and wakefulness, an inability to release aversive memories, and increased sensitivity to stress.[28] Furthermore, some antidepressant medications enhance endocannabinoid activity.[28]

One mechanism by which CBD reduces depression may be via its ability to protect against the effects of stress. Stress can lead to anxiety and depression. In animal models, CBD lowers autonomic indices of stress and behavioral effects of depression and anxiety and improves the delayed emotional consequences of stress via mechanisms that involve serotonin receptors.[29,30] CBD is also thought to reduce depressive symptoms by enhancing hippocampal neurogenesis. Ongoing administration of CBD in mice undergoing chronic unpredictable stress improved depressive- and anxiety-like behaviors and triggered hippocampal progenitor proliferation and neurogenesis.[31]

CBD is thought to stimulate neurogenesis by elevating hippocampal levels of the endocannabinoid anandamide (AEA). A clinical study found that higher serum concentrations of AEA were associated with reduced anxiety in patients with major depression, although in this group of patients AEA levels were not associated with major depressive symptoms.[32] Conversely, in people with minor depression, AEA concentrations were elevated compared to controls, suggesting that these levels might be raised as the body's way to compensate for the depression and that they may have a neuroprotective role in patients with less severe depressive symptoms.

The role of cannabinoids in depression is a vast topic, and we recommend that you enroll in the ICCT medical certification program to understand how phytocannabinoids can be safely used in depression.

Gut-Brain Axis and Endocannabinoids

The gut-brain axis refers to the bidirectional interplay between the gut microbiota and the nervous system whereby the gut microbiota can impact behavior and cognition and the central nervous system can influence enteric microbiota composition. The gut-brain axis is thought to explain the association between chronic inflammatory bowel disease and depression.[33]

Accumulating evidence points to the endocannabinoid system's important role in both normal gastrointestinal function and gastrointestinal pathology.[34] The endocannabinoid system is involved in the regulation of motility, gut-brain-mediated fat intake and hunger signaling, and inflammation and gut permeability.[34] The endocannabinoid system also works together with the gut microbiota to maintain gut health.[34] Additionally, cannabinoids help recruit immune cells to the site of intestinal inflammation.[35] In models of colitis, cannabidiol also has been shown to suppress the synthesis of pro-inflammatory cytokines, such as TNF-α and IFN-γ.[35-38] This anti-inflammatory role in gut health was also reflected in a study where intestinal tissues of individuals with ulcerative colitis had concentrations of the endocannabinoid PEA that were 1.8 fold higher compared with healthy patients, likely in an attempt to help heal the inflammation.[39] The anti-inflammatory effect of cannabinoids in the gastrointestinal system may be mediated by the gut microbiota. In mice, dysbiosis of the microbiota caused by antibiotics resulted in a general inflammatory state and altered endocannabinoids in the gut.[33] (The concept of an endocannabinoidome will be addressed in much further detail in the ICCT certification program). Mitochondrial transport in enteric nerves may also be controlled by CB_1 receptors, further lending support to the role of cannabinoids in gut health.[40]

The interplay between the gut, the brain, and the endocannabinoid system is involved in the development and progression of inflammatory bowel disease and irritable bowel syndrome. CB_1 receptors in sensory ganglia modulate visceral sensation. During ongoing psychological stress, epigenetic pathways change the transcription of CB_1 receptors, a mechanism which may explain the link between stress and abdominal pain.[41] Furthermore, in rodent models, the endocannabinoid system is altered by early-life stress, leading to the development of irritable bowel syndrome (IBS).[42,43]

Accumulating evidence points to the endocannabinoid system's important role in both normal gastrointestinal function and gastrointestinal pathology.

In tissue from humans with inflammatory bowel disease, there is elevated epithelial CB_2-receptor expression.[44] This indicates that CB_2 receptors modulate immunity in this disorder.[45] The CB_2 receptors impact mucosal immunity and act together with CB_1 receptors in the colonic epithelium to encourage epithelial wound healing.[44]

Research suggests that type 1 vanilloid receptors ($TRPV_1$) may regulate some cannabinoid effects. One study observed a 3.5-fold increase in TRPV1-immunoreactive nerve fibers in biopsies from IBS sufferers compared with controls.[45] This elevation may promote visceral hypersensitivity and pain in IBS.[45] One scientist concluded, "Thus, a rationale exists for therapeutic interventions that would boost AEA levels or desensitize TRPV1, such as cannabidiol (CBD), to treat the condition [IBS]."[25]

Cannabinoids, Autoimmunity, Strokes, Epilepsy, and Other Disorders

Cannabidiol may have a role to play in autoimmune health. Animal models indicate it exerts beneficial actions in a number of autoimmune disorders including multiple sclerosis (MS), type 1 diabetes, and autoimmune myocarditis.[46,47] Autoimmune disease develops due to transformed subsets of

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T cells into autoreactive memory T cells. These cells are falsely directed to target the body's own cells resulting in tissue degeneration and autoimmune disease development such as type 1 diabetes, rheumatoid arthritis, and MS.[46] CBD is able to modulate autoreactive T cell function.[46] In one study it weakened the function of encephalitogenic Th17 cells.[46] CBD also increased anti-inflammatory actions in activated memory T cells including enhanced synthesis of the anti-inflammatory IL-10 cytokine.[48] Furthermore, CBD produced anti-inflammatory effects in animal models of T cell-mediated collagen-induced arthritis,[49] autoimmune diabetes,[50] and autoimmune hepatitis.[51] It also has reversed the development of type 1 diabetes mellitus in mice.[52] Most of the human studies showing cannabinoids are beneficial in multiple sclerosis have used a pharmaceutical combination of THC and CBD.[53,54]

Cannabinoids are important to other aspects of immunity. Specifically, they possess strong antibacterial activity. All five major cannabinoids (cannabidiol, cannabichromene, cannabigerol, Delta (9)-tetrahydrocannabinol, and cannabinol) significantly inhibited a number of methicillin-resistant *Staphylococcus aureus* (MRSA) strains.[55] THC use by itself, however, was associated with increased susceptibility of mice to infection with the pathogen *Legionella pneumophila*.[56]

Another application of CBD may include protection against stroke.[57] In vivo and in vitro stroke models indicate cannabidiol reduces infarct size.[57] A study of human brain microvascular endothelial cells and human astrocyte co-cultures suggests that CBD can prevent permeability changes in the blood brain barrier.[57]

Another promising role for cannabidiol is in the improvement of schizophrenia. Modulating the endocannabinoid system using THC, the main psychoactive component in cannabis, can cause acute psychotic effects and cognitive impairment in schizophrenia patients.[58] Conversely, CBD may possess antipsychotic actions and may have a role to play in supporting schizophrenia patients. Evidence to this effect is emerging thanks to small-scale clinical studies with CBD for the treatment of patients with psychotic symptoms.[59] The results demonstrated that CBD is effective, safe, and well-tolerated in patients with schizophrenia, although large randomized clinical trials are needed.[59]

It is also important to keep in mind that cannabidiol can affect levels of medications. This is indicated by the fact it is an inhibitor of multiple cytochrome P450 enzymes, which are involved in the metabolism of drugs.

Cannabidiol has also been used successfully in clinical practice and in human studies in patients with epilepsy. It has been found to improve brain tumor-related seizures.[60] Additionally, patients with Sturge-Weber syndrome, a disorder characterized by medically refractory epilepsy, stroke, and cognitive impairments, experienced up to a 50% reduction in seizures after supplementation with cannabidiol.[61] It's important to note that CBD supplementation can alter the serum levels of certain anti-epilepsy medications. This is not always a bad thing as CBD may reduce the side effects of some epilepsy medications by lowering their dosage.[62] However, the blood levels of these pharmaceuticals should be monitored when taking CBD.

Dr. Meletis will discuss these and other clinical applications of CBD in the ICCT medical certification course and will also talk about the proper dosing to ensure that doctors who suggest CBD aren't doing more harm than good. This is especially important in regard to seizures as too much CBD may actually cause seizures.

Dosing, Side Effects, and Drug Interactions

Cannabidiol is a safe substance, with a half-life of 18-32 hours,[63] but it can have minor adverse effects in some people. Potential side effects are dry mouth, low blood pressure, light-headedness, drowsiness, tiredness, diarrhea, and changes of appetite or weight.[62,64] There is also cross-reactivity between medical marijuana and certain foods as well as molds, dust mites, plants, and cat dander.[65] It's unclear whether these same reactions occur with cannabidiol. In fact, one mouse study indicated CBD in a dose-dependent manner markedly reduced inflammatory reactions associated with delayed-type hypersensitivity reactions.[66] These are allergic reactions that develop days after exposure to the offending substance.

It is also important to keep in mind that cannabidiol can affect levels of medications. This is indicated by the fact it is an inhibitor of multiple cytochrome P450 enzymes, which are involved in the metabolism of drugs.[67]

The issues of potential side effects, proper dosing, and how to balance the endocannabinoid system without overwhelming its receptors are complex topics that Dr. Meletis and other scientists and doctors at the ICCT discuss in the certification program.

Conclusion

This three-part series began with an article discussing the ICCT's certification for cannabinoid-rich hemp oil manufacturing facilities and products and how American Nutritional Products was the first company in the US to become ICCT-certified. It also discussed a new medical certification program for healthcare practitioners. This certification program is essential for any doctor recommending cannabinoid-rich hemp oil who wants to be aware of the legal ramifications and develop a greater level of trust among patients. The second part of the series discussed the endocannabinoid system's interaction with the adrenals, sex hormones, and gut with an emphasis on the management of pain and inflammation. Finally, we wrapped up our discussion in this article with many of the clinical applications for cannabidiol.

Cannabinoid-rich hemp oil is being used successfully for a number of conditions. But we want to leave you with the caution that, as noted in the first part of this series, many manufacturers are producing inferior-quality products contaminated with pesticides. Healthcare practitioners who enroll in the certification program at https://www.icctcertification.

com/international-cannabinoid-therapy-clinical-mastery/ will know how to differentiate between these poor quality products and ones that are more likely to benefit patients in a safe and effective manner.

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Literature Review & Commentary

by Alan R. Gaby, MD
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Probiotic Prevents Urinary Tract Infections

Two hundred fifty-two postmenopausal women (mean age, 64 years) with at least three self-reported symptomatic urinary tract infections (UTIs) in the previous year were randomly assigned to receive antibiotic prophylaxis (480 mg of trimethoprim-sulfamethoxazole once a day) or oral capsules containing 10^9 colony-forming units of *Lactobacillus rhamnosus* GR-1 and *L. reuteri* RC-14 twice a day for 12 months. During the trial, as compared with the year before the trial, the number of UTI episodes fell by 58.5% in the antibiotics group and by 51.4% in the probiotics group (difference not statistically significant). In the antibiotics group, resistance of uropathogenic *Escherichia coli* to trimethoprim-sulfamethoxazole and to amoxicillin increased from 20-40% at baseline to 80-95% after one month of treatment. In contrast, resistance to these antibiotics did not occur during probiotic treatment.

Comment: Lactobacilli are a normal component of the urogenital flora of healthy women. These "friendly" bacteria (usually called probiotics) may help prevent genitourinary infections (i.e., urinary tract infections, bacterial vaginosis, and candidiasis) and increase the efficacy of conventional therapy in women suffering from such infections. Probiotics work by several different mechanisms, including competing with pathogenic organisms for nutrients and for binding sites on uroepithelial cells, and producing substances that kill or inhibit the growth of pathogens.

Two *Lactobacillus* strains – *L. rhamnosus* GR-1 and *L. reuteri* RC-14 (formerly known as *L. fermentum* RC-14) – have been found to be useful for preventing and treating various types of genitourinary infections in women. These organisms, originally isolated from the distal urethra or vagina of healthy women, are more effective than other *Lactobacillus* strains at colonizing the vaginal mucosa, adhering to uroepithelial cells, competing against pathogenic organisms, and producing compounds that inhibit the growth of urogenital pathogens (including *Candida albicans*).[1-4] *L. rhamnosus* GR-1 and *L. reuteri* RC-14 have been shown to colonize the genitourinary tract after oral administration.[5] The results of the present study indicate that the combination of *L. rhamnosus* GR-1 and *L. reuteri* RC-14 was nearly as effective as antibiotics for preventing UTI recurrences and, unlike trimethoprim-sulfamethoxazole, did not lead to antibiotic resistance. This probiotic combination is available commercially as Proflora Women's Probiotic (Integrative Therapeutics), Fem-Dophilus (Jarrow), and UltraFlora Women's (Metagenics).

Beerepoot MA, et al. Lactobacilli vs antibiotics to prevent urinary tract infection. A randomized, double-blind, noninferiority trial in postmenopausal women. *Arch Intern Med*. 2012;172:704-712.

D-Mannose for Prevention and Treatment of Urinary Tract Infections

Three hundred eight women (aged 29-58 years) with an acute urinary tract infection (UTI) and a history of recurrent UTIs were treated with ciprofloxacin (500 mg twice a day for 1 week) and were then randomly assigned to receive 2 g of D-mannose in 200 ml of water once a day in the evening, 50 mg of nitrofurantoin once a day in the evening, or no prophylaxis (control group) for six months. Women with urinary tract anomalies, interstitial cystitis, or diabetes, and those who were pregnant or taking hormone therapy or contraceptives were excluded. During the study, 98 women (31.8%) had a recurrent

UTI. The recurrence rate was significantly lower in the groups that received D-mannose (14.6%) and nitrofurantoin (20.4%) than in the control group (60.8%) ($p < 0.001$). The recurrence rate did not differ significantly between the D-mannose and nitrofurantoin groups. The incidence of side effects was significantly lower in the D-mannose group than in the nitrofurantoin group (8% vs. 27%; $p < 0.0001$). The only side effect of D-mannose was diarrhea, which occurred in 8% of patients and did not require discontinuation of treatment.

Comment: Some 25 years ago, Dr. Jonathan Wright began using D-mannose (a sugar structurally similar to glucose) to prevent and treat urinary tract infections. This treatment was based on *in vitro* reports that D-mannose prevents uropathogenic *Escherichia coli* from adhering to the epithelial cells of the genitourinary tract. Since then, Wright has administered D-mannose to more than 200 patients. In his experience, it has an efficacy rate of 85-90%. In addition to being an effective treatment for UTIs, D-mannose can prevent post-intercourse UTIs and is also effective for prophylaxis in women who are prone to recurrent UTIs. For treatment of UTIs, Wright recommends a dosage of 1 teaspoonful (about 2 g) for adults and 1/2 to 1 teaspoonful for children, dissolved in a glass of water or juice and repeated every two to three hours. Treatment should be continued for two to three days after symptoms have disappeared. For preventing recurrent infections, patients should start with the dosages listed above, and then reduce the dose if possible. For prevention of post-intercourse UTIs, the recommended dosage is one tablespoonful one hour prior to intercourse and again immediately afterwards.[6] D-Mannose is not effective for UTIs caused by organisms other than *E. coli.* Many practitioners are now using D-mannose, and informal surveys I have conducted at medical conferences reveal that these practitioners generally concur with Wright's observations. The results of the randomized controlled trial described above support these clinical observations.

While the discovery of the D-mannose as a treatment for UTIs was an important medical advance, its mechanism of action may be different than that initially hypothesized by Wright. Even if 100% of the recommended oral dose of D-mannose were absorbed and excreted intact in the urine, the average urinary mannose concentration would be less than half the concentration that decreased bacteriuria by 90% in rats. Moreover, once *E. coli* has adhered to the bladder wall, one could not necessarily expect that free mannose in the urine would successfully detach it from its cellular binding sites. Another possible explanation for the efficacy of D-mannose is its relationship to Tamm-Horsfall protein. This glycoprotein, which is produced by renal cells and excreted in the urine, plays a key role in the body's defense against UTIs. Tamm-Horsfall protein contains a large number of high-mannose structures, which appear to account for its infection-fighting activity.[7] It is possible that orally administered D-mannose works primarily by facilitating the synthesis or promoting the activation of Tamm-Horsfall protein.

Kranjcec B, et al. D-Mannose powder for prophylaxis of recurrent urinary tract infections in women: a randomized clinical trial. *World J Urol*. 2014;32:79-84.

Probiotic Improves Results of *Helicobacter pylori* Eradication Therapy

Eight hundred four patients undergoing triple therapy for *Helicobacter pylori* infection were randomly assigned to receive, in double-blind fashion, a probiotic (*Lactobacillus rhamnosus* GG and *Bifidobacterium* BB-12; 10^8 to 10^{10} organisms per capsule) at a dose of one capsule twice a day or placebo for 14 days. Treatment was started along with the triple therapy, with the probiotics taken at least two hours before or two hours after the antibiotic doses. Six hundred fifty patients (80.5%) were included in the analysis. The main reasons for non-inclusion were noncompliance with the treatment or failure to return for follow-up visits. Eighty-nine patients in the placebo group and 65 patients in the probiotic group were not included in the final analysis. The proportion of patients who were cured was significantly higher in the probiotic group than in the placebo group (87.4% vs 72.6%; $p < 0.001$). Compared with placebo, the probiotic significantly decreased the severity of symptoms thought to be side effects of antibiotic therapy.

Comment: In this study, the addition of a probiotic to triple therapy increased the cure rate in patients undergoing *H. pylori* eradication therapy. This effect appeared to be due in part to greater adherence to the triple therapy, presumably as a result of fewer side effects.

Hauser G, et al. Probiotics for standard triple Helicobacter pylori eradication: a randomized, double-blind, placebo-controlled trial. *Medicine*. 2015;94:e685.

Food Allergy and Eosinophilic Esophagitis

Seventy-eight children (aged 1-18 years) with eosinophilic esophagitis received a proton pump inhibitor twice a day and underwent a four-food elimination diet (excluding cow's milk, wheat, egg, and soy). Clinical, endoscopic, and histologic assessments were made after eight weeks. Children who had a positive response reintroduced single foods sequentially for eight weeks each. Endoscopy was repeated after each food reintroduction to assess for recurrence of disease. The primary endpoint was histologic remission (fewer than 15 eosinophils per high-power field). Secondary endpoints included symptomatic and endoscopic improvement and identification of foods associated with active histologic disease. After ➤

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eight weeks on the elimination diet, 50 children (64%) were in histologic remission. The mean clinical symptom score improved from 4.5 to 2.3 among the histologic responders ($p < 0.001$). Thirty-six percent of the histologic responders became symptom-free and 91% had symptomatic improvement. Forty-seven children reintroduced one to four foods. The proportions of patients who developed histologic inflammation from specific foods were as follows: cow's milk (85%), egg (35%), wheat (33%), and soy (19%). Sixty-two percent of the children who reintroduced foods reacted to only one food. Two patients who reintroduced all four foods did not react to any of them.

Comment: Eosinophilic esophagitis is a chronic inflammatory disorder of the esophagus characterized by eosinophilic infiltration of the esophageal epithelium. Esophageal strictures are frequently found on endoscopic examination. Eosinophilic esophagitis occurs primarily in children but is becoming increasingly common in adults as well, and the overall incidence has been rising. Symptoms may include heartburn, dysphagia, vomiting, failure to thrive, abdominal pain, and impaction of food. Although the clinical presentation often resembles gastroesophageal reflux disease (GERD), eosinophilic esophagitis is a distinct clinical entity which, unlike GERD, does not respond well to acid suppression.

It is generally accepted that eosinophilic esophagitis is caused mainly by food allergy, and treatment includes identification and avoidance of allergenic foods. A six-food elimination diet (excluding milk protein, soy, egg, wheat, peanut/tree nuts, and fish/shellfish) is often recommended because it has been reported to produce significant improvement in about three-quarters of patients. The four-food elimination diet used in the present study was nearly as effective as the six-food elimination diet for inducing remission. The four-food elimination diet (which allows peanuts, tree nuts, and fish) may be preferable for patients who would have difficulty following the more restrictive six-food elimination diet.

Kagalwalla AF, et al. Efficacy of a 4-food elimination diet for children with eosinophilic esophagitis. *Clin Gastroenterol Hepatol*. 2017;15:1698-1707.e7.

Low FODMAPs Diet for Irritable Bowel Syndrome

Three hundred seventy-five patients with irritable bowel syndrome (IBS) were prescribed a low-FODMAPs diet for at least six weeks, after which they were advised to reintroduce individual high-FODMAPs foods in increasing amounts in order to determine their tolerance level to those foods. At 6-18 months after the initial visit, the patients were invited to answer a questionnaire regarding their diet and symptoms. One hundred three patients (27.5%) agreed to participate. Of those, 61% reported adequate symptom relief during the first six weeks of FODMAPs restriction and 57% reported long-term symptom relief. At long-term follow-up, 82% of the patients were continuing an "adapted" low-FODMAPs diet and 18% had returned to their usual diet.

