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A Model for Recovering from Chronic Lyme Disease and Mold Illness

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1) Sinha R, Sinha I, Calcagnotto A, et al. Oral supplementation with liposomal glutathione elevates body stores of glutathione and markers of immune function. Eur J Clin Nutr. 2018;72(1):105-111. doi:10.1038/ejcn.2017.132

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From the Publisher

Why Does the Origin of the Covid-19 Virus Continue to Be Such a Rancorous Dispute?

An investigative report published by *Vanity Fair* on March 31, based on release of hundreds of thousands of documents obtained by the Freedom of Information Act, details the ongoing dueling of those who think SARS-CoV-2 spilled over from bat to human versus those who think laboratory experimentation went awry accidentally or intentionally.[1] In June of 2021 an evolutionary biologist, Jeremy Bloom, who had completed a paper examining viral genomic sequencing, discovered that some of the earliest SARS-CoV-2 sequences discussed in Chinese studies were missing from databases, including the one at the NIH. Bloom thought that the sequences had disappeared without a trace and that the Chinese government sought to delete the sequences to avert any suspicion that China played a role in causing the pandemic. He had determined that the NIH removed the sequence data following a request by the Wuhan Institute of Virology (WIV). Bloom had notified the NIH about his pre-print wanting their input as to why the viral sequences had been removed.

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Letter from the Publisher

➤ *continued from page 2*

At the NIH, Director Francis Collins was greatly concerned about Bloom's paper and hastily arranged a Zoom meeting. Collins invited Anthony Fauci and a few other NIH personnel as well as two outside experts asking Bloom to do the same. For "team" Collins, there was evolutionary biologist Kristian Andersen and virologist Robert Garry, both of whom had sided with a natural zoonosis origin of SARS-CoV-2. Bloom invited fellow evolutionary biologist, Sergei Pond and genetic biologist, Rasmus Nielsen.

Within minutes after starting the Zoom call Andersen and Nielsen were yelling at each other. Andersen claimed that the Chinese had the right to delete genetic sequences as allowed by NIH guidelines and that Bloom had no "ethical" right to do further study on such sequences once deleted. (Pond's opinion of Bloom is that he is one of the most ethical scientists he has ever known.) Andersen further claimed there was nothing unusual about the SARS-CoV-2 sequences that the Chinese had reported. Nielsen countered that the "Wuhan sequences were extremely unusual and puzzling." Andersen then proposed that he could arrange with the server storing the pre-print to modify Bloom's text or even eliminate it to prevent any controversy stirring up the conspiracy fanatics. Fauci immediately disagreed with Andersen's proposal.

None of this Zoom call came to light until Bloom wrote about it in January of this year. Both Nielsen and Garry objected to Bloom's discussion of what occurred at the meeting and denied that Andersen proposed to modify the pre-print. But Pond agreed with Bloom's account. As the *Vanity Fair* investigation described it, there was a "siege mentality" present at the NIH in June of 2021 with reputations to maintain, research grants on the line, and risky research projects that could be terminated.

Of course, the background actor in all of this was a little known NGO, the Wildlife Fund, lately renamed the EcoHealth Alliance, whose director, Peter Daszak, characterized by *Vanity Fair* as "part salesman, part visionary" who funded his organization through grants from federal agencies. Before 2010 the Wildlife Fund advocated for Florida manatees being slaughtered by motorboaters. With a budget that was teetering year by year, Daszak needed substantial and sustainable funding. Daszak's virology work had taken him into Cameroon's tropical forests in the early 2000s to explore the zoonotic relationship between bats carrying virus and diseases like Ebola. (The reservoir for Ebola virus remains unknown.) Daszak's interest in bats extended into China where he developed a relationship with WIV virologist, Shi Zhengli, who has a fearless reputation of studying bats in their caves. Zhengli's work focused on SARS-like coronaviruses living in bats. Zhengli provided Daszak, whose EcoHealth Alliance's office is off of Central Park in NYC with no laboratory, a well-known lab for studying emerging viruses that posed pandemic risks. In 2009 USAID awarded a five-year $18 million grant to what was then, the Wildlife Fund, to predict viral emergence and pandemic risk, by studying bats and their viruses. For Daszak this was a homerun enabling the non-profit's transformation to EcoHealth Alliance, providing monies to fix air conditioning in their run-down office. Now Daszak had the money to set up studies with Zhengli at the WIV. He boasted that his NGO would be on the frontline of predicting future viral outbreaks.

Then in 2014 Daszak was awarded $3.7 million from Fauci's division of the NIH. The grant was titled, "Understanding the Risk of Bat Coronavirus Emergence." The viral sequences of bats would be studied to determine the risk for human disease. The Wuhan Institute of Virology received $600,000 of the NIH funding to do the study. (Daszak provided the WIV $1.1 million from his earlier grant from USAID.) As the *Vanity Fair* investigation reveals EcoHealth Alliance sponsored a great many "educational" events at a restaurant off of Dupont Circle for biologists with government agency funding bureaucrats– $8,000 of brie and Chardonnay was a great investment. The WIV studies were not confined to simply finding bat viruses. Viral gain-of-function studies, like modification of the MERS virus, were definitely among Daszak's grant applications. And the NIH approved such grants not once, but twice until finally in 2020 the NIH grant was temporarily cancelled, then reactivated, and then again suspended.

Gain-of-function studies are a prudent or not so prudent part of science. The implicit reason for conducting such research is to be better able to study viral infections in humans, enabling better diagnostics and treatment. Unfortunately, gain-of-function studies also increase the risk that a virus may become more virulent, increasing infectivity and contagion. In addition to the WIV, Daszak contracted UNC Chapel Hill virologist, Ralph Baric, who specializes in coronavirus. While Daszak was experiencing challenges with getting a renewal of his NIH contracts in 2017, the Department of Defense's DARPA became very interested in gain-of-function viral research. DoD was particularly interested in obtaining information about what was happening in virology laboratories in the BRICS (Brazil, Russia, India, China, South Africa) and related countries. Zhengli and Baric along with Daszak burned the midnight oil putting together a grant application for DARPA by a March deadline. Not only was the application late but it was a hodge-podge of research purpose, goals, data, and whatnot lacking, according to the DARPA reviewers, "common sense." One particular gain-of-function part of the application was alarming: The grant would study "SARS-like bat coronaviruses for furin cleavage sites and possibly insert new ones that would enable them to infect human cells." A furin cleavage site enhances the entry of the virus into a cell.

Years later Garry would write that the furin cleavage site of the SARS-CoV-2 is stunning: "I really can't think of a plausible natural scenario where you get from the bat virus or one very similar to it to SARS-CoV-2 where you insert exactly 4 amino acids/12 nucleotides that all have to be added at the exact same time to gain this function…I just can't figure out how this gets accomplished in nature."

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Letter from the Publisher

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The DARPA application was not granted. However, according to virologist Simon Wain-Hobson, the DARPA application "was a road map to a SARS-CoV-2 virus." Given that Baric had approved this research, the Wuhan Institute would have sufficient motivation to conduct such studies even without DARPA approval, especially with China's thirst for intellectual property, and its military interest in (biologic) advanced weaponry.

As the pandemic unfolded in 2020, Daszak was among those who predicted that the pandemic would be easily contained based on research work that his organization and the WIV had done. As the pandemic spread Daszak was instrumental in March in organizing a letter to the journal, *Lancet*, arguing for the natural zoonotic spillover origin of the virus. He was clearly worried about his NIH funding being revoked and wanting the WIV lab not to be blamed for the virus. Three months prior to the December 2019 outbreak of cases in Wuhan, the WIV took down from their database the viral genome of 22,000 viruses based on studies funded by Daszak's NGO through the largesse of the NIH. When the WHO organized a commission to study the virus in Wuhan, Daszak was the only US scientist invited. He was quarantined for two weeks and then allowed a one-day visit to WIV for questioning of a very limited nature. The WHO report concluded that a zoonotic spillover was "very likely" and that a laboratory origin of the virus was "very unlikely." However, most scientists were not convinced. The data was incomplete, not conclusive, and there was no willingness by the WIV and the Chinese government to give full access to patient virus data. All claims that the virus was genetically modified have been labelled wrong and any acceptance is deemed a conspiracy theory.

On February 26, 2022, virologist Michael Worobey, Andersen, Garry, and 15 co-authors released to the public a pre-print claiming "dispositive evidence" (evidence that settles a dispute) that SARS-CoV-2 emerged from the Huanan market. Ironically the Chinese CDC published a day earlier their own pre-print finding that there was no evidence of SARS-CoV-2 found in 18 animal species studied from the market, but there was ample evidence of the virus found on surfaces throughout the market. Rather than being the origin of the virus, the market was an "amplifier" of it.

Those scientists most adamant about the natural origin of the virus are very worried about the consequences if a lab origin is established to be the case. It is outrageous that the WIV has removed the genetic sequences of coronaviruses from their database. The "dispositive" evidence for a natural origin of the virus is hardly settled. A viral origin based on a laboratory experiment gone wrong is no crackpot conspiracy theory.

Coming up: Our August/September issue on cancer prevention and treatment.
Look for your issue after mid-August.
(No issue to be mailed in July.)

Cover Article: Recovering from Lyme Disease and Mold Illness by Scott Forsgren

The treatment of Lyme disease has evolved considerably over the past two decades. Conventional medical treatment remains a short course of antibiotics following diagnosis of Lyme after a tick bite. Chronic Lyme disease isn't considered a valid diagnosis. For those patients dealing with chronic Lyme disease, conventional care is a frustrating battle convincing doctors and insurance companies to prescribe and pay for antibiotic treatment; unfortunately, such requests are often denied and patients are asked to consider antidepressant medication. Lyme-literate doctors aware of the chronicity of Borrelia, Bartonella, and Babesia infections do treat patients with antibiotics typically on a long-term basis. However, antibiotic therapy is fraught with potential adverse effects, not the least of which is disruption of a normal microbiome and Candidiasis. Additionally, not a few chronic Lyme disease patients also suffer with mold illness and related chronic problems. Neither a short nor a long course of antibiotics appears to be sufficient treatment for patients with Lyme disease.

Scott Forsgren, like many other practitioners in the Lyme arena, suffered greatly after he had a tick bite two decades earlier. As he describes in this issue's cover article, he developed excruciating, wide-ranging physical and mental symptoms. Unlike some folks, Scott took his problem from physician to physician, seeing 45 doctors over a period of eight years. Remarkably the practitioner that put him on the right path practiced Electroacupuncture according to Voll (EAV) diagnosing energetically a Lyme disease infection. Scott also was introduced to the problem with mycotoxins—he had been living in an apartment that was moldy. The path to recovery not only took him to managing Lyme infection and mold toxins but also addressing overall wellness issues mentally and physically.

Forsgren's model would argue against immediate treatment with antibiotics unless they are absolutely indicated. Instead, he would recommend as a first step to begin the process of detoxification and "drainage." If the organs meant to eliminate toxins are not functioning well, there is little chance for systematic improvement. While removing toxins internally, the external environment needs to be cleaned up. A Lyme disease patient cannot recover while living in the midst of mold. Of course, a diet clean-up is in order as well; patients cannot remain on a standard American diet. Addressing sleep and mental health issues are vital for recovering health. Antibiotics (and anti-fungals) have a place in the Lyme disease program, but detoxification needs to be underway first in restoring health.

Jonathan Collin, MD

1. Eban, K. "This shouldn't happen": Inside the Virus Hunting Nonprofit at the Center of the Lab-Leak Controversy. *Vanity Fair.* March 31, 2022.

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Shorts

briefed by Jule Klotter
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Parasites and Diabetes

In searching Google Scholar, I found several studies that have investigated the presence of intestinal parasites in patients with diabetes. The consequences of having diabetes and hyperglycemia include decreased T cell function and decreased activity of polymorphonuclear leukocytes that are at the frontline of immune defense. Also, intestinal barrier function becomes impaired. As a result, people with diabetes can become more susceptible to intestinal parasites – both protozoan (e.g., *Giardia intestinalis, Entamoeba histolytica, Blastocystic hominis*) and helminths (e.g., roundworm, hookworm, tapeworm).

A 2021 cross-sectional study of 152 diabetes patients in Ghana found that 12.5% of the patients had intestinal parasites. The researchers examined a single stool sample from each patients using direct wet mount, formol-ether concentration, and modified Ziehl-Neelsen staining methods. *Giardia lamblia* and *Entamoeba histolyrica* were the most common parasites found. "Fasting blood glucose level was a significant risk factor for acquiring intestinal parasites," according to the researchers. Most of the patients with parasites had fasting blood glucose levels greater than 11.0 mmol/L (198 mg/dl); the average level was 14.34±2 (~258 mg/dl). The authors note that the use of other laboratory techniques (e.g., molecular and immunofluorescence) may have detected more parasite infections than the method used.

A 2021 Egyptian study that compared 100 diabetic patients with gastrointestinal symptoms (e.g., diarrhea, flatulence, abdominal pain) to 100 non-diabetic controls found a higher, but statistically non-significant incidence of parasitic infection in people with diabetes (44% vs. 32%; p=0.08). Patients with uncontrolled diabetes were more likely to have parasitic infections than patients with controlled diabetes (77.3% vs. 22.7%; p=0.014); and those with complicated diabetes were more likely to be infected than those with uncomplicated cases (79.5% vs. 20.5%; p=0.043).

Although many of the studies linking parasitic infection and diabetes are from tropical and/or less developed countries, recent *Townsend Letter* articles by Omar Amin, PhD, of the Parasitology Center (Scottsdale, Arizona) report that parasitic infections are common in the United States as well. In his article "Detecting Parasites," he explains that detecting such infections can be tricky because parasites have complex life cycles and often do not shed consistently: "This means that the parasite may be present in the stool for two, three, or four days a week, but not the rest of the week." Because of this, he recommends that at least two or three stool samples, taken on different days, be used to determine whether parasites are present.

In addition to gastrointestinal symptoms, parasites can cause a number of other symptoms, including fatigue, skin rashes, dry cough, lymph blockage, allergies, nausea, muscle and joint pain, and headaches.

Amin O. Detecting Parasites. *Townsend Letter.* January 2022;41-47.
Sisu A, et al Intestinal parasite infections in diabetes mellitus patients: A cross-sectional study of the Bolgatanga municipality, Ghana. *Scientific African.* 2021;11;e00680.
Waly WR, et al. Intestinal parasitic infections and associated risk factors in diabetic patients: a case-control study. *J Parasit Dis.* June 9, 2021.

Medical Licenses and Misinformation

An Assembly bill (No. 2098), introduced in the California legislature on February 14, 2022, requires the medical boards overseeing professional conduct to take action against any licensed MD or DO for "[disseminating] misinformation or disinformation related to COVID-19, including false or misleading information regarding the nature and risks of the virus, its prevention and treatment; and the development, safety, and effectiveness of COVID-19 vaccines." In its decision whether to take disciplinary action, the board is supposed to consider whether "the licensee departed from the applicable standard of care and whether the misinformation or disinformation resulted in harm to patient health."

This legislation follows the lead of the Federation of State Medical Boards (FSMB), which on July 29, 2021, released a statement that said: "'Physicians who generate and spread COVID-19 vaccine misinformation or disinformation are risking disciplinary action by state medical boards, including the suspension or revocation of their medical license.'" The California bill, which was amended on April 20, 2022, does not limit a doctor's speech to the general public; rather it focuses

on information that doctors give to their patients "in the form of treatment or advice."

As California health care attorney Richard Jaffe, Esq., explains in a letter to the California Assembly Committee on Appropriations, covid data and research is still evolving, making it problematic to identify true "misinformation." He wrote:

> Moderna is now seeking FDA approval of its vaccine for children under 6 even though its clinical trials efficacy rate is 37%, which is a number many consider to be sub-par. If the vaccine receives such approval, will it be covid misinformation to advise parents against that vaccine because of the low efficacy rate?
>
> Some countries have taken quite different approaches to lock-downs and vaccination…. Is it going to be prosecutable covid misinformation for California physicians to consider the pandemic policies of countries who objectively have had a more successful approach to the pandemic that what we have seen in the United States?

Some state medical boards are acting against "misinformation" without a state law to back them up. In a high-profile case, Maine's medical board suspended Meryl Nass' medical license in January 2022 for 'spreading misinformation' and ordered her to undergo a neuropsychological evaluation. Doctors who are ordered to get such an evaluation are automatically reported to a national physician data, which prevents them from getting a job or license in another state; also, their case and any patients' records send to the board enter public domain and become accessible to the media. "Since the Maine Medical Board wanted to 'out' me publicly, I feel no compunction about telling my side of the story to the public, and I will continue to do so," she explained in a January 13, 2022, blogpost.

Dr. Nass is board certified in internal medicine and has spent most of her 40-year career evaluating and treating patients with complex illnesses like fibromyalgia, Lyme, chronic fatigue syndrome, Gulf War syndrome, and multiple chemical sensitivity (MCS). She co-authored the published 1999 case definition for MCS and became an authority on the use of anthrax in biological warfare, after investigating an anthrax outbreak that occurred during Rhodesia's civil war over 40 years ago.

When covid hit, Dr. Nass began treating patients for a one-time fee of $60 with the aim of keeping them out of the hospital. The Maine medical board criticized her charting; she would make notes about the many text messages, phone calls, and email communications she had with her patients, but the board considered these communications "telemedicine visits' that should have included a history and physical. The board also received two reports that she had prescribed ivermectin and hydroxychloroquine for covid patients. Dr. Nass, herself, also attracted board attention by asking for a policy change after she told a "white lie" to a pharmacist in order to acquire hydroxychloroquine for a high-risk covid patient; Nass said it was for a Lyme patient. Pharmacies were refusing to give the drug to patients with covid: "'…I wrote the Maine Medical Board of Licensure and told them that my patients can't get a potentially life-saving drug unless I tell a white lie, which is unacceptable.'"

Dr. Nass told Matt McGregor at *The Epoch Times* "'None of the organizations, like the FSMB or AMA, or state agencies that have threatened or suspended doctors' licenses, has had the courage to put into writing how they define misinformation and disinformation…..Do you want to live in a state that says the law is what we think it is, but we're not putting it in black and white?'"

Jaffe R. My Analysis and Opposition to AB 2098 to the Assembly Appropriations Committee. April 29, 2022.

McGregor M. 'There's No Law': Physician Experienced in Investigating Biological Warfare Challenges Medical Board's Misinformation Allegation. *The Epoch Times*. February 8, 2022.

Meryl Nass's CV. https://anthraxvaccine.blogspot.com/.

Nass M. My side of the story, and the Constitutional protections that I believe are being abridged by the Misinformation Witch Hunt. January 13, 2022. https://merylnassmd.com/my-side-of-story-and-constitutional_13/.

WHO Pandemic Treaty

During a special session of the World Health Assembly (November 29-December 1, 2021), this decision-making body of the World Health Organization (WHO) agreed to assess the benefits of developing an international pandemic treaty and launch negotiations with delegations of the 194 countries that are WHO members. In early March 2022, the Council of the European Union agreed to negotiate. The World Health Organization says the treaty would "promote an 'all-of-government' and 'all-of-society' approach, integrating health matters across all relevant policy areas (e.g. research, innovation, financing, transport)." Reports by The Independent Panel for Pandemic Preparedness and Response to the Covid-19 Pandemic (https://theindependentpanel.org/) made several recommendations to strengthen WHO's authority. WHO anticipates that the treaty will be ready for a vote by May 2024. The WHO held public hearings about the treaty on April 12-13, 2022, and again in June.

➤

Shorts

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Tess Lawrie, MBBCH, PhD, a British medical doctor and research consultant, took part in the hearing on April 13. Dr. Lawrie is the CEO of Evidence-Based Medicine Consultancy (E-BMC Ltd.) and is an external analyst for the WHO, serving as a guideline methodologist (assesses evidence, compiles it, and makes recommendations). In an April 13 blogpost, she wrote "… the WHO is proposing a global pandemic agreement that would give it undemocratic rights over every participating nation and its citizens….Whether your country's elected government would agree or not, the WHO could impose lockdowns, testing regimes, enforce medical interventions, dictate all public health practice, and much more."

WHO is a captured agency; WHO's susceptibility to pharmaceutical interests has been of concern for decades. Forty-four years ago, Halfdan Mahler, WHO director general from 1973-1988, claimed "'the industry is taking over WHO.'" That was before WHO changed its financial policy (about 20 years ago); instead of being funded solely by member nations, WHO began accepting money from the private sector. In a 2015 review article for *Journal of Integrative Medicine & Therapy*, Søren Ventegodt says that WHO recommends many drugs that independent researchers who performed meta-analyses for Cochrane found to be ineffective and/or harmful. Ventegodt also recounted the WHO's actions during the 2009 swine flu epidemic – actions that included inciting panic with its prediction of millions of deaths, calling for the closure of national borders and public meeting places, and pushing the use of vaccines and drugs that later turned out to be ineffective and harmful. Shortly before deeming the mild 2009 flu a pandemic, WHO had changed its definition of pandemic "from meaning 'millions of deaths' to mean a non-dangerous infection that spreads worldwide…."

Over and beyond conflict-of-interest concerns, an international pandemic treaty that gives one agent the authority to make decisions affecting the entire world is, in the words of Australia's leading clinical immunologist, Professor Robert Clancy, "foolhardy":

> It is foolhardy to even suggest that a 'one size fits all' response to a pandemic crisis across geographic zones characterized by hugely different parameters, could possibly be covered by a central bureaucratic process – the need for local decision making is of prime importance. **The rule of science and the rule of the doctor-patient relationship must determine any response to a pandemic,** and current experience where the rule of the narrative has so distorted disease outcomes – supported by the WHO – must make very clear the foolishness of rewarding incompetence and corruption with even greater powers.

World Council for Health (https://worldcouncilforhealth.org) is among the groups that is working against the pandemic treaty and is, instead, advocating for transparency, open debate and dialogue, the right to choose and refuse treatments, and human rights and civil liberties.
Council of the European Union. Towards an international treaty on pandemics. https://www.consilium.europa.eu/en/infographics/towards-an-international-treaty-on-pandemics/
Lawrie T. We can't let them get away with this power grab. April 13, 2022. https://drtesslawrie.substack.com/p/urgent-my-video-call-with-the-who?s=r
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[1] Journal of Pain Research (D Hamilton, G Jensen). Pain reduction and improved vascular health associated with daily consumption of an anti-inflammatory dietary supplement blend. J Pain Res. 2019; 12: 1497–1508.

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Literature Review & Commentary

by Alan R. Gaby, MD
drgaby@earthlink.net

Gluten and Inflammatory Bowel Disease

The association between gluten intake and risk of developing inflammatory bowel disease (IBD; ulcerative colitis or Crohn's disease) was examined in a prospective cohort study of 208,280 US participants from the Nurses' Health Study (1986-2016), Nurses' Health Study II (1991-2017), and Health Professionals Follow-up Study (1986-2016) who did not have IBD at baseline or celiac disease and who completed food frequency questionnaires. During 5,115,265 person-years of follow-up, 337 new cases of Crohn's disease and 447 new cases of ulcerative colitis were documented. No significant associations were found between gluten intake and risk IBD. Compared with participants in the lowest quintile of gluten intake (mean, 3.1 g/day), the adjusted hazard ratios for participants in the highest quintile of gluten intake (mean, 8.8 g/day) were 1.16 for Crohn's disease (p for trend = 0.41) and 1.04 for ulcerative colitis (p for trend = 0.64). The authors concluded that gluten intake was not associated with risk of Crohn's disease or ulcerative colitis.

Comment: Anyone who practices nutritional medicine knows that wheat is a major symptom-evoking food in some patients with IBD. Other gluten grains are sometimes involved as well. Contrary to the conclusion of the authors of the present study, there was in fact an association between gluten intake and IBD. A more appropriate conclusion would have been that the highest quintile of gluten intake, as compared with the lowest quintile, was associated with a 16% increase in incidence of Crohn's disease and a 4% increase in incidence of ulcerative colitis; but that we are less than 95% certain that these associations are real (as opposed to being due to chance). Moreover, comparing the risks associated with higher versus lower levels of intake does not necessarily provide useful data. Wheat-induced symptoms in people with IBD are likely mediated by an allergic mechanism. Therefore, both smaller and larger levels of intake might have a similar adverse effect. Finally, it is possible that some people who were destined to develop IBD had already decreased their level of gluten intake because they were aware that it caused symptoms. If that is the case, it would be more difficult to detect a true association between gluten intake and risk of IBD.

This study should not dissuade practitioners from investigating whether gluten grains are a contributing factor in specific cases of IBD.

Lopes EW, et al. Dietary gluten intake is not associated with risk of inflammatory bowel disease in US adults without celiac disease. *Clin Gastroenterol Hepatol*. 2022;20:303-313.e6.

Tea and Kidney Stone Risk

Ten healthy men received a standardized diet for 10 days. During the first five days they consumed 1.5 liters of fruit tea per day (which contained no oxalate), followed by 1.5 liters of black tea per day for five days (which provided 86 mg of oxalate per day). Compared with fruit tea, black tea increased mean 24-hour urinary oxalate excretion by 10% (p = 0.14) and increased mean 24-hour urinary citrate excretion by 21% (p = 0.002).

Comment: There is concern that drinking black tea can increase the risk of developing calcium oxalate kidney stones because black tea contains a relatively large amount of oxalate. Previous studies have suggested that the oxalate in tea is not well absorbed, although the evidence is conflicting. In the present study, consumption of a fairly large amount of black tea resulted in a small increase in urinary oxalate excretion, which was not statistically significant. However, tea consumption also increased urinary excretion of citrate, which is an inhibitor of stone formation. Therefore, it is unlikely that drinking black tea increases stone risk.

Siener R, Hesse A. Effect of black tea consumption on urinary risk factors for kidney stone formation. *Nutrients*. 2021;13:4434.

L-Arginine for Erectile Dysfunction

Ninety-eight men (mean age, 51.4 years) with vasculogenic erectile dysfunction (erectile dysfunction [ED] due to reduced cavernous blood inflow secondary to vascular disease) were randomly assigned to receive, in double-blind fashion, 6 g per day of L-arginine or placebo for three months. Outcome

measures included the International Index of Erectile Function (IIEF-6) score and cavernous arteries peak systolic flow velocity (PSV). For IIEF-6, a score of 26 or higher indicates no ED, 18 to 25 indicates minimal ED, 11 to 17 indicates moderate ED, and 10 or lower indicates severe ED. In the L-arginine group, the mean IIEF-6 score increased from 20 at baseline to 24 ($p < 0.0001$ compared with baseline and compared with the change in the placebo group). The improvement was significant in the subgroups of patients with mild/moderate ($p < 0.0001$) and severe ($p < 0.01$) ED. The mean IIEF-6 score did not change in the placebo group. L-arginine also increased mean PSV ($p < 0.0001$ compared with baseline and compared with the change in the placebo group). The improvement in PSV values was seen only in those with initially mild or moderate ED, not in those with initially severe ED. Seventy-four percent of the patients receiving L-arginine had an improvement in erectile function, and 24% (mainly in the baseline category of mild ED) reached IIEF-6 scores compatible with absence of ED.

Comment: Arginine is a precursor to nitric oxide, which plays a role in the development of erections by promoting dilation of blood vessels of the penis and relaxing smooth muscle cells of the *corpus cavernosum*. In previous clinical trials lasting two to six weeks, supplementation with 5 g per day or 2.8 g per day of L-arginine improved ED, whereas a dose of 1.5 g per day was ineffective. For comparison, a typical Western diet contains about 5-6 g per day of L-arginine. The present study confirms the effectiveness of L-arginine and demonstrates that, with continued treatment, the benefit lasts at least three months.

Menafra D, et al. Long-term high-dose L-arginine supplementation in patients with vasculogenic erectile dysfunction: a multicentre, double-blind, randomized, placebo-controlled clinical trial. *J Endocrinol Invest*. 2022;Jan 1:[Online ahead of print].

L-Carnitine for Heart Failure

Eighteen Japanese patients (mean age, 79 years) hospitalized with heart failure with preserved ejection fraction (left ventricular ejection fraction [LVEF] of 45% or higher) who had carnitine deficiency were randomly assigned to receive L-carnitine or no L-carnitine for 12 months. Carnitine deficiency was defined as a serum free-carnitine level below 36 µmol/L or an acylcarnitine/free carnitine ratio of 4 or greater. The initial dosage of L-carnitine was 300 mg per day. If carnitine deficiency was still present after one month, the dosage was increased to 600 mg per day. Thirteen patients completed the trial: six in the L-carnitine group and seven in the control group. After 12 months, there was a trend toward greater handgrip strength in the L-carnitine group than in the control group. The 10-meter maximum walking speed increased in the L-carnitine group ($p < 0.05$ for the difference in the change between groups). The body fat ratio decreased in the L-carnitine group and increased in the control group ($p < 0.05$ for the difference in the change between groups).

Comment: Most of the research that has been conducted regarding the treatment of heart failure has studied patients who had a reduced LVEF (<40%). Heart failure with preserved ejection fraction, which is caused primarily by diastolic dysfunction, has received much less attention, even though it accounts for approximately 50% of heart failure cases. The present study provides preliminary evidence that L-carnitine is beneficial for this subset of patients. Animal research suggests that maintaining adequate magnesium status is also important for people with heart failure with preserved ejection fraction.[1]

Kinugasa Y, et al. L-Carnitine supplementation in heart failure patients with preserved ejection fraction; a pilot study. *Geriatr Gerontol Int*. 2020;20:1244-1245.

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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.

Gaby's Literature Review

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Saffron for Chemotherapy-Induced Peripheral Neuropathy, or More Iranian Research Fraud?

One hundred seventy-seven Iranian cancer patients with chemotherapy-induced peripheral neuropathy (CIPN) were randomly assigned to receive, in double-blind fashion, 15 mg of crocin (a constituent of saffron) twice a day or placebo for eight weeks. After a two-week washout period, each patient received the alternate treatment for an additional eight weeks. Compared with placebo, crocin significantly decreased the severity of neuropathic pain ($p < 0.05$).

Comment: *Townsend Letter* readers are aware of my concern that many research papers coming from Iran appear to be fraudulent. Several issues related to the present study raise questions about its credibility.

1. Discrepancy regarding the number of study subjects: The paper stated that 177 patients were enrolled. The Iranian Registry of Clinical Trials (IRCT) document associated with the study stated that the target sample size was 60.
2. Discrepancies regarding the treatment: The paper stated that the dosage of crocin was 15 mg twice a day. The IRCT document stated that the dosage was 15 mg once a day. The paper stated that there were two treatment groups: crocin and placebo. The IRCT document stated that there were three treatment groups: crocin (n = 20), placebo (n = 20), and a positive control group (n = 20) that received 100 mg per day of gabapentin. The use of 100 mg per day of gabapentin for a positive control group is curious, considering that the typical dose of gabapentin for CIPN is 800-1,800 mg per day. The paper stated that the study was a crossover trial with two eight-week treatment periods. The IRCT document stated that patients received their assigned treatment for three months, with no crossover.
3. Ethics concern: According to the IRCT document, the patients were told they would be given a medication that would aid in their treatment. The paper stated that all patients signed an informed consent form. The patients were apparently not told that some of them would be given a placebo. That apparent omission raises ethical concerns.
4. Issue regarding the study authors: According to the paper, two of the three recruitment sites were hospitals in Tehran, and the other site was a hospital in Semnan (a 3-hour drive from Tehran). However, none of the six authors of the study were from Tehran.
5. Issues regarding funding: Double-blind trials are expensive to conduct, and it is unusual for sponsors to fund a large double-blind study such as this one before there is any preliminary evidence of clinical efficacy from uncontrolled trials, case reports, or animal studies. The paper stated that there have not been any prior clinical trials or animal studies that have examined the effect of crocin on CIPN. The paper also stated that the funding for this large double-blind study came from a "student research committee." Iran is not a wealthy country, and there is a lot competition for research funding. It is difficult to believe that a university with limited funds would allocate so much money to a project conducted by a graduate student.

Bozorgi H, et al. Effectiveness of crocin of saffron (Crocus sativus L.) against chemotherapy-induced peripheral neuropathy: A randomized, double-blind, placebo-controlled clinical trial. *J Ethnopharmacol*. 2021;281:114511.

Cow's Milk and Rectal Bleeding

Of 61 children under the age of four months who were experiencing rectal bleeding, 58 had a resolution of the bleeding after cow's milk protein was removed from their diet. The median age of onset of rectal bleeding was 21 days, which corresponded to two days after the introduction of cow's milk protein. The children were re-challenged with cow's milk protein a median of 36 days after it had been removed from the diet. Eighteen children experienced significant and persistent symptoms during the food challenge (such as a relapse of rectal bleeding, behavioral changes, diarrhea, or vomiting) and were considered to have cow's milk protein allergy. Seventy-five percent of the children acquired tolerance to cow's milk protein before the age of 10 months.

