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July 2020
Issue #444
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Vitamin C for Viral Illnesses

COVID-19 and Lessons in Fear

Connection, Compassion, and the Healing Journey

Nicola Ducharme, ND
Lyme Disease and Mold

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From the Publisher

The Educational Fallout from the Pandemic

In 2004, a TV series appeared based loosely on Daniel Defoe's eighteenth-century novel, *Robinson Crusoe*; *Lost* portrayed how a hundred or so survivors of a plane crash lived on a tropical island. While these office workers and suburbanites thought survival meant figuring out how to live on a beach and jungle, they were surprised to discover that a cult group geared up with electronics were preying on them from underground bunkers. Like Robinson Crusoe and the *Lost* survivors, we are slowly realizing that we have somehow crashed onto a new world, one that is not the same as the one in which we had been living. For many of us, survival means maintaining employment so that we can pay for food, shelter, and medicine. As unemployment reaches beyond 15% and in many places 20% or more, survival becomes much more desperate – will we be able to come together and create security for these basics? At least one editorialist has suggested that we need to create a "Youth Corps" to hire folks to work on infrastructure and community-based projects, especially at a time when young people will have extreme difficulty finding employment and securing funding to go to college.

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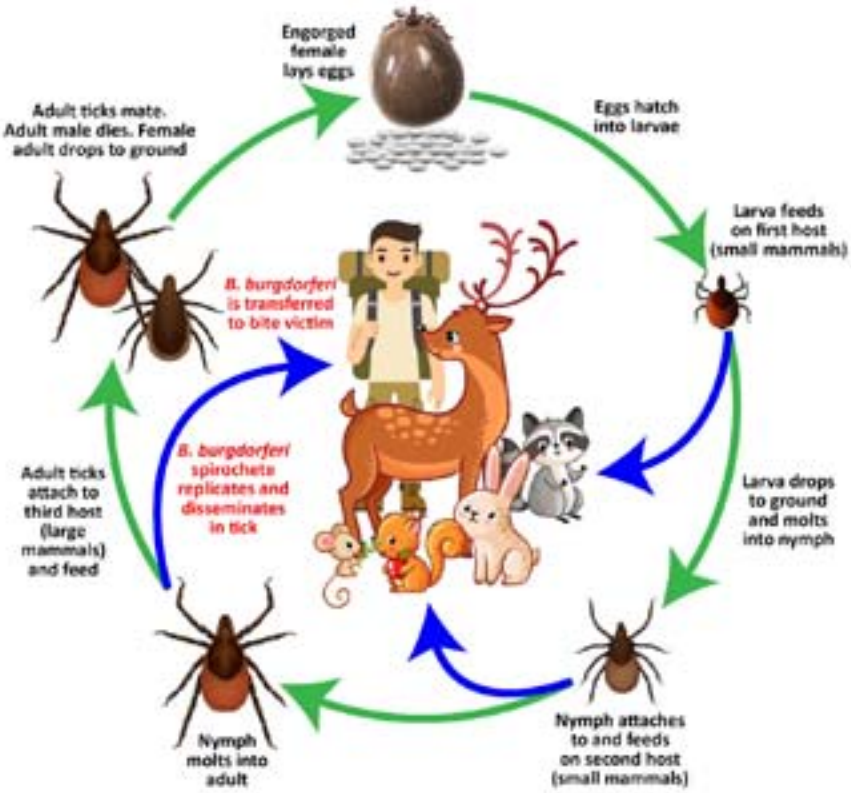

Untreated Lyme disease can turn into chronic Lyme disease, which in turn can lead to Lyme arthritis and neuroborreliosis.

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Letter from the Publisher

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While Amazon announced on May Day that engineers and designers can continue to work at home until October, the country remains divided as to when businesses may reopen. Restaurants, movie theatres, and malls have been given permission to open in nearly 20 states although dining-in still seems like a dicey affair. Public schools have shut down this semester but what is to happen in the Fall? Moreover, what is to happen on college campuses and post-graduate universities and medical schools? College has become a very expensive proposition; who wants to pay $30-$60K to attend a university offering only online classes? University students who returned home in March had already pre-paid for tuition and lodging; by and large none of these expenses are being refunded. Who is going to be willing to commit to attendance at a school if a second wave of COVID-19 appears and campuses are once again shut? And if students refuse to ante up for college and professional education this fall, what will happen to the college or university? One could imagine that naturopathic colleges will incur serious tuition shortfalls; will faculty need to be furloughed, curriculum reduced, laboratories shut?

What about medical meetings? When will we be able to convene together with colleagues in a large gathering? Or will the medical meeting of the future be limited to 50 or less participants? Will continuing medical education shift primarily to webinars and online training courses? Not surprisingly, many health professionals are writing now about COVID-19. But human health has not transformed, and the virus is not all there is to disease. We will continue to publish your thoughts on SARS-CoV-2 but this issue focuses on Lyme disease and mold toxicity. We do appreciate your reading the *Townsend Letter* and request that you subscribe or renew your subscription today!

Remdesivir or Intravenous Vitamin C?

During the first week of May the news announced that the anti-viral drug, Remdesivir, has demonstrated in several hospitals remarkable benefit in treating COVID-19. The study was double-blinded giving it the imprimatur of being scientifically validated, not simply an observational study. The FDA has given Remdesivir "emergency-based" approval for treatment of the viral illness. (However, supplies of Remdesivir appear to be very limited as most hospitals have not been able to obtain it.) Meanwhile, a treatment that has been already used in Wuhan as well as elsewhere in the world, intravenous ascorbic acid, languishes without the benefit of a double-blinded study. Although ascorbic acid has had innumerable medical reports for decades of its effectiveness in treating viral infections, there has been no major study yet supporting its use in COVID-19 treatment.

This is unquestionably a situation when the medical demand for a double-blinded study is short sighted and a travesty. Even if Remdesivir were to be administered to every sick patient there is no compelling reason to not also administer intravenous

continued on page 6 ➤

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Letter from the Publisher

➤ *continued from page 4*

ascorbic acid. In fact, that study should be organized as soon as possible – Remdesivir and IV vitamin C versus Remdesivir alone. Unlike the earlier reported observational studies using ascorbic acid, the dose of vitamin C should be at least 2-3 grams administered continuously every hour. Ascorbic acid works best when administered together with minerals especially magnesium, potassium, calcium, and trace minerals. It also should be administered with B vitamins, including vitamin B12.

I know that I am preaching to the choir; most readers of the *Townsend Letter* are familiar with the efficacy and safety of intravenous ascorbic acid (and most are probably not singing praises for Remdesivir). Given the concern in most integrative clinics about treating active COVID-19 illness, intravenous ascorbic acid must be a hospital-based treatment. The sooner this treatment is implemented broadly, the sooner we will see a drop in the death rate.

Lyme Disease and Mold Toxicity

While the coronavirus continues to turn our world upside down, nature has not taken the slightest notice – well, perhaps a little, with a greater intrusion of coyotes in urban environments because of the dearth of humanity. Spring has brought forth foliage and flowers and pollen, birds are mating and singing, temperatures have moderated, and the days are longer. The bugs are here too and that means ticks will be on the hunt for their next blood meal. While we fret over COVID-19's latest clinical manifestation, such as an inflammatory disorder in children similar to Kawasaki disorder, ticks will be introducing Borrelia, Bartonella, and Babesiosis as well as other organisms to those of us who will be bitten over the months ahead. (For those who have not read our July 2015 *Townsend Letter*, please do; it is an excellent diagnostic and treatment review of Borrelia, Bartonella, and Babesiosis.) Despite the relentless number of individuals contracting SARS-CoV-2 in the months ahead, mosquitoes will not lay docile and ignore us – most of us will be annoyed by harmless bites, but many will develop malaria, and some will acquire viral meningitis, Zika, or dengue fever. Also, not to be ignored, mold continues to play havoc in our households and work environments; for those individuals already impaired by a non-COVID-19 virus like Epstein Barr virus, mold toxicity can be the "straw that breaks the camel's back." Our writers review in this issue how to tackle mold toxicity and Lyme disease.

Our cover story this issue, "Untangling the Lyme/Mold Conundrum," by Dr. Nicola M. Ducharme is one that you will not only enjoy reading but keep handy as a checklist. For some clinics chronic illness is Lyme disease, for others it is mold toxicity, and for most it is an unrelated disorder to be diagnosed. After ruling out other pathologies and conditions, Ducharme makes the case that we should diagnose and manage Lyme disease and mold toxicity not separately but conjointly. She would argue that it is rare that a patient having the one does not also have the other at least to a certain degree. However, after understanding the case clinically one should start with a broad laboratory evaluation to rule out nutrition and hormonal disorders. Lab examination should assess past and current exposure to viruses and Candida.

continued on page 8 ➤

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Letter from the Publisher

➤ *continued from page 6*

An assessment of inflammation must go beyond measuring the C-reactive protein and Sed rate. Ducharme recommends the need to evaluate immune and inflammatory markers that frequently behave abnormally in Lyme disease and with mold toxicity. Of course, the measurement of mycotoxins as well as antibody studies for Borrelia and co-infections are necessary not only to confirm the diagnosis but also to assess treatment response. Once Lyme disease and mycotoxicity are established, treatment should be directed to managing both concurrently. Managing inflammation, regulating immune dysfunction, correcting dysbiosis, controlling Candida overgrowth, reversing mitochondrial dysfunctioning, and mitigating "limbic system dysfunction" are all required to restore health in the patient with Lyme disease and mold toxicity.

Tapping into the Patient's Emotional and Spiritual Needs

Healing is not always the prescription of an antibiotic, anti-fungal, or anti-parasitic. Nor is it always cleaning up one's diet, engaging in exercise, sleeping better, or completing a round of detox. Sometimes we are stuck emotionally and spiritually, and we do need our doctor to hear us. The old joke about the world-class clinician having a terrible bedside manner is a serious matter, especially when dealing with the complexities of a tick-borne illness. Certain patients do respond well underneath the knife, undergoing antibiotic intravenous treatment, following a course of intensive oral herbal therapy. But others do not and their failure to respond is not necessarily because the diagnosis or treatment were wrong.

As Aparna Taylor, ND, explains in her article, "In the Spirit of Connectedness," sometimes we just need the doctor to look us in the eye, let us speak, acknowledge what we have said, and confirm that we have been heard. That simple transaction incredibly may be all that is needed for a patient to become unstuck and to free up one's healing process. Of course, for many of us becoming unstuck will assuredly require much more introspection and emotional unburdening. The business of medicine does not permit the time for the doctor to establish a therapist's role; but somehow, we need to take it on even if it is abbreviated to just listening and acknowledging. Taylor wants us to find a balance between diagnostic acumen and therapeutic empathy; terrible bedside manner be damned.

*****

We are pleased to announce that our eleven previous issues focusing on Lyme disease are now available in digital format. Contact us to order your collection of issues (also available as print copies). See ordering information on page 90.

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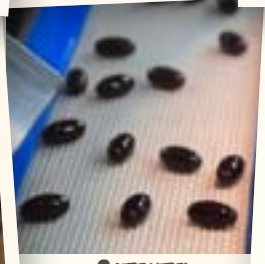

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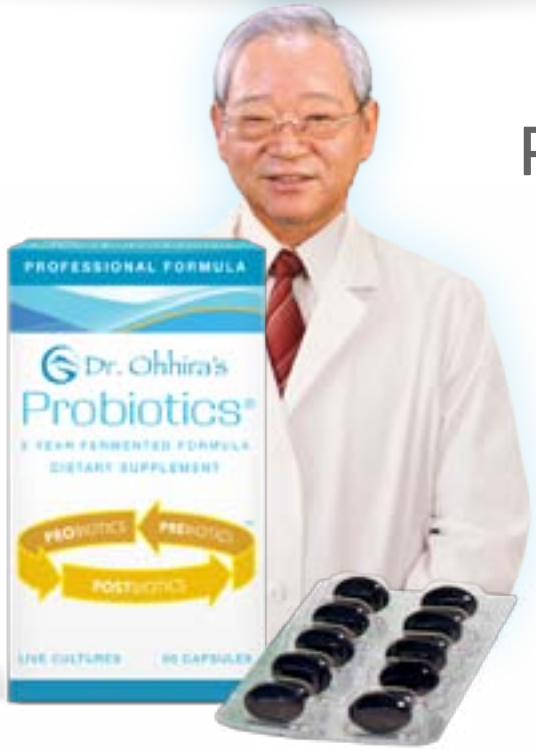

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Pathways to Healing

by Elaine Zablocki

US Healthcare System – Complex and Unique

As we live through the coronavirus pandemic, we experience US healthcare in a new way. With benefit of hindsight, we see the gaps so clearly! Over the coming months and years, our experience with a high-risk contagious virus will open our debate about healthcare to new ideas and shape the healthcare system in new directions.

This is a good time to read Uwe Reinhardt's recent book, *Priced Out: The Economic and Ethical Costs of American Health Care*. Reinhardt was a professor of economics and public affairs at Princeton University for nearly 50 years, and he has the knack of explaining complex public issues in language all of us can understand.

The first part of the book focuses on the ways American healthcare is financed and priced. In Europe and in Asian countries such as Taiwan, Korea, and Japan, there is usually one health insurance system covering most of the population, with uniform fee schedules and rules. In addition, high-income households often use a small private insurance market. The healthcare delivery system is a mixture of public and private institutions, including for-profit institutions.

In the United States we have a mix of several different insurance systems, including employment-based insurance, private insurance, Medicare, Medicaid, and Medigap, each with its own rules. "A health insurance system this complex makes incremental health reform challenging," Reinhardt writes. "Changing the rules in one cell of the system can easily have an effect on other cells in the system."

In other countries hospitals need only a few billing clerks and coding consultants. Because the US health insurance system is so complex, US hospitals need many. For example, Duke University's hospital system, with 957 beds, has 1600 billing clerks.

Americans generally consume fewer healthcare services (such as physician visits and hospital admissions) than Europeans do, but we spend much more on healthcare. "Prices for virtually any healthcare product or service in the United States tend to be at least twice as high as those for comparable products or services in other countries," Reinhardt writes.

He reviews pricing issues in detail and notes many reasons US prices for healthcare tend to be high. For example, employers deduct their contributions to employees' health insurance as a business expense. Employed Americans "may be surprised to learn that the federal subsidies they are given through the tax preference...are estimated to total $250 billion a year," Reinhardt writes. "That subsidy is about two-and-a-half to three times the total public subsidies paid low-income Americans under Obamacare."

Uwe Reinhardt

Cancer and rheumatology treatments, generally administered in the physician's office, use expensive drugs. The Medicare program pays for these medications at the average sales price with a 6 percent markup. "With some of these drugs costing more than $100,000 a year, this 6 percent markup clearly provides a strong financial incentive for physicians to favor expensive drugs," Reinhardt writes. In 2016 the Centers for Medicare and Medicaid Innovation Center proposed ways to experiment with alternative payment methods, reducing the markup on these drugs and increasing the flat fee paid for administering them. However there was "vehement opposition from powerful interest groups," Reinhardt writes. "On behalf of the interest groups, K St. lobbyists won out over plain common economic sense."

Read the book for more examples of ways US healthcare includes costs to consumers that don't contribute to an efficient healthcare system. There's a section on the enormous variations in prices and the difficulties consumers face when they try to search for cost-effective healthcare.

Is Healthcare a Social Good?

In the second part of his book, Reinhardt looks at the ethical issues embedded in US healthcare. American progressives consider healthcare to be "a pure social good to be available to all on equal terms, financed by the ability to pay," he says. American conservatives consider healthcare to be a "private consumption good whose financing is primarily an individual responsibility."

Reinhardt writes, "although healthcare has features of ordinary commodities – it is, after all, bought and sold in the economy – the distributive ethics most nations seek to impose on their health systems set it starkly apart from other commodities.... Canada and virtually all European and Asian developed nations have reached, decades ago, a political

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consensus to treat healthcare as a social good." In the United States, elementary education is treated as a social good, available to all, but healthcare is not.

In European healthcare systems about 90% of the population shares one egalitarian health insurance system, while 5 to 10% of the population (those with high incomes) purchase private health insurance. "By contrast, we in the United States have never reached a politically dominant consensus on the issue. We debate these ethical issues only in camouflaged form," Reinhardt writes. "We routinely signal through our payment systems that in our eyes the value of the professional work of doctors and of hospital staffs varies by the socioeconomic status of the patient. New Jersey, for example, pays a pediatrician only about one-third as much for a poor child on Medicaid as he or she is paid for commercially insured child."

Should the child of a poor American family have the same chance of avoiding preventable illness or being cured from an illness as the child of a rich American family? In public discussions about possible futures for the US healthcare system, we don't explicitly discuss this question. Reinhardt calls it the hidden elephant in the room.

He closes his book with his own proposal for restructuring US healthcare, a system that could be accepted by those who answer the question 'Yes' and those who answer it 'No.' He suggests that by age 26 all Americans would choose either to join an insurance arrangement with community-rated premiums OR commit to being uninsured or using health insurance with premiums based on an individual's health, for the rest of their lives.

In the community-rated model, everyone young and old pays the same premium. Young Americans would pay while they are healthy to ensure they will receive care when they are sick. In the "rugged individualist" model, each person takes responsibility for their own individual care and gambles that their personal assets will be able to cover their healthcare costs.

After reading *Priced Out*, we come away with a vivid sense of how unusual the United States healthcare system is, compared to most other countries. Our system has evolved over time until now it resembles a clanking inconsistent Rube Goldberg device, so complex that a significant part of the money we spend on healthcare simply supports the complexity. Just because it's so complex, so intertwined, and so familiar, it's difficult to change. At the same time, the coronavirus pandemic is teaching us all that change is essential.

Resources

Priced Out: The Economic and Ethical Costs of American Health Care by Uwe E. Reinhardt. Princeton University Press, 2019.

Elaine Zablocki is the former editor of CHRF News Files.

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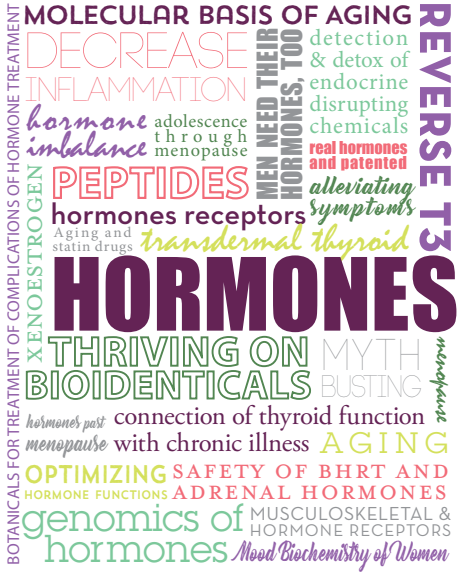
-Malcolm Sickels, MD, Program Chairman

Alan McDaniel, MD

Angela Cortal, ND

Phyllis Bronson, PhD

Dr. Wright has been my mentor since I learned about holistic medicine over 25 years ago. In fact, his nutritional book was the first holistic/alternative anything that I was exposed to. For that, I am ever grateful. -David Brownstein, MD, Program Committee



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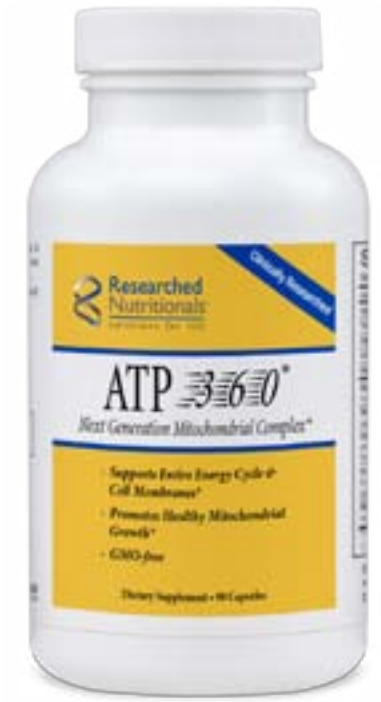

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The Textbook of Naturopathic Oncology

review by Jacob Schor, ND, FABNO

The Textbook of Naturopathic Oncology by Gurdev Parmar, ND, FABNO; Tina Kaczor, ND (ed)
ISBN (hardcover) : 978-1-7770367-0-6; c. 2020; 554 pp; $195.95

Six years ago, in 2014, Dr. Gurdev Parmar made a bold step and took a six-month sabbatical thinking it would give him the time to write this book. Back then a search on PubMed limited for the query of "dietary supplements and cancer" yielded 60,081 citations. Today, (February 2020) the same search yields 99,466 citations, a 66% increase. Searching for "complementary medicine and cancer" today yields 43% more citations than it would have in 2014. The greatest increase in research though has been for "herbal medicine and cancer"; the number of published studies doubled. The volume of data that should be included in this book is increasing at a rate that should have made the project impossible. Yet it wasn't impossible: I've held a physical copy of the book in hand and just finished reading a digital version. The actual book is rather nice; Smyth bound, printed in Canada… the kind of book that will stand up to frequent use.

Let me confess upfront that back in 2014, Dr. Parmar besieged me to edit the first draft of his book. I gave up after only a few weeks certain that the project was beyond me. Dr. Parmar didn't give up; he persevered enlisting the aid of other more optimistic colleagues and a year ago, in early 2019, convinced Tina Kaczor, ND, to take on what proved to be a full-time job of pounding the book into a comprehensive publishable form. Dr. Kaczor is a long-time colleague of mine; she served on the board of the Oncology Association of Naturopathic Physicians (ONCANP) and, more importantly, for the past decade we both helped produce the *Natural Medicine Journal* (*NMJ*). Thus, for me it is easy to see this book in a positive light. I also am well aware of what a challenging undertaking it was and view it as a massive accomplishment for our profession.

The book is designed to serve two purposes at the same time, to be both an instructional textbook and at the same time to be the desktop reference that someone practicing integrative or naturopathic oncology reaches for when working with a patient. The book is roughly divided into three sections. The first three chapters are a foundation of knowledge in naturopathic oncology, providing information on theories and practice, patient management and safety, and cancer biology. The next four chapters are resources for practicing clinicians to reach for when they need evidence-based recommendations for co-treating oncology patients. Parts of the chapter on dietary approaches to cancer treatment struck me as familiar; only then did I recall that I am listed among the contributing authors. Dr. Kaczor must have convinced me to provide some material at one point or another.

It is chapter five that will get your attention: Integration with Conventional Treatments.

Integration or as we once called it 'Co-Treatment' is the core of why most patients come to see us. They want to know if there are ways to enhance the benefits or reduce the side effects of the standard cancer treatments they are going through. This is the heart of the matter, the place where we need up-to-date, current, well-referenced information, and Chapter Five is where the book starts to earn its keep. Chapter Five is divided into five sections based on the interventions practiced by medical oncologists:

1. Radiation therapy
2. Surgery
3. Targeted agents
4. Immunotherapy agents
5. Cytotoxic agents.

It is worth noting that cytotoxic agents, the old school chemotherapy drugs, that remain the standard of care for many cancers is left for last. This may reflect the revolution standard cancer care is about to undergo and the forward thinking of the book's authors. I should ask them.

Each of these sections starts out with a "rudimentary review of the given conventional therapy." For radiation and surgery this is followed by a straightforward review of integrative therapies that we should consider as suitable adjuncts. For the other sections, the information gets more complicated. Take for example "Targeted Agents" and ponder that this heading includes drugs that target estrogen and HER-2 in breast cancer, testosterone in prostate cancer, and all the specific targets that the monoclonal antibody drugs (-mabs) and the -nibs and -mus hope they hit. In these groupings there are so many different agents or drugs under each heading that the information cannot be presented simply. The information is presented as charts with listings for each drug. For the -mabs the charts include side effects' half-life, pathways of elimination, plus space for additional comments. For the fifty -nibs (and other closely related small molecules) (that were FDA approved in 2018), their target pathways are also listed. This alone makes the chart invaluable. Patients come into the office knowing a huge amount of detailed information about their specific cancer and expect you to know even more. That's why they are paying you after all. If they rattle off the brand name of the drug they are taking, they expect you to respond cogently and not be opening Google. Being able to flip open this book "just to double check pathways" will make you look conscientious rather than ignorant.

In fact, this is rather a good practice even if you think you remember these details. I doubt even Drs. Parmar or Kaczor would score perfectly if we asked them to match all these drugs with their respective pathways.

When it comes to immunotherapy drugs, there are at least four separate categories: checkpoint inhibitors, adoptive cell therapies, therapeutic vaccines, and non-specific immune modulating agents. The side effects of these new therapies share little in common with those we've seen in years past from the cytotoxic drugs.

Let me take this image of "Surprise! A quiz!" a step further. Each patient we see is in essence a unique surprise quiz. It is enough that some of us specialize in naturopathic oncology. Most naturopathic physicians are still in general practice. For a urologist who may specialize and only see prostate cancer patients, it may be easy to recall the names say, for example, of the androgen receptor antagonist drugs in common use (bicalutamide, flutamide, nilutamide, and enzalutamide). But for someone in general practice or even who sees a wide range of cancer types, having these details quick at hand is priceless. You may recall the main themes of this chapter, but the book provides the cram sheets you may need to open and review between patients to do your job well and not look dumb.

When we get to the cytotoxic agents, for many years I actually kept a printed copy of the Lamson and Brignall articles on antioxidants and chemotherapy, published in *Alternative Medicine Review* about twenty years ago.[1,2] I used these as my go-to reference for many years, and I see that this book will provide better information that is more accessible. Parmar and Kaczor provide a chart that provides basic information (adverse reactions, half-life, nadir, metabolic site, excretory pathways, and additional details) for a list of sixty different chemo drugs. With this information one can make educated guesses when and how to control their side effects by increasing elimination once their therapeutic impact is over.

Chapter Six tackles specific side effects. The chapter is divided into 27 subsections, an A to Z of side effects, (though the list actually only goes from Alopecia to Taste Changes). If the authors had used the proper term, xerostomia, rather than 'dry mouth', we could say A to X. Once again, the book looks useful, concisely providing the information a working practitioner will want at hand: a cheat sheet or checklist to use while seeing patients.

I was pleased to see a cautionary sidebar about vitamin B-12 to treat anemia, a pet worry of mine. For many years B-12 was considered safe to use for nearly everyone. In recent years we've grown more caution as elevated levels are associated both with cancer risk and poor prognosis. I am happy to see that the information in this book is as current and up to date and research based as we might hope for.

In fact, if I had to make a complaint about this book, it is that occasionally it may seem to be too much research driven, too much a regurgitation of information found in the published medical literature. It also feels as if, at times, the suggestions might be limited only to therapies identified by the medical literature. Occasionally I would like to read an aside from one of the authors that starts out, "In my own practice I have found…."

Take for example an idea mentioned under the subsection of Chapter Six. Mandarin orange peels are listed as a possible treatment for cachexia. This suggestion struck me as odd. The study cited was a clinical trial of 26 mice who were given a commercial extract made from mandarin orange peel that is used medicinally in Asia countries. In their haste to deliver this book into our hands, I fear that on this occasion the authors, usually so diligent in vetting the information collected by the book's many contributing authors, may have let a statement slip by that did not reach their bar of accuracy and transparency when treatment suggestions are based on human data or not.

The decision to separate discussion of therapies from treatment of the side effects of therapies in Chapters Five and Six must have been difficult. In some situations, particularly in regard to the cytotoxic drugs, this strategy seems to work well as many drugs cause similar damage. In the case of radiation therapy, it is less clear that this strategy is better; my preference would have been a single in-depth discussion of ways to both enhance the effectiveness of radiation therapy and reduce unwanted side effects of treatment. The absence of any discussion or review of abscopal effects related to radiation also seems to me to be an omission; granted some might recall that I have been rather fixated or possibly obsessed by this abscopal effect in recent years.

Chapter Seven may prove to be the most valuable chapter in the book. This chapter provides brief reviews and treatment considerations for two dozen cancer types. Again, not A to Z, but the list from Bladder to Uterine cancers is comprehensive and covers the majority of cancers any of us see in practice. To use one of Dr. Kaczor's favorite phrases, "This is where the rubber meets the road." This is where the book proves its value.

One measure of this chapter's value is the effort it is taking me not to break my vow to the authors, and to share the material. As I read the information, the impulse to share sections on particular cancers with friends, patients, and colleagues who are undergoing treatments for these cancers is nearly overwhelming. At least that was my first impression. As I worked my way through these subsections, I realize that the review material on each cancer type is straight from ASCO and one could conceivably obtain the same information by scouring ASCO's webpages. The naturopathic recommendations provide what I call "shopping lists" of supplements to consider, rather that treatment strategies or innovative ways of approaching specific cancers. Still there are gems hidden among these shopping lists. Things I haven't heard of before: *Fructus bruceae* oil for radiation therapy is just one example. Not that I have any idea where to purchase it, but now at least I've heard of it.

Of course, loco-regional hyperthermia, the specialty offered at Dr. Parmar's clinic, seems to be listed as useful for every type of cancer.

One problem with these sorts of shopping lists is that the reader has no idea of the relative weight of evidence supporting

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the items on the list. There is often a single footnote after a suggested therapy. For example, under suggested treatments for melanoma, we find DCA, artesunate and hyperthermia among the suggestions for naturopathic treatment. The citation for DCA leads to our friend Akbar Khan's case report of a single patient who went into remission.[3] The suggestion to use artesunate is supported by a description of two patients who used this supplement in conjunction with chemotherapy.[4] The hyperthermia suggestion is backed up by van der Zee's randomized trial that followed 70 patients for extended periods of treatment.[5] In my mind the later citation should somehow carry more weight.

Luckily the text is laid out with decently wide margins allowing the conscientious reader to jot notes and my suggestion would be to come up with one's own ranking system to grade the strength of each recommendation and leave it in the margin.

Another complaint, now that I've started keeping a list, is that it takes one suitable reference for something to get added to the list though the reference may be one of many and may not be the best or most compelling. For example, the lone citation justifying metformin's use in ovarian cancer is an in vitro study that is far from compelling.[6] I'd rather see the recommendation cite a systematic review and meta-analysis of human data.[7]

Chapter Eight provides an introduction to the advanced integrative therapies that some naturopathic physicians may offer. The chapter covers the intravenous vitamin C, repurposed drugs, and hyperthermia.

I am a critical reader and at times wanted to use a red marker, circling the occasional typos in the text that slipped past the editors. That's just me though. I do this to most things I read.

For a better part of the last two decades my practice was focused on caring for cancer patients and this has affected my appreciation for this text. For me this book will be valuable. For the general practicing naturopathic physician who does not work with cancer patients day in and day out, I think the book will prove to be even more useful. It provides the important information you will need to know, concisely and accurately so that you can do the most good.

The bottom line is that this book is an achievement, and it is now the most complete resource naturopathic physicians have to both further their understanding of how to care for cancer patients and as a desktop resource while consulting with these patients. It is clearly worth the space it will take up on your desktop; it will be the book you reach for often. It is currently, and for the foreseeable future, the best choice we have on the subject of naturopathic oncology.

References

1. Lamson DW, Brignall MS. Antioxidants in cancer therapy; their actions and interactions with oncologic therapies. *Altern Med Rev*. 1999 Oct;4(5):304-29.
2. Lamson DW, Brignall MS. Antioxidants and cancer therapy II: quick reference guide. *Altern Med Rev*. 2000 Apr;5(2):152-63.
3. Khan A, et al. Long-term stabilization of metastatic melanoma with sodium dichloroacetate. *World J Clin Oncol*. 2017 Aug 10;8(4):371-377.
4. Berger TG, et al. Artesunate in the treatment of metastatic uveal melanoma--first experiences. *Oncol Rep*. 2005;14(6):1599-1603.
5. Overgaard J1, et al. Hyperthermia as an adjuvant to radiation therapy of recurrent or metastatic malignant melanoma. A multicentre randomized trial by the European Society for Hyperthermic Oncology. *Int J Hyperthermia*. 1996 Jan-Feb;12(1):3-20.
6. Rogalska A, Bukowska B, Marczak A. Metformin and epothilone A treatment up regulate pro-apoptotic PARP-1, Casp-3 and H2AX genes and decrease of AKT kinase level to control cell death of human hepatocellular carcinoma and ovary adenocarcinoma cells. *Toxicol In Vitro*. 2018;47:48-62.
7. Shi J, et al. Association of metformin use with ovarian cancer incidence and prognosis: a systematic review and meta-analysis. *Int J Gynecol Cancer*. 2019 Jan;29(1):140-146.