Comment: FODMAPs is an acronym for fermentable oligosaccharides, disaccharides, monosaccharides, and polyols. FODMAPs include fructose, lactose, sorbitol, fructans (fructooligosaccharides, inulin), and galactans (also called galactooligosaccharides; e.g., raffinose). Foods restricted on a low-FODMAPs diet include lactose-containing foods, foods with added fructose, foods which naturally contain fructose in excess of glucose (e.g., apples, pears), fructans-containing foods (e.g., wheat, artichokes, onions, garlic, leeks), sorbitol-containing foods (e.g., stone fruits), and raffinose-containing foods (e.g., legumes, lentils, cabbage, and Brussels sprouts). The results of the present study support previous research in which consumption of a low-FODMAPs diet improved symptoms in some patients with IBS. It is not possible to determine from this study what proportion of IBS patients would improve with such a diet, since only about one-quarter of the patients respond to the questionnaire.

O'Keeffe M, et al. Long-term impact of the low-FODMAP diet on gastrointestinal symptoms, dietary intake, patient acceptability, and healthcare utilization in irritable bowel syndrome. *Neurogastroenterol Motil*. 2018;30: doi: 10.1111/nmo.13154.

Zinc Lozenges Prevent Postoperative Sore Throat

Seventy-nine patients undergoing low- or moderate-risk surgery with endotracheal intubation were randomly assigned to receive, in double-blind fashion, 40 mg of zinc in the form of a lozenge or placebo 30 minutes preoperatively. The incidence of sore throat at four hours postoperatively was significantly lower in the zinc group than in the placebo group (7% vs. 29%; $p < 0.05$). Mean severity of postoperative sore throat was also significantly lower in the zinc group than in the placebo group.

Comment: Postoperative sore throat occurs frequently after endotracheal intubation. In the present study, administration of a single dose of 40 mg of zinc as a lozenge 30 minutes prior to surgery decreased the incidence and severity of postoperative sore throat. The mechanism of action is not clear.

Farhang B, Grondin L. The effect of zinc lozenge on postoperative sore throat: a prospective randomized, double-blinded, placebo-controlled study. *Anesth Analg*. 2018;126:78-83.

Does Exposure to Phthalates Cause Precocious Puberty?

A cross-sectional study was conducted in girls in Thailand with precocious puberty (breast development before age 8 years; n = 42) and early puberty (breast development at age 8-9 years; n = 17) and in 77 age-matched controls. The median urinary excretion of mono-ethyl phthalate (expressed as µg/g of creatinine) was significantly higher in girls with precocious puberty (6,105; $p < 0.05$) and nonsignificantly higher in girls with early puberty (5,141; $p = 0.4$) than in age-matched controls (4,634). When the girls were stratified according to body weight, the association between increased urinary mono-ethyl phthalate excretion and precocious puberty was significant for normal-weight girls, but not for those who were overweight or obese.

Comment: Phthalates are endocrine-disrupting chemicals present in many plastic food and beverage containers and in various other household products. These chemicals are known to have both estrogenic and anti-androgenic activity. The present study found an association between exposure to a specific phthalate and precocious puberty in Thai girls, an

association that was restricted to girls of normal body weight. These findings are consistent with those from a study in Puerto Rico, in which phthalates were detected in the serum of 68% of girls with premature breast development, but in only 3% of girls with normal development.[8] Observational studies in humans and *in vitro* data suggest that phthalates may also play a role in the pathogenesis of male reproductive abnormalities, attention deficit-hyperactivity disorder, uterine fibroids, and endometriosis.

Srilanchakon K, et al. Higher phthalate concentrations are associated with precocious puberty in normal weight Thai girls. *J Pediatr Endocrinol Metab*. 2017;30:1293-1298.

Paleolithic Diet May Be Deficient in Iodine

Seventy healthy postmenopausal overweight or obese Swedish women were randomly assigned to consume a Paleolithic diet or a diet consistent with Nordic Nutrition Recommendations (NNR) for two years. At baseline, median 24-hour urinary iodine excretion was around 134 µg per day in both groups. At six months, median 24-hour urinary iodine excretion had decreased to 77 µg per day in the Paleolithic diet group and remained unchanged in the NNR group.

Comment: A Paleolithic diet (also called a Paleo or caveman diet) is the type of diet thought to be consumed by humans during the Paleolithic period. It consists of fruits, vegetables, nuts, roots, and meats, and excludes refined sugar, dairy products, grains, legumes, processed oils, salt, alcohol, and coffee. This type of diet is being promoted for weight loss and to improve glucose tolerance, blood pressure, and lipid levels. While a Paleolithic diet is likely to confer various health benefits, it excludes two of the main dietary sources of iodine – dairy products and salt. The results of the present study suggest that people following a Paleolithic diet are at risk of developing iodine deficiency. Iodine supplementation may therefore be warranted in selected cases.

Manousou S, et al. A Paleolithic-type diet results in iodine deficiency: a 2-year randomized trial in postmenopausal obese women. *Eur J Clin Nutr*. 2018;72:124-129.

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Lyme Climb: Shrinking the Mountain of Testing and Treatment

by Dr. Aparna Taylor, MSc, ND

Diagnosing and Treating

Navigating through the controversial and complex forest of Lyme and associated diseases can be overwhelming for patients as well as clinicians. One of the challenges is the slow shift in the paradigm of thinking that these infections are limited to endemic areas. Another is the narrow view that the treatment is easy, short in duration, and any remaining symptoms are not related to a persistent infection. Finally, many patients are emotionally charged about their challenges and, because they may physically present well, are labeled as suffering from a psychiatric disorder rather than a physical one.

On the other side, is the grave possibility that patients are being diagnosed and treated aggressively for an infection that may not be the root cause of their illness.

How can we find our way through the thicket if one paradigm sees tick-borne disease as invisible while another may be seeing infection in every symptom?

What I tell patients is to be aware of the bias either way. If the treatment and interventions were non-invasive, with low risk, there would not be as much confusion and challenge. The risk of long-term high doses of antibiotics in multiple classes is serious, impacting the microbiota and causing loss of diversity of organisms. The risk of a long-term complex treatment plan using non-pharmaceutical interventions may not have the same consequences as antibiotics, though carries its own financial and psychological burden.

What is a clinician to do? The bias of under- or over-diagnosing puts the primary care clinician in a difficult position.

There are practical challenges in diagnosis. The biology of the bacteria's pleomorphic forms[1,2] and preference for tissue rather than bloodstream makes direct testing inaccessible. Though antibody tests are some of the most widely used, the issue of antigen-antibody complexes, immunosuppression, and cross reactivity are still limitations. There is also the challenge of waiting for an immune response before testing for antibodies after an initial infection.

It is up to the clinician to interpret the test results with a full clinical picture of the patient. There are more current techniques and tests that will provide a different way of assessing an individual.

There are multiple labs offering tests that help guide clinicians. Since most are out-of-pocket expenses for patients, assessing which tests to use is up to the individual clinician with his/her patient, based on the questions they are trying to answer. The laboratory should be accredited and offer up-to-date techniques. ArminLabs in Germany fits this criterion. The EliSpot from ArminLabs is a T lymphocyte test that can be used after an initial infection, as T cell responses behave differently than B cell (antibody). A positive response (2+ or higher) offers patients and clinicians insight into the risk versus benefit of an intervention such as antibiotics. For accuracy, a patient must not be on antibiotics or immunosuppressants, such as methotrexate or corticosteroids, at the time of testing. The results are based on T cell activity over the last 60 days.

In addition, I typically test for natural killer cell count, (CD 57). If the EliSpot is negative, this non-specific test will likely indicate a persistent infection and will help determine if antibiotics are still an intervention to consider. This is relevant as often clinicians will rule out tick-borne disease if a Borrelia EliSpot is negative: this is a grave mistake. Other tick-borne illnesses may be playing a part and are typically the norm rather than the exception when assessing persistent infections. Cost is the limiting factor for testing; there is also the possibility that there is an infection not identified with available tests. For the CD 57 test, there are different interpretations of what is low. In my experience, results around or just under 100 (80-100, where above 130 is optimal) may not be a tick-borne illness or persistent infection, as other causes of immunosuppression may be present not necessarily due to an infection. As always, treat the person not the test.

With respect to other infections, Leona Gilbert's group has developed a test offered through ArminLabs that tests for several tick-borne diseases including common viruses. This antibody test has important assets: It has high specificity and sensitivity, and it can test for other pleomorphic forms of *Borrelia*. What was previously thought of as a cyst[3] has now been identified as a round body,[1,2] not an impenetrable cyst but a form that has a cell wall, which means that it can be tested for. This test exemplifies how medicine and science are continually evolving and changing.

Though we are able to make clinical diagnoses based on an appropriate assessment, physical exam, testing, and history, more often than not patients will have atypical and vague presentations that have other diagnoses that may explain some of their symptoms. There are a host of other tests, as treatment continues, that help link specific symptoms with a possible infection, as other EliSpot tests are offered for other infections. The peace of mind of having an answer does not have a monetary value: patients value having something on paper. Even a negative antibody test is still an interpretable test.

Investigating other options prior to starting the long train of multiple, high doses of long-term antibiotics or complex non-pharmaceutical regimens for months and months can help support both patient and clinician weigh the risk versus benefit of the interventions.

Treating

As many of us have experienced, most patients in our practices have been on a journey that began prior to the initial office visit. Whether it has been a journey of unsuccessful doctors and specialists, failed treatments in the past, refractory illness or relapse, or simply a second opinion, there are many reasons patients will seek our help.

Over the years, I have found myself simplifying treatments rather than adding more complexity to the regimen. This has been one of the most important successes that I have seen to correlate improvement in the patient population; it not only helps to focus the treatment but also to appropriately determine what is helping and what is not, with the additional benefit of lowering cost to the patient.

One of the benefits of evaluating multiple facets of an individual's health is assessing obstacles to cure. This can range from simply identifying the different infections (bacterial, parasitic, fungal, viral, or other) to uncovering heavy metal burden, mold toxicity, poor lifestyle, nutritional deficiencies, comorbidities, or clogged detoxification pathways among others. An unfortunate side effect of this complexity is multiple and expensive interventions and lifestyle changes, however well-meaning, that add more stress to the individual's ecosystem than intended. Most of our patients are resourceful and intelligent, and either self-treat, self-diagnose, or have seen practitioners to guide interventions.

Ultimately, the pathogenic load of whatever infection(s) involved needs to be decreased and the immune function improved in order to tip the balance to appropriate healing. Further immunosuppression arises if there is significant stress from swallowing 50+ pills a day, following a strict diet, removing all types of potential exposures, traveling for the best practitioner to perform a procedure, and spending thousands of dollars on testing that puts the individual under financial burden. This is not a criticism of this approach, as these are the very factors that may be needed; most of us adopt a multifaceted approach because it treats the whole individual. This simply asks the clinician to consider a harm-reduction approach for some patients, helping them weigh the risk versus benefit and understand overall consequences. Many patients are willing and able to adopt many changes at once and able to sustain them. There are others, however, who find this challenging and not practical and may need a step-wise guided path to change that is sustainable.

While the interventions have merit, this is a bias we must face head on.

Is this intervention necessary? This is not meant to assume these interventions are not helpful, only to look at the impact overall on the patient and whether it is the best time and to consider what may do more harm at that time.

In some cases, expensive and extensive regimens and testing lead to the same intervention. Although the information is useful, consider with the patient the risk versus benefit of the investigation (extensive rather than pointed tests) as well as the intervention, and perhaps resist the urge to treat with many things all at once.

So, what is most important to treat? This is the finesse of individualized treatment and strategy based on each patient. A strong foundation of appropriate nutrition is paramount, not necessarily gluten- or dairy-free for everyone; but what will be a suitable starting place? Simplify your process and have a plan; the patient will appreciate this.

First, bring wholesome food, water, and people into the environment. Work towards smoking cessation as smoking taxes the immunity and detox pathways. A plant-based diet with plenty of vegetables and no processed foods (if gluten-free, avoid junk/gluten-free products) is one of the most difficult steps as patients are too tired to shop, prepare, and cook wholesome foods. In some cases, wholesome food delivery services, more available in bigger cities, may be a better option and ease the burden. I work with each patient to address a wholesome diet in a way they are able to commit to.

Over the years, I have found myself simplifying treatments rather than adding more complexity to the regimen. This has been one of the most important successes that I have seen to correlate improvement in the patient population…

Food sensitivity testing can be very helpful, though to keep costs low, initially start with removal of junk or processed food and sugar to start the process of immune support. Elimination or anti-inflammatory diets are useful at the right time. Most patients have inflamed digestive tracts and will end up with positive sensitivities. As this is not likely the primary cause of their symptoms but significantly impacts the immune system, nutrition and gut healing should be one of the priorities. If appropriate and no allergy, helpful products include Villicote, which is N-acetyl glucosamine (contraindicated if shellfish allergy), or L-glutamine by Thorne, Cytomatrix, or another powder-based brand without additives, or demulcent herbs such as slippery elm, or for diarrheal conditions *Filipendula ulmaria* (meadowsweet), which acts as a soothing tonic to the digestive tract. Herbs can be sourced from a local herbalist or company that specializes in preparing herbal medicines. If tolerated, tinctures or tea preparations will impact the mucous membranes immediately rather than capsules or tablets.

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Whether on antibiotics or not, ensuring the gut is colonized appropriately with good bacteria has a far-reaching effect. The same probiotics will not suit all patients. Without antibiotics, some patients are able to use fermented foods if appropriate. Most patients do better with a supplement, brands ranging from Klaire Labs, Metagenics, or others. The strains used depend on other factors as well (SIBO, IBD).

The top three reasons patients fail to respond are (1) smoking or sugar addiction, (2) insomnia, and (3) emotional trauma and continual stress response. Assuming accurate infectious cause, in my experience, if there is a delay in response often these are the most common causes. There are other reasons, of course, and uncovering these with each patient is part of the clinician's differential diagnosis.

The addictions serve a purpose. Finding a different way to cope and reading books such as Allen Carr's how to stop smoking series help tremendously. Sugar addictions serve a similar purpose and may be from habit, underlying infectious 'craving', or stress response, often related to serotonin pathways. Another reason to individualize treatment is the possibility that a sugar-rich diet (and stress) may present differently in men and women.[4]

Good-quality sleep is rarely reported in this population of patients. Hypersomnia without refreshed waking or insomnia is more the norm. Inflammation, whether from pain or actual antagonistic action of cytokine-associated substances, may be inhibiting spontaneous sleep.[5] This relationship is complex, and the details of which cytokines or inflammatory markers are involved may not be as critical as an intervention to help globally reduce inflammation (diet, hydration, stress response, pain management). The basics of sleep hygiene often begin with short-acting hypnotics or anxiolytics, whether pharmaceutical or herbal.

The root cause of sleep disturbance, particularly in the last five years, is excessive device and technology use. Intervention is often needed. Curtailing overuse of technology (often due to patients' efforts to educate themselves or to have a sense of community) is an aspect of sleep hygiene that has dramatic results. Instruction to patients to cut all technology/device use by half, and none one-to-two hours prior to bedtime is an overlooked intervention that may eliminate the need for habit-forming medications. Sleep disturbance and technology use near bedtime is well known and documented.[6]

The relationship between chronic illness and trauma is complex. Many health care providers are focused on biomedical aspects of care without realizing that delivery of information and interventions to patients will either contribute or help subdue a stress response. Biological embedding of early experiences brings in the importance of epigenetic factors turning genes on or off. This does not mean a complicated supplementation regimen is the cure. Rather, providers need to educate and acknowledge the emotional dimensions associated with chronic illness. Patients with tick-borne illnesses typically experience extreme marginalization by medical professionals, based on their own bias or paradigm. While not every patient who believes they have Lyme disease has a persistent infection, they have chronic illness and over- or under-diagnosis does not result in a net response of improved health.

How to Begin?

Each of us has a process and after years in practice this often becomes mechanical and second nature. The complexity of Lyme and tick-borne illness and the multiple questions, requests, and desire for guidance from our patients are often the reasons for complex treatment plans. The effectiveness or importance of this is not being questioned here: it is rather the question of keeping up with evolving diagnostics to support overall assessment and the question of how to very simply address immunosuppression by targeting the most common obstacles to cure.

There is not one magical brand, product, drug or company that will be the best. We often seek something novel, creative and complex and sparkly, to be the most effective, best and the newest thing for helping our patients. The reality is industrialization, with all of its benefits, has also influenced diet, which has decreased diversity of the microbiota and microbiome over every generation,[7] and placed synthetic materials and other components into our ecosystem, which is compounded by each individual's perception of stress in their own environment. Adding sweeping antibiotic regimens for years (if unnecessary or misguided, however well meaning) will amplify these challenges.

1. Ensure you have appropriately identified whether your patient has a persistent infection. Observe your own bias, as well as the patient's, and weigh the risk versus benefit of an aggressive regimen, perhaps initiating a trial of treatment for a shorter duration first (4-6 weeks).
2. Address the obstacles to cure without judgment and with practical solutions that meet the patient where s/he is at, using a harm reduction approach.
3. Address factors influencing the most restorative immune interventions: diet, hydration, and sleep. Simplify this (eat

Dr. Aparna Taylor has a love of nature and medicine and strives to help patients find a healthy balance on this journey. Growing up in Thunder Bay, Ontario, she received her biology degree from Lakehead University then took some time to volunteer in hospitals in India, travel, and became a yoga teacher. After this gap year, she moved to western Canada where she completed her masters in muscle physiology and aging at the University of Calgary. While pursuing her PhD in molecular neuroscience, she re-awakened her passion for patient-centered medicine and became a naturopathic doctor.

One of her first patients in Thunder Bay inspired her to learn more about Lyme disease and she was introduced to ILADS. All of her experiences have provided tools to incorporate the principles of Eastern and Western medicine, yoga, and mindfulness to individualize regimens for each patient based on individual goals. Most of her practice is devoted to guiding patients who have chronic conditions, infections, and tick-borne illnesses. She believes that fundamentally, a balanced approach that brings calm allows room for patients to heal. She shares her passion for learning, medicine, and community by teaching at seminars, conferences and participating in research when she isn't chasing and playing with her two young children and husband, all the while trying not take herself too seriously.

real food, adjust lifestyle to have less technology). This will calm the nervous system.

4. Resist the urge to intervene heavily: be mindful of the delivery of your information and interventions – the emotional dimensions of chronic illness are like a kaleidoscope, individual to each patient and continually changing.
5. Knowing your biases and identifying them will help when weighing risks versus benefit of evaluating testing, interventions, and reaching patients' short- and long-term goals. Being "Dr. Informative" and running through a series of options for the patient to choose from can be dizzying in itself. Find out what is most important to the patient and begin the individualized program there.

Often the well-meaning bias of finding Lyme in patients who have been aggressively berated by other medical professionals can cloud judgment. Identifying as clearly as possible whether this is a potential root cause of persistent illness is key. The EliSpot with other supportive tests has eliminated at least some of the interpretation involved in assessing other tests available in the past, though is still indirect. Appreciating the overall impact of our ecosystem, industrialization, and emotional dimension of illness on our patients also suggests beginning with a re-introduction of microbiota diversity to our internal ecosystems. The goal is not simply to eliminate Lyme and associated illnesses; it is to create an internal terrain and ecosystem able to handle other pathogenic organisms that we either have not yet identified or have yet to find an appropriate intervention for.

This is not a dismal view of our evolution, rather a practical one. As I believe and discuss with patients, there is still thriving life on our planet, in our hearts, as eco-communities. The anxiety of trying to be healthy, removing toxins, or viewing what appears to be a dismal future will not set our patients up for success. What will, is what will bring calm, which can begin with these simple steps. Patients are intelligent and resourceful and often will have adopted some changes already. It is our role to help identify bias, help identify with the best available assessments whether Lyme and associated infections are persistent, and how best to address the foundation of immune benefit for our patients. Along with each patient's short- and long-term goals, this will create a foundation, if further aggressive treatments are implemented, but will also help support patients to prevent other chronic illnesses in years to come.