Comment: This study confirms previous studies demonstrating that allergy to cow's milk protein is a common cause of rectal bleeding in infants. The majority of the children developed what the study authors called "tolerance" to cow's milk protein, in that it no longer triggered the symptoms it had previously caused. However, practitioners who work with hidden food allergy have found that childhood allergies sometimes resurface later in life, manifesting as conditions such as migraines, arthritis, fatigue, asthma, or perennial rhinitis. The symptom-evoking foods in adulthood are often the same ones that caused problems during childhood. That observation does not necessarily mean that children who develop tolerance to cow's milk protein should continue to avoid it. However, if new symptoms occur later in life, one should consider that possibility that cow's milk protein is a contributing factor.

Lemoine A, et al. Rectal bleeding and cow's milk protein-induced allergic proctocolitis: A prospective study. *Clin Exp Allergy*. 2021;51:1242-1245.

Does Prenatal Choline Supplementation Improve Children's Brain Development?

Twenty-six pregnant women were randomly assigned at 27 weeks of gestation to consume 480 mg or 930 mg per day of choline until delivery (a supplementation period of approximately 12 weeks). To achieve these levels of choline intake, all women consumed the same study diet, which provided 380 mg per day of choline, plus a choline supplement of either 100 mg or 550 mg per day. Sustained attention was assessed in 20 of the children at seven years of age. Compared with 480 mg per day, 930 mg per day significantly improved measures of sustained attention.

Comment: Choline plays a key role in brain development. Therefore, it is important for women to consume adequate amounts of choline during pregnancy. The Food and Nutrition Board of the Institute of Medicine has not established Recommended Dietary Allowances (RDAs) for choline, because of a lack of sufficient data upon which to base an RDA. Instead, the Institute established Adequate Intake levels, which are defined as the levels of nutrient intake that are assumed to be

adequate for healthy individuals. The Adequate Intake level for choline has been set at 450 mg per day for pregnant women. In contrast, average choline intake in the United States is estimated to be 320-380 mg per day. Thus, many if not most pregnant women are consuming less than the Adequate Intake level for choline. The results of the present study indicate that consumption of choline at the Adequate Intake level during the third trimester of pregnancy, as compared with a higher level of intake, produces offspring with a poorer ability to sustain attention. Thus, it would seem that most women should increase their choline intake during pregnancy.

Good food sources of choline include organ meats, eggs (140 mg for a 2-ounce large egg), wheat germ, soybeans, pork, chicken, nuts, peanuts, spinach, fish, and beef.

Bahnfleth CL, et al. Prenatal choline supplementation improves child sustained attention: A 7-year follow-up of a randomized controlled feeding trial. *FASEB J*. 2022;36:e22054.

Epigallocatechin and Vitamin D for Uterine Myomas

Ninety-five women of childbearing age with at least one uterine myoma (fibroid) with a diameter less than 4 cm were offered treatment with tablets containing the combination of 150 mg of epigallocatechin gallate (EGCG), 1,000 IU of vitamin D, and 5 mg of vitamin B6. The dosage was one tablet twice a day for four months. Women who agreed to take the treatment (n = 41) were considered the treatment group, and those who declined (n = 54) were considered the control group. Mean myoma volume decreased by 38% in the treatment group (p < 0.001 compared with baseline) and increased by 6% in the control group. In addition, pelvic pain decreased significantly in the treatment group, whereas there was no change in the control group. No significant side effects were seen.

Comment: Uterine myomas are the most common type of benign tumors in females. They often cause pain or bleeding and are associated with an increased risk for infertility. In the present study, treatment with a combination of EGCG (a polyphenol present in green tea), vitamin D, and a small amount of vitamin B6 was followed by a reduction in myoma size and an improvement in pain. A weakness of the study is that the treatment group and the control group were not necessarily comparable. There may be fundamental differences between people who agree to try a treatment and those who decline the treatment. Those differences, rather than the treatment being studied, could have been responsible for the better outcomes in the treatment group. Randomized trials are therefore needed to confirm the results of this study.

Miriello D, et al. Uterine fibroids treatment: do we have new valid alternative? Experiencing the combination of vitamin D plus epigallocatechin gallate in childbearing age affected women. *Eur Rev Med Pharmacol Sci*. 2021;25:2843-2851.

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1. Liu M, et al. Magnesium deficiency causes a reversible metabolic, diastolic cardiomyopathy. *J Am Heart Assoc*. 2021;10:e020205.

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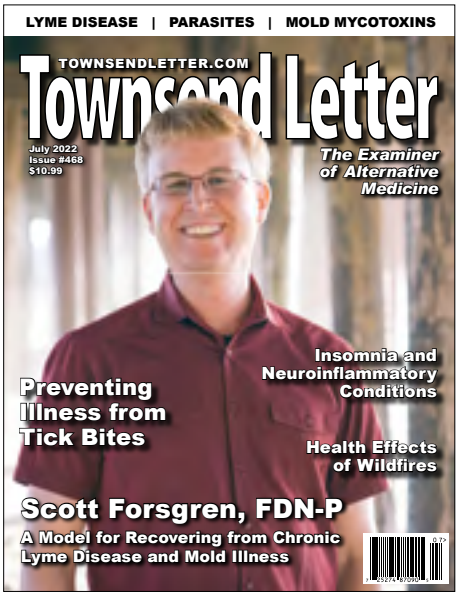

On the Cover

From "Dis-Ease" to Better Health: A Model for Recovering from Chronic Lyme Disease, Mold Illness, and Related Conditions

by Scott Forsgren, FDN-P, HHP

Introduction

In 1996, I was bitten by a tick in Northern California. Several months later in 1997, over the course of a weekend, my health rapidly deteriorated to the point that I was unsure if I would survive. I had never experienced anything quite so frightening in my life at that point; nor have I since.

I had full body burning sensations in my skin, difficulty walking, issues with my balance, cognitive issues, muscle and joint pain, crawling sensations, tremors, twitching, light sensitivity, GI issues, rapid heartbeat, vision issues; and the list went on….

Over the next eight years, I worked with 45 doctors with limited progress and only a diagnosis of chronic fatigue syndrome (CFS/ME) and fibromyalgia based on symptoms – but no root cause. In 2005, after an MD sent me to an acupuncturist that did Electro-Acupuncture According to Voll (EAV; a computer-based system of energetic testing), it was suggested that I have my doctor test for Borrelia, Bartonella, Babesia, and Ehrlichia. Ultimately, blood testing confirmed an unexpected diagnosis, and my journey with chronic Lyme disease began.

Shortly after, I learned about the work of Ritchie C. Shoemaker, MD, and his book *Mold Warriors*. That exploration led to the recognition that exposure to a water-damaged building was another key aspect of my health challenges. At the time, I knew there was mold in my apartment, but no one was talking about the consequences of living in such an environment.

Fortunately, today I am doing very well. I continue to take good care of and prioritize myself – which was one of the most important lessons of the journey and something that I had not been doing very well prior to having become ill. Today, I am blessed to have an active, productive life and am beyond grateful.

A Model for Recovery

Throughout my journey, I have been fortunate to have been connected to several amazing and talented practitioners and healers that became mentors and helped me to shape my view of these conditions. It was an honor to be mentored by Dietrich Klinghardt, MD, PhD, Neil Nathan, MD, Raj Patel, MD, Amy Derksen, ND, Ann Corson, MD, Simon Yu, MD, and others.

What has emerged from my more than 25-year experience is a model for how I might approach recovery, based on what I know today, if I were starting over. It is not a one-size-fits-all "protocol" that will work for everyone. Some steps may or may not apply to a given individual. The order will often be different based on each person's unique priorities. The goal was to create a framework that would lead to discussion between a patient and their practitioners with the hope of moving their healing journey forward.

The steps are

1. Support **Detoxification** and **Drainage**
2. Improve the **External Environment** (Mold/EMFs)
3. Optimize **Sleep**
4. Work on **Mental** and **Emotional** Contributors
5. Retrain the **Limbic System** and Tone the **Vagus Nerve**
6. Stabilize **Mast Cells**, Reduce **Inflammation**, and Modulate the **Immune System**
7. Optimize **Hydration**, **Nutrition**, **Microbiome**, and **Gut Health**
8. Support **Mitochondria**, **Adrenals**, **KPU** and **Coagulation**
9. Address **Microbial Overgrowths**
   - Viral and Retroviral Support
   - Parasites and Dysbiosis/SIBO Support
   - Fungal Colonization and Yeast Support
   - Lyme and coinfections
   - Biofilm Support
10. Consider **Dental Contributors**
11. Support **Regeneration** and **Restoration**

Step 1: Support Detoxification and Drainage

In my experience, detoxification and drainage are the most important aspects of any recovery protocol, and thus are the foundation. We live in a soup of environmental toxicants never before experienced by the human race. I do not personally believe that we would experience conditions like chronic Lyme disease to the extent that we are today if we did not have such a toxic burden – or terrain. Improving the terrain is the road back.

continued on page 20 ➤

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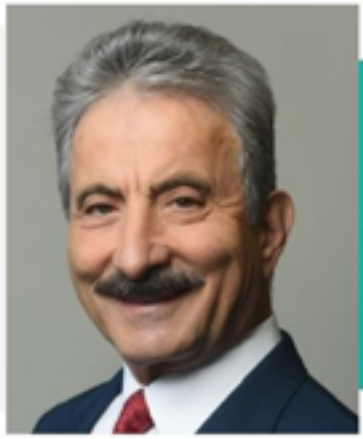

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Recovery Model

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The first, and commonly overlooked, step is to reduce as much of the incoming toxicant burden as possible. Personal care products, scented products, laundry products, and home cleaning products should be thoroughly evaluated to ensure they are not a source of additional toxicity. Pure air, pure food, and pure water are critical in optimizing health. Various medical implants, including breast implants, may also serve as an ongoing source of toxicity within the body.

"Detoxification" conceptually is the incorporation of binders. Toxins move from the liver to the bile to the gallbladder and then to the small intestine. Binders are then needed to adsorb or "bind" to these toxins in order to minimize enterohepatic recirculation of toxins and maximize excretion via the stool.

"Drainage" is supporting the body's innate ability to process and excrete toxins via the liver, gallbladder, kidneys, lymphatics, extracellular matrix, colon, skin, and lungs. All of the exit routes or channels of elimination or emunctories must be optimized and supported. Constipation and healing do not go together.

In the binder realm, Supreme Nutrition Products Takesumi Supreme™ has been a favorite for many years. In recent years, CellCore Biosciences ViRadChem, Biotoxin Binder, and HM-ET have been added to the toolbox. Beyond Balance® TOX-EASE BIND®, Bio-Botanical Research® GI Detox+, BioPure® chlorella and ZeoBind®, and bentonite clays such as Yerba Prima® Great Plains® Bentonite Detox or Premier Research Labs Medi-Clay FX™ are often helpful tools.

When we think about binding agents that act primarily in the GI tract, optimizing bile production and flow is a critical component of maximizing a binder's ability to bind toxins. If the toxins are instead moved from the liver back into the bloodstream, there will be minimal toxins in the GI tract to bind to. This process has been termed "Phase 2.5 Detoxification" by Kelly Halderman, MD, and discussed by Christopher Shade, PhD, as well.

In the drainage realm, homeopathic tools such as those from Energetix®, Pekana, and DesBio can be powerful allies in shifting the terrain in the direction of health. Herbal support such as milk thistle (liver), dandelion (liver), solidago (kidneys), and red root (lymphatics) can provide further support. BioRay® Liver Life, BioPure® Livessence, Genestra® Liv Complex, Gaia Liver Cleanse, and NutraMedix® Burbur are personal favorites.

Bitters such as Quicksilver Scientific BitterX, Eurbal Hildegard's Original Bitters Tablets, or NatureWorks® Swedish Bitters can support optimization of bile flow; as can Uni Key Health® Bile Builder, ox bile, and TUDCA.

Glutathione and melatonin can each be helpful tools in supporting detoxification. Trace minerals can be another key tool in supporting improvement of the terrain and reduction of heavy metals over time. Silica can be a useful tool in reducing aluminum toxicity in the body.

A broad detoxification and drainage approach can be a powerful tool for optimizing health. Later in a protocol, if one requires more targeted support for heavy metals, pesticides, chemicals, mycotoxins, or other toxicants, there may be value in exploring more specific tools. Heavy metal chelators such as DMPS and DMSA, for example, would not be considered until much later, if at all.

Furthermore, it is interesting to consider that microbes such as Candida and many parasites may actually be allowed in the body, in part, to serve us in that they hold or concentrate heavy metals in order to protect us from their detrimental effects. Thus, detoxification can be viewed as an indirect antimicrobial strategy as well.

Movement is a key aspect of detoxification. Life is about flow; stagnation is the opposite of flow and of life. Keeping the lymphatic system moving, or flowing, is critical. Fortunately, walking is a powerful strategy for this purpose. Exercise should not push beyond what is comfortable or within one's level of capability at the time; pushing too hard can make things worse.

Lastly, there are several tools that can be helpful adjunct interventions for supporting the removal of toxicants from the body. These may include

- Coffee Enemas
- Colonics
- Ionic Foot Baths
- Castor Oil Packs
- Oil Pulling
- Peloid Mud Baths
- Liver / Gallbladder Flushes (with medical supervision)
- Sauna (though may not be the place to start and can lead to toxin mobilization within the body)

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Recovery Model

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Step 2: Improve the External Environment (Mold/EMFs)

Our internal environment will only ever be as healthy as our external environment: the external environment being the likely cause of so many chronic conditions today. We can take supplements all day long, but if the external environment in our home, workplace, school, or even our car is our kryptonite, we will never regain our superhero status.

First is mold and the soup of toxic materials that exist within water-damaged buildings; this may include bacteria, endotoxins, mVOCs, and other materials. For many with chronic Lyme disease, exposure to mold may be a very significant factor. In my personal journey, mold illness may have been even more of an issue than Lyme disease ever was. Many people with chronic Lyme disease have significant mold exposure in their history if it is looked for.

There is no perfect test for mold in the external environment, but a reasonable place to start may be the Environmental Relative Moldiness Index (ERMI) from Mycometrics (https://Mycometrics.com) or EnviroBiomics (https://EnviroBiomics.com). ERMI results can then be used to calculate a HERTSMI-2 score, which is another indication of the potential for an environment to not be health-supporting.

Another helpful tool done in addition to an ERMI can be mold plate testing such as that offered by ImmunoLytics (https://ImmunoLytics.com). If finances are not a constraint, the preferred option would be to find an Indoor Environmental Professional (IEP) to do professional testing; ISEAI (https://ISEAI.org) is a top resource for finding vetted IEPs that understand biotoxin illness. Similar to doing a regular physical exam on a human body, regular testing of the external environment, such as on a yearly interval, can be a powerful health-promoting strategy.

Another way to explore the potential of mold as a contributor to one's condition is to look for evidence of mold toxins, or mycotoxins, in the urine. While these tests are somewhat debated and some argue that food sources can impact the results, in my experience they have been tremendously helpful. Labs that offer these include RealTime Laboratories (https://RealTimeLab.com), Great Plains Laboratory (https://GreatPlainsLaboratory.com), and Vibrant Wellness (https://Vibrant-Wellness.com).

Once an exposure has been identified, the options are to remediate or to find a new environment that better supports health restoration. While some people will not be able to recover in the same environment they became sick in, remediation is at least working with a known entity. Estimates suggest that between 50-90% of buildings have some degree of water damage, and a new environment may represent an unknown with potentially new issues that may not lead to the improvement one had hoped for.

Working closely with an IEP can help to determine which path forward may be the best option. While this process is not an easy one, it must be done. Ideally, improving the external environment comes very early in the recovery process. If one is dealing with chronic Lyme disease and has not explored the impact of exposure to a water-damaged building, they are likely doing themselves a great disservice.

Air filtration devices can be of benefit, but they are not the solution alone. The core source of the exposure needs to be identified and removed. Mold in a building is much like cancer in a body; ideally you remove the tumor before starting the chemotherapy. It may be akin to a hole in the bottom of a sinking boat; it is best to plug the hole rather than to bail out the water with a paper towel.

For mold and mycotoxin detoxification, CellCore Biosciences Biotoxin Binder and Carboxy, Beyond Balance® TOX-EASE BIND® and PRO-MYCO™, Supreme Nutrition Products Takesumi Supreme™ and Smilax Supreme®, Researched Nutritionals® MycoPul®, liposomal glutathione, and calcium D-glucarate may be helpful interventions. Some practitioners find cholestyramine a helpful tool as well. My observation has been that natural options often work well if the source of the exposure has been addressed, but that cholestyramine may be needed in those with ongoing or significant exposures. While not as effective, Welchol may be a better tolerated alternative to cholestyramine.

Another debated aspect of recovery from mold illness is the potential for colonization of fungal organisms inside the body; particularly in the sinuses and GI tract, which may lead to our own internal mycotoxin-production factory. This may mean that no matter how clean the external environment has now become, the focus may later need to shift to the internal environment to fully address the issue. This will be discussed later.

When mold exposure has been ruled out or addressed, a significant roadblock to recovery has been removed. It cannot be stressed 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 years of struggle in one's recovery journey from "chronic Lyme disease."

Next, EMFs are becoming a more and more prevalent environmental toxin in our world that can drain our vitality and keep our cells in a sympathetic dominant state that has the potential to impair our detoxification functions. Turning off Wi-Fi, tossing cordless phones, sleeping in a sleep sanctuary or canopy, and minimizing cell phone use can be helpful strategies.

It is also important to recognize that electrical wiring in the walls and dirty electricity impact our body voltage in our sleep location; assessing body voltage using a meter may be a helpful exercise. Reducing exposure to EMF is a critical part of the recovery process. Regular grounding, or earthing, can help the body to mitigate the effects of EMF exposure.

Dietrich Klinghardt MD, PhD, has suggested that EMFs lead to molds creating more mycotoxins. He has correlated the increase in EMFs with the increase in mold growth in buildings. He often says the first step to addressing mold in the external environment is to turn off Wi-Fi. Not only that, but he has observed that EMFs trigger the microbes within us to become more aggressive. There is no road back to health in the Klinghardt world without reducing EMF exposure.

While harmonization devices may be the icing on the cake for some, reduction of exposure is the cake itself. Ignoring exposure and attempting to use harmonization devices as a sole strategy is not a solid path forward.

EMF sensitivity has been correlated to the level of heavy metal toxicity in the body (as well as to metal implants), and thus, a focus on detoxification and removal of heavy metals may reduce symptoms of electromagnetic hypersensitivity (EHS) over time. Thus, the detoxification focus discussed on step 1 is another strategy for minimizing the effects of EMFs that we cannot mitigate over the long haul.

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While reduction of exposure is key, some may benefit from tools such as DesBio EMF Protect and Balance, BioPure® Rosemary, BioPure® Propolis, Ki Science Ray Wave, Functional Genomic Nutrition EMF PROTECT, magnesium, melatonin, or NADH to mitigate some of the damaging effects.

A common mistake in recovery is to minimize work in this step and to not be strict enough with avoidance of water-damaged buildings and reduction of EMF exposure. Raj Patel, MD, often suggests a "house arrest" with zero exposure to environments not known to be safe, as even the smallest inflammatory "hits" may prevent the overall program from working in some people. Creating a safe environment for recovery is paramount.

Step 3: Optimize Sleep

Everyone will be unique in terms of the ideal order of these steps, but EMFs are one of the key reasons people experience insomnia and the reason that EMFs were discussed in step 2. If we don't sleep, we don't heal. Creating the right environment for sleep is key to creating the right environment for healing.

There are numerous supplements such as melatonin, Honokiol, GABA, 5HTP, magnesium and others that some may benefit from; but looking at blood sugar with a continuous glucose monitor (CGM), measuring oxygen saturation, using a weighted blanket, implementing inclined bed therapy, and exploring devices such as BrainTap® and Apollo™ can be supportive tools. Minimizing blue light exposure at night and ensuring the sleep environment is dark are often important considerations.

Tracking sleep with a device such as the Ōura ring (in airplane mode) can help to reinforce what changes are improving or impairing sleep quality. Similarly, the Wellue O2Ring™ Continuous Ring Oxygen Monitor can be a helpful tool for measuring oxygen saturation while sleeping.

Mast cell activation syndrome and histamine intolerance can play a role in sleep dysregulation and will be discussed in step 6.

Every bit of improvement we are able to achieve with our sleep has the potential to exponentially increase our overall healing potential.

Step 4: Work on Mental and Emotional Contributors

Past emotional traumas and conflicts can set the stage for illness. Many have been invalidated by the medical community such that their physical illness led to an experience that created an emotional trauma. Either way, mental and emotional contributors must be explored to maximize health outcomes.

Everyone has some emotional baggage to work through. Accepting that reality doesn't mean that the illness is all in your head, but that our mental and emotional health do play a role in the development of physical illnesses.

In the chronic Lyme community, a common pattern is the Type A overachiever perfectionist. Many may not feel at a deep level that they deserve to be well.

Cultivating healthy relationships, eliminating toxic people, and experiencing joy all play a role. It is also important not to identify with the illness; it is a part of us, but it is not us. Being able to move past our stories and create a new reality is critical.

In Dr. Klinghardt's 5 Levels of Healing model, work in this arena is third level work. Shifts here are far more powerful than shifts on the physical level alone.

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Viewing illness as a gift rather than a curse or reframing the experience in more positive terms can be very healing. What happens in our lives is often intended to help us; to show us more balance. Applying what the universe is attempting to reveal to us can lead to more rapid identification of the pieces we need to get well on a physical level.

Getting healthy is not solely about killing bugs.

Tools in this realm may include: Eye Movement Desensitization and Reprocessing (EMDR), Applied PsychoNeurobiology (APN), Mental Field Therapy (MFT), Emotional Freedom Technique (EFT), Emotion Code, and similar modalities. Amy B. Scher's book *How to Heal Yourself When No One Else Can* is an excellent guide for work in this realm.

Step 5: Retrain the Limbic System and Tone the Vagus Nerve

Given that the order of these steps may vary based on the individual's illness contributors, this step could make sense elsewhere – sometimes earlier, sometimes later. For the most part, the trigger(s) of the limbic system impairment should be addressed before limbic system retraining tools will provide their full benefit. However, in some cases, doing work in this realm expands the toolbox of supplements and other interventions that one may be able to tolerate and thus, may have benefit earlier in a protocol.

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 items one may smell, see, hear, taste, and feel. The limbic system is thought of as the body's "alarm center" or "anxiety switch". It impacts the functioning of the immune system, endocrine system, and the autonomic nervous system (which controls blood pressure, heart rate, breathing, digestion, and more).

Numerous triggers may lead to limbic system impairment, including exposure to water-damaged buildings, chemicals, pesticides, bacteria, viruses, and physical, mental, or emotional trauma; and more.

Coming back to the earlier comments on timing of these tools, if you think of a threat like Lyme disease or mold illness as a tiger, you generally will find the most benefit from limbic system retraining once your tiger is now more of a purring kitten, but your limbic system still interprets it as the threatening tiger. That's the ideal time to use tools to reboot the limbic system; such that its perception of threat is more equivalent to the actual threat.

Some people think of limbic system retraining as being more in the mental/emotional realm. While it is true that an emotional event could be the trigger for the impairment, limbic system impairment can entirely be a response to a physical or biochemical threat.

For many, limbic system retraining has been the single most helpful tool in recovering from complex, chronic illness. Those ➤

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with food and chemical sensitivities often notice the benefits the fastest; but these symptoms are not required for these systems to provide benefit.

The most well-known tools in this arena are Dynamic Neural Training System (DNRS) and The Gupta Program. Another benefit of these tools is that they focus our attention on a new reality.

Beyond working on the limbic system, tonification of the vagus nerve and parasympathetics and calming of the nervous system are often powerful strategies.

Some tools in this realm include BrainTap®, Frequency Specific Microcurrent (FSM), vagal nerve stimulators, HeartMath, and the exercises from Stanley Rosenberg's book *Accessing the Healing Power of the Vagus Nerve: Self-Help Exercises for Anxiety, Depression, Trauma, and Autism*. Even the ionic footbaths discussed earlier such as the IonCleanse by AMD support the parasympathetic nervous system to allow for more efficient detoxification.

The body needs to be in a parasympathetic state in order to rest, digest, detoxify, and heal.

Step 6: Stabilize Mast Cells, Reduce Inflammation, and Modulate the Immune System

In conditions like chronic Lyme disease, it has become more apparent over time that many of the symptoms experienced are about the host response to the microbe and not the presence of the microbe alone. Getting healthy is not solely about killing bugs – as it is unlikely that Lyme and co-infections will ever be fully eradicated. The bug does not make the disease.

If the immune system is hypervigilant, hyper-reactive, overactive, dysregulated, or responding in an autoimmune fashion, that inappropriate response may be the driver of many of the symptoms one experiences.

A significant portion of the inflammation in these conditions is driven by mast cell activation syndrome (MCAS) and histamine intolerance. The primary trigger for mast cells in these populations is likely mold exposure, but many other triggers may be factors such as: parasites, Lyme and co-infections, environmental toxicants, medications, foods, supplements, temperature changes, physical and/or emotional stress, EMFs, and more.

I personally suspect that the impact of EMFs in MCAS will be better understood over time. Theo Theoharides, PhD, MD, has suggested that mast cells are 10 times more activated in the presence of a cell phone. Our external environment matters when it comes to healing from these complex, chronic conditions.

Early on, a low histamine diet may be very helpful in reducing inflammation, minimizing symptoms, and setting the stage for other interventions to work more effectively. Additionally, inflammation impairs detoxification; thus, attempts to reduce inflammation improve detoxification efficiency. Many are often surprised to learn that items once thought to be health-promoting may not be in this population – kombucha, avocados, bone broth, and fermented foods; even many probiotics can be histamine promoters.

Next, implementing mast cell stabilizers and histamine reducers such as quercetin, luteolin, holy basil, Algonot NeuroProtek®, Seeking Health® Probiota HistaminX, QuickSilver Hista-Aid, Beyond Balance® MAST-EASE®, Pure Encapsulations® Hist Reset, and Researched Nutritionals® HistaQuel® can provide relief. Some may benefit from Ketotifen, Cromolyn, DAO, Allegra, Claritin, Montelukast, Famotidine, and various other mast cell stabilizers or histamine reducers.

While treating MCAS may lead to a notable shift in symptoms, it is not addressing the root causes or triggers of the condition, which must be simultaneously addressed in order to make longer-term improvement.

Systemic inflammation plays a key role in these conditions. Reducing inflammation can also support detoxification efforts. Tools may include Pro-Resolving Mediators such as Metagenics® SPM Active® or Microbiome Labs Gut Specific Fish Oil as well as tools like Ortho Molecular Products® Inflamma-bLOX, FlexNow, Researched Nutritionals® CytoQuel®, UNIQUE E®, curcumin, and others.

Tools that may help with immune modulation may include low dose naltrexone (LDN), low dose immunotherapy (LDI), homeopathy, peptides, Beyond Balance® IMN-CALM®, and the PureResponse™ line created by Samuel F. Yanuck, DC, for Pure Encapsulations®--such as Balanced Immune, Innate Immune Support, Th1 Support, and Th2 Modulator.

Getting well is not about "boosting" the immune system, which can actually make things worse; it is more about modulating, calming, and creating integration within our microbiome.

Furthermore, reducing the inflammatory burden as much as possible by addressing the external environment from step 2 and implementing a low-histamine diet and stabilizing mast cells sets the stage for later work in the microbial arena in step 9. If one does not do this foundational work, more aggressive tools are often needed, and people may be on protocols with dozens and dozens of supplements that they may not need.

Step 7: Optimize Hydration, Nutrition, Microbiome, and Gut Health

Many with biotoxin illness have low anti-diuretic hormone (ADH); they drink all day, pee it out, and are still cellularly dehydrated. Structuring water, adding electrolytes, cell salts, trace minerals, or sea salt can be a good start. Energetix® Rehydration can be another helpful tool.

Given that the immune system comes largely from the gut and particularly in the presence of intestinal hyperpermeability, certain foods may serve as triggers for immune dysregulation and mast cell reactions. Removing triggering foods such as gluten, A1 cow dairy, sugar, and high histamine foods can help to reduce the overflowing inflammatory bucket. While the right diet needs to be personalized to each individual, and to their unique food sensitivities, a low histamine diet is often a helpful tool.

What we do eat should be highly nutrient dense and include healthy fats and proteins. I personally include a "Power Shake" with a high-quality protein, numerous fibers, healthy fats, a phospholipid blend, and organic nut milk in my morning routine. It has been a game-changer.

Supporting the diversity of the microbiome with Microbiome Labs MegaSporeBiotic™, which may also help with inflammation and immune modulation as well as leaky gut, has been a favorite tool. It has been generally well-tolerated in those with MCAS and SIBO as well. Other tools for improving gut health may include

Microbiome Labs MegaPre™ and MegaMucosa™, BPC-157, and ION* Gut Support (formerly known as RESTORE).

Step 8: Support Mitochondria, Adrenals, KPU and Coagulation

Cellular energy or ATP is the energy currency of the body, which is needed to support detoxification, function, and repair. Red light therapy can be a helpful tool in this realm as can Frequency Specific Microcurrent (FSM).

Many supplements exist in this realm such as CoQ10, PQQ, acetyl-L-carnitine; more recently, applications of NAD such as NADH, NMN, and NR are worth exploration as is Urolithin A. Researched Nutritionals® offers several tools for mitochondrial support including ATP Fuel®, ATP 360®, and NT Factor® Energy, which contains mitochondrial supporting lipids and other co-factors.

One caution is that extracellular ATP is the danger signal as described by Robert K. Naviaux, MD, PhD in his Cell Danger Response (CDR) model. Thus, mitochondrial support is often best done low and slow if one is still in the early stages of the CDR model; or attempts to support the mitochondria may backfire. The body is a finely tuned machine with a delicate balance. Attempts to be too aggressive with treatment may further trigger a protective response and impede progress.

While it may ultimately be more important to support the mitochondria, adrenal support can be important as well. With a long illness, the adrenals can become exhausted and benefit from adrenal support or adaptogens. BioRay® Loving Energy® is a personal favorite. Holy Basil can be a helpful tool that supports the body on many levels including adrenal, histamine, and microbial support. Similarly, ashwagandha can support adrenals, histamine, microbial, and sleep support.

Dietrich Klinghardt, MD, PhD, has talked about Kryptopyrroluria (KPU) for many years. Our collaboration "Kryptopyrroluria (aka Hemopyrrollactamuria) 2017: A Major Piece of the Puzzle in Overcoming Chronic Lyme Disease" was published in the July 2017 issue of *Townsend Letter.*

If one has the KPU condition and is deficient in zinc, B vitamins, and other co-factors, WBCs are "like an army with no bullets." Supporting these deficiencies can support immune defense. At the same time, this should be done slowly as to not trigger a release of heavy metals and potentially increase in inflammation. BioPure® CORE and CORE-S are formulations in this realm based on Dr. Klinghardt's work.

Lastly, and possibly most importantly, hypercoagulation is a commonly overlooked consideration in complex, chronic illnesses. When blood viscosity is thickened, nutrient and oxygen delivery, as well as removal of toxic wastes, are impaired. Hypercoagulation can be triggered by numerous infections such as Babesia; as well as toxicants such as mold, heavy metals, and EMFs. Boluoke and nattokinase are commonly used interventions. Detailed testing and monitoring are suggested to correctly identify and address this issue. Hypercoagulation is an area that is commonly overlooked.

Step 9: Address Microbial Overgrowths

Killing bugs is not the priority in a well-balanced health restoration protocol, which is why addressing microbial overgrowths is near the end of this discussion.

At one time, I believed that killing bugs was the priority, detoxification was next, and mental/emotional health was last. I now view healing as the exact opposite with mental/emotional healthy being the priority, detoxification being the more important focus in terms of the physical body, and killing bugs, while important, being the least important of the three.

Observation has shown that the more foundational work done in earlier steps, the less aggressive one may need to be with the microbial focus. Raj Patel, MD, suggests that if the foundational work is done to address mold exposures and mast cell activation, which minimize the ongoing inflammatory burden, addressing microbial overgrowths often requires only a "light tough" or "micro-dosing strategy" to adequately address.

Within the microbial support focus against different pathogens, the order will vary, but a common approach is to start with viral and retroviral stress as these can be significant players and treatment is generally well-tolerated. Next, the focus may shift to parasites and SIBO and GI dysbiosis; then to fungal colonization and yeast. At that point, Lyme (Borrelia) and co-infections may be explored. Finally, some may need to address biofilms for longer-term recovery.

Viral and Retroviral Support. Many with chronic illness have reactivation of EBV, HHV-6, and VZV (Zoster) as well as endogenous retroviruses (which some suggest are worsened by EMF exposure). Once these are reactivated, they often need long-term support while other contributors are being addressed. Potentially helpful tools include BioPure® EN-V™, Vital 9, and Cistus (tincture or tea), Beyond Balance® IMN-V-II™ or IMN-V-III™, CellCore Biosciences ViRadChem, sulforaphane, pantethine, selenium, zinc, lysine as well as homeopathics such as Energetix® Viru-Chord or HZ-Chord.