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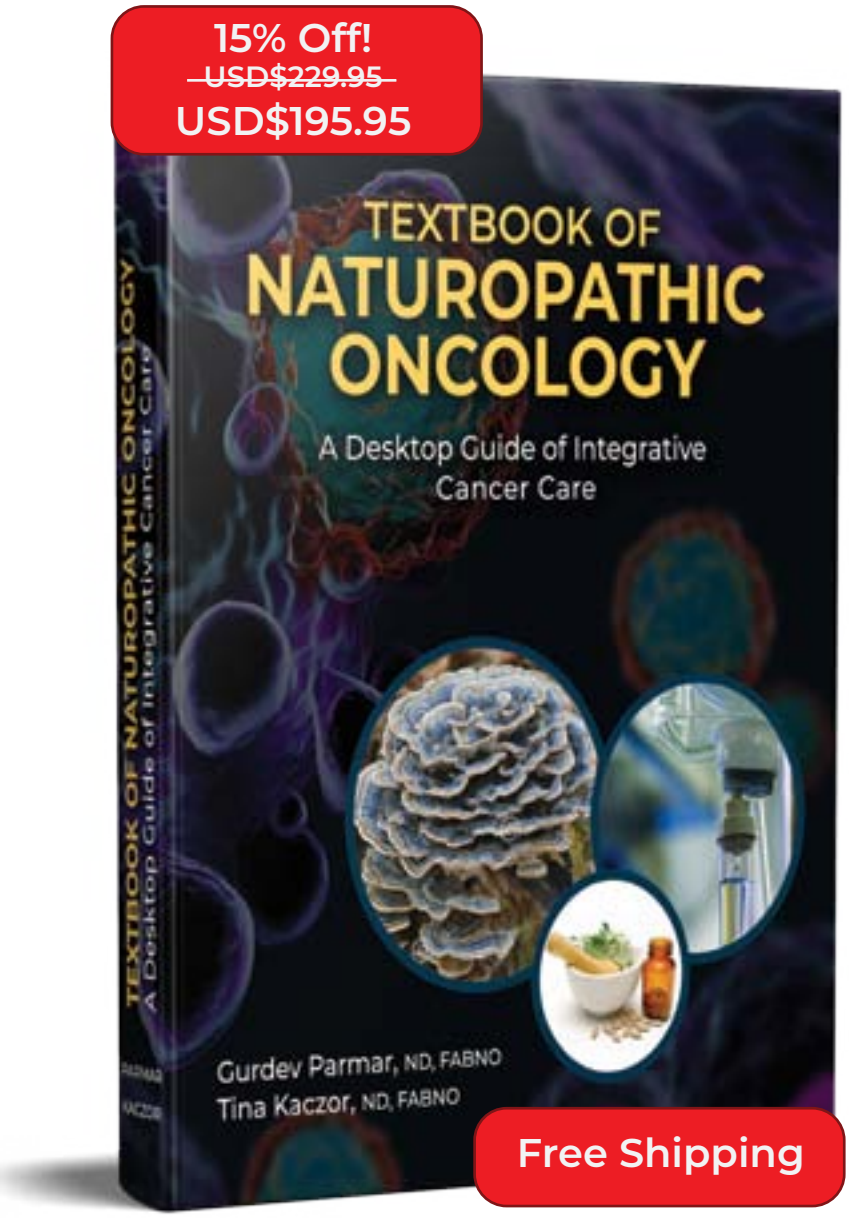

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A few communities have already used our film and guide to begin creating their own community holistic health care days.

Our work is a work of love. It makes us happy and we wish to share it with you. ◆

Hyperbaric Application to COVID-19 Pulmonary Infection

by Paul Harch, MD

In the midst of the coronavirus epidemic/pandemic, it bears remembering the application of hyperbaric oxygen therapy to the last major pandemic that impacted the United States in 1918, the Spanish flu pandemic. Death was primarily by pulmonary infection and its attendant hypoxemia and respiratory failure. The first application of hyperbaric medicine to a Spanish flu victim was likely also the first application to a human being in the United States. In 1918 Dr. Orval Cunningham of Kansas City was brought a dying friend of a fellow physician. The patient was moribund and blue. Before Cunningham could perform his planned animal experiments, he was asked to treat this dying patient. With just a one-hour treatment with compressed air at 1.68 atmospheres absolute, the patient experienced improvement. Combined with additional hyperbaric treatments over the next three days, this patient's life was saved. Others followed.

Today's coronavirus' mortality is due to pulmonary infection and respiratory failure. While there are differences between the Spanish flu and coronavirus, the primary pathology is in the lungs, the first organ of contact with hyperbaric therapy beyond the skin. The ability of hyperbaric oxygen to penetrate inflammatory pulmonary secretions allows adequate oxygen to reach the blood while inhibiting the inflammatory process. Applied correctly, hyperbaric therapy may have utility in coronavirus patients similar to its life-saving history with the Spanish flu. For more information about hyperbaric oxygen therapy, see Harch Hyperbarics, Inc: 504-309-4948; www.hbot.com. ◆

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COVID-19 Testing: What Clinicians Need to Know

by Andrea Gruszecki, ND

In December 2019, a novel coronavirus outbreak in Wuhan, China, progressed in three short months into a world-wide pandemic.[1] With an easily recognized symptom pattern (fever, dry cough, shortness of breath), the number of people presenting to health care facilities for diagnosis continues to rise.[2] Testing needs to be available to all who want it to avoid the under-reporting of COVID-19 cases. Under-reporting can result in a false sense of security and worsen the pandemic in the end.[3] However, as testing backlogs continue, clinicians in private practice have not had direct access to COVID-19 testing in their offices until now. A number of private commercial laboratories have invested the necessary resources to provide COVID-19 testing for clinicians in an office setting, so that patients now have another resource available for diagnostic testing.[4,5]

Before using such tests, it is important for clinicians to understand what tests are available, how the tests works, what the tests can (and cannot) do, how sensitive and specific the tests are, and what can be done to minimize pre-analytical (collection and shipping) errors. Several different tests are currently being offered with different strategies: one type detects viral RNA, and the others test for antiviral antibodies.

What Tests Are Available?

Of the tests currently used to gain information regarding the COVID-19 status of patients, the diagnostic gold standard is the real-time reverse transcriptase polymerase chain reaction (RT-PCR) test.[6] A saliva-based RT-PCR test has been developed, but at present is only being distributed to hospital-based care centers and state health departments, and may not be immediately available to private practice and office-based clinicians.[7]

Figure 1. The CDC recommends the collection of a nasopharyngeal swab for RT-PCR testing.

The second type of test is a blood test to measure antiviral IgM and IgG antibodies that increase in the human host after a COVID-19 virus exposure. The serological antibody tests can help clinicians establish immunity and past exposure in asymptomatic or recovering patients.

Several point-of-care "rapid tests" have also been developed and allowed into the marketplace for COVID-19 testing; however, the available evidence for these "lateral-flow" immunoassays indicates that they have a lower sensitivity (similar to rapid flu tests).[8] To provide an adequate standard of care, as has been done with influenza, negative rapid tests usually require a reflex RT-PCR to confirm the finding.[9] The available point-of-care "rapid tests" are not considered diagnostic but are currently intended for research purposes only per the World Health Organization (WHO), and will not be discussed further in this article.[10]

How Do the Tests Work?

The RT-PCR test detects the presence of the COVID-19 virus and requires a specimen that contains human cells. In the laboratory, a sample from the specimen is prepared and tested for the presence of COVID-19 RNA. The CDC currently recommends nasopharyngeal swabs as the preferred specimen collection, although health-care-worker-collected oropharyngeal (throat), nasal mid-turbinate or anterior nostril swabs may also be used to obtain specimens (see Figure 1).[11] Depending upon the test manufacturer, the RT-PCR test may identify two or three sequences of COVID-19 RNA, and contains internal controls to prevent false negatives.[12-14] Ideally, RT-PCR specimens are collected three-to-seven days after the first symptoms appear. As the patient moves into the recovery phase, the viral load can drop, and RT-PCR may be less reliable later in the course of the disease.[15]

Serological (blood or plasma) testing for antibodies uses a different strategy. Instead of testing for the COVID-19 virus directly, the blood tests look for an antibody response to COVID-19 exposure.[16] In the body, antibodies prevent infection by binding to proteins specific to the infecting virus. These serological tests are different from the rapid tests; they require specialized personnel and equipment, which increases their sensitivity and specificity. In the lab, the antibody test provides protein analogs for the blood sample antibodies to bind to, and then measures the levels of binding (which indicates the amount of antibody in the blood). Human studies of COVID-19 and SARS provide the necessary information to establish cut-off values: if

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the antibody level is higher than the cutoff, the test is read as positive ("reactive") against the COVID-19 virus.

It is possible for antibody tests to cross-react with other coronavirus strains as the coronavirus family shares a highly conserved genome.[17] However, it is currently unknown if these prior exposures may provide some partial immunity to COVID-19. While some private laboratories are offering expanded testing for IgA antibodies or antibody protein responses, there is no human COVID-19 data to indicate that such information improves either clinical decision-making or patient outcomes. Studies from the SARS epidemic indicate that IgA antibody responses are not as strong as IgM antibodies and seem to closely follow IgM patterns.[18]

It is the interpretation of the IgM/IgG pattern that makes serological testing useful for clinicians and others, such as public health officials that need to track the spread of COVID-19 (see Figure 2.).[19] IgM rises fairly quickly, and it is detectable as early as five-to-seven days after symptoms begin; this can be important because viral loads can start to drop after about seven days, which makes RT-PCR testing less reliable. The IgM antibodies continue to rise until the IgG antibodies begin to rise about three weeks after symptoms begin. The IgG antibodies are considered protective and are presumed to provide proof of immunity. During the recovery phase, the IgG levels may rise up to four times above baseline. It is important for clinicians to evaluate the level of response (quantitative information) as well as the presence or absence of antibodies (qualitative information), to determine if the patient has mounted a sufficient immune response.[20,21] The IgM levels can begin to drop after a month, while the protective IgG levels may remain elevated for several years.

What Can the Tests Do?

The available testing differentiates the patient population into manageable groups. This is particularly important for symptomatic patients; clinicians need to know who is COVID-19-positive so that immediate steps (such as quarantine and deep cleaning) can be taken. The RT-PCR test provides this emergent, vital information; either the virus is present or it is not. The RT-PCR test can also be used to decide when it is appropriate for a patient to break quarantine, which may further protect the general population and reduce the rate of transmission. Evidence from Wuhan, China, indicates that most people carry the virus after recovery. The average time of viral carriage is 20 days; however, one patient continued to shed virus for 37 days (until they died). The CDC currently recommends a test-based strategy: two negative RT-PCR tests 24 hours apart after symptom resolution to confirm the patient is virus-free.[22]

While the antibody test is not considered independently diagnostic, it has a great deal of value in screening asymptomatic or resolved mild cases for adequate immune response. When used in conjunction with RT-PCR testing, antibody testing can help discern the false-negative RT-PCR tests that occasionally occur when specimen collection is poor or past the recommended time frame.

How Sensitive and Specific Are the Tests?

Sensitivity is the probability of disease detection or the "true positive" rate. Specificity is the "true negative" rate; in other words, specificity correctly identifies people who *do not have* the disease. For diagnostic medical testing both sensitivity and specificity should be at least 90%, and preferably the sensitivity and specificity determinations should be based in human studies that demonstrate clinical utility.[23,24]

What Can Be Done to Minimize Pre-Analytical Errors?

After deciding which test is best, ensure that the right specimen is collected at the right anatomical site at the right time in the infection cycle. Attention to proper collection is key to obtaining accurate results.[8,24] For RT-PCR, this means collecting a nasopharyngeal or oropharyngeal sample within three-to-seven days after symptoms begin. For serological antibodies, collection seven or more days after the first symptoms allows the patient enough time to mount an antibody response. Remember too, that antibody testing still has predictive value for asymptomatic patients or those already in recovery.

In addition, make sure that testing supplies are properly stored (no extremes of humidity or temperature), that specimens are properly labeled, and that they are shipped back per the laboratory's instructions. Taking these simple steps can improve turn-around times to get important clinical information back into the medical office as quickly as possible.

Conclusion

While recommendations about who to test may continue to evolve, the available test methods (RT-PCR and antibodies) will probably not.[25] Choosing tests with good sensitivity, specificity, and clinical correlations may be the best way to provide patients with accurate and timely information about their COVID-19 status.

Test results			Clinical Significance
RT-qPCR	IgM	IgG	
+	–	–	Patient may be in the window period of infection.
+	+	–	Patient may be in the early stage of infection.
+	+	+	Patients is in the active phase of infection.
+	–	+	Patient may be in the late or recurrent stage of infection.
–	+	–	Patient may be in the early stage of infection. RT-qPCR result may be false-negative.
–	–	+	Patient may have had a past infection, and has recovered.
–	+	+	Patient may be in the recovery stage of an infection, or the RT-qPCR result may be false-negative.

Figure 2. The interpretation of serological IgM/IgG results.
Image courtesy of Diazyme Laboratories, Inc. Used with permission.

References

1. Guo YR, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. *Mil Med Res*. 2020;7(1):11.
2. Stein R. Coronavirus Testing Backlogs Continue As Laboratories Struggle To Keep Up With Demand. NPR.org. April 3, 2020.
3. Wang J, Huth L, Umlauf T. CDC created COVID-19 testing criteria that masked the numbers contracting the coronavirus in US. *Wall Street Journal*. March 22, 2020.
4. Modern Healthcare (2020) Commercial COVID-19 test developers race to get products out.

5. US Food & Drug Administration (2020) Coronavirus (COVID-19) Update: FDA expedites review of diagnostic tests to combat COVID-19. https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-expedites-review-diagnostic-tests-combat-covid-19 Accessed 13 April 2020.
6. Lippi G, Simundic AM, Plebani M. Potential preanalytical and analytical vulnerabilities in the laboratory diagnosis of coronavirus disease 2019 (COVID-19) [published online ahead of print, 2020 Mar 16]. *Clin Chem Lab Med*. 2020.
7. Accurate Diagnostic Laboratories and Rutgers University Cell & DNA Repository Lab Work Together to Change the COVID-19 Testing Landscape. www.prnewswire.com. April 6, 2020.
8. Tang Y, et al. The Laboratory Diagnosis of COVID-19 Infection: Current Issues and Challenges. *J. Clin. Microbiol*. Posted online 03 April 2020.
9. Yarbrough ML, et al. Influence of Molecular Testing on Influenza Diagnosis. *Clin Chem*. 2018;64(11):1560–1566.
10. World Health Organization. Advice on the use of point-of-care immunodiagnostic tests for COVID-19. April 8, 2020.
11. Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens from Persons for Coronavirus Disease 2019 (COVID-19). https://www.cdc.gov/coronavirus/2019-ncov/lab/guidelines-clinical-specimens.html Accessed 13 April 2020.
12. Fuk-Woo Chan J, et al. Improved molecular diagnosis of COVID-19 by the novel, highly sensitive and specific COVID-19-RdRp/Hel real-time reverse transcription-polymerase chain reaction assay validated in vitro and with clinical specimens. *J Clin. Microbiol*. 04 March 4, 2020.
13. ThermoFisher TaqPath™ COVID-19 Combo Kit Instructions for Use. Pub. No. MAN0019181 Revision B.0 24 March 2020.
14. Dreier J, Störmer M, Kleesiek K. Use of bacteriophage MS2 as an internal control in viral reverse transcription-PCR assays. *J Clin Microbiol*. 2005;43(9):4551–4557.
15. Specimen Collection Guidelines. https://www.cdc.gov/urdo/downloads/SpecCollectionGuidelines.pdf Accessed 13 April 2020.
16. Diazyme DZ-Lite SARS CoV-2 IgM and IgG CLIA Kits Frequently Asked Questions (FAQs). http://www.diazyme.com/dz-lite-sars-cov-2 Accessed 13 April 2020.
17. Fehr AR, Perlman S. Coronaviruses: an overview of their replication and pathogenesis. *Methods Mol Biol*. 2015;1282:1–23.
18. Woo PC, et al. Longitudinal profile of immunoglobulin G (IgG), IgM, and IgA antibodies against the severe acute respiratory syndrome (SARS) coronavirus nucleocapsid protein in patients with pneumonia due to the SARS coronavirus. *Clin Diagn Lab Immunol*. 2004;11(4):665–668.
19. Kai-Wang To K, et al. Temporal profiles of viral load in posterior oropharyngeal saliva samples and serum antibody responses during infection by SARS-CoV-2: an observational cohort study. *Lancet*. Published online 23 March 2020.
20. Wu LP, et al. Duration of antibody responses after severe acute respiratory syndrome. *Emerg Infect Dis*. 2007;13(10):1562–1564.
21. Mao p, et al. Study on the response of specific antibodies against SARS-CoV in patients infected with SARS. *Chinese J Epidemiol*. 2004;25(10):856-858.
22. Discontinuation of Isolation for Persons with COVID-19 Not in Healthcare Settings (Interim Guidance). https://www.cdc.gov/coronavirus/2019-ncov/hcp/disposition-in-home-patients.html Accessed 14 April 2020.

23. University of Minnesota School of Public Health. Understanding medical tests: sensitivity, specificity, and positive predictive value. 2018. https://www.healthnewsreview.org/toolkit/tips-for-understanding-studies/understanding-medical-tests-sensitivity-specificity-and-positive-predictive-value/ Accessed 14 April 2020.
24. Cohen JF, et al. STARD 2015 guidelines for reporting diagnostic accuracy studies: explanation and elaboration. *BMJ Open*. 2016;6(11):e012799.
25. Evaluating and Testing Persons for Coronavirus Disease 2019 (COVID-19). https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-criteria.html Accessed 14 April 2020.

Andrea Gruszecki, ND, received her BA in ecology and evolutionary biology from the University of Connecticut, where she was exposed to a variety of research projects; her own research project examined the effects of diurnal cycles on *Poeciliopsis* species. Trained as a radiologic technologist and army medic, she spent the years prior to graduation working in urgent care and hospital settings, gaining valuable clinical experience. She received her doctorate in naturopathy from Southwest College of Naturopathic Medicine. Upon her graduation from SWCNM, she worked with patients at the Wellness Center in Norwalk, Connecticut, before starting her own naturopathic practice.

Her experiences in private practice evolved into an inclusive model of medicine for use by conventional and CAM providers, designed to allow cross-specialty communication among health care providers ("Forward into the Past: Reclaiming Our Roots Through an Inclusive Model of Medicine." *NDNR eNewsletter*, June 2013). She has presented at a variety of venues, including the American Academy of Environmental Medicine, Integrative Medicine for Mental Health, International College of Integrative Medicine, and the California Naturopathic Doctors Association.

Dr. Gruszecki is a member of the consulting department at Meridian Valley Laboratory, where she may provide interpretive assistance with laboratory results, write interpretations, and create conference presentations.

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Shorts

briefed by Jule Klotter
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Coronavirus Vaccines

As of April 23, the World Health Organization (WHO) was assessing 83 possible vaccines for COVID-19; seven are already undergoing human clinical trials.[1] Usually, vaccine development takes several years, but government agencies and pharmaceutical companies are collaborating with the hope of having an effective vaccine within 12-18 months, by early 2021 (or sooner, if US FDA grants "emergency use" status[2]). Instead of culturing the virus in cells, a time-consuming process that slows manufacturing, companies are turning to new techniques.[3] A Chinese biotech company, CanSino Biological, is working on a subunit vaccine that uses the coronavirus spike protein, delivered by an adenovirus vector, to induce antibody response.[1] Researchers at UK's University of Oxford are using a similar technique for their vaccine, which is being tested on 1102 healthy volunteers. Johnson & Johnson is using genetic engineering to modify an adenovirus so that it resembles the COVID-19 virus (SARS-CoV-2).[4] The US biotechnology company Inovio began testing a novel DNA vaccine in April; and Moderna (US) and BioNTech (Germany) are testing mRNA vaccines.[1]

SARS-CoV-2 is not the first coronavirus to be targeted by the vaccine industry. Researchers tried to make vaccines for both SARS-CoV, the virus that caused severe acute respiratory syndrome in the 2002 epidemic, and MERS-CoV, the virus that caused Middle East respiratory syndrome in 2012. SARS vaccines (inactivated subunit and whole virus) produced antibody protection in monkeys, ferrets, and mice; but animals also developed an "immunopathologic-type lung reaction."[5] A US-Saudi research team reported a similar risk with an inactivated MERS coronavirus vaccine. Vaccine development for both viruses was stopped due to safety concerns. Research scientist James Lyons-Weiler, PhD, says, "In SARS, a type of 'priming' of the immune system was observed during animal studies of SARS spike protein-based vaccines leading to increased morbidity and mortality in vaccinated animals who were subsequently exposed to wild SARS virus."[6] A similar immunological priming reaction occurred with Sanofi Pasteur's Dengvaxia; people in the Philippines who had never been exposed to dengue fever (primarily children) experienced an enhanced response to wild dengue infection after being vaccinated. Some died. The Philippine government recalled the vaccine in December 2017 and filed criminal damages against Sanofi officials about a year later.[7]

Lyons-Weiler says that animal studies need to be conducted before human trials to investigate the possibility that SARS-CoV-2 vaccines might have the same priming effect. Most COVID-19 vaccines have skipped animal trials or are performing animal trials concurrent with clinical studies. In his article, Lyons-Weiler says that over one-third of the immunogenic proteins in SARS-CoV-2 are similar to proteins in the human adaptive immune system: "…many functions of the human adaptive immune system might be impacted via autoimmunity against these proteins and their interactors…."[6] (As many of the proposed COVID-2 vaccines use subunit technology instead of the entire virus, it may be possible to avoid using these proteins.)

Safety issues for two of the "frontrunners," Inovio's DNA vaccine and Moderna's mRNA vaccine, are even less clear. Instead of providing an antigen, these vaccines provide synthesized genetic information that instructs a person's cells to *create* the desired antigen.[8] After cells make "pieces of the virus," the immune system responds with a defense. No human vaccine using this type of technology has been approved and licensed by FDA. One of the advantages of nucleic acid vaccines is that they can be manufactured very quickly.

Inovio's DNA technology uses a proprietary computer algorithm "to identify and optimize the DNA sequence of the target antigen," according to the company website. After the sequence has been determined, DNA plasmids are synthesized for intramuscular or intradermal injection. A hand-held device gives an electrical pulse that creates temporary pores in cell membranes, allowing the synthetic DNA to enter the cell's nucleus. Concerns about DNA vaccine safety include the

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Relax Sauna Users Raving about the Relax Sauna:

"I was a non-sweater. It's amazing because it just helped me start eliminating and dumping all of my mold toxins. I found out that I had very high levels of mycotoxins from mold that was found in my home. By doing Relax Sauna therapy and glutathione, I was actually able to eliminated all of the mycotoxins. This was a life-saver for me. I love it." - P.S.

"When I would get in the sauna, it would absolutely, positively boost my immune system and I was able to overcome the virus and germs that were invading my body. If I did have a cold, it shortened the duration of it by 70 to 80% "- Dr. K Moses

"It's just phenomenal. I had some diabetic retinopathy, which it's just great for. The feeling in my hands and feet has just been astronomically better. I feel better overall. I sweat for the first time after I got the sauna. I hadn't sweat in 10 years. It's just fabulous. I know that heating up the core actually kills off Lyme." - Casey

"I have many clients who have Lyme. In the extreme cases what actually worked on those that are now Lyme-free, has been the Relax Sauna." ... "This is the easiest protocol I know to get rid of Lyme, get yourself feeling better, looking better and get the toxins out" - Dr. Catherine

"After using the Relax Sauna, I realized I was able to achieve a sweat much more rapidly, and that it utilized an incredible technology I had not found in any other sauna. I highly recommend the Relax Sauna. I have benefited tremendously, as have my patients and family."

Dr. Bill Akpinar, (M.D., D.S., O.M.D. Chi Gong Master)
Author of "No Sweat? Know Sweat!"
Definitive guide to hyperthermia and detoxification therapy.

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- **Mobilizing the Lymphatic System**
  (Detoxifying Heavy Metals, Dioxins, Phylates, Metabolic Waste)
- **Activating the Parasympathetic Nervous System**
  (Relieving Stress, Better Sleep & Producing Deep Profound Relaxation)
- **Activating Mitochondria to produce ATP & Nitric Oxide**
  (Rejuvenating & Enhancing Oxygenation of the Body)
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  (Arthritis, Muscle Pain, Diabetic Ulcers, Scar Tissue, Neuropathy, Reynaud's)

Medical professionals find the Relax Sauna great & highly effective for treating Lyme

The Relax Sauna is very effective for treating Lyme disease and Lyme co-infections. This has been proven in many happy, relieved Relax sauna customers who are extremely grateful as they have reported that they miraculously went into remission after using the Relax sauna for as little as 15 minutes a day! The Relax Sauna is very effective in treating Lyme because of its ability to warm the body instantly, increase core temperature significantly within a few minutes and create a profuse sweat within 15-20 minutes. The intensity of the light rays of the Relax Sauna penetrate deeply into the tissues and disable the reproduction of the spirochetes by starving them. Many familiar with Lyme disease know the importance of sweating out the toxins and the Relax Sauna does this in the comfort and privacy of your home, and at an excellent, affordable price. Users are able to get in and out of the sauna multiple times a day and aggressively attack the Lyme on all fronts.

Using The Relax Sauna for combating COVID-19

Dr. Stephen Forbess has achieved remarkable results treating patients with the Relax Sauna and even developed a special protocol. He reported:

"After people exit out of the therapy, they find that their breathing is generally easier. This sauna reduces body inflammation. And beneficial side effects like improved joint motion reduced pain and a feeling of wellness. There are really no side effects other than those good side effects with this type of therapy.

"Know that we can beat this pandemic. ...This will kill any virus or bacteria due to this hot environment."

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Shorts

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following: possibility of chronic inflammation because the vaccine continually stimulates the immune system, possible integration of plasmid DNA into the person's genome, and possible triggering of autoimmunity or cancer-causing genes.[2] I also wonder if these nucleic acid vaccines, which program cells to make a specific antigen, might have another effect: Will the immune system become fixated on the antigen produced in cells and become less responsive to other, similar viruses encountered in the future? Inovio began phase 1 clinical trials to evaluate immune response and safety in early April. Phase 2 is expected to commence immediately after phase 1 concludes this summer.

While the plasmid for DNA vaccines needs to enter the nucleus, genetic material for mRNA vaccines must enter just the cell's cytoplasm in order to work. mRNA vaccines are less stable than DNA vaccines. They need to be kept refrigerated or frozen, or they will degrade.[4] Safety concerns include the possibility of chronic inflammation and autoimmune reactions. Moderna started phase 1 clinical trials of its mRNA vaccine in March 2020; phase 2 trials are expected to begin by June, and phase 3 in Fall 2020.[9]

On February 4, 2020, the Secretary of US Department of Health and Human Services issued a declaration that provides liability immunity to individual persons and entities – including manufacturers, distributors, program planners, and any qualified person – that develop, manufacture, test, distribute, or administer vaccines, drugs, or medical devices related to COVID-19.[10] COVID-19 vaccine manufacturers cannot be sued in the US, under the Public Readiness and Emergency Preparedness Act of 2005, now that this declaration has been issued. This legislation did set up an emergency fund to provide compensation to those who are injured by any "countermeasure" used to address the virus.[11]

The rush to put vaccines into the marketplace, the lack of liability, and concerns about public distrust of the vaccine industry impelled the executive and scientific director of Alliance for Natural Health International, Robert Verkerk, and the president of British Society for Ecological Medicine, Damien Downing, to request for full transparency around the development, testing, and roll-out of COVID-19 vaccines.[12] They ask the UK's Secretary of State for Health and Social Care for full disclosure of all raw data from studies so that independent researchers can make their own assessments; full disclosure about vaccine composition; transparency of any studies regarding adjuvants used in COVID vaccines; and full disclosure of cases and potential cases of vaccine injury. They also request that the UK government clarify indemnity offered to vaccine manufacturers and the criteria for no-fault vaccine injury payments. In addition, Verkerk and Downing ask that validated antibody tests be available so that people can assess their immunity before giving their consent to be vaccinated.

References

1. Mahase E. Covid-19: What do we know so far about a vaccine? *BMJ.* 2020;369:m1679.
2. Fisher BL, Raines K. Inovio COVID-19 Vaccine Uses Electricity to Drive DNA Into Body Cells. www.TheVaccineReaction.org. April 18, 2020.
3. Berezow A. How to Make a Coronavirus Vaccine. www.acsh.org. February 26, 2020.
4. Schmidt C. Genetic Engineering Could Make a COVID Vaccine in Months Rather Than Years. *Scientific American.* April 2020.
5. Agrawal AS, et al. Immunization with Inactivated Middle East Respiratory Syndrome coronavirus vaccine leads to lung immunopathology on challenge with live virus. *Human Vaccines & Immunotherapeutics.* 2016;12(9):2351-2356.
6. Lyons-Weiler J. Pathogenic priming likely contributes to serious and critical illness and mortality in COVID-19 via autoimmunity. *J Translational Autoimmunity.* 2020.
7. Philippines to charge Sanofi officials over dengue vaccination deaths. Medicalxpress.com March 1, 2019.
8. Children's Health Defense Team. COVID-19: The Spearpoint for Rolling Out a "New Era" of High-Risk, Genetically Engineered Vaccines. May 7, 2020.
9. Al Idrus A. BARDA promises Moderna up to $483M to shepherd COVID-19 vaccine to approval. FierceBiotech.com. April 16, 2020.
10. Department of Health and Human Services. Declaration Under the Public Readiness and Emergency Preparedness Act for Medical Countermeasures Against COVID-19. Federal Register. March 17, 202;85(52):15198-15203.
11. Association of State and Territorial Health Officials. Public Readiness and Emergency Preparedness Act Fact Sheet. Astho.org.
12. Verkerk R, Downing D. Open letter to the Rt Hon Matt Hancock MP. April 2020.

Antibacterial Effects of Cannabis

Cannabinoids in cannabis plants have antibacterial effects that may prove useful against antibiotic-resistant bacteria. At the American Society of Microbiology 2019 annual meeting, Australian researchers reported that cannabidiol, the main non-psychoactive chemical in cannabis plants, effectively kills Gram-positive bacteria (e.g. *S. aureus*), including antibiotic-resistant bacteria, and disrupts biofilms (hard-to-treat microbial colonies). Moreover, bacteria reportedly did not develop resistance to the cannabinoid: "Under extended exposure conditions that lead to resistance against vancomycin or daptomycin, cannabidiol did not lose effectiveness."

In a 2020 study, Canadian researchers found that five major cannabinoids (cannabichromene, cannabidiol, cannabigerol, cannabinol, Δ^9-tetrahydrocannabinol) in *Cannabis sativa* repressed methicillin-resistant *S. aureus* (MRSA) and biofilm formation. Cannabigerol (CBG) was the most potent. CBG also destroyed *S. aureus* persister cells, the bacterial cells that tolerate antibiotics: "Notably, CBG rapidly eradicated a population of ~10^8 CFU/ml MRSA persisters to below the detection threshold within 30 minutes of treatment." The researchers found that cannabinoids destroy Gram-positive bacteria, like *S. aureus,* by breaking down the cytoplasmic membrane. Tests with mice showed that CBG's efficacy against MRSA was similar to vancomycin, the antibiotic control.

Unlike Gram-positive bacteria, Gram-negative bacteria (e.g., *E. coli*) have an outer membrane that protects them from many antibacterial compounds, including cannabinoids. The Canadians found that all five cannabinoids "gained potent activity in the presence of sub-lethal concentrations of polymyxin B," an antibiotic that disrupts the outer membrane's integrity. Combination therapy, such as this, opens new possibilities for treating hard-to-treat and drug-resistant Gram-negative bacteria.

American Society for Microbiology. Cannabidiol is a powerful new antibiotic (news release). 6/13/2019.
Farha MA, et al. Uncovering the Hidden Antibiotic Potential of Cannabis. *ACS Infect Dis.* 2020;6(3): 338-346.

Post-Vaccination Autoimmunity

During the 2009 H1N1 influenza pandemic, mass vaccination programs with newly developed vaccines were conducted in several countries. About a year after the vaccines

were authorized, researchers noticed an increase in narcolepsy cases among those who had received the European vaccine Pandemrix. Narcolepsy is a chronic neurological disorder that produces abrupt daytime sleepiness. In 2012, Finland reported a 12.7-fold increased risk of narcolepsy in children and adolescents within eight months after vaccination with Pandemrix. Ahmed et al report: "As of January 2015, more than 1300 cases of vaccine-associated narcolepsy have been spontaneously reported to the European Medicines Agency EudraVigilance database." Vaccine-attributable risk estimates from the UK and Finland studies range from 1 in 16,000 doses and 1 in 50,000 doses.

Narcolepsy is due to impaired signaling or low levels of the neuropeptide hypocretin (HCRT, also known as orexin). Anoma Nellore and Troy D. Randall explain, "Narcolepsy can also be caused by naturally-occurring or experimentally-induced mutations in HCRT itself, its precursor protein or in its receptors, such as HCRT-R2." In their editorial, they note that the narcolepsy linked to the Pandemrix vaccine was associated with a specific genetic polymorphism (HLA DQB1*0602) and with other immune-related genes, "suggesting that in some cases, narcolepsy can be an autoimmune disease mediated by CD4 T cells." Finnish narcolepsy patients with this haplotype had circulating antibodies against HCRT-R2 after vaccination with Pandemrix.

Nellore and Randall tried to figure out why Pandemrix was associated with narcolepsy and the other two vaccines used in Europe (Focetria and Arepanrix) were not. At first, they thought it was due to the squalene-based emulsion adjuvant, AS03; but Arepanrix also contained AS03. They learned that the manufacturing processes for Pandemrix and Arepanrix differed. The virus used in Pandemrix was treated with detergent and then inactivated with deoxycholate and formaldehyde. Arepanrix manufacturers first inactivated the virus with ultraviolet irradiation before fixing it with formaldehyde. Unlike Arepanrix, the Pandemrix process exposed the viral nucleocapsid protein (NP) directly to the immune system. As a result, the antigens in Pandemrix and Arepanrix functioned differently – and one was linked to an autoimmune reaction in some people and the other was not. Why some people with HLA DQB1*0602 developed narcolepsy and others did not is still unanswered. The authors say, "…identification and characterization of T and B cells that cross-react with NP and HCRT-R2 in narcoleptic patients will be key to understanding the potential link between vaccination, infection and narcolepsy."

Ahmed SS, et al. Antibodies to influenza nucleoprotein cross-react with human hypocretin receptor 2. *Sci Translational Med.* July 1, 2015;7(294).

Nellore A, Randall TD. Narcolepsy and influenza vaccination – the inappropriate awakening of immunity. *Annals Translational Medicine.* 2016;4(Suppl 1):S29.

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Literature Review & Commentary

by Alan R. Gaby, MD
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Since infectious disease is the theme of this issue of the *Townsend Letter*, I thought it would be useful to review some of my favorite studies on the use of natural remedies for the prevention and treatment of infections. You will note that some of the studies are relatively recent, some date back more than 20 years, and some are more than 40 years old. Many of these "older" studies failed to attract the interest of the mainstream medical community and were never followed up by other researchers. However, they appear to be effective in clinical practice.