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Clinical Update from Sophia Health Institute

by Dietrich Klinghardt, MD, PhD, and Christine Schaffner, ND

As physicians on the front line of treating complex illness, we would like to share the latest clinical updates from our team at the Sophia Health Institute. In this article, we will review updates to the Provoked Lyme Urine PCR test, revisit the role of retroviruses in patients that are resistant to treatment, strategies to enhance brain detoxification, and a novel application of artesunate.

While this edition of the *Townsend Letter* is focused on Lyme disease, it is imperative to not only treat Lyme and co-infections but also the delicate balance of microbes (parasites, fungi, bacteria, viruses, retroviruses) as well as supporting detoxification in recovering from any chronic illness. We often see patients who have tried everything and have seen many well-respected physicians in our community. Our patient population demands that we are continually evaluating and innovating our diagnostics and treatment protocols so that we can better serve them. We welcome feedback and inspiration from the many of you in our community that have dedicated your professional careers to serving this complex patient population.

Provoked Lyme Urine PCR Test

We are still prescribing the Provoked Lyme Urine PCR Test using the RK protocol[1] at Sophia Health Institute.[2] We have made several changes to the provocation technique. In addition to the ultrasound provocation protocol listed below, we have added infrared light and the use of a vibration plate to enhance the movement of microbes out of the tissues and into the sample collected.

Near infrared light wavelengths range between 700-1200nm. Infrared wavelengths penetrate two to three inches into body tissues, increasing circulation, stimulating regeneration, and can aid in pain relief. According to our friend, Dr. Gerald Pollack, infrared light increases the amount of exclusion zone water inside the cell. Increased exclusion zone water in the cell optimizes the cell charge, increases oxygen content, and provides energy for the movement of the blood in capillaries. When infrared light is applied to a tissue that is most likely infected with Lyme and co-infections (joints, paraspinal muscles, lymph nodes, the vagus nerve, bladder, spleen, the jaw, etc.) circulation is increased and exclusion water builds up in the cells and tissues. This allows for greater provocation of the microbes out of the tissues, moving into the lymph, then the blood, and then filtered via the kidney for the urine collection.

In addition, we added the vibration plate to enhance whole body lymphatic drainage to enhance the likelihood of making the microbes detectable.

Protocol

The patient is treated in a supine position. If needed for diagnostic precision, a six-hour urine collection is done before the ultrasound treatment. The following settings, treatment, locations, and times are used:

Ultrasound

- Bladder – 50% pulsed 1Mhz 0.5W/cm² for 2 minutes
- Spleen – 50% pulsed 1Mhz 0.5W/cm² for 2 minutes
- Vagus – 20% pulsed 3.3Mhz 0.5W/cm² for 1 minute each side with a mild neck extension
- Temple – 10% pulsed 3.3Mhz 0.5W/cm² for 1 minute each side
- Submandibular/Salivary glands – 20% pulsed 3.3Mhz 0.5W/cm² for 1 minute each side.

Infrared Light

- While the patient is still supine, we apply a simple 850nm infrared light device (Towallmark) to the same areas mentioned above: bladder, spleen, the vagus nerve, temple, submandibular/salivary glands for 45 seconds to each area.
- Please also include tissues where your patient has symptoms (sore/swollen joint, swollen lymph node, etc.).
- We are now exploring the use of an 850nm near infrared panel (Joovv) applied to the whole body. We have had patients stand in front of the panel for three minutes against bare skin front and back. It is too soon to comment on our results with the infrared panel.

Vibration Plate

- Next the patient stands on a vibration plate for 10 minutes as the last step in the provocation protocol.

After the procedure, the urine is collected for six hours and an aliquot sent in for PCR testing (ideally along with the pre-provocation urine test).

At the time this article was written, DNA Connexions has undergone some changes in their PCR grading system. The lab runs each sample twice. However, now if one sample is noted as non- specific amplification (NSA) and one sample is negative, they report the result as negative. In the past, the lab would have reported the result as NSA. They are considering a quantitative grading system in the future. We have seen less positive results due to this change. We are continuing to dialogue

with DNA Connexions to support research.

Revisiting Retroviruses

Our colleague and friend, Dr. Judy Mikovits, came to the Sophia Health Institute to update us on her latest discoveries on retroviruses and therapeutic approaches. Dr. Mikovits is known for her discovery of XMRV-like viruses (23% of prostate cancer, but much higher percentage of patients with aggressive prostate cancer) and the involvement of retroviruses in ME/CFIDS and a multitude of other chronic illnesses.

What are retroviruses? The more familiar DNA viruses such as those from the "herpes family" – and many others – work their way from the DNA over to the RNA and from there to the manufacture of viral proteins. Retroviruses work their way backwards – from the RNA to the DNA – and then forward again from there. Retroviruses are subdivided in different-lettered classes: Beta retroviruses (HERV-K), Gamma retroviruses (HERV-H and HERV-W). The generally accepted key contributors to chronic illness are inflammation, oxidative stress, and microbial infection. All of these are known triggers for retroviral activity and, in turn, also caused by retroviral activity.

Both human and animal retroviruses can infect the CNS. These are associated with many diseases of the CNS, causing neurological disease by several mechanisms: 1) directly through infection of immune cells which traffic to the brain, 2) indirectly through increases in proinflammatory cytokines and chemokines, or 3) in the absence of detectable brain inflammation indirect effects known as "bystander effects," causing chronic retroviral replication of immune cells.

A retrovirus works via the enzyme "reverse transcriptase." Once inside the cell, it uses the enzyme to force the cell to create viral DNA. This viral DNA becomes integrated into the host-cell DNA. A retrovirus integrated into our genome may be passed from mother to child during pregnancy. Only 2% of our DNA is protein-coding, but 6-8% of our DNA is retroviral DNA, passed down to us from our ancestors as scars from our constant encounter with an often hostile microbial and virus-rich environment. These viruses are referred to as human endogenous retroviruses or HERVs.

But not all embedded retroviral DNA is bad. Some sections have become a functional part of our genome because they have given us an evolutionary advantage, such as the formation of the p53 gene regulatory network. Other retroviruses have to be silenced throughout life – mainly through DNA methylation and acetylation. The transcription of retroviral DNA makes the infected person susceptible to numerous de-novo genetic mutations, including MTHFR, DNMT and other genes which control methylation. Many other illness-producing effects are known, implicating HERV- K in the pathogenesis of neuroinflammatory and autoimmune illnesses. For a patient to get well today, it is rarely enough to just interpret the genomic testing and to substitute accordingly.

How Do We Become Infected?

Retroviruses can be acquired (inhalation, blood-based products, physical contact), or the viruses already present in our DNA can be activated through influences such as a viral infection or chronic inflammation. The Epstein Barr virus induces expression of the HERV-K envelope gene and the transactivation of MSRV (the multiple sclerosis retrovirus). Herpes simplex type-2 activates members of the HERV-W family. These, and other mechanisms are likely responsible for the activation of HERVs seen in RA, SLE, Sjogren's disease, schizophrenia, autism, MS, and cancer. Cellphone radiation has disabled many of our protective proteins[3] and so have many of the food-based toxins such as glyphosate[4] and air-based inhalants (aluminum, etc.). An unintended source of retroviruses are some vaccines.[5]

Illnesses Linked to Activated Retroviruses

- CNS-related illnesses: ME/CFS, Gulf War Syndrome, autism, MS, Parkinson, ALS, schizophrenia, SLE (Lupus), Crohn's disease, Hashimoto's thyroiditis, polymyositis, Sjogren's syndrome, Bechet's disease, primary biliary cirrhosis.
- Cancer: prostate, breast, non-Hodgkin's lymphoma, chronic lymphocytic leukemia, mantle cell lymphoma, hairy cell leukemia, bladder, colorectal, kidney, and ovarian.
- I am adding a list of other illnesses that have responded under my care to retroviral interventions: intractable Lyme disease, mold illness, insomnia, brain fog and all stages of a deteriorating brain, most childhood illnesses including ADHD and behavioral problems, asthma, breast cancer, lung cancer and many more.

When [retroviral] treatment is included early on in the treatment of persistent Lyme, the work with liposomal herbal anti-Lyme agents is often more effective than the antibiotic approach.

Diagnosis

Currently PCR testing is only available to the research community. We have to rely on indirect parameters.

- Decrease of **CD56** NK cells (CD56 is involved in adhesion, migration, growth, differentiation and other cellular functions); downregulation of IL-13, IL-2, IFN gamma TH-1 cytokines.[6]
- Dysregulated levels of TH-2 cytokines: IL-4, IL-10 and pro-inflammatory cytokines: IL-1, IL-6, IL-8 and TNF-alpha.
- Elevated levels of TGF beta-1 has profound effects on innate

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and adaptive immunity through stimulation of mast cells (often mistaken as mold-related). This may be the true cause of mastocytosis.

- Practical markers from my experience: low wbc (white blood count) below 4500, low CD 56. I always include the CD 57 to keep an eye on *Borrelia burgdorferi* as compounding factor.

At SHI, we use Autonomic Response Testing (ART), a muscle biofeedback technique to establish the diagnosis using digitalized HERV frequencies as test substances. ART is now in PubMed and on its way to belong to the safer area of "evidence-based medicine."[7]

Most patients with persistent Lyme test positive for HERVs. It seems clear that clients with severe symptoms have underlying activity of HERV; those with milder or no symptom do not. Including the treatment of HERV has dramatically changed the outcome of the treatment of persistent Lyme. When HERV treatment is included early on in the treatment of persistent Lyme, the work with liposomal herbal anti-Lyme agents is often more effective than the antibiotic approach.

We consider the following anti-retroviral agents, along with bee venom therapy (also established as an effective anti-retroviral treatment):

- **Cistus incanus.**[8] We found the plants with the highest amount of bioactive anti-Lyme and anti-retroviral plant adaptogens grow wild in Sardinia. Use as a tea (6-8 cups/day), sweetened with whole leaf stevia, because of stevia's potent borreliocidal effects.
- **Scutalaria root.**[9] Skullcap root is a potent antiviral and antibacterial and reduces cytokine cascades. Baicalin, one of the active constituents, strongly concentrates in lungs and brain, especially the hippocampus, thalamus, and striatum. Skullcap reduces also cytokine cascades in the CNS that are initiated by viruses and bacteria. It also inhibits the aggregation of neuronal amyloidogenic proteins and induces dissolution of amyloid deposits in the brain. Skullcap contains melatonin. It is important to check for drug interactions before prescribing skullcap. Skullcap may increase the bioavailability of certain drugs due to its inhibition of CYP3A (acetaminophen, codeine, cycolospoin, diazepam, and erthyromycin). Baicalin can also be a synergist with drugs such as albenza, ribavirin, cipro, and amphotericin B.
- **Broccoli sprouts.**[10] Broccoli sprouts or extracts have to be chewed for the conversion to sulphoraphane to occur. Broccoli extracts are especially effective in the treatment of Lyme/HERV-caused autism and cancer.
- **St John's Wort**.[11] Biopure has a potent anti-retroviral mix called "Key5" (cilantro, ginkgo, lemon balm, lomatium, and St. John's wort) that we frequently prescribe in the course of our Lyme treatment.
- Because of its often-forgotten anti-retroviral effects, I like to put my patients on a higher dose of **seleno-cysteine** (commonly 800 mcg, a dose that has been established as safe.).[12,13]
- **Suramin**,[14] an old antiparasitic has turned out to be one of the most effective anti-retroviral agents. Retroviruses activate the "cell danger response" and the P2 purinergic receptor (on each cell). Suramin downregulates this receptor and inhibits the binding of growth factors (TGF-beta, EGF, PDGF) to their receptors and thus antagonizes the ability of these factors to stimulate growth of tumor cells. It can be given IV every six weeks. I prefer giving daily homeopathic doses.

When we use suitable liposomal extracts of plants in proper dose and frequency, together with selenium and "energetic copies" of immune modulators like suramin, olmetarsan (Vit.D receptor), rapamycin (mTOR), significant results can be achieved in the treatment of persistent Lyme and other chronic illnesses that were not possible before. This new therapeutic approach should always be combined with the synergistic use of EMR protection, treatment of Lyme and co-infections, mold, and the simultaneous use of metal detox strategies (especially aluminum).

The Glymphatic System and Strategies to Detoxify the Brain

The glymphatic system is the waste clearance pathway for the central nervous system. This system ramps up its activity during sleep, thereby allowing the brain to clear out toxins, including amyloid beta. During sleep, the glymphatic system becomes 10 times more active than during wakefulness. Simultaneously, brain cells shrink by about 60 percent, allowing for greater efficiency of waste removal. During the day, the constant brain activity causes the brain cells to swell in size until they take up just over 85 percent of your brain's volume, thereby disallowing effective waste removal during wakefulness.

A good night's sleep becomes of greater importance in preventing and reversing neurological disease. We have had success including liposomal melatonin in our protocols. Liposomal melatonin allows for better delivery to the nervous system. Melatonin not only helps to regulate our circadian rhythm but is also a powerful neuroprotective antioxidant for the CNS. Melatonin induces sleep and helps to clear pathogens and toxins from the brain, enhancing the effect of the glymphatic system.

We have found that the "melatonin hangover" effect can be reversed in some patients with the addition of taking melatonin with DMSA (200-600mg) at bedtime. The dose of DMSA is titrated until symptoms are gone. The reversal of this "hangover effect" suggests that the liposomal melatonin is enhancing detoxification and removal of heavy metals from the brain. This protocol provides an elegant solution for detoxing the difficult to reach toxins from the CNS.

Many of our patients have compromised lymph drainage in their neck. We have found that opening up

this lymphatic channel helps to clear toxicity from the brain. We also make sure to address chronic sinus infections, dental infections, and Waldeyer's ring. We use a combination of oleic acid, chondroitin sulfate, and a proprietary of blend of probiotics transdermally to reduce lymph congestion and allow for greater detoxification of the brain. We have developed a product called Sophia Flow that has these ingredients. Ultrasound has shown increased blood flow and decreased lymph node congestion after application of the cream.

One more technique to note is making sure that the lymphatic congestion in the abdomen is addressed. Many of our patients have radix edema (lymph congestion in the abdomen) secondary to chronic gut dysbiosis, etc. The lymph from the head and the extremities cannot drain well if the lymph is not draining in the gut. Our team has been trained in a manual technique, Sophia Matrix, that focuses on draining the lymph in the abdomen to allow for better lymph drainage.

Other techniques to consider include colonics, coffee enemas, castor oil packs, Mayan abdominal massage, constitutional hydrotherapy, etc.

A Novel Application of Artesunate

Neural therapy is a treatment for chronic pain and illness. It involves the injection of local anesthetics (procaine) into autonomic ganglia, peripheral nerves, scars, glands, trigger points, and other tissues. It is common for neural therapists to enhance the benefits of the injection by adding injectable homeopathics, nutrients, and medicinal preparations.

Many of our patients struggle with chronic pain, especially in their neck and back. We have combined artesunate with procaine into segmental therapy along the paraspinal muscles and have been pleasantly surprised by the often-immediate reduction of pain and inflammation reported after an injection. The results tend to be cumulative with consistent application.

Artesunate is an anti-malarial drug and shown to be effective against malarial and cerebral malaria, but also Babesia, cancer, schistosomiasis, CMV, HSV 1, EBV, Hep B, Hep C, and bovine viral diarrhea virus.[15] The week before this article was submitted, the FDA banned compounding artesunate. We hope with proper research, education, and activism this ban will be reconsidered.

Conclusion

For us to serve our complex patient population, we need to continue to pioneer and innovate diagnostic tests and assessment techniques that lead us to effective treatments. The Provoked Lyme Urine Panel using the RK protocol as well as Autonomic Response Testing continue to guide us. Our most challenging cases have taught us to look beyond Lyme. Our protocols continue to focus on replacing deficiencies, detoxifying the body, modulating the immune system, and decreasing the microbial burden.

Resources

Lyme Urine Panel: http://www.dnaconnexions.com/

Joovv Infrared Panel: https://joovv.com/

Infrared Lights: https://www.amazon.com/Towallmark-48-LED-Infrared-Vision-lluminator/dp/B0067S8IZ8

Ultrasound Unit: https://www.theratek.com/collections/clinical-equipment/products/chattanooga-ultrasound-intelect-transport-1-3-3-mhz?variant=38601796876

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Supplements:

- Biopure: https://biopureus.com/
- Sophia Nutrition: https://www.sophianutrition.com/

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Dietrich Klinghardt, MD, PhD, was born, raised and educated in West Germany, where he graduated from Freiburg Medical School/Albert Ludwigs University in 1975. He also studied psychology and completed a 3-year research project/PhD in angiology. He is internationally known for his successful treatment of chronic pain and illness. Dr. Klinghardt combines nonsurgical orthopedic medicine with immunology, endocrinology, toxicology, neural therapy, hypnotherapy, and energy psychology. He has been in practice for over 40 years and has been a pioneer in the diagnosis and treatment of Lyme disease, applying his 5 Levels of Healing model. Dr. Klinghardt founded Sophia Health Institute in Woodinville, Washington, where he sees patients.

Dr. Christine Schaffner is a board-certified naturopathic physician who graduated from Bastyr University. She completed her undergraduate studies in pre-medicine and psychology at the University of Virginia in Charlottesville, Virginia. Dr. Schaffner specializes in the treatment of chronic illness and is the clinic director of Sophia Health Institute in Woodinville, Washington.

Who Else Committed the Crime of Post-Lyme? Can Forensics Help Diagnostics?

by Simon Yu, MD

Who else committed the crime of post-Lyme? How can we improve diagnosis, treatment, and outcomes for our patients? I am concerned about over-diagnosis of Lyme disease as a default mode based on clinical diagnosis, with too much focus on aggressive antibiotic approaches. This can be a dead-end treatment plan, especially if it misses other contributing factors.

Forensic science is the application of science to criminal and civil laws, mainly during criminal investigation, as governed by the legal standards of **admissible evidence**. Assuming the Borrelia is dead, mutated, transformed, or hiding as a cyst form, Lyme specialists look for co-infections as a culprit for persistent post-antibiotic Lyme symptoms: Babesia, Bartonella, Ehrlichia, Anaplasmosis, Mycoplasma, and Rocky Mountain spotted fever (RMSF).

For the Integrative Medicine for the Treatment of the Tick-borne Diseases conference in Baltimore, April 2018, the DelMarVa Lyme Association asked me to give a lecture on parasites in the context of Lyme and tick–borne diseases. I do not treat Lyme disease; I am neither Lyme-literate nor specialized in Lyme disease or tick-borne disease. I am not a parasitologist, but I have written many articles on parasites based on 25 years of experience as an US Army Reserve Medical Corps physician. At the conference, I gave a lecture on parasites and on hidden dental infections that can mimic Lyme disease.

There is a clear indication to use antibiotics for acute tick bite incidents with associated classic skin lesion of a bull's eye red rash (erythema migrans) and/or arthralgia and flu-like symptoms after a tick bite. What happens when the symptoms become progressive, and develop into even weirder symptoms after antibiotics? Using more powerful antibiotics may not solve the problem, which is now called post-treatment Lyme disease syndrome (PTLDS) by the US Centers for Disease Control (CDC), and chronic, complex or persistent Lyme disease by patients.

If *Borellia burgdorferi* spirochete and co-infections are treated with aggressive IV antibiotics and the patient still has symptoms of Lyme, can we solve the mystery of post-Lyme by applying the analogy of forensic science? Let us investigate what happened after aggressively eliminating Borellia spirochete infection. In other words, who else committed the crime?

Let me introduce 60-year-old Sharon, a college professor from upstate New York, a classic post-Lyme syndrome patient as a forensic case study. The patient had a tick bite in 2013 and was on doxycycline and initially felt better. In 2014, she was officially told she had seronegative Lyme disease. In 2016, she experienced vision loss with white clouding on her vision, but the eye exam was normal. Since then, she has experienced right eye pain, pins-and-needles-like pain, and has seen 13 physicians. She needs to use an eye patch to read, but her eye exam has been completely normal per numerous ophthalmologists.

A spinal tap was done in January 2017 and was positive for Borrelia. She was officially diagnosed with CNS neurologic Lyme disease. An infectious disease specialist started her on a 28-day course of IV ceftriaxone, and there was no improvement. She was told her Lyme disease was treated, and she now had post-Lyme syndrome. She experienced persistent tingling in her arms and legs, incontinence, low back pain, fibromyalgia pain all over, severe fatigue, loss of appetite, weight loss, and severe insomnia.