Parasites, SIBO, and GI Dysbiosis Support. Parasites are more common than most recognize and are not difficult to acquire – even in those that have never left the United States. Parasites consist of larger organisms such as helminths and smaller organisms such as protozoa like Giardia, Cryptosporidium, Blastocystis, Toxoplasma, and others.

Parasite testing is notoriously poor. My favorite approach is to use multiple evaluative tools, including ParaWellness Research (https://ParaWellnessResearch.com), Diagnostic Solutions GI-MAP™, or DiagnosTechs™ Expanded Gastrointestinal Health Panel. Steven Phillips, MD, has often uncovered parasites with a panel of tests through Quest. Beyond these options, energetic testing with tools like Dietrich Klingahrdt MD, PhD's Autonomic Response Testing (ART), ZYTO™, QEST4™, or Simon Yu, MD's Acupuncture Meridian Assessment (AMA) can provide insights into potential parasite-related stressors. No one test is perfect when it comes to parasite exploration.

Potential tools include Jernigan Paragen™, Beyond Balance® PARALLEVIARE®, Zahler ParaGuard™, and CellCore Biosciences PARA 1-4; as well as homeopathics such as UNDA 39 and Energetix® Para-Chord. Pharmaceutical antiparasitics can shine in this realm. One caveat is that when killing parasites and fungi, it is important to consider the potential heavy metal release into the body and to ensure that detoxification is still being adequately supported throughout; in other words, step 1 of this model continues, and each step builds upon the prior steps. ➤

Recovery Model

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With SIBO, while there can be an overgrowth of bacteria (SIBO) or fungi (SIFO), the core issue is likely more about the autonomic nervous system, the vagus nerve, the migrating motor complex, and bile production and flow than about killing a bug. That said, incorporation of tools to balance the microbiome can be helpful; as they are in more generalized dysbiosis such as Clostridia, H. Pylori, Klebsiella, and others where tools like Biocidin®, Beyond Balance® IMN-GI™ and IMN-B™, MegaSporeBiotic™ and others may be supportive.

Fungal Colonization and Yeast Support. Fungi consist of yeasts and molds. Most are familiar with Candida, which is a yeast and may require treatment. Further, colonization of molds such as Aspergillus from water-damaged building exposures is a possibility and may impact the sinuses and the gut, essentially creating a mycotoxin-producing factory inside the body. Neil Nathan, MD is an expert in this realm, and his book *Toxic: Heal Your Body from Mold Toxicity, Lyme Disease, Multiple Chemical Sensitivities, and Chronic Environmental Illness* explores this topic in detail.

Potential tools include Thorne® SF722®, Microbiome Labs MegaMycoBalance™, Metagenics Candibactin AR® or BR®, Beyond Balance® MYCOREGEN®, and Byron White Formulas™ A-FNG; as well as pharmaceutical options such as Itraconazole. Many researchers feel that fungi are a significant threat to human health.

Lyme and Co-Infection Support. With Lyme (Borrelia) and co-infections such as Bartonella and Babesia, as well as opportunistic infections such as Mycoplasma and Chlamydia, it is often best to start with a layered approach; unlayering each pathogen with targeted interventions one at a time as to not overwhelm the system.

Starting with a broad-spectrum tool may lead to more die-off and inflammation than can be comfortably tolerated. Additionally, being more targeted can itself lead the practitioner to insights as to what may be impacting a given person and benefit from additional support. If someone has a strong positive or negative reaction to a Bartonella intervention, that may be very useful information.

Once a layered approach has been implemented, it can then make sense to move on to broader spectrum tools as well. Many natural tools exist in this realm that can be quite supportive and beneficial. While pharmaceutical tools may not be required to recover health, it's always good to be open to the broadest toolbox possible, and some tools in this realm such as Disulfiram have been quite helpful for many in recent years.

Some of my favorite product lines in this realm are BioPure®, Beyond Balance®, Byron White Formulas™, CellCore Biosciences, DesBio, Maypa Herbals, NutraMedix®, Researched Nutritionals®, Supreme Nutrition Products, and Vital Plan.

Other tools may include ozone, immune-modulating and antimicrobial peptides, as well as the incorporation of physics-based tools such as the FREmedica WAVE 1 device.

Biofilm Support. Chronic infections are often protected in the body by biofilms. While many recover without a specific focus on biofilms, the incorporation of biofilm support in a protocol can be very helpful. While strategies vary, these are often helpful later in the process for a short period of time; once free-floating organisms have been addressed.

Breaking down biofilms may lead to a release of microbes and toxins into the system and can trigger MCAS and other immune components as well as generalized inflammation. Having continued support for microbial and toxic burdens while working with biofilms is important.

Potential tools include BioPure® Cistus tea which is said to be a selective biofilm breaker (not all biofilms are bad); as well as products such as Beyond Balance® MC-BFM-1®, Klaire Labs Interfase® Plus, Supreme Nutrition Products BFB-1™ and BFB-2™, and other enzyme-based products. Some of the enzymes used earlier for hypercoagulation, such as Boluoke, may have a gentler role in supporting the reduction of biofilms – as can interventions like Pectasol Modified Citrus Pectin.

Step 10: Consider Dental Contributors

Considering dental contributors may need to be done earlier in the process in a given individual. However, based on the work of Dietrich Klinghardt, MD, PhD, it is often best to address retroviral stress prior. Further, based on the work of Simon Yu, MD, it is often appropriate to address parasites prior to significant dental interventions.

Additionally, exploring dental work prior to the body being ready for it can make things worse in some people. Ideally, other steps would be dialed in prior to significant dental interventions, particularly surgical procedures such as to address cavitations.

Given that this population often has a primary doctor or "captain of the ship" guiding their care, it is always

best to ensure collaboration between the doctors and dentists or oral surgeons to ensure that the timing is right, the body is well-supported, and that there is agreement in terms of the path forward. Amalgams, root canals, and cavitations can all be significant stressors on the system, but they may not be the place to start.

Amalgams may contribute to our body burden of mercury and other heavy metals. Removal of amalgams should only be done by a biological dentist. While often helpful, far too many people have worsened their overall state of health by pursuing removal that was done incorrectly.

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

Cavitations are infections in the jawbone often in areas of prior tooth extractions, but these can occur elsewhere. Those with Lyme-related co-infections and retroviral activation may be at higher risk for dental cavitations, and these will generally require surgical intervention to remove the stress from the body. Sadly, cavitations are not uncommon in those 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. Some, myself included, have explored this with regenerative cryotherapy in Germany.

While significant dental issues will require a biological dentist or oral surgeon to address, self-care for optimizing the oral biome may include Supreme Nutrition Products Oral Defense™, Bio-Botanical Research Dentalcidin™, essential oil blends such as Trusted Health Products OraMD, and oil pulling. I have found the use of Bite Toothpaste Bits and Researched Nutritionals® OraMax™ to be a supportive combination.

While work in this realm can be a key to recovering health, it is not to be taken lightly. Creating a supportive healing team with solid collaboration among your providers is important.

Step 11: Support Regeneration and Restoration

David Jernigan, DNM, DC, used the analogy of termites in a recent podcast where treatment can address the termites, but one may still be left with the structural damage from years of hosting the termites. Thus, once the microbial burden has been addressed, there will likely still be a need for interventions that can support regeneration and restoration.

By the time most have gone through chronic Lyme disease and mold illness, it has been years or even decades, and it has taken a toll on the body. There are some tools in this realm that could be introduced earlier in this process. However, at some point, interventions have been in place to detoxify and to reduce the microbial burden, and you reach a point where a focus on regeneration, restoration, and rebuilding may be necessary.

Step 7 discussed the concept of a "Power Shake" which incorporates phospholipids. Phospholipids can be a significant tool in repairing cell membranes. I use the BodyBio PC product in my shake, but there are also practitioners that implement IV lipid therapies based on the work of Patricia Kane, PhD, that may be thought of as a "deep clean" and a significant cell membrane restoration tool.

Numerous peptides have emerged in the past several years that may support repair, regeneration, and restoration of the body. Peptides stand out in this realm, but they have become more restricted by the FDA over time.

Photobiomodulation tools can support the mitochondria in producing ATP as well as supporting collagen which is often negatively impacted by Borrelia. These tools provide our body with photons that assist regeneration.

A personal favorite in this realm for full body restoration support has been Exercise With Oxygen Therapy (EWOT) using the LiveO2 Adaptive Contrast System.

Bioidentical hormone replacement can often be a supportive tool and may be introduced earlier. However, in many cases, a downregulation of hormones like thyroid and testosterone can be an intelligent adaptation by the body to put on the brakes as a protective mechanism; this ties back to the Cell Danger Response discussed earlier. Thus, the application of BHRT may be better accepted by the body when the primary triggers for the Cell Danger Response have been addressed.

While I have not to date been impressed with stem cell therapies for chronic Lyme disease and related conditions, it is an area that I continue to monitor; advances such as with exosomes are ongoing. If someone is considering stem cell therapy, it is often best done very late in the process if being used for systemic benefit; or done for more localized issues such as an injury or deterioration of a joint like a knee.

Conclusion

While recovering from a condition such as chronic Lyme disease or mold illness can be a long process, a marathon not a sprint, advances in the treatment of these conditions continue to emerge at an even more rapid pace than in years past. Having personally dealt with these conditions for over 25 years, so much has changed in the understanding of these conditions in the last several years. New tools and solutions continue to emerge. Don't ever lose hope; there is hope, and people do get better and move from "dis-ease" to better health!

Disclaimer: Nothing in this article is intended to serve as medical advice. Lyme disease and mold illness are complex conditions which require 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.

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Scott Forsgren, FDN-P, HHP (https://betterhealthguy.com) is a health coach, blogger, podcaster, health writer, and advocate. He is the editor and founder of BetterHealthGuy.com, where he shares his 25-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 YouTube, Apple Podcasts, Google Podcasts, Stitcher, Spotify, Amazon Music, and Audible.

He serves on the Board of Directors of LymeLight Foundation (http://lymelightfoundation.org) which provides treatment grants to children and young adults dealing with Lyme disease. He is a member of ILADS (International Lyme and Associated Diseases Society; http://ilads.org) and ISEAI (International Society for Environmentally Acquired Illness; http://iseai.org). He is the co-founder and moderator of The Forum for Integrative Medicine (http://forumforintegrativemedicine.org) which hosts an annual conference bringing together some of the top integrative practitioners to share practical tools for treating complex, chronic illness.

Tick, Tac, Woe, Is There an Uninvited Foe?

by Aparna Taylor, ND

Each spring in most parts of Canada, we watch green grass start to peak out of the sea of yellow, and buds start to fill out tree silhouettes waking from winter. Seeing the landscape change brings the promise of warmer weather activities in the outdoors though more and more we are hearing about the risks and fear associated with being in nature – as if it is separate from us as humans. The threat of a tiny tick sneaking its unwanted cargo into unknowing bodies is real and often under reported; being mindful and prepared can help us remain balanced and increase peace of mind to enjoy being outside while still being responsible. Being outside brings tranquility, positive effects on our health, and cleans the slate of our over processed world. I support being present, aware, and doing what brings calm to each individual; *we are a part of nature.*

There are multiple resources available through local Lyme support groups (for example, CanLyme in Canada) that provide practical and useful information. The ILADEF (International Lyme and Associated Diseases Society Educational Foundation) is another resource for prevention: https://iladef.org/education/chronic-lyme-dos-and-donts/. I encourage the reader to explore these and other resources to find what resonates.

What if an individual is bit by a tick? Is there always an unwanted infection?

The cases discussed in this writing reflect examples of how acute tick bites were managed, using the following five questions:

1. Is there a potential risk of infection(s), and was the tick identified?
2. Was it attached and engorged?
3. Was it removed with all parts?
4. Are there any symptoms?
5. What is important to the individual/family?

Anya*

Anya's family lives near a valley and river. Her grandmother's garden was frequented both by the grandchildren and unfortunately, also deer, known hosts for ticks. One evening after spending a weekend playing in the garden, Anya's mom noticed an attached bug on Anya that looked like a tick.

Is there a risk of potential infection(s)? Yes, the area is a known endemic region for Lyme disease. Not every tick carries an infection, though can carry more than one – thus it is not only Lyme disease that can be transmitted. **Was the tick identified?** While there is some question of other vectors or carriers of the infections, the *Ixodes* species of ticks are known vectors. There is no harm in keeping whatever vector/bug is found to send away for further assessment and peace of mind. Anya's mom identified the bug as the black legged *Ixodes scapularis* tick from an online resource and saved it in a hard-sided container. Keeping the tick/bug will allow it to be identified in the future, if not immediately identifiable.

Was the tick attached and was it engorged? The tick was embedded in Anya's skin and was engorged. Remember, not all ticks carry all infections. While the probability of transmission of an infection is less with a shorter feeding time, it is not zero. Since it was engorged, this represents a longer feeding time and increased probability of transmission of infection(s) if the tick is infected.

Was it removed with all parts? Ticks have retractable mouth parts like barbs; pulling it out will snap off the body and leave the head and mouth parts attached thus increasing the chance of transmitting the infection(s). Anya's mom, while understandably panicked, took her time to review how to properly remove the tick from an online source and was able to do this without any parts being left behind.

Are there any symptoms? Anya was fatigued, though her parents did not observe much other than that. There was no rash or other signs, and her fatigue could be attributed to late nights and a busy weekend. Each person must be evaluated individually. While Anya did not show all of the "typical" symptoms associated with transmission of an infection (fever/chills, joint pain, fatigue), each individual is unique as is their own immune system and each tick bite/potential infection(s) may be different also. While tempting to treat all the same way, taking time to review symptoms and history together is valuable.

What is important to the individual/family? This will outline the next steps and will guide informed decision making. Anya's family and I reviewed her history and did a risk benefit analysis. Testing Anya was discussed, with T cell tests, which can indicate an acute response; in contrast, antibodies take weeks to mount an immune response, which

(*all names have been changed)

may be too late to test and then treat if there is an infection. T cell tests are indirect looking for immune responses rather than the pathogen itself and can be costly depending on how many infections are tested for. Since Anya's mom had the tick, this was the most practical direction to take. We sent the tick to a private lab in Canada (Geneticks in Ontario; author has no conflicts of interest or affiliation) and tested the broadest possible list of infections.

While waiting for the results, the family opted for herbal treatments that would have minimal risk and other individualized supports specific to Anya's health and history. While there are various public health facilities that test ticks, *I consider a found tick to be extremely valuable!!* I have had reports of individuals who have sent the tick for testing to a local lab and either had only one infection tested for (and only 1-3 *Borrelia* species), or worse, nothing tested due to the opinion that the risk is low and the tick thrown out or reported lost. I encourage individuals to make informed decisions about which place they feel comfortable working with, and since there are private labs that test ticks for the relevant infections that may be present, this is an option. There are also research facilities, some associated with universities, that test possibly with no cost, though they may not have the quick turn around the private labs have.

The results were back within a few days, and we all did a dance of joy when they came back negative for all tested tick-borne diseases. Anya continued with the herbal treatments for a few more weeks, exhibited no adverse or new symptoms and regular tick checks and other preventive strategies are now a part of their routine when outdoors. We discussed what is important to the family, and Anya's love of the outdoors was top of the list. Following the practical strategies, and the steps to follow should there be another bite, provided peace of mind to the family and to Anya. This may not be the case for others, highlighting the importance of informed decision making and a case by case evaluation of what is important to the individual or family. Monitoring after the testing comes back, even if negative, is recommended as there may be infections that testing was not available for.

Pauline*

Pauline contacted me with questions after a tick bite. While she had been given a prophylactic dose of antibiotics, over the next week she began experiencing some troubling symptoms. She requested more antibiotics, though it did not help.

Using the five questions leads to individualized treatment.

Is there potential risk of infection(s), or was a tick identified? Pauline was visiting the east coast of Canada, and found a tick attached to her just before leaving. This area of Canada is a known endemic area, and she identified the tick as an *Ixodes* species tick comparing it to an online picture.

Was it attached and engorged? It was attached, though did not appear engorged. This would imply less time for feeding, though only decreases the probability of transmission, does *not exclude it*. The longer a tick is attached feeding, the greater the probability more of the gut contents will be regurgitated (including pathogens) and transmitted to the new host.

Was it removed with all parts? She was able to remove the tick with all mouth parts intact and saved it.

Are there any symptoms? Pauline had pre-existing arthritis, though was exhibiting other symptoms now that were generalized and new to her. They did not all fit the "typical" list of symptoms and she was unsure how to proceed, as her primary care physician believed the doses of antibiotic she was given were sufficient.

What is important to the individual? Pauline was concerned her treatment was not long enough as it did not seem these symptoms were a flare of her pre-existing condition; and while she did not have a bull's eye rash, she was concerned she may have Lyme disease. Another question was whether she was treated for the actual infection(s) that may have been transmitted by the tick, as it is possible it was different than Lyme disease. The cost of testing Pauline's blood (T cell tests) for the potential infections was prohibitive, and since she had the tick it would be a direct window into a testing method. She sent the tick off to a private lab and based on her history and presentation of symptoms, we reviewed her overall treatment plan and her health goals.

She wanted to treat some of her symptoms with supportive herbal and supplemental interventions first and wait for the test results. The results came back within days with multiple tick-borne infections, which took the mystery out and provided a framework for reviewing what is important to her, and what options we may have to proceed. She opted for a combination of pharmaceutical and non-pharmaceutical interventions, and we tracked her progress and symptoms with regular monitoring and lab work. This outlines the importance of considering that Lyme is not the only infection, symptoms may not present with what is considered "typical" (Bull's eye rash, fever/chills, fatigue, joint pain), and prophylaxis treatment may not cover all infections or be long enough. The tick may not be engorged, though a decreased feeding time may not mean zero probability of transmission. It is possible that the infections that are carried by the tick may not necessarily be transmitted to the host, though this is part of the risk benefit analysis with each individual and what is important.

She noted her ability to rebound from physical and emotional stresses significantly improved along with her symptoms with treatment. While there was not a baseline test Pauline was able to do for herself, reviewing her history in detail along with the symptoms the infections potentially transmitted by the tick matched her presentation. This allowed us to determine the course of action based on risk-benefit analysis and monitoring her progress. Despite

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previous arthritic tendencies, she was able to differentiate the symptoms from prior to the tick bite to her progress on the comprehensive treatment plan. She responded well and discontinued the treatments with sustained benefit. She opted to continue some herbal interventions and supplement therapies for general maintenance as they appeared to also help her previously diagnosed arthritis. The treatment regimen was concise, specific to the treatment principles for her case focusing on inflammation, infections, and immunity, and was not complex or difficult to follow, so that we were also able to assess the response clearly.

Jarvis*

Jarvis went hiking in Kananaskis country in Alberta and discovered a rash on his upper arm. Though he found no tick attached or on his clothing, he was concerned about the possibility of contracting Lyme disease, so was evaluated by his general practitioner. Since Alberta is not considered an endemic area (as of this writing), his practitioner assured him that his risk was negligible and the rash did not have a central clearing that is the "typical bull's eye" rash – though suggested he observe the rash and if it worsened, they would treat topically.

Jarvis had (correctly) found information that indicated an erythema migrans rash (the "bull's eye" rash) that is considered indicative of a Lyme infection, need not look like a bull's eye. This information is available directly from the Centers for Disease Control website: https://www.cdc.gov/lyme/signs_symptoms/rashes.html, among other sources. Since there was not a tick, we discussed the possibility of a different root cause, as well as the probability of infection since the tick was not identified or found.

Is there a potential risk of infection(s), or was a tick identified? While Alberta may not be considered an endemic region, the risk is not zero (dogs and horses have been diagnosed with Lyme and tick-borne illnesses in Alberta…. I'm not convinced the ticks are snobby and avoiding human hosts). One researcher reported the risk of transmission of Lyme disease from a tick bite in Alberta is 1 in 5 (if there is a tick bite). Consider these questions: 1. What is the probability of ticks/vectors in the geographical area in question? 2. Is there current information on the probability the tick will have and transmit infection(s)? Since there was nothing found, the vector was not identified. Another important point to remember is the best available evidence may be outdated, and infected ticks can be in non-endemic areas, carried by song birds or other migratory hosts.

Was it attached, and engorged? Was it removed, with all parts? He did not find the tick or any other vector.

Are there any symptoms? Immediately after the bite he did not experience any symptoms other than observing the rash, though within the week some joint pain and headaches started. He wondered if these could be related to the stress of his concerns, physical activity, or an infection from a potential tick bite. We reviewed these symptoms and how they may relate to the potential root cause(s).

What is important to the individual? Jarvis was gravely concerned he would lack support from the medical community if he did contract Lyme disease, and that he may progress to chronic illness. In this case, we reviewed his options and sent his blood to be tested for T cells, since antibody tests would not show an immune response within this short a time from the bite. He wanted to support his body with a mixture of herbs that were low risk and specific to his needs while we waited for the results of the T cell test. His test result was positive for *Borrelia* species, and in addition to the herbal mixture he opted for pharmaceutical antibiotic treatment for four weeks. He tolerated the treatment well and his symptoms resolved, despite stresses continuing and mounting over the weeks related to work, a positive test, and fear of chronic infection(s). He waited another month with herbal treatment alone to wash out the pharmaceutical and retested, which indicated a negative T cell response that matched the resolution of symptoms. Months later he sent a follow up note to indicate he continues to enjoy outdoor time with his hiking group, is more

Testing for Tick-Borne Infections

The T cell test I typically order is from Arminlabs and is known as the Elispot: https://www.arminlabs.com/en/tests/elispot.

There may be some limitations to tests between countries and I am not sure why this has changed. I am not certain that the Elispot is available in the USA though I could be wrong.

There are other T cell tests available from other labs, such as IGeneX, known as the IGX spot: https://igenex.com/test-interpretations/ (further down the list of tests).

There are likely other labs as well, though I have minimal experience with those, and recognize the potential bias.

What exactly is ordered:

- Based on the suspected infection (Borrelia sp, Babesia or other tick-borne disease), the T cell test for that infection is ordered.
- While this is still an indirect test (looking for evidence of infection, not the pathogen itself), together with history, symptoms and likely causes, this is supportive to answer the questions we are asking.

Typical results:

- The results are interpreted as negative (0-1), weak positive (2-3) or positive 3+ and is measured with the unit SI (stimulation index), which is the term to compare spots in the antigens with possible spots in the negative control.
- Some clinicians interpret this differently (ie some do not consider a weak positive treatable) this is where I believe treating the whole person is utterly important.

conscious of some preventive strategies (tucking pants into socks, tick checks) and has maintained resolution of his symptoms.

Conclusion

Each acute case can be reviewed systematically; and, in my experience, it has been much more successful if assessed individually. It can be tempting to follow the same treatments for each person in similar situations, though this can miss some details or be too many interventions for the person sitting in front of you and may not be what is most important to them. It may not be possible to test ticks or individuals early on or be clear on the correlation versus causation of the root cause(s). As with each individual case, reviewing all of the information together with your patient allows for evaluating risks and benefits and available options. There are individuals who have opted to avoid pharmaceutical interventions, and it is our responsibility as clinicians to provide the best available evidence for the individual to make an informed decision, based on what is important to them.

To note, these cases did not follow the typical checklist of post tick bite symptoms, which is a consideration not to rule out something important to an individual without investigating it further. Even if the root cause is not from an infection transmitted by a tick, walking through what is important to your patient will be sure to include the available options that may not fit the typical narrative.

As we continue to rely more on technology and industrialized advances, the time we spend in nature seems to become less and encouraging a practical way to enjoy it with bliss and buoyancy allows us to remember we are part of nature; this connects us to the core of our being. Listening to the sound of voices, crackling fire, the wind, rain or water along with singing birds while our other senses experience all of the elements when outdoors brings a sense of grounding that anchors us, and as beings of nature, I feel, has the ability to powerfully connect us to these elements and each other.

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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 moved to Toronto to study at the Canadian College of Naturopathic Medicine (CCNM) and become a naturopathic doctor. One of her first patients in Thunder Bay inspired her to learn more about Lyme disease. 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 to take herself too seriously.

Solutions for Insomnia in Lyme Disease and Related Neuroinflammatory Conditions

by Connie Strasheim

Note: Parts of the following are taken from my 2018 book, *Beyond a Glass of Milk and a Hot Bath: Advanced Sleep Solutions for People with Chronic Insomnia*. I receive no financial benefit in exchange for mentioning any of the treatment modalities/companies described here.

Insomnia may be one of the most debilitating symptoms caused by chronic Lyme disease and other neuroinflammatory conditions, partly because it exacerbates inflammation and creates other symptoms, such as fatigue, brain fog, depression, and pain. Lack of adequate, quality sleep also suppresses immune function,[1] making it difficult for the body to heal, so it is critical to address as part of patients' healing protocols.

As a medical researcher/writer and health consultant, and one who has suffered from insomnia caused by Lyme and environmental illness, over the years I have discovered many beneficial solutions for resolving sleeplessness. I now share these with you.

Reduce Neuroinflammation and Histamine

First, Lyme disease causes inflammation, which is important to address as it can affect sleep. For instance, mast cell activation syndrome and excessive histamine release are known to cause insomnia. Therefore, taking an antihistamine – such as ketotifen (which has a lower side effect profile than others such as diphenhydramine, or Benadryl, which has anticholinergic effects upon the brain) or doxylamine (Unisom), an over-the-counter antihistamine which I have found to produce fewer side effects than Benadryl – can be profoundly beneficial. Obviously, it is also important to treat the causes of inflammation: namely, infections, toxins, stress, and any dysfunctional immune response.

That said, the body adjusts its chemistry to most medications; and long-term use of antihistamines may cause the body to reduce its own production of diamine oxidase (DAO) enzyme, which it uses to break down histamine. Some medications may also cause long-term side effects such as an increased risk of dementia.[2] Therefore, it is best to only use antihistamines for as long as needed, until the root causes of illness are addressed. However, these drugs are powerful and effective for reducing insomnia caused by inflammation.

Natural antihistamines such as quercetin, vitamin C, bromelain, black cumin seed (*Nigella sativa*), and stinging nettle may be helpful as well, especially if they are taken as part of an anti-inflammatory food plan. The Autoimmune Paleo Diet (AIP) and The Plant Paradox are two diets that may be beneficial for people with Lyme; however, no two people are alike and any anti-inflammatory food plan is best tailored to the individual.

Some doctors recommend benzodiazepines to quell neuroinflammation and mast cell activation, but these can be dangerous and lead to life-altering addictions. While I am not a medical doctor, my personal experience and that of many others I know has led me to endorse benzos only occasionally and as a last resort. I took benzos periodically for years, and went through serious withdrawal symptoms when I weaned off of them. My last tapering process took several years, and throughout that time, I suffered from extremely debilitating symptoms – even though my taper was very slow. I have witnessed many other people go through the same.

Protracted benzo withdrawal syndrome has been estimated to occur in 10-15% of people,[3] but I have observed that in those with neuroinflammatory conditions it is much higher, perhaps up to 50%. The suffering it causes can be just as, if not more, difficult to endure than Lyme disease.

I've found cannabis to be a great alternative to benzodiazepine drugs for sleep, and to even assist with benzodiazepine withdrawal syndrome. CBD or CBN with a small amount of THC can be very helpful for reducing inflammation. One product I take contains a 20:1 ratio of CBD to THC. THC is important for making the CBD work effectively in the body and in small amounts will not cause psychotropic effects.

Mold and Lyme expert Neil Nathan, MD, has also found Chinese skullcap (*Scutellaria baicalensis*) to be helpful for reducing neuroinflammation,[4] and

I have found lion's mane mushroom to mitigate other symptoms of benzo withdrawal, especially cognitive dysfunction.

Practice Good Sleep Hygiene

Good sleep hygiene is critical for restorative sleep, as well. Reducing electromagnetic pollution in the sleep environment is an important part of this. Manmade electromagnetic fields (EMFs) can be a major cause of insomnia and come from sources such as Wi-Fi routers, cell phones, power lines, household appliances, smart meters, wall wiring, and computers. EMFs disrupt the body's bioelectric energy, stimulate the nervous system, and make sleep challenging.

EMF remediation greatly helped to restore my sleep. For me, this meant doing the following:

1. Turning off the circuit breakers in my bedroom, as well as my cell phone and Wi-Fi router at night
2. Measuring the electromagnetic fields in my house and placing my bed in the room and area where the fields were lowest
3. Using Graham-Stetzer filters to reduce low-frequency EMFs from the wall wiring/smart meter transmissions
4. Using an EMF shielding canopy over my bed (Swiss Shield® makes quality products).
5. Staying away from my computer, cell phone and other EMF sources at least two hours prior to bedtime. The light and electromagnetic frequencies from these devices stimulate the pineal gland in the brain and disrupt the body's bioelectric field.

Hundreds of studies have linked EMF exposure to many health conditions, including insomnia. The Bio-Initiative Working Group, a group of scientists, researchers, and public health policy professionals dedicated to researching the effects of EMFs, state in their 2012 Report, "Insomnia (sleep disruption) is reported in studies of people living in very low-intensity RFR environments with Wi-Fi and cell tower-level exposures."[5]

EMF remediation can be complex, so I encourage you to read *Beyond a Glass of Milk and a Hot Bath* for more details on how to reduce EMFs in the home. In addition, I recommend the aforementioned measures, as well as purchasing a Cornet ED78S EMF RF Electrosmog or similar EMF meter to measure EMFs in the home and workplace. I recommend the Cornet ED78S meter because it is inexpensive, relatively accurate, and easy-to-use.

Unfortunately, as of now, there are no affordable meters that will measure the extremely high frequencies produced by 5G, but there is still much that we can do to reduce our exposure to EMFs in the meantime. Building biologist Oram Miller also has a website with informative tips on how to make one's home and workplace EMF-safe: CreateHealthyHomes.com.

In addition, good sleep hygiene involves going to bed and getting up at the same time daily. The body likes routines. Taking in bright sunlight or using a sunlamp first thing in the morning for 20-30 minutes, as well as staying away from bright light and sources of blue light such as the computer or cell phone in the evenings, help to establish a healthy circadian rhythm.

In addition, taking a hot bath, lying on a BioMat®, reading an uplifting book, or listening to meditation CDs before bed can help the body relax. Turning off cell phones, the computer and television – especially the news – two to four hours before bedtime is likewise helpful, as is sleeping in a dark, cool and quiet room.

Balance Neurotransmitters

Another cause of poor sleep in Lyme disease is neurotransmitter imbalances. Neurotransmitters are chemical messengers that coordinate the transmission of signals between nerve cells throughout the body. They regulate many processes, including sleep. Imbalances can cause many health problems, including insomnia.

It's not uncommon for people with Lyme to have deficiencies of the calming neurotransmitters that aid in sleep and an excess of the excitatory ones that promote wakefulness.

People with Lyme commonly have inverted sleep-wake cycles with high levels of nighttime cortisol and low daytime cortisol,

Glutamate is one excitatory neurotransmitter that causes insomnia when found in excess in the brain. It plays a role in learning, cognition, and memory. It is also the precursor for GABA, which is the body's primary inhibitory neurotransmitter. Unfortunately, Lyme disease and other factors can disrupt the glutamate-GABA conversion, resulting in elevated levels of glutamate and poor sleep.

One study suggests that treatment with oxaloacetate may decrease glutamate levels and protect against the neurotoxic effects of glutamate on the brain.[6] Another study showed that large doses of oxaloacetate reduced levels of glutamate by 30-40% in lab animals, which indicates that it is a potentially potent neuroprotectant and sleep aid for people with Lyme.[7]

Perhaps the most important calming neurotransmitter involved in sleep is gamma-amino butyric acid (GABA). GABA promotes restful sleep by decreasing neuron firing in the brain. GABA is also an amino acid, and supplements may help to resolve insomnia. There is controversy about whether GABA supplements can cross the blood-brain barrier; however, they are nonetheless useful for calming/relaxing the body, perhaps because of their effects upon peripheral tissues.[8]

In addition, taurine is an amino acid that modulates and promotes healthy levels of GABA. Taurine also may prevent neuron damage caused by excessive glutamate. Experimental studies on rats have shown that taurine inhibits glutamate toxicity through a variety of mechanisms.[9]

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Theanine, another calming amino acid, is also believed to play an important role in modulating several neurotransmitters, especially GABA.[10]

Most people will need to experiment to determine what amino acids they need, and/or do amino acid and neurotransmitter urine testing through a reputable lab.

Finally, tryptophan and 5-HTP are precursor amino acids to serotonin, another calming neurotransmitter that converts to melatonin at night. However, these aminos aren't always effective and may even produce symptoms in some patients with Lyme disease who have methylation defects. Fortunately, taking co-factors and/or methylation support can enable the body to more effectively synthesize serotonin from aminos and mitigate symptoms.

Methylation support may include one or more of the following: SAM-e, methyl-folate, pyridoxal phosphate (P5P), a bioavailable form of vitamin B6, and/or methyl B12 – among others.

In addition, adequate zinc, magnesium, and vitamins C and B-6 are needed to make serotonin from 5-HTP, so if patients are deficient in these nutrients, taking one or more may be helpful.