Vitamin C for the Common Cold

Eight hundred eighteen volunteers who normally experienced at least one cold per winter were randomly assigned to receive, in double-blind fashion, vitamin C (250 mg 4 times per day, as a mixture of ascorbic acid and sodium ascorbate) or placebo for a mean of 103 days during the winter. At the first sign of any illness, the dosage of vitamin C or placebo was increased to 1 g four times per day. The proportion of subjects who remained free of illness during the study was significantly higher in the vitamin C group than in the placebo group (26% vs. 18%, $p < 0.05$). The mean number of illnesses was nonsignificantly lower by 7% in the vitamin C group than in the placebo group. The mean total number of days confined to the house because of illness was 30.4% less in the vitamin C group than in the placebo group ($p < 0.001$). The difference between groups was most marked with respect to constitutional symptoms such as malaise, fever, and chills. Less marked differences were seen for symptoms referable to the nose, throat, and chest. The reduction in days of disability was seen with all types of acute illness, including those that did not involve the upper respiratory tract.

Comment: Vitamin C has demonstrated an antiviral effect *in vitro*, and it also enhances immune function. Leukocyte vitamin C concentrations have been found to fall precipitously (to the levels seen in people with scurvy) within 24 hours of the onset of a cold.[1] This decline is presumably due to increased vitamin C utilization for implementation of tissue defense mechanisms.[2] Supplementation with 200 mg per day of vitamin C had no effect on the decline in leukocyte vitamin C levels during colds. However, the decline was largely prevented by prophylactic administration of 1 g per day of vitamin C, increased to 6 g per day for three days at the first sign of a cold.

In the present study, treatment with 1 g of vitamin C four times per day significantly decreased the number of days people had to stay home because of colds or other illnesses. Vitamin C also decreased the number of illnesses by 7%, but that decrease was not statistically significant. Numerous other studies have examined whether vitamin C is an effective treatment for the common cold. Most, though not all, of these studies have reported results similar to those of the present study.

Anderson TW, et al. Vitamin C and the common cold: a double-blind trial. *Can Med Assoc J*. 1972;107:503-508.

Zinc Lozenges for the Common Cold

One hundred employees of the Cleveland Clinic who developed cold symptoms were randomly assigned to receive, in double-blind fashion, zinc gluconate lozenges (containing 13.3 mg of zinc per lozenge) or placebo. Treatment was begun within 24 hours of the onset of symptoms. The patients dissolved a lozenge in the mouth every two hours while awake, for as long as they had cold symptoms. Median time until symptoms resolved was significantly shorter by 42% in the zinc group than in the placebo group (4.4 vs. 7.6 days; $p < 0.001$).

Comment: Zinc ions have been reported to inhibit the replication of rhinovirus (a virus that causes colds) *in vitro*.

Ionized zinc may also protect cells from damage by viral toxins. In this study and several other studies, the use of zinc lozenges significantly decreased the duration of cold symptoms.

However, zinc lozenges were not beneficial in several other studies. It has been argued that the negative results in these studies were due to a failure of the lozenges to release zinc ions in the oral cavity. Loosely bound zinc salts such as zinc gluconate and zinc acetate would be expected to release zinc ions more effectively than more tightly bound zinc salts such as zinc picolinate, zinc citrate, zinc orotate, and zinc aspartate. In addition, certain flavoring agents or excipients such as citric acid, mannitol, sorbitol, and tartrate may chelate zinc and prevent it from ionizing in the mouth. Zinc products that have been demonstrated to be effective for adults contain zinc gluconate or zinc acetate, do not contain citric acid, mannitol, sorbitol, or tartrate, and do not contain fatty acids that have been heated to high temperatures. Zinc lozenges do not appear to be beneficial for children or adolescents with colds.

Mossad SB, et al. Zinc gluconate lozenges for treating the common cold. A randomized, double-blind, placebo-controlled study. *Ann Intern Med*. 1996;125:81-88.

Probiotic Prevents Urinary Tract Infections

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

Comment: Lactobacilli and other probiotics are normal inhabitants of the vagina. Probiotics may help prevent the development of UTIs by competitively excluding pathogenic organisms and by producing compounds that inhibit the growth of these pathogens. In the present study, two specific probiotic strains were nearly as effective as antibiotics for preventing UTI recurrences in postmenopausal women. These strains may be preferable to other probiotic organisms for preventing and treating UTIs since they appear to be more effective at colonizing the vaginal mucosa and inhibiting bacteria that cause UTIs. *L. rhamnosus* GR-1/*L. reuteri* RC-14 is available in the US under the names Pro-Flora Women's Probiotic (Integrative Therapeutics), Fem-Dophilus (Jarrow), and UltraFlora Women's (Metagenics).[3]

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

D-Mannose Prevents Urinary Tract Infections

Three hundred eight women (aged 29-58 years) with an acute urinary tract infection (UTI) and a history of recurrent UTIs were treated with ciprofloxacin (500 mg twice a day for 1 week) and were then randomly assigned to receive 2 g of D-mannose in 200 ml of water once a day in the evening, 50 mg of nitrofurantoin once a day in the evening, or no prophylaxis (control group) for six months. Women with urinary tract anomalies, interstitial cystitis, or diabetes, and those who were pregnant or taking hormone therapy or contraceptives were excluded. During the study, 98 women (31.8%) had a recurrent UTI. The recurrence rate was significantly lower in the groups that received D-mannose (14.6%) and nitrofurantoin (20.4%) than in the control group (60.8%) ($p < 0.001$). The recurrence rate did not differ significantly between the D-mannose and nitrofurantoin groups. The incidence of side effects was significantly lower in the D-mannose group than in the nitrofurantoin group (8% vs. 27%; $p < 0.0001$). The only side effect of D-mannose was diarrhea, which occurred in 8% of patients and did not require discontinuation of treatment.

Comment: About 25 years ago, Dr. Jonathan Wright began using D-mannose (a sugar structurally similar to glucose) to prevent and treat UTIs. This treatment was based on *in vitro* evidence that D-mannose prevents uropathogenic *Escherichia coli* from adhering to the epithelial cells of the genitourinary tract. Since then Dr. Wright has administered D-mannose to hundreds of patients. In his experience, it is effective in 85-90% of patients, although it is not effective for UTIs caused by organisms other than *E. coli.*

For treatment of UTIs, Dr. Wright recommends a dosage of 1 teaspoonful (about 2 g) for adults and 1/2 to 1 teaspoonful for children, dissolved in a glass of water or juice and repeated every two to three hours. Treatment should be continued for two to three days after symptoms have disappeared.[4]

Many practitioners are now using D-mannose because of the writings and teachings of Dr. Wright. Informal surveys that I conducted at medical conferences revealed that these practitioners generally concur with Wright's observations. The results of this randomized controlled trial from 2014 confirm the anecdotal evidence regarding the efficacy of D-mannose.

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

Green Tea Extract Prevents Influenza

One hundred twenty-four elderly residents of a nursing home in Japan (mean age, 83 years) gargled three times per day with an aqueous solution of green tea catechins (polyphenon E; 200 µg/ml) or with a control solution for three months during the winter. The concentration of catechins in the gargles of the active-treatment group was half that of commercial green tea beverages. It was not stated whether the study was randomized or blinded. All participants received an influenza vaccine. The incidence of influenza during the study was significantly lower in the active-treatment group than in the control group (1.3% vs. 10.4%; $p < 0.03$). No adverse effects were observed.

Comment: In this study, gargling with an aqueous solution that contained a green tea extract decreased the incidence of influenza in elderly nursing home residents. In another randomized controlled trial, administration of a proprietary ➤

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green tea extract (1 capsule twice a day for 3 months) to young healthy volunteers decreased the number of days with cold or flu symptoms by 35.6%, compared with placebo ($p < 0.002$).[5] Green tea extracts may work in part by inhibiting the growth of influenza virus, an effect that has been demonstrated *in vitro*.[6] Green tea extracts also enhance the function of a subset of T cells that play a role in the immune response.[5] Based on this research, it would seem reasonable to expect that regularly drinking green tea could also help prevent influenza.

Yamada H, et al. Gargling with tea catechin extracts for the prevention of influenza infection in elderly nursing home residents: a prospective clinical study. *J Altern Complement Med*. 2006;12:669-672.

Vitamin A for Chickenpox

Ninety-three children with chickenpox who had no clinical evidence of vitamin A deficiency were randomly assigned to receive a single dose of vitamin A (200,000 IU) or placebo. In addition, eight exposed siblings who had not yet shown signs of illness were given the same dose of vitamin A during the incubation period. Crusting of the lesions (a sign of recovery) occurred significantly earlier in the vitamin A group than in the placebo group (mean, 5.34 vs. 6.37 days; 16.2% reduction; $p < 0.01$). Fewer children developed complications (viral pneumonia, conjunctivitis, or gastroenteritis) in the vitamin A group than in the placebo group (0 vs. 5). Among vitamin A-treated siblings, mean time to healing was only 5.1 days, even though secondary cases in the same household are normally expected to be more severe than initial cases.

Comment: Vitamin A plays a role in immune function. In addition, vitamin A has been shown to inactivate a number of different viruses *in vitro*. Most infections provoke an acute-phase response that reduces the synthesis of retinol-binding protein in the liver, and thereby decreases circulating vitamin A levels. Moreover, urinary excretion of vitamin A increases during infections, particularly infections associated with fever. Therefore, infections may lead to low vitamin A status or to a decreased capacity to mobilize vitamin A to areas in the body where it is needed. These changes could, in turn, reduce a person's ability to combat the infection. In numerous studies, treatment with vitamin A significantly decreased morbidity and mortality in patients with measles. The present study demonstrated that vitamin A is also beneficial in the treatment of chickenpox.

Ozsoylu S, Cemeroglu AP, Gunay M. Vitamin A for varicella. *J Pediatr*. 1994;125:1017-1018.

Bromelain for Sinusitis

Fifty-nine patients with acute or chronic sinusitis, most of whom had an allergic background with superimposed bacterial infection, were randomly assigned to receive, in double-blind fashion, an enteric-coated bromelain preparation (Ananase; 40 mg 4 times per day) or placebo for six days. Conventional treatments, including antibiotics, decongestants, or both, were also given. The proportion of patients who had an excellent response was significantly higher in the bromelain group than in the placebo group (69% vs. 23%; $p < 0.01$).

Comment: Bromelain is an extract of pineapple stem that has anti-inflammatory and fibrinolytic activity. Through its de-polymerizing action on fibrin and other inflammatory products, bromelain appears to increase the permeability and reduce the viscosity of inflammatory exudates, thereby promoting drainage and enhancing access of antibacterial agents (i.e., antibodies, other components of the immune system, and antibiotics) to the site of an infection.

The enteric-coated product used in this study was a prescription medication that is no longer commercially available. Non-enteric-coated bromelain would presumably be partially inactivated by gastric enzymes after ingestion. While clinical experience suggests that currently available bromelain products have beneficial effects, dosage comparisons with Ananase are difficult. For non-enteric-coated bromelain, a dosage of 250-500 mg, four times per day would be reasonable for the short-term treatment of sinusitis.

Taub SJ. The use of bromelains in sinusitis: a double-blind clinical evaluation. *Eye Ear Nose Throat Mon*. 1967;46:361-365.

Probiotic Prevents *Clostridium difficile* Infections

One hundred twenty-four patients with *Clostridium difficile* infection were treated with vancomycin or metronidazole and were randomly assigned to receive, in double-blind fashion, *Saccharomyces boulardii* (500 mg twice a day) or placebo for four weeks. The patients were then followed for an additional four weeks. The probability of a recurrence during the follow-up period was 57% lower in the *S. boulardii* group than in the placebo group ($p < 0.05$).

Comment: *C. difficile* is a Gram-positive bacterium that is a common cause of antibiotic-associated diarrhea and pseudomembranous colitis. It occurs most often in frail, elderly hospitalized patients but has also been seen in previously healthy individuals. *C. difficile* infection usually manifests as mild-to-moderate diarrhea, but severe colitis culminating in colectomy or death may also occur. Since around the year 2000, there has been a marked increase in the incidence of *C. difficile* infection. Increases in disease severity and mortality rates have also been observed, apparently because of the emergence of a more virulent strain of the organism. *C. difficile* infection is usually treated with vancomycin or metronidazole. The infection recurs in approximately 20% of patients after treatment with these antibiotics; and in patients who have a recurrence, subsequent recurrences are even more frequent.

The present study demonstrates that treatment with *Saccharomyces boulardii*, which is a fungal probiotic organism, can decrease the recurrence rate of *C. difficile* infections.

McFarland LV, et al. A randomized placebo-controlled trial of Saccharomyces boulardii in combination with standard antibiotics for Clostridium difficile disease. *JAMA*. 1994;271:1913-1918.

References

1. Hume R, Weyers E. Changes in leucocyte ascorbic acid during the common cold. *Scott Med J*. 1973;18:3-7.
2. Wilson CW. Colds and vitamin C. *J Ir Med Assoc*. 1975;68:511-516.
3. Financial disclosure: Dr. Gaby receives a royalty for sales of a product that contains *L. rhamnosus* GR-1 and *L. reuteri* RC-14.
4. Wright JV, Lenard L. D-Mannose and Bladder Infection. Auburn, WA, Dragon Art, 2001. Note: Additional information regarding the use of D-mannose was obtained in a personal communication from Wright JV, September 10, 2008.
5. Rowe CA, et al. Specific formulation of Camellia sinensis prevents cold and flu symptoms and enhances gamma,delta T cell function: a randomized, double-blind, placebo-controlled study. *J Am Coll Nutr*. 2007;26:445-452.
6. Imanishi N, et al. Additional inhibitory effect of tea extract on the growth of influenza A and B viruses in MDCK cells. *Microbiol Immunol*. 2002;46:491-494.

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On the cover

Untangling the Lyme/ Mold Conundrum

by Nicola McFadzean Ducharme, ND

Chronic Lyme disease and mycotoxin illness are rapidly becoming more and more intertwined, with many patients suffering greatly from both maladies. It gets incredibly difficult to sort out what is causing what in terms of a patient's health picture, given the overlap of symptomatology. For patients it is confusing, and for health practitioners it can also make navigating treatment planning very difficult.

The purpose of this article is to highlight some of the commonalities and distinctions in terms of both testing and treatment. We can utilize testing to evaluate which stressors are present, try to sort through which ones are having the greatest impact, and what the secondary effects on the body systems are. Such testing can help guide treatment choices.

Having said that, from a clinical standpoint, I have found in my clinical practice that rather than viewing these issues as two totally separate things to be dealt with one at a time, it helps to look at the whole person and find the common traits that come from both issues and addressing those. Yes, there are differences, of course – Lyme disease involves bacteria, mycotoxins are from mold exposure – and so of course there will be specific treatments that are needed for each. But in my experience, looking for treatment options that help with both things at the same time provides a better outcome for patients and is less overwhelming for them.

Some practitioners believe that you can't treat mold-toxin illness until Lyme disease is treated. Others say that you can't treat Lyme until mold is dealt with. To me, in the reality of how these two issues show up in the body, it's simply not as black and white as that. I tend to try to chip away at both things, gradually and systematically, on the premise that every stressor, be it a pathogen or a toxin, is going to be impacting that individual's health. We cannot separate them out. So where do we start?

A patient comes to my office. They complain of joint pain, headaches, foggy brain, pins and needles in their hands and feet, constipation, abdominal pain, dizziness, and terrible fatigue.

Is it Lyme? Could be. Is it mold toxicity? Could be. Is there something else going on? Possibly.

Obviously, we take a thorough history since clinical presentation is such a big part of the Lyme diagnosis, but since we're talking labs right now, we'll just assume that clinical presentation has been gathered and taken into account.

Also, most patients with chronic complex illness have been through the gamut of doctors before they get to our clinic and have had an extensive work up for all the other things that could be going on – autoimmune markers checked, MRI's done, ultrasounds performed. They may even come with a previous diagnosis that reflects one of the many things that Lyme disease can mimic. Therefore, for the purposes of this article I am keeping our differential diagnosis to Lyme disease and mycotoxin illness.

Level One: The Basics

If a patient has not had standard bloodwork for a few months, I will ask for a panel of labs to make sure there aren't any imbalances that we need to correct – any causes of fatigue that might be contributing such as low iron or ferritin. These labs are helpful to get a baseline and to show

how to fine-tune treatment. The difference here is that if they all come back normal, we do not tell the patient that there's nothing wrong with them and it must all be in their head! These basic labs are more an evaluation of "how is your body coping with all of this."

Labs I might run include the following:

- Complete blood count
- Comprehensive metabolic panel
- Lipid panel
- Serum iron
- Ferritin
- B12 and folate
- Vitamin D
- Hemoglobin A1C
- Magnesium
- Thyroid (TSH, free T3, free T4, reverse T3, anti-TPO, anti-thyroglobulin)
- Reproductive hormones – estrogen, progesterone, testosterone (free and total)
- Cortisol (will run that through a salivary panel with morning, noon, afternoon and evening collections to assess the circadian rhythm)
- C-reactive protein (CRP)
- Erythrocyte sedimentation rate (ESR).

Surprisingly, despite the massive inflammation in these chronically ill patients, CRP and ESR are frequently within normal range.

Getting a little more in depth on opportunistic infections and other underlying infections, I might also run IgG and IgM antibodies to Chlamydia pneumonia, Mycoplasma pneumonia, Epstein-Barr virus, cytomegalovirus, HHV-6, and Candida albicans. Those labs can all be run through large commercial labs such as Quest and Labcorp.

Level Two: Indicators of Neuro-Inflammation and Immune Dysregulation

Dr. Ritchie Shoemaker[1] has been a pioneer in the field of mycotoxin illness and chronic inflammatory response syndrome (CIRS). In developing his work, he compiled a panel of lab markers, which are indicators of mycotoxin illness. I find these markers to be useful; however, I would argue that they are not only influenced by mycotoxins alone, but by biotoxins, which can be created by mold *or* by pathogens in the body. Mast cell activation syndrome (which may be more of a result than a cause) can also alter some of these results.

Therefore, in my opinion they are better used as tools to assess and evaluate than to actually diagnose. These markers can also provide a good baseline to be able to retest later and quantify progress on the treatment given.

While each marker has its own unique actions, they all have one thing in common – they influence immune activity and inflammatory processes in the body. Some of these markers are outlined below.

C3a and C4a are part of the complement system, which are proteins that travel through the bloodstream, and play a significant role in immune function and inflammatory responses. Elevations can be a sign of an overactive immune system that can't regulate itself.

TGF-beta is a protein that regulates cell differentiation, proliferation, and apoptosis (cell death); it is also an indicator of prolonged inflammation.

Both Lyme and mold toxicity illnesses trigger massive immune reactions and inflammation.

MMP-9 is involved in allergic and non-allergic inflammatory response. When MMP-9 is in balance, it aids in regeneration and remodeling of tissue. However, when it is out of balance it sets up an inflammatory cascade of cytokines and chemokines. Those tissues then have higher levels of histamine, which is why MMP-9 is also used to evaluate MCAS.

MSH is a hormone called a neuropeptide that controls other hormones, as well as immune response and inflammation. MSH is typically *low* in biotoxin illness, which means it can't have its normal control on inflammation. Without sufficient MSH, individuals are more susceptible to sleep issues and chronic pain due to reduced endorphin production.

VIP is a neuro-regulatory hormone that regulates peripheral cytokine responses and inflammation in the body. If we don't have sufficient VIP, we cannot adequately regulate inflammation in the body.

HLA-DR genes. Looking at certain genotypes can help emphasize an individual's susceptibilities. According to Dr. Shoemaker's work, approximately 26% of the population are genetically susceptible to mold toxin illness.[2]

VCS test is not a lab test as much as a self-guided assessment that one can take online. The Visual Contrast Sensitivity test is a reflection of neurological function and the potential damage that biotoxins have done to neurons.

NeuroQuant EEG. I have very limited personal experience with NeuroQuant EEG, however, it may be a useful tool in distinguishing the impact of Lyme versus mold on the human brain. The challenges of this modality are cost, access, and accurate interpretation.

CD-57. I include this in the "indicators" category. CD-57 is a cluster designation marker that is theorized to be suppressed in chronic Lyme patients. I do measure it as a guide; however, it is not a marker that I lean heavily on as I have concerns about reliability of the test.

Level Three: Getting Specific

Here is where the rubber hits the road, and where I put most of my focus with my chronic, complex patients in assessing the underlying causes of their health issues.

While general/basic markers of health are important to have and while the indicators listed above can provide helpful information, I am a firm believer in being as specific as possible in testing. Therefore, the following tests are the ones I choose as a priority in assessing my patients. ➤

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Mycotoxins. For assessing mycotoxins, I am a big fan of doing a direct urine mycotoxin test. If mycotoxins measure high in the urine, the patient has mycotoxins. To me it's simple, its direct, and its quantifiable. It's not perfect, of course, if a patient doesn't detoxify well, the output may not be truly representative of their body stores, but it's good enough in my opinion to be the most useful assessment for mycotoxins.

Now there are many questions that come from a positive result. Where did this exposure come from? Are they still being exposed? Have they had their current home or workplace evaluated? Do they need to move? Do they need to throw away all their belongings? The rabbit hole of mold illness is deep and difficult to navigate.

I mostly use Great Plains Laboratory's urine mycotox panel. I was always happy with Real Time Labs, but the price point made it prohibitive for many patients. Great Plains Lab has always offered great testing at a reasonable price, and their panel has made mycotoxin testing possible for many of my patients.

I am grateful to Neil Nathan and his book *Toxic*[3] for his suggestion to provoke the urine mycotoxin test. He suggests using glutathione 500 mg twice daily for a week before (if the detoxification effect of this is too strong, patients can stop taking the glutathione and do the collection the following day) *or* use an infra-red sauna prior to collection.

I do think that MARCONS testing is valuable here too. Aligned with the work of Dr. Brewer and Dr. Nathan, I am seeing the significance of mold and fungal colonization in the sinuses and have responded by using more nystatin and amphotericin B nasal spray, both with EDTA to help break down biofilm. If a MARCONS swab comes back positive, then I would start with BEG spray to try to eradicate bacterial infection before moving on to antifungals, then move on from there to VIP spray, which is more for neurological healing rather than being antifungal or bacterial. If MARCONS negative I move directly to nystatin/amphotericin B with EDTA as a starting point.

Lyme disease. In my opinion, IGeneX is still the gold-standard for Lyme testing, and I utilize their testing extensively. I believe it's just as important to assess co-infections as Borreliosis itself, so I recommend that patients get a panel that at least includes the Borrelia IFA, and IgM and IgG Immunoblots, plus testing for tick-borne relapsing fever. I have seen several cases now where the Borrelia Western blots came back negative, but the tick-borne relapsing fever came back positive, so I am appreciating the expansion in strains of Borrelia testing that are becoming available to us.

From a co-infection standpoint, Babesia and Bartonella have always been the ones I've kept the closest watch on, mostly because Ehrlichia and Rickettsia tends to respond to the same treatments as the Borrelia itself. Bartonella is a bacterium, as is Borrelia, however its treatment path is fairly distinct. Babesia, being a protozoon, requires a different set of medications and herbs altogether. For that reason, these two are highest on my radar.

Personally, I opt for the antibody tests and the FISH tests for co-infections. As with the Lyme panels, I never felt the PCR tests were sensitive enough to warrant the extra expense.

When urine PCR testing became available, it appeared to be a good, cost-effective, comprehensive option to cover Borrelia and co-infections. I have had some concerns about sensitivity of the test but I will run it in conjunction with IGeneX Borreliosis testing as a more cost-effective option than the full Lyme/co-infection panel.

For new patients, I still tend towards the IGeneX panels using IFA and Western blots. If finances are limited, I might choose the Lyme/TBRF panel 1 (LTP1), along with the new urine PCR panel (TBD7). If finances are not a major consideration, I'll opt for the tick-borne disease panel 1 (TBD1), as well as the urine PCR just to utilize the different types of testing to maximize the chance of getting helpful information.

Where I think the urine PCR testing is also useful is in evaluating a patient who is nearing the end of treatment. For some, Western blots were always negative or indeterminate at best, so when we go to repeat them during or at the end of treatment, what change are we expecting to see?

If we have high antibody responses on the IFA test, multiple bands on Western blot, positive antibodies for co-infections…they can all be repeated and see change. But what about the many people who had "meh" test results. Is there a point in repeating an indeterminate IgM Western blot? What "before" and "after" are we hoping to achieve? And if IgG is positive to start, can we expect that to turn to negative, or not, since memory cells may stay active for a decade to a previous infection?

Here is where I think the urine PCR testing has a place. If PCR positive, then we know there is some level of ongoing infection. If negative, it doesn't guarantee it, but it's a good sign.

The bottom line is, I order Lyme/co-infection testing to try to clarify the chronic infection situation. IGeneX is still my preferred lab, and I will order a combination of blood and urine testing, depending on the patient and their needs. Coupled with the urine mycotoxin panel from Great Plains, that to me offers the most succinct way to evaluate those two issues.

Implications for Treating Lyme/Mold-Related Illness

I am a proponent of trying to be as specific as possible in the testing we do, to identify as clearly as possible the role of Lyme versus mold in a patient's situation. Obviously, each one is going to have its own specifics of treatment, however, I thought it might be helpful to highlight some of the commonalities between the two. For people dealing with both issues, this may help to feel less overwhelmed and more streamlined in their approach. For this conversation, let's think about Lyme and mold toxicity *both* as biotoxin

illnesses that trigger massive immune reactions, that then trigger systemic inflammation and chemical mediators of inflammation, including cytokines and chemokines.

Toxicity. Mycotoxin illness is clearly a toxic issue. Mold spores give off toxins that are inhaled into the body and settle there. If you are one of the unlucky 25% that can't detoxify mold properly, those toxins can stay for years, until something is done to get them out. Lyme has a strong toxic element too – any antimicrobial therapy, killing the bugs, causes them to release toxins into one's body as well, which then have to be detoxified. This is what Lyme patients identify as a Herxheimer reaction. Therefore, addressing detoxification in the body through methylation support, liver/kidney support, blood cleansers, opening up pathways of elimination (skin, lungs, kidneys, bowels) is key for both situations. I tend to use a combination of herbal tinctures and glutathione for detoxification, as well as encouraging patients to do home-based modalities such as Epsom salts baths, infrared sauna, and coffee enemas.

Inflammation. In the previous section on markers of neuro-inflammation and immune dysregulation, we saw that there are many different indicators that reflect the inflammatory cascade that many of these stressors on the body can create. Massive inflammation in the body and neuro-inflammation occur both in Lyme disease and mycotoxin illness. Therefore, the common thread of working to support healthy immune function while dampening inflammation in the body is a valuable approach. One's diet can play a big role in that: avoiding gluten, dairy and other inflammatory foods, including saturated fats, and eating lean proteins, healthy fats, and vegetables. There are many herbs that help calm the inflammatory response, such as curcumin, white willow, and green tea. I love Cytoquel by Researched Nutritionals. Proteolytic enzymes can be helpful as well; InflaQuell (also by Researched Nutritionals) is a great blend. When taken on an empty stomach, it can help to break down the products of inflammation in the body.

Immune regulation is somewhat linked with inflammation since immune responses create inflammation. But separate from reducing inflammation, it's also important to strengthen a health immune response while minimizing the possibility of an autoimmune situation being triggered. I utilize Transfer Factors, both general – such as Transfer Factor Multi-immune – and targeted, with TF L-Plus and TF Enviro, to cover both Lyme and mycotoxins. They strengthen immune response and enhance signaling and communication within the immune system.

If I see any indicators of autoimmunity (thyroid antibodies, positive ANA etc), I will suggest low dose naltrexone for its ability to help balance the immune response through upregulation of enkephalins (immune-mediating chemicals). Through its ability to boost endorphins it can be helpful for pain, mood balance, sleep and energy, which are things that the majority of Lyme/mold patients struggle with.

Gut Health. I would estimate that 80% of my Lyme/mold patients have fairly significant digestive issues. Both conditions can create gastrointestinal symptoms, or they may be a slightly separate phenomenon. Either way, if one's gut isn't functioning well, it can hamper treatment overall. Remember, too, that the gastrointestinal tract has its own nervous system and its own immune system so it's a vital system to have functioning well.

Anything that causes imbalance and inflammation in the gut can lead to a condition called leaky gut, where the junctions between the cells in the small intestine open up and allow larger-than-normal food particles into the bloodstream. The immune system reacts to these as a threat and will mount an immune response, leading to, you guessed it, inflammation. The chemicals of inflammation can travel through the bloodstream and cross the blood-brain barrier, causing even more issues in the central nervous system.

Treating the gut is also important to be able to tolerate various treatments for Lyme and mold. We can't give antibiotics to a person who has massive gastritis or dysbiosis; we might have trouble getting any binders, especially cholestyramine, into a patient with ongoing constipation.

Candida overgrowth. Another part of the discussion about gut health involves Candida and other yeast overgrowth. I have found my Lyme patients have a greater propensity to Candida overgrowth, whether or not they are taking antibiotics. We are also paying more attention now, thanks to the work of Dr. Brewer and Dr. Nathan, to yeast and fungal colonization in the sinuses that ties into the mycotoxin picture.

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I like to use a very direct test to evaluate for Candida as well – the urine Microbial Organic Acid test from Great Plains Lab. It measures metabolites of yeast and gives a clear, quantified report that can be used as a baseline for monitoring treatment.

Other non-prescription things that can be useful as nasal sprays are colloidal silver, and XClear. There are many great antifungal herbs (my favorite blends are Biocidin and Citricare), and we also have prescription antifungals such as nystatin, fluconazole, and itraconazole. I use all of the above in both my Lyme and mold patients.

Oxidative stress, aka free radical damage, occurs in all of us in each and every cell, but toxins and infections are going to accelerate it. High levels of oxidative stress have been linked to a myriad of chronic health conditions. We can help counter oxidative stress using nutrigenomics. I use an NRF2 activator that is a combination of five herbs in very specific ratios and functions to bring down oxidative stress. I have seen this be helpful in both my Lyme and mold (and combinations thereof) patients in enhancing their overall baseline of health.

*Mitochondrial dysfunction.*The mitochondria are the powerhouses of our cells that produce ATP, or energy. Mitochondrial dysfunction also plays a big role in chronic health conditions. We can support mitochondrial repair with agents such as phosphatidylcholine, Coq10, ALA, acetyl-L-carnitine, and glutathione. I use an Nrf1 activator that contains a combination of the key nutrients.

*Limbic system dysfunction.*If you are an individual that just looks at a herb and gets a negative side effect, you are reactive to everything, including foods, chemicals, and EMFs, and are trying to figure out how you'll tolerate the treatment you need when everything makes you sick, you might want to consider limbic system dysfunction getting in the way.

The premise of limbic system dysfunction is that the part of the brain called the limbic system gets "stuck" – the wiring all gets tangled, neurons are stuck in negative pathways, and as a result its putting out signals to the rest of the body that create disordered function in the body.

Annie Hopper developed a program called Dynamic Neural Retraining Program,[4] that helps people address limbic system dysfunction. It is a step-by-step system, based on neuroplasticity, which means that we can indeed rewire our brains in healthier patterns with healthier signals. This leads to healthier physiological responses in the body as a whole.

I have seen this program benefit many people. It can be done from your own home and can help with Lyme disease, mycotoxin illness, EMF sensitivity, multiple chemical sensitivities, and more. It also helps to release prior trauma, which Annie believes is a significant piece of causing the dysfunction in the first place.

Conclusion

It used to be that a complex Lyme patient was that way because of multiple co-infections; now it's a tangled web of Lyme and co-infections, opportunistic infections (such as Candida overgrowth), mycotoxins, heavy metals, mast cell activation syndrome, to name a few.

Trying to separate each individual stressor out has its challenges, including the accuracy of testing, genetic variances in each individual, responses to treatment etc. It also can be incredibly overwhelming for the patient. The approach of finding commonalities in physiological responses and processes within the body can make treatment planning easier, less overwhelming, and more in line with treating the whole person.

While I have covered quite a few different topics in this article, I want you to take away two key messages. One is, get as specific and direct testing as you can to evaluate what's going on in the body. The second is, if you don't know where to start or feel overwhelmed with treatment, go back to basics. Toxicity and inflammation are the most important common threads. They are the key pieces and are shared jointly between Lyme and mold toxicity.

TOXICITY…INFLAMMATION…TOXICITY…INFLAMMATION

Remember that at the end of the day, there is an interconnection between the "terrain" (which is the body), and outside agents such as Lyme bacteria or mold toxins. The more you can do to make the terrain healthier, through diet, positive thought processes, lifestyle choices, clean food/water/air, detox modalities, herbs, and supplements to balance immune function and so on, the best chance the body has to deal with the offending agent.

Lyme and mold might feel like a double whammy, so that's why it's important to keep remembering the commonalities. Ask the patient to think of it this way: that you're working on strengthening your own health; you happen to have a couple of different sources of biotoxins, but they do similar things in your body, and therefore many interventions will help with both. Focus on those interventions as the core of your protocol and build from there.

Nicola McFadzean Ducharme, ND, is a licensed naturopathic doctor and is the founder and medical director of RestorMedicine. She consults with patients around the world, blending conventional and integrative approaches to treating Lyme and other tick-borne illnesses.

She has authored several books on the subject, including the best-selling *The Lyme Diet, The Beginners Guide to Lyme Disease, Lyme Disease in Australia,* and *Lyme Brain*. She has also been a chapter contributor in two of Connie Strasheim's books, *Insights Into Lyme Disease Treatment,* and *New Paradigms in Lyme Disease.*

Dr. Nicola has developed two online training programs for Lyme disease – Lyme-Ed for Patients and Lyme-Ed for Practitioners.