Dr. Simon Yu, MD is a board-certified internist. He practices internal medicine with an emphasis on integrative medicine to use the best each has to offer. Before opening Prevention and Healing Clinic in St. Louis, Missouri, he was a medical center director for managed care and served as a US Army Reserve Medical Corps physician for 25 years, retiring as a full Colonel. For more information, articles, and Dr. Yu's book, *Accidental Cure: Extraordinary Medicine for Extraordinary Patients,* visit his website at www.preventionandhealing.com. Dr. Yu also offers Acupuncture Meridian Assessment training to doctors, dentists, and other prescribing health professionals. To learn more or register for the August 24-26, 2018, session in St. Louis, Missouri, see AMA Training at his website.

She went to a Lyme clinic in Arizona and received a 10-week course of IV antibiotics and six weeks of insulin potentiation therapy (IPT), but developed pancreatitis during the course of treatment. Next she had oral surgery in Colorado for four cavitations, replaced two amalgams, and "crashed" according to her words. She also had a coffee enema and passed "two different kinds of parasites" – the admissible evidence – and came to see me for parasite problems.

Acupuncture meridian assessment (AMA) showed that eight out of 40 meridians were out of balance. Her gallbladder, allergy/immunology and small intestine meridians were the dominant problems. She was started on parasite meds (ivermectin, pyrantel pamoate, and praziquantel), followed by anti-fungal meds (fluconazole and itraconazole) and other support therapies.

On her second visit, she reported feeling much better, and all her 40 meridians were balanced. She will be on multiple rounds of alternating parasite/antifungal meds. She has embarked on a long process of eliminating several layers of infections – including *Borrelia burgdorferi* and coinfections – with IV antibiotics, dental cavitation (jawbone) infections with oral surgery, and finally, parasites and fungal infections with potent prescribed medications.

It may be premature for me to say she is healing from post-Lyme syndrome. Time will tell. From the forensic science of who committed the crime, her missing links between Lyme disease and post-Lyme syndrome were her dental infections (four jawbone cavitations), mercury and heavy metals, and parasites/fungal infections.

It is time to broaden knowledge and awareness of Acupuncture Meridian Assessment (AMA), which provides doctors and dentists an additional tool for connecting the dots of missing "forensic evidence" links, such as dental, parasites, and fungal problems. It combines acupuncture – a 5000-year-old disruptive technology, part of ancient energy medicine – with digital bioresonance technology that measures changes in frequency specific microcurrents.

Changes in these energetic pathways, or energy field flows, within the body are indicators of infection and inflammation along each meridian connecting a tooth and organs, which interestingly, correspond to morphological pathways of development. This adds an additional dimension – more "forensic evidence" – to precision diagnostics, and a pathway to precision health for patients facing complex chronic diseases, and the physicians who treat them.

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The Unique Challenges of Lyme Disease and a Multi-Pronged Strategy to Address Them

by Carrie Decker, ND

Many clinicians may shy away from treating Lyme disease patients. This may be because very few had an immersed internship, or they knew, likely from a personal or close family member's experience, that working with Lyme disease was a personal passion they would pursue until unable any more. So, how do we step into the world of Lyme and work with this patient population and all its complications? An understanding of the challenges that can make this infectious disease so chronic helps us to recognize what tools from our holistic toolbox may be useful in not only the eradication of this infection, but also for palliating the symptoms with which our patients may suffer.

Lyme disease specifically refers to the tick-borne infection typically caused by one of three pathogenic species of the spirochete *Borrelia burgdorferi* sensu lato.[1] Of these, in the United States, *B. burgdorferi* is the most common, while *B. afzelii* and *B. garinii* have been observed more in Europe as well as Asia. Many new species and variants within this family continue to be recognized.[2] However, *B. burgdorferi,* or one of these others, is not the only pathogenic agent which a tick may transmit. Common co-infections include microbes from the families of *Bartonella*, *Ehrlichia*, *Anaplasma*, and *Babesia*,[3,4] which not only lead to symptoms associated with their presence but also can increase Lyme disease severity and have their own distinct challenges in the process of eradication.[5] The various diagnostic tests on the marketplace, and their advantages or pitfalls, are beyond the scope of this article and are a complex discussion as well.

The Borrelia spirochete not only often travels with a companion, but itself can take many forms in the body. It is able to defend itself by switching to a cystic form or existing within a biofilm-like colony, as well as by differentially expressing proteins and genes that enable survival in the host.[6-8] By doing such, it is not only able to avoid immune system clearance, it also is able to avoid detection.[9,10] Because of this switching, we will see not only resistance to antibiotics, but also botanicals, necessitating an ongoing process of switching our therapies, often through a long course of treatment.

Given these issues, the interventions selected for the treatment of Lyme disease must consider the broad array of pathogens that may exist, the protective nature of biofilms that prevent eradication, and support to encourage a necessary, yet balanced, immune system response. With the vast array of symptoms which are debilitating for many, support for symptom palliation, ideally in a manner that does not suppress but rather further encourages healing, also is necessary.

Antimicrobial Therapies

Artemisia annua, also known as sweet wormwood, or *Qinghao*, has a long history of use as an antimicrobial agent.[11,12] The primary compound derived from this plant is artemisinin, also known as *Qinghaosu*.[13] However, additional bioactive substances found in its oil include camphor, germacrene D, artemisia ketone and 1,8 cineole.[14]

A. annua has broad-spectrum action as an antiparasitic, antibacterial, antifungal, and antiviral agent. *A. annua* and its derivatives, particularly artemisinin, have been shown to be active against Babesia, as well as cytomegalovirus, herpes simplex virus, Epstein-Barr virus, and *Toxoplasmosis gondii* – each of these being additional common causes of persistent, chronic infections that burden the immune system.[15-18] Action has also been demonstrated against *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Escherichia coli*, *E. coli* UPEC, *Haemophilus influenzae*, *Helicobacter pylori, Pseudomonas aeruginosa*, *Campylobacter jejuni, Clostridium perfringens,* and *Candida* spp.,[19-22] many of which may exist as pathogens or at unbalanced levels in the often immune-compromised Lyme patient. Artemisinin also may impact biofilms, which make some of these pathogens resistant to treatment.[23,24]

In a recent study of patients experiencing short-term memory deficits associated with Lyme disease, oral treatment with artesunate, a water-soluble artemisinin derivative, was shown to significantly reduce the short-term memory difficulties.[25] Although the memory issues may occur due to central nervous system infection with *Borrelia spp.*, this symptom also may be attributable to a Babesia co-infection.

Regardless of the infectious etiology, this recent finding is noteworthy and may translate to clinical improvements.

Grapefruit seed extract, although the subject of some controversy due to the possible contamination of products with benzethonium chloride and triclosan,[26,27] also may be helpful in the treatment of Lyme disease, due to its demonstrated action against both the motile and cystic forms of *B. burgdorferi*.[28,29] It has been reported to have no significant adverse effects, including on the population of healthy *Lactobacillus* spp. or *Bifidobacterium* spp. in the gut.[30]

Immune Support

Many botanicals have evidence of supporting immune system function; of these, one which is of importance in the treatment of Lyme disease is cat's claw (*Uncaria tomentosa*), also known in Spanish as uña de gato. Cat's claw is ideally suited in the Lyme setting, as in addition to its immune-supportive actions, it has been shown to have anti-inflammatory, anti-arthritic, and antioxidant effects, and supports cognitive function. Cat's claw has been shown to enhance proliferation of both T helper and B lymphocytes,[31,32] also increasing lymphocyte viability and survival. In the setting of rheumatoid arthritis, cat's claw has been shown to significantly reduce the number of painful and swollen joints.[33] In osteoarthritis, similar benefits have been seen, with a significant improvement in pain associated with activity, as well as medical and patient symptom assessment scores.[34] Potent antioxidant activity, including the protection of membrane lipids from peroxidation, has been demonstrated in multiple *in vitro* studies, along with a strong level of inhibition of tumor necrosis factor (TNF)-α, a primary pro-inflammatory cytokine associated with the acute immune system response.[35,36]

Cat's claw also has the potential to improve some of the cognitive symptoms seen with Lyme disease and its common co-infections. In multiple animal models, cat's claw has been demonstrated to have a neuroprotective effect and improve memory,[37,38] possibly attributable to its antioxidant action or altered glutaminergic signaling.[39]

Reducing Biofilms and Taming the Inflammatory Response

Lactoferrin, a glycoprotein found in milk and at much higher concentrations in colostrum, has long been recognized for the role it plays in protecting infants from infection as well as supporting normal immune system function.[40] It has been shown to have antimicrobial activity against parasites, bacteria, fungi, and viruses,[41] and supports the body's protective response to tick-borne pathogens. Lactoferrin has been shown to have an inhibitory effect on bacterial biofilms,[42] including that of *B. burgdorferi.*[43] Lactoferrin also has been shown to inhibit the growth of *Babesia spp*., one of the common co-infections.[44]

Lactoferrin's immunomodulating effects support symptom reduction and an improved systemic response. Many Lyme patients not only experience symptoms due to the active infection in their body; but when treatment commences, a reaction referred to as "die-off," or formally, a Jarisch-Herxheimer reaction, may occur. Specifically, a Jarisch-Herxheimer reaction is the symptoms that transpire due to the uncontrolled release of endotoxin (also known as lipopolysaccharide or LPS), as well as endotoxin-like products, during lysis of the broad spectrum of bacteria which many natural and pharmaceutical antibiotics impact.[45] These products of bacterial die-off not only stimulate a further immune response and inflammation, they also can adversely affect organ and systemic function, sometimes critically, in patients with Lyme disease.[46,47] Lactoferrin has been shown to neutralize endotoxin,[48] also directly inhibiting the endotoxin-induced immune system response.[49,50] Lactoferrin has also been shown in several studies to decrease levels of TNF-α.[51] In animal models, the administration of supplemental lactoferrin prior to endotoxin shock dramatically reduced mortality and increased overall wellness.[52,53]

Chitosan is a biopolymer derived from chitin, a component of the shell of crustaceans that is used in a variety of biological applications including as a vaccine adjuvant. Chitosan also is used in an array of applications as a chelator.[54,55] It has been shown to have the ability to bind and remove a variety of toxins including polychlorinated biphenyls, phthalates, bisphenol A, mold toxins, and heavy metals.[56-59] It also has an ability to chelate and remove the heavy metals manganese and zinc.[60,61] Manganese and zinc are two minerals that are essential for the lifecycle and metabolic needs of *B. burgdorferi,* also serving as central regulators of many of its virulence genes.[62,63]

Chitosan has been shown to have an antimicrobial effect via disrupting biofilms associated with *Streptococcus mutans* and *C. albicans*, particularly when the chitosan is of low molecular weight.[64,65] Chitosan also has the ability to bind endotoxin[66,67] and has been shown specifically, in the setting of Lyme, to reduce symptoms attributed to the Jarisch-Herxheimer reaction.[68] In the gut, chitosan has been shown to have a prebiotic effect, promoting the growth of *Bifidobacterium* spp. and *Lactobacillus* spp., which are predominant healthy flora that also support the reduction of inflammation and a normal immune response.[69-71]

One possible contributor to the fatigue that is experienced with Lyme disease, and with other chronic infections for that matter, is altered cellular function due to oxidative stress and damage.

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Support for Cellular Function

One possible contributor to the fatigue that is experienced with Lyme disease, and with other chronic infections for that matter, is altered cellular function due to oxidative stress and damage. In Lyme borreliosis patients, classified by the CDC definition of Lyme disease and not being treated by antibiotics, significantly low levels of cytosolic ionized calcium, indicative of interrupted cellular communication, and significantly higher levels of mitochondrial superoxide, indicative of oxidative stress and damage within the cell, have been shown.[72] Additionally, *B. burgdorferi* has been shown to sequester cysteine, the rate-limiting amino acid for glutathione production, for its growth.[73] This may further impair cellular function and detoxification, leaving the cell even more susceptible to oxidative damage particularly if additional insults occur. It is not uncommon that we see patients with Lyme disease easily fall ill when exposed to mold or heavy metals; the reduced ability for the cells to detoxify and carry on normal function may be a significant contributor.

Lipid replacement therapy, that is, oral supplementation with glycerolphospholipids, which are the main component of cellular membranes, is one strategy to support normal cellular function and repair. To further enhance this, critical antioxidants such as coenzyme Q10 (CoQ10) and reduced nicotinamide adenine dinucleotide (NADH) are also often provided as well. The combination therapy of glycerolphospholipids, CoQ10, NADH, and additional ingredients to support cellular function, such as L-carnitine, has been studied in the setting of intractable chronic fatigue and chronic Lyme disease, diagnosed by symptoms and positive Western blog analysis. After two months of daily supplemental support, fatigue, as well as all subcategories of fatigue including cognitive function and mood, were significantly improved ($P<0.0001$).[74] Trendlines also showed significant and consistent downward trends in the data, indicating that symptoms would have further improved with time. Additional studies utilizing glycerolphospholipids as a monotherapy or in combination with additional nutrients have shown positive outcomes in similar settings of chronic fatigue, also leading to improvement in mitochondrial function.[75,76]

Although the challenges associated with supporting patients whose health has been compromised by a tick-borne infection do have many complexities, therapies such as these, or a combination thereof, offer a starting point that clinicians can trust, due to evidence in *in vitro,* animal, and human clinical studies that support their use. Other botanical and nutritional substances, as well as energetic medicine and physical modalities, also are often necessary for complete recovery; but for some, therapies such as these discussed herein may be adequate to encourage the body to respond and recover.

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On the cover

Mold-Related Illness and Mycotoxins – A Unique Opportunity for Functional Medicine Practitioners

by Jill Carnahan, MD

Chronic and complex illnesses are inherently complex and difficult to treat for doctors operating under the modern healthcare system. These illnesses require more thorough medical histories, testing, treatment plans, and patience than many conventional doctors are able to provide due to time, money, and insurance constraints.

Developments in treating complex chronic illnesses are in a constant state of flux as we learn more about infectious and toxic triggers. Thus, doctors choosing to treat patients with chronic conditions must forever be students. Educating ourselves on the most current medical literature and protocols is essential for the success of future treatments.

There is no doubt in my mind that this shift from treating symptoms to treating root cause of infectious and environmentally acquired illnesses will only continue to grow. In my personal practice, I'm seeing a rise in conditions such as:

- Chronic inflammatory response syndrome (CIRS),
- Neuroinflammatory conditions,
- Mast cell activation syndrome (MCAS),
- Tick-borne illnesses,
- Viral reactivation and viral load illnesses, and
- All autoimmune diseases.

Moreover, I continue to hear similar patterns from my colleagues. It's not that environmentally acquired illnesses are new, it's that our industrial society is rapidly contributing to the overall toxic burden of the body through new chemicals, plastics, artificial ingredients in the food supply, and cheap construction materials that foster an ideal breeding ground for mold. I often think in terms of total toxic load and infectious burden. Most of these chronic conditions are a complex stew of both of these things.

The model of care required to successfully treat illnesses like chronic inflammatory response syndrome provides integrative and functional medicine practitioners with a unique opportunity to fill a much-needed gap in today's world of medicine.

Specifically, mold-related illnesses have become of particular concern because – depending on the mold species, a person's genetic predisposition, and level of mold exposure – mycotoxins and the other inflammagens and toxins present in a water-damaged building can result in many types of inflammatory responses, including the following:[1,2]

- Chronic inflammatory response syndrome (CIRS),
- Mycotic infections (mycoses),
- Fungal rhinosinusitis,
- Asthma,
- Pulmonary diseases like hypersensitivity pneumonitis and VOC-induced COPD,
- Mitochondrial toxicity,
- Cytotoxicity/cancer,
- IgE-mediated sensitivity,
- Hypersensitivity pneumonia,
- Carcinogenicity,
- Nephrotoxicity,
- Immune system suppression/dysfunction,

- Abnormalities in T and B cells,
- Central and peripheral neuropathy, and
- Sarcoidosis.

More and more, we are finding how significantly environmental factors can influence disease states. Although, it's not just the environment that plays a role; each person brings their own set of genetics and other variables to the table.

Mycotoxin Mechanisms of Injury

The ways in which mycotoxins impact the body differ greatly based on the person, the mycotoxin, and any other exposures that may be occurring. Here's a brief overview of the different mechanisms of injury from mycotoxins[3]:

- Infections,
- Allergies,
- Inflammation,
- Autoimmunity,
- Oxidative stress,
- Toxicity,
- Carcinogenicity,
- Synergistic interactions with other bio-contaminants; water-damaged buildings (WDB) nearly always have more than just mycotoxins causing issues (endotoxins, beta glucans, dust, VOCs, etc.).

What Does a Patient Who Has Been Exposed to Mold Look Like?

No two mold patients look exactly the same, which is why case studies are one of the best methods for learning more about mold-related illnesses. (See Sidebar.) That being said, there are some common symptoms:

- Extreme fatigue,
- Weakness,
- Headaches,
- Light sensitivity,
- Brain fog,
- Insomnia,
- Morning stiffness and joint pain,
- Tingling or numbness,
- Shortness of breath,
- Chronic cough or sinus congestion,
- Sugar cravings,
- Metallic taste in mouth,
- Vertigo,
- Static shocks,
- Digestive issues – gas, bloating, heartburn, diarrhea or constipation,
- Blurred vision or red eyes,
- Balance issues,
- Anxiety,
- Depression,
- Skin rashes,
- Urinary incontinence,
- Decrease libido,
- Frequent infections, and
- Chemical intolerance or MCS.

Other common presentations include the following[3]:

- Seeking multiple practitioners and feel desperate and hopeless,
- Having tried many different treatments with little success,
- Taking multiple medications or intolerance to most medications,
- Normal routine lab work,
- Well appearance, and
- Having been diagnosed with any of the following: chronic fatigue syndrome (ME/CFS), fibromyalgia, depression/anxiety, non-specific rheumatologic disorders, asthma, chronic allergic rhinitis, interstitial cystitis, irritable bowel syndrome, gastroesophageal reflux disease, and/or chemical sensitivity.

Common Misconceptions About Mold Patients

Due to the complex nature of mycotoxin illness, many misconceptions have arisen. It's important not to assume any of the following about a patient is true[3]:

- They must have the HLA susceptible gene to become sick.

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Case Study

A 43-year-old male executive found out his condominium was full of black mold. His symptoms included fatigue, brain fog, ice-pick headache, static shocks, and multiple chemical sensitivity.

- Patient Medical History: restless leg syndrome, allergic rhinitis.
- Patient Surgical History: sinoplasty.
- Family History: mother – coronary artery disease; father – diabetes.
- Social: non-smoker, social drinker, no drugs

Pertinent Labs: C4a elevated, TGF Beta elevated, MSH = 10, ADH/Osm abnormal, MMP-9 normal, VEGF normal, anti-gliadin antibodies positive, urinary mycotoxins positive for multiple strains, Visual Contrast Study abnormal, NeuroQuant showed hippocampal atrophy.

Assessment: chronic fatigue syndrome, multiple chemical sensitivity, chronic inflammatory response syndrome

Treatment: Mold avoidance, remediation, liposomal and IV glutathione, binders (including clay, charcoal and cholestyramine), liver support, vitamin D3, B complex, Spore probiotics, multi-mineral supplement, anti-fungal sinus spray, BEG nasal spray, and low-mold diet.

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- If others in their home or work aren't sick, it can't be mold.
- If their labs are normal, it can't be mold-related illness.
- If they moved and symptoms didn't get better, it can't be mold.
- They don't look sick, so it can't be mold.
- They have multisystem symptoms, and therefore it can't be mold.

Factors That Affect How Mold-Related Illness Presents in the Body

How mycotoxins affect an individual depends on hundreds of factors, which is part of the reason definitive diagnostics remain complex. Factors that influence how mycotoxin exposure presents include the following:

- Nutrient deficiency (which could be due to either diet or poor absorption),
- Other microbial infections,
- Alcohol and drug use,
- Other autoimmune or degenerative diseases,
- Genetics – particularly HLA DR typing and MTHFR; and
- Method of exposure: Inhalation and ingestion are most common. Surprisingly inhalation may be many times more toxic than ingestion. However, transdermal should not be ruled out.[4] Those who work in agriculture and some industrial occupations could have a higher risk of exposure.[3]

How Should a Clinician Approach the Patient with Suspected Mold-Related Illness?[5]

- Ask about the above symptoms. Create a handy ROS sheet that pertains to water-damaged buildings (WDB) and mold-related illness.
- Take a comprehensive medical history including birth and in utero exposure.
- Some common questions…
  - Has your work or home recently been flooded or had water damage?
  - Have you noticed mold in your work or home?
  - Are any of your family members or coworkers chronically sick or experiencing similar symptoms to you?
  - Do your symptoms get worse on rainy days?
  - What do you do for work?
  - What are your hobbies? Looking for other areas of exposure.
  - Are you exposed to dust, chemicals, or fumes at work?
  - Do your symptoms change when you're in a particular location? (Keep in mind, sometimes when a person is ill due to mold exposure they increasingly stay at home, which worsens their condition if that's the source.)
- Be sure to rule out other conditions.