Ideally, to find out what aminos and methylators/co-factors patients may need, it's best to do a complete amino acid and neurotransmitter profile, along with a methylation panel, which are available through functional medicine labs and compounding pharmacies.

Balance the Hormones

Few things disrupt sleep in Lyme disease as much as hormonal imbalances. People with Lyme commonly have inverted sleep-wake cycles with high levels of nighttime cortisol and low daytime cortisol, in addition to hypothyroidism and other hormonal imbalances. These affect sleep partly by causing the brain and body to be in an excitatory state at night and sluggish during the day. Adrenal hormone imbalances occur when there is a constant drain on the body from stress, disease and other factors. One major symptom of adrenal dysfunction is insomnia.

Balancing the hormones can be challenging, and removing the underlying factors – namely, infections, toxins and stress – while modulating the immune response is crucial. It is beyond the scope of this article to describe in detail tools for balancing the neuroendocrine system, so I will only share in summarized fashion a few strategies that I have observed to be helpful.

First, no saliva or blood test perfectly measures adrenal and thyroid function, but they can provide insights into hormone imbalances and what patients need. In chronic Lyme disease, many practitioners have found bioidentical hormone replacement – using hormones such as pregnenolone, progesterone and DHEA, as well as bioidentical T3 – to be helpful for restoring sleep and alleviating other symptoms such as brain fog, fatigue, and depression.

That said, the former two hormones may hyper-convert to cortisol (especially progesterone) which is a hormone that promotes wakefulness, so it may be useful to measure hormones both prior to and after supplementation. However, in general, progesterone is calming and supplementation is particularly beneficial for pre- and peri-menopausal women, when progesterone levels drop, although others may benefit from it, as well.

In addition, phosphatidylserine is a nutrient and phospholipid that lowers cortisol, and which may be beneficial for those with elevated nighttime cortisol levels. Zinc, holy basil, and Relora have also been shown to lower cortisol.[11]

Natural remedies such as fresh bone broth, liposomal vitamin C, pantothenic acid, rhodiola, ashwaghanda, and licorice may also indirectly promote sleep by supporting the adrenal glands.

Adrenal hormone imbalances are also linked to hypoglycemia and frequent nighttime awakenings, so eating a decent-sized snack or even a small or medium-sized meal before bedtime can help to prevent these awakenings. This goes against the conventional belief that eating before bedtime prevents deep sleep – but in people with Lyme disease, I have observed the opposite: most *don't* sleep well unless they eat before bedtime and/or keep a snack bedside for early morning awakenings. Personally, I sleep deeper and longer whenever I consume a substantial amount of healthy protein and fat before bedtime. For me, that often includes 2-3 poached eggs and an almond flour tortilla.

Correcting hypothyroidism with bioidentical T3 may also be indirectly beneficial for restoring sleep, as well. Many people with Lyme disease don't effectively convert T4 into T3 and may do better with pure bioidentical T3 preparations. Thyroid tests are also imperfect measures of thyroid hormone uptake and utilization, so it's best to evaluate patients based on symptoms as well as test results. This is because, for instance, cortisol is required for thyroid hormone utilization; and if there isn't enough cortisol in the body, thyroid hormone will tend to "pool" in the bloodstream, leading to falsely elevated free T3 levels.[12] I have experienced this for myself – having elevated blood levels of free T3 and yet symptoms of hypothyroidism. Therefore, treating adrenal hormone and thyroid imbalances is important.

For more information on adrenal and thyroid health, I recommend M. Lam, MD's book, *Adrenal Fatigue: Reclaim Your Energy and Vitality with Clinically Proven Natural Programs* and D. Kharrazian, DHSc, DC's, *Why Do I Still Have Thyroid Symptoms? When My Lab Tests Are Normal: a Revolutionary Breakthrough in*

Understanding Hashimoto's Disease and Hypothyroidism.

Finally, another important step for restoring the adrenal glands is to calm the limbic system and the body's "fight or flight response." People with Lyme must do what they can to reduce stress and put their bodies into a state of parasympathetic dominance, which may include one or more of the following: 1) Developing a relationship with God 2) Prayer/meditation 3) Practicing deep breathing, 4) Living peacefully and mindfully and 5) Doing techniques such as limbic or neural retraining, all of which aid in restoring sleep.

Brain Wave Entrainment Therapy

Brain wave entrainment therapy using neurofeedback or sound/light frequency devices is another powerful tool for resolving insomnia. Neurofeedback devices measure brain waves and then use that information to produce signals that are used as feedback to regulate brain activity. They entrain the brain into a delta-wave sleep pattern so that the body can more easily fall asleep.

During my benzo tapering process, I used a neurofeedback device from a company called Clear Mind Center, which helped me overcome insomnia caused by benzo withdrawal. The device had leads attached to sensors, which I placed on strategic locations on my head. The sensors provided feedback to the device about my brain wave patterns. The device in turn used this feedback as input to create new frequencies, which were then fed back to my brain to facilitate sleep.

Alternatively, other devices feed-in fixed energetic sound and light frequencies to the brain to encourage it into a delta-wave sleep pattern. They utilize audio headphones and blinking-light glasses, which deliver the frequencies to the brain via the ears and eyes.

These devices may be somewhat less effective than those that rely on feedback from the brain, but I have found them to work as well; and they are more economical. Tools for Wellness is one company that sells such devices, although there are others.

The King Method or TKM®

Finally, a simple, free, and very effective technique for resolving insomnia comes from a system of medicine called The King Method, or TKM®, which was developed by Glen King, PhD. TKM is composed of a series of hands-on techniques that are used to restore the body from a variety of conditions, including insomnia. Foundational to TKM is the Median Sequence, which is its core sequence. It balances the body's bioelectric and autonomic nervous systems. It takes just a few minutes to learn and about 25-40 minutes to do.

The technique involves lightly placing the pads of the fingers over certain locations on the body for 5-10 minutes per location. The sequences involved in TKM take a bit of practice and time to learn, but the basic Median Sequence most anyone can do from the comfort of their beds; and it can be quite beneficial for restoring sleep. TKM practitioner Dr. A. Alarcon describes how to do the sequence in the video *TKM® Median Sequence: A Powerful Immune Health Booster based on The King Method®*: https://www.youtube.com/watch?v=06hxoWpAJic&t=80s.

Finally, emotional and spiritual factors also play a role in sleep, but it is beyond the scope of this article to describe these in detail, so I encourage you to read *Beyond a Glass of Milk and a Hot Bath* for more information.

Insomnia

The good news is, I believe that with enough experimentation, patients can find a strategy or combination of tools that will enable them to sleep better, and in return, recover faster from chronic Lyme disease and related conditions. I know I did, and I hope my experience and research has provided some new helpful insights.

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However, Connie's most recent work, *Encounters with My Beloved in Heaven* (2020) is a powerful memoir about how to love amidst chronic and terminal illness, as well as a story of divine revelation about Heaven following her husband's passing in April 2020. Connie also hosts healing prayer meetings via Zoom and has seen people supernaturally restored from diseases such as chronic Lyme. For more information, see ConnieStrasheim.org.

We Are Still in a Time of Lyme

by Michael Gerber, MD, HMD

Lyme Symptoms

Numerous articles in *Townsend Letter* have elucidated the manifold symptoms of Lyme disease and the mechanisms of interference with human metabolism and enhanced proinflammatory pathways over many years.

And yet patients keep appearing with muscle pains, extreme fatigue, brain fog, memory problems, anxiety, chronic headaches, depression, insomnia, joint pain with normal lab values, normal radiology, multiple medical consultations, and interventions with no improvement in their symptoms. This frequently results in patients being given a psychiatric diagnosis and receiving antidepressants and/or anti-anxiety medications, which may aggravate the patients' symptoms and steer them away from seeking underlying pathology. Sorting through possible etiologies, including chronic viral illness, parasitism, flukes, heavy metal toxicity, mycotoxin illness, and allergies are always important to rule out as other possible causalities.

Although many patients don't remember being bitten by a tick, it can be gotten conjugally or from other stinging insects. Tick bites are non-painful as they introduce an anesthetic agent during the bite.

Of course, there is the patient who grew up on a ranch or farm and remembers multiple tick bites from childhood but was found to be negative on Lyme testing. A 64-year-old patient from a nearby city who I was treating for asthma, bipolar illness, and severe musculoskeletal pain was sitting in my exam chair; coincidently I had left up *Borrelia bergdorferi* on my EAV testing computer and it tested positive for her. I asked her if she had ever had a tick bite and she said when she was four years old, a tick had bitten her on the scalp and her hair had turned white around the bite for several weeks. She said she was the hit of the neighborhood. She'd had Borrelia for 60 years.

What To Do?

Learning from our many great teachers over the past 50 years in practice has given me many realms with which to work. I have modified approaches from Lee Cowden and Dietrich Klinghardt with encouraging results.

Electroacupuncture according to Voll (EAV) is one of the tools available for diagnosing Lyme and its co-infections. Many doctors around the country also utilize this technology for diagnosing Lyme and other conditions.

PCR evaluation from IGENEX in Palo Alto, California, can also confirm Lyme diagnosis when usual antibody tests prove false negative.

Our modified Cowden approach uses the NutraMedix's Samento (cat's claw) and Cumanda anti-bacterial herbal tinctures from the Peruvian rain forests with burbur, or burbur-pinella, drainage remedies for any die-off reactions. Sometimes called Jarish/Herxheimer response, this is the body's reaction to killing spirochetes.

These anti-bacterial herbals can cause die-off reactions, which are not that intense; but reduction of dosage of the tinctures is good when patients experience flu-like symptoms, fatigue, aches, pains and headaches, which usually subside with lowering the number of drops of Samento and Cumanda and increasing the burbur drops frequency.

An acute tick bite, especially in children, responds well to doxycycline. Dr. Cowden doesn't recommend antibiotics for Lyme, but I find azithromycin 250 mg per day for 30 days is very helpful to eradicate the Lyme symptoms along with the anti-bacterial herbal tinctures and is usually well tolerated. Probiotics are always helpful as well. Most patients resolve symptoms in a month.

My great mentor, Dietrich Klinghardt, MD, PhD, who does a weekly debriefing online (see www.KlinghardtInstitute.com), believes the DNA of Lyme hides out in vesicles on the surface of the spirochete and can't be killed with extreme heat or toxic substances. However, he feels they can be seduced from hiding by feeding them hyaluronic acid drops and then killing them with a combination of twenty herbals in a powder. This is especially helpful when antibiotics are contraindicated for the patient but seems to take a bit longer to irradicate symptoms.

What About Babesia?

Babesia microti, a co-infection of Lyme, I feel, is worse than Lyme. It gives severe weakness and more cardiac symptoms than Lyme. It can be diagnosed with blood analysis or EAV. I had it several years ago and remember being barely able to stand up to vote. It also put me into atrial fib. After looking into various remedies including quinine, which has some tough side effects, such as headaches and hearing difficulties, I found atovaquone, an anti-parasitical drug, to be much more user friendly.

Taken in combination with azithromycin (250 mg BID for 10 days) and atovaquone (100 ml, 750 mg per 5 ml twice per day) with a fatty meal, no dairy, Babesia usually resolves in approximately 10 days. It is sometimes necessary to cultivate a pharmacist who is willing to purchase and dispense it. It is a little pricey. I had to repeat it two times and had some pretty good night sweats.

As we know there are many co-infections of Lyme. I will address Bartonella and Anaplasma another day. However, in a preview of coming attractions, I have been overwhelmed by the power of eradicating *Fasciolopsis buski*, the giant human liver fluke, to resolve chronic digestive disorders, including daily nausea and vomiting, bloating, gas, and abdominal pain sometimes undiagnosed for twenty years by university gastroenterologists and saving several gallbladders in the process. It is endemic in southeast Asia, but it is here. Also, as Klinghardt has noted, and our publisher Jonathan Collin has opined, schistosomiasis, effecting 200 million people around the world, is also here causing many chronic kidney and other diseases in the Northern hemisphere, including kidney failure. Found in freshwater lakes and streams, Klinghardt has found it even in pristine lakes in Switzerland. It penetrates the skin and can be readily observed in the blood under dark field microscopy, a very handsome worm with unique mouth parts. Let me not forget *Paragonamus westermanly,* the Mexican and South American lung fluke in chronic lung disorders along with under-diagnosed *Coccidiomycosis imitis*, Valley fever, found everywhere in the Western US.

When the diagnosis of chronic illness is not obvious, our parasitic "partners" deserve more inspection and treatment.

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Dr. Gerber graduated from the Kansas University School of Medicine in 1972. He completed his internal medicine internship at Oakland, California County Hospital. Additional professional experience included surgical training in Congo, Africa, a psychiatric externship at the University of California, San Francisco School of Medicine, and conducting psychopharmacology research at the Stanford Research Ward of the Palo Alto Veterans Administration Hospital.

Dr. Gerber was always drawn to natural approaches in medicine and has studied with many well-known medical pioneers and two-time Nobel Prize Laureate Dr. Linus Pauling. He is a diplomate of the International College of Anti-Aging Medicine and a graduate of the UCLA Medical Acupuncture Training Program. Dr. Gerber is the president of the Nevada Homeopathic and Integrative Medical Association and past president of the Orthomolecular Medical Society. He is a columnist for *Townsend Letter* and has lectured nationally and internationally.

Wildfires and Declining Air Quality: Treating the Rise in Environmental Illness

by Jill Carnahan, MD

As climate change continues to evolve, we've seen an increase in unpredictable wildfires that seem to grow larger and burn hotter each year. With this increase in disastrous wildfires comes another quandary – a radical spike in air pollution that causes a multitude of health complications in both the short-term and long-term.

These fires roar through acres of wilderness, farmland, and man-made structures. This creates billowing plumes of smoke that engulf surrounding areas near and far. We inevitably inhale this smoke that's chock-full of noxious gas, charred plant material, toxic synthetic materials, and other chemical-laden particulates.

This cocktail of incinerated toxins and particles is well-documented to be severely detrimental – especially to those with existing respiratory conditions or those with prolonged exposure. To make matters worse, more and more research is finding that this toxic haze may also be loaded with another concerning component – microscopic mold spores.

As clinicians at the forefront of root-cause medicine, we're seeing an influx of patients being affected by this surge of environmental toxins after a wildfire strikes. And if recent years are any indication of what the future holds, it's safe to assume that air pollution and subsequent illnesses triggered by these wildfires will continue to be a growing concern.

As practitioners we must continue to educate ourselves in our increasingly toxic world so we can best fulfill our roles as facilitators of healing. Fortunately, we are making great strides in understanding the link between wildfires, environmental-related illnesses, and how we can best treat patients dealing with these complex and life-altering conditions.

Toxins Contained Within Wildfire Smoke

When a wildfire strikes, it can and will engulf anything unlucky enough to be in its path – indiscriminately incinerating wilderness, trees, crops, and a slew of man-made structures. As smoke, soot, and ashes are released into the air, so are a cocktail of man-made chemicals and volatile organic compounds (VOCs), including the following:[1-3]

- Aldehydes
- Acid gasses
- Benzene
- Dioxins
- Ethylene glycol
- Formaldehyde
- Heavy metals
- Methylene chloride
- Nitrogen oxides
- Petroleum hydrocarbons
- Polycyclic aromatic hydrocarbons (PAHs)
- Styrene
- Sulfur dioxide
- Tetrachloroethylene
- Toluene
- Xylene

It's estimated that wildfire smoke and the particulate matter that comes with it, now accounts for up to half of all fine-particle pollution in the western United States.[4] The particulates contained within wildfire smoke linger long after the fire has been extinguished – becoming suspended in the air and drifting miles away from their source – making declining air quality a concern across the globe.

Health Effects Associated With Exposure to Wildfire Smoke

Elevated or prolonged exposure to the organic particles within smoke as well as the toxic VOCs it contains can trigger:

- Increased endothelium inflammation
- Recruitment of macrophages and white blood cells
- Autonomic dysregulation in cardiac function
- Increased oxidative stress leading to depletion of antioxidants
- Cytokine release, leading to systemic vascular inflammation and subsequent increased risk for vascular disease

This can lead to a range of symptoms and conditions ranging from mild to serious. And if not addressed, the damage can spiral into life-altering or even life-threatening conditions. Health effects may include:[5-7]

- Irritation of the eyes, nose, and/or throat
- Headaches and dizziness
- Loss of coordination
- Nausea and/or vomiting
- Worsening of asthma symptoms

- Increased risk for the development of asthma and respiratory illness (including COPD)
- Difficulty breathing
- Fatigue
- Cancer
- Damage to the liver and/or kidneys
- Damage to the central nervous system
- Increased susceptibility to viral and bacterial infections – especially respiratory infections
- Increased risk of premature birth and/or low birth weights
- An increased risk of neurodegenerative diseases like dementia and Alzheimer's
- A decrease in respiratory, cardiovascular, and neurological function in adults and children – exposure has been found to be particularly detrimental to developing children
- Suppression of immune function and regulation

And to further complicate matters, there is mounting evidence that the particulates found drifting through the air after a fire can also contain mind-bending levels of bacteria, fungi, and toxic mold spores.

The Link Between Wildfires and Toxic Mold Exposure

As wildfires roar through a region, the fire's heat propels everything it ignites up into the air. And as firefighting crews employ bulldozers and hand tools in an attempt to halt advancing flames, an array of compounds are churned up – making their way into our atmosphere. Among these compounds are a multitude of bacteria and fungi. As these bacteria and fungi are whisked skyward, they attach to floating particulate matter – hitching a ride into the air and eventually into our lungs.[8,9]

The fact that wildfire smoke not only contains poisonous gasses and charred materials but also pathogens raises a whole new slew of health-related concerns. This is particularly troublesome considering how exposure to wildfire smoke suppresses the immune system and compromises the respiratory system's natural defense mechanisms. This creates the perfect storm that allows these fungal spores to penetrate directly into the body.

While recent studies have revealed that wildfire smoke and its particulates do in fact contain copious amounts of living organisms – including toxic fungal species – we still have more questions than answers. More time and research are needed to truly grasp the complex nature of the microbial ecosystem within wildfire smoke and its overall effects on the environment and human health.

But understanding potential contaminants within wildfire smoke can help us, as clinicians, identify our most vulnerable patients, pinpoint underlying triggers, and create comprehensive treatment plans.

Vulnerable Populations

While exposure to wildfire smoke and its detrimental components poses a risk to anyone, there are certain individuals at greater risk of experiencing more severe and adverse health effects. These vulnerable populations include:

- The very young and the elderly
- People who work outdoors and/or in close proximity to wildfires
- Pregnant women
- Those who have an underlying respiratory condition like asthma, chronic obstructive pulmonary disease (COPD), or chronic bronchitis
- Individuals with an underlying cardiac condition like congestive heart failure (CHF), angina, or ischemic heart disease
- Those with a diagnosis of diabetes since this disease impairs cardiovascular and immune function

Individuals with specific genetic polymorphisms are also predisposed to a more exaggerated response to wildfire smoke. These genetic polymorphisms include[10]:

- **Certain SNPs:** The following single nucleotide polymorphism (SNPs) genes all play a strong role in pulmonary response to air pollution:
  - TNF-alpha
  - GSTM1
  - GSTP1
  - NQO1
  - TLR4
  - NRF2 SOD2
- **GSTM1 gene deletion:** Deletion of this gene increases the risk for inflammatory lung response to fire smoke and ozone. It has also been shown to increase sensitivity to particulate matter, as evidenced by greater changes in heart rate variability.

Getting a clear picture of a patient's potential susceptibility to wildfire smoke exposure can help us better understand how to treat them.

Treating Patients Exposed to Wildfire Smoke and Potential Mold Spores

The interplay between environmental toxins and the exacerbation of chronic illnesses makes environmentally triggered illnesses inherently challenging to diagnose and treat. Fortunately, when it comes to conditions that are caused or exacerbated by exposure to toxic wildfire smoke and potential mold and fungal spores, there are some simple steps that can drastically minimize exposure.

When encountering patients with suspected or known wildfire smoke-related illnesses, it's best to take a three-pronged approach of addressing exposure, detoxing, and promoting holistic whole-life healing.

Address Exposure

Particulate matter and the toxic chemicals and microbes contained within them float through the air, settle on surfaces, and deposit themselves in our soil, water, crops, and homes. This makes the after-effects of wildfires a wider concern than simply focusing on air quality.

Before a treatment protocol can be truly effective, it's critical to address sources of exposure to minimize further

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exposure. We can do this by educating patients on the importance of taking the following steps.

Protection From Additional Exposure: Removing post-fire toxic residue that has settled within patients' homes and/or businesses is crucial. Educate patients on the importance of deep cleaning all surfaces:

- Vacuuming carpets, rugs, drapes, and furniture
- Mopping tile, laminate, hardwood, and other floorings
- Wiping down all countertops and walls

During the process of cleaning and eliminating post-fire smell and residue, it's imperative for patients to take precautionary measures by wearing:

- A well-fitted NIOSH-certified mask (like an N95 mask) or respirator to protect their airways
- Gloves
- Safety goggles
- Long-sleeved shirts and long pants
- Shoes with socks

Removing these deposits of toxic particulates is essential for any of the subsequent steps to be effective.

Addressing Indoor Air Quality: Encourage patients to replace their HVAC filters and have HVAC ducts cleaned out. Incorporating an air purification system that utilizes a high-efficiency particulate air (HEPA) filter is a powerful tool to help trap any lingering particles and VOCs floating around.

While many excellent air purification systems are available for purchase, studies conducted by the EPA (Environmental Protection Agency) have found that at-home, DIY air cleaning systems effectively reduce moderate smoke concentrations to near zero. They also have a clean air delivery rate that's comparable to a small commercial air cleaner. Patients can be directed to resources to build their own DIY at-home air filters with a Corsi-Rosenthal box that requires the following simple materials:

- A total of four 20-inch x 20-inch MERV 13 air filters
- A 20-inch box fan
- Two 20-inch x 20-inch cardboard boxes
- A roll of duct tape

As clinicians, patient education is one of our core duties. Educating our patients on the importance of addressing potential exposure within their homes is foundational for treatment and cannot be overemphasized.

Addressing Water Quality: As soot settles, it makes its way into the waterways – making the already questionable tap-water a toxic soup. And as wildfires decimate trees and vegetation, there's a massive spike in sediment that gets washed into our waterways further contaminating drinking water.

We can help dramatically reduce our patients' exposure to environmental toxins by educating them on the importance of filtering water and directing them to evidence-based resources and products.

Enhance Detoxification

Even with the best of air purification and water filtration systems, during and after a fire, exposure to particles, toxins, and microbes is inevitable. A critical part of detoxification protocol is supplementation. This aids the body in eliminating toxins and pathogens while reversing damage and enhancing healing. The specific supplementation protocol that has been proven to aid in addressing exposure to wildfire is outlined below:[11-17]

- **Folic acid + Vitamin B6 + Vitamin B12:** A combination of 2.5 mg/d folic acid, 50 mg/d vitamin B6, and 1 mg/d vitamin B12. Studies have found that if given for four weeks, this trio significantly reduces the inflammatory effects of smoke inhalation.
- **Omega-3 fatty acids EPA and DHA:** 1.6 grams of EPA and DHA taken once daily can help stabilize heart rate variability seen after smoke inhalation.
- **Vitamin C + Vitamin E:** A combination of vitamin C (up to 500 mg daily) and vitamin E (up to 800 IU daily) has been shown to decrease airway irritation and improve airflow in children and adults after ozone exposure.
- **Sulforaphane:** 30-50 mg of sulforaphane per day for adults can help enhance antioxidant levels and fast-track toxin excretion.
- **N-acetyl cysteine (NAC):** NAC (typical adult dose 1800 mg/d) can help reduce lung inflammation by blocking pro-inflammatory cytokine production.
- **Detox binders:** Detox binders are designed to safely trap toxins in the digestive tract for safe elimination from the body.
- **Glutathione:** Glutathione is the body's primary endogenous antioxidant – making it a key player in accelerating detoxification.

In addition to supplementation, accompanying detoxification strategies can help expedite the detoxification of pollutants absorbed via wildfire particulates. Adjunct detoxification methods include:

- Infrared saunas
- IV detoxification therapy
- Dry brushing
- Epsom salt baths
- Mineral or alkaline waters

As partners in our patients' healing, it's important to personalize a detoxification plan best suited to each individual's needs.

Promote Mental, Emotional, and Financial Well-Being

While the physical effects of a natural disaster like a wildfire can be devastating, there's also a significant amount of mental, emotional, and financial turmoil that can turn our patients' worlds upside down. And as clinicians, it's our responsibility to address patient well-being from a holistic perspective – because true healing and health encompass much more than just their physical state. Here's what you can do to help your patients cope:

- Encourage them to process their emotions and acknowledge that they've been through a traumatic experience. In some cases, it may be helpful to direct them to clinicians who specialize in mental health and trauma processing.
- Emphasize the importance of connecting with others, and if applicable, direct them to groups or community resources.
- Speak to them about the importance of seeking spiritual solace and encourage them to find ways to seek spiritual healing and renewal.
- Point them in the direction of community resources that can assist them in financial matters. Also advise them to communicate with their insurance claims adjuster to ensure they're recovering from a financial and material standpoint as well.
- Reassure them that recovering from a fire is a process – from a physical, emotional, and material perspective. Help them set realistic expectations for bouncing back and reassure them that you're a partner in their healing process.

While our area of expertise is our patients' physical health, we can't deny that as human beings, our well-being encompasses much more than just our bodies. So it's our duty to support and direct our patients in ways that will help them heal inside and out.

Next Steps in Understanding the Health Impact of Wildfires

We still have much to learn when it comes to wildfires, the air pollution they bring, and the impact they have on new and existing health conditions. However, we've made significant progress in understanding how to best support these patients. As our world continues to evolve and our air quality continues to shift, I have no doubt that environmental-related illnesses will become more prevalent and grow in complexity. Our role in identifying and treating these environmental-related conditions will only become more imperative.

The need for integrative and functional medicine practitioners well-versed in caring for patients struggling with these multi-layered illnesses is dire. My hope is that we as clinicians can come together to find answers, continually improve upon diagnosis and treatment guidelines, and contribute to the body of knowledge to aid our fellow clinicians in serving these patients.

For more articles and information by Dr. Jill Carnahan – visit https://www.jillcarnahan.com and subscribe to Dr. Jill LIVE on Dr. Jill Carnahan's YouTube Channel where there are over 100 interviews with experts on topics like this.

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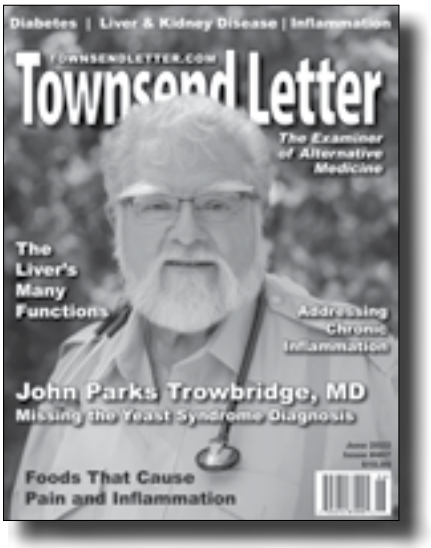
Dr. Jill Carnahan completed her residency at the University of Illinois Program in Family Medicine at Methodist Medical Center. In 2006 she was voted by faculty to receive the Resident Teacher of the Year award and elected to Central Illinois 40 Leaders Under 40. She received her medical degree from 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!



Part 2 of the June cover article

Still Missing Diagnosis of The Yeast Syndrome? – Part 2

by John Parks Trowbridge, MD, FACAM

In Part 1 (*Townsend Letter,* June 2022), Dr. Trowbridge explains the history of The Yeast Syndrome, describes its symptoms and underlying causes, and outlines the primary treatment components.

When Christopher Columbus set forth across the Atlantic from Spain in 1492, he was seeking a direct route to the East Indies, hoping to capitalize on the lucrative spice trade. As with the best laid plans in many fields, his understanding of the *terrain* was slightly "off." Still, he made history as the first European contact with the Caribbean, Central America, and South America. His "Indians" were…well, you know the rest. Interestingly, the name was assigned also to the American natives inhabiting North America proper.

So how does this history relate to The Yeast Syndrome? Since the time of Dr. Truss' initial observations, *ad hominem* attacks and unsupported criticism from various professional groups have discouraged practitioners from investing the time and effort required to understand and embrace proper treatment. While published studies document the pathophysiology creating their discomforts and diseases, innocent patients are directed to *other* conventional (and even integrative) *in*effective approaches. And in most instances, they continue to suffer. For years.

Research requires funding as well as dedicated interest by investigators. Both are in short supply. All of us should take heart in the 1999 Mayo Clinic findings in patients with chronic sinusitis…but sadly few practitioners know of this exceptional report. The physicians were excited when documenting nasal fungus in *96 per cent* of 210 patients. Early reports noted that further research at Mayo was underway to confirm that the immune response to the fungus is the cause of the sinus inflammation, hopefully to help relieve 37 million sufferers.

> "Medications haven't worked for chronic sinusitis because we didn't know what the cause of the problem was," says Dr. Ponikau. "Finally we are on the trail of a treatment that may actually work."
>
> "Fungus allergy was thought to be involved in less than ten percent of cases," says Dr. Sherris. "Our studies indicate that, in fact, fungus is likely the cause of nearly all of these problems. And it is not an allergic reaction, but an immune reaction."
>
> "This is a potential breakthrough that offers great hope for the millions of people who suffer from this problem," says Dr. Kern. "We can now begin to treat the cause of the problem instead of the symptoms."[7]

Despite this enthusiastic report, you should not be surprised that there's no limit on challenges from the medical community, such as this from two Utah otolaryngologists:

> " … [S]ubsequent clinical trials of topical and systemic antifungal treatments have failed to demonstrate meaningful efficacy. …. Combined with clinical data about antifungal therapy's ineffectiveness, these findings appear to tip the scales against fungus as the universal etiology of CRS [chronic rhinosinusitis]."[8]

And from these specialists in The Netherlands, reviewing the literature and offering merely their opinions – but *no* experimental evidence:

- "Presently, in the absence of convincing immunological data and evidence for clinical improvement of CRS upon therapy with antifungal agents, the case against the fungus remains unproven."[9]
- "There are not many arguments to suggest a causative role for fungi in CRS with or without nasal polyps. However, due to the intrinsic or induced change in immunity of CRS patients, fungi might have a disease-modifying role."[10]
- "Almost a decade after the launching of the hypothesis by Ponikau, the absence of convincing immunological data or evidence for clinical improvement of CRS upon therapy with antifungal agents now means that the hypothesis that fungi play a role in a majority of the cases of CRS has to be rejected and antifungal treatment should not be used."[11]

Pause for just a moment: what you're witnessing is terribly disturbing. Ear-nose-and throat specialists generally have no clue on definitive ***treatment*** of The Yeast Syndrome, which could resolve chronic sinus inflammation and infection. So their published *opinions* that weave their way unceasingly through the medical literature are flagrantly ***wrong***. Is this an arrogant pronouncement offered by a

solo general physician who has decisively treated the vast majority of such patients for almost 40 years? It ain't arrogance if it's right. And it is right.

The Mayo Clinic physicians literally hit the nail on the head: "because we didn't *know what the cause* of the problem was" and "We can now begin to *treat the cause* of the problem instead of the symptoms." For 24 years, *Know the Caus*e, the wildly popular (now global) daily television program, has been hosted by Doug Kaufmann. I met Doug over 40 years ago – he taught me about food allergies. Over 30 years ago, I shared with him much of what I was learning about yeast overgrowth, my diet ideas, nutritional supplements, and medications. Working with Dallas physicians, he concentrated on clinical nutrition and the role of fungus provoking both symptoms and diseases. Doing more than any other individual to share these critical ideas, this talented former Navy medical corpsman and his production team find ways to enlighten and educate viewers around the world of the wide range of health problems associated with fungi/yeast/mold/mildew. [https://knowthecause.com]

But wait, there's more! I know you think you understood what you thought I said, but I'm not sure you realize that what you heard wasn't what I meant. Missouri poet Maya Angelou says it very well: "I've learned that I still have a lot to learn."

In medicine, a broad definition of "syndrome" is used, which describes a collection of symptoms and findings without necessarily tying them to a single identifiable pathogenesis. When a syndrome is paired with a definite cause, this becomes a "disease." Medical definitions of the disease state are lacking or insufficient. The World Health Organization offers that "In general, disease is defined as any harmful deviation from the normal structural or functional state of an organism, generally associated with certain signs and symptoms and differing in nature from physical injury. A diseased organism commonly exhibits signs or symptoms indicative of its abnormal state."

Confused yet?

Yep, part of the problem with modern medicine in the digital world is that doctors are looking to stuff every condition into a digital "cubby-hole," a small mental compartment operating as specific diagnostic category, especially an overly restrictive one. Once assigned to a cubby-hole, less attention needs to be paid to resolving a patient's complaints – "Nothing new, patients with *that* diagnosis get *those* kinds of problems."