She can be contacted through her practice www.restormedicine.com or www.drnicoladucharme.com. Her courses can be found at www.lyme-ed.com.

References

1. www.survivingmold.com.
2. https://www.survivingmold.com/diagnosis/lab-tests
3. Nathan N. *Toxic: Heal Your Body from Mold Toxicity, Lyme Disease, Multiple Chemical Sensitivities, and Chronic Environmental Illness*. Victory Belt Publishing, 2018.
4. www.retrainingthebrain.com

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The Link Between Mold Toxicity and Occult Infections: Functional Medicine Leads the Way

by Jill Carnahan, MD

As clinicians in the field of integrative and functional medicine, we often encounter patients that are frustrated and exhausted from navigating the conventional healthcare system. It has left them with more questions than answers and a slew of unresolved symptoms. Our practices are seeing a growing number of patients with complex and layered conditions, further complicated by an enormous influx of environmental toxins and triggers.

As clinicians at the forefront of "root-cause" medicine, it's our duty to remain forever students. Educating ourselves on the most up-to-date research and protocols is our best bet in giving our patients a fighting chance. From a clinical standpoint, pinpointing and treating occult infections is inherently complex and challenging. But as our knowledge grows, the way we approach treatment is changing when it comes to conditions such as:

- Lyme disease
- Tick-borne illnesses
- Atypical bacterial infections
- Mycoplasma pneumonia
- Chlamydia pneumonia
- Epstein Barr virus
- Human Herpesvirus
- Parasitic infections

While occult infections and their underlying cause are undoubtedly complex and often multi-faceted, one factor that is garnering more attention is environmental triggers – specifically mold.

Exposure to mold and its metabolites, known as mycotoxins, are of particular concern not only due to their adverse health outcomes but also because they significantly exacerbate and complicate occult infections.

We're finding that mold exposure and mold-related illnesses significantly impact health and disease states. And more importantly, we're making strides in learning how to successfully treat patients struggling with these invisible illnesses.

We're finding that mold exposure and mold-related illnesses significantly impact health and disease states.

What Does a Patient with Mold Toxicity Look Like?

Patients suffering from toxic mold exposure can have a wide range of clinical presentations. With that being said, some symptoms are more common than others. For example:[1,2]

- Fatigue and weakness
- Headaches
- Light sensitivity
- Poor memory or difficulty with word-finding
- Difficulty concentrating
- Morning stiffness and joint pain
- Unusual skin sensations, tingling, or numbness
- Shortness of breath
- Sinus congestion or a chronic cough
- Appetite swings
- Difficulty with body temperature regulation
- Increased thirst
- Increased urinary frequency
- Red eyes or blurred vision
- Abdominal pain or bloating
- Digestive issues – diarrhea, constipation, gas, heartburn
- Metallic taste in the mouth
- Static shocks
- Vertigo
- Sugar cravings
- Frequent infections

In addition, diagnosing mold-related illnesses is made even trickier because patients also display:[3]

- A generally well appearance
- Sought out multiple practitioners with little results
- On multiple medications or intolerance to medications
- Normal routine lab work

So, it takes a thorough history and physical by a practitioner who knows what to look for to make this diagnosis.

Mycotoxins' Effects on Body Systems

Mycotoxins' impact on the body can vary greatly from person to person. Exactly how mold exposure affects each individual is influenced by a number of factors, including the following:

- Type of mycotoxin exposure
- Magnitude of exposure
- Method of exposure
- Genetics – in particular, MTHFR and HLA DR
- Age
- Nutritional status
- Immune function
- Presence of other underlying infections

The following body systems are most dramatically impacted by mycotoxin

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exposure and explains why we see certain clinical presentations: the brain, digestive system, and immune system.

The Brain. Many mycotoxins are known neurotoxins, causing damage to the brain through neuronal damage, chronic activation of inflammatory and apoptotic pathways, hypoactivation of the frontal cortex, and oxidative DNA damage, which disrupts and damages neurons and brain activity.[4] Because of the powerful impact on the brain, many mold-exposed patients also present with anxiety, depression, PTSD-like reactions, or may even appear similar to a mild brain injury patient.

The Digestive Tract. Mycotoxins are particularly damaging to gut health. The way they impact the gut is threefold.[5-7] In general, mycotoxins change the structure and morphology of the intestinal epithelium, damaging tight junction proteins and causing increased permeability. They alter both the abundance and diversity of intestinal microflora. Mycotoxins also significantly reduce mucus production in the intestinal tract. Because gut health and immune system functions are so intricately linked, the damaging effects to the digestive tract negatively impact the immune system.

The Immune System. Depending on the type of mycotoxin and the health status of a patient, mycotoxins can have both an immunostimulatory and immunosuppressive effect. In both cases, either effects cause increased susceptibility to infection, activation of any chronic underlying infections or parasites, and decreased efficacy of vaccines or medications.

The long-term immune system over-activation and low-level inflammation is particularly troublesome when it comes to occult infections – as they cause exacerbation of occult infection symptoms.

Mold Toxicity and Increased Sensitivity to EMFs

Another potential clinical manifestation worth mentioning is mold patients' increased sensitivity to EMFs – the electromagnetic fields emitted by wireless technology. EMFs' exact mechanism of injury is still up for debate within the scientific community. But it's strongly suspected that EMFs' damaging effects are primarily due to an increase in free radical concentrations in the body that leads to oxidative stress and genetic damage.

While often difficult to pinpoint due to the abundance of technology and EMFs in our modern world, many patients struggling with mold exposure or underlying occult infections notice a hypersensitivity to EMFs and report a drastic increase and worsening of symptoms when in areas with increased EMF exposure.

Major Sources of Mold Exposure

Exposure to mycotoxins can occur through physical or dermal contact where they're absorbed through the skin; inhalation when in a home or building with mold growth; and oral ingestion through contaminated food.

Some level of mold and mycotoxin exposure is unavoidable. Mold spores are found naturally in the air, so we're breathing them constantly. But in our modern world, patients may be exposed to mold at a much higher concentration that becomes toxic. The most prevalent sources of mold exposure that are clinically significant include environmental exposure and mycotoxins in food.

Environmental Exposure to Mold. Most people spend the vast majority of their day indoors – in buildings that may be a breeding ground for mold. With warmth, moisture, and plenty of viable surfaces to grow on, the indoor environment can be the perfect place for mold to thrive. In fact, an estimated 50 percent of all buildings contain mold growth.[8]

Mycotoxins in Our Food. The most common route of mycotoxin exposure is through contaminated food with an estimated 25 percent of all crops containing mold or fungal growth.[9] Depending on growing and harvesting methods, storage techniques, and/or processing and transportation practices, that number can rise even higher.

Most foods can potentially be contaminated with mycotoxins, but certain food products are more commonly contaminated, such as:

- Wheat-derived products
- Cocoa/chocolate
- Coffee
- Fruit juices
- Milk and dairy products
- Vegetable oils
- Ethanol and beer

So, you can see how the average American is exposed to harmful mycotoxins.

Primary Mycotoxins to Be Concerned About

Mycotoxins are produced by a variety of fungal species, have a diverse chemical structure, and cause a broad range of biological effects on the human body. With over 500 species of hazardous molds identified, we're still learning exactly how dangerous mycotoxins are.

So far, a handful of particularly toxic mycotoxins have been identified and studied; they include the following:[10]

- Aflatoxins: Aflatoxins are potent liver toxins and have been linked to cancer, immune suppression, and other "slow" pathological conditions.
- Citrinin: Citrinin is a dangerous nephrotoxin that can cause irreversible damage to the kidneys. It can also act synergistically with other mycotoxins to interrupt RNA synthesis – inhibiting cells' ability to reproduce.
- Ergot alkaloids: Ergot alkaloids are particularly interesting because their derivatives are used in medications like ergotamine used in the treatment of migraines and bromocriptine used in the treatment of Parkinson's disease. But when exposed at toxic levels, these mycotoxins cause two forms of ergotism. Gangrenous ergotism impacts blood supply to the arms and legs, and convulsive ergotism damages the central nervous system.
- Fumonisins: Fumonisins impact the body's ability to metabolize sphingolipids, induce neuronal degeneration, induce cellular death, and in high levels can cause death. They have also been linked to infertility.

- Ochratoxin: Ochratoxins inhibit enzymatic reactions and cause widespread oxidative stress. Ochratoxins are known to be neurotoxic, teratogenic, immunotoxic, and genotoxic.
- Zearalenone: Zearalenones, a type of phytoestrogen, leads to significant hormonal imbalance and negatively affects the reproductive system in both men and women.

Keep in mind, these are just the mycotoxins we know about. This area of study is one to follow in the coming years, as we learn how even more classifications of mycotoxins affect our patients.

Treating Patients with Suspected Mold Related Illness

Chronic and complex illnesses such as occult infections and mold-related illnesses are inherently challenging to diagnose and treat. Fortunately, when it comes to conditions that are caused or exacerbated by exposure to mold and mycotoxins, there are simple steps that can drastically minimize exposure.

When encountering patients with suspected mold-related illness, it's best to take a three-pronged approach of testing, limiting exposure, and detoxing.

Test for Mold Exposure. While there's no one definitive test, as clinicians, it's our job to put the pieces of the puzzle together. There are a number of tests that clinicians can use to get a clearer clinical picture and narrow in on a diagnosis of mold exposure. A diagnosis of mold exposure usually requires a combination of diagnostic techniques, including the following:

- A comprehensive medical history.
- A detailed assessment of the patient's environment, ideally of both present and past. This can also include IEP inspection and Mycometrics ERMI for environmental home testing.
- Diagnostic and laboratory screening tests, including
  - Cluster symptom analysis
  - Visual contrast sensitivity test
  - CIRS (TGF-beta, MMP-9, MSH, ADH/Osm, VEGF)
  - Biotoxin mold illness panel
  - HLA-DR mold genetic testing
  - Great Plains MycTox testing
  - RTL Mycotoxin and EMMA testing
  - Vibrant Mycotoxin testing
  - Mymycolab.com
  - Immunolytics
  - EnviroBiomics
  - Mycometrics ERMI

Because many patients will not be aware of how they've been exposed, it's important to educate them of this while you take a detailed history.

Minimize Exposure to Mycotoxins. The most promising aspect of treating patients with mold-related illness is the ability to remove patients from constant levels of toxic exposure through implementing steps such as cleaning up the home environment, following a low-mold diet, and purifying the air.

Often the first step in treating mold patients is to identify any underlying source of mold growth in the home. By eliminating factors that create a welcoming environment for mold and completing a comprehensive mold clean up, exposure levels can be drastically reduced.

A low-mold diet works in a few ways. It eliminates foods that are known to be frequently contaminated with mold, limits sugary foods that fuel mold growth, helps restore any nutrient deficiencies caused by mold exposure, and minimizes pro-inflammatory foods that can cause chronic inflammation.

A low mold diet eliminates processed food and sugars; mold and yeast containing foods (like cheese, dried fruits, or alcohol); and gluten and grains.

Purifying the air is the third step. Indoor air is notoriously polluted – with pollution levels sometimes being up to 10 times more polluted than outdoor air. The simple addition of a high-quality air purifier drastically improves air quality by capturing and neutralizing mold spores before they're inhaled. To be most effective, air filters should filter at least 0.3 microns in size.

Enhance Detoxification. Removing exposure is the first step in helping patients to identify and recover from mold exposure. But as a clinician, one of our primary focuses is helping patients heal and detox. After extensive research and treating countless patients that have occult infections caused or exacerbated by mold exposure, I've developed a very specific mold detox protocol.

A critical part of a mold detox protocol is supplementation to aid the body in eliminating mold and to begin healing underlying damages. The specific supplementation protocol included in my Mold Detox Box is outlined below.

Liposomal Glutathione Complex. A potent antioxidant and liver support blend of

- Reduced glutathione: as the body's main endogenous antioxidant, glutathione is a master detoxifier.[11]

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- A complete suite of B-complex vitamins: to provide support for cellular and hepatic function.
- Nanoparticle milk thistle to stabilize and protect the liver during a time of high activity.[12]

How to Most Effectively Use Detox Binders to Detox from Mold Toxicity

Detox binders are a particularly crucial component of a mold detox protocol. Most patients with occult infections and mold-related illnesses have compromised detoxification pathways and need assistance to effectively process and excrete toxins. Binders are beneficial in helping clear out toxin buildup and inducing biofilm removal in the gut (the protective barrier used by pathogens that set up shop in the body).

Removing exposure is the first step in helping patients to identify and recover from mold exposure.

- NAD+: A formulation of Nicotinamide Mononucleotide (NMN) and Trimethylglycine (TMG) to support recovery, energy production, and maximum detoxification through boosting cellular ATP generation and mitochondrial health.
- Essential minerals and trace elements to support electrolyte balance and remineralization during detoxification.
- A blend of bitter herbs, R-Lipoic Acid, DIM, milk thistle, quercetin, and luteolin: these compounds work synergistically to support the liver and gallbladder. They support all phases of detox with special attention to bile flow, while encouraging a healthy inflammatory response.
- Detox binders: these powerful agents are designed to safely 'catch' toxins in the GI tract for safe elimination from the body. When taking binders, it can also be helpful to include acacia gum, a prebiotic fiber, and aloe vera to soothe the gastric mucosa and reduce the risk of constipation.

Without binders, patients may experience enterohepatic recirculation. This creates a vicious cycle of processing by the liver, reabsorption by the intestines, and then recirculation by the liver. When it comes to detoxing from mold, some of the most effective binders include

- Upgraded coconut charcoal
- Zeolite clay
- Monomethylsilanetriol silica
- Humic and fulvic acid
- Fruit pectin
- Activated bamboo charcoal

I recommend mold patients follow a detox protocol that includes taking binders on a daily basis for a minimum of six to 12 months. In addition to binders, adopting other detoxifying techniques can also be useful in eliminating mycotoxins. Other strategies might include

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

It is important to guide our patients to what combination of detox strategies are best for them.

An All-In-One Protocol for Comprehensive Mold Detoxification

To obtain all of these critical detoxification compounds, I recommend that mold patients follow a gentle yet comprehensive mold detox program, such as Dr. Jill's Miracle Mold Detox Box. This all-in-one protocol encourages effective detoxification by combining six targeted formulas. The foundation of the protocol is a formulation that supports the movement and detoxification of mycotoxins from the body with bile-moving bitter herbs, milk thistle, R-Lipoic acid, liposomal glutathione, B vitamins and pure phosphatidylcholine. The inclusion of Nicotinamide Mononucleotide (NMN) plays a crucial role in super-charging mitochondrial health and cellular ATP generation supporting energy, recovery,

and maximum detoxification potential. Purified deep sea minerals are included to support remineralization and electrolyte balance during detoxification. To address recirculation of toxins, a full spectrum binder completes phase III of detoxification by 'catching' toxins that have been excreted into the GI tract for safe elimination from the body. This easy to follow protocol can be a powerful, effective tool to help patients overcome mold exposure.

Protocol details: **Dr. Shade's Liver Sauce®** is a blend of bitter herbs, R-Lipoic Acid, DIM, milk thistle, quercetin, and luteolin working synergistically to support liver and gallbladder axis, supporting all phases of detox with special attention to bile flow while encouraging a healthy immune response. **Liposomal Glutathione Complex** is an antioxidant and liver support blend of reduced glutathione, milk thistle, and B vitamins providing powerful detoxification assistance. **NAD+ Gold™** is included to provide regenerative formulation of Nicotinamide Mononucleotide (NMN) and TMG to super-charge mitochondrial health and cellular ATP generation supporting energy, recovery, and maximum detoxification potential. **Ultra Binder®** Sensitive Formula is a powder binder formula supporting phase III detoxification, safely 'catching' toxins in the GI tract for safe elimination from the body. The formula includes bentonite clay, activated charcoal, zeolite, and chitosan. Acacia gum is added for its soothing, healing effect, and aloe vera soothes the gastric mucosa reducing constipation which can be common when taking binders. **Quinton® Hypertonic and Isotonic** are nutrient-rich raw marine fluid harvested from protected plankton-rich ocean blooms. Over 78 essential minerals and trace elements support remineralization and electrolyte balance during detoxification. Quicksilver Delivery Systems® utilizes modern science to unleash the curative power of nature. With the world's most advanced phospholipid delivery systems, Quicksilver Scientific supplements can help to nourish your cells with phosphatidylcholine as they deliver their core effective ingredients faster and more efficiently.

Next Steps in Understanding Mold-Related Illness

While we still have much to learn when it comes to mold and its interaction with other underlying infections, we've made great strides in our understanding of how to treat these patients. As our industrial society continues to contribute to the overall toxic burden on the body, I have no doubt that mold-related illnesses and other environmentally triggered illnesses will become more prevalent. And our role in addressing mold exposure will only become more critical as our knowledge of how to diagnose and treat these conditions evolves.

There is a dire need for integrative and functional medicine practitioners well-versed in caring for the patients suffering from these complicated illnesses. I, for one, am dedicated to driving forward with research to find answers and continually improve upon diagnosis and treatment guidelines to serve these patients.

References

1. Peraica M, et al. Toxic effects of mycotoxins in humans. *Bulletin of the World Health Organization*. 1999;77(9).
2. Milićević DR, Skrinjar M, Baltić T. Real and perceived risks for mycotoxin contamination in foods and feeds: challenges for food safety control. *Toxins (Basel)*. 2010;2(4):572–592.
3. Hope, Janette. Complete evaluation of mold exposed patients and their environments. Lecture presented: AAEM Dallas 2018.
4. Doi K, Uetsuka K. Mechanisms of mycotoxin-induced neurotoxicity through oxidative stress-associated pathways. *Int J Mol Sci*. 2011;12(8):5213–5237.
5. Katsuyama A, et al. The Mycotoxin Patulin Decreases Expression of Density-Enhanced Phosphatase-1 by Down-Regulating PPARγ in Human Colon Cancer Cells. *Tohoku J Experimental Medicine.* 2014; 233(4);265-274.
6. Marin D, et al. Comparative effect of ochratoxin A on inflammation and oxidative stress parameters in gut and kidney of piglets. *Regulatory Toxicology and Pharmacology*. 2017; 89. 224-231.
7. Akbari P, et al. The intestinal barrier as an emerging target in the toxicological assessment of mycotoxins. *Arch Toxicol.* 2017; 91. 1007–1029.
8. Indoor Air Quality Scientific Findings Resource Bank. Prevalence of building dampness. https://iaqscience.lbl.gov/dampness-prevalence. Accessed March 2020
9. Liew WP, Mohd-Redzwan S. Mycotoxin: Its Impact on Gut Health and Microbiota. *Front Cell Infect Microbiol*. 2018;8(60).
10. Bennett JW, Klich M. Mycotoxins. *Clin Microbiol Rev*. 2003;16(3):497–516.
11. Gaucher C, et al. Glutathione: Antioxidant Properties Dedicated to Nanotechnologies. *Antioxidants (Basel)*. 2018;7(5):62.
12. Yang KY, et al. Silymarin-loaded solid nanoparticles provide excellent hepatic protection: physicochemical characterization and in vivo evaluation. *Int J Nanomedicine*. 2013;8:3333–3343.

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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!

MyLymeData

by Dorothy Leland

MyLymeData is a patient registry and research platform launched by LymeDisease.org in 2015. Using big data research tools, it allows patients to privately pool information about their Lyme disease experiences. They answer questions such as how long they have been sick, what treatments they have tried, and what has and has not worked for them.

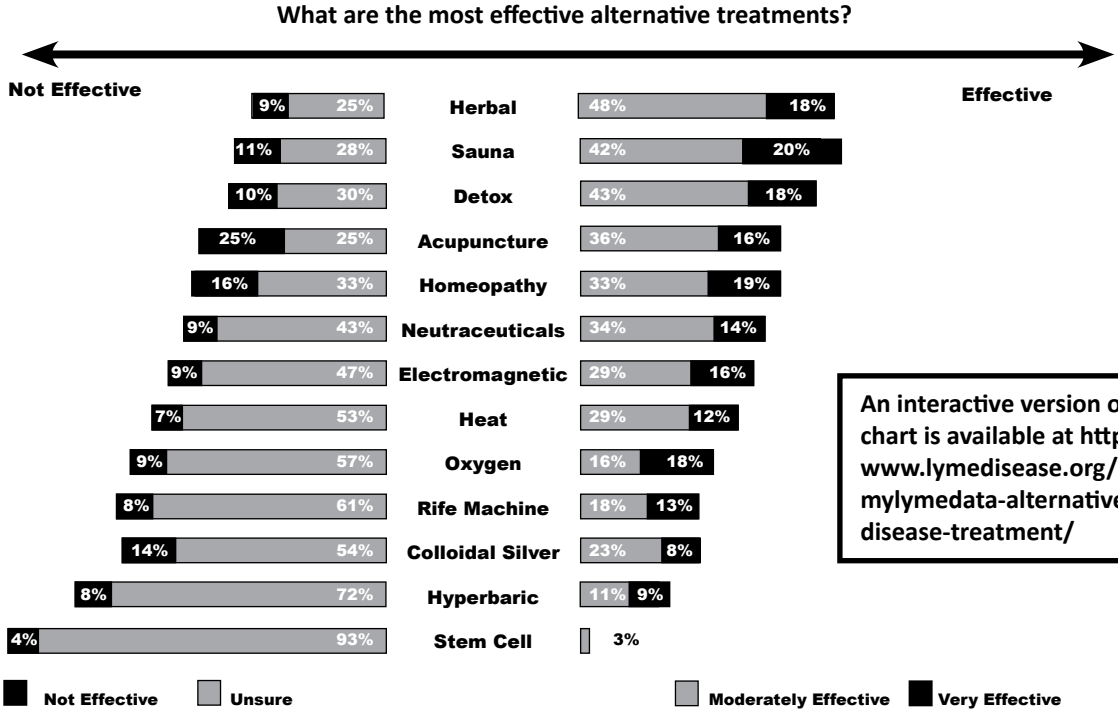
When Lyme disease is diagnosed and treated early, most patients are restored to health. However, even in patients diagnosed and treated in the acute phase, many remain ill after treatment. In addition, delays in diagnosis often makes treatment more difficult. Lorraine Johnson, CEO of LymeDisease.org and principal investigator of MyLymeData, says the organization started the project because of staggering unmet needs of the community for prompt diagnosis and effective treatment.

"Huge numbers of people with Lyme disease do not get diagnosed and treated in the early phase of the illness, when treatment is most successful," Johnson says. Unfortunately, this allows the pathogen to get deeply entrenched in the body, making it more difficult to eradicate. Protocols developed for the acute illness do not appear to be effective for long-term Lyme disease.

Unfortunately, there has been little research into how to help people who suffer persistent Lyme symptoms. "Lyme disease is extremely research-disadvantaged," says Johnson. The National Institutes of Health (NIH) has funded only three treatment trials for Lyme disease, with small samples. For instance, the treatment group in the largest NIH trial enrolled only 64 patients. "The problem with small trials is that they don't give you much information," says Johnson. Furthermore, recruitment for those trials took place 20 years ago, with nothing in the pipeline since then.

In contrast, more than 12,000 patients have enrolled in MyLymeData, providing over three million data points on Lyme disease demographics, tick bites, diagnosis, symptoms, lab tests, co-infections, treatment, and quality of life. The results have been eye-opening.

- **70% of those in the registry were not diagnosed until six months or more following the onset of their symptoms**. Most patients take three or more years to diagnosis and see five or more clinicians. Studies show that patients diagnosed late are less responsive to short-term antibiotic treatment.
- **Fewer than 12% of patients in the registry were diagnosed within the critical first month.** Most patients who are diagnosed and treated early



An interactive version of this chart is available at https://www.lymedisease.org/mylymedata-alternative-lyme-disease-treatment/

respond well to short-term treatment protocols.

- **74% reported early symptoms of the disease, but only 34% recall having the distinctive erythema migrans rash (EM) commonly relied on by physicians for diagnosis.** More common early symptoms were flu-like symptoms (64%) and severe headache or stiff neck (44%). Patients who do not have an EM rash are more likely to be misdiagnosed.
- **60% report that they have been diagnosed with an additional tick-borne infection, such as babesiosis or ehrlichiosis.** The presence of co-infections may increase the likelihood of developing chronic Lyme disease.
- **72% of patients with chronic Lyme disease report that they were initially misdiagnosed with another condition.** Patients misdiagnosed with another condition experience diagnostic delays and may be exposed to adverse effects from treatments for diseases that they do not have.

In 2018, the first peer-reviewed study using information from MyLymeData was published in the medical journal *Healthcare*. Using patient-reported outcome data from over 3900 registry patients, it looked at how individual Lyme patients vary in their response to antibiotic treatment.

Using a widely validated global rating of change scale, the MyLymeData team identified subgroups of patients who responded differently to treatment. Fifty-two percent reported at least some improvement with antibiotic treatment – with 34% reporting substantial improvement with treatment. Thirty-seven percent had no treatment response at all and 12% were worse after treatment.

Why do patients respond so differently to treatment? Do some of them have co-infections, were there diagnostic delays, different treatments or treatment durations? So far, that is unknown, but examining real-world data from registry patients may provide the path to more individualized care. "Such subgroup analysis of large samples allows us to uncover critical information that otherwise may not be available," says Johnson.

MyLymeData also asks questions about alternative treatments for Lyme disease. Patients who use alternative treatments either use them in conjunction with antibiotics (38%) or as a sole means of treatment (31%). The most popular alternative treatment included herbal protocols, sauna, chelation, and medical marijuana.

Important considerations for selecting any treatment modality include effectiveness and side effects. Herbal protocols, many of which have antimicrobial properties, are among the most popular. Sixty-eight percent of patients who used them reported that they were either moderately or very effective, with few side effects.

The MyLymeData team works with academic researchers at the University of California, Los Angeles and the University of Washington. The National Science Foundation has funded the UCLA researchers to explore big data analytics using information from MyLymeData. The registry also collaborates with the Lyme Disease Biobank, a Bay Area Lyme Foundation program. In addition, MyLymeData can assist with clinical trial recruitment, augment clinical trial research findings, and generate hypotheses for further clinical studies.

"We view the patient registry as a vital part of a research engine that can accelerate the pace and increase the depth and breadth of Lyme patient research," says Johnson. "At the same time, we take patient privacy seriously." Accordingly, LymeDisease.org vets researchers and restricts data use and re-use, to ensure that patient data is used solely for the benefit of Lyme disease patients. "Many big data projects sell data to third parties like pharma or insurers," cautions Johnson. "We do not. We make sure that patient data is used for the benefit of patients – period."

In 2019, LymeDisease.org published a 36-page full color chart book of highlights from MyLymeData. You can download a free PDF copy: https://www.lymedisease.org/mylymedata-lyme-disease-research-report/.

Patients interested in participating in the MyLymeData patient registry, should visit www.mylymedata.org.

LymeDisease.org advocates nationally for quality accessible healthcare for patients with Lyme and other tick-borne diseases. We are committed to shaping healthcare policy through science-based advocacy.

Resources

Johnson, Lorraine (2019): MyLymeData 2019 Chart Book. figshare. https://doi.org/10.6084/m9.figshare.8063039.v1

Johnson L, Shapiro M, Mankoff J. Removing the Mask of Average Treatment Effects in Chronic Lyme Disease Research Using Big Data and Subgroup Analysis. Healthcare (Basel). 2018 Oct 12;6(4).

https://res.mdpi.com/d_attachment/healthcare/healthcare-06-00124/article_deploy/healthcare-06-00124.pdf.

https://www.mylymedata.org/

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This month you'll find the following article published only online at www.townsendletter.com.

COVID-19: Hidden Coinfections and Chain Reactions: Parasitic Infectious Relationships Within Us by Simon Yu, MD

Untreated parasitic and dental infections can weaken the immune system and have been implicated in many chronic health problems. Simon Yu, MD, a doctor of integrative internal medicine, describes a multi-pronged approach to strengthen the immune system that includes treating unaddressed infections. Strengthening the immune system can lessen the impact of a possible COVID-19 infection.

The Next Generation of Lyme Disease – A Focus on Gestational Transmission

by Michelle McKeon, MS

Lyme disease is the most common vector-borne disease, the most prevalent tick-borne disease, and one of the fastest-growing infectious diseases in the United States.[1] There are many different factors that are contributing to this growing epidemic. Gestational Lyme disease (transferred infection from mother to baby in pregnancy) is a crucial component adding to the rise in numbers of this disease that are affecting people worldwide and often resulting in a serious debilitating illness. **Over the past 35 years (1985-2020) evidence of transplacental transmission and congenital infection of *Borrelia burgdorferi* have been clearly reported.** However, the longer this takes to get the recognition that it deserves will directly prolong the cataclysmic effects on pregnant women and their children. In the US, the Tick-Borne Disease Working Group submitted a 2018 report to Congress in which they acknowledged transplacental transmission of Lyme from mother to fetus.[2] Furthermore, in March 2020 the committee agreed upon a recommendation to Congress for further research into this alternate mode of transmission: "Further evaluation of non-tick bite transmission of Lyme disease, for example maternal-fetal transmission."[2] The National Institute of Health also published the statement: "If you are pregnant, be especially careful to avoid ticks in Lyme disease areas because you can pass on the infection to your unborn child."[3]

The current edition of a highly acclaimed, authoritative reference medical textbook, Remington and Klein's *Infectious Diseases of the Fetus and Newborn Infant*, includes Lyme disease in their list of in-utero/congenital infections. They suggest that the well-known acronym TORCH (Toxoplasmosis, Other (T. pallidum, Varicella Zoster Virus, Parvovirus), Rubella virus, Cytomegalovirus and Herpes Simplex) is too limiting, and thus expanded to TORCHES-CLAP, with the L indicating Lyme disease.[4] The Update on TORCH Infections in the newborn infant explains, "The usual way in which a fetus is infected is by transplacental spread after maternal infection in which the organism circulates in the mother's blood. These infections, acquired in utero, can be severe enough to cause fetal loss or can result in intrauterine growth restriction, prematurity, or chronic postnatal infection."[5] It also states that "Clinical evidence of infection may be seen at birth, soon afterward, or not until years later."[5] By acknowledging that Lyme disease is not only a zoonotic disease but can also be transferred from mother to baby requires us to reevaluate what this means moving forward with this disease.

The CDC recently updated their website as well, stating:

> If you are pregnant and suspect you have contracted Lyme disease, contact your physician immediately. Untreated Lyme disease during pregnancy can lead to infection of the placenta. Spread from mother to fetus is possible but rare. Fortunately, with appropriate antibiotic treatment, there is no increased risk of adverse birth outcomes. There are no published studies assessing developmental outcomes of children whose mothers acquired Lyme disease during pregnancy.[5]

Under recommendations for Lyme Disease and Breast Feeding, the CDC states, "There are no reports of Lyme disease transmission through breast milk."[6]

Published Studies

The stealthy nature of gestational Lyme disease can manifest a complicated diagnosis, due to the delay or changing nature of symptoms, multisystemic effect on the body, and the unreliability of standard diagnostic tests. Syphilis, just like Lyme disease, is also caused by spirochetes. Therefore, it has often been thought that the disease developments have similarities when it comes to gestational transmission. Dr. Alan MacDonald, pathologist, published a comprehensive case series on gestational Lyme, including his findings from fetal autopsies. He states:

> It is documented that transplacental transmission of the spirochete from mother to fetus is possible. Further research is necessary to investigate possible teratogenic effects that might occur if the spirochete reaches the fetus during the period of organogenesis. Autopsy and clinical studies have associated gestational Lyme borreliosis with various medical problems including fetal death, hydrocephalus, cardiovascular anomalies, neonatal respiratory distress, hyperbilirubinemia, intra-uterine growth retardation, cortical, blindness, sudden infant death

> syndrome, and maternal toxemia of pregnancy. It is my expectation that the spectrum of gestational Lyme borreliosis will expand into many of the clinical domains of prenatal syphilis.[7]

Dr. Tessa Gardner, a pediatric infectious disease physician, authored a comprehensive chapter on Lyme disease in the 4th and 5th editions of Remington and Klein's *Infectious Diseases of the Fetus and Newborn Infant*. Through her research, she discovered:

> …a total of 46 cases of adverse outcomes of these 161 cases of gestational Lyme borreliosis were found, including miscarriage, still-birth, perinatal death, congenital anomalies, systemic illness, early-onset fulminant or mild sepsis and later-onset chronic progressive infection....Thirty-seven percent of the total number of adverse outcomes were miscarriages or fetal deaths, 11 percent were neonatal deaths and 48 percent were either fetal or neonatal deaths. The effect of antibiotic therapy was dramatic in these patients: with antibiotics, 85% of neonates were normal, while 15% had an adverse outcome. In striking contrast, without antibiotics, only 33% were normal, while 67% had an adverse outcome.[8]

Dr. Charles Ray Jones is the world's leading expert on pediatric tick-borne diseases, having treated more than 12,000 children.