Additionally, you can have them take the Visual Contrast Sensitivity test.[6] This test can be taken at home, costs $15 online or can be done in office. It checks their ability to distinguish between very similar shades of black and gray. The inability to differentiate between slight color variations is a sign of neuroinflammation that can be caused by mycotoxins and other biotoxins. You can order a full panel of urinary mycotoxins through Real Time Labs or Great Plains Labs to document exposure to mycotoxins. I frequently order inflammatory markers on routine lab work as well as including, HLA typing, C3a, C4a, VEGF, MMP-9, MSH, PA-1 activity, TGF-beta, VIP, ADH/Osm, APA, ACA, Leptin/adiponectin, amylase/lipase, Ig levels and subclasses, ANA, and other viral and atypical bacterial infectious titers.

How Prevalent Are Moldy Buildings?

We now spend 90 percent of our time indoors, which adds to the impact indoor air pollution can have on our health.[7] Molds can grow in a variety of climates and only need 24 to 28 hours of dampness to start growing.[8] Estimates vary on how many homes have mold growth; however, overall, they suggest moldy buildings are more prevalent than many realize.

Table 1. Prevalence of mold in US homes.

Publication	Location	Sample Size	Mold or Mildew	Dampness or Mold
Brunekreef, B[9]	6 US Cities	4625	30%	55%
Maier, WC[10]	Seattle	925	54%	68%
Spengler, JD[11]	24 Cities in US and Canada	12,842	36%	50%
Stark, PC[12]	Boston	492	38%	52%
Average			**40%**	**56%**

**Numbers populated from Berkeley Lab, averages calculated by Dr. Jill Carnahan.* [13]

These reports are a few of the studies that have led to the widespread and common claim that about half of all American homes have dampness and mold growth.

Though, this potentially high prevalence of mold growth across the country is a definite reason for concern, there's a lot of good news that comes with environmentally acquired illness. First and foremost, is the ability to remove a patient from the environment or implement remediation to improve their overall health. Diagnosis, treatment, and prognosis of mold-related illnesses have a positive potential outcome once the origin of the assault is identified and removed.

This is where awareness and education come in. As a country, we are in denial at how significant the role mold and mycotoxins play in our health, and it's time we all paid better attention.

Mold in Our Food

Another major source of mold is our food supply. Most of the studies on mycotoxins in the food supply revolve around animal feed. Overall, we could use more investigation on mycotoxins in our food, though the United Nations estimates that about 25 percent of the world's food supply is impacted by mycotoxins – primarily grains, corn, and anything that is stored for long periods of time.[14] Research has found that most acute mycotoxicosis cases have occurred due to mycotoxins in the food supply.[15]

Mycotoxins of Concern

The Centers for Disease Control and Prevention (CDC) estimates there are over 500 species of hazardous molds; though, in the past decade or so a few have begun to stand out among the rest.[16]

- Aflatoxins,
- Aflatrem (a tremorgenic mycotoxin),
- Aspergillosis,
- Citreoviridin,
- Ergot alkaloids,
- Fumonisin B1,
- Gliotoxin,
- Macrocyclic trichothecenes,
- Ochratoxin A,
- Patulin,
- Penitrem,
- Rubratoxin,
- T-2 Toxin,
- Tremorgens,
- Verruculogen, and
- Zearalenone.

Of these mycotoxins, the most dangerous and best studied thus far include the following mycotoxins.

Aflatoxins (AT) – Aflatoxins are natural carcinogens and commonly contaminate foods, especially crops that are pre-harvested and stored, such as grains, corn, nuts, and seeds. Aflatoxins can also be found in water-damaged or damp buildings where *Aspergillus* mold is growing. Aflatoxins can cause many different forms of aspergillosis, which is a group of diseases caused by mycotoxins of the *Aspergillus* genus.

Aflatoxins are fat soluble and readily absorbed by the body. They are usually ingested through contaminated foods or inhaled through dust ➤

Dr. Jill's Low-Mold Diet

Foods That Must Be Avoided

Avoid sugar and sugar-containing foods: table sugar and all other simple, fast-releasing sugars such as fructose, lactose, maltose, glucose, mannitol and sorbitol. This includes honey and natural sugar syrup type products such as maple syrup and molasses. This also includes all candies, sweets, cakes, cookies, and baked goods. *Sweetleaf whole leaf stevia concentrate may be used in moderation.*

High sugar fruits:

- Avoid pineapple, mango, banana, melons, oranges, and grapes.
- Organic berries, apples and lemon/lime are okay.

Packaged and processed foods:

- Avoid canned, bottled, boxed, and otherwise processed and pre-packaged foods as they more often than not contain sugar of one type or another.
- Canned – Baked beans, soups, ready-made sauces.
- Bottled – Soft drinks, fruit juices, all condiments and sauces.
- Boxed/Packaged – Ready-made meals, breakfast cereals, chocolate/candy, ice cream, frozen foods.

Mold- and yeast-containing foods:

- Cheeses: All cheese, especially moldy cheeses like Stilton are the worst, buttermilk, sour cream, and sour milk products.
- Alcoholic drinks: beer, wine, cider, whiskey, brandy, gin, and rum.
- Condiments: vinegar and foods containing vinegar, mayonnaise, pickles, soy sauce, mustard, relishes.
- Edible fungi, including all types of mushrooms and truffles.
- Processed and smoked meats: sausages, hot dogs, corned beef, pastrami, smoked fish, ham, bacon.
- Fruit juices: All packaged fruit juices may potentially contain molds.
- Dried fruits: raisins, apricots, prunes, figs, dates, etc.

Foods Okay to Be Eaten in Small Amounts

1. Gluten-free grains: brown rice, quinoa, buckwheat, millet, teff, certified gluten-free oats
2. High starch vegetables and legumes: sweet corn, potatoes, beans and peas, lentils, sweet potatoes, squashes, turnips, parsnips.
3. Fruits: low sugar types such as berries, apples, pears and peaches.

Foods to Be Eaten Freely

1. Organic pastured animal products: beef, bison, veal, lamb, buffalo, wild-caught seafood, poultry, pastured eggs.
2. Low-carbohydrate vegetables: broccoli, spinach, cauliflower, kale, cabbage, arugula, chard, cucumber, peppers, tomato (fresh only), onion, leek, asparagus, garlic, artichokes.
3. Raw nuts and seeds: sunflower seeds, pumpkin seeds, flax seeds, chia seeds, almonds, low-mold nuts. (No peanuts, walnuts, pecans, cashews, Brazil nuts)
4. Healthy Fats: extra virgin olive oil, coconut oil, coconut milk, ghee, avocado, organic butter.
5. Other: tempeh, miso, apple cider vinegar
6. Beverages: filtered water, non-fruity herbal teas, mineral water, fresh veggie juice.

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particles of food items. Once in the bloodstream they are distributed to tissues and the liver. From here (depending on the type of aflatoxin) they are metabolized into different proteins that can cause DNA damage and induce cancer or acute toxicity (aflatoxicosis).[17]

Aflatoxin exposure can result in leukemia, lymphoma, aplastic anemia, and renal failure. This mycotoxin gravely impacts the central nervous system through an invasion of blood vessels causing hemorrhagic infarction.[18]

Aflatrem – Aflatrem is a secondary metabolite of *Aspergillus flavus* that commonly occurs alongside aflatoxins. This fungus is commonly found in corn and therefore ends up in cattle feed. Aflatrem is able to infect both livestock and humans, where it has profound neurotoxic effects. Aflatrem decreases the capacity of glutamate and GABA uptake, which translates as degradation of nerve terminals, a decrease in corresponding neurotransmitters, and their release.[19] This mycotoxin can result in seizures, tremors, and disorientation.

Fumonisin B1 – Another mycotoxin mostly found in corn and cereals, Fumonisin B1 induces neuronal degeneration in the cerebral cortex, disrupts sphingolipid synthesis, inhibits protein synthesis, promotes DNA fragmentation, increases lipid oxidation, causes cell death, and can eventually result in death.[20, 21]

Macrocyclic trichothecenes (MT) – Macrocyclic trichothecenes of *Stachybotrys chartarum*, is one of the mycotoxins most often found in water-damaged buildings. MT is commonly found in ventilation systems, drywall, and ceiling tiles, but unlike many other mycotoxins, it's also found in airborne particles.[22]

MT causes neuronal cell apoptosis and inflammation in the olfactory epithelium and olfactory bulb.[21] It inhibits protein synthesis through binding to proteins and other macromolecules. Chronic exposure to MT causes inflammation and cell death, which can lead to respiratory illness, immune system dysfunction, CIRS, and neurological impairment.[23]

Ochratoxin A (OTA) – OTA is caused by several species of mold and found both in food and water-damaged buildings. This mycotoxin is neurotoxic, teratogenic, immunotoxic, and genotoxic. OTA impacts the body by causing oxidative stress, which impairs the mitochondria, and inhibits protein synthesis. Chronic exposure to OTA has been associated with kidney diseases and enzymuria.[24]

In a 2013 study on CIRS, 93 percent of the 112 patients tested positive for one of three mycotoxins AT, MT, and OTA. Additionally, 30 percent tested positive for more than one mycotoxin. Of the three mycotoxins tested, OTA was by far the most common, accounting for 83 percent of all cases.[25]

T-2 Toxin – T-2 Toxin is not usually associated with chronic conditions but still worth mentioning because low level exposures to certain mycotoxins are proving to cause complex conditions, meaning, the T-2 toxin shouldn't be disregarded.

T-2 Toxin commonly causes an acute mycotoxicosis reaction and is usually found in contaminated foods. T-2 toxin causes neuronal cell apoptosis in fetal and adult brains.[21] It inhibits protein synthesis through binding to peptidyl transferase, which triggers a ribotoxic stress response.[26] T-2 toxin also interferes with membrane phospholipid metabolism, increases liver lipid peroxides, and suppresses glutathione S-transferases.

Psychological Effects of Mycotoxins

Perhaps the most startling findings surrounding the effects of mold on human health is the widespread and debilitating psychological, neurotoxic, and electrocortical impacts. Patients who are exposed to mold mycotoxins typically experience strong cognitive and emotional symptoms.

I often see depression, anxiety, and signs of strong PTSD-like reactions in my patients with mold exposure. Sometimes their symptoms appear similar to a mild brain injury. This is due to a hypoactivation of the frontal cortex, constant activation of inflammatory and apoptotic pathways at low levels of exposure in brain capillary endothelial cells, neuronal damage, and inflammation. Cognitive impairment, inability to multitask, and mood swings are also common.[27, 28] Studies even suggest that low level exposure to OTA increases oxidative DNA damage and decreases striatal dopamine levels, which could lead to symptoms of parkinsonism.[29]

One of the most fascinating developments unfolding in the realm of mold-related illness is the research under Dr. Dale Bredesen of the Buck Institute for Research on Aging. Dr. Bredesen has identified six subtypes of Alzheimer's disease, one of which is called Inhalational Alzheimer's Disease (IAD). He attributes the pathogenesis of this subtype to biotoxins, such as mycotoxins.

Inhalational Alzheimer's disease is a phenotypic manifestation of CIRS. The onset of IAD typically occurs at a younger age, the ApoE genotype is typically 3/3 instead of 4/4 or 3/4, there's usually a lack of family history of Alzheimer's, the symptoms are often set off by a period of stress, anesthesia, loss of sleep, menopause or andropause. Instead of memory loss, cognitive symptoms typically include depression, dyscalculia, executive dysfunction, aphasia, or other cortical deficits.[30]

Beyond Mold – This is Just the Beginning

Though there is still much to understand about mold and mycotoxins exposure, they are actually one of the best understood indoor air contaminants. Beyond mycotoxins, other exposures we know far less about include Gram negative and positive bacteria, endotoxins, microbial particulates, non-microbial volatile organic compounds, glucans, and microbial volatile organic compounds. All in all, we are just breaking ground in our understanding of environmentally acquired illness.[22,31]

There's a need and demand for more doctors on the front lines of environmentally acquired illnesses. I believe our understanding of mold-related illnesses is in its infancy. As we continue to research and understand the effects of mycotoxins (and other pathogens) on human health, we will be more effective in our diagnosis and treatment of mold-related illness. And I, for one, am committed to leading the way.

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Dr. Jill Carnahan completed her residency at the University of Illinois Program in Family Medicine at Methodist Medical Center. In 2006 she was voted by faculty to receive the Resident Teacher of the Year award and elected to Central Illinois 40 Leaders Under 40. She received her medical degree from Loyola University Stritch School of Medicine in Chicago and her Bachelor of Science degree in bio-engineering at the University of Illinois in Champaign-Urbana. She is dually board-certified in family medicine (ABFM) and integrative holistic medicine (ABIHM).

Dr. Jill was also part of the first 100+ health-care practitioners to be certified in functional medicine through the Institute of Functional Medicine (IFMCP). In 2008, Dr. Carnahan's vision for health and healing resulted in the creation of Methodist Center for Integrative Medicine in Peoria, IL, where she served as the medical director for two years. In 2010, she founded Flatiron Functional Medicine in Boulder, Colorado, where she partnered in functional medicine with medical partner, Dr. Robert Rountree. She recently opened a brand new medical clinic with a broad range of services in Louisville, Colorado.

Dr. Jill is also a 15-year survivor of breast cancer and Crohn's disease and passionate about teaching patients how to "live well" and thrive in the midst of complex and chronic illness. She is also committed to teaching other physicians how to address underlying cause of illness rather than just treating symptoms, through the principles of functional medicine. She is a prolific writer, speaker, and loves to infuse others with her passion for health and healing!

Forest Bathing: Immersion in the Healing Power of Nature

by Kurt Beil, ND, LAc, MPH

Everyone understands how spending time in a beautiful natural setting can be good for one's health. The sensation of peace and relaxation that comes from being surrounded by the trees and other vegetation leaves one feeling restored and invigorated. People have been seeking out these experiences for hundreds of years, and this simple activity is affordable and enjoyable for anyone.

However, the practice of forest bathing, originating in Japan as *shinrin-yoku*, is more involved than just "a walk in the woods." It is a fully focused body-mind experience incorporating the use of all five senses and interaction with the surrounding landscape. Forest bathing is part nature walk, part moving meditation and part quiet contemplation as you soak up the healing presence of the forest.

In the 35 years since the practice of forest bathing first was developed, there has been an astounding amount of supportive research about demonstrating its significant benefits to physical and mental health.[1,2] This article explores some of the background information about forest bathing and discusses some of the evidence and mechanisms for why it is such a beloved and effective health promotion experience.

Background

Forest bathing is based on the ancient Japanese cultural respect and reverence for the natural world, but only began as a distinct practice in the 1980s. It was promoted by the Japanese Ministry of Forestry in an effort to get people to utilize public lands more frequently in an era when the modern pressures of urbanization, academic and job stress, and television were decreasing the amount of time people spent enjoying the out-of-doors. Dr. Alan Logan, ND, author of *Your Brain on Nature* and one of the few Westerners to have spent time studying the *shinrin-yoku* model in Japan, has noted how complete the Japanese thinking about the problem is.[3] He notes that forest bathing was promoted to address the "diseases of civilization": sedentary lifestyle, over-exposure to digital media, feelings of isolation and disconnection, and lack of community.[4] Developing a culturally relevant, healthy nature-based activity that could be enjoyed alone or in groups was, and still is, the perfect way to address many individual and public health issues.

Shinrin-yoku (lit. "Immersion in the Forest Air") is an experience that lets people be mindfully present with the surrounding forest. The sights, sounds, and smells of the environment support and comfort each person as they literally "bathe" in the forest air. Walking with the direct purpose of connecting with the vegetation around you is a very powerful way of engaging the senses and stepping away from the concerns and distractions of modern life.

Knowing that forest bathing could be an experience with potential health benefits, Japanese scientists began to study the effects of *shinrin-yoku*. Over the past few decades this research has consistently shown how health promoting this activity can be. The evidence is so strong that forest bathing is now a recognized health intervention in Japan, with special land designated and jointly funded by the Japanese Ministries of Forestry and Health as "Forest Therapy Bases." Currently, there are 62 of these dedicated places that provide forest bathing experiences to locals and visitors, complete with on-site physicians and health experts that can make customized recommendations according to individuals' health status. Organizations such as the "Forest Therapy Society" coordinate and report on the continuing research being conducted.[5] A number of books are being published about forest therapy including two by some of the most prominent researchers on this topic.[6,7] Clearly this is an area of large interest, with many interesting areas of research for health and well-being.

Bio-Evolutionary Origins

Many of the health benefits of forest bathing can be explained by derivations of the "Biophilia Hypothesis" developed by the biologist and author E.O. Wilson. This theory describes biophilia as "the innate human affinity for life and other living things."[8] This affinity for the forest and other natural places is no accident; it is the result of millions of years of exposure and adaptation. For our pre-historic ancestors, the natural world was not something they occasionally visited for rest and relaxation. It was their constant experience, and the background context in which all other activities occurred. Throughout the millennia,

our ancestors evolved in conjunction with the natural world as a "baseline" of experience. Being immersed in a natural forested environment was their constant way of life for hundreds of thousands of years. The vast majority of this experience included quiet, serene landscapes with natural vegetation, geological formations, and encounters with small birds, insects, and mammals. It is these types of environment to which our ancestors' sensory-perceptual and autonomic nervous systems adapted and are the reason why we find them comforting and relaxing today. Of course, occasional threats such as attack by a predator or a natural disaster would occasionally occur to prompt the "fight-or-flight" reaction. However as soon as the danger passed, the body would return to its resting state, facilitated by the calm scenery of the natural surroundings.

In contrast, our modern world is a very different one from the primarily serene landscapes of our pre-historic ancestors. For many of us today, being in close connection with the land is a rare occurrence. More often it is the moving cars and construction sounds and digital media of our modern world that make up our sensory experience. While we make adjustments to tolerate these daily events, it can be a constant barrage on our senses. Even when we accommodate to these events, we are really just becoming numb to the stimuli that continually excite our nervous system. This is the reason why experiencing something like forest therapy can feel so relaxing. Immersion in the quiet stillness of a forest allows us a respite from the intrusions of modern living. As far as our bodies and brains are concerned, the ancestrally familiar sights and sounds and smells of the forest match our neuro-evolutionary baseline. When we return to the forest, we return home. This manifests in a few ways that allow forest bathing to be such a valuable health-promoting experience.

Reduction of Stress and Allostatic Load

Being in a picturesque natural landscape is inherently relaxing for most people. But this common activity wasn't considered clinically useful until an American researcher named Roger Ulrich conducted a series of studies showing how stress-reducing these activities can be. His first study showed that patients recovering from surgery were able to do so faster with less post-op pain medication and with better mood if their recovery room had a window view of the hospital's adjacent natural area rather than a blank wall of the hospital.[9] A follow-up study exposed participants to a stressor followed by videos of either natural or urban environments, and assessed stress recovery using both biomarker and psychometric measures.[10] The participants that viewed flowing forested streams were in better moods and had less tension then participants that viewed congested traffic. These conceptually simple studies laid the groundwork for an explosion of environmental stress research that followed.

It is now well established that "stress" has significant impacts on physical and mental health.[11] Medically, a more useful concept for quantifying the damage produced by stress is allostatic load, the "wear and tear that the body experiences" due adverse psycho-social and environmental conditions.[12] Allostatic load allows for the measurement of cumulative negative effects of stress on the body and is typically assessed according to various biomarkers such as:

- Cardiovascular measures (e.g. heart rate and blood pressure),
- Neuro-cardiac measures (e.g. heart-rate variability (HRV)),
- Endocrine markers (e.g. salivary cortisol and serum insulin),
- Neuro-endocrine markers (e.g. urinary epinephrine and norepinephrine),
- Immune markers (e.g. IL-1, IL-6 and TNF-α), and
- Other metrics like blood oxygen perfusion.