This should become obvious: The Yeast Syndrome fails to "fit into" the modern medical paradigm. Conventional physicians can feel comfortable denigrating, dismissing, and ignoring practitioners who treat "yeast overgrowth" because TYS is simply irrational at best and deceptive at worst. As critics submit, "you claim that *everything* can be caused by yeast" – so they can feel righteous in disregarding any evidence of clinical improvements. Mainstream medicine recognizes invasive fungal infections occurring in various categories of patients, including those with cancer, burns, as well as patients with AIDS or undergoing organ transplantation. But they resist accepting that apparently "healthy" patients (whose standard blood panels are "normal") can suffer debilitating symptoms for years because unsuspected, undiagnosed, and therefore untreated yeast overgrowth injures their biochemical and endocrine functions. Some laboratories can identify "mold toxins" present in blood tests – but even these clearly abnormal findings fail to persuade conventional physicians to consider TYS.

Indeed, an incredible range of symptomatic complaints has been associated with The Yeast Syndrome. Not in the same patient, of course, but we have documented reduction of discomforts and distress along with impressive clinical improvements in many patients over the years. This should lead to the question: So, how can you diagnose "yeast overgrowth."

Some presentations are obvious: persistent thrush, recurrent vaginitis, endless skin rashes. Others are insidious, such as impaired memory, reduced mental capacity, headaches, altered sensations, fatigue, and many more. The *sine qua non* of correct diagnosis is, of course, virtually full recovery when treated appropriately for The Yeast Syndrome. Reliance on this admittedly different approach does little to assuage or assure medical critics.

With seemingly boundless physical and mental complaints possible, do we have other diagnostic options? Sort of. My friend California immunopathologist Edward Winger, MD, developed an "anti-Candida antibody profile" in the mid-1980s. [Available now from LabCorp, test code 096719, Candida antibodies]. Casual exposure to microbes stimulates an immune response, but this is minimal when an "invasion" does not appear threatening. But when your defense system begins creating antibodies against antigens that are found only *within* yeast organisms, *that* finding is suggestive of contents spilling from harmful yeast overgrowth. Sadly, practitioners have little training interpreting immunological reports – so when detected antibody levels are *not* elevated, they wrongly leap to the conclusion that "yeast is not the problem" and wrongly direct their attention elsewhere. Certainly that *could* be the conclusion…but patients whose defenses have given up fighting an overwhelming yeast presence *could* be demonstrating immune tolerance, as Dr. Winger and I easily demonstrated. These patients are "sicker" and require definitive treatment management.

Dental/oral abscesses – often persistent or recurrent – usually have a yeast component with the bacterial invasion.

Is there another way to evaluate patient complaints, especially when the anti-Candida antibody test appears "negative" ("normal")? Now we're back to old-fashioned diagnosis: questioning and listening long enough to create a sweeping understanding of the patient's history, exposures, illnesses, medications, prior treatments, and current complaints. You might have heard of the SF-36 questionnaire. RAND corporation developed this 36-Item Short Form Health Survey as a set of generic, coherent, and easily administered quality-of-life measures. These measures rely upon patient self-reporting and are now widely utilized by managed care organizations and by Medicare for routine monitoring and assessment of care outcomes in adult patients. ➤

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Realizing the patient management value of such data, years ago I developed my own "short form" of 42 items, where *every* patient, at *every* visit, rates his or her current discomforts on a scale of zero to 10. Many patients suffering with The Yeast Syndrome have a dizzying number of 7's, 8's, 9's, and 10's. [To obtain a copy of my form, send your request and email address to info@healthCHOICESnow.com]. Their "major complaints" guide our discussions, testing, and assessment. Proper treatment for their yeast overgrowth (along with other medical issues) leads to many having sustained lower scores (0's, 1's, 2's) and markedly fewer disturbing issues in their future. In the 20th century, before physicians had laboratory tests and pharmaceutical treatments, clinical improvement was a standard measure. Now, however, critics demand Pasteur-like identification of organisms and ever more esoteric "tests" of chemical components. Is the *patient* "better"? Who cares!

Fixing the Dominos That Have Fallen

Remember where we started: *yeast* is *not* the problem. The patient has succumbed to an overgrowth of yeast because of other challenges that have compromised their protective responses. Each of these must be addressed – but further, increasing concentrations of yeast elaborate ever greater volumes of metabolic and toxic substances. These interfere with usual cellular functions, finally impairing critical organ functions. As physiologic efficiency is steadily more impaired, maintaining "health" becomes a precarious uncertainty. Many people, especially younger and middle-aged adults, often "soldier on," ignoring nuisance discomforts or hoping for minimal treatment to help.

Indeed, these various symptoms and distresses doggedly worsen, becoming more than just an annoyance but a frank interference to daily life. Time to hop on the medical merry-go-round. A brief visit (aren't they all?) to the local doctor often delivers a reassuring "you're ok, your blood tests are fine." That scenario can be repeated time and again, maybe even with referral to a specialist or two or more. Eventually, medications are offered…such as for depression or anxiety, which can be expected when complaints to physicians produce little or no improvement.

How about helping these fine people trying to recover from afflictions unknowingly due to The Yeast Syndrome – because…it just *ain't that hard!*

We've already reviewed various nutritional factors that are targeted by yeast toxins. In addition to restoring needed elemental components, a quick look at digestive capability is essential. Indeed, *many* suffering with TYS offer chronic gut complaints: reflux, heartburn, belly bloating, constipation, diarrhea, even belly pains, understandable because the gut can become a toxic waste dump churning with pathological yeasts. Many have been reassured by gastroenterologists that "nothing is wrong" or "you don't have anything to worry about." How about getting a simple (but old time!) urine indican test. If "positive," your patient is not sufficiently digesting proteins in the stomach and upper small intestine. So…you order a comprehensive stool analysis, to find whether you should offer betaine hydrochloride or pancreatic enzymes or both. Patients who have gallbladder complaints (even after having had theirs removed) can benefit from bile acid salts as well. Butyrate deficiency must be replaced for optimal epithelial function, specifically to help "leaky gut." While recovery of digestive functions might occur over years, many people will benefit from lifelong use of needed supplements.

Constipation? Diarrhea? "Irritable bowel" (*that's* both!)? Many patients will resolve even long-standing complaints with nothing more than the MEVY diet and perhaps digestive support. Otherwise, I have a patient take a heaping teaspoon (up to tablespoon) of psyllium seed husks (tastes like cardboard) each morning and evening – and after *each* loose stool if any – regardless of their initial complaints. Even though fiber is an essential but usually missing component for our dietary intake, realization of its profound health benefits is quite recent. Irish surgeon Denis Burkitt, MD, spent 20 years in Africa, where he first described a B-cell non-Hodgkins lymphoma spread by mosquitos. Perhaps more importantly, he realized that many Western diseases rare in Africa were the result of diet and lifestyle. Dr. Burkitt extended and popularized the recognition of dietary fiber as reducing the risk of bowel cancer, and the incidence of diverticular disease, irritable bowel syndrome, appendicitis, varicose veins, hemorrhoids, diabetes, obesity, coronary thrombosis, atherosclerosis, peptic ulcer, and dental decay.[12]

In addition to digestive support as noted, "heartburn" (esophagitis) can be resolved for many by sipping all day long on aloe vera. We used to mix half-and-half with papaya liquid, but that is almost impossible now to find or afford. Dissolving or chewing papaya tablets helps many people. Slowly dissolving a clotrimazole 10 mg troche – four times a day, before meals and at bedtime to start, decreasing as improving – can help esophagitis and also periodontal disease. Slowly dissolving nystatin powder one-fourth tsp can work as well…*but the taste!* Surprisingly, 47 per cent of adults 30 and older have periodontal disease. That rises to 70 per cent in those older than 65 years. To help patients with gingivitis or receding gums to avoid periodontal surgery, I have had many years of success by adding twice daily use of an ultrasonic electric toothbrush (soft bristles, brush lightly) with Tooth Chips Spritz Liquid Tooth Soap by Rose of Sharon Acres. Bleeding and tender gums can resolve within weeks. Some patients have added "MMS," also known as "Miracle Mineral Solution," as an oral mouthwash. This product generates chlorine dioxide, which has received considerable study as an antiviral/antibacterial since the onset of the COVID-19 epidemic. While helpful for reducing plaque, gingival inflammation, and bacterial counts, patients should be cautioned to avoid swallowing the solution (some popular press books promote it as a solution for many diseases – but oral intake can be dangerous).[13]

Research shows perhaps more than 1,000 bacterial species spread on the tongue, teeth, gum, inner cheeks, palate and tonsils. Periodontopathic bacteria contribute to systemic diseases including diabetes, respiratory and cardiovascular cases. The World Health Organization defines probiotics as "live microorganisms which when administered in adequate amounts, confer benefits to the health of the host." Conventional practitioners are

not yet persuaded that yeast contribute to these problems. My approach to resolving oral pathology with dietary guidance, digestive support, aloe vera, clotrimazole or nystatin, and fluoride-free dental soap with an ultrasonic electric toothbrush has been uniformly successful. I have not yet had occasion to prescribe any of the recently developed oral-targeted probiotics. Incidentally, discrete areas of your body have their own unique microbiome, such as gut, mucous membranes, respiratory tract, urogenital tract, and so on. Further, each person has his own unique microbiome, in every biological site.

As an aside, root canals are a safe haven for microbes, including yeast. Because no blood reaches the inside of the tooth, the immune system cannot kill any microbes percolating in the dead tooth. Some 24+ million root canals are performed in the United States each year. They were proven deadly disease agents in 1925 in a study by Cleveland dentist and head of research for the American Dental Association, Weston A. Price, DDS, and 60 prominent researchers. Cancers have been related to root canals on the same energy meridian.[14]

Dental/oral abscesses – often persistent or recurrent – usually have a yeast component with the bacterial invasion. The condition can lead to systemic problems throughout the body. Dental amalgams – so called "silver fillings" that are actually 50 per cent mercury – have been associated with significant damage to body systems, especially immune defenses. As such, mercury vapors percolating continuously from "filled teeth" might slow or limit results when treating The Yeast Syndrome. Mercury-safe/mercury-free dentistry is promoted by the International Academy of Biological Dentistry and Medicine (iabdm.org).

The gut microbiome is incredibly diverse, complex, and massive in volume. Studies show how it interacts with us in several ways in health and disease, including (1) modulating the inflammatory host response to the gut, (2) synthesizing small molecules and proteins that are taken up by the host, (3) changing the amount of available energy in the diet by fermentation of polysaccharides to short-chain fatty acids, and (4) interacting in any number of physiologic processes. Abnormal patterns to be understood include "leaky gut," dysbiosis, and SIBO (small intestine bacterial overgrowth). Modern thinking is that biochemical (even genetic?) factors elaborated by the microbiome can dramatically influence our behavior, memory, thinking, mental disorders, as well as diseases in different systems. Studies of biofilm communities reveal entangled and pathological ecosystems beyond our imagination, resistive to normalization. Dietary choices, fiber, food additives – even lifestyle factors such as cigarette smoking, alcohol consumption, and recreational drug use – predispose us for earlier and more dramatic deviations. Curiously, less research appears to be devoted to gut fungal organisms … which might be key participants in perpetuating pathologic patterns.

Not only do antibiotics variably impact organisms of the gut microbiome, more alarmingly has come the realization that this is a reservoir of antibiotic resistance genes. Even the minimal exposure we get to antibiotics through the food chain might predispose us to development of inflammatory and metabolic diseases later in life. Béchamp's concept of the biological terrain takes on entirely new dimensions. Research into prebiotics and probiotics has failed to give us clear direction in accurately choosing products to "move" a maladapted pattern toward a more optimal status. Further, we have little clinical data regarding the time needed to do so. A distorted microbiome unmistakably maintains stability in the face of dietary shifts and likely most other modifications.

Given the obvious proliferation of yeast and fungal organisms when antibiotics reduce the presence of competing bacteria, I always recommend concurrent (and extended) treatment with systemic antifungals. Ketoconazole and fluconazole readily penetrate into many tissues, while itraconazole penetrates preferentially into tissues with high lipid content. Nystatin and amphotericin B, both polyenes, more predictably remain in the gut. In my clinical experience, concurrent aggressive treatment with one or more antifungals is absolutely indispensable when addressing deeper tissue infections: persistent sinusitis, pneumonia, pyelonephritis, diverticulitis, lympadenitis, and wounds or cellulitis.

Yeast Syndrome

This approach emerged from a *Eureka!* moment shared in 1985 with my friend, Pittsburgh internist Milan J. Packovich, MD, as we were listening to a lecture reporting on infecting rodents with streptococcus and with Candida in varying protocols invariably led to finding viable bacteria in the kidneys, contained *within* an insulating "yeast shell." Excitedly over lunch we realized that our patients suffered with frequently relapsing episodes of diverticulitis, pyelonephritis, pneumonia and the like because of our failure to "eliminate" the offending bacteria, persisting because they were being protected by a yeast wrapper…only to emerge again when the terrain was inviting. Since that time, thankfully I have never needed to hospitalize an "upright" patient presenting with any of these conditions.

Another round of drinks for the boys! Well, not really, but that introduces a fascinating but little known and underreported condition: Auto-Brewery Syndrome.[15] Also known as gut fermentation syndrome, it is a rare disorder characterized by the *endogenous* production of alcohol. The victim presents with signs of alcohol intoxication, such as staggering gait, slurred speech, gastrointestinal distress, and state of confusion. Symptoms can arise suddenly and are associated with sugar and starch intake not alcohol – but specific yeasts in their gut manufacture ethanol that is absorbed just as readily as that from beer, wine, or hard liquor. Antibiotics and other factors create microbiome imbalances where pathologic yeast overgrowth is possible. Aggressive treatment for The Yeast Syndrome is essential – along with *strict* dietary controls. Some of these folks draw attention because they have fallen asleep behind the wheel at a traffic light. I have lectured to defense attorney, because innocent lives should be protected, but prosecutors, judges, and even juries honestly struggle with these medical issues.[16]

One more gut-wrenching revelation: gluten "intolerance" is rarely that … and almost never celiac disease. People often have the misunderstanding that they

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suffer with this autoimmune disorder that damages the small intestine and inhibits absorption of nutrients, where they cannot tolerate gluten, a protein in wheat, rye, barley, and in some commercial products. Symptoms can vary widely from almost none to marked discomforts and other issues. More than 90 per cent of actual celiac patients have two HLA genetic markers; negative tests make the disease highly unlikely. Several antibody tests can aid in diagnosis and monitoring. Fewer than 1 per cent of Americans have celiac while up to a third claim to be "avoiding" gluten. So why do people claim they feel much better when they curtail gluten-containing foods? Could the reason be that by reducing grains they are dramatically *reducing exposure to yeast*…and often adding more vegetables to their diet?

One last mention of autoimmune conditions: The Yeast Syndrome is often provocative to your defense system. The broad range of autoimmune diseases that have a documented relationship to TYS is definitive and growing. An excellent review was offered as early as 1985 by California clinical ecologist Phyllis L. Saifer, MD, MPH, of the "auto-immune polyendocrinopathy immune-dysreglation candidosis hypersensitivity" (APICH) syndrome. [*TYS*, pages 325-334]. Needless to say, many of these conditions can improve quite dramatically with proper and continuing treatment for yeast overgrowth…not needing cortisone, chemotherapy, or newer advertised immunosuppressive medications (-imabs, -umabs, -ercepts, and so on). Food allergies often accompany TYS, sometimes complicating dietary choices, and proper treatment can help resolve many of these. A unique panel using lymphocyte responses to assess several aspects of disordered immune activation is the hsLRA-ELISA/ACT, developed by internist and clinical pathologist Russell Jaffe, MD, PhD, to address the hidden causes of many health concerns (elisaact.com). A number of other excellent laboratories offer food allergy test reports that can be helpful as well.

Hold Yer Horses, Cowboy!

You might be chomping at the bit, ready to treat TYS right away. A few other issues need assessment, so your programs can work best. Hormonal interruption ["APICH"] is a common feature found in these patients, and this must be addressed to help resolve symptoms quickly. Many with TYS present with the non-specific complaint of fatigue. Thyroid appears to be the first gland affected by yeast toxins – and mild thyroiditis is not an uncommon finding.

My approach is to establish baseline results, drawing T3F/T4F/TSH/Thyroid antibodies and, if the patient has been taking supplemental thyroid, also T3R. I have them note basal temperature on awakening, before stirring. Best results are with axillary temps, usually for 5 to 10 minutes to stabilize readings. American professor of endocrinology Broda O. Barnes, PhD, MD, realized that hypothyroidism could be associated as well with chronic headaches, repeated infections, unyielding skin problems, or circulatory difficulties, even a major factor in heart disease, lung cancer, and emphysema, and even many emotional and mental disturbances.[17] Despite his persuasive studies, mainstream medicine has failed to accept his hypotheses.

Bringing baseline temps up to between 98.0 degrees is often best titered with compounded T3 hormone (depending on test result and patient's weight), especially watching pulse. Further, unless they claim an allergy, I assess iodine status by having the patient "paint" a silver-dollar-size circle once daily and documenting how "dark" the spot remains in 24 hours (apply to different areas!). Deficiency can take many months to replenish, using Iodoral or Lugol's iodine. Hypothyroid status often associates with adrenal exhaustion as well. I rarely order any tests but advise supplemental support. Some patients also do better with addition of hydroxycortisone, 5 mg twice daily, slightly below the usual physiologic production, giving the adrenals time to rest and restore.

Complicating thyroid and adrenal compromise often is mild glucose intolerance – setting the stage for prediabetic changes. Many of these patients will improve simply with the MEVY diet. Others will benefit from nutritional supplements known to improve sugar management. Occasional fructosamine and glycohemoglobin will help document improvement but usually I rely on overall symptomatic changes. Dr. Saifer noted changes can occur with female and male hormones as well. Evaluating these issues and carefully rebalancing can help resolve many complaints. Additionally, bringing DHEA and pregnenolone levels to mid- or even high-normal levels appears to accelerate clinical improvement.

Undiagnosed toxicity can be confusing, where a compliant patient doesn't seem to recover as expected. A probing history can reveal exposure to various uncommon chemicals, usually related to employment. Estimates in the 1970s suggested 60,000 chemicals in use with several thousand added annually. The Environmental Protection Agency has more than 85,000 chemicals listed on its inventory of toxic substances. Little is known about which are actively used – or even their long-term side effects. Some estimates are of more than 700 drugs or toxic substances present in our bodies.

Pollution is the largest environmental cause of disease and premature death in the world today. Diseases caused by pollution were responsible for an estimated 9 million premature deaths in 2015 – 16% of all deaths worldwide – three times more deaths than from AIDS, tuberculosis, and malaria combined and 15 times more than from all wars and other forms of violence.[18] Given this disturbing realization that we are immersed in a sea of damaging and deadly chemicals, is it any wonder that our immune (and other) systems suffer, making us more prone to developing TYS?

Documenting such toxicity can be challenging – but "treatment" with the sauna protocol described by L. Ron Hubbard could provide welcome relief.[19] Home infrared saunas are readily available for frequent use and ideal control of temperature and time (www.HighTechHealth.com; www.realaxinfraredsauna.com). My protocol limits exposure to 125-130 degrees, up to 30-45 minutes, for productive sweating – with adequate hydration.

Given the pervasive presence of toxic metals in our environment, many patients will show significant levels on a DMSA-

challenged 24-hour urine collection (www.doctorsdata.com). Excessive lead, mercury, and arsenic are common findings – and these clearly impair immunologic, neurologic, and other system functions, easily associated with widely varying symptoms. Reducing the toxic body burden by proper chelation techniques might be the key to unlocking delays or limitations in recovering better health, especially in those already suffering with TYS.

Let's do a quick tour of so-called "minor" yeast issues. Any one of these might create lingering insults to your immune system, making adequate resolution difficult. Onychomycosis is extremely common in adults, progressing to severe distortion of nail structure – on fingers as well as toes. My program is uniformly safe and often effective: at bedtime, make a paste of baking soda, smear onto nails, and wear socks (or gloves) to reduce spreading powder in bed linen. In the morning, rinse off, dry, and smear Dr. Blaine's Tineacide onto nails. Difficult cases might take many months – and I advise continuing for at least three months after nails appear healthy, to reduce reemergence of yeast/fungus from the nail root. This treatment works well with persistent paronychial inflammation/infection around nail margins. Many patients also have "dry flaking skin," irritations, or even cracks on the soles of their feet, also between their toes. Often this is a deficiency of EPA fish oil, which must be corrected – and nightly (or twice daily) massage with coconut oil or Udder Butter (from the feed store) can improve skin condition within months.

Chronic or recurrent vaginitis is all too frequent, and resolution is critical for patient comfort. I have heard that some doctors prescribe one or perhaps three oral Diflucan tablets. Remember, the problem is not the yeast but the body terrain. I have a variety of treatment protocols, one of the simplest being nightly use of an over-the-counter yeast cream such as Monistat (miconazole 2% vaginal cream), sometimes for weeks. Of course, at the same time, I'm treating the patient for The Yeast Syndrome – *that* is the key! Sometimes a short boost with Terazol (terconazole) 80 mg vaginal suppositories or vaginal cream 0.4%-0.8% will help greatly. I discourage any douche, just treat as advised and wear a panty-liner. When a patient is recovering well, I encourage "yogurt douche" each evening using a 30-60 cc syringe or a small douche bag, using plain yogurt. The goal, of course, is to normalize the terrain. Studies have shown that recurrent yeast infections can be the very same organism – when conditions were "unfavorable," the microbe simply sprouted hyphae and burrowed into the vaginal wall, coming out again at more propitious time.

Yeast Syndrome

"Jock itch" isn't just for guys – women can have superficial yeast irritations in their inguinal folds as well. The simplest treatment is Nizoral (ketoconazole) 2% cream, applied liberally twice daily and continuing for weeks after all symptoms are gone. Of course, treatment for TYS is helping at the same time. An old wives' tale is the use of corn starch when babies ➤

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have "diaper rash." That is nothing short of stupid – just cover liberally with yogurt until resolved. Again, the baby likely has yeast overgrowth in the gut (thrush and deeper), often from treatments with antibiotics without worrying to replenish gut flora. A useful product is Miracle II Soap, a coconut-derived soap, cleaner, degreaser, and deodorizer all in one. I personally have used it (sparingly, it's powerful and gentle) for many years as a shampoo, face and body wash, hand cleanser, and even laundry detergent.

Thyroid appears to be the first gland affected by yeast toxins – and mild thyroiditis is not an uncommon finding.

Rashes on the hands, arms, other body parts might be a bit more complicated. Many times this is diagnosed at "psoriasis," which is fine by me, since that is associated with TYS. Again, I endorse local care – Nizoral 2% cream, Udder Butter, coconut oil – until treatment for the deeper yeast overgrowth creates the terrain for healing. Resist the temptation to apply steroid creams (even ones combined with antifungal medication), since that is more like taking 3 steps forward and 2 steps back. Cheilitis is a special case, where inflamed/infected tracings streak down from the corners of the mouth, often pestering older adults. Local care is important for early relief – but these patients need aggressive treatment of perioral/gingival yeast, as described above. Again, the terrain *not* the organism.

You might read about *Candida auris*, a recently discovered and very vicious microbe. This might present a serious global health threat, as it is often multi-drug resistant, difficult to identify, and has caused outbreaks in health care settings. Quite honestly, my approach is to treat all TYS patients appropriately, for as long as it takes to reduce their symptoms and to restore immune competency. My comprehensive program might be your best armor against emerging infections. Other yeast and fungal species can cause issues as well, but these are far less prominent than with *C. albicans* – and many of these might respond as well to aggressive treatment for TYS.

One last item is not inconsequential. Almost seven years ago, my Scottsdale, Arizona, friend, general physician and immunology researcher Stephen E. Fry, MS, MD, released a blood test detecting fungal and other parasitic genetic elements, biofilms, and erythrocytic bacteria (www.frylabs.com). Using sophisticated isolation techniques and data-processing algorithms to compare findings with the national nucleic acid sequence database, his report can show ("pan-protozoal metagenomics") internal infections not detected otherwise. Needing a descriptive name, I have termed this "Deep Blood Fungus" (DBF) to distinguish it from TYS. Since 2015, his studies have positively identified specific fungi (or other protozoa) found in the blood of patients suffering with a wide range of "inexplicable" diseases, such as…various cancers, blood cancers, severe skin conditions, sudden kidney failure, sudden worsening of diabetes, MS (multiple sclerosis), ALS (Lou Gehrig's disease), RA (rheumatoid arthritis), SLE (lupus), vague immune defense system disorders, and others, even fungus evidence in the plaque blocking heart arteries (our *leading* cause of death) and in other body organs.

You might want to review my two-hour lecture on youtube.com detailing my evaluations and clinical experience with several unusual disease presentations. (Deep Blood Fungus: Dental and Other Connections to Devastating Illnesses, Parts 1 and 2) What is worrisome is that DBF might be our first ominous glimpse of deeper parasitic pathology, far beyond our simplistic understanding of bacteria and yeast.

May the Peace of the Lord Be with You

We have reviewed extremely effective treatments for many disturbing discomforts – and I have barely scratched the surface. But I must share with you one final stratagem, to help your patients recover faster and better.

My lab director, when I was pre-med in the late 1960s and working in the immunology department at Stanford, was psychiatry professor George F. Solomon, MD. He was one of the first scientists to hypothesize that the relationship between brain activity and the immune system can be important for determining health and influencing the course of the disease and its outcome. Interestingly, Ayurveda dating back over 2,000 years had concepts of natural and acquired immunity, of psychophysiological response specificity, and beliefs that certain types of people, based on personality and somatotype, had greater resistance to disease. Canadian physician Sir William Osler, MDCM, created the first journal club, created the first residency for specialty training, was the first to bring medical students out of the lecture hall to the bedside, was a founding member of the Association of American Physicians, and was instrumental in the creation of the Johns Hopkins School of Medicine. From this lofty vantage point, he is reputed to have said that it is as important to know what is going on in a man's head as in his chest, in order to predict the outcome of pulmonary tuberculosis.

Physicians long gave recognition to Hippocrates' observation that "The natural healing force within each one of us is the greatest force in getting well." But understanding the profound significance of that concept would wait until 1964, when Solomon coined the term "psychoneuroimmunology." Research now aims to uncover the mechanisms by which the brain is able to influence the functions of the immune system. You might realize that we now call this "mind-body medicine," exploring behavioral and biological mechanisms that link psychosocial factors, health, and disease.[20]

Recall that patients suffering with The Yeast Syndrome, desperately seeking professional help for years while watching their symptoms multiply and escalate without needed relief, these people suffer enormous stress and anxiety. Chronic stress through "wear and tear" ravages the immune system, induces chronic activation and altered health outcomes that resemble those seen in chronic inflammatory diseases. Altered immune function can lead to exacerbated symptoms of both physical *and* psychological illnesses. Studies have suggested that stress might "cause" autoimmune disease because of a higher

incidence in those previously diagnosed with stress-related issues.

Solomon later confirmed that stress, hostility, and depression impact the immune system[21]:

> Many conditions such as heart disease**,** osteoporosis, arthritis, delayed wound healing, and premature aging, are related to stress and negative emotions….
>
> Many doctors have noted that a patient's desire to get well is related to the outcome of a disease….
>
> In particular, older adults are one obvious at-risk group because there are reliable age-related decrements in immunity.[21]

While these observations are critical to achieve early results and long-term improvement, few physicians assist their patients with "stress" management.

One resource I have found valuable for 45 years is the first book by Herbert Benson, MD, *The Relaxation Response.* A Harvard physiologist, he studied transcendental meditation then being popularized by "the Beatles guru," Maharishi Mahesh Yogi. His studies showed that every culture has some form of meditation, and he "took the mysticism" out of the technique. His instructions are simple and often effective.[22] Otherwise, patients can seek formal training from a Transcendental Meditation Center (www.tmhome.com). I wrote a delightful article on stress for *Rotarian Magazine*, republished in 19 languages.[23]

As a strong believer in spiritual centering, I encourage most of my patients to try an easy and personal approach to reading Proverbs in a very special way. I have them select each day a phrase or verse that resonates with them right then, write it on a 3 x 5 card, and refer to it four times that day. Each day they select a new phrase and on Sunday they review all seven from the week and then start anew. At the end of the month, they review all 30 – and then begin again. I have seen remarkable calming and tranquility emerge, which encourages not only their compliance with treatment but also their improvements across the entire symptom spectrum of TYS.

Dr. Solomon went on to examine the relationship between spirituality and religiousness and important health outcomes, specifically studying people living with HIV. Using the four factors of the Ironson-Woods Spirituality/ Religiousness (SR) Index (Sense of Peace, Faith in God, Religious Behavior, and Compassionate View of Others), they found *each* subscale was significantly related to long survival with AIDS. Long survival was also significantly related to both frequency of prayer (positively) and judgmental attitude (negatively). Their study documented strong and significant correlations with less distress, more hope, social support, health behaviors, helping others, lower cortisol levels and altruistic behavior as mediators of the relation between SR and long survival.[24]

End of the Line – But Not End of Your Rope!

Thank you for joining me on an expedition that has formed a central part of my practice for almost 40 years. This exploration has, of necessity, been severely limited but I have labored to share the most important concepts, within their historical context. Treating patients is the most honorable profession, one that blesses those that give and those that receive. Each has a compassionate duty, one to share fully and truthfully, the other to assess and advise with best effort. As a practitioner of any kind seeing "yeast" patients, your obligation is to seek to understand the pathophysiology and the bases of effective treatments … *and* to listen intently, to revise your diagnoses and instructions as needed to provide speedy results. I trust that my experience and efforts have given you assurance that helping many of those who present to you, who entrust their health and their future to your care, is well within your reach. For many years to come. Godspeed.

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John Parks Trowbridge, MD, recognized for a career of innovative integrative solutions, has been named a Marquis Who's Who Top Doctor in Advanced Medicine and a recipient of the Alfred Nelson Marquis Lifetime Achievement Award. An Eagle Scout and then a National Merit Scholar educated at Stanford, Case Western Reserve, Mount Zion Hospital (now a UC San Francisco campus), the Texas Medical Center, and the Florida Institute of Technology, his exceptional experiences in medicine, surgery, and nutritional technologies encouraged him to ask provocative questions. His persistent curiosity in resolving perplexing issues has enabled him to find effective answers. Serving for years as a senior aviation medical examiner for the FAA, a "company doc" for heavy industry, and medical director for a mold remediation company provided invaluable expertise in toxicology and environmental science. A Fellow of the American College of Advancement in Medicine, he is recipient of the Distinguished Lifetime Achievement Award of the International College for Integrative Medicine. He has served as president, officer, or director of several integrative medical, dental, and lay organizations, has lectured around the world, has produced dozens of hours of CDs and DVDs, and has authored many articles and several books, all sharing his unique perspectives. He and his devoted staff at Life Celebrating Health near Houston, Texas, continue to welcome those who insist on enjoying a healthier future: 1-800-FIX-PAIN, www.healthCHOICESnow.com.

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Stevia and Uncaria Extract (GlucoMedix®) Reduces Glucose Levels and the Need for Medications in Type 2 Diabetes: An Open Label Case Series of Six Patients

by Thomas P. Dooley,[1]* Johnny Martín Paredes Pérez,[2] and Carlos Rengifo Rodriquez[3]

Abstract

Background: GlucoMedix® is an all-natural phytotherapy consisting of a hydro-alcoholic extract of *Stevia rebaudiana* (Bertoni) Bertoni and pentacyclic chemotype *Uncaria tomentosa* (Willd. Ex Schult.) DC. The nutraceutical product has potential for the treatment of hyperglycemia in type 2 diabetes and Metabolic Syndrome.

Methods: Six adult Hispanic type 2 diabetic patients were included in an outpatient retrospective open label physician-sponsored case series study. GlucoMedix® extract of *Stevia* plus pentacyclic chemotype *Uncaria* was administered orally at doses of 2 ml, diluted in water, two or three times daily. The patients' blood glucose levels were recorded historically, at baseline, and thereafter while taking GlucoMedix® orally.

Results: When treated with GlucoMedix®, with or without coincident advice to modify diet, all six patients manifested reductions in blood glucose levels. At baseline four of the six patients were administering one or more prescription treatments for hyperglycemia, e.g., Glibenclamide, Metformin, Vildagliptin, or Insulin. Two patients displayed substantial reductions in glucose of 50 and 70 mg/dl, and in conjunction with the removal of their prior drug treatments of Glibenclamide plus Metformin or of Vildagliptin. An Insulin-treated patient experienced a 50 mg/dl reduction while ceasing Metformin and was subsequently able to reduce the dose of Insulin by half. Thus, in three patients GlucoMedix® abrogated in whole or in part the requirement for pharmaceutical or biologic therapies to achieve substantial beneficial reductions in glycemic levels.

Conclusions: In this proof-of-principle study oral GlucoMedix® was an effective treatment for hyperglycemia in type 2 diabetic individuals. This all-natural phytotherapy can be used beneficially in conjunction with existing pharmaceutical or biological therapy regimens, and in some cases can replace in whole or in part the requirement for pharmaceutical or biologic therapies. These in-life results suggest that this natural product approach can serve as an alternative to prescription monotherapies or multimodal therapies for the regulation of hyperglycemia.