> According to Charles Ray Jones, MD, out of over 7,000 children seen, 300 (approximately 4%) have gestational Lyme. Data from his practice indicated that of 66 mothers with Lyme disease who were treated with antibiotics prior to conception and during the entire pregnancy, all gave birth to normal healthy infants. However, 8 pregnancies resulted in Borrelia burgdorferi and/or Bartonella henselae positive placentas, umbilical cords, and/or foreskin remnants. Those with positive PCRs were treated with 6 months of oral antibiotics and are without symptoms 3 months to 4 years later.[9]

According to Dr. Charles Ray Jones, most of the children born with gestational Lyme disease have manifestations of the disease at, or shortly after birth. Dr. Jones used Positive Western Blots, Positive PCRs, Positive LUATS, Positive Bb blood cultures, Positive Brain SPECT, and neuropsychological evaluations confirming cognitive problems to compile the date below.[9]

Percentage	Symptoms
40	Gastroesophageal reflux with vomiting and coughing
80	Irritability
60	Low grade fevers, pallor, and dark circles under their eyes
72	Fatigue and lack of stamina
23	Secondary rashes
45	Other rashes
30	Eye problems: posterior cataracts, myopia, astigmatism, conjunctival erythema (Lyme eyes), optic nerve atrophy and optic neuritis and/or uveitis
40	Frequent upper respiratory tract infections and otitis
20	Abdominal pain
40	Noise, light and skin sensitivity
50	Arthritis and painful joints
18	Developmental delay, including language, speech problems and hypotonia
80	Cognitive problems, learning disabilities and mood swings
30	Cavernous hemangiomas

Dr. Robert Bransfield is known as one of the top psychiatrists specializing in tick-borne infections. He is seeing that "congenital LB [Lyme Borreliosis] infections can contribute to developmental disorders and neuropsychiatric impairments. Congenital transmission of Bartonella has also been documented."[10] One of the most relevant studies pertaining to neuropsychiatric symptoms was a retrospective chart review of 102 gestational LB cases. The diagnostic methods used were clinical criteria, Lyme enzyme-linked immunosorbent assay testing, Lyme Western blot testing, Lyme urine antigen testing, culture, polymerase chain reaction (urine), polymerase chain reaction (blood), single-photon emission computed tomography and magnetic resonance imaging.[9]

> This study demonstrated 9% had been diagnosed with autism and 56% with attention deficit disorder in addition to a broad spectrum of multisystem symptoms. Other psychiatric symptoms included irritability or mood swings (54%), anger or rage (23%), anxiety (21%), depression (13%), emotional lability (13%), obsessive compulsive disorder (11%), suicidal thoughts (7%), developmental delays (18%), tic disorders (14%), seizure disorders (11%), involuntary athetoid movements (9%), photophobia (43%), auditory hyperacuity (36%), other sensory hypersensitivity (tactile, taste or smell) (23%), poor memory (39%), cognitive impairments (27%), speech delays (21%), reading/writing impairments (19%), articulation impairments (17%), auditory/visual processing impairments (13%), word selectivity impairments (12%), and dyslexia (18%)."[10]

It should also be noted that neurological Lyme disease can be fatal in neonates and infants. A newborn whose mother had suffered from Lyme disease during early pregnancy died 23 hours after birth, and *B. burgdorferi* s.l. was demonstrated in the brain and liver by silver staining and immunochemistry."[11]

Dr. Richard Horowitz has been at the forefront of treating tick-borne infections and has come across complications due to transplacental transmission as well. He reported:

> A 37-year-old female presented to our office with a 4-month history of migratory joint pains and a positive IgG Western Blot through Igenex laboratory. She was given 1 month of Doxycycline 100 mg po bid by her PMD, but relapsed upon stopping the medication, and came to our office for a consultation. She was placed on Amoxicillin and Probenecid, which promptly resolved her symptoms but caused hives, and was instead changed to Ceftin 1000 mg bid, Flagyl ER 750 mg q12hrs, and Zithromax 250 mg bid to address the cell wall, cystic, and intracellular forms of Bb. ➤

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> This medication regimen was tolerated well without side effects, and after 4 months, the patient reported feeling 100% back to normal (two months symptom free) with none of her mid cycle flares, and rare fleeting aches of unclear significance. The medication regimen was therefore stopped, and the patient subsequently became pregnant within the next month, with no change in her overall level of well-being. She had a normal OB/GYN exam but had a miscarriage at week 18. Polymerase Chain Reaction (PCR) testing was done on the placenta and fetus through Medical Diagnostic Laboratories in NJ, which both returned positive for *Borrelia burgdorferi*.[12]

Borrelia burgdorferi is recognized to survive in patients who have been treated with antibiotics, and at this time there are not any adequate scientific studies accessible to guide physicians in treating women who have thought to be successfully treated for Lyme disease without substantial symptoms that are ongoing. Dr. Horowitz said:

> Until such studies are available, it would seem prudent based on this case report to advise any woman wishing to get pregnant who has a history of Lyme disease to have an open dialogue with her physician, and consider serial PCR testing (urine/blood) before and during pregnancy to determine if there is evidence of persistent infection. However, since Bb may lie deep in tissues with long dormancy periods, an individual PCR may not be adequate to rule out ongoing infection.[12]

Amoxicillin is often recommended for a women with a history of Lyme wishing to become pregnant, as it is known to be safe for the fetus. Additional scientific studies need to be completed to identify the safest course of treatment for women wishing to become pregnant who have received successful treatment for clinical symptoms of this infection.[12]

Borrelia burgdorferi Found In Breast Milk

Currently studies are showing that that *Borrelia burgdorferi* can be found in the breast milk, as breast milk from infected mothers has detected spirochetes that can be detected by PCR and grown in culture.[13] However, more research needs to be done on whether *B. burgdorferi* can be transmitted through the breast milk to their baby. Another study in the FDA Science Forum documented transmission via breast milk of *B. burgdorferi* from experimentally infected mating pairs to offspring in a murine model.[14]

Gestational Lyme Disease in Animals

The maternal-fetal transmission of *B. burgdorferi* has been documented not only in humans but also in horses, coyotes, cows and *Peromyscus leucopus* (white-footed mouse).[14,15] A study reports that intrauterine transmission can occur through dogs as well. A female dog infected with *B. burgdorferi* delivered puppies, and at six-weeks-old they came up positive for *B. burgdorferi* through DNA detected in their tissues.[16] Another study reports:

> B. burgdorferi can cause in utero infections in horses and can be associated with foal mortality. The kidney lesions in the foals that died soon after birth and, in the yearling, contributed to the deaths of the animals. The lesions were attributed to B. burgdorferi infection as B. burgdorferi was isolated from the kidneys of three of the four animals and spirochetes were identified in the kidneys of histologic sections.[17]

Active Lyme During Pregnancy

Often women who are pregnant with active Lyme experience a reduction in symptoms. However, we are unsure as to exactly, why this occurs. A study done on mice shows that during pregnancy in a murine model, the severity of pathogenic inflammatory response associated with Lyme arthritis is significantly attenuated.[18] One of the commonly observed effects on immune responses during pregnancy has been a bias toward humoral responses, frequently at the expense of cell-mediated immunity and related inflammatory sequelae. In this study the changes are correlated with an altered tryptophan metabolism and progesterone-mediated alterations in the balance of cytokine elaboration. However, the intricate cytokine balance among the host response to infection and maintenance of pregnancy may also work against the fetus in some cases.[18] "Clinical observations in humans suggest that the severity of rheumatoid arthritis is ameliorated during pregnancy, whereas systemic lupus erythematosus, in which the principal pathology is associated with autoantibody production, may become exacerbated during gestation."[18]

However, in this study done with pregnant mice, the results show that pregnancy changes the equilibrium of cytokine expansion to decrease the pathogenic inflammatory response from an infectious challenge. This down-regulation of Th1 responses, likely due to progesterone-mediated up-regulation of Th2 cytokine production, provides a reasonable explanation for the significant reduction of Lyme arthritis in pregnant mice. That said, the study did not detect substantial differences in spirochetal tissue burden amongst pregnant and nonpregnant controls.[18] Further research surrounding the immune response in pregnant mice and in other infectious models may be useful for understanding the foundation of the profound immunologic changes involved with pregnancy. The 2018 Tickborne Disease Working Group report to Congress has also identified that, "hormonal changes during pregnancy can lead to changes in immune function that may affect the detection of clinical or laboratory findings."[19]

Objective

It is transparent that through the past 35 years there has been enough documentation verifying transplacental transmission, and having organizations acknowledge this opens the door to constructively collaborate on research that needs to be done to determine

solutions. On December 20, 2019, a letter was sent to Anthony S. Fauci, MD, Director of National Institute of Allergy and Infectious Disease (NIAID), requesting information about the Lyme disease research and coordination programs at the National Institute of Allergy and Infectious Disease (NIAID) to strengthen local responses, improve clinical efficacy, and implement strategies to prevent the spread of Lyme disease. The letter states that, "To help us better understand how NIAID is approaching the health threat of Lyme Disease, they ask to provide answers to a list of questions."[20] Number two on the list is "What is NIAD conducting to better understand modes of transmission for Lyme disease? What research is the agency planning to conduct or incentivize to improve understanding of modes of transmission including vertical transmission?"[20] This letter was written and signed by United States Senators, Edward J. Markey, Susam M. Collins, Robert Menedez, Chris Van Hollen, Elizabeth Warren, Angus S. King Jr, and Richard Blumenthal.

Moving forward, research and urgent investigation of gestational Lyme disease is crucial and requires a reconstructed multi-disciplinary approach, including an evidence-based inclusive model involving clinical researchers, physicians, and patients with lived experience to be valued members of the research team.

Next Steps in Research, Study, and Solutions

- Retrospective questionnaires and surveys on Lyme disease and co-infections (specifically babesia, bartonella, and ehrlichiosis)
- Assess short- and long-term results (miscarriages, stillbirths, infants) of pregnancies involving tick-borne infections
- Large-scale long-term prospective follow-up studies with both the mother and her baby to identify maternal cofactors correlated to maternal-infant transmission
- Large-scale long-term prospective follow-up studies for maternal and infant outcomes, including occurrence of possible early and late stage sequelae of congenital Lyme borreliosis
- Early diagnostic methods to determine Borrelia-infected infants
- *B. burgdorferi*-specific evaluation of any fetal or neonatal death[21]
- Studies determining whether *B. burgdorferi* can be transmitted from mother to child through breast milk
- Animal models
- Studies to determine the optimum course and duration of treatment for women wishing to become pregnant who have received successful treatment for clinical symptoms of tick-borne infections
- Studies showing the rate at which women who were in remission relapse with symptoms from tick-borne infections after giving birth and ways to help prevent that.

Now is the time, more than ever, to come together and determine solutions that will work towards preventing more miscarriages, stillbirths, and babies born with tick-borne illnesses potentially causing chronic debilitating health issues. As Sue Faber, RN, co-founder and president of LymeHope, states: "Despite this failed framework, I still have great hope that this isn't the end of the story, but rather a fresh beginning, a reawakening to the reality of the Lyme crisis, which continues to sweep across our nation. Your decisions and actions on this issue will directly impact the fate of millions."[22]

References

1. Nationally Notifiable Infectious Diseases and Conditions, United States: Annual Tables (2018) https://wonder.cdc.gov/nndss/static/2018/annual/2018-table1.html
2. Tick-Borne Disease Working Group Meeting #12 Day 2. March 4, 2020. https://www.youtube.com/watch?v=uB57bypBwFk&feature=youtu.be. March 2020. 7:37:00 to 7:45:00
3. Lyme Disease The Facts The Challenge – U.S. Department of Health and Human Services National Institutes of Health – NIH Publication No. 08-7045 July 2008.
4. Maldanado Y, et al. Current Concepts of Infections of the Fetus and Newborn Infant (Chapter 1). In Remington and Klein's *Infectious Diseases of the Fetus and Newborn Infant*, 8th ed., 2016.
5. Boyer S, Boyer K. Update on TORCH infections in the newborn infant. *Newborn and Infant Nursing Reviews*. 2004;4(1).
6. Silver HM. Lyme disease during pregnancy *Infect Dis Clin North Am*. 1997 Mar;11(1):93-7.
7. MacDonald AB. Gestational Lyme borreliosis. Implications for the fetus. *Rheum Dis Clin North Am*. 1989;15(4): 657-77.
8. Gardner T. (1995). Lyme disease. Infectious diseases of the fetus and newborn infant. J. S. Remington and J. O. Klein. Philadelphia, Saunders. Chap. 11: 447-528.
9. Jones C, Gibb E, Johnson L, Smith H. *Lyme Times – Gestational Lyme Studies*, 2005,
10. Bransfield R. Neuropsychiatric Lyme Borreliosis: An Overview with a Focus on a Specialty Psychiatrist's Clinical Practice. *Healthcare*. 2018; 6(3):104.
11. Scott JD, et al. Lyme Disease Bacterium, Borrelia burgdorferi Sensu Lato, Detected in Multiple Tick Species at Kenora, Ontario, Canada. *J Bacteriol Parasitol*. 2017;8:304.
12. Horowitz R, Yunker LL. Lyme Disease and Pregnancy: Implications of Chronic Infection, PCR testing and Prenatal Treatment Case Presentation. 16th International Scientific Conference on Lyme Disease and other Tick-Borne Diseases. June 7, 8, 2003.
13. Burrascano, J. *Advanced Topics in Lyme Disease. Diagnostic Hints and Treatment Guidelines for Lyme and other Tick-Borne Illnesses*. 16th edition. October 2008.
14. Altaie SS, et al. Transmission of Borrelia burgdorferi from experimentally infected mating pairs to offspring in a murine model. Abstract # I17. 1996.
15. Leibstein MM, Khan MI, Bushmich SL. Evidence for in-utero Transmission of Borrelia burgdorferi from Naturally Infected Cows. *Journal of Spirochetal and Tick-borne Diseases*. Fall/Winter 1998;5: 54-62.
16. Gustafson JM, Burgess EC, Wachal MD, Steinberg H. Intrauterine transmission of Borrelia burgdorferi in dogs. *AM J Vet Res*. June 1993;54 (6).
17. Burgess EC, Gendron-Fitzpatrick A, Mattison M. Foal mortality associated with natural infection of pregnant Mares with Borrelia burgdorferi. In Proceedings, 5th Int Conf Equine Infectious Dis, 1989, 217-220.
18. Moro MH, et al. Gestational Attenuation of Lyme Arthritis Is Mediated by Progesterone and IL-4. *Journal of Immunology*. 15 June 2001.
19. Tick -borne Disease Working Group 2018 Report To Congress. 2018, https://www.hhs.gov/sites/default/files/tbdwg-report-to-congress-2018.pdf
20. Letter to National Institute of Allergy and Infectious. 20 March 2020, Disease https://www.facebook.com/livlymefoundation/photos/pcb.2583526775078153/2583520958412068/?type=3&theater
21. Faber S. 34 Years of Maternal-Child Transmission of Lyme Disease and Congenital Lyme Borreliosis. 2017 Feb. https://www.lymehope.ca/uploads/8/4/2/8/84284900/updated_dec_3_2018_-_32_years_of_literature_review.pdf
22. Parliamentary Testimony of Sue Faber, RN - Parliamentary Standing Committee of Health Study of the Federal Framework on Lyme Disease, June 6, 2017.

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Michelle McKeon is a wellness coach, author, and educator specializing in detoxification, nutrition, hyperthermia treatment, and herbal therapies for individuals with tick-borne illnesses. She also co-owns a health and wellness company called Lyme and Cancer Services (http://lymeandcancerservices.com), where she is director of patient services. Michelle advocates for people with Lyme disease, writes articles on tick-borne illnesses, and speaks at conferences and support groups.

In the Spirit of Connectedness

by Aparna Taylor, MSc, ND

The definition of spirituality has evolved over time, more recently to include a broad spectrum of themes that involve a belief in a greater source and a sense of connectedness. It can also be defined as a personal journey to make sense of the human experience, either with or without a community of others, either practicing or not practicing a religion.

I wondered, how might spirituality, or acknowledging spirit, shape clinician interactions with patients in a way that can benefit individual care?

Yawar[1] discusses two realms of existence we have as human beings, the inner and outer realms. The inner realm is the individual's ideals through experiences such as love, awe and beauty, or interaction with the divine or transcendental experiences. The outer realm is the individual's interaction with the world.

Why is this important?

In situations where questions of life and death emerge, such as birth, terminal disease, or illness (such as chronic tick-borne diseases), these inner and outer realms converge, and the questions are pondered more.[1] Patients may look for answers somewhere in the broad definition of spirituality for support and guidance. A clinician has the opportunity to create space for this aspect of well-being, despite the possibility of having different views from his or her patient. One of the ways I aim to stay grounded with patients is to also ask myself what is important to me, what inspires, uplifts, or allows me to be 'in spirit'?

There are rare occasions in my practice that allow an early intervention to tick-borne diseases. The majority involve long-standing, complex, and chronic health issues that are identified (at least in part) as related to tick-borne and other infections. Many of these individuals are unable to work, dealing with intractable fatigue, pain, and brain fog – among many other symptoms unpredictable by the day and sometimes by the hour. In some occasions, these symptoms impede the ability to get out of bed, prepare meals, and carry out activities of daily living independently. In these individuals, life and death and sense of purpose are foreboding.

Kim* (not her real name) would have extreme anxiety about whether the next medical appointment would provide relief and support, or failed symptom management and minimization of her concerns. This cast a shadow behind the looming financial distress that was another worry. She was overcome with thoughts of her mortality, and simple daily tasks were full of challenges. She expressed feeling relief when she found a Lyme literate clinician, though when recalling her typical visits, shared that "the doctor never sat down, she barely made eye contact with me and wrote the treatments onto a sticky note then would walk out. If I had questions, she told me to ask her front desk though they couldn't really answer them. I felt guilty….I finally found a doctor who believed me, but felt lost and overwhelmed." She felt compelled to follow all directions even though, in this case, she felt a lack of being heard, and the interaction was not one that benefited patient care. In Kim's case, creating space might simply have been being present with her, to listen to her needs in a way that she felt benefited her health. This clinician, whether intentionally or not, was unavailable in a way that was meaningful to Kim.

In this population of people, many have become burdened with the physical and emotional challenges associated with their long-standing illness and suffering. A sense of purpose in life, whether spiritual or not, may continuously be left unfulfilled when chronic illness and symptoms overshadow every day. Yawar summarizes various definitions of spirituality as essentially "the ways in which people fulfil what they hold to be the purpose of their lives."[1] It is not uncommon, in this population of patients seeking support for tick-borne diseases, for a sense of purpose to be hindered by the physical, mental, emotional, and financial challenges discussed. Patients suffering from chronic tick-borne illnesses may experience their sense of purpose through a search for meaning.

What is the meaning of this illness, and the way it has altered life?

Why is there suffering, what is the meaning of this suffering?

There is value in accompanying an individual on their journey through the suffering to find meaning. Kim had seen countless doctors prior to finding her Lyme-literate clinician. Most of those doctors concluded that her health issues and suffering were due to mental illness since they were unable to find a diagnosis that supported the symptoms she was experiencing. Though the cause of her symptoms was not mental illness, it became part of her symptom picture for multiple reasons. There are approaches Cutcliffe discusses

to support individuals experiencing mental health-related suffering,[2] which would first involve a foundational relationship to have the conversation.

Kim shared with me that her anxiety was mild in the past and now was the symptom overshadowing all other symptoms, and she was unable to find relief in the treatments offered, even with the Lyme-literate clinician. We determined that her experiences likely amplified the anxiety but were not the cause – with some other symptoms and her test results supporting a Bartonella infection. Ultimately, she expressed the value to her of a partnership with her clinician with the ability to share how she was suffering, which was meaningful to her. Regardless of the limitations that prevented her previous Lyme-literate clinician from being able to support Kim in the way that she needed, there is empirical evidence that a simple action, sitting versus standing in a visit, has a positive impact on physician-patient interaction.[3]

What if the suffering itself served a purpose?

"Only through experience of trial and suffering can the soul be strengthened, ambition inspired and success achieved."

– Helen Keller

Keller makes a strong statement, which is not to say without these experiences strength, inspiration, or success is not possible, rather it is an example of contemplating the possibility of seeing value in the suffering itself.[4] In this case, some of Kim's mental health-related symptoms were a manifestation of a Bartonella infection that began to resolve with treatment. Overall, despite the multiple, chronic and complex health issues she had in addition to her extreme anxiety and infections, her sense of well-being was related to her feeling heard and involved in her health journey. This allowed her to express herself freely, which in turn resulted in a more accurate diagnosis and, ultimately, effective treatment.

Clinicians supporting individuals through this journey carry the weight of systematizing the complexity of physiological, environmental, social, and lifestyle factors involved in simply making an appropriate diagnosis, and devising interventions, all with compassion. To the clinician treating this population, the effort in creating space for each individual to be heard on their terms may require a *personal* sense of purpose and well-being.

If the clinician is overworked, burnt out, or missing this sense of well-being, would it still be possible to create space for patients?

Or put another way, can clinicians show compassion and empathy for the patient experiencing suffering and searching for purpose or meaning, if the clinician is missing this for him or herself?

"Your purpose in life is to find your purpose and give your whole heart and soul to it"

– Buddha

There may not be direct answers to these questions, given the diversity in belief systems and ways of practicing that each clinician finds resonates with her or his lifestyle or personality.

Why might creating space for spiritual well-being help our patients?

Human existence has some commonalities regardless of spiritual belief systems. One commonality is the desire for a sense of well-being, whether it is physical, mental/emotional, or spiritual. In cases of illness, this well-being is influenced deeply by the interactions each individual has with the inner (ideals) and outer (worldly interaction) realms, as discussed earlier. Most North American conventional medicine relies heavily on evidence-based, objective (outer worldly) realms for diagnosis and treatment and this often extends to the relationship between clinicians and patients. Creating space for spiritual well-being takes into account the deep need for connectedness, as part of the human existence, especially at a time of vulnerability in illness.

The broad definition of spirituality includes compassionate care.

How can a clinician create space for spiritual well-being, while attempting to tackle the complexity of individuals with chronic tick-borne diseases?

Kim felt a lack of connectedness to her clinician in three important ways:

1. Her doctor did not make eye contact or sit down.
2. She did not feel heard.
3. She did not feel included in decision making.

Creating a space for spiritual well being could begin in this case with basic connection, eye contact, sitting down with Kim creating the baseline for rapport. In the current climate of telemedicine becoming more commonplace, this connection is possible through tone and ensuring questions are answered or addressed. Most conventional medical training does not include spirituality as central to medicine, though these basic communication skills are emphasized.

Spirituality may be considered as part of overall patient needs, though not directly discussed in most curriculums. Regardless of personal views, a sense of *awareness* of spiritual needs, and how best to meet these needs for each individual will benefit patient care. In a health survey, 67% of American patients polled felt doctors should talk to their patients about spiritual concerns, and in this group surveyed, only 10% reported their doctors had this discussion.[5] Other medical traditions intertwine spirituality with medicine, serving the whole person with compassion, which in itself is a spiritual activity. With technological advances, the focus of medicine changed from a caring, service-oriented model to a technological, cure-oriented model, which has prolonged lives.[6] The value of information gathered through evidence-based trials of larger groups of patients has lost the sense of service to each individual as a whole. Most clinicians

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value empathy and compassion in medicine, and many link compassion to underlying spiritual values, despite common barriers to compassionate care (time and values of current medical culture).[7]

"Never worry about numbers. Help one person at a time and always start with the person nearest you."

– Mother Teresa

From a practical standpoint, the effort required to organize the complexity of our patients already places the clinician in a challenging position; this reinforces the need for each clinician to be mindful of his or her own well-being. Puchalski wrote, "patients with serious or chronic illnesses endure all types of suffering – spiritual as well as physical." She believes that "physicians are obliged to respond to – if not attempt to relieve – all types of suffering, including spiritual."[8] If we are to attempt to relieve all types of suffering for our patients, being able to *discuss* a patient's spiritual beliefs and how they may affect the patient's health is the beginning of creating space for this aspect of well-being. Regardless of individual belief systems, another commonality to the human existence is the connectedness created by compassion, empathy, and warmth. The broad definition of spirituality includes compassionate care; this in itself allows space to be created for patients so they perhaps would feel comfortable sharing their spiritual views.

"It's a strange myth that atheists have nothing to live for. It's the opposite. We have nothing to die for. We have everything to live for."

– Ricky Gervais

There are concrete methods that exist to begin incorporating spiritual aspects into clinical practice[9] that may or may not be relevant to all patients or doctors. The art of compassionate care in medicine falls into the spectrum of spirituality with Yawar's definition of spirituality, as the sense of purpose. Whether a patient is agnostic, atheist, religious or spiritual, a clinician with her or his own sense of purpose can create a space of compassion and empathy and ask each individual: *What is important to you*?

This question, asked with compassion and empathy, creates a space of well-being. Asked in different ways and contexts, it has allowed me to learn the benefit of this space – supporting healing through the journey, sometimes with intense suffering, regardless of the outcome. The conversation need not be directly about spirituality, or even in person; rather the *way* in which we have a conversation is what comes across, along with valuable information that can benefit individual care.

The word *Seva* in Sanskrit means selfless service, possibly the most important part of any spiritual practice since selfless action has no expectation of outcome.

Rachel Naomi Remen, MD, in *Kitchen Table Wisdom: Stories That Heal* wrote: "Helping, fixing and serving represent three different ways of seeing life. When you help, you see life as weak. When you fix, you see life as broken. When you serve, you see life as a whole. Fixing and helping may be the work of the ego, and service the work of the soul."[10]

Each individual we see in our practices brings a unique experience as part of their complex journey towards health, and our support and guidance require much more of us as clinicians, treating tick-borne diseases. Creating a space of well-being for our patients means we create that space for ourselves, with our own sense of purpose. Leonardo da Vinci said, "Make your work to be in keeping with your purpose." This for us is a mountain to climb when treating tick-borne illnesses and the comorbidities that come with chronic health issues. The rewarding part of this mountain, this sense of purpose, is to find a way to encourage being in spirit, well-being, and healing while on the journey with our patients, regardless of the outcome. Living near the Rocky Mountains in Alberta, their image to me is grounding, majestic, and a reminder that the journey itself, at times difficult, has rewards along the way. Whether climbing a mountain or supporting a patient with complex health issues, the path reminds me of our interconnectedness to each other, nature, and spirit; and all we can learn, if we allow it.

"The best things in life make you sweaty."

– Edgar Allan Poe (Unless, those things are Babesia infections….)

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 volunteered in hospitals in India and became a yoga teacher. After this gap year, she moved to Western Canada where she completed her Masters in muscle physiology and aging at the University of Calgary. While pursuing her PhD in molecular neuroscience, she re-awakened her passion for patient-centered medicine and became a naturopathic doctor.

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

References

1. Yawar A. Spirituality in medicine: what is to be done? *J R Soc Med*. 2001;94(10):529–533.
2. Cutcliffe JR, et al. Mental health nurses responding to suffering in the 21st century occidental world: accompanying people in their search for meaning. *Archives of Psychiatric Nursing*. 2015;*29*(1), 19–25.
3. Swayden KJ, et al. Effect of sitting vs. standing on perception of provider time at bedside: a pilot study. *Patient Educ Couns*. 2012;86(2):166–171.
4. Rawlinson MC. The sense of suffering. *J Medicine and Philosophy*. 1986;*11*(1), 39–62.
5. McNichol T. The new faith in medicine. *USA Today Weekend*. 1996 April 5–7:4–5. (Survey conducted February 1996 by ICR Research Group.)
6. Puchalski CM. The role of spirituality in health care. Proceedings (Baylor University. Medical Center). 2001;14(4), 352–357.
7. Anandarajah G, Roseman JL. A qualitative study of physicians' views on compassionate patient care and spirituality: medicine as a spiritual practice? *R I Med J*. 2014;97(3):17–22.
8. Puchalski CM. Spirituality and health: the art of compassionate medicine. *Hospital Physician*. 2001;37(3):30-36.
9. Puchalski CM. The FICA spiritual history tool# 274. *J Palliative Medicine*. 2014; 17(1), 105-106.
10. Remen RN. *Kitchen Table Wisdom: Stories That Heal*. New York: Riverhead Books; 1997.

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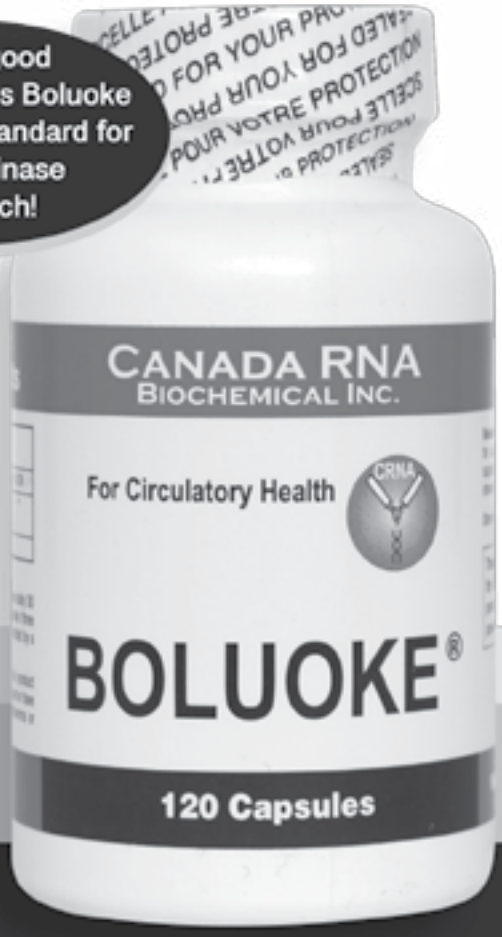

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Charles Mraz and the Art of Bee Venom Therapy

by Dr. Douglas Lobay, BSc, ND

Of bees, the American writer, poet, and philosopher Henry David Thoreau once said, "there are certain pursuits which, if not wholly poetic and true, do at least suggest a nobler and finer relation to nature than we know. The keeping of bees, for instance…."

One of my favorite books growing up was the American classic *Walden* by Henry David Thoreau. In the mid-1800s Thoreau moved to Walden Pond in Concord, Massachusetts, and decided to live simply, in close harmony with nature for two years. The book *Walden* chronicles his experience and insight with his life there. I had the good fortune of visiting Walden Pond after attending a Dr. Jonathan Wright weekend seminar in early October of 1994 in Marlborough, Massachusetts. I was just two years graduated from Bastyr College and practicing in Kelowna, British Columbia. I was young, impressionable, and eager for knowledge and practicalities of naturopathic medicine. After the conference I rented a car and travelled to Walden Pond and then drove to Middlebury, Vermont, to visit the legendary beekeeper Charles Mraz.

Driving through the White Mountains of New Hampshire and Green Mountains of Vermont one late afternoon was spectacular. The fall foliage was out in full bloom. The oaks, maples, hickory, birch, and sumac were the bright colors of watermelon red, lemon yellow, and apricot orange. The sun glinted off the windshield of the rental car and reflected on the array of autumn colors. I pulled late into Middlebury, Vermont, and stayed in a nondescript motel for the night. I woke early the next day and found my way to the home of Charles Mraz, the pioneer beekeeper who championed the use of bee venom therapy in people afflicted with arthritis and multiple sclerosis.

Mr. Mraz was a tall, slender, stately gentleman in his 80s whose distinguished demeanor resembled Joe Dimaggio. He invited me in his home and offered me a cup of tea. We had a long conversation of his experience with bee venom therapy. An elderly lady with arthritis showed up during our visit, and he gave her a few stings with live bees from the hive that he had in his house. He adroitly picked up the honeybee with a pair of tweezers on the thorax and applied gentle pressure on the insect's abdomen to the lady's skin. She winced a few times, thanked him, and left.

Afterwards Mr. Mraz took me to see his apiary and farm. He showed me his ingenious method of extracting bee venom from the honeybees without killing them. He made a device from a one-foot-square piece of half-inch-thick white plastic and copper wire. He made a grid of exposed copper wires running parallel to each other and separated by slightly less that every half inch. Another set of copper wires were running at ninety degree to the first set. He attached each set of parallel wires to a twelve-volt car battery. He inserted a rheostat in the circuit to adjust the amperage delivered to the grid. When a honeybee landed on the plastic sheet, he turned up the current to give the insect a slight electric shock. The startled bee tried to sting the apparatus, deposited venom on the plastic sheet, and then flew away. Charles then collected the bee venom that was deposited on the plastic sheet, purified it and reconstituted the bee venom into vials for injection.

After our visit I thanked Mr. Mraz for his time and hospitality. I drove back to Boston, visited the old Boston Gardens arena where Bobby Orr and the Boston Bruins played hockey and the bar that was based on the television show *Cheers*. Inspired and enlightened, I returned to my clinic and continued to incorporate bee venom therapy into my practice with vigor.

Bee venom is the fluid extracted from the stinger of the common honeybee, *Apis mellifica*. Honeybees are literally milked for their venom. The venom is collected, purified, and sterilized before human use. Bee venom is then used and given as an intracutaneous or subcutaneous injection in the form of blebs or "quaddles" that resemble a real, live bee sting. Bee venom has shown to be a remarkably effective therapy for generalized pain and inflammation. It has been widely used to treat different rheumatic diseases. It has also been used to treat a variety of autoimmune diseases.

The therapeutic effects of bee venom have been known for hundreds of years. Beekeepers throughout the world have observed the remarkable medicinal effects of this therapy. In folklore, it has been known that beekeepers seldom developed arthritis. And if they did, they would let the honeybee sting them for relief. Bee venom is widely

used throughout the world, including China, Korea, Russia and Eastern Europe. Interest in bee venom therapy has been renewed in France, Germany, Switzerland, Canada, and the United States.