Each of these biomarkers has been used in forest bathing research to demonstrate clinically and statistically significant reductions in allostatic load and associated levels of physiologic stress after forest exposures as brief as 15 minutes.[2,13,14]

As noted above, much of forest bathing's ability to reduce allostatic load is the result of biophilia. We have a decrease in physiological stress response because our autonomic nervous systems are adapted to the stimuli of passive natural environments. When we are immersed in the forest, our bodies sense the return to evolutionarily baseline context that promotes a parasympathetic maintenance state. This shift is perceived as relaxing compared to the varying level of chronic sympathetic "fight-or-flight" state in which many people experience their daily lives.

As far as our bodies and brains are concerned, the ancestrally familiar sights and sounds and smells of the forest match our neuro-evolutionary baseline. When we return to the forest, we return home.

Forest bathing is also stress reducing because of the intentional way this activity is conducted. Mindful awareness of one's surroundings is a specific component of *shinrin-yoku*, and this likely contributes to its rejuvenative and health-promoting effects. Mindfulness of any type is associated with significant health effects, and mindfulness-based walking programs have demonstrated their stress-reducing benefits.[15,16] Mindfully walking in the woods and being aware of one's surroundings is a valuable part of the forest bathing experience.

Affect/Mood

Of course, stress-reduction, allostatic load and mindfulness have beneficial impacts on psychological health as well as physiology status. Multiple studies have shown that spending time in forest therapy centers and other natural settings has beneficial effects on both positive and negative aspects of mood.[17,18] The "good feelings" everyone gets from a beautiful sunny day in a park or at the beach are more than just passing "perks" of being outside. Forest bathing has been researched extensively for its ability to promote clinically relevant positive mood changes[19–21] in both feelings of joy and happiness (*hedonia*) as well as the

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deeper experiences of meaning, purpose and connection to something larger than oneself (*eudaimonia*).[22] According to the field of "positive psychology" both of these states improve longevity, quality of life, immune system function, and decrease risk of cardiovascular disease and mental illness.[23,24] These are all important benefits of a nature-based experience and may be one of the reasons that epidemiological studies show residential proximity to natural spaces is associated with reduced mortality rates, even after controlling for factors like socio-economic status and exposure to pollution.[25] Being in natural settings helps us feel good, which leads to being healthier in mind and body.

Similarly, *shinrin-yoku* and other nature exposures have demonstrated clinical benefit in addressing negative mood states and various psychopathologies.[13,20] Several studies have shown the benefits of nature-based group walking programs for individuals diagnosed with mild-to-moderate depression, as measured by the Beck Depression Inventory (BDI) and Hamilton Depression Rating Scale (HDRS), and supported by qualitative participant feedback.[21,26] Another study from Korea has demonstrated significant reduction in HDRS scores after weekly group cognitive behavioral therapy (CBT) that occurred outside in a forested setting, compared to a comparison group CBT intervention occurring inside a local clinic.[14]

Evidence of improved mood disorders provide clinically useful support for the idea of nature-based therapies as an adjunctive component to the holistic approach of mental health care. These studies provide supportive evidence for the potential causal mechanisms underlying longitudinal and epidemiological studies that show spatial correlation between the green-ness of a person's residential location and a reduced prevalence of depression and mental distress, even after controlling for factors like socio-economic status.[27–30] All of this information together suggests that exposure to forested areas is an important component of improving and maintaining mental health and well-being.

PTSD and Military

One group in the United States directly benefitting from forest therapy's stress reducing effects are military veterans suffering with PTSD. The relaxing, safe environment of a forest or other natural area is the perfect setting to address the complex psycho-physiological disruptions of PTSD. One literature review of nature-based therapies for veterans with PTSD showed significant benefit in objective and subjective measures including PTSD symptoms, psychological well-being, social functioning, quality of life, and depression.[31] This approach has been so well received that governmental and private funding sources have combined to create a designated forest therapy space known as the Green Road on two acres of the Walter Reed National Military Medical Center campus in Bethesda, Maryland.[32] This space is set aside for veterans and their families to enjoy all of the benefits of a forest therapy experience. No data is currently available about the efficacy of this project for addressing PTSD, but response from the veterans and monitoring clinical staff is overwhelmingly positive.

Attention, Memory, and Performance

Another area of forest bathing research focuses on ways the brain processes sensory information. Brains are constantly processing all of the stimuli from the surrounding environment and filtering out most of that information from our conscious awareness. The effort of this filtering process can lead to mental fatigue when it becomes overloaded, such as having to turn off the radio to concentrate on driving in the rain with your kids yelling in the back seat. Too many stimuli at the same time can overwhelm the senses.

According to environmental psychologists Rachel and Stephen Kaplan, natural settings are unique because, unlike other stimuli from modern sources, we have an evolutionary adaption to these places that allows us to process and filter them without difficulty. In fact, quite the opposite occurs. According to the Kaplan's "Attention Restoration Theory" (ART), the stimuli of natural settings replenish mental energy and reduce mental fatigue.[33] This is the reason many people feel refreshed after taking a walk in nature to "clear their head," and why many people take their vacations to tropical beaches or serene remote locations, rather than busy urban centers.

The hypotheses of ART have been validated by many studies, from memory tasks to student and worker performance, all benefited by exposure to natural scenery in the background.[34,35] Other studies in this area of research suggest that cumulative exposure to natural green spaces over a lifetime may be beneficial for cognitive status and help reduce age-related cognitive decline and dementia.[36,37] This is in keeping with recent fMRI studies that show a lifetime of green space exposures can enhance key neuroanatomical areas of the brain relating to memory, attention, and emotional control.[38,39]

One of the most clinically applicable implications of ART relates to attention deficit hyperactivity disorder (ADHD). A number of studies have shown that children with ADHD have a reduction in severity of symptoms, as well as increased concentration and memory, when allowed to play or walk in outdoor, natural areas compared to built outdoor or indoor spaces.[40.41] This has positive implications for addressing ADHD and other childhood behavior disorders. Similar research demonstrates natural vs. built effects on adult impulsivity,[42] which is known to be co-morbid with psychiatric disorders (anxiety and depression) and unhealthy behaviors (substance abuse, risky sex, violence against self and others).[43]

A Beneficial Olfactory Experience

One of the other senses that makes forest bathing so therapeutic is the olfactory experience. Walking through the forest and smelling the rich combination of soil, flower, trees and fresh air is dramatic. It is an experience that can remove a person from their daily concerns and transport them to someplace else. It is well known that smells convey information directly to the brain and have important influence on mood, memory and behavior.[44] It is likely that the smells of the forest are

a significant component of the stress-reducing and attention-restoring effects mentioned above.

This aromatherapeutic journey is more than just psycho-neurologically beneficial however. Forest bathing research has demonstrated that specific olfactory compounds produced by forest trees directly affect human physiology. These chemicals, primarily terpenes known as "phytoncides," are produced by the coniferous pines, cypress, and cedars that make-up Japan's forest therapy bases. Studies have demonstrated the ability of these chemicals in both lab and forest settings to positively affect blood pressure, heart-rate variability, salivary cortisol, and alpha-amylase, and oxygenation of the prefrontal cortex.[45-47] This research confirms that the benefits of *shinrin-yoku* come from truly becoming immersed and "bathing" in the forest air.

A specific area of interest regarding phytoncides is their ability to stimulate immune system function, in particular the innate natural killer (NK) cells that are famous for destroying tumors and viral-infected cells. The now-classic cross-over field study by Dr. Qing Li published in 2010 demonstrated that a single three-hour forest therapy exposure can elevate both NK cell quantity and activity for up to 30 days.[48] Many other *shinrin-yoku* studies have replicated or added to these findings, and Dr. Li has just published a book on this research.[2,6] This awareness of phytoncides has led some researchers to investigate the therapeutic potential of forest bathing for providing adjunctive cancer care in semi-residential settings.[49,50] While there has not been any randomized, placebo-controlled research on this topic yet, the underlying mechanism of NK cell activation may be the reason that percentage of forested land in Japan is inversely correlated with mortality rates of cancer, even after controlling for smoking and socio-economic status.[51] No one is advocating for forest bathing to take the place of current onco-therapies; but given its proven immune-stimulatory actions as well as other proven mental/emotional and quality-of-life benefits,[50] it makes sense to include it as a complementary component of cancer care.

Ecopsychology and Sustainability

Lastly, it has been proposed that activities like forest bathing may be able to help us with the biggest health threat of all: the continued existence of viable ecosystems and life on planet Earth. Environmental degradation is recognized as a significant public health concern,[52] and the *Lancet*'s Commission on Global Health and Climate Change has labelled that process as "the biggest global health threat of the 21st century."[53] Without a sustainable environment, all living things including human beings are at risk.

It has been established that human activities are the largest driver of environmental damage and that the biggest perpetuators of this are 1) lack of concern with environmental issues and 2) the underlying absence of conceptual and/or emotional connection with the surrounding environment.[54] It is easy for destruction of the environment to occur if there is no personal relationship with it.

All of this comes from one simple factor: the absence of direct experience with natural settings. In this era of increasing urbanization, longer work hours, digital distractions, and for children the "stranger danger" and "helicopter parenting" that keep kids inside, it is becoming rarer for people to spend time outside in nature.[55] This creates a situation, described in 1993 by the ecologist and author Robert Pyle as an "extinction of experience" in which reduced immersion in nature leads to a lack of concern for it, resulting in a downward spiral of passive and active environmentally destructive behaviors, environmental degradation, and ultimately loss of health to both individuals and ecosystems.[56]

The research is clear that the most important factors for overcoming this extinction and for promoting a strong ethic of environmentally sustainable behaviors are direct, personally meaningful experiences with natural spaces.[35,57] Scientists in Japan are acutely aware of this separation between people and environment and of the value that nature immersion experiences can bring.[4] Getting people, especially children, out into natural environments like a local park or nature center is the best way to establish and maintain current and future generations' capacity for pro-environmental actions that are going to be healthy for both them and the planet.[58]

Conclusion

Forest therapy is a modern application of an ancient experience. It can help us achieve a state of balance ➤

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and peace within our bodies and minds. The accumulated research evidence over the past few decades has brought scientific validity and clinical applicability to this simple human practice. Interest in forest bathing is already quite high in contemporary media and the general public, and some healthcare organizations have begun including forest bathing and other nature-based therapies in their complementary and integrative medicine programs. It will be exciting to see how continued interest and advancing research expand the awareness and inclusion of this valuable activity into the healthcare landscape. Hopefully the evidence presented here and elsewhere is sufficient for healthcare providers to investigate forest bathing further as a viable, holistic, restorative activity for their patients and possibly themselves.

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Required Reading

review by Jacob Schor, ND, FABNO

Master Your Diabetes: A Comprehensive, Integrative Approach for Both Type 1 and Type 2 Diabetes by Dr. Mona Morstein, ND, DHANP
Chelsea Green Publishing, White River Junction, Vermont
c. 2017; 560 pp.; $29.95.

There are a few things we know right off the bat. First, diabetes is common. Two, the standard treatments offered to patients with diabetes are mediocre at best for controlling the disease; and third, a naturopathic approach, in particular a whole foods, low-carbohydrate diet as championed by Mona Morstein, works far well.

The Centers for Disease Control reported in July 2017, "More than 100 million U.S. adults are now living with diabetes or pre-diabetes… as of 2015, 30.3 million Americans – 9.4 percent of the U.S. population – have diabetes. Another 84.1 million have pre-diabetes, a condition that if not treated often leads to type 2 diabetes within five years." Diabetes was the seventh leading cause of death in the US in 2015.[1]

A 2017 estimate suggests that incidence of diabetes will increase 54% between 2015 and 2030 so that there will be nearly 55 million Americans with diabetes, and annual deaths from diabetes will top 385,000.

Thus, almost one in ten people have diabetes plus about one in four people are headed toward diabetes. Whether you plan on seeing diabetics in your practice or not, you won't have a choice. You're going to. I limit my practice to oncology patients only, yet, probably 10 – 15% of my patients are diabetic, about the same as this national average. It doesn't matter if you want to specialize in treating allergies or SIBO, you are still going to see diabetic patients. You don't get to choose.

The standard medical approach advocated by the American Diabetic Association (ADA) to treat insulin-dependent diabetes is to have the patient follow a slightly altered version of the standard American diet, and then take enough insulin to match their carbohydrate intake. Basically, the ADA-suggested diet is a low-fat, high-carb diet. The problem with this is that getting that insulin dose to match exactly is hard, and the higher the carbohydrate intake, the harder it gets to pull off. Too much insulin and the patient is hypoglycemic, too little and they are hyperglycemic. Most of their days and nights are spent riding a rollercoaster between these two extremes.

Over the years, Dr. Morstein has developed a strategy of low-carbohydrate diets for treating these patients. The lower the carbohydrate intake, the lower the insulin requirement. Patients can control their blood sugar easier, and they feel better. This approach is modeled off the work of Richard Bernstein, MD, who pioneered this concept of low-carb diets for treating diabetes.[2] Bernstein has over the years shared a number of comments disparaging the American Diabetic Association's stance on a range of diabetic-related topics. I mention this because while many of us feel that Bernstein is onto something valuable, we must concede that his ideas are far from mainstream.

His 1997 book, *Dr. Bernstein's Diabetes Solution*, recommends "… limiting daily carb intake to about 30 grams, the amount in a sweet potato or about four or five cups of cooked broccoli." Bernstein believes the fewer carbs eaten, the easier it is to stabilize blood sugar with insulin.[3]

To sum up Dr. Morstein's approach, think of it as a healthier version of Bernstein. Bernstein is fixated on carbohydrate intake alone. Morstein attempts to add healthy food choices on top of that. Her practice has focused on treating diabetes for a quarter of a century. She is the expert on treating diabetes in the naturopathic profession.

Dr. Morstein practices in Tempe, Arizona. She was the professor of nutrition at Southwest College of Naturopathic Medicine from 2002 to 2013. She's been teaching diabetes-focused continuing education seminars for doctors for the past fifteen years. She is the founder of the Low Carb Diabetes Association (LCDA): https://lowcarbdiabetes.org/.

Dr. Morstein breaks down naturopathic diabetes treatment into what she calls "The Eight Essentials" and then divides her book to cover each of them in turn:

1. Diet
2. Exercise
3. Sleep
4. Stress Management
5. Healing the Gut and Microbiome
6. Environmental Detoxification
7. Supplementation
8. Medications

Of course, this is the same focus most naturopathic physicians might use in treating any chronic disease.

This is the information you need to know if you ever plan to see a diabetic patient in your practice. As previously mentioned you're going to see diabetics, whether you want to or not.

Reading this book feels like you are sitting in one of Dr. Morstein's seminars, except that here she has enough time to cover each topic in as much detail as she wants, and no one is expecting you to have a photographic memory. I would say it's the next best thing, but perhaps it is better. There is ample time and space to say everything and insert charts to store the detailed information you may not need now but might need to look up someday. There are over 500 pages in the book; if you read 50 pages a day, think of this as a two-week seminar. The advantage of reading the book is that you can take your time. Dr. Morstein is a fast talker and even faster thinker; keeping up with her train of thought is an exhausting task

As I sit to write this review a new article published in the May 2018 issue of the journal *Pediatrics* catches my eye. The authors conducted an online survey of type 1 diabetics who followed a very low-carb diet. Almost half (43%) of the 326 respondents in the study were parents of children with T1DM. Participants had a

mean daily carb intake of only 36 grams and a mean hemoglobin A1c level of 5.67%. If you do not understand the significance of that last line, you really do need to read this book. The study authors use the word 'exceptional' in their conclusion to describe how well controlled these participants' diabetes was.[4] Not only does this low-carb diet strategy work, it works really well.

I have been having something of a debate with Dr. Morstein about the title of the book, *Master Your Diabetes: A comprehensive, integrative approach to both type 1 and type 2 diabetes*. The argument comes down to whether the adjectives 'comprehensive' and 'integrative' are coordinate or cumulative adjectives. If they were coordinate adjectives, both modifying the noun 'approach' then their order wouldn't matter and separating them with a comma would be appropriate.[5] This is the position that Dr. Morstein and apparently her editors take. As I read it, the order of the adjectives does make a difference; saying an 'integrative, comprehensive approach' doesn't sound right. My position is that 'comprehensive' modifies 'integrative approach' and thus the comma is uncalled for. Why do I say this?

Dr. Morstein is a naturopath through and through. She has no ability to see the world through anything else but a naturopathic paradigm. She could not write a book that wasn't about integrative medicine. Well, she could have used the phrase 'naturopathic approach' instead of 'integrative approach' but without any change in meaning or intention. She could have written a short-focused book, say on type 1 insulin dependent diabetes or on diet alone, but instead she wrote a 'comprehensive' book, one that covers all types of diabetes, even including the odd duck disease LADA (latent autoimmune diabetes of adults), and a wider range of treatment options. This book is comprehensive, the A to Z, 'the everything you are ever going to need to know' treatise. She's going to argue with me about this; we've been colleagues and friends since we were both students at National College of Naturopathic Medicine, once upon a time.

I do have two complaints about the book, though, I am not going to put any of the blame on Dr. Morstein. Instead, I am going to blame the publisher, Chelsea Green, a small employee-owned publishing house in rural Vermont. They began publishing books almost 40 years ago with titles focused on sustainable living. In recent years they have expanded their niche to books on alternative health.

My first problem is that the book is in sore need of a copy editor to proofread the text more thoroughly and correct spelling and grammatical errors. Few people would consider me a neurotic reader, but I found myself reading with a red pen in hand, unable to pass by the numerous errors without circling them.

The second problem and perhaps the most troubling was the references, or more exactly the lack of citations. There are twenty-plus pages of bibliography at the end of the book but there is no way to link statements in the text with a particular citation in that bibliography. The accepted custom in writing books these days in which statements regarding medicine are made is to cite either published scientific research in support of each statement not considered to be common knowledge or at a minimum to source a particular idea.

Let me provide an example or two of this lack in the book: "…Dr. Liu analyzed the American diet over a span of decades and found high fructose corn syrup and decreased fiber intake to be leading factors in the development of diabetes." (page 46)

"Dr. Liu who?" reads my note in the column. This is the only mention of Dr. Liu in the book. The reader has no idea of who he is, when he performed this analysis or when it was published. Liu is a common enough name among scientific researchers that searching the literature via PubMed yields nearly 50,000 citations. Even limiting the search to articles related to diabetes yields nearly 13,000.

In science, knowledge tends to shift over time as new research is published. Take the statement, "Statin drugs given to prediabetic patients caused a 9 percent increased risk of developing diabetes." (page 130)

I confess to a habit, or some might say addiction, to wanting access to the source of information, to reading abstracts and full texts. This 9% number likely came from a 2010 meta-analysis published in *Lancet* by Sattar et al. The authors "… identified 13 statin trials with 91,140 participants, of whom 4,278 ….developed diabetes during a mean of 4 years. Statin therapy was associated with a 9% increased risk for incident diabetes (odds ratio [OR] 1.09; 95% CI 1.02-1.17)…." They point out that for every 255 patients treated with statins for four years, there will be one extra case of diabetes and conclude that "… the risk is low both in absolute terms and when compared with the reduction in coronary events."[6]

We should make note before committing this 9% to memory that a newer study adds complexity to this idea that statins increase risk of diabetes. Published in May 2018, a year after Dr. Morstein's book was, a meta-analysis by Cui et al suggests that certain statin drugs depending on dose may improve blood sugar control in diabetics. Specific dose ranges of pitavastatin, atorvastatin, rosuvastatin and pravastatin appear to lower A1c levels, possibly improving diabetes.[7]

Scientific knowledge is not static, and we acknowledge this inconstancy by citing references.

Another paragraph starts with the phrase, "In several studies…." without going on to cite them somewhere. Or at least not in the world I live in, a place where truth is still valued.

As I wrote, the modern custom is to reference any 'fact' stated in the text. This is true in all medical writing, but it becomes vastly more important in 'alternative medical literature' as the opinions are more likely to be questioned and thus our responsibility to leave a clear trail of evidence becomes more important. As mentioned, this would appear to have been negligence on the part of Chelsea Green, the publisher, and we can hope that these errors are corrected in a second edition. While I encourage you to read this book now, I will stall passing on a copy to my friend Jane the endocrinologist over at the VA hospital even if there is a lot she could learn by reading it.

Those complaints aside, you should still purchase and read Dr. Morstein's book. Even if you don't want to read it, the detailed discussions of each insulin type are valuable enough to justify purchase of the book and space on your shelf.

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Ask Dr. J

by Jim Cross, ND, LAc
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What's Really Behind Door Number 3?