Keywords: diabetes, glucose, *Stevia*, *Uncaria*, cat's claw, Insulin, alternative medicine, natural product

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Background

Type 2 diabetes is a complex metabolic disorder of chronic hyperglycemia involving peripheral insulin resistance, insulin deficiency from pancreatic beta cells, and elevated glycosylation of proteins (e.g., Hb A1C). Glucose control in this disease progressively deteriorates over time. After the failure of diet and exercise to reverse hyperglycemia or to maintain overall health, it is necessary to add oral pharmaceutical therapies to achieve adequate glucose control. When pharmaceutical options fail, the treatment of choice by default is Insulin. If the patient is not fully compliant with the proper use of Insulin, then the disease can worsen, causing greater weight gain, increase in adipose tissue, fatty liver, and thereby entering a harmful cycle for the patient. This can result in diabetic ulcers, impaired vision, and Metabolic Syndrome, thus, extending beyond the primary issue of hyperglycemia.

Obesity, dyslipidemia, and hypertension are often associated with type 2 diabetes in Metabolic Syndrome, which can lead to an increased risk of cardiovascular and cerebrovascular diseases.[1] Metabolic Syndrome is common and affects 34% of adults in the USA[2] and 27% in Peru.[3] Pharmacological interventions, as well as diet and exercise, can treat type 2 diabetes in some individuals. However, given that some drugs can exhibit side effects, many individuals are more interested in the use of traditional medicinal plants or herbal extracts as phytotherapies.

Stevia rebaudiana, a sweet herb native to South and Central America, has long been used by the indigenous peoples for a variety of medical conditions, including diabetes. Steviol glycosides present in dried *Stevia* leaves are responsible for their intensely sweet taste. In addition, various pharmacological effects of *Stevia* and steviol glycosides have been identified in animal models and humans, including antihypertensive[4-10] and anti-hyperlipidemia[11,12] effects. Of high relevance to the current study, *Stevia* and steviol glycosides have demonstrated anti-hyperglycemic effects.[6,11,13-18] In view of its anti-hyperglycemic and antihypertensive effects, *Stevia* has been suggested as a possible treatment for Metabolic Syndrome.[19,20]

Uncaria tomentosa (cat's claw) is commonly used to treat various diseases by South American indigenous people groups.[21-28] Of high relevance to the current study, *Uncaria* has demonstrated anti-hyperglycemic activity,[29-33] perhaps due to alpha-glucosidase and alpha-amylase inhibitory activities.[34,35] *Uncaria* contains various pharmacologically active agents, such as oxindole alkaloids with two major chemotypes: tetracyclic oxindole alkaloids (TOA) and pentacyclic oxindole alkaloids (POA). TOAs act primarily on the central nervous system, while the POAs affect the cellular immune system.[36-38] The interaction of tetra- and pentacyclic alkaloids can be antagonistic. Thus, TOA-free *Uncaria* is preferable. Also, oxindole alkaloids in wild populations of *Uncaria tomentosa* in South America are variable.[39] Therefore, in the present study we utilized a commercial extract that contained pentacyclic chemotype *Uncaria tomentosa*.

In view of the complementary biochemical mechanisms of action of phytochemicals within *Stevia rebaudiana* and pentacyclic chemotype *Uncaria tomentosa*, a hydro-alcoholic extract admixture, GlucoMedix®, has been developed as a commercial product. This study aimed to evaluate this phytotherapy product in a retrospective open label physician-sponsored case series of type 2 diabetic patients as a proof-of-principle.

Methods

This is a retrospective physician-sponsored study of glucose levels in six Hispanic diabetic patients conducted in Peru. The outpatients were under the routine care of the physicians and were assessed and treated orally as outpatients with commercial GlucoMedix® hydro-alcoholic extract (23% ethanol) of pentacyclic chemotype *Uncaria tomentosa* (Willd.) DC (Samento® brand) and *Stevia rebaudiana*. The product was obtained from NutraMedix Inc. (Jupiter, FL, USA). The patients provided consent to the physicians for use of their anonymized results in publications. The patients were advised to administer orally 2 ml (40 drops) per dose, diluted in water, two or three times daily, for a total daily dose of 4 or 6 ml of the extract. Blood glucose levels were recorded historically, at baseline prior to the phytotherapy, and periodically subsequent to commencing the phytotherapy at intervals convenient to the patients at home and the physicians in their offices. At the professional judgment and discretion of the physicians the pharmaceutical and/or biologic treatments for glycemic control were modified in some patients while being administered GlucoMedix®.

Results

Individual Case Reports

Patient S1 is a 53-year-old female (Pucallpa, Peru), 67 kg weight, 163 cm height, and blood pressure of 100/70 mmHg. She was diagnosed with diabetes mellitus 12 years previously, and current diagnoses include diabetes and obesity. S1 was treated with Glibenclamide 5 mg every 12 h for 3 months, then 5 mg every 24 h for five years. Because her blood sugar levels remained high, treatment was modified to add a Metformin 850 mg tablet during breakfast and dinner, in addition to Glibenclamide 5 mg in the afternoon for four years. Despite the modifications of the pharmaceutical treatments, S1 maintained high blood sugar levels (175 - 200 mg/dl).

GlucoMedix® 2 ml (40 drops) was added to the dual pharmacological treatment, 30 minutes before breakfast and dinner, in addition to 2 ml (40 drops) before sleep, for a daily total dose of 6 ml. A decrease in blood sugar levels to 62 mg/dl was recorded 7 days after the start of the use of GlucoMedix®, so Glibenclamide was withdrawn from the pharmacological treatment.

After the second week of starting the GlucoMedix® blood sugar levels were maintained between 62-65 mg/dl. This change prompted a reduction in the dose of Metformin to ½ tablet (425 mg) during breakfast and dinner, which resulted in regularized blood sugar levels between 80-110 mg/dl.

When treated with GlucoMedix® all six patients manifested reductions in blood glucose levels.

During the third week of GlucoMedix® treatment, it was possible to completely withdraw the pharmacological portion of the treatment, leaving only the use of GlucoMedix® and a low carb diet, which resulted in the maintained blood sugar levels of <130 mg/dl. With the use of GlucoMedix® and the removal of the low carb diet, blood sugar levels remained between 130-145 mg/dl.

Patient S2 is a 50-year-old female (Pucallpa, Peru), 59 kg weight, 153 cm height, and blood pressure of 110/70 mmHg. She was diagnosed with diabetes mellitus 3 years ago, and current diagnoses include diabetes and obesity. S2 was on a Vildagliptin treatment (Galvus®) 50 mg daily for 6 months and maintained high blood sugar levels of 180 - 200 mg/dl.

The high blood sugar levels prompted the removal of the pharmacological treatment and start of treatment with GlucoMedix® 2 ml (40 drops) 30 minutes before breakfast and dinner, in addition to 2 ml (40 drops) before sleeping, for a total daily dose of 6 ml, alongside a low carb diet. Blood sugar levels were recorded being between 110 - 130 mg/dl, 7 days after the start of the use of GlucoMedix®.

Patient R1 is a 53-year-old male (Pucallpa, Peru), 112 kg weight, 180 cm height, and blood pressure of 110/80 mmHg. His current diagnosis is type 1 obesity and diabetes. He reported blood sugar levels of 127 mg/dl in monthly control examinations 2 years ago, as well as being overweight.

To improve blood sugar levels, R1 began treatment with GlucoMedix® 2 ml (40 drops) 30 minutes before breakfast and dinner, plus 2 ml (40 drops) before sleeping, for a total daily dose of 6 ml, together with a low carb diet, which ➤

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resulted in a decrease in blood sugar levels between 85-105 mg/dl 8 days after starting the use of GlucoMedix®. Furthermore, the patient continued to maintain blood sugar values between 100-120 mg/dl with the use of GlucoMedix® and without incorporating a low carb diet.

Patient O1 is a 59-year-old male (Pucallpa, Peru), 84 kg weight, 170 cm height, and blood pressure of 130/82 mmHg. He was diagnosed with type 2 diabetes 24 years ago, and current diagnoses include diabetes and obesity. He was treated with Glibenclamide 5 mg every twelve hours and Metformin 850 mg during breakfast and dinner. During the prior 15 years, despite the treatment, O4 had maintained high blood sugar levels (200-270 mg/dl).

The patient added GlucoMedix® 2 ml (40 drops) 30 minutes before breakfast and dinner, also 2 ml (40 drops) before sleeping, for a total daily dose of 6 ml. Together with the dual drug treatments and a low carb diet, after 4 weeks the blood sugar levels were reduced to 121 mg/dl. Treatment continued thereafter, with the patient expressing satisfaction with the addition of the phytotherapy.

Patient R2 is a 54-year-old male (Pucallpa, Peru), 72 kg weight, 171 cm height, and blood pressure of 100/70 mmHg. He was diagnosed with diabetes mellitus 17 years ago, and current diagnoses include diabetes and chronic kidney disease, as evidenced by clinical chemistry (i.e., urea 40 and creatinine 2.1). From 2004 until 2010 he was treated with Metformin 850 mg at breakfast and dinner, in addition to Glibenclamide 5 mg during breakfast and dinner. This medical approach resulted in blood sugar levels of 145-205 mg/dl.

The patient was diagnosed with chronic kidney disease in 2010, for which he was treated by a nephrologist, plus an endocrinologist exchanged the Metformin and Glibenclamide for Insulin 15 IU at breakfast and dinner. However, the patient rejected Insulin therapy in 2011, and proceeded to change his lifestyle (i.e., no alcohol, no tobacco, low carbohydrate diet, and no sugar). With these medical and lifestyle changes he managed to reduce blood sugar levels to 130 - 165 mg/dl.

The patient administered GlucoMedix® 2 ml (40 drops) 30 minutes before breakfast and dinner, plus 2 ml (40 drops) before sleeping, for a total daily dose of 6 ml. This treatment decreased glucose to 110 - 120 mg/dl at 12 days after the start of the use of GlucoMedix®. At 20 days the glucose level reached 78 - 116 mg/dl, and he continued to maintain those values thereafter for more than one year.

Patient R3 is a 65-year-old female (Tarapoto, Dept. San Martin, Peru), 64 kg weight, 154 cm height, and medicated blood pressure of 135/75 mmHg. She has had a diagnosis of type 2 diabetes for 20 years and a history of mismanagement of her disease, as evidenced by Hb A1C greater than 10%. Before the start of the use of GlucoMedix®, the patient was managed with combined therapy of Metformin 850 mg in conjunction with Insulin six years earlier. As an Insulin-dependent diabetic she has been maintained on Glargine Insulin (Lantus) 28 IU/day. She exhibited other comorbidities consistent with Metabolic Syndrome, such as hypertension grade I (Irbesartan 150 mg once daily), mixed dyslipidemia, and obesity grade I, and chronic collateral damage as a poorly controlled diabetic patient, such as stage 2 to 3 kidney failure (mild to medium kidney damage) and mild to moderate proliferative diabetic retinopathy.

Between December 2019 and July 2021, the patient replaced Metformin 850 mg with oral GlucoMedix®. At the time of the start of the all-natural treatment, the patient was poorly managed, having high glycosylated hemoglobin values (A1C > 10%) and fluctuating glycemic levels (> 150 mg/dL). The last baseline control of Hb A1C was 11.2%, and the lipid profile showed mild mixed dyslipidemia. The initial dose of GlucoMedix® was 2 ml (40 drops) twice daily, 20 to 30 minutes before meals, diluted in water, for a total daily dose of 4 ml. At the same time, the patient was instructed to change her style of eating, gradually decreasing the intake of complex carbohydrates and saturated fats, and ceasing sugar from the diet. Frequently used medicines were not initially modified with the exception of discontinuing Metformin.

The first month the patient reported daily glycemic controls with a tendency to decrease, which prompted a decrease in the daily insulin dose, at a rate of 2 IU, each time the patient achieved glycemia less than 100 mg/dL. Within approximately one month the level managed to drop from 28 to 18 IU/day, a decrease that continued until January 2020, stabilizing at 14 IU – Insulin doses that maintained a daily glycemic level below 140 mg/dL, and remaining at this level for more than a year. The A1C levels reduced to values between 5.7% to 6.5% to the present.

A decrease in the level of glycemia was found, the effect was greater if it was accompanied by a change in the eating style in a sustained manner. In the initial adaptation phase, the patient reported symptoms similar to that of hypoglycemia (feeling of weakness, early fatigue, and nausea), so the dose of 2 ml (40 drops) twice daily was temporarily decreased to 2 ml (40 drops) once daily before breakfast, resuming it after 5 days. Improvements were observed in the results of quarterly control laboratory examinations.

During 2020, auxiliary glycemic control tests were performed on a daily and quarterly basis, as well as other complementary tests (A1C and lipid profile). It was observed that the main beneficial effect of the GlucoMedix® extract was that of being anti-hyperglycemic, and as an adjunct to her main treatment (insulin). A lipid-lowering effect was observed. However, more controls are required to determine if it was the result of the consumption of the phytotherapy, or due to other factors. The anti-hyperglycemic effect of the product substantially improves Hb A1C levels, making them acceptable compared to previously recorded baseline level of 11.2%.

Furthermore, the levels of total cholesterol, triglycerides, and LDL were regularized, achieving normal or low-risk levels (assessments in March 2020, September 2020, and January 2021). But more controls are needed to determine whether the beneficial effects are due to the *Stevia - Uncaria* extract and/or to any substantial change in nutrition.

The patient's compliance/adherence on GlucoMedix® was better than when using pharmaceutical medications (e.g., Glibenclamide, Metformin), thus favoring better long-term results and non-abandonment of adjuvant treatment(s). The gradual decrease in the dose of insulin helped to avoid greater long-

term weight gain in the patient, which would have been more detrimental to her Metabolic Syndrome. Furthermore, the patient noted another benefit - the loss of the sensation of bitterness in the mouth that she had reported when using oral Metformin or Glibenclamide.

Group Results

The treatment effects of GlucoMedix® in all six diabetic patients are summarized in **Table 1**. All patients manifested reductions in blood glucose levels within one week to one month while treated with GlucoMedix® at daily doses of 4 or 6 ml. Four of the six patients were receiving prescription drug and/or biologic treatments for hyperglycemia, such as Glibenclamide, Metformin, Vildagliptin, Insulin, or a combination thereof, prior to this study. The results from four of the patients indicate that Glucomedix® may be used beneficially in conjunction with existing pharmaceutical or biological therapy regimens for glycemic control, including tapering doses or ceasing medications.

Remarkably patients S1 and S2 displayed substantial average reductions in glucose (50 and 70 mg/dl, respectively), while replacing the pharmaceutical treatments of Glibenclamide plus Metformin or of Vildagliptin, respectively. Patient R3, who was being treated at baseline with Insulin and Metformin, experienced 50 mg/dl reductions while continuing Insulin and ceasing Metformin. She was subsequently able to reduce the dose of her Insulin by half, and experienced improvement in A1C levels. Thus, in three patients GlucoMedix treatment abrogated in part or in whole the requirement for prescription pharmaceutical or biologic therapies to achieve substantial reductions in glycemic levels [S1, S2, and R3].

Two unmedicated patients [R1 and R2] manifested reductions in glucose of 17-50 mg/dl. One medicated patient [O1] experienced a substantial reduction of 114 mg/dl from a high level of hyperglycemia, yet without modifying the pharmaceutical treatments. Thus, reductions in glucose were observed in both unmedicated and medicated patients, and in the latter category some individuals were able to reduce the dose and/or cease the use of prescription medications.

Discussion & Conclusions

The type 2 diabetes patients' results on oral GlucoMedix® provide initial proof-of-concept evidence of the phytotherapy's ability to regulate the level of blood glucose in humans. Can we speculate on the possible mechanisms of action? Perhaps it increases uptake of blood glucose into tissues and/or increases insulin secretion from the pancreas in diabetic patients. Beyond these possibilities, based upon previous studies on the phytochemicals from *Uncaria* and *Stevia*, this commercial extract might (also) inhibit the enzymatic catalysis of complex carbohydrates, regulate cortisol and the HPA axis, and/or exert pharmacologic effects via other mechanisms of action.

Stevia extract has long been used for the treatment of diabetes in South America.[40] *Stevia* or steviol glycosides were known in humans to affect type 2 diabetes.[4,11,15] *Stevia*-derived ingredients were also effective in rat models of hyperglycemia[13,14,17,18,41] and hyperlipidemia.[12] Furthermore, stevioside is a potent sweetener with no calories. Thus, *Stevia*-derived products can achieve reductions in blood glucose by at least two means: (a) as a substitute for dietary sugars, thus reducing ingested sugars; and (b) as pharmacologic active ingredients affecting glucose homeostasis.

Uncaria extracts have alpha-glucosidase and alpha-amylase inhibitory activities [34,35]. These enzymes catalyze the hydrolysis of complex polysaccharides, such as dietary starch and endogenous glycogen. This enzymatic antagonism might reduce blood glucose derived from dietary and/or endogenous precursors. Furthermore, extracts of *Uncaria* showed a reduction in glycemic levels in mice and rat models.[32,33] Also, *Uncaria* POAs can affect the immune system,[33,38,42,43] but whether this effect on immunity might possibly impact upon glucose regulation is unknown.

Yet another mechanism of action is that steviol glycosides and/or phytochemicals from *Uncaria* might be affecting the endocrine and/or neuro-endocrine system, and in particular the hypothalamic-pituitary-adrenal (HPA) axis. Cortisol levels might be a possible mediator under the influence of these bioactive phytochemicals. Cortisol is known to play a key role in glucose utilization. Patients with Metabolic Syndrome exhibit elevated HPA axis properties leading to hypercortisolism.[44,45]

In multiple rat animal models daily oral administration of GlucoMedix® has been found to reduce hyperglycemia, in addition to hyperlipidemia and hypertension, and without toxicity (Drs. Villegas Vilchez, Hidalgo Ascencios, and Dooley, manuscript submitted). Likewise

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Table 1: Glucose Levels and Concomitant Prescription (Rx) Treatments of Type 2 Diabetic Patients at Baseline and Following Daily Oral Administration of GlucoMedix®

Patient	Age	Sex	Glucose (mg/dl) at Baseline	Rx Treatments at Baseline	Glucose (mg/dl) on GlucoMedix	Rx Treatments on GlucoMedix	Glucose (mg/dl) Reduction (Ave.)
S1	53	F	175-200	Glibenclamide, Met.	130-145	none	50
S2	50	F	180-200	Vildagliptin	110-130	none	70
R1	53	M	127	none	85-105	none + diet	32
					100-120	none	17
O1	59	M	200-270	Glibenclamide, Met.	121	Glibenclamide, Met.	114
R2	54	M	130-165	none	78-116	none	50
R3	65	F	> 150	Insulin, Metformin	< 100	Insulin	> 50
					< 140	Insulin (half dose)	> 10

Abbreviations: Rx, prescription drugs or biologics; Met., Metformin

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other toxicologic studies in rodents have demonstrated the safety of extracts and isolated compounds of *Uncaria tomentosa* and *Stevia rebaudiana.*[13,25,46]

Limitations of this work should be noted: (a) Open label physician-sponsored studies commonly lack randomization, blinding, a placebo control, inclusion and exclusion criteria, and statistical power analysis; (b) The pharmacologic effect(s) on glucose levels might be due to *Uncaria* alone, *Stevia* alone, or the combination thereof; (c) Was the dose of GlucoMedix® optimal? One can speculate that doses lower than 4 or 6 ml per day and/or alternative dosing schedules might also be effective; and (d) There are multiple confounding variables in an "in life" open label study, including the possible effects of dietary and/or behavioral changes coincident with this treatment.

Although the results of this pilot study are indicative of a beneficial restoration of glycemic levels in type 2 diabetic patients, additional clinical trials are merited to confirm this proof-of-principle from six patients. Regardless, a safe and effective natural product, such as GlucoMedix®, that can address type 2 diabetes would be a welcome alternative or adjunctive therapy to pharmaceutical or biologic monotherapies (e.g., Glibenclamide, Metformin, or Insulin) or multimodal therapies (e.g., Insulin plus one or more pharmaceuticals). However, it is recommended that any changes to a patient's prescription drug and/or biologic treatments (i.e., medications, doses, and schedules) be undertaken in consultation with a licensed physician.

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Declarations

Acknowledgements: A physician-sponsored study (e.g., a case report or a case series) of a commercial natural product may be conducted at the discretion of the physician(s) using his/her professional judgment concerning patient care and treatment options. The patients provided consent for use of their anonymized results in publications.

Authors contributions: JMPP and CRR conducted the physician-sponsored study, including patient assessments, treatments, and drafted the initial case report summaries. TPD was the principal author responsible for preparing the manuscript.

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Is Covid-19 Vaccination Safe in Patients with Hashimoto's Thyroiditis?

by Dan Sullivan (ND student) and Baljit Khamba, ND, MPH

Introduction

Hashimoto's thyroiditis (HT) is a chronic autoimmune disease that occurs in all age groups and presents in women to men 7:1.[1] It is characterized by lymphocytic infiltration of the thyroid gland, which usually results in impaired thyroid function and a painless goiter. The exact cause is unknown; however, certain factors can predispose individuals to the development of HT. These factors include genetic susceptibility, such as family history of autoimmune diseases, gene polymorphisms associated with autoimmune diseases (HLA-DR3, HLA-DR4, HLA-DR5, VDR etc.), and chromosomal abnormalities; environmental risk factors, such as selenium deficiency, pollutants, bacterial or viral infections (like EBV), pregnancy, stress; and various immunological factors are thought to play an important role. Thyroid function can be measured using several laboratory markers such as TSH, free T4, or free T3, while HT typically presents with elevated levels of TPOAb (90-95% of patients), TGAb (60-80% of patients), or TSH receptor blocking antibodies (10% of patients).[1]

The Moderna mRNA vaccine enters the cell cytoplasm and is translated by the ribosomes to form perfusion-stabilized SARS-CoV-2 spike proteins. The spike proteins are transported to the cell surface and presented to the immune system. Some of the spike proteins are also processed into smaller peptides that are presented to the immune system. The spike protein peptides are presented to T cells via MHCII, while the spike proteins are presented to B cells via BCR.[2]

The severity of HT independently involves CD8+ activated T lymphocytes and thyroid auto-antibodies. IFN gamma, an inflammatory cytokine produced by Th1 cells, activates cytotoxic T lymphocytes and increases cell-mediated cytotoxicity. IFN gamma may therefore be one influencing factor in the severity of HT. Part of the mechanism of action of mRNA vaccines such as the Moderna COVID-19 vaccine is triggering of the IFN pathway. Theoretically, upregulation of the IFN pathway via mRNA vaccination in an already upregulated state could increase the severity of HT.[3, 4]

Patient Information

Patient X is a 53-year-old Caucasian female with a history of Hashimoto's thyroiditis, facial paralysis, flank pain, chronic fatigue, leg pain, chronic UTI's, chronic constipation, and obesity who presented to BUC clinic for naturopathic evaluation and management of symptoms as well as improved quality of life.

Context: Symptoms of hypothyroidism appeared about 6 years ago, including fatigue and cold intolerance. Patient was first seen at BUC in 2019 to improve thyroid function and improve overall health. Over the next several months, lifestyle, dietary intervention, and supplementation yielded an improvement in her hypothyroid symptoms; however, her physical and mental health began to decline during the COVID-19 pandemic. She received the Moderna COVID-19 mRNA vaccine in hopes of improving her immunity to COVID-19; however, facial paralysis and a worsening of symptoms began shortly thereafter: See Clinical Findings (left).

Clinical Findings

Vitals:	Height 5'5"; Weight 282 lbs; BMI 45.9; BP 128/82; SpO2 96%
Past medical history	Eczema, heart ablation therapy, long standing constipation (typically 3-4 days without a bowel movement), tarsal tunnel syndrome, plantar fasciitis, cysts, and adenomyosis
Allergies	MRI dyes and hydrocodone
Medications and supplements	Armor thyroid 15 mg QD; Vitamin D3 10,000 iu QD; NAC 600 mg QD; Fish Oil 2 g QD; Ashwagandha 450 mg QD; Multivitamin QD; B12, B6, Zinc QD
Social history	Previous veteran, was in the Navy for 20 years and is currently unemployed
Diet	Recent elimination of gluten, vegetables, fruits, string cheese, keto bars, meats, eggs, fish, and gluten-free bread. Hydration typically five glasses of water and five glasses of unsweetened decaffeinated tea per day
Physical Exam	Thyroid tender to palpation (TTP), head and neck lymph nodes TTP, abnormal eye tracking, reduced facial expression on left side of the face, reduced discriminatory touch of left side of face, onset of headache during neurological exam

Discussion

This case showcases the importance of critical thinking, adaptability, and properly evaluating the risks and rewards of interventions such as vaccination in patients suffering from HT. Some of the strengths of this case were the lab testing done on the patient throughout the later stages of her symptomatology, as well as numerous doctor patient encounters over

the past several years, during which her symptoms could be tracked: See Timeline (below). Specifically, the hyperactivity of her immune system, autoimmunity, and inflammation were key players in the reaction (facial paralysis) to the vaccine.

This is a relatively uncommon side effect with VAERS (Vaccine Adverse Event Reporting System) reporting 1986 cases of facial paralysis and 2681 cases of Bell's palsy due to a COVID-19 vaccination (as of 8/12/21).[11,12] However, this potential side effect should be taken into consideration as patients' quality of life can be significantly affected. Additionally, facial paralysis is only one of many potential adverse sequelae that can occur. A proposed mechanism for this outcome is the immunologic response from the vaccine triggers pre-existing underlying dysregulated immunological and inflammatory pathways. The patient's lab work supports this hypothesis as her anti TPO antibodies increased exponentially from before and after the vaccination with no other major life events, diagnoses, or stressors occurring during that time: See Diagnostic Assessment (below). The patient's inflammatory response was elevated pre-vaccine, but we don't have data post-vaccine which is a limitation to this case study. However, it is suspected that her inflammatory status would be more elevated post-vaccine, especially given the exacerbation of her thyroid-related symptoms.

Currently, the Moderna vaccine has a 94.1% efficacy in preventing symptomatic, laboratory-confirmed COVID-19 among persons without evidence of previous SARS-CoV-2 infection in a study of over 30,000 people.[13] Therefore, the risks and rewards of vaccination need to be critically evaluated in patients with HT and potentially other autoimmune conditions, as well as the efficacy of giving a second dose of the vaccine if the first dose yielded a negative reaction.[14-20]

At this time, the patient's prognosis is guarded, given the severity of symptoms and the patient's various comorbidities. The future plan includes ordering follow up labs (listed in the diagnostic section), improving hypothyroid status with med management, dietary and lifestyle intervention, as well as reducing systemic inflammation with dietary, lifestyle, and supplement recommendations, and finally improving facial paralysis by treating underlying causes i.e. inflammation, immune dysregulation.

Timeline

Date:	Main Concerns:	Other Information:
2013	First noticed hypothyroid symptoms	
11/19/19 1st visit at BUC	Thyroid problem, insomnia, chronic UTIs, leg pain, and abdominal pain	Had just completed her 5th round of antibiotics for chronic UTIs. We recommended running thyroid labs at this visit.
12/3/19	Thyroid problem, lower abdominal pain, and chronic bilateral low back pain with bilateral sciatica	Improvement from D-mannose supplementation i.e. no urinary difficulties or dysuria. Improvement in digestion from apple cider vinegar. Recommended Mediterranean diet
1/15/20	Hashimoto's thyroiditis, urinary incontinence, anxiety, depression, and chronic fatigue	No longer walking with a cane, mood had increased since taking thyroid support, fatigue had decreased
3/13/21	Moderna COVID-19 Vaccine	Day of vaccine extreme exhaustion. Day after, a rash developed on most of her body with severe itching. Two days after, involuntary lip twitching. Three days after, left-sided facial paralysis, brain fog, a Hashimoto's flare i.e. her thyroid became noticeably enlarged, tender, and inflamed, could not speak for approximately two weeks
5/12/21	Depression since the COVID-19 pandemic, decline in overall health, weight gain, severe fatigue, brain fog, urinary incontinence, facial paralysis	Perimenopausal, menses ranging several months between. 35-40% improvement in facial paralysis, flank and back pain, negative urine test for UTI and yeast. Was given an antiviral medication from other health care provider to help with facial paralysis and chronic constipation sporadically resolved shortly thereafter
6/9/21	Hashimoto's thyroiditis, chronic fatigue, facial paralysis, and intermittent flank and low back pain	No further improvement in facial paralysis. PCP recommended a brain MRI to rule out brain tumor or other potential cause for facial paralysis
8/13/21	Facial Paralysis, Hashimoto's thyroiditis	No further improvement in facial paralysis. Brain MRI results within normal limits. Reported an improvement in both mood and energy levels, as well as a six-pound weight loss.

Diagnostic Assessment

1/15/20	5/12/21	Future Blood Work Recommendations 8/21
Anti-TPOab: 291 High (0-34 IU/mL)	Anti-TPOab: High 8373.6 (0-34 IU/mL)	TSH, Free T4, Total T4, Free T3, Total T3
HsCRP: 14.3 High (0-2.9mg/L)	TSH: 4.62 High (0-4.5 µU/mL)	Anti-TPOab, Anti-TGab
Homocysteine: 11 High (0-10.3µmol/L)	Free T3: 3.2 (2.30-4.20 pg/mL)	Vitamin D
Anti-TGab: 64.9 High (0-1.00 IU/mL)	Total T3: 145 (76-181 ng/dL)	Homocysteine
SHBG: 142 High (17-124 nmol/L)	Free T4: 0.9 (0.80-1.80 ng/dL)	CMP, CBC, CRP
	eGFR: 61 (60-160 mL/min/1.73m2)	MTHFR, Celiac Panel
	Glucose: 91 (65-99 mg/dL)	Ferritin, B12

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Vaccination Safety in Hashimoto's Thyroiditis Patients

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Therapeutic Intervention

Date	Intervention	Rationale
11/19/19	D-mannose powder by Pure Encapsulations 2 g QD	UTI support and symptom relief[5]
	Apple Cider Vinegar 2 g PRN	Stimulation of digestive enzymes and HCl production to support digestion and assimilation of nutrients
12/3/19	Thyroid Support Complex by Pure Encapsulations 2 caps QD	Thyroid support and necessary nutrients and cofactors for thyroid hormone production
	D-mannose 2 g PRN	UTI support and symptom relief
	Mediterranean diet	Reduce inflammation, improve lipids, improve antioxidant status and detoxification
1/15/20	Basic B-Complex by Thorne - 1 cap QD	Reduction of homocysteine, support energy production
	Boron 6 mg QD	Reduction of SHBG, reduction of hsCRP, increased glutathione production[6]
	Adaptogenic Tincture (*Eleutherococcus senticosus* 30mL, *Centella asiatica* 15mL, *Passiflora incarnata* 30mL, *Melissa officinalis* 15mL, *Bacopa monnieri* 30mL) - 2 mL BID	Increase resilience to stress, reduce fatigue
5/12/21	Ashwagandha extract by Protocol for Life Balance 450 mg QD	Thyroid support, mood support, stress reduction, weight management[7]
	Increase water intake	Increase detoxification and aid in weight management
	Two-day food diary	Track dietary habits and ensure compliance
6/9/21	Armour Thyroid 30 mg QD	Thyroid support, addressing chronic fatigue, elevated TSH
	Gluten elimination	Reduce potential molecular mimicry and Hashimoto's severity from molecular mimicry of gluten and thyroid tissue[8]
	Vitamin D3 10,000 iu QD	Increase T-regulatory cell function and self tissue recognition[9]
	NAC by Klaire Labs 600 mg QD	Support glutathione production and detoxification
	Increase water intake	Increase detoxification and aid in weight management
	Increase vegetable intake	Increase detoxification, aid in weight management, aid in antioxidant status
8/13/21	Fish oil by Nordic Naturals 2 g QD	Reduce inflammation, reduce mildly elevated lipids[10]
	Trace Minerals by Pure Encapsulations 1 cap QD	Thyroid hormone production support
	Egg and Dairy elimination	Reduce inflammation and potential food sensitivity
	Reduce Armor Thyroid to 15 mg QD	Due to excessive sweating on 30 mg QD

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Dan Sullivan is a former division one hockey player turned health professional. He began his career in health by pursuing certification as a health coach from the Institute for Integrative Nutrition followed by a high-performance coaching certification from Bulletproof. After working for and being mentored by a functional medicine doctor for four years, he is currently pursuing a doctorate in naturopathic medicine at Bastyr University San Diego. Dan has consulted with hundreds of patients on diet and lifestyle modifications as well as facilitated neurofeedback training and QEEG brain mapping for patients at the Maine Center for Neurointegration. After graduation, he plans to specialize in men's health, sports performance, and mental health. In his free time, he enjoys reading, traveling, dancing Argentine tango, and plans to attain his private pilot's license.