Bee venom is a complex mixture that contains at least eighteen different pharmacologically active constituents. Isolated ingredients include melittin, apamin, adalopin, phospholipase A2, hyaluronidase, and mast cell degranulating peptide. Melittin content ranges between 40 to 60% of the dry weight of the venom, with an average content of about 50%. Melittin is a short, basic peptide that is 26 amino acids long. It has demonstrated both pro-inflammatory and anti-inflammatory activity and shows analgesic effects. Adolapin prevents the formation of inflammatory prostaglandins. Apamin also shows strong anti-inflammatory activity. Apamin is believed to be the active ingredient that is effective for neurological disorders like multiple sclerosis. Hyaluronidase, phospholipase A2, and mast cell degranulating peptide also contribute to the overall effectiveness of bee venom therapy. Whole venom appears to be considerably more effective than the isolated constituents alone.[1-3]

Bee venom therapy can be used in the treatment of degenerative joint disease or osteoarthritis, rheumatoid arthritis, tennis elbow, carpal tunnel syndrome, shoulder problems, neck pain and whiplash, low back pain and sciatica, ankylosing spondylitis and degenerative disc disease. It has also been used in the treatment of autoimmune disorders, lupus, scleroderma, fibromyalgia and multiple sclerosis. Bee venom has also been used for immune stimulation in common infections like colds, flus, sinusitis, and bronchitis. Mood elevation and improved energy are frequently reported by many individuals receiving bee venom therapy. Trace amounts of neurotransmitters such as dopamine, norepinephrine and serotonin have been found in bee venom.[4-6]

Bee venom injections are administered in a manner similar to a regular bee sting in nature. Venom is injected intracutaneously or subcutaneously below the surface of the skin. A large, itchy red welt where the sting has been administered is a normal reaction to a bee venom sting. This usually indicates that the person's immune system is awake and ready to respond. All the chemicals in bee venom begin to act and stimulate the body and initiate healing. Bee venom can activate some chronic disease and should be administered with caution in individuals with latent infection or tuberculosis.[1-3]

There is an enormous amount of scientific research that supports the medicinal use of bee venom therapy. A quick search on PubMed on the National Institute of Health website revealed over 1600 articles have been published throughout the world in scientific journals in the past sixty years. Research was originally conducted in China, Japan, Korea, Russia, and Eastern Europe. New research is being conducted in France, Germany, and Switzerland.

Bee venom stimulates the body to produce endogenous cortisone in the adrenal glands.

Relief of pain can be instantaneous. Within two hours, patients usually report a significant reduction of pain and inflammation. Just how long the relief lasts is highly variable. For some individuals the pain relief from a single bee venom injection can last for several months. In others, the relief can last for several days to week. The effects of bee venom therapy can be individualistic.

The exact course and duration of bee venom therapy depends on the individual and specific illness being treated. Conditions such as bursitis, gout, and tendonitis usually require only one session of one to four stings. Osteoarthritis usually responds in two to six weeks of bee venom therapy. Rheumatoid arthritis usually responds in four to twelve weeks of treatment. The number of stings depends on the extent of inflammation and the number of joints involved. Fibromyalgia can be treated over two to twelve weeks for positive results. Diseases such as multiple sclerosis involve multiple stings and sessions. A typical MS patient might require ten to forty stings per session two to three times per week. Some MS patients have had up to 4000 stings per year. MS patients usually report decreased muscle cramps, increased flexibility, increased range of motion, and pain relief. Other diseases such as Lou Gehrig's disease have been treated and while not curative, have reported positive results.

Research has consistently demonstrated that bee venom is a potent anti-inflammatory and analgesic. Bee venom has both local and generalized effects throughout the body. Local effects include activation of the immune system to prevent swelling and inflammation. Bee venom prevents the release of chemicals that promote inflammation. Bee venom stabilizes local nerve conduction and prevents transmission of pain impulses. Bee venom stimulates the body to produce endogenous cortisone in the adrenal glands. Unlike corticosteroids, bee venom does not seem to produce deleterious side effects other than the characteristic feeling of a bee sting.[1,2]

The most important side effect of bee venom therapy is the risk of anaphylactic reaction. Although rare, anaphylactic shock can occur with potentially fatal results. For this reason patients should be carefully screened for the potential benefits and risks of applying this treatment. Every patient should be asked whether or not they have been stung by a bee, how long ago, and what reaction occurred.[7,8]

A great deal of confusion exists about allergic reactions to bee venom. Most people confuse local itching and swelling as an allergic reaction. A certain amount of pain, swelling, redness and inflammation is normal after a bee sting and usually does not constitute an allergic reaction.

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Bee Venom Therapy

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Bee venom therapy should only be administered by a licensed medical practitioner who is trained in this therapy and who fully understands the risk and treatment of anaphylactic reactions. They should know how to administer adrenaline, antihistamines such as diphenhydramine, and how to use corticosteroids. Oral antihistamines, such as Benadryl or generic alternatives, may be used to decrease bee sting reactions. Swelling and itching from the venom is caused by release of histamine at the site and possibly throughout the body.

As a rule, bee venom is not administered to the head and face region. It is also not to be used on those who are pregnant or on young children. It is used with caution in all individuals with heart and cardiovascular conditions.

I have used bee venom therapy for over 25 years in my clinical practice. I have found it to be a useful, practical and effective treatment of chronic pain conditions in some patients. I usually screen patients for the risk of allergic reactions and the possibility of anaphylactic shock. I perform a small test injection equivalent to a single bee sting. Occasionally I put in an equal amount of local anesthetic such lidocaine or procaine and occasionally sodium bicarbonate to help neutralize painful reaction to the sting. I usually wait for 5 to 10 minutes before proceeding with any further injections. For new patients, I usually administer less stings than with long-term patients whom I am comfortable with and know how they react.

I have been fortunate to have only a few minor reactions. In one patient with carpal tunnel syndrome, his wrist and hand swelled up after the administration of the equivalent of four bee stings. Antihistamines, ice, and conservative therapy were good enough to treat the reaction. Interesting the carpal tunnel symptoms went away after the swelling subsided. In another older patient with chronic pain and arthritis, I administered the equivalent of six stings, which produced the typical reactions on the affected joints. After waiting in the office for 30 minutes after injections, the patient appeared stable and then went home. However about one to two hours after treatment, the symptoms of swelling seemed to be more systemic. The area injected was red and swollen and even her eyelids were slightly red and swollen. I instructed her to come back to the office for further evaluation and then administered injectable antihistamines and a small amount of adrenaline. I then waited in the office for one hour to monitor her condition. She appeared stable enough to discharge and send home with additional oral antihistamines to continue for three days. Of course, I cannot over-emphasize the need to be vigilant about screening patients for risks versus benefits of bee venom therapy and stress the need to be comfortable with the use of emergency medical procedures.

Early in my career I discovered the remarkably powerful effectiveness of bee venom therapy. I was lucky enough to have met the renowned New England beekeeper, Charles Mraz. I was fortunate enough to have him as a kind and compassionate mentor. I learned that bee venom is a wonderful, effective natural treatment for both acute and chronic pain. I believe it is the closest thing I have seen to a natural cortisone shot. I tell patients it has strong anti-inflammatory and analgesic effects. And despite the discomfort associated with the stings, I have many patients who routinely come back and ask for their bee venom shots. It seems to help relieve their pain and inflammation.

Henry Thoreau once made a journal entry, "If I were a physician, I would try my patients thus. I would wheel them to a window and let Nature feel their pulse. It will soon appear if their sensuous existence is sound. The sounds are but the throbbing of some pulse in me."

Douglas G. Lobay is a practicing naturopathic physician in Kelowna, British Columbia. Dr. Lobay graduated with a bachelor of science degree from the University of British Columbia in 1987. He then attended Bastyr College of Health Sciences in Seattle, Washington, and graduated with a doctorate of naturopathic medicine in 1991. While attending Bastyr College, he began researching the scientific information on the use of food, nutrition, and natural healing. Dr. Lobay enjoys research, writing, and teaching others about good health and good nutrition. He is the author of four books and numerous articles in magazines. He also enjoys hockey, skiing, hiking, tennis, and playing guitar.

References

1. Chen J, Lariviere WR. The nociceptive and anti-nociceptive effects of bee venom injections and therapy: A double-edged sword. *Prog Neurobiol*. 2010 Oct; 92(2) 151-183.
2. Zhang S et al. Bee Venom Therapy: Potential Mechanisms and Therapeutic Applications. *Toxicon*. 2018 Jun 148: 64-73.
3. Hossen MS et al. Impact of Bee Venom Enzymes on Diseases and Immune Responses. *Molecules*. 2016 Dec 22(1):25-34.
4. Soo Lee M et al. Bee Venom Acupuncture for Musculoskeletal Pain: A Review. *J Pain*. Apr 2008; 9(4), 289-97.
5. Lee JA et al. Bee Venom Acupuncture for Rheumatoid Arthritis: A Systematic Review of Randomised Clinical Trials. *BMJ Open*. 2014 Nov; 4 (11): e006140.
6. Chen SY et al. Treatment of Rheumatoid Arthritis by Bee-Venom Acupuncture. *Zhen Ci Yan Jiu*. 2018 Apr; 43(4):251-254.
7. Cherniak PE, Govorushko S. To Bee or Not to Bee: The Potential Efficacy and Safety of Bee Venom Acupuncture in Human. *Toxicon*. 2018 Nov; 154:74-78.
8. Park JH et al. Risk Associated With Bee Venom Therapy: A Systematic Review and Meta-Analysis. *PLoS One*. 2015 May 10(5): e0126971.

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Rationale for Vitamin C Treatment of COVID-19 and Other Viruses

by the Orthomolecular Medicine News Service Editorial Review Board

Epidemics seem to be on the rise: in a total of 98 epidemics in the 200 years of 19th and 20th centuries, there were 14 epidemics with 1000 or more deaths. However, in the last 20 years, in a total of 63 epidemics, there have already been 11 epidemics with more than 1,000 deaths. With the recent COVID-19 pandemic, the trend is concerning as our modern world becomes more connected by high-speed travel.[1-5]

Vaccines

Research and development of vaccines and virus-specific drugs takes at least a few years to develop and deploy for worldwide use – if indeed possible. There has never been a vaccine available to stop an ongoing major pandemic in the history of mankind. We didn't have a vaccine for SARS or MERS. We can't expect a vaccine for most of the worldwide people anytime soon for COVID-19. Likely this trend will continue for the foreseeable future. This is due to the nature of the process: vaccines are always in reaction to a new outbreak, and R&D of vaccines takes a long time. Even if a vaccine for COVID-19 does become available, it will be too late; and the world will likely be affected by major chaos with lives lost and economies damaged. It's clear that although a vaccine strategy is desirable, with the current R&D process, it's not practical.[4,5]

Integrative Medicine Is Effective and Practical

The world's political, scientific, medical, and industrial leaders need to consider this very carefully. We must face the reality of the current crisis and look elsewhere for more proactive, effective, and practical ways for preventing and stopping major pandemics like COVID-19. The integrative medical approach that employs safe supplements of vitamin C, vitamin D, and zinc and other nutrients is highly relevant. This approach is a proactive, effective, and eminently practical way to deal with the present pandemic. Treatment with high-dose vitamin C has been widely utilized by hospital ERs and ICUs to prevent death from SARS-associated pneumonia.[6-21] This treatment needs due attention paid, and most definitely warrants further studies. If there is one good thing out of this world-wide tragedy of COVID-19, maybe it has prepared us for future pandemics.

Role of Vitamin C in the Body

Vitamin C is the main systemic extracellular antioxidant, and when given at high doses, either orally (3-10 gm/d) or IV (10-50 gm/d, etc.), can function as an antioxidant to prevent toxicity from ROS and viruses. When oxidized through donating an electron to reduce an ROS, it can be regenerated through a variety of mechanisms, including reducing enzymes and other antioxidants.

Vitamin C can support intracellular antioxidants such as GSH (glutathione) and catalase when the load of ROS is severe. Vitamin C can regenerate GSH when depleted by severe stress. The role of catalase is mainly to reduce hydrogen peroxide, and it can function along with SOD and vitamin C to protect cells. However catalase and SOD are large molecules and do not serve the same role as vitamin C (ascorbate), which is a small molecule and can donate electrons to any reactive oxygen species (ROS) that it contacts, including oxidized vitamin E and many other molecules that may get damaged by ROS – in either the intracellular or extracellular space.[22]

Vitamin C also empowers the immune system, promoting chemotaxis, growth, and activity of some immune cells (macrophages, lymphocytes, natural killer cells) allowing the body to more effectively fight an infection.[22]

Vitamin C has many other roles in which it functions as a specific co-factor for biochemical reactions, for example, in the synthesis of aggrecan and collagen in which it is necessary for the crosslinking of long fibers into a 3D matrix, in the absorption of iron and in the metabolism of many essential biochemicals, including carnitine and neurotransmitters (e.g. norepinephrine, serotonin). Thus, it is essential for recovery from damage caused by viral or bacterial infections, as well as for the normal functioning of the brain and many essential biochemical pathways.[22]

In addition, when the body is under severe stress, for example, recovering from toxin exposure, surgery, or SARS, the level of vitamin C can be depleted so that it cannot perform its direct or indirect antioxidant functions or its many other specific co-factor roles in biochemical metabolism. This can in turn deplete the other antioxidants, e.g. GSH and vitamin E, which can cause severe oxidative damage inside cells that normally they would prevent.

In high-dose intravenous vitamin C (IVC) therapy, vitamin C is thought to be a pro-oxidant in selective cell types, which allows it to kill specific cell types. This role may function in some types of cancer and also immune hyperinflammation.[23-30] ➤

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Overall, vitamin C has a variety of effects (i.e. "pleotropic") that are not duplicated by intracellular antioxidants. It supports intracellular antioxidants and is necessary as a specific co-factor in many critical biochemical reactions in many organs of the body.

Dosage of Vitamin C: Effects

IVC can supply much higher blood plasma levels than oral doses. However, the vitamin C levels from IVC peak and fall rapidly. Although IVC can be given continuously, this is performed less often than IVC doses given at intervals. Oral doses taken regularly (i.e. in divided doses throughout the day) can maintain an even (but lower) level.[25-30]

The lower level of vitamin C produced by oral dosing is commonly thought to provide an anti-oxidant function. However, higher doses provided by IVC are considered to cause a pro-oxidant state within cells such as cancer cells that lack antioxidant enzymes, where the high vitamin C level generates H2O2 (hydrogen peroxide) and other free radicals and causes cell death. Since vitamin C has a similar structure to glucose (sugar), cancer cells, which have a high metabolic rate and transport large amounts of sugar into the cell, will also transport large amounts of vitamin C. This is thought to be one of the mechanisms through which high-dose vitamin C is effective against cancer.[23-30]

In other types of cells that have a lower metabolic rate but also have antioxidant enzymes, the same high dose of vitamin C is thought not to cause a pro-oxidant state, but to maintain an anti-oxidant state. Thus, the same bloodstream level of vitamin C is thought to function differently in different cell types.

Absorption of oral doses of vitamin C is modulated by the blood level. When the blood level is high, absorption from the gut is low but can increase during illness when the blood level drops because of oxidative stress. In addition, the blood level from low oral doses of vitamin C (100-200 mg) is regulated by level-dependent active transport in the kidneys that maintains a threshold plasma level (50-100 µM or µmol/L), and the remainder is excreted in the urine. For higher oral doses (500 - 5,000 mg or more), absorption can be much lower (50% down to 10% or less), depending on the blood level and oxidative stress. The blood level from an oral dose may take up to several hours to reach its peak. Therefore, higher oral doses taken at intervals throughout the day (e.g. 3,000-10,000 mg/day in divided doses) can produce higher plasma levels (200-400 µmol/L). But IVC (1-200 g) can produce plasma concentrations of up to 20 mmol/L (up to 100-fold greater than possible by oral dosing) within one-to-two hours of administration. However, after a single IVC transfusion, the higher peak level falls by half every half-hour. Therefore, to maintain a relatively constant high level from IVC requires transfusions at short intervals or continuous IVC. For a comparison, blood glucose typically varies from 4 mmol/L to 6 mmol/L for individuals without diabetes.[25-27]

Therefore, the levels achieved from a single high dose of IVC can apparently go through anti-oxidant and pro-oxidant phases after administration. With this knowledge, treatments for cancer can adjust the doses and timing of IVC administration to maintain the pro-oxidant effect for cancer cells. Even a transient rise in the vitamin C level from an IVC transfusion can have a prolonged physiological effect, such as direct viral inactivation and up-regulation of immune cascades.

Prevention of Viral Infections

To prevent infection by viruses and bacteria, vitamin C (capsules of ascorbic acid, or crystals of ascorbic acid or sodium ascorbate) dissolved in water or juice has been taken at low and high oral doses (200 mg/d to 10,000 mg/d). The upper limit for an oral dose is defined by the "bowel tolerance" above which the dose is not absorbed in the gut and causes a laxative effect. This dose is set by the body's need to absorb vitamin C from the gut into the bloodstream. Since the level of vitamin C in the body varies according to the level of oxidative stress, the amount of vitamin C absorbed by the gut also varies.[27-30]

Typically, many individuals can tolerate 1000-3000 mg/day in divided oral doses, which can then maintain a relatively constant level of vitamin C in the bloodstream. Some organs (e.g. liver, brain, eyes, etc) actively transport vitamin C to maintain a higher level than provided by the blood. This state of a relatively high maintained level of vitamin C throughout the body is thought to lower the risk of viral infection by assisting the immune system in detecting and destroying foreign microbes such as viruses that attack the nasopharynx and lungs. In addition, oral doses of vitamin C can directly denature viruses.[29]

Liposomal C

Liposomal vitamin C is absorbed by a different mechanism in the gut. The liposomes containing vitamin C can bind directly to the gut cells to release their content of vitamin C, which therefore does not require active transport. Thus the maximum level achievable with oral doses of liposomal vitamin C is higher than for regular vitamin C. However, since the absorption mechanism for liposomal vitamin C differs from the active transport of regular vitamin C, both forms can be taken together to increase the level in the bloodstream (up to 400-600 µM), greater than either oral form alone.[29]

High-Dose IVC: Treatment of Severe Stress

With severe shock, trauma, or sepsis, ascorbate blood levels typically drop to near zero. To restore the ascorbate level, several grams of vitamin C must be administered.[30] To treat pneumonia and hyper-inflammation caused by COVID-19, vitamin C has been given at high doses, both oral and IVC. Some IVC protocols have specified doses of 1000-3000 mg as necessary at intervals throughout the day. Other IVC protocols have specified doses as high as 10-20 grams daily for several days or weeks, and even as high as 50-100 grams daily, when necessary for several days.[6-21]

In severe lung infections, a "cytokine storm" generates reactive oxygen species (ROS) that can be effectively treated with doses of 30-60 g of vitamin C. At the same time the relatively high level of vitamin C can promote an enhanced chemotaxis of white blood cells (neutrophils, macrophages, lymphocytes, B cells, NK cells).[14-20]

High-Dose Oral C

When the body is stricken with severe stress, oral vitamin C supplements of 20,000 mg/day or even 50,000-100,000 mg/day, in divided doses, can be surprisingly well tolerated because

it becomes depleted by helping to alleviate a critical inflammation, e.g. SARS pneumonia. In this case, the level of vitamin C in the bloodstream will not rise much above 200-300 µmol/L, even though under normal circumstances a much lower oral dose would produce the same blood level. The reason is that the vitamin C is oxidized in the process of attacking the inflammatory agent, e.g. viral infection, so that more vitamin C can be absorbed from the gut than normally possible. In this range of high oral doses, vitamin C is considered to function as an antioxidant.[27-30]

Iron: Pro-Oxidant

Iron can act in conjunction with vitamin C to cause a powerful oxidation reaction (the "Fenton reaction") that generates free radicals. For individuals who are iron-overloaded, vitamin C can cause this problem and can generate hydrogen peroxide throughout the body. Normally this type of reaction is limited by the "catalase" enzyme that degrades hydrogen peroxide. However, some viruses contain an iron atom that in the presence of vitamin C may denature the virus. As mentioned above, vitamin C can cause a similar reaction when it is taken up at high levels into cancer cells. Therefore, it is thought that vitamin C can act as an anti-oxidant for some organs and cell types, and as a pro-oxidant for other cell types and e.g. viruses. Yet vitamin C is also thought to be capable of "neutralizing" viruses since their binding sites contain free radicals.[29,31]

Pro-Oxidant vs. Anti-Oxidant

This dual function of anti- vs. pro-oxidant is thought to be dose- and level-dependent. What dose should be the best, given that a low IV dose is thought to provide anti-oxidation, but a high dose is thought to provide pro-oxidation? Which action is working best against a virus? This question is at the cutting edge of current research. The specific cancer-killing dose is thought to be in the high pro-oxidant range. But it is not known what range of oral or IVC doses is the best for treatment of viruses. Apparently, a single relatively low dose IVC treatment can raise bloodstream levels only transiently and generate blood levels that range from the anti-oxidant to the pro-oxidant, and then back to anti-oxidant – which may target different target cell types. Continuous or short-interval IVC dosing may allow taking advantage of all the direct and indirect antiviral mechanisms of ascorbate. For example, doses of 10 g every six hours might fit this purpose.

Vitamin D, Zinc

Many studies have shown the efficacy of vitamin D (2000-5000 IU/d) for preventing viral infections. Vitamin D has been shown to assist the body in preventing viral infections. The level of vitamin D in patients with flu is lower than healthy individuals. For those who do not take supplements of vitamin D, the level of vitamin D is the lowest in the body in the winter and early spring – which is flu season. In a study of hospitalized older patients, those with pneumonia more often had a severe vitamin D deficiency.[32-43] Further, zinc supplements (20-50 mg/d) are known to assist the immune system in fighting viral infections, especially by inhibiting viral replication.[22,44]

Optimal Doses for Prevention and Treatment of COVID-19

The theme of dose-dependent action of vitamin C may be important for prevention and treatment of relatively innocuous viral infections and also for treatment of severe critical SARS pneumonia from COVID-19 and other flu-like infections. In the treatment of COVID-19, we likely need both the anti-viral and antioxidant effects of vitamin C. We know high-dose vitamin C may have pro-oxidant activity, but if the dosage is too high (And what defines too high?), would this add a pro-oxidant effect to an already elevated oxidative stress? With protocols specifying 30-50 grams of IVC, how can this dose be scientifically justified?

Further, the existing data from many decades of studies show that oral vitamin C can prevent viral infection. It would be helpful for an NIH panel to further study the prevention of COVID-19 with oral vitamin C by pushing the oral dose higher. COVID-19 infection seems to linger around for a longer time than the common cold. Several COVID-19 patients who have improved on high-dose vitamin C have not healed quickly, implying that the high doses should be continued beyond their hospital stay.

Many studies of the effect of vitamin C on infections and cancer have been hampered by an ineffective dose, duration, or dose frequency. For the maximum effect, relatively high oral vitamin C doses (10,000-50,000 mg/d in divided doses) must be continued for several (or many) days, and the dose frequency must be adequate to supply a relatively continuously high level in the bloodstream. Further, early treatment of a viral infection is important. Oral vitamin C (1000 mg at 1-2 hour intervals) should be started immediately upon noting symptoms of an infection. For severely ill patients with pneumonia, early initiation of an IV vitamin C protocol can be critical.[14-19] Studies that have not observed these precautions have often not found much benefit.

Oral vitamin C (1000 mg at 1-2 hour intervals) should be started immediately upon noting symptoms of an infection.

Conclusion

Supplemental vitamin C, both oral and IV is an excellent and relatively simple and inexpensive treatment for both uninfected individuals at home, and critically-ill individuals in the hospital. It has been proven to be effective in treating many different viral infections, including SARS pneumonia. With early and high dosing at regular intervals, vitamin C can effectively fight against sepsis, hyper-inflammation, and high virus titer to allow ICU patients to recover quickly. Combined with an overall integrative approach to health management, vitamin C, vitamin D, zinc, and other essential vitamins and minerals can effectively prevent and treat COVID-19. However, the mechanisms and relative benefits of different doses, both oral/liposomal and IV need further study.

Side Effects and Precautions

Intravenous Ascorbic Acid. Most IVC is given as an isotonic solution of sodium ascorbate. However, ascorbic acid can also be given IV with careful precaution

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– it may sting a bit – and can be given with magnesium sulfate or magnesium chloride; the most used form is sodium ascorbate. Compatible diluents: 0.9% Sodium Chloride (Normal Saline or NS), 0.45% Sodium Chloride (half-Normal Saline), Lactated Ringer's (LR), Dextrose/ Saline combinations or Dextrose/LR solutions. However, dextrose solutions should be discouraged because they will compete for transport of vitamin C into cells, since both of these molecules are imported by the same membrane transporter. For IV infusion: Add to a large volume of diluent and infuse slowly. A faster rate of infusion and less diluent have also been used.[14-19]

IV Osmolarity. From experience, we know that the osmolarity of an IV transfusion is more important than the pH (until it goes paravenous of course). Advice written to our Italian colleague two weeks ago: Do give IVC in addition to oral vitamin C. (It is a paradoxical thing that patients generally tolerate more oral C on the day they receive IVC). We calculate the osmolarity for such infusions. It's important for people under oxidative stress. If the osmolarity of the IV is outside the normal serum range, it can cause a collapsed or thrombosed vein. The total milli-Osmoles in an infusion is the sum of all the mOsmoles of the components. Total Osmolarity mOsm/ml is Total mOsm/ Total volume. This should be within the range 0.28 to the value for the vein size. A 20 gram infusion is nearly at the borderline to add both calcium gluconate and bicarbonate.

Side effects of IVC treatment include the following:

- High dose intravenous AA may lower blood glucose, potassium, calcium.
- A fluid overload from a series of IVs can cause congestive heart failure.
- Glucometer readings of glucose level can be falsely raised by vitamin C since it is similar in shape to vitamin C.[25]
- It is important to monitor blood glucose (not by glucometer), and Na, K, Ca levels if the patient is symptomatic after high dose ascorbate (acid or buffered).
- There is no need to check the serum ascorbate for safety; there is no maximum above which it is unsafe. The rationale for checking serum ascorbate is to make sure of an effective level – which depends on the severity of the clinical picture.
- The side effects of high-dose IVC appear minimal. In one study, of about 9000 patients surveyed, only about 1% reported minor side effects that included lethargy, fatigue, change in mental status and vein irritation. More recent safety trials of high dose IVC show only minor side effects and no adverse events beyond what could be expected from the underlying disease or chemotherapy.[25]

Oxalate from Vitamin C

Although the body metabolizes vitamin C to produce small quantities of oxalate, for individuals with normal kidney function IV vitamin C does not contribute to calcium oxalate kidney stones.[25,45] More important sources of oxalate for most individuals are the amount of cruciferous vegetables, tea, and other sources in the diet. These oxalates bind with the excess calcium that is in our dairy, fortified foods, and supplements. To prevent oxalate stones, in general, and when taking oral vitamin C, it is important to drink adequate amounts of fluid and avoid excessive calcium levels in the diet. In addition, magnesium supplements (300-500 mg/ day, in malate, citrate, or chloride form) can prevent calcium from precipitating with oxalate to form stones.[46,47]

G6P6 Deficiency and Hemochromatosis

For some individuals with a mutation in the glucose-6 phosphate dehydrogenase gene, high levels of vitamin C in their bloodstream can cause anemia and lysis of their red blood cells. This genetic issue is found most commonly in individuals with African or Middle Eastern descent. If you have this rare disorder, you may want to limit your dosage of vitamin C. Moderate doses are thought to be acceptable. Before taking vitamin C supplements or IVC therapy, you may want to discuss this issue with your doctor.[25,48]

Vitamin C Treatment for HIV

The research of Linus Pauling, in the years before he died, was on HIV. With private funds and a grant from the Shipbuilding Industry Foundation in Japan, he started an in vitro experiment into the effect of vitamin C in HIV. In 1990 he published the results: the replication (multiplication) of HIV was reduced by more than 99% by vitamin C.[49]

One of the co-authors, Raxit Jariwalla, said they compared the effect of vitamin C with that of the HIV inhibitor AZT. In this in vitro test, the cell cultures were pretreated with ascorbic acid (vitamin C) or with AZT. It was found that the artificially induced enzyme activity, which is a measure of HIV replication, was greatly reduced by vitamin C (the higher the concentration, the stronger the effect). The HIV drug AZT did not show a significant result.[50]

References

1. The 10 deadliest epidemics throughout history. Health24.
2. The Most Dangerous Epidemics in U.S. History. Healthline.
3. List of Epidemics. Wikipedia.
4. Fauci AS, Lane HC, Redfield RR. Covid-19: Navigating the Uncharted. *NEJM.* March 26, 2020.
5. Fauci (2020) Dr. Fauci: You don't make the timeline, the virus does. (Endorses use of vit C, D) https://www.youtube.com/watch?v=xkyO1DTqoWQ&feature=youtu.be.

Vitamin C and COVID-19

6. Gage J New York hospitals giving patients 16 times the daily recommended dose of vitamin C to fight coronavirus. *Washington Examiner*, March 24, 2020
7. Frieden T Former CDC Chief Dr. Tom Frieden: Coronavirus infection risk may be reduced by Vitamin D. https://www.foxnews.com/opinion/former-cdc-chief-tom-frieden-coronavirus-risk-may-be-reduced-with-vitamin-d.
8. Cheng R. (2020) Can early and large dose vitamin C be used in the treatment and prevention of COVID-19? Medicine Drug Discov. In Press, Journal Pre-proof.
9. Mongelli L, Golding B. New York hospitals treating coronavirus patients with vitamin C. *NY Post*. March 24, 2020
10. Cheng R (2020) NY Hospitals' use of Vit C is applaudable, but the dosage is too small. https://www.youtube.com/watch?v=NBbbncTR-3k.
11. Cheng R. Shanghai Expert Consensus on COVID-19 Treatment, March 21, 2020. Shanghai Expert Group on Clinical Treatment of New Coronavirus Disease. *Chinese Journal of Infectious Diseases*. 2020, 38: Pre-published online..
12. Cheng R. Hospital treatment of serious and critical COVID-19 infection with high-dose Vitamin C. Posted on March 18, 2020 by Dr. Cheng. http://www.drwlc.com/blog/2020/03/18/hospital-treatment-of-serious-and-critical-covid-19-infection-with-high-dose-vitamin-c.
13. Lichtenstein K. Can Vitamin C Prevent and Treat Coronavirus? MedicineNet on 03/09/2020.
14. Hemilä H, Chalker E. Vitamin C may reduce the duration of mechanical ventilation in critically ill patients: a meta-regression analysis. *J Intensive Care*. 8:15.
15. Kashiouris MG, et al. The Emerging Role of Vitamin C as a Treatment for Sepsis. *Nutrients*. 12(2). pii: E292.
16. ZhiYong Peng, Zhongnan Hospital (2020) Vitamin C Infusion for the Treatment of Severe 2019-nCoV Infected Pneumonia. https://clinicaltrials.gov/ct2/show/NCT04264533.
17. Li J. Evidence is stronger than you think: a meta-analysis of vitamin C use in patients with sepsis. *Crit Care*. 22:258.
18. Hemilä H, Louhiala P. Vitamin C may affect lung infections. *J Roy Soc Med*. 100:495-498.
19. Cheng R. Successful High-Dose Vitamin C Treatment of Patients with Serious and Critical COVID-19 Infection. Orthomolecular Medicine News Service. 2020.
20. Erol A. High-dose Intravenous Vitamin C Treatment for COVID-19. Orthomolecular Medicine News Service. 2020.
21. Player G, et al. Published Research and Articles on Vitamin C as a Consideration for Pneumonia, Lung Infections, and the Novel Coronavirus (SARS-CoV-2/COVID-19) Orthomolecular Medicine News Service. 2020.

Vitamin C, on dosage

22. Gropper SS, Smith JL (2013) *Advanced Nutrition and Human Metabolism*, 6th Ed. Wadsworth, Cengage Learning. ISBN-13 9781133104056.
23. Cameron E, Pauling L. Supplemental ascorbate in the supportive treatment of cancer: Prolongation of survival times in terminal human cancer. *Proc Natl Acad Sci USA*. 1976;73(10):3685-3689.

24. Cameron E, Pauling L. Supplemental ascorbate in the supportive treatment of cancer: reevaluation of prolongation of survival times in terminal human cancer. Proc Natl Acad Sci USA. 1978;75:4538-4542.
25. Carr AC, Cook J. Intravenous Vitamin C for Cancer Therapy – Identifying the Current Gaps in Our Knowledge. *Front. Physiol*. 2018;9:1182.
26. Ried K, Travica N, Sali A. (2016) The acute effect of high-dose intravenous vitamin C and other nutrients on blood pressure: a cohort study. *Blood Press Monit*. 2016;21:160-167.
27. Hickey S, Roberts HJ, Cathcart RF. Dynamic Flow: A New Model for Ascorbate. *J Orthomol Med*. 2005;20:237-244.
28. Cathcart RF. (1981) The Method of Determining Proper Doses ofVitamin C for the Treatment of Disease byTitrating to Bowel Tolerance. *J Orthomol Psychiat*, 10:125-132.
29. Levy TE (2011) *Primal Panacea*. Medfox Pub. ISBN-13: 978-0983772804.
30. Berger MM. Vitamin C Requirements in Parenteral Nutrition. Gastroenterology 2009;137:S70-78.
31. Jalalzadeh M, et al. Effect of short-term intravenous ascorbic acid on reducing ferritin in hemodialysis patients. *Indian J Nephrol*. 2012;22:168-173.

Vitamin D

32. Grant WB, Giovannucci E. The possible roles of solar ultraviolet-B radiation and vitamin D in reducing case-fatality rates from the 1918-1919 influenza pandemic in the United States. *Dermatoendocrinol*. 2009;1:215-219.
33. Dancer RC, et al. Vitamin D deficiency contributes directly to the acute respiratory distress syndrome (ARDS). *Thorax*. 2015;70:617-624.
34. McGreevey S, Morrison M. Study confirms vitamin D protects against colds and flu. Harvard Gazette, February 15, 2017.
35. Mamani M, et al. Association between serum concentration of 25-hydroxyvitamin D and community-acquired| pneumonia: a case-control study. *Int J Gen Med*. 2017;10:423-429.
36. Lu D, et al. Link between community-acquired pneumonia and vitamin D levels in older patients. *Z Gerontol Geriatr*. 2018;51:435-439.
37. Slow S, et al. Effect of adjunctive single high-dose vitamin D3 on outcome of community-acquired pneumonia in hospitalised adults: The VIDCAPS randomised controlled trial. *Sci Rep*. 2018 Sep 14;8:13829.
38. Brance ML, et al. Serum 25-hydroxyvitamin D levels in hospitalized adults with community-acquired| pneumonia. *Clin Respir J*. 2018;12:2220-2227.
39. Zhou YF, Luo BA, Qin LL. The association between vitamin D deficiency and community-acquired pneumonia: A meta-analysis of observational studies. *Medicine* (Baltimore). 2019;98(38):e17252.
40. Shirvani A, et al. (2019) Disassociation of Vitamin D's Calcemic Activity and Non-calcemic Genomic Activity and Individual Responsiveness: A Randomized Controlled Double-Blind Clinical Trial. *Sci Rep*.2019; 9(1):17685.
41. Gombart AF, Pierre A, Maggini S. A Review of Micronutrients and the Immune System-Working in Harmony to Reduce the Risk of Infection. *Nutrients*. 2020;12(1). pii: E236.
42. Grant WB, Anouti FA, Moukayed M. Targeted 25-hydroxyvitamin D concentration measurements and vitamin D3 supplementation can have important patient and public health benefits. *Eur J Clin Nutrit*. 2020;74:366-376.
43. Grant WB, et al. Evidence That Vitamin D Supplementation Could Reduce Risk of Influenza and COVID-19 Infections and Deaths. Preprints 2020, 2020030235 https://www.preprints.org/manuscript/202003.0235/v2.