If we only knew the answer, we might be able to choose the correct door that has that all expense-paid trip to Maui behind it! How many of us actually know what's in those cute little capsules/tablets that many of us consume on a daily basis for whatever ails us. I unfortunately must admit that I was clueless until Eric Gordon, MD, asked me to search out quality supplements for him. Eric is one of the top chronic Lyme doctors in the US and wanted to advise only top-tier supplements for his patients.

My brain seems to expand exponentially in its critical thinking capacity whenever I'm walking in the woods. Fortunately, this happens on a daily basis. As I was searching supplement companies for Eric, I had one of those lovely creative thoughts on my daily jaunt (I also saw a large male bear that day, so I'll give him the real credit for my thoughts): Eric's patients are not only taking 20 – 40 capsules/day but are also some of the most chemically sensitive people on the planet. What if the supposedly inert ingredients in these capsules really aren't so inert?

Looking into capsules led me down an extremely long, windy, and convoluted road. I am not going to write about the different kinds of capsules/tablets or their advantages/disadvantages. I'm going to write about what are called "excipients" or basically the extra, inactive components listed under "Other Ingredients" on the label. These substances are the fillers, binders, coloring agents, etc. that are added to the active ingredients of the capsule during the encapsulation process to help preserve them, color them, or make them taste better.

There are several classes of excipients. The following are the most common[1]:

- **Fillers**: Their job is basically to perform the job that their name implies: fill out the space in the capsule that isn't occupied by the active ingredient, which in some cases can be actually quite small as in folic acid which is measured in mcg or micrograms. Manufacturers wouldn't want you to see a mostly empty capsule.
- **Binders**: They do exactly what their name implies and also add volume.
- **Flow Agents**: They help make the costs of supplements lower by facilitating the manufacturing process so ingredients don't stick to and gum up the machinery.
- **Disintegrants**: If the supplement is described as fast-acting, it more than likely contains disintegrants to stimulate a faster dissolving process in your stomach and intestines.
- **Coatings and Glazes**: They have three different functions: keep the capsule from falling apart, protect it against humidity, and make it easier for a person to swallow. These also supply the enteric coating to some supplements so they aren't digested in the stomach, leaving their active ingredients disassembled there.
- **Colorings and Flavorings**: Colors enhance the appearance of the product whereas flavors are added to mask an unpleasant taste and increase compliance.
- **Preservatives**: Some natural substances are used to help improve shelf life and protect against bacterial growth or other undesired chemical changes. Examples are antioxidants like vitamins A, C, and E and specific amino acids like methionine and cysteine.

Before we begin our expedition into synthetic excipients, let's look at a new possibility that claims to be all "natural": OrganiFlow. OrganiFlow is produced by the company Ingredient Evolution. It is a proprietary blend (isn't everything?) of organic brown rice that they grind into a fine powder. Then they use an extensive three-step conduction drying process that creates what they call "the first all organic excipient" that can provide supplement companies with a choice that theoretically has no harmful side effects to consumers and can provide them with a product that makes for a reliable capsule.[2]

Let's begin our journey into synthetic excipients with what are probably the two most common: stearic acid and magnesium stearate. Stearic acid is a saturated fatty acid found in many foods including animal and vegetable fats and oils[3] and cocoa.[4] Magnesium stearate is a magnesium salt of stearic acid and contains stearic acid and magnesium.[3]

What is the fate of these two compounds in the body? Stearic acid is converted primarily into the monounsaturated fatty acid oleic acid, which is the primary fatty acid in olive oil[5] and is also found in substantial quantities in grape seed oil[6] and in everyone's favorite South American superfood, acai berry.[7] Since stearic acid is converted into a monounsaturated fat, studies suggest it has no pathological effect on cholesterol levels in the blood[8] and research suggests it actually lowers LDL cholesterol.[8] Magnesium stearate is just broken down into its constituent parts in the body, and magnesium is recycled and stearate follows the same path as stearic acid.

Stearic acid is used as a binder and has lubricant properties. Magnesium stearate prevents sticking of the proprietary mix to the machinery, keeps the mix of ingredients consistent throughout the manufacturing process, and allows the capsules to glide easily and

be ejected from the machinery. This allows the machinery to be cleaned less often and allows larger runs, which result in cheaper production costs and cheaper actual cost to us and our patients.[9]

What amounts of these two substances are we talking about in a tablet/capsule? A 500 mg tablet would contain about 25 mg of stearic acid and about 5 mg of magnesium stearate.[9] Doing the math, 10 tablets would supply 300 mg of the two substances. A piece of roasted chicken would supply about 359 mg of stearic acid, and half a bar of milk chocolate would supply about 1,283 mg of steric acid. The average American actually consumes 5,000 – 9,000 mg of stearic acid/day from commonly consumed foods such as beef, poultry, cocoa butter, milk, and cheese.[10] A research study in rats found that there were no negative effects with magnesium stearate if it constituted 5% or less of their diet. Harm to the rats only occurred if it was increased to 10-20% of their diet.[11] I think that the vast majority of our patients will not come close to this 5% level. Of course, there are always a few people out there who might think that supplements are preferable to real food and could consume amounts that might initiate some bodily damage. This isn't George Orwell's 1984, so we can't control everybody's excesses!

One possible issue with stearic acid and magnesium stearate is their possible negative effect on immunity, which is based on an article in the journal *Immunology* in 1970.[12] The article states that an in-vitro experiment with stearic acid suppressed the immune activity of T cells. Here is where critical thinking is important, as is reading *Doctoring Data* by the great MD, Malcolm Kendrick, to learn how to discern fact from fiction. Being a physiology teacher also helps. It turns out T cells lack the biochemical ability to metabolize stearic acid,[13] plus results from another study found that stearic acid was found to have a positive effect on immunity, particularly NK or natural killer cell activity.[14]

Conclusion: In modest amounts both stearic acid and magnesium stearate appear to be safe and essentially harmless; objection raised was not borne out by research.

Next, let's consider hydroxypropyl methylcellulose/HPMC or hypromellose as a short term. It originally came into being as a substitute for gelatin capsules, which some vegetarians find offensive. It is a synthetic of the natural polymer cellulose and is used as a binding and thickening agent and coating polymer.[15] It is also used as an enteric coating material as it is not dissolved in a gastric acid solution (around pH 3) but is dissolved in an alkaline environment such as that present in the small intestine.[16] It also provides a highly flexible and acceptable alternative to gelatin capsules, solving numerous challenges in providing a capsule that is easily digestible but durable enough to last an extended period of time in a bottle. From a 90-day feeding study in rats, a safe dose was determined to be 5 mg/kg body weight/day for humans, which is more than a hundred times that of the estimated current consumption in humans of 0.047 mg/kg body weight/day.[17]

I'm going to halt my submersion into excipients right now and pivot into another direction. There are multiple other possibilities of excipients to discuss such as titanium dioxide and its possible carcinogenicity in humans or silicon dioxide and its possible contribution to renal failure. I've been reading reams and reams of information on the possible downside to excipients and also equal reams of info that says there are no problems, mostly because of the tiny amounts involved.

To me, this smacks of the fog of war. What is true and what is false? Did Saddam Hussein really have weapons of mass destruction and ties to Osama bin Laden? Have we really wasted trillions of dollars in a part of the world we don't belong attempting to convince a completely different type of human being that they need to be just like us?

I think that the answer lies in getting back to the concepts I gleaned from what I think is one of the greatest nutritional books every written: *Biochemical Individuality* by Roger Williams. We are all human but at a cellular, biochemical level we all exhibit slight quirks. Potatoes do not work for me. For my wife, it's coconut and kiwis. Some people think a certain supplement is the bomb while others develop diarrhea or headaches from it.

The direction that I'm attempting to go with this information is that evidence-based medicine doesn't necessarily work for chronically ill people with, say, Lyme disease or cancer. These individuals are the outliers or canaries in the coal mine. The studies that show various excipients don't really cause abnormalities in humans are deficient in two possible ways. First, no one can really visualize what is happening at a cellular level. Is HPMC damaging ribosomes or mitochondria in ways that won't be readily apparent for 30 years or more? Second, could there be individuals who are overly sensitive? Maybe these individuals are much more sensitive to even small amounts of those excipients and ingesting them will prevent the reversal of their chronic diseases or even facilitate the disease process in these susceptible individuals.

So, what's an honest, hard-working, educated person to do? I suggest everyone take the taste and texture test. It's very easy to open up a gelatin/vegetarian capsule and empty its ingredients into a little bowl. Then, take the empty capsule, put it into your mouth, chew on it, and, if you dare, swallow it. Please consider what your stomach, small intestine, and large intestine will think of this masticated little delight slipping and sliding down the esophagus and passing through them. Now, what will they think if you're taking 20-30 capsules/day?

Your patients might not be able to withstand some of the tastes from the powders in your capsules. I think you can. In the long run, your body will thank you for your choice and will run exceptionally well at a cellular level for many years to come!

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Monthly Miracles

by Michael Gerber, MD, HMD
Practitioner of Homeopathic Medicine
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What A Trip!

Remembering

It is good to remember the importance of our fearless publisher, Jonathan Collin, MD, his staff, and columnists who have brought us countless important subjects and remembrances of the pioneers in our field who have passed over the last 30 years. This is a wonderful club we have embraced for the benefit of our patients, our families and ourselves. The state of current integrative, alternative, homeopathic, functional, nutritional, naturopathic, orthomolecular, oriental, isopathic, allopathic, energetic, wholistic, neural therapeutic, psychological, exercise physiological, regulatory and the other magical disciplines presented in *TL* will have a long-term resonance with the health and well-being of the planet.

Traveling?

There are many important services we can provide our traveling patients. I always offer a travel letter to accompany my national or international travelers. We have a macro on the computer stating that the patient is under my care and is taking vitamin supplements and injectable nutrients that are necessary for the maintenance of their daily health and that if there are any questions, to please contact my office. Nobody ever does, but it is comforting for the patient traveling with supplements.

GI Issues

Some patients have very sensitive intestinal issues when traveling, others have a cast-iron gut and don't need much support. We have many favorite potions for traveling. Constipation secondary to dehydration and traveling stress is very common. We always suggest increases in vitamin C intake and magnesium when traveling which are osmotic laxatives and draw water into the bowel to encourage stools. If loose bowels occur reduce the dose.

Our favorite remedy for acute abdominal upset are *Penicillium roqueforti* capsules available from sanPharma as roquefoSAN. Take two at the first sign of intestinal rumble and then one twice per day away from meals until improved. If the roqueforti doesn't bring relief in half a day, Septra DS (one twice per day) has been very helpful for patients not sensitive to sulfa drugs. Many of our international traveling patients pack these treatments for digestive emergencies.

Clays such as bentonite, Kaopectate, and Luvos from MarcoPharma also help soak up toxins and slow down diarrhea. Too much can cause constipation, of course. Probiotics are a good idea when eating foreign food, especially *Sacchromyces boulardi*. Digestive enzymes and betaine are always important for patients with compromised digestion. Homeopathically, *China* 200C or *Podophyllum* 200C are great helpers for diarrhea from food poisoning.

We always test for parasites after traveling patients develop diarrheas or abdominal pain and use antiparasitic drugs when appropriate.

Peppermint Sealer

Peppermint oil drops licked off the back of the hand help to seal the oropharynx from bacteria and viruses when in public venues and is especially beneficial when flying. It is antibacterial, antispasmodic, great for asthma, coughs, digestive upsets, fainting episodes and many other conditions. We have used Nestmann peppermint oil from MaroPharma for 30 years. Other brands are also fine. I love to recount the story of our return flight from Frankfort years ago when a man sat behind us in the plane and coughed continuously for ten hours. We dosed peppermint oil hourly and didn't get sick after the flight. I have recommended this treatment for our patients for many years and their feedback has been very positive. Too much peppermint oil can give a strong sensation which resolves in a few minutes.

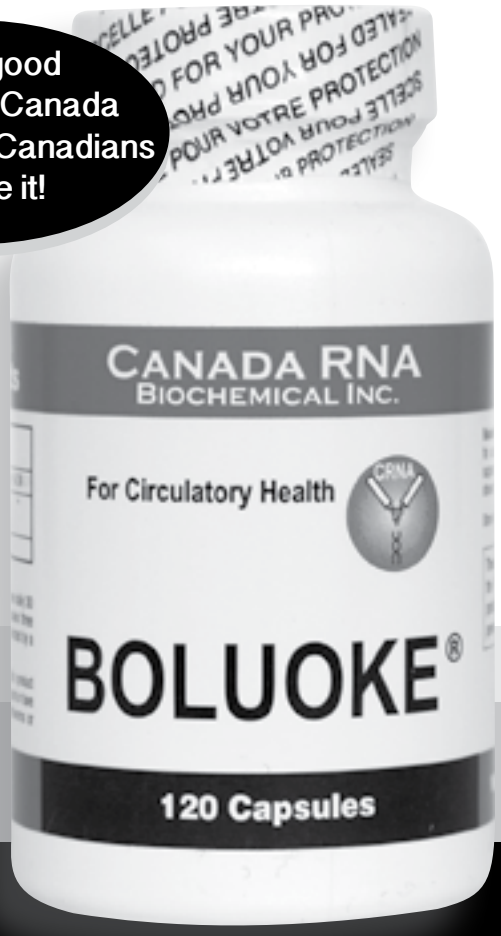
Can't Sleep on Planes?

International travelers frequently ask for drugs to help them sleep on planes. I remind them to take a cocktail of magnesium glycinate capsules (two, three or four), De-Stress (cortisol blocker, a hydrolysate of casein only 10 amino acids long) two caps, melatonin (max 60 mg caps), two or three capsules one hour before the destination sleeping time, Tranquility (beta phenyl GABA with taurine) two or three, and Avena Sativa drops from Nestmann (a combination of 10 calming and sleepy herbals from Germany), 30 to 60 drops. Progesterone cream, 50 or 75 mg per pump, rubbed into the forearms blocks adrenalin and enhances GABA and may be repeated every 15 minutes and is not feminizing. Some patients do well with sustained release progesterone capsules at 100 or 200 mg before sleeping because they have a much longer half-life than topical cream. If the patient can tolerate alcohol, a shot of Cognac or brandy may be helpful. There are numerous homeopathics for fear of flying, *Argentum nitricum* 200C, *Coffea cruda* 200C (anti-coffee effect), and many others. This combination will usually knock out an elephant but, as we know, an unbridled flood of cortisol and adrenalin can be difficult to assuage.

These are some of my favorite helpers to make traveling more pleasant and healthful. ◆

HYPERCOAGULATION

It's so good that Health Canada doesn't want Canadians to have it!



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Klaire Labs (SFI USA) Announces a New Probiotic Targeted for Nursing Comfort and Infant Immune Health Support Target b²™: BREAST and BABY

Klaire Labs (SFI USA) today announced impending availability of a new probiotic, Target b² with Hereditum® Lc40 (*Lactobacillus fermentum* CECT5716), which is clinically demonstrated to support breast health, resolve discomfort associated with mammary dysbiosis, and positively influence infant immune health.[†1, 2, 3]

As many as one-third of lactating women experience significant discomfort that often results in premature cessation of breastfeeding. Conventional approaches are frequently ineffective and commonly associated with adverse effects.[4]

"Current medical approaches to address breast health concerns during lactation are less than optimal. Some medical interventions are not appropriate for breastfeeding mothers and may disrupt intestinal microbiota of both mother and child, interrupt maternal-infant bonding, and could even have a long-term impact on the health and maturation of the infant immune system. In addition, the effectiveness of conventional approaches also remains very much in question," said Jeremy Appleton, ND, Vice President of Science and Education at Klaire Labs. "The advent of safe, effective support for maternal breast and infant immune health should be a matter of intense interest among obstetricians, lactation consultants, nurses, midwives, and other allied health professionals who provide primary care for breastfeeding mothers, and Klaire Labs is very excited to provide them with this solution."

Target b² was launched officially at the American College of Nurse-Midwives 63rd Annual Meeting & Exhibition in Savannah, Georgia, May 20-24, 2018. Klaire Labs sponsored a product theatre discussing the mechanisms and clinical evidence behind this product.

About Klaire Labs

Klaire Labs has been formulating and manufacturing premium, hypoallergenic supplements sold through healthcare practitioners for nearly half a century. Our mission is to develop and manufacture the purest, most potent nutraceuticals possible, thereby empowering clinicians with consistently reliable performance.

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Women's Health Update

by Tori Hudson, ND
womanstime@aol.com

More Good News on Ginger and Bad News on Vaginal Douching

The Effect of Ginger Extract on Nausea due to Chemotherapy

Nausea can be a significant side effect of numerous chemotherapy medications, and preventing and treating chemotherapy-induced nausea and vomiting (CINV) is a priority in oncology patients. There are indeed some important and often effective conventional medications but, even then, the symptoms can occur in 25% (vomiting) and 61% (nausea) of cancer patients. Nausea and vomiting are, at best, unpleasant symptoms but can significantly affect quality of life and cause insufficient nutrition and can even result in chemotherapy treatment delays or reduction in desired dosing.

Nausea due to other causes such as pregnancy and post-operative nausea and vomiting has been studied. There is also a literature review published in 2013 on ginger and chemotherapy-induced nausea and vomiting. However, there are some research methodology problems in the previous studies, which might be preventing common use of ginger in these patients in the oncology setting.

The primary objective of this double-blind, randomized placebo-controlled trial was to address those methodology issues and assess ginger compared to placebo in patients receiving chemotherapy agents that are moderately to highly associated with causing nausea and vomiting.

Patients were randomly assigned to receive 300 mg capsules four times daily of standardized ginger extract or placebo in conjunction with the standard medications for nausea/vomiting for the first three cycles of chemotherapy. Ginger or placebo was given with meals, starting on the day of the chemotherapy, for a total of five days for each cycle. Over three consecutive chemotherapy cycles, nausea was more prevalent than vomiting. In cycle one, those who received ginger reported significantly better quality of life in terms of chemotherapy-induced nausea, nausea/vomiting, quality of life, as well as less fatigue than placebo. There were no significant results in cycle 2. In cycle 3, quality of life and fatigue were significantly better in the ginger group compared to placebo.

Commentary: The overall summary would be that ginger, in addition to the conventional antiemetics, was associated with better chemotherapy-induced nausea-related quality of life and less cancer-related fatigue compared to those who received placebo along with their antiemetic prescription. This is good news, but it is not a trial comparing ginger to the conventional antiemetics used during chemotherapy regimens. These results confirm several previous studies. A larger study would be needed to confirm results, and hopefully a study comparing ginger to prescription antiemetics.

Marx W, et al. The effect of standardized ginger extract on chemotherapy-induced nausea-related quality of life in patients undergoing moderately or highly emetogenic chemotherapy: a double blind, randomized, placebo controlled trial. *Nutrients*. 2017;9:867

My Other Favorite Uses of Ginger….
Menstrual Cramps

Rather than discuss each of the studies on this topic, I was pleased to see in 2015, a systematic review and meta-analysis of randomized trials on the efficacy of ginger for primary dysmenorrhea.[1] In this analysis, seven randomized controlled trials met the inclusion criteria, and these were used for the

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systematic review. Six of these trials were conducted in Iran and one in India. The meta-analysis of the data from these studies demonstrated a significant effect of ginger in reducing the pain visual analog scale (PVAS)(a tool widely used to measure pain), in women having primary dysmenorrhea. In total, these randomized controlled trials showed significant efficacy for primary dysmenorrhea at doses of 750-2000 mg per day during the first three to four days of the menstrual cycle.

The cause of menstrual cramps is thought to be due to an increased production of prostaglandins in the endometrium (lining of the uterus). Menstrual blood of women with primary dysmenorrhea has greater amounts of the pro-spasmodic and pro-inflammatory prostaglandins, PGE2 and PGF2 alpha. It is thought that the anti-inflammatory properties of ginger are due to the gingerols, which can lead to a reduction in prostaglandins and inhibit cyclooxygenase-2, NF kappa beta, and 5-lipoxygenase.

Heavy Menstrual Bleeding

In this study, Iranian high school students had regular menstrual cycles and a recent history of at least one heavy menstrual cycle.[2] These were girls, who also had no gynecological disease, were not regularly taking hormonal medications or NSAIDS, did not have a vaginal or pelvic infection, and were not overweight or obese. Three consecutive menstrual cycles were monitored and scored for blood loss before starting the ginger or placebo. Ginger capsules contained 250 mg of dried ginger, and one capsule or a placebo capsule was given three times daily starting from the day before menstrual bleeding until the third day of the menstrual period for a total of four consecutive days for three months of menstrual cycles.