Dr. Baljit Khamba, ND, MPH, EdD(cand) is an assistant professor at Bastyr and a naturopathic doctor. She graduated from the Canadian College of Naturopathic Medicine in 2009. Dr. Khamba also completed her undergraduate degree in cognitive psychology at York University and Master in Public Health with a focus on nutrition and mental health from Lakehead University. She is currently completing her Doctorate of Education at the University of Western Ontario with a focus on leadership.

At Bastyr University, Dr. Khamba is the Chair of Clinical Sciences and is actively involved with teaching students in the Naturopathic Medicine Program. Both Dr. Khamba and Dr. Roth teach students case report writing skills in Advanced Case Studies. Here, they write case reports based on patients they have seen through Bastyr University's clinic.

Dr. Khamba has extensive research experience with a focus on natural health product safety, as well as nutrition and mental health. She most recently completed a rapid review on honeybee products and treatment of respiratory illness symptoms, like those of COVID-19.

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What Causes Antibiotic Resistance, and Do We Have a Solution?

by Sue Visser

A growing number of bacterial diseases are becoming resistant to tried and trusted antibiotic treatments. Newer types of antibiotics also lose their efficacy against perpetually rebellious bacteria that cause illness, infectious lesions and loss of lives. Bacteria seem to acquire their drug resistance by swapping genes with other organisms or sampling antibiotics and developing a resistance to them.[1] Methicillin-resistant *Staphylococcus aureus* (MRSA) causes a universal problem with sepsis in post-surgical wards. Other infections due to fungi, yeasts, mycoplasmas, and parasites have also become resistant to standard medical treatments. What is behind this microbial rebellion that is gaining the upper hand in hospitals? In answer to an urgent plea from doctors for intervention,[2] we need to first address the cause of the problem. It is not only that our antibiotics no longer work. Some still can – in a petri dish. But when bacteria hide under a blanket of slime, called a biofilm,[3] the antibiotics cannot reach them. Yet we continue to use them and kill off beneficial bacteria – our probiotics as a matter of course.

Blame It on the Biofilms!

Dental plaque is a typical example of a biofilm, one that bugs us every day; and we fight it by brushing, rinsing, and flossing – sometimes to no avail. Biofilms are formed by a colony of bacteria on any surface[4] – a tooth, membranes and tissues, surgical implants, medical equipment and so on. The surface bacteria are vulnerable to attack and exude a stickiness to anchor themselves down. Then they begin to communicate with each other by means of QS or quorum signalling.[5] Call it telepathy! The broods of bacteria form into colonies that can alter their DNA and basic functionality to adapt to the new zone. They exude a slimy blanket of extracellular polymeric substances (EPSs) over themselves plus neighboring debris and other microbes for company. This is their new home – a biofilm made out of protein, polysaccharides, fibrin, and toxins that are acidic enough to attract a coating of calcium – rather like tiles on a roof. Other parasites, especially mycoplasmas also inhabit biofilms. These mini-microbes cause autoimmune, neurological, and chronic degenerative diseases that persist for many years without much relief, it seems. The grip of fibromyalgia, chronic fatigue, cancer and rheumatoid arthritis, Alzheimer's, Parkinson's, terminal neuropathy and multiple sclerosis is also reinforced by the biofilm phenomenon.

Within their protective, nourishing environment, bacteria and other pathogens can evade the immune system and ward off the silver bullets that doctors fire at them. They can divide and multiply, disrupt DNA and then pop out, invade the bloodstream or seep through (leaky – parasite damaged) blood vessel walls to seek a new residence within tissues. It is here that autoimmune reactivity adds to the mayhem; 80% of chronic infectious diseases are mediated by biofilms that result in persistent inflammation and tissue damage.

The Importance of Probiotics

Upping the dosage of antibiotics or using them to fight off other microbes merely kills off our resident gut flora as a further blow. The hundreds of strains of beneficial bacteria known as probiotics actually help us to control yeast[6] (*Candida albicans*) overgrowth in the first place! An excess of yeast then reverts to mold and fungal-based pathogens called mycotoxins and cause new illnesses and allergies. Probiotics are needed to digest food, to make vitamins, metabolize hormones, neurotransmitters and enzymes; and they form 80% of our immune system. So, you could say that the inappropriate use of antibiotics wipes out a major part of our immune system and sabotages our basic physiology. Probiotics also help to bulk up the intestines and facilitate healthy bowel movements.

Diarrhea as a side effect of taking antibiotics makes the gut more vulnerable to infections and renders it unable to digest any food. So there is little point in persisting with antibiotics[7] and ignoring the need to replenish probiotics.[8] This practice is doing more harm than good and causes mental and emotional problems[9] – believe it or not. The gut has a direct link to the brain via the vagus nerve to maintain supplies of our feel-good neurotransmitters, like serotonin and GABA, to the brain and other receptor sites. Within the gut, serotonin production depends on probiotics – in particular the *Bifidobacterium* strains and *Lactobacillus rhamnosus*. To compensate we take antidepressants, tranquilizers, sleeping pills, and other drugs that, in turn, have adverse effects. Bad gut health = poor mental health = replace probiotics, please![10] Probiotics also come from naturally fermented foods,[11] the traditional way to stock up and maintain a healthy colony of beneficial bacteria. Prebiotics are sources of fiber in certain foods like onions that facilitate the growth of probiotics.[12]

The Biofilm's Expansion into Tumors

Within a biofilm, normal cells that are damaged (genetically mutated cells) can also divide and multiply undisturbed. The family of cell-proliferating estrogens (16-estrogen) take over to facilitate the growth of the mound and oust the 2-estrogens that block cell-dividing receptors as a safety measure. A simple 2/16 urine test at this stage will show the extent that the baddies outnumber our protective estrogens long before lumps and bumps are detected in breasts or prostate glands. The bad cells can form clumps of tissue large enough to excrete their own human growth hormone (HGC). Intended as a gestational signal to allow the growth of a fetus, it can also switch off the immune alert to rapid cell division (tumor formation.)[13] Now the real mischief begins, because a tumor can develop, and the immune system cannot seek out and destroy the real culprits, namely the "drug resistant" bacteria and other pathogens, including mycoplasma. *Pseudomonas aeruginosa*, associated with cystic fibrosis, and *Staphylococcus aureus*, which is responsible for most wound infections, are typical examples of persistent pathogens that form biofilms.

Biofilms Plus an Iodine Deficiency Facilitate the Growth of Cancer

Bundles of fibrous tissue tend to accumulate and form swollen lumps when we are deficient in iodine.[14] Without any iodine the lymphatic system cannot efficiently flush out metabolic waste, mycotoxins, and other bugs. Ideally blood circulates our iodine reserves in breast and thyroid tissue, killing off microbes; but most of us do not have enough iodine to maintain thyroid health, hormone regulation, or breast tissue safety – let alone kill bacteria! This includes bacteria that ooze out with sweat, under the armpits. When iodine reserves are up and running, the oxidizing bacteria (stinky) are automatically zapped and do not overwhelm us with odor.

Modern man prefers to use antiperspirants. As a result, the bacteria and other toxic debris get trapped inside the breast tissue and the bacteria whip up a biofilm. DNA-damaged cells, assisted by an estrogen overload, then automatically clump into a cell-proliferating lump. Cutting away malignant or cancerous tissue does not stop it from returning. Biofilms also play havoc in these post-surgical wounds. The anaerobic bacteria swim around pools of slime and pus and let off a very bad odor. How about a little iodine instead? Iodine kills 90 percent of bacteria on the skin within 90 seconds (a deodorant?), but its use as an antibiotic has been ignored until recently. Iodine exhibits activity against gram-positive and gram-negative bacteria, mycobacteria, fungi, yeasts, viruses, and protozoa.[15] If these are not eliminated, they will perpetuate the pro-cancerous conditions that need radiation, chemotherapy, and surgery.

We all have the potential within us for cancer to advance, undetected at a very early stage when biofilms gain the upper hand. It is now known that bacteria as well as mycotoxins are partners in crime and contribute to the aetiology of cancer long before lumps are found. How many of us check the iodine status, the 2/16 urine ratio, or scan for symptoms of biofilms before we resort to oncology? Iodine expert Dr. Brownstein found that it was impossible to instill cancer into rats that have a healthy iodine status.[14] He suggested that the average person take two-to-three drops of Lugol's iodine a day for good measure. (But not those who suffer from thyroid growths or from an autonomous thyroid – very rare, but doctors can follow this up should there be a reaction to iodine[16]).

Unusual Ways to Bust Up Biofilms

If the biofilm integrity is violated – torn, open, dissolved or gobbled away – most of the bacteria within can still be efficiently zapped by antibiotics. A combined strategy[17] that embraces green herbs with silver bullets is gaining ground in the fight against bacteria[18] at all levels, including the biofilm itself. While many scientists are racing to formulate the ultimate patentable biofilm buster, there is some old-fashioned chemistry that is coming to the fore. Using a combination of natural remedies such as garlic and honey to help control infections is not just folklore.[19] Scientists have now discovered that some of our favourite foods, spices and herbs hold the key to penetrating or even ripping up a biofilm to help antibiotics to target the bacteria.

Weird science indeed, but the most effective strategy according to some in depth studies is to disrupt their communication network – the QS or quorum signalling setup.[5] Garlic blocks the production of quorum-sensing signal molecules and has also been proven in a recent study to wipe out a broad range of gram-positive and gram-negative bacteria.[20] Rose, geranium, lavender, and rosemary essential oils target *E. coli* signals. Clove bud, cinnamon, lavender, and peppermint oils contain effective QS inhibitors against *Pseudomonas aeruginosa*. By taking other natural enzymatic anti-biofilm agents such as nattokinase and serrapeptase in combination with antibiotics, doctors are achieving better results than when using them separately. Interrupting pathways used by bacteria and other germs to communicate also inhibit biofilms from forming in the first place. Anti-parasitic/anti-microbial herbs,[21] such as olive leaf[22] and artemisia also penetrate biofilms and effectively help to control many infectious diseases, such as malaria, that are beyond the scope of antibiotics.

Interrupting pathways used by bacteria and other germs to communicate also inhibit biofilms.

Olive leaf extracts or even tablets made from olive leaves are easier to ingest and have many benefits for patients especially in rural areas who cannot afford other medications. They do not harm our resident gut flora and can even help to prevent colds and flu. (Some doctors I know take them too!) Olive leaf tablets are also useful as anticoagulant, hypertensive and diabetic treatments. Doctors are also finding that they can effectively treat candidiasis[23] when their drugs and restrictive diets have failed.

Sweet Strategies Against Biofilms

Honey and garlic especially, contain a volley of QS disruptors that allow antibiotics to invade the biofilm. These are more than "natural antibiotics" as they attack biofilms as well as kill germs. Colloidal silver and povidone iodine[24] augment the antibacterial effect. Now we know why modern hospitals are reverting to this sweet elixir and getting excellent results. Honey is a biofilm buster of note![25] Wound care especially, can

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benefit from honey as a natural healer, and it helps to clear up perpetually weepy wounds. Dental plaque is a biofilm that harbors a nasty, tooth-gobbling bacteria called *Streptococcus mutans*. Xylitol is a sweetener derived from cellulose that wipes out this deadly duo, and even mint deserves recognition as a refreshing, pleasant-tasting biofilm buster. Maple syrup[26] and stevia[27] are also the sweet enemies of biofilms to pave the way for antibiotics to kill off the bacteria within.

Herbs and Essential Oils Also Work Against Biofilms

Many foods, herbs, and essential oils[28] have been shown to inhibit quorum sensing, and are referred to as QS inhibitors. Essential oils, especially clove oil,[29] contain solvents called phenols, which may enable them to cut through biofilms throughout the body; but not all of them are really ingestible. Essential oils also kill off viruses, bacteria, parasites, and fungi. Tea tree and eucalyptus essential oils are effective against *Staphylococcus aureus*, methicillin-resistant *S. aureus* (MRSA), *E. coli*, *Pseudomonas aeruginosa*, and *Candida albicans* biofilms. Eucalyptus, peppermint, clove bud, tea tree, and lemongrass essential oils have been used safely and effectively both topically and internally, for instance, in Lyme disease patients diagnosed with biofilm colonies.

Conclusion

Despite the frustration of pathogens gaining the upper hand and doctors running out of silver bullets to fire at them, there are plenty of medical practitioners who have embraced these natural protocols to assist them. The use of traditional antibiotics used in combination with alternative antimicrobials and anti-biofilm agents includes many of our favorite foods, herbs, and spices. So we can truly let our food be our medicine to help eradicate pesky bacteria![17]

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Eat What Grows in Season

by Andrea Castillo and Erik Peper

We are what we eat. Our body is synthesized from the foods we eat. Creating the best conditions for a healthy body depends upon the foods we ingest as implied by the phrase, *Let food be thy medicine*, attributed to Hippocrates, the Greek founder of Western medicine.[1] The foods are the building blocks for growth and repair. Comparing our body to building a house, the building materials are the foods we eat, the architect's plans are our genetic coding, the care taking of the house is our lifestyle and the weather that buffers the house is our stress reactions. If you build a house with top of the line materials and take care of it, it will last a lifetime or more. Although the analogy of a house to the body is not correct since a house cannot repair itself, it is a useful analogy since repair is an ongoing process to keep the house in good shape. Our body continuously repairs itself in the process of regeneration. Our health will be better when we eat organic foods that are in season since they have the most nutrients.

Organic foods have much lower levels of harmful herbicides and pesticides, which are neurotoxins and harmful to our health.[2,3] Crops that have been organically farmed have higher levels of vitamins and minerals, which are essential for our health, compared to crops that have been chemically fertilized.[4]

Even seasonality appears to be a factor. Foods that are outdoor grown or harvested in their natural growing period for the region where it is produced, tend to have more flavor that foods that are grown out of season such as in green houses or picked prematurely thousands of miles away to allow shipping to the consumer. Compare the intense flavor of a small strawberry picked in May from the plant grown in your back yard to the watery bland taste of the great looking strawberries bought in December.

The Seasonality of Food

It's the middle of winter. The weather has cooled down, the days are shorter, and some nights feel particularly cozy. Maybe you crave a warm bowl of tomato soup so you go to the store, buy some beautiful organic tomatoes, and make yourself a warm meal. The soup is… good. But not great. It is a little bland even though you salted it and spiced it. You can't quite put your finger on it, but it feels like it's missing more tomato flavor. But why? You added plenty of tomatoes. You're a good cook so it's not like you messed up the recipe. It's just missing something.

That something could easily be seasonality. The beautiful, organic tomatoes purchased from the store in the middle of winter could not have been grown locally, outside. Tomatoes love warm weather and die when days are cooler, with temperatures dropping to the 30s and 40s. So why are there organic tomatoes in the store in the middle of cold winters? Those tomatoes could've been grown in a greenhouse, a human-made structure to recreate warmer environments. Or they could've been grown organically somewhere in the middle of summer in the southern hemisphere and shipped up north (hello, carbon emissions!) so you can access tomatoes year-round.

That 24/7 access isn't free, and excellent flavor is often a sacrifice we pay for eating fruits and vegetables out of season. Chefs and restaurants who offer seasonal offerings, for example, won't serve bacon, lettuce, tomato (BLT) sandwiches in winter. Not because they're pretentious, but because it won't taste as great as it would in summer months. Instead of winter BLTs, these restaurants will proudly whip up seasonal steamed silky sweet potatoes or roasted Brussels sprouts with kimchee puree.

When we eat seasonally available food, it's more likely we're eating fresher food. A spring asparagus, summer apricot, fall pear, or winter grapefruit doesn't have to travel far to get to your plate. With fewer miles traveled, the vitamins, minerals, and secondary metabolites in organic fruits and vegetables won't degrade as much compared to fruits and vegetables flown or shipped in from other countries. Seasonal food tastes great *and* it's great for you too.

If you're curious to eat more of what's in season, visit your local farmers market if it's available to you. Strike up a conversation with the people who grow your food. If farmers markets are not available, take a moment to learn what is in season where you live and try those fruits and vegetables next time to go to the store. This Seasonal Food Guide for all 50 states is a great tool to get you started (https://www.seasonalfoodguide.org/).

Once you incorporate seasonal fruits and vegetables into your daily meals, your body will thank you for the health boost and your meals will gain those extra flavors. Remember, you're not a bad cook: you just need to find the right seasonal partners so your dinners are never left without that extra little something ever again.

Sign up for Andrea Castillo's "Seasonal," a newsletter that connects you to the Bay Area food system, one fruit and vegetable at a time (https://seasonal.substack.com/). Andrea is a food nerd who always wants to know the what's, how's, when's, and why's of the food she eats.

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Some Summer Reading

review by Jonathan Collin, MD

Spillover: Animal Infections and the Next Human Pandemic by David Quammen
W.W. Norton & Company, https://wwnorton.com/
c. 2012; 592 pp; $19.95 (paperback)

The headline as I started to type this was that a SARS-CoV-2 variant is expected to have a surge this fall and winter with numbers like 100 million cases. At the very least this would seem to mean that the virus should bottom out this summer. Does that mean we gather with friends, go to ball games and theatre and museum, travel to beach or lake, attend concerts, eat at restaurants again like pre-pandemic? Yes. But there is assuredly a sense of caution wondering about how well we are doing after congregating in a crowd for hours. Those summer nights dancing ecstatically in a loudly blasting club to all hours of the night will certainly give pause (to some of us).

Quammen, a science journalist among the best of them, author of the non-fiction, *The Reluctant Mr. Darwin* and the fiction, *Blood Line,* won in 2000 "The Best American Science and Nature Writing" award. *Spillover*, written in 2012, would deserve such an award by this reviewer. I don't usually think of science books as "page turners," but Quammen writes as well as any mystery writer and keeps the reader intent to read through each "adventure" he experienced studying a pathogen, more often than not, a virus. The book is about spillover, the event that takes place when a virus or bacteria or parasite jumps from an animal to human. Often there is an intermediate animal serving as a reservoir so the spillover moves from the host to the reservoir to the human. But the spillover can be much more complicated. I've been doing a reread because Quammen is just that much fun to read.

Given that spillovers take place all the time and all around the world, Quammen makes great efforts to study the event in the wild (or city) close in time to when the spillover took place. Of course, some occurred much earlier like Ebola in 1976; HIV is estimated to have occurred in the 1920s – both in central Africa. The spillover that captured my imagination occurred following what had fallen from a tree near Brisbane, Australia in 1994. At a small horse ranch, a horse became unsettled in the late evening, was not looking good, had some swelling around the lips, began to sweat, and was sluggish. The trainer was called urgently because this was a pregnant horse and there was a foal to save, but his efforts did not help, so a veterinarian was called as well. Symptoms began to develop rapidly with the horse developing a fever, rapid heart rate, and uneaten carrot shreds were seen remaining in the mouth. The vet injected antibiotic and analgesic but by the following morning the horse lay prone, soon to die. The next day other horses showed signs of illness, fever, muscle spasms, respiratory symptoms, and blood tinged salivation. Within 12 hours seven horses were dead. Soon other horses at nearby ranches showed signs and had to be put down. Of course, the vet and local health authorities were alarmed trying to understand the cause of the sudden illness. Meanwhile the trainer and an assistant had become ill. The trainer, after a protracted illness, died; his assistant survived as did the vet who attended the sick horses.

What was the cause? Ultimately after infectious disease specialists intervened, necropsies were undertaken, a new virus was discovered, Hendra, named after the town where the horses had expired. Hendra is a paramyxovirus, somewhat different from a typical one in that group with a double crown of spikes. It was more formally named equine morbillivirus, but it remains simply called Hendra. In the following year more horses would develop Hendra as would more humans. Searching for the origin of the virus was quite the Sherlock Holmes hunt. I won't spoil the fun of reading *Spillover* by disclosing host-reservoir-human events although you already know the virus jumped from horse to human. But to whet your appetite let me say that quite literally this was a situation where however the virus appeared in the affected horse fell from a tree. I know that's mean to leave it like that, but I don't want to be a spoiler.

Quammen also takes a look at many other spillovers, including Ebola and HIV. His book is a prescient prelude to what we have been experiencing with Covid-19. One takeaway which is food for thought is that while we consider virus, a pathogen, something "bad" from our perspective, there may be a more benign world view of virus. Just as mammal predators like the wolf kill elk, deer, beaver, rabbit and other mammals allowing a greater diversity of animals and plants, different virus species kill or sicken most all animal and plants controlling their numbers. From that world view might virus be considered a natural control of excess human population?

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The Lobay Viewpoint

by Douglas Lobay, BSc, ND
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Resperex: A Blend of Lobelia and Lung Herbs

I live in the beautiful Okanagan valley of southern British Columbia, which lies on the northeast edge of the North Cascade mountain range in Washington State. The environment resembles northern California's Napa Valley. The climate is a complex tapestry of semi-arid desert mixed in with fertile soil for orchards and vineyards and temperate forests of pine, spruce, and fir trees. Okanagan Lake splits the valley and attracts tourists for sunshine, wine, and fruit. I am truly blessed to able to work and play in such a beautiful geographical region.

However, the drastic change in weather patterns is a sobering reality of the world we now live in. Climate change affects both air quality and purity everywhere. Wildfires have ravaged the Okanagan valley for two decades. The Okanagan Mountain Park fire of 2003 was a firestorm that devoured homes and habitat on a scale never seen before. The wildfire season of 2018 blanketed the valley with plumes of thick smoke that never left the area for over two months. The smoke was so thick and putrid that it resembled a foggy day in London. And to excuse the vernacular, but you could literally cut it with a knife. The air was hot and dry, and breathing was labored and difficult.

Few would argue that the quality of air we breathe is getting worse. Air pollution is a worldwide problem that affects millions of people. Air contaminants from human activity include industrial emissions, auto traffic, coal burning, home heating, shipping, construction, agricultural work, war and fire incidents. Also natural contributions to air pollution can be from earthquakes, volcanic activity, forest and wildfires, and extreme temperature fluctuations. Chemical air pollution can contain inorganic chemicals such as ozone, carbon monoxide, nitrogen dioxide, and sulfur dioxide and organic chemicals such as poly and mono-cyclic hydrocarbons, including benzene, toluene, industrial petrochemicals, other aliphatic chemicals, and toxic heavy metals, including mercury, cadmium and asbestos. The most harmful forms of particulate matter are less than 10 micrometers in diameters. These particles are inhaled and can affect the bronchi and bronchioles but the action of the mucociliary tract usually helps to expel them. Particles less than 2.5 micrometers in diameter pose a particular problem because they can be inhaled and lodged deep in lung tissue. Ultra-fine particles are less than 0.1 micrometer in diameter, and they can actually be absorbed into systemic circulation and lodged in tissues throughout the body.[1]

Air pollution can contribute to airway and lung problems, including asthma, chronic obstructive pulmonary disease (COPD), emphysema, respiratory infections, chronic bronchitis and sinusitis, and lung cancer. Air pollution can also contribute to systemic disease, including cardiovascular disease with heart attacks and stroke. Air pollution can also be particular bothersome to the developing fetus in pregnant women, young children, and the frail elderly. Sometimes the effect of environmental exposure is latent on the body and will manifest as disease years and decades later.[1]

As a naturopathic physician I am always looking for natural ways to improve lung and respiratory function. I have been using a lung formula that incorporates lobelia, peppermint, fenugreek, and wild cherry bark. It is a proprietary custom formula that I blend myself and get professionally encapsulated. I do not sell it commercially, but just dispense it in the office to patients. I have tinkered with the formula and have been happy with the current formulation. Most patients like the effects, and it seems to work well. At the very least it is a good, natural expectorant that helps to remove mucous and phlegm from the lungs. At its best it can improve lung function as well as a metered dose inhaler or mdi in asthmatics and those with chronic bronchitis.

Lobelia (*Lobelia inflata*) is an annual or biennial plant that grows up to one meter in height and is native to parts of North America. The small distinctive blue and purple petals and ease of growth make this a gardener's favorite. Some native Indian cultures used to smoke the aerial parts of the plant and used it in indigenous medicine. Lobelia contains 0.48% piperidine alkaloids composed mainly as lobeline.[2] Other constituents

include lobelanine, isobelanine, lobelandine, apigenin, quercetin, coumarins, glycosides and flavonoids.[3] Lobeline shares some of the same chemical characteristics as nicotine and extracts of lobelia can even taste like a cigarette. As such, lobelia has been used as a smoking deterrent. Lobelia is a good expectorant and can help improve lung function. Lobeline may stimulate pulmonary sensory afferent nerves. Lobelia may stimulate chemoreceptors and mechano-receptors in juxtapulmonary capillaries as well as the carotid arteries. This may in turn stimulate the phrenic nerve and improve vascular tone to lung tissue. Lobeline can improve the cough reflex, promote expectoration, and relax bronchial smooth muscle.[4] Other possible mechanisms suggest that lobeline decreases lung inflammation and edema through modulation of nuclear factor-kappa beta.[5] This inhibits several pro-inflammatory pathways, including nitric oxide, cyclooxygenase-2, tumor necrosis factor and inteleukin-6.[6] Lobeline has also demonstrated to decrease oxidative reactive species in lung tissue. It should be mentioned that high doses of lobelia and lobeline can cause nausea and vomiting. Excessive doses of lobelia and lobeline have been reported to cause respiratory suppression, heart arrhythmias, mental confusion, and stupor.[2,3]

Fenugreek (*Trigonella faenum-graecum*) is an herb and culinary spice that has been used as a carminative and digestive aid, hormone balancer, hypoglycemic aid, and as a galactogogue. Fenugreek seeds contains alkaloids, including trigonelline, steroidal saponins, bitter principles, volatile oils and up to 30% mucilage. It is a good demulcent and vulnerary. Fenugreek has mild expectorant qualities and may help improve lung function.[7] One study on mice showed that *Trigonella foenum-graecum* has a significant anti-inflammatory effect on lung tissue. Researchers concluded that it may prove to be an efficacious therapeutic regent on allergic asthma.[8]

Peppermint (*Mentha piperta*) is a common aromatic herb that is widely used as an herb in cooking and teas and also a wide variety of over-the-counter cosmetics and analgesic counter-irritant medicines. The plant contains up to 2.0% volatile oil in all part, including the stalks, stems and leaves, in addition to tannins and bitter principles. Menthol makes up to 50% of the content of the volatile oil along with jasmone and menthone and minor esters.[9] Mint and menthol can improve lung function. In one small study, supplementation of peppermint oil in twelve male volunteers improved exercise tolerance and lung function parameters.[10] In another small study with 23 patients, nebulized menthol helped to reduce airway hyper-responsiveness in cases of mild asthma without improving lung parameters on spirometry measurement of forced expiratory volume. The patients that consumed menthol had less wheezing episodes and consumed less bronchodilator medicine than the control group.[11] It should also be mentioned that large dose of menthol can cause airway irritation and asthma in some individuals.

Wild cherry bark (*Prunus serotina*) has been popular in folk medicine as an expectorant, antitussive, antispasmodic and anti-inflammatory. It was a popular ingredient in cough syrups and bronchial formulas.[2] The active ingredients in wild cherry bark include cyanogenic glycosides like prunasin, amygdalin, maldelonitrile and hydrocyanic acid, benzaldehyde, volatile oils, tannins, coumarin, a resin mainly as scopletin, and trace minerals. The hydrocyanic acid content varies from 0.23 to 0.32% of the dry bark. Wild cherry bark has demonstrated a sedative effect on the cough reflex.[12]

The combination of herbs in Resperex is a good expectorant that helps to expel mucous and phlegm from the broncho-pulmonary tract and sinuses. It can help to relax the bronchi smooth muscles and improve air flow. In some patients I have measured an approximate 25% to 30% increase in office based spirometry as measured by FEV (forced expiratory volume). It can be a good adjunct to the use of bronchodilator medicine. For some patients it seems to work as well as mdi inhaler. I have used it with patients on beta-agonist inhalers as well as inhaled corticosteroids. I have modified the formula by adding licorice (*Glycyrrhiza glabra*), mullein (*Verbascum Thapsus*), magnesium, potassium iodide, and guaifenesin or glyceryl guaiacolate with no appreciable change in benefits. I seem to like the formulation that has a small amount of guaifenesin and potassium iodide. I have additionally recommended patients to take supplemental magnesium and N-acetyl cysteine.

No one can deny that the quality of the air we breathe is important for human health. As climate change and air pollution increases, the quality of the air we breathe decreases. In true ecological fashion, we can understand the inter-relatedness of environmental disasters in one region of the planet affecting the air quality in another region. As climate change and air pollution worsens, lung disease increases. The quest to find some natural based supplements to improve lung function has been an interesting forethought. Resperex, a mixture of the herbs lobelia, fenugreek, peppermint, and wild cherry bark is an attempt to help clear the airways and improve lung function.

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Pediatric Pearls

by Michelle Perro, MD

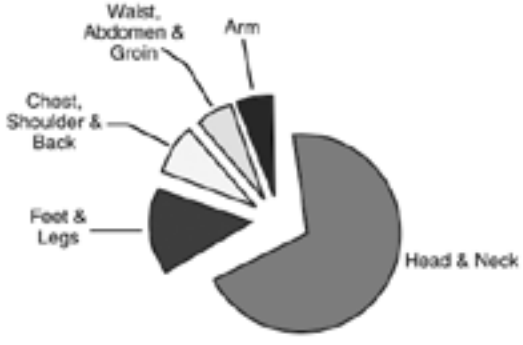
Managing New Tick Bites in Children with Lyme Disease

Through the years, I've observed that certain children seem to be tick magnets. An entire family will be out for a hike, but just one of the kids comes home with a tick either behind the ear, embedded in the axilla or along the hairline (ticks' favorite hiding spots in little kids. Ticks prefer the arms and legs in bigger children.) Interestingly, tick destinations on the body can also vary depending on the species of the tick. The State of Connecticut published the graph below to show where ticks generally gravitate:[1]

A surprising number of people experience subsequent reinfections with tick-borne infections.[2] Upon performing a literature search, studies are sparse to non-existent on how best to manage bites in patients with preexisting infection, especially for children. It is clear that previous infection does not fully protect those with a potential re-infection. What's also clear is that the management of this common issue has demonstrated the greatest divergence in treatment protocols between allopathic and integrative medicine.

Proportion of *Ixodes scapularis* (A) and *Dermacentor variabilis* (B) submitted to The Connecticut Agricultural Experiment Station recovered from various regions of the body.

A. *Ixodes scapularis*



B. *Dermacentor variabilis*

Ticks Targeting Sophia

I received a frantic text from a distant relative regarding their 16-year-old daughter who just got a new tick bite while out hiking. The tick was carefully removed and intact. Sophia developed an immediate circular rash around the bite site, which could have been consistent with erythema migrans, one of the most common manifestation of *Borrelia* infection.[3] Her situation was complicated by the fact that she had just developed symptoms of COVID-19, confirmed via a positive molecular antigen test. She reported feeling achy, tired, coughing and nasal congestion, and complained of a severe headache. She couldn't be sure if what she was experiencing was secondary to COVID-19 or her underlying Lyme disease/co-infections (*Epstein Barr Virus* and *Bartonella*). Gone are the days of an "easy" patient or relative!

I am an avid supporter of trying to maintain the integrity of the tick and

sending it for evaluation when feasible. A live tick can be placed in a container or plastic bag with a blade of grass and not taped or mounted. I use *Tick Report* (https://www.tickreport.com) for a tick analysis. Their recommendation is to avoid alcohol or preservative, but if already applied, they report that it doesn't appear to change the outcome.

Tick Report tests for multiple pathogens at an affordable price. Additionally, an extensive surveillance database can be accessed showing the statistics and distribution in age, tick bite site, genus, tick host, stage of tick, and percentage of positivity by zip code. Fortunately, the percentage of infected ticks where Sophia was bitten was extremely low and subsequently lowered everyone's anxiety until the report was completed. Good news for Sophia; her tick was clean.

End of Story?

It took five days to get Sophia's report back. The question is with her history and symptoms, should she be covered with antibiotics for a potential infection while awaiting the results of her tick test? As a seasoned practitioner, this is where experience and "anecdotes" come into play due to the fact that data is sparse or lacking, especially in the patient with preexisting Lyme disease. Even when antibiotics are promptly administered after a tick bite, there is a treatment failure rate of 15-20%. Antibiotics or not? Consider the fact that mainstream physicians will think nothing of placing a teen with acne on antibiotics for months! If a tick-borne infection is missed, the child could be facing life-long devastating health consequences.

Because Sophia had the complicating factors of chronic Lyme disease/co-infections/COVID-19 infection simultaneously, I had quickly decided to treat her. There are herbal and pharmaceutical options, especially in a patient who has already received many of these antibiotics. Because Sophia preferred herbal treatments in general, this was the route we chose. The choice is often decided by what is available and what the patient has had success with in the past. Sophia had easy access to *Biocidin*®, which is an herbal formulation I've used successfully in tick-borne disease infection management. Biocidin® contains bilberry extract {25 percent anthocyanosides}, noni, milk thistle, echinacea (purpurea and angustifolia), goldenseal, shiitake, white willow (bark), garlic, grapeseed extract (minimum 90 percent polyphenols), black walnut (hull and leaf), raspberry, fumitory, gentian, tea tree oil, galbanum oil, lavender oil (plant and flower), and oregano oil (plant and flower). Of interest, a study from Finland in 2018 reported that *Biocidin*® demonstrated strong antimicrobial action against *Borrelia in vitro*.[4] The liposomal formulation is preferable but wasn't what the patient had on hand.