Other topics

44. Case HS (2017) Orthomolecular Nutrition for Everyone: Megavitamins and Your Best Health Ever. ISBN-13: 978-1681626574.
45. Prier M, Carr AC, Baillie N. No Reported Renal Stones with Intravenous Vitamin C Administration: A Prospective Case Series Study. *Antioxidants* (Basel). 2018;7(5). pii: E68.
46. Dean C. *The Magnesium Miracle*. 2nd Ed., Ballantine Books, 2017, ISBN-13: 978-0399594441.
47. Levy TE (2019) *Magnesium: Reversing Disease*. Medfox Pub. ISBN-13: 978-0998312408
48. Saul AW. Glucose-6-phosphate dehydrogenase deficiency http://doctoryourself.com/G6PD.html. https://ghr.nlm.nih.gov/condition/glucose-6-phosphate-dehydrogenase-deficiency.
49. Harakeh S, Jariwalla RJ, Pauling L. Suppression of human immunodeficiency virus replication by ascorbate in chronically and acutely infected cells. *Proc Natl Acad Sci USA*. 1990;87:7245-7249.
50. Harakeh S, Jariwalla RJ. Ascorbate effect on cytokine stimulation of HIV production. *Nutrition*. 1995;11:684-687.

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Considerations for the Use of Glutathione or Its Precursor in COVID-19 Patients

by Zina Kroner, DO

I would like to propose a simple, safe, inexpensive, readily available, adjunctive treatment for both hospitalized and non-hospitalized COVID-19 patients: the utilization of glutathione or its precursor, N-acetylcysteine (NAC), already in all hospital formularies. Many physicians and institutions are already on the forefront of medicine and have been lauded for their incorporation of trials utilizing potentially life-saving medications as well as integrative treatments, including intravenous vitamin C, zinc, melatonin, thiamine, etc. Its safety profile combined with the research studies to support its use can make this a key component of our COVID-19 toolkit.

High Glutathione Reductase Levels in COVID-19 Patients

An elevated glutathione reductase level in the blood is a clue that the body's antioxidant defense system is taxed. Glutathione reductase (GR) is an enzyme that recycles oxidized glutathione back to the reduced form. An infection such as COVID-19 depletes glutathione and obviates its need from an exogenous source. GR tends to be elevated in COVID-19 patients, as demonstrated by a study from Shanghai, pre-printed in March 2020, where clinical as well as hematologic markers were followed in 198 hospitalized COVID-19 patients in a single center. This is novel research as this is not a typically ordered test in the US but being privy to these results can help us to implement a safe and effective adjuvant and novel therapy for COVID-19.[1]

COVID-19 and Reactive Oxygen Species

Cytokine storm, hypoxemia, inflammation, and mechanical ventilation have been shown to increase the generation of a pro-oxidant state.[2,3] GR is necessary for the immune system to work effectively. The higher the level, the greater the body's attempt at a compensatory reaction to oxidative stress. COVID-19 is indeed triggering an increase in reactive oxygen species (ROS). The increase in glutathione reductase that we see in the Shanghai study is considered, by the authors, an adaptation of the body's antioxidant defense against an increased production of ROS.[1] Glutathione or NAC can potentially replete this deficiency.

Glutathione Levels in Those with Metabolic Syndrome Is Essential

It is know that diabetics and those with metabolic syndrome, a category of patients at greater risk of getting complications from COVID-19, are known to have a lower baseline glutathione level and thereby utilize their antioxidant defense system (glutathione) at a greater rate due to their enhanced production of ROS. As their antioxidant defense system gets hyper-utilized and is ultimately ineffective, they wind up having a low glutathione content in erythrocytes. Therefore, diabetics have a baseline strain on their antioxidant defense system.[4] This low baseline glutathione state, combined with the pro-oxidant stresses of COVID-19, puts them at a greater disadvantage of being able to deal with the virus.

Glutathione Depleted by Acetaminophen Use

Ibuprofen is touted to have a controversial effect on COVID-19 patients, and hospitals are more likely to prescribe acetaminophen, which is known to deplete glutathione levels; a further dampening of the patients' glutathione levels can occur with acetaminophen use. NAC will help the liver regenerate glutathione and neutralize the toxic breakdown products formed by even small doses of acetaminophen.

Pulmonary Fibrosis Helped by Glutathione Precursor

COVID-19 patients suffer from significant pulmonary fibrosis, a diagnosis with a poor prognosis; NAC, a glutathione precursor, has been used as a treatment for pulmonary fibrosis with some success over the years. A July 2019 study, which was a systematic review and meta-analysis, where the efficacy and the safety of NAC was evaluated for the use of idiopathic pulmonary fibrosis (IPF) demonstrated that NAC improved the FVC and DLCO, which demonstrated a decrease in the decline in lung function, and also slowed the progression of fibrosis, evidenced by the improvement in PaO2.[5]

Glutathione and the Immune System

Glutathione has been shown to have a direct effect on the immune system. It has been shown to substantially increase natural killer cells and proliferate lymphocytes.[6,7] This is crucial as lymphocytes have been shown to be

low in COVID-19 patients.[1] Glutathione reductase and lymphocyte levels are inversely proportional in the Shanglai study. We can reverse this somewhat by glutathione repletion.

Should Physicians be Recommending Glutathione or its Precursors to COVID-19 Patients?

The body needs help obtaining this nutrient from an exogenous source during a time like this. These patients already have a propensity for a low glutathione status, as all but 6 percent have either a pre-existing metabolic syndrome or other conditions that lower one's antioxidant status and therefore increases inflammatory markers. The infection itself propagates ROS, and as evidenced by the Shanghai study, the body works hard to compensate for this by increasing the glutathione reductase levels. Glutathione is lower in those who are hypoxic, on a ventilator, getting acetaminophen, and in a cytokine storm.

Glutathione can be administered in its most effective way, which is intravenously. Few patients will have access to such a treatment. The second-best way is the nebulized form, which although is ill-advised in an inpatient setting due to aerosolization, it can be done in an outpatient setting. There is a minute potential for bronchospasm in some asthma patients, so care must be taken. However, a safe, cheap, and easy alternative is a precursor to glutathione, NAC. It can be used in a capsule form, thereby foregoing the sulfur-like taste of the liquid acetylcysteine. It is a mucolytic,[8] has shown benefit in pulmonary fibrosis, helps to reverse toxic effects of acetaminophen, has promise in decreasing ROS, and can increase lymphocyte proliferation and NK cells. I urge physicians to consider embracing this addition to the cocktail of medications and supplements that COVID-19 patients currently receive. The use of NAC or nebulized glutathione for COVID-19 patients alone will not be an ultimate game changer in terms of one's clinical status, but there certainly is enough evidence demonstrating that its use will give these patients more of a fighting chance by enhancing their antioxidant defense system.

References

1. Min Cao, Dandan Zhang. Clinical Features of Patients Infected with the 2019 Novel Coronavirus (COVID-19) in Shanghai, China. medRxiv 2020.03.04.20030395.
2. Tamura DY, et al. Acute hypoxemia in humans enhances the neutrophil inflammatory response. *Shock* (Augusta, Ga.), 17 (2002), pp. 269-273.
3. Sarma JV, Ward PA. Oxidants and redox signaling in acute lung injury. *Compr Physiol*. 2011;1:1365-1381.
4. Gawlik K, et al. Metabolic Disorders: Pathogenesis, Prevention, and Therapeutics. Markers of Antioxidant Defense in Patients with Type 2 Diabetes. *Oxid Med Cell Longev.* 2016; Article ID 2352361.
5. Feng F. Efficacy and safety of N-acetylcysteine therapy for idiopathic pulmonary fibrosis: An updated systematic review and meta-analysis. *Exp Ther Med*. 2019 Jul;18(1):802-816.
6. Dröge W, Breitkreutz R. Glutathione and immune function. *Eur J Clin Nutr*. 2018 Jan;72(1):105-111.
7. Sinha R, et al. Oral supplementation with liposomal glutathione elevates body stores of glutathione and markers of immune function. (Abstract) *Eur J Clin Nutr*. 2018 Jan;72(1):105-111.
8. Aldini G, et al. N-Acetylcysteine as an antioxidant and disulphide breaking agent: the reasons why. *Free Radic Res*. 2018 Jul;52(7):751-762.

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Pectin – An Alternative to Synthetic Chelators?

by Eleonore Blaurock-Busch, PhD

Pectins are considered an essential primary cell wall component of all higher flowering plants. The average contents of pectin in a plant's cell walls can be 30%. Pectin-rich sources are sugar-beet pulp, apple pomace, and citrus peels. Pectins are commonly used in food industry as gel-forming, thickening and stabilizing agents and emulsifiers. Pectins are also obtained from marine plants such as seagrasses and are an important nutrient in the human diet as they are a major component of dietary fiber. Pectins have been reported to bind heavy metals, to lower serum cholesterol levels, and to have immune-stimulating and anti-ulcer activities [Marounek 2007; Vos 2007].

The ability of pectins to bind metal cations in water has been studied. It has been demonstrated that pectin's adsorbant ability is useful for the removal of toxic metals from aqueous waste streams (Kusrini 2018). Human studies indicate that pectin increased the urinary excretion of toxic elements. (Eliaz 2006)

Apparently, this effect is caused by the presence of non-methyl esterified-galacturonosyl residues and the reduction of the degree of esterification, which causes a dramatic increase of the metal-binding capacity of pectins. In a study, published in 2012, Russian researchers focused on the cerium binding activity of water-soluble pectin compounds and demonstrated that not all pectins have equal metal binding. "The obvious mechanism of sorption is related to the formation of covalent and hydrogen bonds between the metal ions and non-esterified carboxyl groups and hydrogen atoms located on the pectin molecules and acting as the binding sites." (Khotimchenko 2012)

Khotimchenko and colleagues stated that the source of the pectins and their chemical structure influence metal binding: "The main parameter affecting metal uptake of pectins is the amount of carboxyl group which are not occupied by methyl radical i.e., degree of esterification. The lower the degree of esterification, the larger is the amount of metal that can be bound by pectin molecules." The authors conclude that "commercially high esterified pectins barely bind metals."

Removing Metals with Pectin

Pectins as well as other dietary fibers with high degree polymerization are neither digested nor absorbed in the small intestine [Lattimer 2010]. Therefore, they exert their binding properties in intestinal lumen. As the major part of cerium ions are concentrated in enterocytes of the proximal intestine [Floren 2001], the pectin molecules can easily interact with the metal.

There are studies confirming the possibility for application of the pectins for removal of heavy metals from the human body [Zhao 2008].

In a 2006 study, Eliaz et al evaluated the effect of modified citrus pectin (MCP) on the urinary excretion of toxic elements in healthy individuals and the results are worthy of attention. The abstract reads as follows:

> This study was undertaken to evaluate the effect of modified citrus pectin (MCP) on the urinary excretion of toxic elements in healthy individuals. MCP is a reduced molecular weight pectin (weight-average molar mass=15400) that is mostly linear homogalacturonan with a 3.8% degree of esterification and approximately 10% rhamnogalacturonan II based on the presence of 2-keto-3-deoxy-octonic acid. Subjects ingested 15 g of MCP (PectaSol®) each day for 5 days and 20 g on day 6. Twenty-four hour urine samples were collected on day 1 and day 6 for comparison with baseline. The urine samples were analysed for toxic and essential elements. In the first 24 h of MCP administration the urinary excretion of arsenic increased significantly (130%, $p < 0.05$). On day 6, urinary excretion was increased significantly for cadmium (150%, $p < 0.05$). In addition, lead showed a dramatic increase in excretion (560%, $p < 0.08$). This pilot trial provides the first evidence that oral administration of MCP increases significantly the urinary excretion of toxic metals in subjects with a 'normal' body load of metals. It is suggested that systemic chelation of toxic metals by MCP may in part be attributable to the presence of rhamnogalacturonan II, which has been shown previously to chelate metals.

The authors concluded that "No significant changes in the excretion of

Al, Sb, Be, Bi, Ni, Pt, Tl, Th, U, Ca, Mg, Zn, Cu, Se and Fe were observed."

Pectin is a complex plant polysaccharide consisting of homo-galacturonan. Eliaz and his team documented that treatment with pectin significantly increased the urinary excretion of arsenic, cadmium and lead. (Eliaz 2006). Tahiri et al reported that the pectin-induced oral chelation was specific for Pb, Ba, Sr, La, Eu, Ce, Pr and Nd, whereas essential cations such as Ca, Mg, Fe, Zn and Cu are not bound (Tahiri 2000). Moreover, the efficacy of the apple pectin in reduction of 137Cs-storage in the "Chernobyl" children body was shown [Nesterenko 2004].

An excerpt of the Eliaz study protocol reads as follows:

> Subjects ingested 15 g of PectaSol® modified citrus pectin (MCP) in three divided doses each day for 5 days and 20 g in four divided doses on day 6. Fifteen grams of MCP was selected for this pilot trial based on this clinical observation. An acute increase in urinary excretion was expected, but the magnitude of that increase was unknown. The increased amount of pectin ingested on day 6 was used in case the smaller amount did not give detectable changes in the urinary excretion of toxic metals. More than 20 g was not used in order to avoid potential intestinal discomfort from the high fiber content of the pectin. Prior to commencing the MCP ingestion, the subjects collected a 24 h urine sample as a baseline. Twenty-four-hour urine samples were collected on day 1 and day 6 for comparison.

Eliaz also mentioned a previous study using 15 g a day MCP to attenuate the progression of prostate cancer in men with biochemical relapse (Guess 2003). A reduction in heavy metals, in particular mercury, was observed in men using MCP at 15 g a day long term as part of their prostate cancer treatment (Eliaz, 2006).

Pectins and the Treatment of Metal Overexposure

Over the years, a handful of physicians, mostly those working with children or neurological patients have used pectin for metal detoxification. One of the first were Drs. Marcus Mazzuka and his sister Dr. Rosella Mazzuka, paediatricans whom I've known for many years. They run clinics in Rome, Madrid, and Palma de Mallorca where I had visited them some time ago. Just recently and after the gadolinium controversy, which shed light on pectin again, I corresponded with Dr. Marcus. According to him, he and his sister have treated many children with a product named Pectasol. Most of the children responded well, maybe 3% suffered stomach pain that was solved when doses were reduced. Only two children out of more than one thousand showed a skin rash without pruritus.

The dosage Drs. Mazzuka use is 70 mg x kg/day, given with or without meal, 0-0-1, 1-0-1 or 1-1-1, depending on age and the patient's gastrointestinal health. Patients with GI problems are ruled out. According to Dr. Marcus, the classic administration of oral pectin is giving one dose 1 hour before or after breakfast, lunch and dinner. According ➤

Table 1: Comparing Urine Excretion: Pectin vs Baseline Urine

Values in µg/g creatinine, except zinc (Zn)

N= 12011	Baseline mean N=1820	Baseline Stdev	Pectin mean N=143	Pectin Stdev	Detection Limit (DL)
Ag	<DL	0.75	<DL	<DL	0.5
Al	6.3	71.04	*30.5*	*41.64*	5.00
As	9.68	115.98	**56.41**	**180**	0.35
Ba	1.68	25.43	1.28	2.42	0.10
Be	<DL	<DL	<DL	0.37	0.15
Bi	<DL	1.56	<DL	<DL	0.05
Cd	0.19	0.43	0.21	0.30	0.10
Ce	<DL	0.25	<DL	0.06	0.10
Cr	0.59	1.51	**1.01**	**2.39**	0.50
Cs	4.94	11.49	**8.25**	**23.20**	0.02
Ga	0.08	0.22	0.08	0.19	0.05
Gd	<DL	2630*	<DL	0.09	0.05
Hg	<DL	0.82	**1.83**	**2.81**	0.40
La	<DL	0.05	<DL	0.04	0.01
Mn	1.74	44.3	**5.66**	**5.11**	0.75
Ni	3.88	7.05	**6.65**	**7.90**	0.50
Pb	0.65	4.35	*1.37*	*1.56*	0.30
Pd	<DL	1.1	**0.88**	**1.89**	0.65
Pt	<DL	18.16	<DL	0.16	0.10
Sb	<DL	0.54	*0.11*	*0.38*	0.10
Sn	0.36	2.44	**0.94**	**6.43**	0.20
Tl	0.16	1.06	0.21	0.20	0.05
U	<DL	<DL	<DL	0.13	0.03
V	0.09	0.83	**0.41**	**0.93**	0.05
Zn mg/g Crea	0.25	0.71	0.49	0.66	0.01

➤

to him, "the detoxification effect are good but not excellent" (www.prof-dr-marcos-mazzuka.com; www.medicosenconsulta.com).

To verify this statement, we statistically evaluated urine tests that we received from Drs. Mazzuka and three other European clinics. A total of 143 urine tests were evaluated statistically. The urine collection time was two-to-six hours; for about 10 patients the urine collection time was between 8-24 hours. We established the mean value and standard deviation as can be seen from Table 1 and compared these with the mean and standard deviation of baseline (=unchallenged) urines.

Data Evaluation

The *highlighted values* after the oral administration of pectin deserve attention. Values shown as *italics* may be of interest; however, aluminum (Al) is an element found in all plants and since we have no data on the aluminum content of pectin products, we hesitate to take a position on Al. Similarly, the slightly higher mean and standard deviation for Sb (antimony) do not signal pectin's efficiency for chelating antimony. For lead (Pb), the mean is double that of the baseline mean, but the standard deviation leaves room for questions.

We cannot draw a conclusion from the gadolinium values shown here. The high standard deviation seen in baseline urine data indicates that some extreme values were seen in baseline urines. Since the pectin data in Table 1 is mostly from children, its comparatively low standard deviation makes sense.

Rare Earth Metals

A number of studies suggest that pectin has the ability to bind the rare earth lanthanum metals such as cerium and gadolinium.

The lanthanides, also called lanthanoids are a series of 15 elements, also known as rare earth elements. The group received its name because all these rare earth elements are chemically similar to the element lanthanum (La).

Cerium belongs to the lanthanide series as does gadolinium. These rare earth elements exert diverse biological effects mainly by their resemblance to calcium. Because of their diverse physical, chemical and biological effects, lanthanides have been used industrially in color TVs, lasers, binoculars, photographic cameras, and semiconductors. Lanthanides-enriched fertilizers are used (mainly consisting of cerium, lanthanum, and neodymium nitrates) to increase plant growth and because plants can accumulate lanthanides, this group of biologically non-necessary elements inevitably accumulates in the environment and is transferred to the human body through the food chain.

In medicine, cerium is used in anti-cancer, anti-inflammatory, and antiviral agents. Like other lanthanides, cerium has the ability to inhibit proliferation of cancer cells. (Palizban 2010). However, in vivo studies showed that lanthanides could accumulate in the liver, kidney, spleen, and lung, and have adverse effects on organs, causing disturbance of the homeostasis of essential elements and enzymes [Feng 1996). Another problem is the negative influence of radioactive cerium on humans.

Khotimchenko and colleagues conclude that "it is essential to find an effective and safe method to remove radioisotopes from the human body."

Kusrini et al demonstrated with waste-water studies that "pectin as a cost-effective biosorbent could remove lanthanum with efficiency" (Kusrini 2018).

Conclusion

Pectin's ability to bind potentially toxic metals, including the lanthanide metals to which cerium and gadolinium belong, deserves attention.

Eleonore Blaurock-Busch, PhD, founded the US toxicology laboratory Trace Minerals International of Boulder, Colorado in 1984 and Micro Trace Minerals of Hersbruck, Germany in 1975. She is research director at Micro Trace Minerals Laboratory in Germany, founding member and co-chairman of the International Association of Trace Element Research and Cancer, and organizer of the first East-West World Congress on Trace Element and Cancer, held in Beijing, China in 1996. She is advisor to the German Medical Association of Clinical Metal Toxicologists and a member of the British Society for Ecological Medicine.

She has lectured worldwide at various universities and learning institutions and was a frequent guest speaker on radio and TV shows in the US, Germany and elsewhere. She was and is instrumental in environmental and laboratory research projects in metal toxicology, including epidemiological studies on cancer and autism, and continues to evaluate the toxic burden of people of various countries.

She published several books in German and English, and recently published *Toxic Metals and Antidotes. Handbook of Chelation Therapy*. Her books have been translated into French, Portuguese and other languages. Some are utilized as teaching textbooks by colleges and teaching organizations. She is a regular columnist for various medical journals.

The above article is an excerpt of her forthcoming book, *Evidence-Based Chelation Therapy,* a textbook with protocols, available soon through Amazon and other booksellers.

References

Eliaz I, et al. The Effect of Modified Citrus Pectin on Urinary Excretion of Toxic Elements. *Phytother. Res*. 2006; 20:859–864.

Feng ZX, et al. Influence of intraperitoneal injection of rare earth compounds on the activity of antioxidant enzymes and the level of lipid peroxidation in mice livers. *J. Rare Earth.* 1996; 14:66–69.

Flore, C, et al. Analytical microscopy observations of rat enterocytes after oral administration of soluble salts of lanthanides, actinides and elements of group III-A of the periodic chart. *Cell Mol. Biol.* 2001;47:419–425.

Guess BW, et al. Modified citrus pectin (MCP) increases the prostate-specific antigen doubling time in men with prostate cancer: a phase II pilot study. *Prostate Cancer Prostatic Dis* 2003;6: 301–304.

Khotimchenko Y, et al. Cerium Binding Activity of Pectins Isolated from the Seagrasses Zostera marina and Phyllospadix iwatensis. *Marine Drugs* 2012;10:834-848. www.mdpi.com/journal/marinedrugs

Kusrinia E, et al. Kinetics, mechanism, and thermodynamics of lanthanum adsorption on pectin extracted from durian rind. *J Environm Chem Engineering* 2018;6 :6580-6588.

Lattimer JM, Haub MD. Effects of dietary fiber and its components on metabolic health. *Nutrients* 2010; *2*:1266–1289.

Lipoic acid. https://www.mssociety.org.uk/research/explore-our-research/emerging-research-and-treatments/explore-treatments-in-trials/lipoic-acid

Marounek M, et al. Effect of pectin and amidated pectin on cholesterol homeostasis and cecal metabolism in rats fed a high-cholesterol diet. *Physiol. Res*.2007;56:433–442.

Nesterenko VB, et al. Reducing the 137Cs-load in the organism of "Chernobyl" children with apple-pectin. *Swiss Med. Wkly*. 2004;134:24–27.

Palizban AA, Sadeghi-aliabadi H, Abdollahpour F. Effect of cerium lanthanide on Hela and MCF-7 cancer cell growth in the presence of transferring. *Research in Pharmaceutical Sciences.* 2010; 5(2): 119–125.

Tahiri M, et al. The rhamnogalacturonan-II dimer decreases intestinal absorption and tissue accumulation of lead in rats. *J Nutr.* 2000;130: 249–253.

Vos AP, et al. Dietary supplementation of neutral and acidic oligosaccharides enhances Th1-dependent vaccination responses in mice. *Pediatr. Allergy Immunol*. 2007;18: 304–312.

Zhao ZY, et al. The role of modified citrus pectin as an effective chelator of lead in children hospitalized with toxic lead levels. *Altern Ther Health Med*. 2008;14: 34–38.

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The Potential Role of the Mitochondria and Nicotinamide Riboside in Addressing COVID-19

by Chris D. Meletis, ND

Despite ongoing discussions about potential treatments for COVID-19, there has been little talk of the role that the mitochondria may play in supporting the health of patients with this disease as well as in proactively bolstering our immune systems. Yet, there is some recognition in the medical literature that SARS-CoV-2, the virus that causes COVID-19, may escape innate immune surveillance through causing changes in the mitochondria.[1] In this article, we will discuss the role that the mitochondria play in immunity, the possible effect of SARS-CoV-2 virus on the mitochondria, and the potential role of NAD^+ and its most efficient precursor nicotinamide riboside on immune health in people exposed to the SARS-CoV-2 virus.

Mitochondria's Role in Immunity

Mitochondria are important organelles in the cell. They are essentially the cells' batteries, as they are responsible for the production of ATP, the body's cellular fuel. Mitochondrial DNA promotes innate immunity,[2] the type of immunity that serves as the first line of defense against viral, bacterial, and other pathogens. When mitochondrial DNA (mtDNA) is released from the mitochondria, this stimulates immune responses.[2] Within cells, there are systems in place to detect the DNA of invading pathogens. Cyclic GMP-AMP synthase (cGAS) and stimulator of interferon genes (STING) both play an important role in the cell's detection of pathogens.[2]

Mitochondrial DNA released from the mitochondria into the cytoplasm of the cell (the part of the cell outside the nucleus) can activate cGAS and STING, thus helping cells to identify invaders and promote viral resistance.[3,4] Additionally, cells that exhibit mitochondrial DNA stress and release mtDNA into the cytoplasm are more resistant to infection with herpes simplex virus-1 (HSV-1) or vesicular stomatitis virus (VSV).[2] SARS-CoV-2, however, is an RNA virus. Yet, even though cGAS, which detects the presence of viruses, is specific for DNA, RNA viruses such as the dengue virus can elicit a cGAS-STING response.[5] Studies have found that the dengue virus can trigger the release of predominantly oxidized mtDNA into the cytosol of the cell, where it activates the viral detector cGAS.[6] However, the dengue virus has evolved to bypass this mitochondrial strategy of the cell to signal a viral infection, which leads to the persistence of the virus.[7] It is interesting to note that in addition to DNA, mitochondria also contain dsRNA, which promotes a strong immune response.[2]

We do not know at this point how SARS-CoV-2 will respond to mtDNA release into the cytosol of the cell and the subsequent cGAS signal to the body that a virus is present. We do know that a number of viruses target the mitochondria in order to proliferate throughout cells in the body. The influenza A viral protein PB1-F2, which is involved in the virulence of this viral infection, targets mitochondria, resulting in mitochondrial fragmentation and impaired innate immunity.[8]

An NAD^+ precursor that supports mitochondrial function could potentially inhibit SARS-CoV-2.

A number of viruses cause mitochondrial fusion, which is required for the virus to spread throughout cells of the body and help the virus evade innate antiviral responses.[9] Severe acute respiratory syndrome coronavirus (SARS-CoV) contains a virulence factor called ORF-9b, which can trigger mitochondrial fusion.[10] This eventually inhibits host cells from producing interferon (IFN).[10] IFN is important in an immune response against the virus and induction of interferon inhibits viral replication. Additionally, a viral protein from HIV can also lead to mitochondrial hyperfusion.[11]

One group of researchers suggested that "Since many of the viral proteins that target mitochondria are essential for viral replication, they might serve as critical drug targets for generating therapeutics against viral infections."[9]

Different viruses target different aspects of mitochondrial metabolism, including β-oxidation and the citric acid cycle (TCA Cycle or Krebs Cycle).[9] Some

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viruses such as influenza A and HIV can disrupt mitochondrial function to cause cell death[9] whereas others such as dengue, Zika, and chikungunya promote viral replication and dissemination by inhibiting cell death.[12-14]

What SARS-CoV Does to the Mitochondria

The virus that causes severe acute respiratory syndrome (SARS) is known as SARS-CoV. It was discovered in Asia in 2003. We can get an idea how its viral successor, SARS-CoV-2, which causes COVID-19, affects the mitochondria by looking at the behavior of SARS-CoV.

SARS-CoV can effectively hide from the body's innate immune surveillance. As mentioned earlier in this article, a protein encoded by SARS-CoV called open reading frame-9b (ORF-9b) localizes to the mitochondria, where it causes mitochondrial hyperfusion.[10] This facilitates viral replication by targeting a mitochondrial protein that's involved in an antiviral response.[10] This in turn stops the host cell from making enough IFN as well as NF-κB and IL-6,[15] which are other substances that normally signal the immune system that there is a problem that needs to be addressed. This may encourage viral replication in the beginning stages of infection while the virus works behind the back of the immune system.[10,15] In fact, IL-6 levels are not significantly enhanced until the fourth day after human lung epithelial cells are infected with SARS-CoV.[16]

The Role of NAD^+ in the Mitochondria and Immunity

Nicotinamide adenine dinucleotide (NAD^+) is an essential coenzyme required for healthy metabolism and energy production in each of our cells. It is the primary electron donor in the mitochondrial respiratory chain.[17] Increased NAD^+ levels are linked to increased sirtuin activity, especially SIRT1 and SIRT3.[17] Sirtuins are proteins that are essential for cellular health and play a role in increased longevity. In fact, sirtuins need NAD^+ to function. The body also needs SIRT1 and SIRT3 for mitochondrial biogenesis,[17] and NAD-consuming sirtuins are involved in the innate immune response.[18]

NAD^+ is involved in immunity and it has been shown to regulate the function of macrophages, immune cells that act as the first defense against pathogens.[19] Increasing levels of NAD^+ production in immune-compromised or aged macrophages restored immune responses.[19] This led one group of researchers to conclude, "Breakdown of de novo NAD^+ synthesis may underlie declining NAD^+ levels and rising innate immune dysfunction in aging and age-associated diseases."[19]

There are a number of other indications NAD^+ plays an important role in immunity. Without NAD^+ we could not make ATP, which is essential for immune function.[20] In addition, viral infections disrupt NAD^+ homeostasis and deplete NAD^+ levels.[21] Recently, researchers investigated SARS-CoV-2 infection of cell lines, infected ferrets, and a deceased patient's lung.[21] They found that SARS-CoV-2 "consistently and strikingly" impaired the NAD^+ gene set in regards to the production and use of NAD^+. SARS-CoV-2 triggers a set of poly(ADP-ribose) polymerase (PARP) family members, including enzymes required for innate immune response. Overexpression of a virally induced PARP (PARP10) suppresses host cell NAD^+ metabolism.[21] Research indicates that increasing NAD^+ levels through the nicotinamide and nicotinamide riboside kinase pathways may restore antiviral PARP functions, thereby supporting innate immunity to SARS-CoV-2.[21] The fatigue commonly associated with COVID-19 is likely in part due to NAD^+ depletion and mitochondrial impact, along with alterations of sirtuins and PARPs activity.

We also lose up to about 50% of our NAD^+ levels between the ages of 40 and 60,[22] and NAD^+ levels are also low in diabetics and during obesity,[22] underlying conditions that predispose to a worse outcome in COVID-19. It is of note that the SARS-CoV-2 virus takes a greater toll on the elderly.

Increasing Levels of NAD^+ to Enhance Immunity

The role that mitochondria play in immunity and the fact that viruses can deplete NAD^+ levels indicate that increasing NAD^+ concentrations may be a potential way to support immunity both before and during exposure to the SARS-CoV-2 virus. The scientific literature and results in my clinical practice and those around the country indicate that supplementing with nicotinamide riboside (NR), a unique and naturally occurring precursor to NAD^+, is highly effective at raising NAD^+ levels and improving mitochondrial health.

In humans, NR supplementation is well known to increase blood NAD^+ levels.[23,24] NR also boosts NAD^+ levels in mice and leads to mitochondrial biogenesis.[25] In animal studies, NR was beneficial in mitochondrial myopathy.[25] NR's ability to strengthen the mitochondria may make it a useful tool for ensuring these organelles stay healthy during viral infections such as SARS-CoV-2.

Supporting the Health of People with Underlying Conditions

Cardiovascular concerns are known to be associated with worse outcomes during COVID-19. Furthermore, some patients with COVID-19 present with cardiovascular symptoms without typical fever and cough.[26,27] In about 7% of people who have a confirmed diagnosis of COVID-19, the SARS-CoV-2 virus causes damage to the heart.[26,27] This is thought to be the result of either a direct attack of the virus on the heart or a cytokine storm that leads to the death of heart cells. [26,27]

Restoring mitochondrial health with nicotinamide riboside may support heart health and provide a strong cardiovascular foundation. A randomized, double-blind, controlled cross-over study of 30 middle-aged and older healthy male and female adults were given 500 mg NR orally twice a day for six weeks.[28] NR significantly increased average NAD^+ levels by 60%. Additionally, in individuals with elevated/stage I hypertension, NR supplementation was associated with

a mean 9 mmHG decrease in systolic blood pressure (SBP) compared with the placebo. This reduction was not observed in participants with initial SBP in the normal range. NR supplementation also increased ATP levels.