The level of menstrual blood loss dramatically decreased during the three intervention cycles in the ginger group and was significantly better than in the placebo group. The average decrease in heavy menses in the ginger group started the very first month, and was even better the second month and then a little better the third month. There were no average hemorrhage changes in the placebo group. After the intervention, the ginger group decreased in mean hemorrhage by 46.6% and the placebo group by 2.1 %. Three girls had adverse events in each group: ginger - one heartburn, one abdominal pain, and one diarrhea; placebo group - one abdominal pain and two flatulence.

Serum levels of prostaglandin E2 and prostacyclin are higher in women with heavy menstrual bleeding, which results in the vasodilatation and local platelet accumulation in addition to lower amounts of prostaglandin F2alpha, which is responsible for vasoconstriction. Women with heavy menstrual bleeding also have more PGE2 receptors. It would be logical then that herbs and/or foods and/or medications that inhibit prostaglandin synthesis and leukotriene formation may provide the needed anti-inflammatory effect to decrease heavy menstrual blood loss.

Heavy menstrual bleeding is one of the more common gynecological reasons why women come to their health care provider. It can affect quality of life and cause iron deficiency anemia. Not only can this result in mild to severe fatigue, but changes in cognition, exercise tolerance, dyspnea, and heart palpitations. The bigger picture is determining what is causing the heavy menstrual bleeding (defined as greater than 80 mL per menstrual cycle). Causes of heavy menstrual bleeding can include a simple anovulatory cycle due to stress or perimenopause, thyroid disorders, uterine polyps, uterine fibroids, adenomyosis, uterine pre-cancer, uterine cancer and von Willebrand syndrome. While some common herbs and medicines can be used to treat a particular episode of heavy menstrual flow, treating the underlying condition is particular to each of the causes mentioned.

Migraine Headaches

Migraine headaches are one of the most common causes of pain and can vary from a minimal impact on activities of daily living to even incapacitating. An effective herbal intervention for acute pain relief would be a welcome addition to the list of options.

This double-blind randomized controlled clinical trial compared the efficacy of ginger to sumatriptan, a standard conventional prescription treatment, in the treatment of common migraine.[3] Study subjects in Iran with common migraines were randomly delivered either one ginger capsule of 250 mg upon onset of headache or 50 mg of sumatriptan. Women comprised 68% of the sumatriptan group vs 74% of the ginger group. Both sumatriptan and ginger powder decreased the mean severity of common migraine attacks within two hours of use. No significant difference existed between the two treatments, which is impressive for the ginger. Before taking the medication, 22% of the sumatriptan group and 20% of the ginger group had severe headaches. The mean headache severity at two hours after sumatriptan or ginger use demonstrated similar effectiveness for both groups. There was a 4.7 unit reduction in the headache severity in the sumatriptan group and a 4.6 reduction in the ginger group. Favorable relief was achieved in 70% of the sumatriptan-treated headache individuals and 64% of the ginger-treated patients at two hours following intake. There were more side effects from sumatriptan use, including dizziness, sedation, vertigo, and heartburn. The only clinical adverse effect of ginger was dyspepsia.

In a previous study in 2005 using ginger with feverfew in sublingual tablets for acute migraine pain, 32% were pain free at 2 hours in those receiving the medication vs 16% receiving placebo. In total, at 2 hours, 63% receiving medication were either pain free or had only mild pain vs 39% for placebo.[4]

And in another feverfew/ginger study for acute migraine treatment in the early pain phase, an open-label study enrolling 30 subjects, male and female, 48% after 2 hours were pain free with 34% reporting a headache of only mild severity and 29% having a recurrence within 24 hours.[5]

Ginger and Nausea/Vomiting in Pregnancy

Nausea and vomiting are the most common unpleasant symptoms during pregnancy. Fifty percent to 90% of women experience these complications. In the most recent study on this topic, a single-blind controlled randomized clinical trial was conducted in women up to 20 weeks of pregnancy in Iran.[6]

Thirty-two women received ginger and 35 received placebo. One ginger (250 mg) or placebo capsule four times per day was given over the course of four days. Nausea intensity improved in 84% of those who used the ginger and in 56% of the women in the control group. The incidence of vomiting in the control group was 9% decreased and 50% decreased in the ginger group.

At least four previous published studies have shown success in the use of ginger for nausea and vomiting during pregnancy. Doses of 1,000 mg – 1,500 mg per day have been used previously. The current study showed not only a positive effect, but women were satisfied with that effect and no complications were observed during the treatment period.

Another Reason to Avoid Douching

Douching is quite common among US women, especially African-American women, despite previous research demonstrating negative health outcomes such as pelvic inflammatory disease and ectopic pregnancy.

In the current prospective cohort study, researchers investigated whether douching or genital use of talcum powder was predictive of an increased risk for ovarian cancer. This was done in about 50,000 women who had a sister with breast cancer.

After an average follow-up of seven years, 154 women were diagnosed with ovarian cancer. Women who had reported douching at the baseline of the study, had a significantly higher risk for ovarian cancer, with a hazard ratio of 1.8. The use of talc was not associated with the development of ovarian cancer.

Commentary: Vaginal douching disturbs the normal vaginal flora and may impair the local immune system defense mechanisms. In addition, environmental toxins such as phthalates are higher in women who douche. Any reason that a woman may think she needs to douche can be solved in other ways. If infections, then there are vaginal and/or oral treatments, both conventional and natural; if for hygiene reasons, there are other methods including vaginal suppositories, enhanced personal washing, and perhaps getting more comfortable with what could be normal odors. A strong fishy odor is likely related to a vaginal infection and can be tested and treated appropriately. Women should be encouraged not to douche. If they resist this advice, then I would advise tap water.

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Calendar

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JUNE 20-23: SOCIETY OF PROGRESSIVE MEDICAL EDUCATION (SOPMed) INTEGRATIVE THERAPY TRAINING AND ANNUAL CONVENTION in Colorado Springs, Colorado. Includes pre-conference events. CONTACT: 517-242-5813; https://sopmed.org/

JULY 6-8: 5th INTERNATIONAL CONGRESS ON NATUROPATHIC MEDICINE – Promoting Excellence in Natural Medicine in London, United Kingdom. CONTACT: + 44 (0)1745 828 400 Email: secretariat@icnmnaturopathy.eu; http://icnmnaturopathy.eu/en/

JULY 7: LDN 2018 CONFERENCE in Glascow, Scotland, UK. CONTACT: https://www.ldnresearchtrust.org/conference-2018/

JULY 12-14: INSTITUTE FOR FUNCTIONAL MEDICINE – HORMONE APM in Portland, Oregon. CONTACT: 800-228-0622; https://www.ifm.org/

JULY 12-14: AMERICAN ASSOCIATION OF NATUROPATHIC PHYSICIANS (AANP) ANNUAL CONVENTION AND EXPOSITION in San Diego, California. CONTACT: http://www.naturopathic.org/aanp2018

JULY 13-15: METHYLATION 2018 SUMMIT – Integrating Methylation into Clinical Treatment Plans in Chicago, Illinois. CONTACT: 800-755-3402; https://methylation2018summit.com/

JULY 15-17: INSTITUTE FOR FUNCTIONAL MEDICINE – ENERGY APM in Portland, Oregon. CONTACT: 800-228-0622; https://www.ifm.org/

JULY 21: GENETICS IN CLINICAL PRACTICE WORKSHOP in Portland, Oregon. Research-based information on single nucleotide polymorphism testing for integrative and functional medicine practitioners, CONTACT: https://kashilab.com/core-training/

JULY 23-24: INTERNATIONAL MEETING ON TRADITIONAL AND ALTERNATIVE MEDICINE in Osaka, Japan. CONTACT: https://www.meetingsint.com/conferences/traditional-medicine

JULY 27-29: PRIMARY CARE IN WOMEN in Portland, Oregon. CEUs available. CONTACT: http://instituteofwomenshealth.com/

AUGUST 4-5: THE GREAT PLAINS LABORATORY, INC. presents GPL ACADEMY PRACTITIONER WORKSHOPS in Denver, Colorado. This workshop will review organic acids testing, toxic chemical testing, and mycotoxin testing. CONTACT: http://www.GPLWorkshops.com

AUGUST 10-12: THE AMERICAN ASSOCIATION OF STEM CELL PHYSICIANS CONFERENCE in Miami, Florida. CMEs. CONTACT: info@AAOSCP.com; http://www.AAOSCP.com

AUGUST 10-12: INTERNATIONAL HYPERBARIC MEDICINE CONFERENCE & EXPO – ADVANCING HYPERBARIC MEDICINE GLOBALLY in Denver, Colorado. CONTACT: https://www.hyperbaricmedicalassociation.org/conference-agenda

AUGUST 24-26: ACUPUNCTURE MERIDIAN ASSESSMENT (AMA) TRAINING For Doctors, Dentists & Health Professionals: Detecting Chronic Diseases & Causes with Simon Yu, MD, in St. Louis, Missouri. CONTACT: http://www.preventionandhealing.com/

AUGUST 27-29: 3rd INTERNATIONAL CONGRESS ON RESTORATIVE AND ALTERNATIVE MEDICINE – Ancient Herbal Wisdom for Modern Day Healing in Paris, France. CONTACT: https://restorativecongress.conferenceseries.com/

SEPTEMBER 1-3: 46th ANNUAL CANCER CONVENTION in Glendale, California. CONTACT: 323-663-7801; http://cancercontrolsociety.org/

SEPTEMBER 6-9: 9th INTEGRATIVE MEDICINE FOR MENTAL HEALTH CONFERENCE (IMMH) in Dallas, Texas. Evidence-based diagnostic and treatment options to reduce symptoms of autism, ADHD, depression, anxiety, Alzheimer's, and more. CONTACT: http://www.IMMH2018.com

SEPTEMBER 7-9: INTERNATIONAL CONFERENCE ON CHRONIC PATHOLOGIES in Antwerp, Belgium. CONTACT: https://chronic-pathologies.com/

SEPTEMBER 8-9: BUHNER METHOD OF HEALING LYME AND COINFECTIONS with clinical herbalist Julie McIntyre in Halifax, Nova Scotia. Learn updated protocols from Stephen Buhner's esteemed colleague. CONTACT: eastcoastnaturopathic@gmail.com

SEPTEMBER 14-15: CLINICAL MITOCHONDRIAL AND ENVIRONMENTAL MEDICINE in Heidelberg, Germany. Specialist lectures in English. CONTACT: info@mito-medizin.de; http://www.mito-medizin.de/

SEPTEMBER 14-23: KLINGHARDT ACADEMY LYME & LIGHT MASTERMINDS in Kenmore, Washington. With Neural Therapy-Autonomic Response. CONTACT: 908-899-1650; info@klinghardtacademy.com; http://www.kinghardtacademy.com

SEPTEMBER 22-26: ACADEMY OF INTEGRATIVE HEALTH AND MEDICINE (AIHM) CONFERENCE in San Diego, California. CONTACT: http://conference.aihm.org/annual/2018/keynotes.cfm

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achievable only with parenteral administration of the vitamin. In healthy volunteers, the maximum tolerated oral dose of vitamin C (3 g every 4 hours) produced a serum vitamin C concentration of about 4 mg/dl, whereas intravenous administration of 0.5 g, 1.25 g, and 50 g of vitamin C produced peak serum levels of about 7 mg/dl, 14 mg/dl, and 80 mg/dl, respectively.[8,9]

The available evidence supports the conclusion that most patients with TB should take a vitamin C supplement (such as 500 mg per day or more). In addition, clinical trials are warranted to determine whether parenteral administration of large doses of vitamin C would improve the results of conventional therapy.

Alan R. Gaby, MD

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3. Getz HR, Koerner TA. Vitamin A and ascorbic acid in pulmonary tuberculosis. *Am J Med Sci*. 1941;202:831-847.
4. Bellinger GC. Nutrition in tuberculosis. *Dis Chest*. 1942;8:23-26.
5. Sirsi M. Antimicrobial action of vitamin C on M. tuberculosis and some other pathogenic organisms. *Indian J Med Sci*. 1952;6:252-255.
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9. Harakeh S, et al. Suppression of human immunodeficiency virus replication by ascorbate in chronically and acutely infected cells. *Proc Natl Acad Sci*. 1990;87:7245-7249.

Calendar

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SEPTEMBER 27-30: 16th ANNUAL INTERNATIONAL RESTORATIVE MEDICINE CONFERENCE in Burlington, Vermont. Trends in nutrition, pain management, and mind-body therapies. CONTACT: jen@restorativemedicine.org; https://restorativemedicine.org/Burlington

SEPTEMBER 28-30: DR. PAUL ANDERSON'S ADVANCED APPLICATIONS IN MEDICAL PRACTICE (AAMP) FALL CONFERENCE on Advanced Approaches to Complex Infectious Disease in Portland, Oregon. CONTACT: Sharon Phillips 954-540-1896 (tel) or email sharon@aampConferences.com; https://aampportland.com/

OCTOBER 4-7: IVC SYMPOSIUM-Getting to the Roots of Mitochondrial Dysfunction in Wichita, Kansas. CONTACT: Erin Manning, 316-927-4709; https://IVCandCancer.org

OCTOBER 17-22: INTERNATIONAL COLLEGE OF INTEGRATIVE MEDICINE – An Orthomolecular Approach to Cancer in Minneapolis, Minnesota. CONTACT: http://icimed.com/

OCTOBER 19-20: DERMVEDA INTEGRATIVE SKIN CARE SYMPOSIUM in Sacramento, California. CONTACT: http://2018.integrativeskinsymposium.com/

OCTOBER 19-21: AMERICAN INSTITUTE OF HOMEOPATHY ANNUAL CONFERENCE – TACKLING PATIENTS WITH SEVERE PATHOLOGY with Andre Saine, ND, in Cleveland, Ohio. CONTACT: https://homeopathyusa.org/education/2018-conference.html

OCTOBER 25-27: INSTITUTE FOR FUNCTIONAL MEDICINE – GASTROINTESTINAL APM in Nashville, Tennessee. CONTACT: 800-228-0622; https://www.ifm.org/

OCTOBER 26-28: FIELD THERAPY CONTROL® (FTC) THREE-DAY INTENSIVE TRAINING with Savely Yurkovsky, MD, in Westchester County, New York. CONTACT: 914-861-9161; info@yurkovksy.com; https://www.yurkovsky.com/

NOVEMBER 9-11: THE SUMMIT ON NEURODEGENERATIVE DISORDERS: NEW INFORMATION ON POSSIBLE CAUSES, DIAGNOSTICS, AND TREATMENT STRATEGIES in San Diego, California. Presented by Integrative Medicine for Mental Health (IMMH) and The Great Plains Laboratory, Inc. CONTACT: http://www.immh.org/neurosummit

JANUARY 9-13, 2019: 16th ANNUAL NATURAL SUPPLEMENTS: AN EVIDENCE-BASED UPDATE in San Diego, California. CEs available. CONTACT: http://www.scripps.org/naturalsupplements

JANUARY 25-FEBRUARY 8: INTENSIVE CLINICAL TRAINING in India. 200+ live cases demonstrated to show homeopathy in gross pathologies. CONTACT: http://www.homeopathy-course.com/index.php/training-courses/india-homoeopathy-training/2-week-clinical-training-in-calcutta

FEBRUARY 15-17: 8th ANNUAL OncANP NATUROPATHIC ONCOLOGY CONFERENCE in San Diego, California. CONTACT: https://oncanp.org/

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Vitamin C for Tuberculosis

Tuberculosis (TB) is an infectious disease caused by the bacterium, *Mycobacterium tuberculosis*. It is responsible for an estimated three million deaths per year worldwide. Pulmonary TB is the most common form of the disease, but the infection can also involve the central nervous system, gastrointestinal tract, genitourinary system, and other parts of the body. TB may be present as an active infection or as a latent, asymptomatic infection. Reactivation of the disease may occur after either an active or latent infection. An estimated two billion people have latent TB.

Treatment of TB usually involves a four-drug regimen of antibiotics such as isoniazid, rifampin, pyrazinamide, and ethambutol, typically administered for six months or longer. Multidrug-resistant TB (i.e., resistant to isoniazid and rifampin) requires an even longer treatment period and the use of second-line drugs that can have severe side effects. Antibiotic therapy is usually successful, although the prevalence of drug-resistant TB strains is increasing. Interventions that allow for shortening of the treatment period might prevent the development of drug resistance.

A recent study found that administration of vitamin C, as an adjunct to isoniazid and rifampin, shortened the recovery time in mice infected with *M. tuberculosis*. This study supports previous research related to vitamin C and TB and raises the possibility that vitamin C supplementation could improve outcomes in humans with TB.

Vitamin C and Tuberculosis

Research conducted in the 1930s found that guinea pigs fed a vitamin C-deficient diet had decreased resistance against TB infection. In addition, TB-infected guinea pigs had increased susceptibility to developing scurvy, suggesting that TB infection increases vitamin C requirements.[1,2] Studies in the 1940s found that plasma and urinary vitamin C levels were low in patients with TB. The severity of vitamin C deficiency increased with increasing severity of the disease. As much as 400 mg per day of supplemental vitamin C (4.4 times the current Recommended Dietary Allowance) was necessary in some TB patients to increase urinary vitamin C excretion to normal.[3,4]

Maintaining adequate vitamin C status might increase resistance against TB infection in part by enhancing overall immune function. Administration of supraphysiological doses might provide additional benefit, since vitamin C at high concentrations acts directly against *M. tuberculosis*. *In vitro*, vitamin C at a concentration of 1 mg/dl had a bacteriostatic effect on *M. tuberculosis*, and at a concentration of 10 mg/dl or greater was bactericidal.[5] In another study, the bactericidal concentration of vitamin C was higher: 35 mg/dl.[6]

The new research mentioned above included an *in vitro* study and a study in mice. *In vitro*, vitamin C a concentration of 17.6 mg/dl accelerated the killing of *M. tuberculosis* by the combination of isoniazid and rifampin and also accelerated the killing of *M. tuberculosis* by the combination of the second-line drugs, ofloxacin, kanamycin, and thioamide ethionamide.[7] In the second part of the study, mice infected with *M. tuberculosis* were treated with isoniazid and rifampin. The mice also received or did not receive vitamin C intraperitoneally five days a week for four weeks at a dose of 3 g per kg of body weight. Although vitamin C had no activity by itself in infected mice, the combination of vitamin C with isoniazid and rifampin reduced the bacterial burden in the lungs faster than isoniazid and rifampin without vitamin C. At four weeks, the bacterial burden in the lungs was 93% lower in the vitamin C/isoniazid/rifampin group than in the control group.[7]

While the bacteriostatic concentration of vitamin C is within the physiologic range for healthy people (the normal serum vitamin C level is 0.2-2.0 mg/dl), many patients with TB would need to take a vitamin C supplement in order to bring their serum level up to 1.0 mg/dl. The serum vitamin C concentration that is bactericidal for *M. tuberculosis* is

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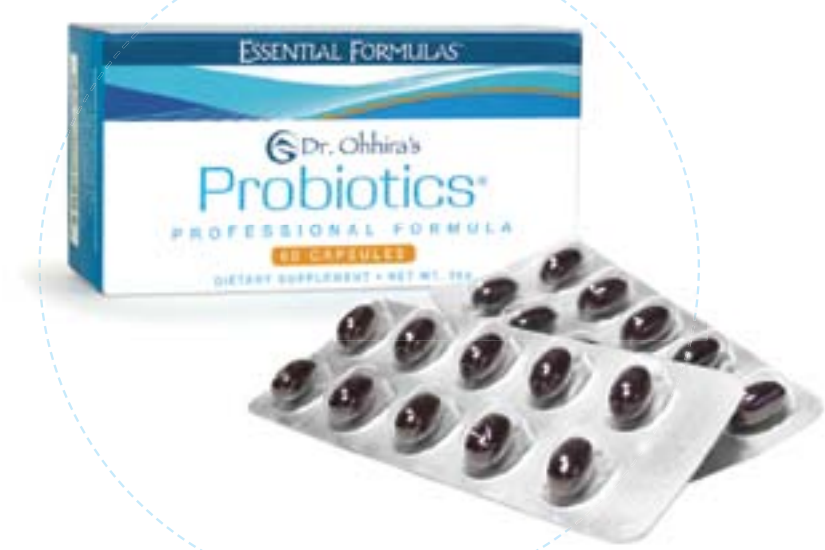

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