If a patient prefers a pharmaceutical route, doxycycline is my first choice since it can also cover other pathogens in addition to *Borrelia*, such as *Anaplasma*, *Ehrlichia, Babesia, Bartonella* and Rocky Mountain Spotted Fever. I prescribe 100 mg two times a day, although reports from colleagues inform me that they have increased that dose in adults to 200 mg two times a day. I treat pending the results of the tick report. If the tick wasn't tested, I might treat for three to six weeks depending on the individual. In a small child, I use the following dosage for doxycycline: 2 mg/kg/day divided by two.[5] If for any reason I need to treat a child under eight years old longer than three weeks, I would then switch to an alternative antibiotic such as azithromycin or amoxicillin. Recent studies have documented that a short course of doxycycline does not cause dental staining so may be used in a young child.[6]

End of Story Now?

From past "Pediatric Pearls," the *Townsend Letter* reader may be familiar with my stance on treating COVID-19 using ivermectin. There were several factors that prompted me to begin treatment in Sophia:

- Significant symptoms at the start of infection
- Underlying chronic infection
- A history of difficulty clearing routine viral infections
- Concern regarding the effects of COVID-19 on someone with an impaired immune response.

Because ivermectin has been shown to have antimicrobial, antiviral (both RNA and DNA virus) and anti-parasitic action, I began a five-day course, 12 mg, two times a day.[7] To my knowledge, I have not read any studies regarding clinical outcomes of patients with tick-borne infections and COVID-19. Additionally, support was given to boost the innate immune system (NK cells, dendritic cells, macrophages, phagocytes, and mast cells), which is important in clearing COVID-19. Some of the other supplements prescribed included vitamin C, vitamin D, NAC, zinc picolinate, quercetin, curcumin, lumbrokinase, beta-glucans, and probiotics. One product that I think may be of particular benefit in this subgroup of COVID-19 patients is Transfer Factor Multi-Immune® which has been shown to increase NK function and was added to her protocol.[8]

Never-Ending Story

Over the following three weeks, Sophia had clinically improved and the majority of her symptoms resolved. However, the profound fatigue which she had experienced in the past, exacerbated by COVID-19, persisted. Hopefully, with the addition of mitochondrial support, she will continue to progress to her baseline. The looming question of long covid comes to mind and hopefully Sophia will not have to add this disorder to her list of chronic diseases she is managing at 16 years old.

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Environmental Medicine Update

by Marianne Marchese, ND
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Short-Term Mold Exposure and Acne

Introduction

Recently a 22-year-old female spent two weeks in a vacation rental. Prior to the vacation with her family, she had no known health concerns and she had clear skin. A week after returning from the vacation she developed acne. The home smelled of mold and mildew, and some visible mold was present in the bathrooms and showers. The home was in an area previously affected by Hurricane Irma. In September 2017 the vacation home suffered flood damage from the hurricane; the home had been remediated for mold. Could mold still be present? Is there a link between mold exposure and skin conditions such as acne? These are questions to be answered.

Mold

Mold can easily grow in water-damaged buildings, creating adverse health effects. Some seem to be more sensitive to mold than others. Visible signs of mold growth can include condensation on surfaces or structures such as windows, visible mold, especially black mold, mildew smell and mold odor, and history of water damage (leaks, wet basement, plumbing).[1]

Mold and mold components such as mycotoxins can create inflammation, oxidative stress, disrupt the gut microbiome, alter the immune system, cause dermatological issues and respiratory conditions in the person exposed.[2] Household mold can wreak havoc on the body. For example, one study states it can cause an estimated 21% of asthma in the US. It found that 67% of adult-onset asthma started after working in a water-damaged office building.[1]

Mycotoxins are the secondary metabolites of mold organisms. Mold and mycotoxins, including ochratoxin (OTA), aflatoxin, and trichothecene mycotoxins, have been found in homes and offices affected by water damage. Aflatoxins are often produced by Aspergillus species and various species of Penicillium, Rhizopus, Mucor, and Streptomyces. Ochratoxin A is produced by Aspergillus species and species of Penicillium, Petromyces, and Neopetromyces. Trichothecenes are produced by Stachybotrys, Fusarium, and Myrothecium mold.[3-5] Gram positive bacteria such as Streptomyces, Mycobacteria, and Nocardia, have also been found in water-damaged buildings.[1,2] Exposure to these can trigger an inflammatory response in the body, affect the neurological and immune system, affect the pulmonary system, and even cause dermatitis such as unexplained rashes and acne.[6-9] Household mold exposure is linked to chronic fungal sinusitis, peripheral neuropathy, sarcoidosis, and chronic fatigue.[10] A recent study of 104 patients with chronic fatigue syndrome showed 93% had at least one mycotoxin present in their urine; ochratoxin-A was the most prevalent.[11]

Can Mold and Mycotoxin Exposure Cause Acne?

Mold exposure can induce dermatological changes through changes to the immune system as well as the gut microbiome. It's not just airborne exposure to mycotoxins that affects us. Mycotoxins can be introduced into the body from food contamination. According to the World Health Organization 25% of the world's crops such as cereals, rice, nuts, and other grains are contaminated by mold. Ingestion of mold and mycotoxins can alter gut health by altering the normal barrier function and nutrient absorption. They disrupt the gut microbiome balance, dysregulate intestinal functions, and impair local immune response, which may eventually result in skin changes such as acne and dermatitis. [12]

It is well known that alterations in the gut microbiome leads to acne and dermatitis. An increase in release of inflammatory mediators as seen in mold exposure is also linked to acne and other dermal conditions.[13] Mycotoxins create altered release of inflammatory makers and changes in the gut microbiome and could indirectly be linked to acne. One study found that exposure to airborne mold and mycotoxins is linked to rashes and itchy skin in school children exposed to mold in the classroom.[14] The skin has its own microbiome that can be penetrated by mycotoxins and cause skin microbiome disruption which can lead to acne.[15,16] These are just a few methods in which mold and mycotoxin exposure could influence the development of acne.

Case

Back to the patient that started the search for the link between household mold exposure and acne. As previously stated, a 22-year-old female spent two weeks in a vacation rental. In September 2017, the vacation home suffered flood damage from the hurricane. The home had been remediated, repaired, and remodeled per the owner. Although the owner stated the home had been remediated, the family renting the home did see and smell mold. Her other family members who stayed at the home all returned with some fatigue, had itchy skin but no visible rash or acne. All felt like they developed a mild cold or allergy-like symptoms that eventually resolved upon returning home.

The 22-year-old female presented to the office for help with acne that started immediately following the trip. She had visible acne on her face; otherwise, the exam was unremarkable and vitals normal of BMI 22.5. Review of systems, including digestion and bowel function was normal. She had never had acne prior to staying in the vacation home. She said her diet was different during the two weeks. She ate more seafood than normal. She is allergic to dairy and avoids all dairy, and she eats minimal refined sugars and carbohydrates. She stated that her sugar and carbohydrate intake did not increase during the trip. She was not stressed while on vacation and used all her own soaps, shampoo, cleanser, and personal care products. She brought these from home. She felt tired and had a stuffy nose for a week after returning from vacation as did her other family members who stayed in the home. She returned from vacation two weeks prior to the visit and still has the acne present—a total of 3 weeks. Her menstrual cycles were regular, every 27-28 days, no cramps, light flow, and no PMS. She is not on hormonal contraception and takes no medication but does take a probiotic and multivitamin. Basic labs and hormones were ordered as well as blood mercury because she ate more fish than usually on the vacation.

Hormone imbalance is often a common cause of acne in this age group so all androgens and ovarian hormones as well as inflammatory markers were ordered. She declined testing for mold/mycotoxins at this time and wanted to start with testing her hormones and initiating treatment. The parents didn't want to spend money on mold testing since they are convinced, they were exposed to mold. Mold/Mycotoxin testing is offered by several labs and can be done through urine or nasal sampling. In many states patient can order the urine, nasal tests themselves without a doctor's order. Sputum or tissue biopsy can also be done by a physician.

Lab results- CBC, CMP, LIPID panel, TSH, FT4, ESR, CRP, vitamin-D, B12, DHEA, testosterone and blood mercury were all normal.

The initial treatment plan was based on presumed mold exposure. Since she was no longer staying in the home avoidance was already initiated by default and it is not possible for her to have the home tested for mold. Typically, if a patient is working, studying, or living in a home with water damage, mold smell or visible mold, the home or building should be tested for mold. The ERMI test (Environmental Relative Moldiness Index) was developed by the US Environmental Protection Agency to investigate mold contamination in homes. The ERMI test involves the analysis of a single sample of dust from a home or building. Several companies offer this test.

Treatment plan included oregano oil capsule (1 twice a day), activated charcoal (1 capsule twice a day), and a supplement that included caprylic acid, garlic extract, milk thistle, Oregon grape root extract, and grapefruit seed extract (2 capsules twice a day).[2] She returned for a follow up after four weeks and her skin was 25%-30% improved. Her probiotic was changed to a spore-based probiotic and oral vitamin A was started, 10,000 IU a day for one month. (She is not sexually active). At the next follow up, her skin improved and cleared.

Summary

Mold and mycotoxin exposure from water-damaged buildings and homes is a common occurrence that produces adverse health effects. Mycotoxins can also occur through contaminated food in small amounts, but most health issues are from mold exposure due to water damage. The most obvious health effect is on the pulmonary system as asthma and other respiratory conditions are linked to mold. Mold and mycotoxins can affect the immune system, create inflammation and oxidative stress, causes rashes, itchy skin, chronic fatigue and even acne. Mold is linked to acne through disruption of the gut microbiome as well as the microbiome of the skin. According to the American Academy of Dermatology, acne affects almost 50 million Americans a year. Although there are several causes of acne, mold exposure and mycotoxins are often overlooked, and a thorough environmental health history of current and recent exposures could identify a link to mold and acne.

Dr. Marianne Marchese is the author of the bestselling book *8 Weeks to Women's Wellness* about the environmental links to women's health and how to mitigate the effects from toxicants. She maintains private practice in Phoenix, Arizona, and is adjunct faculty at SCNM, teaching both environmental medicine and gynecology. She lectures throughout the US and Canada on women's health, environmental, and integrative medicine topics. Dr. Marchese recently helped develop three supplements for Priority One Vitamins. www.drmarchese.com

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CALENDAR

JUNE 25: KEY COLLABORATIONS IN HOMEOPATHY RESEARCH online. CONTACT: https://www.hri2022.org/

JULY 8-10: IFM IN-PERSON CLINICAL SKILLS TRAINING in Chicago, Illinois. CONTACT: https://www.ifm.org/learning-center/

JULY 12-13: INTERNATIONAL CONFERENCE ON PREVENTIVE MEDICINE AND INTEGRATIVE MEDICINE in Ottawa, Canada. CONTACT: https://waset.org/preventive-medicine-and-integrative-medicine-conference-in-july-2022-in-ottawa

JULY 21-23: AANP 2022 CONFERENCE in Spokane, Washington. CONTACT: https://naturopathic.org/

JULY 22-24: FUNCTIONAL MEDICINE ADVANCED PRACTICE MODULES – Hormones live stream online. CONTACT: https://www.ifm.org/learning-center/

AUGUST 4-7: 13th ANNUAL INTEGRATIVE MEDICINE FOR MENTAL HEALTH CONFERENCE in Chicago, Illinois. CONTACT: https://www.immh.org/

AUGUST 19-22: FUNCTIONAL MEDICINE ADVANCED PRACTICE MODULES – Bioenergetics live stream online. CONTACT: https://www.ifm.org/learning-center/

AUGUST 25-28: ACUPUNCTURE MERIDIAN ASSESSMENT (AMA) TRAINING for Doctors, Dentists, & Health Professionals with Simon Yu, MD, in St. Louis, Missouri. Detecting Parasites, Dental & Fungal. CONTACT: 314-432-7802; https://preventionandhealing.com/training

SEPTEMBER 10: FUNCTIONAL MEDICINE FOR PSYCHIATRY – A Patient-Centered Approach to Mental Health Care in Chicago, Illinois. CONTACT: https://www.psychiatryredefined.org/functional-medicine-for-psychiatry-conference-2022/

SEPTEMBER 15-17: NATIONAL RESTORATIVE MEDICINE in Sedona, Arizona and online. CONTACT: https://restorativemedicine.org/conferences/2022-national-conference/

SEPTEMBER 16-18: ENDOCRINE BALANCE AND BIO-IIDENTICAL HORMONE RESTORATION SYMPOSIUM in Boston, Massachusetts. CONTACT: https://www.a4m.com/

SEPTEMBER 22-23: INTERNATIONAL CONFERENCE ON APITHERAPY AND HONEY BEE PRODUCTS in Vancouver, Canada. CONTACT: https://waset.org/apitherapy-and-honey-bee-products-conference-in-september-2022-in-vancouver

SEPTEMBER 22-25: INFECTIOUS DETERMINANTS OF CHRONIC DISEASE in Grand Rapids, Michigan. CONTACT: https://icimed.com/

SEPTEMBER 24-25: OZONE THERAPY CERTIFICATION COURSE with Dr. Bryan Rade, ND, in Halifax, Nova Scotia. Learn intravenous and intraarticular ozone therapy. Space limited to eight attendees. CONTACT: www.eastcoastnaturopathic.com.

OCTOBER 8-9: ASSOCIATION FOR THE ADVANCEMENT OF RESTORATIVE MEDICINE PEPTIDE/STEM CELL INTENSIVE online. CONTACT: https://restorativemedicine.org/conferences/2022-peptide-course/

OCTOBER 14-16: 12th INTERNATIONAL ADVANCED APPLICATIONS IN MEDICAL PRACTICE (AAMP) CONFERENCE -Endocrine Assessment and Treatment in Scottsdale, Arizona, and online. CMEs available. CONTACT: https://aampconferences.com/spring-conference-2022/

OCTOBER 28-29: INTERNATIONAL CONFERENCE ON PREVENTIVE MEDICINE AND INTEGRATIVE MEDICINE in Los Angeles, California. CONTACT: https://waset.org/preventive-medicine-and-integrative-medicine-conference-in-october-2022-in-los-angeles

OCTOBER 28-30: ACADEMY OF INTEGRATIVE HEALTH & MEDICINE CONFERENCE – People. Planet. Purpose in San Diego, California. CONTACT: https://www.aihm.org/conference/

OCTOBER 28-30: AzNMA NATUROPATHIC MEDICINE EDUCATION CONFERENCE in Scottsdale, Arizona. CONTACT: https://www.aznma.org/

NOVEMBER 4-5: NEW HAMPSHIRE ASSOCIATION OF NATUROPATHIC DOCTORS CONFERENCE in Newcastle, New Hampshire. CONTACT: https://www.nhand.org/

NOVEMBER 5-6: OREGON ASSOCATION OF NATUROPATHIC PHYSICIANS ANNUAL CONFERENCE in Portland, Oregon. CONTACT: https://www.oanp.org/page/AnnualConference

DECEMBER 9-10: INTERNATIONAL CONFERENCE ON PREVENTIVE AND INTEGRATIVE MEDICINE in New York City, New York. CONTACT: https://waset.org/preventive-medicine-and-integrative-medicine-conference-in-december-2022-in-new-york

JANUARY 28-29, 2023: INTERNATIONAL CONFERENCE ON TRADITIONAL MEDICINE AND HERBS in New York City, New York. CONTACT: https://waset.org/traditional-medicine-and-herbs-conference-in-january-2023-in-new-york

APRIL 22-23: INTERNATIONAL CONFERENCE ON INTEGRATIVE MEDICINE AND NUTRITION in New York City, New York. CONTACT: https://waset.org/integrative-medicine-and-nutrition-conference-in-april-2023-in-new-york

JUNE 2-4: SASKATCHEWAN ASSOCIATION OF NATUROPATHIC DOCTORS HEALING SKIES CONFERENCE in Saskatoon, Saskatchewan, Canada. CONTACT: http://www.sasknds.com/healing-skies-conference.html

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Curmudgeon's Corner

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Ticks, Curcumin, and Oak Trees

A June 2021 *New York Times* article surprised me when it quoted Matthew Ayres, a biology professor at Dartmouth, who explained that because there was an abundance of acorns in the fall of 2020, there would be a sharp increase in ticks and Lyme infections in 2021. "The rodents that eat acorns (e.g., white-footed mice, chipmunks, and gray squirrels) have been celebrating by making lots more rodents. These rodents are ideal hosts for the ticks that carry Borrelia, the bacterium that causes Lyme disease. So, more acorns = more rodents = more ticks = more tick-human encounters, and more exposure of humans to tick-borne diseases."[1]

His equation seems obvious in retrospect but left me feeling dumb. I've spent many days wandering through our forest planting acorns, hoping to create an abundance of oak trees on our land, believing, 'I was doing a good thing.' My short-lived career as an acorn farmer was inspired by reading the book, *The Nature of Oaks,* by Douglas Tallamy, an entomology professor. Tallamy writes that oaks, more than any other tree, support life in the forest serving as the direct or indirect food source for multiple species of caterpillars, birds, squirrels, and other animals. Oak trees are the foundation of the forest food chain.

The idea that there is a positive association between acorn production and Lyme disease incidence via intermediary animal vectors was first published in *PLOS Biology* in 2006 in an article by Rick Ostfeld et al.[2] Ostfeld's theory got a lot of attention in 2017 because 2015 had been a mast year for oaks. Mast years are one of those strange and peculiar phenomena in nature that we don't understand and that we can only observe and contemplate with wonder. Every so often oak trees collectively, as a species, decide to produce a superabundance of acorns. When this occurs, it is called a mast year. It's not that one or two oak trees make an above average number of acorns, but all oak trees make a superabundance. No one understands what triggers this super overproduction or how it is coordinated between all trees, it just happens. Mast years might argue that there is some shared conduit of information and communication among the entire species, a kind of oak-telepathy. In response to a mast year the population of animals that feed on acorns surge dramatically for a few years only to drop off during the lean years that follow. More acorns, more small furry animals, more ticks, more Borrelia. This equation was cleverly confirmed in 2016 by two Polish researchers, who were able to positively associate the number of Google searches for information related to ticks and Lyme with the occurrence of mast years in the European Union.[3]

One might think that all of this suggests we should reduce oak trees to cut down on Lyme disease. Yet, Ostfeld and other tick ecologists suggest that we might be better off taking the opposite approach, leaving large stands of forest intact. The real problem they say is that residential areas have left forested lands too fragmented to support the wide range of species that typically might prey on the critters that host ticks and so buffer the impact of fluctuating acorn supplies. As we cut down forests, we lose predators that normally would limit deer, chipmunks, mice populations and other intermediary tick hosts and indirectly but most importantly, reduce ticks.[4] Without the owls, hawks, foxes and coyotes to eat the mice, acting as controls to population growth, it takes only a few extra acorns for rodent populations to shoot up.

Biology tends to be both messy and complicated. Few things are as simple as they seem at first glance. Nothing about the Ayres' acorn and Lyme association really tells us what will happen in the long run. We don't have the data to know. We know one small piece of the puzzle and are trying to extrapolate from there to reach the right conclusion about how we might influence Lyme disease incidence.

We face similar puzzles in our practices. We want to make the right decision but often are missing necessary information. I'm thinking in particular of the question as to whether women with a history of breast cancer can mix tamoxifen and curcumin. There are plenty of reasons why most practitioners consider curcumin potentially helpful, yet a Dutch paper has laid out an argument suggesting that curcumin should be contraindicated for these women and many of our patients will be advised by their medical doctors that this is dangerous.

In the Spring of 2019, a paper was published by Hussaarts et al on the effects of both curcumin and piperine on women

taking tamoxifen. Recall that tamoxifen is just a prodrug that has little pharmacologic effect until it is metabolized in the body into its active metabolite called endoxifen. Hussaarts and colleagues investigated whether these two nutritional supplements affect this metabolic activation, initially thinking that curcumin might increase endoxifen levels but discovering it may have the opposite effect.

Tamoxifen, or rather endoxifen, acts as a selective estrogen receptor modulator (SERM) against estrogen sensitive (ER+) breast cancer and has been used extensively since it was approved by the FDA in 1977.[5] With 20-30% of all cancer patients, including breast cancer patients, using dietary products, there is understandably considerable interest as to whether these supplements help (our belief) or hurt (what many oncologists believe).[6] Curcumin, an extract from the roots of *Curcuma longa* (aka turmeric), has become quite popular in this patient population and has been the subject of extensive research.[7] Because of curcumin's poor bioavailability it was often combined with piperine (from black pepper), a practice promised to increase availability by as much as 2000% by inhibiting curcumin's glucuronidation.[8]

Metabolism of tamoxifen is complex and involves several cytochrome P450 pathways particularly CYP2D6 and CYP3A4. A few years back a lot of attention went to genotyping and phenotyping the CYP2D6 enzymes in ER+ breast cancer patients and categorizing how effectively they metabolized tamoxifen. The excitement about categorizing patients by the speed of their metabolic pathways has died down, and attention is shifting to measuring blood endoxifen levels as predicting levels is inaccurate.[9]

In rats given both curcumin and tamoxifen, tamoxifen plasma levels go up 33-64% presumably because the liver enzymes that would normally convert tamoxifen to endoxifen are inhibited.[10] At the same time phase II drug metabolism pathways that eliminate endoxifen slow down. Predicting the net result of combining tamoxifen and curcumin is hard in rats and even more so in patients.[11] Thus, the results from Hussaarts' study ought to be important.

Their trial was a two-arm, three-period, randomized, cross-over study performed between January 2017 and May 2018 at the Erasmus University Medical Center in the Netherlands. The study participants were all women with a history of ER+ breast cancer. The patients took 20 to 30 mg of tamoxifen a day with or without curcumin, and with or without additional piperine. The curcumin dose was generous (3600 mg per day) and the piperine dose was equally high (30 mg per day). The primary outcome measured was the area under the curve (AUC) for serum endoxifen levels. When tamoxifen and curcumin were taken together, this endoxifen AUC trended lower, dropping a non-significant 7.7% compared to when tamoxifen was taken alone (95%CI: -15.4 to 0.7%; p = 0.07). The combination of curcumin and piperine had a greater impact, reaching statistical significance and lowering AUC by 12.4% (95%CI: -21.9 to -1.9%; p = 0.02).

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Results were also examined by CYP2D6 phenotypes. The combination of dietary supplements and tamoxifen in those patients with what is termed an extensive metabolism (EM) phenotype showed even more pronounced effect. The authors suggest that, "… co-treatment with curcumin could lower endoxifen concentrations below the threshold for efficacy (potentially 20¯40% of the patients), especially in EM patients."[12]

This is a rather strong statement given that the impact on endoxifen from curcumin alone was not statistically significant. Granted with piperine the combination lowered endoxifen by about 12% but does anyone still use piperine to enhance curcumin absorption? We stopped selling the combination a long time ago, back when the nanoparticle curcumin came on the market. This study leaves us with questions. Does a 12% decrease in endoxifen really make that big a difference? What exactly is too low an endoxifen level?

There have been various suggestions as to what the therapeutic threshold for endoxifen is. Several publications suggest a level of >5.9 ng/mL (15.8 nM).[13] A 2017 paper, by de Vries et al, reported that patients with endoxifen levels above 5.97 ng/mL had a better disease prognosis with a 26% lower recurrence rate than women with endoxifen concentrations below this.[14] However, a 2020 paper by Sanchez-Spitman et al was uncertain about these suggested levels and after carefully reviewing past publications found lower doses suggested in some papers (5.9 ng/ml, 5.2 ng/ml and 3.3 ng/ml). Analyzing outcome data from 667 patients by endoxifen levels, Sanchez-Spitman's team were unable to show that any of these levels changed relapse free survival when compared to women who quit taking tamoxifen altogether.[15] So, while the current suggestion may be to monitor tamoxifen therapy based on endoxifen levels, the correct target level may be uncertain.

Of the women participating in Hussaarts' curcumin study all but one seem to have maintained endoxifen levels >20 nM, only one of the sixteen had levels in the 10-20 nM range. So even with the AUC reduction, endoxifen levels were still probably in the therapeutic range.[16]

If curcumin was effective at lowering endoxifen levels, one would think it would also decrease side effects in these patients, most notably hot flashes. A 2020 Iranian randomized controlled trial giving curcumin reports that it lowered hot flash frequency significantly by 10.7%.[17] These women were not taking tamoxifen so seeing a reduction of hot flashes in women taking tamoxifen with curcumin might not tell us that curcumin is interfering with tamoxifen's clinical efficacy. To add to the confusion, among Hussarts' patients, more hot flashes were observed in the patients treated with curcumin (both with or without the piperine) compared to tamoxifen monotherapy.

We may start feeling pressure from medical doctors and pharmacists who will take Hussaarts' findings as a contraindication for curcumin. Will they understand how nuanced this is?

At this point we can't see the big picture. It's kind of like the oak trees. Does curcumin's potential for reducing tamoxifen's benefit outweigh the benefits curcumin itself may provide this patient group? We need to remember why cancer patients are so eager to take curcumin. Curcumin exerts inhibitory effects on multiple cancer types. Curcumin can regulate cancer cell proliferation, invasion, angiogenesis and metastasis. These anticancer effects are attributed to curcumin impacting a wide range of cell signaling molecules that control multiple pathways that impede cancer. These chemical pathways include Wnt/β-catenin signaling, PI3K/Akt, JAK/STAT, p38 MAPKs, c-Jun N-terminal kinases, extracellular signal-regulated kinases, p 53 signaling, NF-κB inhibition, apoptotic signaling, downregulation of oncogenic miRNAs and promotion of tumor suppressive miRNAs, to name a few.[18] Furthermore, curcumin hinders development of drug resistance to tamoxifen.[19]

Could these multiple benefits of curcumin outweigh a possible slight reduction in endoxifen levels? The thing is we don't know what the final outcome will be. Honestly we don't even know that curcumin really lowers endoxifen. We certainly don't know what the bottom line will be on progression-free survival or more importantly overall survival if women take both tamoxifen and curcumin.

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thiamine and the 47 patients who served as historical controls. Twenty-two baseline characteristics were reported for the two groups, such as the number of patients with diabetes, the number of patients with heart failure, the number of patients with positive blood cultures, etc. Sheldrick calculated the p value for each of the 22 variables. For example, 16 treated patients and 20 control patients had diabetes; the p value for the difference between 16 and 20 was calculated to be 0.52. Twenty-two patients in each group were receiving vasopressor therapy; the p value for that comparison is 1.0.

Normally, when making multiple comparisons, the p values would be distributed roughly evenly between 0 and 1.0. However, that did not occur with Marik's data. Instead, 13 of the 22 p values were 1.0, and none of the values were below 0.4. According to Sheldrick, the probability that 13 of 22 comparisons would have a p value of 1.0 is between trillions to one and quadrillions to one. Moreover, there is only about a 1 in 100,000 probability that none of the 22 comparisons would have a p value below 0.4.

Based on my elementary understanding of statistics, Sheldrick's arguments seem reasonable. Research fraud would certainly explain why no one has been able to confirm Marik's findings.

Dr. Marik has long been considered an authority in the field of critical care, having written over 400 peer-reviewed journal articles, 50 book chapters, and 4 books on critical care. The possibility that his research on intravenous vitamin C was fraudulent is disturbing on many levels. Marik has disputed Sheldrick's claims, stating that Sheldrick demonstrates "a lack of comprehension of scientific data analysis."

Sheldrick's allegations come on the heels of concerns that were raised previously about some of Marik's other work. In December of 2020 the *Journal of Intensive Care Medicine* published a paper coauthored by Marik that described the use of the MATH+ protocol (methylprednisolone, ascorbic acid, thiamine, heparin, and other compounds) as a treatment for COVID-19.[6] The paper was later retracted by the journal after Sentara Norfolk General Hospital notified the editors that the mortality data as reported in the paper were inaccurate. Perhaps there is an innocent explanation for Marik's implausible baseline data. We'll have to wait and see where the evidence leads us.

Alan R. Gaby, MD

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Intravenous Vitamin C, Hydrocortisone, and Thiamine for Septic Shock: Another Update

In 2017, Paul Marik, MD, and coworkers at Sentara Norfolk General Hospital (which is affiliated with Eastern Virginia Medical School) published a landmark paper on the treatment of septic shock with the combination of vitamin C, hydrocortisone, and thiamine. Septic shock is a life-threatening condition that has a mortality rate of around 50% in the United States and an even higher mortality rate in developing countries.

Beginning in January 2016, Marik's group began administering vitamin C (1.5 g every 6 hours), hydrocortisone (50 mg every 6 hours), and thiamine (200 mg every 12 hours) intravenously to all patients with severe sepsis or septic shock.[1] Among the first 47 patients treated, the mortality rate was 8.5%. In comparison, the mortality rate was 40.4% in a retrospective control group of 47 patients with severe sepsis or septic shock who had been treated at the same hospital between June 2015 and December 2015. Thus, the addition of vitamin C/hydrocortisone/thiamine to standard care was associated with a 78.9% reduction in mortality ($p < 0.01$).

This report, which I reviewed in the October 2017 issue of the *Townsend Letter*, created great excitement, as it potentially represented a major advance in the treatment of critically ill patients. The report led numerous research groups around the world to conduct randomized clinical trials to determine whether Marik's findings could be confirmed. Some studies showed positive clinical results (such as a decrease in the time that patients required vasopressor therapy; or a more rapid improvement in the Sequential Organ Failure Assessment [SOFA] score). However, other studies failed to identify any benefit from the Marik protocol. Moreover, none of the studies found a clear reduction in mortality, let alone the dramatic reduction reported by Marik. I reviewed many of these studies in an editorial in the August/September 2021 issue of the *Townsend Letter*.

Marik and associates have argued that the failure of the randomized trials to confirm their results could have been due to two factors.[2,3] First, the researchers may have waited too long to begin the treatment, which would have decreased the likelihood of a successful outcome. Marik's group also argued that excessive amounts of fluid may have been administered in the randomized trials, and that giving too much fluid can greatly interfere with the beneficial effects of vitamin C, hydrocortisone, and thiamine.

Was It a Case of Research Fraud?

A statistician from Australia, Kyle Sheldrick, recently offered another explanation for why no other research group has been able to duplicate Marik's results. According to Sheldrick, there is strong evidence that Marik's data were fabricated (i.e., fraudulent). In an email sent to the editor of the journal *Chest* (which published Marik's original report), Sheldrick stated, " . . . within about 5 minutes of reading the study it became overwhelmingly clear that it is indeed research fraud and the data is fabricated." Sheldrick went on to state, "While usually I would use cautious language of 'unusual' or 'unexpected' patterns in the data and describe 'irregularities' and 'concern'; no such caution is warranted in this case. This is frankly audacious fraud."[4,5]

Sheldrick's allegation is based on a statistical analysis of the baseline characteristics of the 47 patients who received vitamin C/hydrocortisone/

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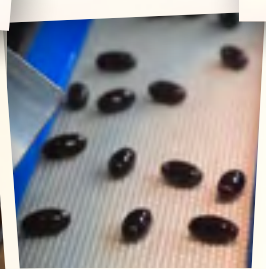
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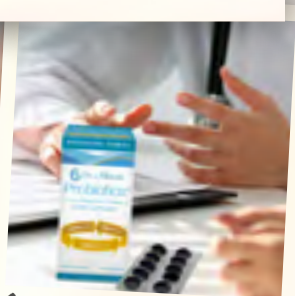
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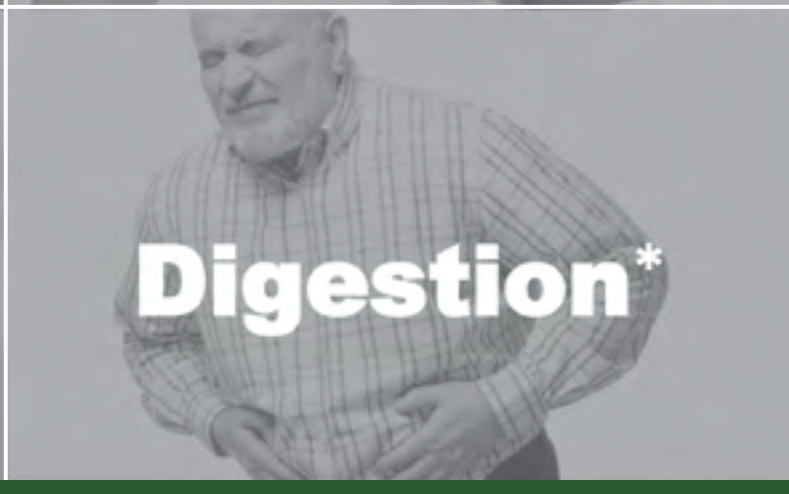

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