In animal models, nicotinamide riboside has been shown to have cardiovascular benefits. For example, in one mouse model of dilated cardiomyopathy, NR reduced the development of heart failure.[29]

Diabetes is another underlying condition that may lead to a worse outcome in COVID-19. Preclinical studies in rodents indicate NR supplementation may be supportive in this condition. In a mouse model of type 2 diabetes, NR significantly lowered non-fasting and fasting blood glucose and led to reduced weight gain.[30]

Case Studies

Female with COVID-19 Pneumonia. A 40-year-old female patient had tested positive for COVID-19. Her primary symptom was pneumonia. She also had co-morbid factors of diabetes, obesity, and sleep apnea. Dr. Meletis ordered an Organic Acid Test (OAT), which pointed to diminished citric acid cycle efficiency. The citric acid cycle is a series of reactions that lead to the generation of ATP, the body's cellular fuel. There were two specific areas of what Dr. Meletis terms "bioaccumulation" of substrates that were NAD^+ dependent, which included pre- and post- alpha ketoglutarate. Dr. Meletis provided the patient with 1,000 mg of a form of nicotinamide riboside that has been shown to increase NAD^+ levels in a clinical trial of 140 healthy overweight adults by 142%.[31] Without any other prescription medications and simply using oral zinc, vitamin D, vitamin C, and nicotinamide riboside, this patient with full-blown COVID-driven pneumonia made a full recovery.

General Clinical Observation of Several Cases. As a clinical educator for US BioTek Laboratories, Dr. Meletis has consulted with numerous health care practitioners across the country and observed several cases of COVID-19 in the field via other clinical practices. One of the common denominators was that the patients' citric acid cycle was notably dysfunctional per their urinary OAT test. NAD^+ plays a critical role in the citric acid cycle, indicating that supplementing with nicotinamide riboside as an NAD^+ precursor may lend support in this group of patients.

Conclusion

The mitochondria are involved in immunity and the body's response to viral invasion. Although any discussion of the role of mitochondrial support and COVID-19 is partially theoretical, there is good rationalization for such an approach both in clinical practice and in the scientific literature. Raising NAD^+ levels through the use of nicotinamide riboside can rejuvenate the mitochondria, support immunity, and maintain a healthy citric acid cycle, thus potentially inhibiting viruses like SARS-CoV-2. Nicotinamide riboside may also have a role to play in supporting the health of people with underlying cardiovascular or diabetic conditions that can increase the threat of poor outcomes with COVID-19.

References

1. Malavolta M, et al. Exploring the Relevance of Senotherapeutics for the Current SARS-CoV-2 Emergency and Similar Future Global Health Threats. *Cells*. 2020;9(4):909.
2. Riley JS, Tait SW. Mitochondrial DNA in inflammation and immunity. *EMBO Rep*. 2020 Apr 3;21(4):e49799.
3. White MJ, et al. Apoptotic caspases suppress mtDNA-induced STING-mediated type I IFN production. *Cell*. 2014 Dec 18;159(7):1549-62.
4. West AP, et al. Mitochondrial DNA stress primes the antiviral innate immune response. *Nature*. 2015 Apr 23;520(7548):553-7.
5. Schoggins JW, et al. Pan-viral specificity of IFN-induced genes reveals new roles for cGAS in innate immunity. *Nature*. 2014 Jan 30;505(7485):691-5.
6. Sun B, et al. Dengue virus activates cGAS through the release of mitochondrial DNA. *Sci Rep*. 2017 Jun 15;7(1):3594.
7. Aguirre S, et al. Dengue virus NS2B protein targets cGAS for degradation and prevents mitochondrial DNA sensing during infection. *Nat Microbiol*. 2017 Mar 27;2:17037.
8. Yoshizumi T, et al. Influenza A virus protein PB1-F2 translocates into mitochondria via Tom40 channels and impairs innate immunity. *Nat Commun*. 2014 Aug 20;5:4713.
9. Tiku V, Tan MW, Dikic I. Mitochondrial Functions in Infection and Immunity. *Trends Cell Biol*. 2020 Apr;30(4):263-75.
10. Shi CS, et al. SARS-coronavirus open reading frame-9b suppresses innate immunity by targeting mitochondria and the MAVS/TRAF3/TRAF6 signalosome. *J Immunol*. 2014 Sep 15;193(6):3080-9.
11. Fields JA, et al. HIV alters neuronal mitochondrial fission/fusion in the brain during HIV-associated neurocognitive disorders. *Neurobiol Dis*. 2016 Feb;86:154-69.
12. Datan E, et al. Dengue-induced autophagy, virus replication and protection from cell death require ER stress (PERK) pathway activation. *Cell Death Dis*. 2016 Mar 3;7:e2127.
13. Liang Q, et al. Zika Virus NS4A and NS4B Proteins Deregulate Akt-mTOR Signaling in Human Fetal Neural Stem Cells to Inhibit Neurogenesis and Induce Autophagy. *Cell Stem Cell*. 2016 Nov 3;19(5):663-71.
14. Joubert PE, et al. Chikungunya virus-induced autophagy delays caspase-dependent cell death. *J Exp Med*. 2012 May 7;209(5):1029-47.
15. Liu F, et al. Klotho suppresses RIG-I-mediated senescence-associated inflammation. *Nat Cell Biol*. 2011;13:254-62.
16. Yoshikawa T, et al. Severe Acute Respiratory Syndrome (SARS) Coronavirus-Induced Lung Epithelial Cytokines Exacerbate SARS Pathogenesis by Modulating Intrinsic Functions of Monocyte-Derived Macrophages and Dendritic Cells. *J Virol*. 2009;3039-48.
17. Lightowlers RN, Chrzanowska-Lightowlers ZMA. Salvaging Hope: Is Increasing NAD(+) a Key to Treating Mitochondrial Myopathy? EMBO Mol Med. 2014 Jun;6(6):705-7.
18. Wang X, et al. Sirtuins and Immuno-Metabolism of Sepsis. *Int J Mol Sci*. 2018 Sep;19(9):2738.
19. Minhas PS, et al. Macrophage De Novo NAD^+ Synthesis Specifies Immune Function in Aging and Inflammation. *Nat Immunol*. 2019 Jan;20(1):50-63.
20. Weinberg SE, Sena LA, Chandel NS. Mitochondria in the Regulation of Innate and Adaptive Immunity. *Immunity*. 2015 Mar;42(3):406-17.
21. Heer CD, et al. Coronavirus Infection and PARP Expression Dysregulate the NAD Metabolome: A Potentially Actionable Component of Innate Immunity. *bioRxiv*. https://www.biorxiv.org/content/10.1101/2020.04.17.047480v2.full Accessed April 24, 2020.
22. Yoshino J, Baur JA, Imai SI. NAD(+) Intermediates: The Biology and Therapeutic Potential of NMN and NR. *Cell Metab*. 2018;27(3):513-28.
23. Airhart SE, et al. An Open-Label, Non-Randomized Study of the Pharmacokinetics of the Nutritional Supplement Nicotinamide Riboside (NR) and Its Effects on Blood NAD+ Levels in Healthy Volunteers. *PLoS One*. 2017 Dec 6;12(12):e0186459.
24. Dellinger RW, et al. Nicotinamide riboside is uniquely and orally bioavailable in mice and humans. *Nat Commun*. 2016 Oct;7:12948.
25. Khan NA, et al. Effective Treatment of Mitochondrial Myopathy by Nicotinamide Riboside, a Vitamin B3. *EMBO Mol Med*. 2014 Jun;6(6):721-31.
26. Clerkin KJ, et al. Coronavirus Disease 2019 (COVID-19) and Cardiovascular Disease. *Circulation*. 2020 Mar 21. [Epub ahead of print.]
27. Otto MA. Cardiac symptoms can be first sign of COVID-19. *The Hospitalist*. March 26, 2020.
28. Martens CR, Denman BA, Mazzo MR, et al. Chronic Nicotinamide Riboside Supplementation Is Well-Tolerated and Elevates NAD^+ in Healthy Middle-Aged and Older Adults. *Nat Commun*. 2018 Mar 29;9(1):1286.
29. Diguet N, Trammell SAJ, Tannous C, et al. Nicotinamide Riboside Preserves Cardiac Function in a Mouse Model of Dilated Cardiomyopathy. *Circulation*. 2018 May 22;137(21):2256-73.
30. Trammell SA, et al. Nicotinamide Riboside Opposes Type 2 Diabetes and Neuropathy in Mice. *Sci Rep*. 2016 May 27;6:26933.
31. Conze D, Brenner C, Kruger CL. Safety and Metabolism of Long-term Administration of NIAGEN (Nicotinamide Riboside Chloride) in a Randomized, Double-Blind, Placebo-controlled Clinical Trial of Healthy Overweight Adults. *Sci Rep*. 2019 Jul 5;9(1):9772.

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He is widely recognized as a world-renowned expert on the science of CBDs and has authored 16 books and over 200 national scientific articles in such journals and magazines as *Natural Health*, *Alternative and Complementary Therapies*, *Townsend Letter*, *Life Extension*, and *The Journal of Restorative Medicine*.

Dr. Meletis served as Dean of Naturopathic Medicine and Chief Medical Officer for seven years at NUNM (Portland, Oregon), the oldest naturopathic medical school in North America. He has received numerous awards, including the prestigious Physician of the Year Award by the American Association of Naturopathic Physicians; Excellence Award for his work in treating and advocating for the medically underserved; and most recently, the NUNM Hall of Fame Award.

The Coronavirus Pandemic: A Trial by Fear

by Artemis Celt, ND

Recently I sat down in meditation with the intention of receiving whatever information I most needed about the coronavirus pandemic. Several times during the meditation the word *crucible* impressed itself like an embossed message on the surface of my otherwise undisturbed mind. "What the heck does *crucible* really mean?" I thought to myself as I concluded my meditation. I knew that Arthur Miller had written a popular play called *The Crucible*, though I had never read it. And associated with this play was a dim sense of something that might loom, with Plutonian intensity, over our ordinary daily lives. In an effort to bring some needed clarity to my feeble grasp of the word crucible, I consulted several online dictionaries. Here is the definition I found most pertinent: "*A crucible is a situation of severe trial, or in which different elements interact, leading to the creation of something new.*"

We are all acutely aware of how this pandemic and the subsequent shelter-in-place mandates have created unprecedented challenges for billions of people on Earth. For some, the main challenge is fear of contracting a serious viral infection or fear of unknowingly passing it on to a vulnerable member of our society. For others, the main challenge has been an abrupt loss of income. And for some, the imposed social isolation has proven to be very difficult. Concerns about current and potentially long-term losses of civil liberties are the biggest worries harbored by some. For others, having to suddenly alter daily work routines in order to accommodate children out of school has been a significant stressor.

These are all hardships, but a severe hardship is not the same thing as a severe trial. A trial is a kind of test: a test of physical endurance, or a test of moral integrity, a test of courage, a test of choosing love over fear, etc. In this article I would like to consider some of the ways this pandemic and the methods by which it is being managed have suddenly immersed us in a crucible: a severe test. I would also like to address the opportunity to create something new that this test affords us.

What kind of trial might this pandemic be? I can think of many kinds of trials that we are facing as a result of this pandemic, but first and foremost is the Trial of Fear.

Fear is a big topic, and thus the Trial of Fear involves more than one aspect of fear.

The First Aspect of Fear: War Consciousness

Once upon a time there were two French biologists and researchers, Louis Pasteur and Antoine Bechamp. In the 1800s they each studied microorganisms and their effect on health, and they each came to a different conclusion. Pasteur, as we know, eventually won the day with his celebrated germ theory: diseases are caused by the presence and actions of specific microorganisms in the body. A medical system, such as our current orthodox Western medical system, that adopts this theory will focus on the identification and eradication of specific germs as a way of safeguarding health. This theory naturally leads to an "us vs them" mentality, whereby the bacteria, virus, or fungus becomes the feared "them" that we must protect ourselves against.

With its "us vs them" focus, the germ theory also naturally gives rise to a warlike mentality in which we humans take the starring role of victims who must put up a fight against "the other" that's trying to destroy us. It also gives rise to entities like our modern pharmaceutical empire that produces weapons (antibiotics) that sometimes enable us to fight off the enemy (germs). This evening I read yet another news article that refers to the novel coronavirus as "the enemy," and that describes our collective situation with respect to this pandemic as "being at war." Some hospitals are now being referred to as "war zones." The language of war is frequently used to describe and shape our relationship to this virus. It is also frequently used to describe our relationship to our massive drug problem, and to the widespread problem of cancer. Placing our relationship to this virus within the framework of war strongly fosters a state of fear in the public mind.

The language of war encourages us to look outside of ourselves and to look outside of the reality we have created on Earth. The problem then becomes "them," rather than "us." A war mentality discourages us from asking certain questions that might desperately need to be asked, such as: "What conditions on Earth and within the human body have made this widespread infection possible?" "How might this virus be a messenger of sorts – a warning signal that we are collectively so out of balance

that a powerful messenger had to come forth in order to shake us out of our complacency?"

Is it wise to accept this "us and them" framework that is being foisted upon us? What are the consequences of accepting such a framework? Well, let's take a look around. The consequences here in the US and in many other countries are plain as day. I don't know what it's like where you live, but downtown Port Townsend where I live is a veritable ghost town. Vast numbers of people have become unemployed overnight. People are afraid to shake hands with each other. Children can't go play with their friends. Well, there's a war on, mate, so buck up and make the best of it. We are told that we might have to make the best of this severely restricted way of life for months, or possibly even a year[1] – until the troops come to our rescue with a new vaccine.

Antoine Bechamp developed a theory that radically departs from Pasteur's famous germ theory.

He maintained that unhealthy tissue is the true cause of disease, and that infections are a secondary consequence of this unhealthy tissue. Bechamp's research led him to conclude that poor diet and other unwise lifestyle choices and emotional states create an oxygen-deficient, acidic cellular environment that lead to an unhealthy "terrain." This has become known as the terrain-is-everything theory, whereby the human body and its relative state of health is the terrain.

If Bechamp's theory is embraced, then focus is placed on maintaining a robustly healthy terrain – a healthy body and emotional state, and a healthy planet free of man-made pollutants – rather than going to war with germs. Microorganisms are not the root-cause problem, and therefore it makes little sense to fear them.

Ideally, this coronavirus experience will become an epic opportunity for humanity to understand that infectious diseases do not occur as isolated events in the absence of a larger context. We have an opportunity to understand that this novel coronavirus is not an enemy that has appeared out of nowhere. It has, rather, appeared within the context of our individual and collectively created physical and emotional terrains. Fortunately, we have already seen some efforts being made to understand this pandemic as part of a larger context. For example, it is widely understood that people with one or more serious comorbidities are particularly vulnerable to the virus. Both Wuhan and northern Italy have a significant air pollution problem, which damages lung tissue and makes for a poorer outcome with respiratory viruses. There is a high rate of cigarette smoking in men who live in these countries as well. One recent study raises the question of whether the flu shot might make people more vulnerable to coronaviruses.[2] Dr. Zach Bush points out that the heavy use of glyphosate in China's Hubei province could have given rise to a viral problem due to the subsequent massive destabilization of the soil microbiome. He also attributes the higher death rate from COVID-19 in the US to the fact that 1) Americans – even young Americans – tend to be sicker with chronic diseases than people in other wealthy nations, and 2) widely prescribed statin drugs and ACE inhibitors significantly increase the risk of major complications from COVID-19.[3] Some people speculate that 5G might play a role. Perhaps there are certain emotions and/or beliefs that make it easier for this virus to gain entry.

There are undoubtedly other as yet unidentified factors that have compromised humanity's terrain. We can, each and every one of us, look within and ask a question such as this: "Within the context of this pandemic, what's the best way I can improve the quality of my terrain?" This is a great question to pose during meditation, or for dreamwork,[4] or as the basis for a shamanic journey.

Doesn't it make sense, given the above red alerts related to our personal and collective terrains, to compassionately shift our focus away from over-sanitizing, masking and lockdowns, and instead focus on the urgently needed work of tending to our terrains?

The Second Aspect of Fear: Fear as a Means of Control

"If you want to control someone, all you have to do is to make them feel afraid." – Paulo Coelho

In her excellent April 7 presentation, *Making Sense of the Coronavirus Data*,[5] Dr. Pam Popper dives into the mechanics of how people were made to feel afraid during the swine flu (H1N1) epidemic of 2009/2010. And who were the purveyors of that fear? None other than our very own WHO and CDC. According to Dr. Popper, the original mortality rate of this flu was predicted to be a whopping 4%. But follow-up serological studies showed that the actual death rate was 0.01%. At some point during that flu season the CDC instructed health care practitioners to stop testing for H1N1 and to assume that anyone who presented with flu-like symptoms had H1N1 and to report it as such. This is, by the way, exactly what WHO and the National Vital Statistics System have begun advising practitioners to do during the current coronavirus outbreak.[6,7]

"How do we want to live, and how do we want our children and grandchildren to live?"

Why would practitioners be encouraged to state that COVID-19 is the presumed cause of death without doing actual testing? This maneuver, which flies in the face of evidence-based medicine, will falsely inflate the number of deaths attributed to COVID-19 and can thus be used to bolster "evidence" that validates the use of lockdowns and vaccination programs.

It is not my purpose in this article to address all of the purported reasons – and there are many – why various players on the COVID-19 stage might want to whip the public up into a state of fear. These purported reasons are covered adequately in the alternative press and in various alternative health websites. I would like to address just one of these reasons: The World Health Organization is in bed with pharmaceutical companies that make vaccines, and vaccines have the potential to rake in billions

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of dollars. If you can frighten people by making them believe that there is a particularly deadly flu going around, then they will line up in droves for the vaccine that will allegedly give them immunity to the virus. The following sentence will illuminate why I used the word *allegedly*. In the case of the swine flu, the Parliamentary Assembly of the Council of Europe's Committee on Social, Health and Family Affairs eventually determined that "WHO colluded with drug companies, turning a run-of-the-mill flu into a pandemic. Drug companies benefited financially, millions of people were vaccinated without cause, *and without evidence that the vaccine was effective since it wasn't clinically tested."*[5] (italics are my addition) Given their appallingly poor track record during the swine flu epidemic, it seems prudent to carefully scrutinize any agendas based on WHO and CDC pandemic alerts.

When fear is selected as a primary means of control, certain tools must be used to get the job done. It goes without saying that the biggest hammer in this particular toolbox is the mainstream media. The media does the bidding of its masters with consummate skill.[8] As one friend of mine recently remarked: "The mainstream media is having a feeding frenzy with this pandemic." In light of this we might do well to ask: "when there's a feeding frenzy in the works, who ultimately gets fed and who gets eaten?"

The Third Aspect of Fear: The Loss of Heart

As I was writing the introduction to this article, I decided to find out when playwright Arthur Miller wrote *The Crucible*. As I scanned through the Google search results on my monitor to locate the information, I noticed two items that took me aback due to their stunning relevance to this pandemic.

The first item was two lines from an online learning site called Study.com. The following question is posed to students: *What was Arthur Miller's message in* The Crucible*?* And the answer? *Miller's message is that public hysteria based on fear destroys people's lives*.

The second item stated that *The Crucible* is about the Salem witch trials that took place in the late 1600s. This probably isn't news to many readers, but it was definitely big news to me! As it happens, "Miller wrote the play [in the 1950s] as an allegory for McCarthyism, when the United States government persecuted people accused of being communists. Miller was questioned by the House of Representatives' Committee on Un-American Activities in 1956 and convicted of contempt of Congress for refusing to identify others present at meetings he had attended." (quote from Wikipedia)

Since much of the world is in a heightened state of fear because of the coronavirus pandemic, it would behoove us to review the painful lessons that we in the US learned and hopefully have not forgotten from events like the Salem witch trials and like McCarthyism. It appears that the great scourge of "the other" has, once again, come calling at humanity's door. Always, it seems, such an easy card to play. This scourge is infamous for the number of guises it has worn throughout history. And no matter the guise, it has never failed to cause untold, long-lasting misery. When we finally decide to stop falling for this fear, perhaps our unwelcome visitor will stop paying us house calls.

Some might say, "Well, for heaven's sake, you can't compare fear of a virus to fear of witches and communists." Well, *is* fear of a virus really so very different from fear of any of these other things? Are the far-reaching consequences really so very different? This is not just an exercise in an ethics class. This is a *critically* important thing to grasp as we all sit in isolation in our homes, and as certain legislators begin to encourage us point blank to snitch on one another.[9,10] I, for one, am not yet convinced that fear of a virus is all that different from these other fears that ended up costing us so very dearly in the past.

The Fourth Aspect of Fear: Fear as a Personal and Collective Responsibility

A few weeks ago, I watched a rather poorly made but very compelling video on YouTube.[11] It was about a Brazilian man's quest for information about the novel coronavirus. Alberto Jose Varela took an entheogen, ayahuasca, to assist him on his quest to connect with the origin of the coronavirus. During the journey he discovered, to his surprise, that the roots of the virus were within himself, originating from his own unconscious fears. On his webpage about this experience he says that "Fear is the most lethal virus that we have developed as human beings. At some point we had to create something that would confront us to overcome it. We had to boost it and make it explode, otherwise we could neither assume it [sic] or resolve it."[12]

Part of the reason that I found Varela's self-styled investigation so interesting is that I had just done a similar investigation, but I used the method of dream incubation[13] to receive information instead of using an entheogen. The question I asked arose from my current understanding that we are co-creators of our reality. So as I fell asleep that night my question was this:

Artemis Celt graduated from Bastyr University's naturopathy program in 1985, and did post-graduate studies in homeopathy. She has had a family practice in Port Townsend, Washington since 1986, aside from a five-year hiatus in New Mexico. One of her current interests is how experiences and emotions held in the unconscious contribute to the eventual development of physical disease.

"How am I co-creating this coronavirus pandemic?" And I received a dream that night that surprised me. The dream was brief, and it showed me one of my fears – a fear that, up until that moment, had been entirely unconscious.

Fear is a powerful emotion, and therefore any fears we have – whether they are conscious or unconscious – will have powerful results in our lives and in the world around us. Is it possible that this virus is largely a result of our collective fears? If so, then what is the most responsible and effective thing that we can do to help dismantle this epidemic?

The Creation of Something New

According to our definition, a crucible is a trial that leads to the creation of something new.

From our current and most unusual locus in history we can look forward in time and see various probable futures. As Charles Eisenstein says in his magnificent piece entitled *The Coronation*, "a million forking paths lie before us."[14] Some of these probable futures make me feel desperately sad for humanity. And some of them make my heart sing like it has never sung before. Each probable future is the result of specific choices that we make in our now. It is advisable now more than ever before that we ask ourselves this question: "How do we want to live, and how do we want our children and grandchildren to live?" Do we passively accept what is being called "the new normal" because fear obscures our natural passion for life? Or do we set our imaginations free and wisely use some of our time to envision what we really want?

I like how Varela refers to his consciousness.[11] He says it is his laboratory. And he understands that in this laboratory he can help create "a new virus, a virus of healing," instead of a virus spawned by fear. He reminds us that if we can create the disease, then we are also perfectly capable of creating the cure. We all have our very own priceless laboratory, and collectively that amounts to a phenomenal amount of creative power.

If we navigate through this crucible with awareness and clear intent, we can come out the other side having created the kind of life on our beautiful planet Earth that reflects our hearts' deepest desires.

References

1. Resnick B. Scientists warn we may need to live with social distancing for a year or more. *Vox.* March 17, 2020.
2. Dolan C. DOD study raises tantalizing question: does flu shot increase vulnerability to coronaviruses? Justthenews.com. May 14, 2020.
3. The Truth Behind the COVID-19 Curtain Backed by Science and Biology 101. YouTube.com May 17, 2020.
4. http://www.deitycentral.com/the-importance-of-dreams
5. https://www.youtube.com/watch?v=modKe1XeFLA
6. https://www.who.int/classifications/icd/covid19/en/
7. https://www.greenmedinfo.com/blog/us-gov-health-statistics-agency-directs-hospitals-confirm-suspected-covid-19-deat1
8. https://www.webfx.com/blog/internet/the-6-companies-that-own-almost-all-media-infographic/
9. https://www.lawenforcementtoday.com/la-mayor-pushes-residents-to-rat-out-those-who-violate-stay-at-home-order-snitches-get-rewards/
10. https://wkow.com/2020/03/19/heres-how-to-report-gatherings-of-10-or-more-people-to-authorities/
11. https://www.youtube.com/channel/UC-XVouWcS6mtBcBXwRZaDIQ (Habla El Creador del Coronavirus)
12. https://www.albertojosevarela.com/en/the-creator-of-the-coronavirus-speaks-i-take-responsibility-for-having-created-it/
13. https://dreamstudies.org/2009/08/31/how-to-incubate-a-dream/
14. https://charleseisenstein.org/essays/the-coronation/?_page=3

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Letters to the Editor

Re: *JAMA* and Probiotics

I am Ross Pelton, and I "brand" myself as *The Natural Pharmacist*. I am writing to express my outrage and disappointment at an article titled "The Probiotic Conundrum"[1] that was published in *JAMA Viewpoint* on March 3, 2020. The authors of this article make absurd generalizations and slanderous statements about probiotics and the whole field of microbiome science.

The fact that *JAMA* would publish such a biased article that does not contain scientific references for the outlandish claims the authors make brings *JAMA*'s integrity into question. *JAMA* purports to be a peer-reviewed medical journal. However, I doubt that "The Probiotic Conundrum" was peer-reviewed because reviewers would catch the glaring omission of references or citations to support the claims the authors have made.

The article's authors Stephen Freedman[2], David Schnadower[3] and Phillip Tarr[4] have positions at respected medical and scientific institutions. However, they make the following unscientific and unsubstantiated claims about probiotics:

a. They state that there is a "paucity of high-quality data supporting the value of probiotics."
b. They say that reports of the efficacy of probiotics are "potentially biased."
c. They also claim that there is "increasing concern about the safety of probiotics."

It puzzles me that these three authors collectively state that there is "a paucity of high-quality data" in the probiotic industry when one of the authors, Phillip Tarr, MD, MPH, is associated with Washington University School of Medicine in St Louis, Missouri. Is it possible that Dr. Tarr is unaware of the fact that Dr. Jeffrey Gordon, who is one of the world's leading probiotic/microbiome scientists heads up one of the finest microbiome and genomic research centers in the world, namely The Edison Family Center for Genome Sciences & Systems Biology?[5] Dr. Gordon and his lab, which employs nearly thirty top-level scientists and staff, are located at Dr. Tarr's institution, the Washington University School of Medicine, in St. Louis, Missouri.

I'd like to remind the authors that the US government committed $140 million to fund the Human Microbiome Project (2007-2012). Then, in May 2016, the US White House Office of Science and Technology Policy announced The National Microbiome Initiative with $121 million from US federal agencies and $400 million from university and industry sources.

Other international microbiome research projects that have been initiated include the Canadian Microbiome Initiative (CMI),[6] Canadian Microbiome Initiative 2 (CMI2),[7] MetaHIT (METAgenomics of the Human Intestinal Tract), which was funded in 2008 involving countries from the European Union and China,[8] and the Human MetaGenome Consortium in Japan.[9]

A search in the Web of Science database revealed that there have been more than 50,000 research articles on the gut microbiome published in the past two decades and over 10,000 articles since January 1, 2019.

Paralleling this explosion of scientific research into probiotics and the human microbiome, many probiotic and microbiome products and companies have been launched. Also, scientists involved in cutting edge microbiome research are frequently involved with start-up companies and new products. Yes, this can lead to conflicts of interest. Yes, there have been instances scientists and/or companies have misrepresented microbiome studies or made inappropriate health claims for various probiotic or microbiome-related products. But this is certainly not the "state of the industry," and broad generalizations suggesting a paucity of high-quality data and questioning the safety and efficacy of the whole industry are totally unjustified.

Let's take a look at the safety of commercial probiotic products. In 2015, there was just one single report of an infant death that was linked to a contaminated probiotic.[10]

To my knowledge, this is the ONLY death that has ever been associated with a probiotic product.

According to results from a Johns Hopkins Medicine study, over 250,000 people in the United States die every year because of medical mistakes.[11] These statistics from 2013 make doctors and the practice of medicine the third leading cause of death in the United States, behind heart disease (611,000 deaths) and cancer (584,000 deaths).

Research on probiotics and the human microbiome are leading to a whole new understanding of what it means to be human. Humans get one copy of each gene from their mother and father. However, we are not just the product of our human DNA. We now realize that over 99% of the DNA in our body is the DNA of our bacteria.[12] We are not just "us"; we are "us" plus "them." We are a human superorganism functioning symbiotically with the approximately 100 trillion bacteria in our microbiome.

A Revolution in Microbiome Science

For decades, we've known that probiotic bacteria play important roles in the regulation of human health; but until recently, probiotic mechanisms of action have remained a mystery. That is beginning to change with the growing understanding of the many functions of postbiotic metabolites.

Probiotic bacteria are amazingly complex little chemical manufacturing plants. There is an increasing understanding that the primary function of probiotic bacteria is to digest and ferment dietary fibers, which results in the production of a wide range compounds known as "postbiotic metabolites." Scientists are learning that postbiotic metabolites are critical health-regulating compounds that influence every organ in the body, including the brain and the immune system.

I wrote an article titled "Postbiotic Metabolites: The New Frontier in Microbiome Science" that was published in the June 2019 issue the *Townsend Letter.*[13] This article explains how probiotic bacteria create postbiotic metabolites and how in turn, various classes of postbiotic metabolites control and regulate a vast amount of human health.

JAMA is one of the most widely read and respected medical journals in the world. However, when *JAMA* publishes an article like "The Probiotic Conundrum," it makes me question the integrity of the editors and the journal. I don't know if the authors of "The Probiotic Conundrum" had biases or conflicts of interest, or if they were just unaware/ignorant of the vast body of research on probiotics and microbiome science.

In closing, I just want to say, *JAMA*, shame on you for publishing such a biased, unscientific article that questions the efficacy and safety of the whole microbiome/probiotic industry and all the dedicated scientists around the world who are doing groundbreaking research in the fields of probiotics, postbiotic metabolites, and microbiome science.

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References

1. Freedman SB, Schnadower D, Tarr PI. The probiotic conundrum: Regulatory confusion, conflicting studies, and safety concerns. *JAMA*. 2020;323(9): 823-824.
2. Stephen B. Freedman, MDCM, MSc. Alberta Children's Hospital, Calgary, Alberta, Canada and Alberta Children's Hospital Research Institute, Cumming School of Medicine, University of Calgary, Calgary, Alberta, Canada
3. David Schnadower, MD, MPH. Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio and University of Cincinnati College of Medicine, Cincinnati, Ohio.
4. Phillip I. Tarr, MD. St Louis Children's Hospital, St Louis, Missouri and Washington University in St Louis School of Medicine, St Louis, Missouri.
5. Jeffrey Gordon, PhD. Research Lab. https://gordonlab.wustl.edu/.
6. Canadian Microbiome Initiative *Workshop Report*. https://cihr-irsc.gc.ca/e/documents/iii_microbiome_works_rep_e.pdf.
7. Canadian Microbiome Initiative 2 (CMI2). https://cihr-irsc.gc.ca/e/39939.html.
8. MetaHIT: The European Union Project on Metagenomics of the Human Intestinal Tract. https://www.researchgate.net/publication/225216838_MetaHIT_The_European_Union_Project_on_Metagenomics_of_the_Human_Intestinal_Tract.
9. HMGJ (Japan) https://link.springer.com/referenceworkentry/10.1007%2F978-1-4614-6418-1_560-2.
10. Vallabhaneni S, et al. Fatal Gastrointestinal Mucormycosis in a Premature Infant Associated with a Contaminated Dietary Supplement -- Connecticut, 2014. MMWR *Morb Mortal Wekly Rep*. 2015 Feb 20;64(6):155-156.
11. Makary MA, Daniel M. Medical error-the third leading cause of death in the US. *BMJ*. 2016;353;i2139.
12. Zhu B, et al. Human gut microbiome: The second genome of the human body.
13. Pelton R. Postbiotic Metabolites: The New Frontier in Microbiome Science. *Townsend Letter*. June 2019;431:64-69.

Homeopathy Politics

It has been brought to my attention that I inadvertently made some errors in my recent column, "Why We Need Homeopathy Now More Than Ever Before." I sincerely thank Ronald Whitmont, MD, who, like me, has devoted his life to homeopathy, to kindly set me straight. I can see that I am much better at being a clinician than in interpreting and communicating the nuances of homeopathic politics! And, since homeopaths, in particular, are under the scrutiny of the FDA at this time, it is very important to communicate accurately. I also want to highly recommend Dr. Whitmont's remarkably thorough and well researched article on COVID-19, which recently appeared on www.hpathy.com: "The Novel 2019 Coronavirus."

I failed to mention the name of the film that recounted the political bias against homeopathic research. It is *Just One Drop*, and I highly recommend watching it, as well as a brand new film that you can find at www.magicpillsmovie.com.

This is the correct information from Ronald Whitmont, MD:

> Homeopathy is a tough pill to swallow for many adherents of conventional medicine. Like acupuncture, it is a complex system of energy medicine. But it has proved very difficult to get funding and publication of homeopathic research, and there is much opposition to recognizing a form of medicine that, in many ways, flies in the face of conventional biomedicine. A recent film, *Just One Drop*, tells the story of how the deck is stacked against the funding and accurate reporting of homeopathic studies. The UK, which has been a bastion of homeopathy, including NHS funding and strong support from the Royal Family, is now at severe risk.. Homeopathy was recently removed from the

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medical and veterinary curricula in Spain. The vibrant atmosphere of homeopathic study in Germany and the Netherlands has waned. Remedies continue to be available in pharmacies throughout France but only in low potencies.

There was a threat to the continued availability of homeopathic remedies in the US beginning in 2015, but most of the homeopathic medical, pharmaceutical, educational, and other institutions formed a united front to educate the FDA. The process is ongoing, but the FDA may have begun listening. Unfortunately, in 2019 it withdrew its Compliance Policy Guidance (CPG 400.400) which allowed them to take a permissive stance for the availability of homeopathic remedies in the US. There is still significant danger at the moment. Sixteen homeopathic organizations in the US recently sent us a letter of alarm, which we and others have forwarded to as many people as possible. In response to these efforts, the FDA has slightly revised the 2017 Draft Guidance and reissued a newer version in October 2019. The new guidance still proposes that homeopathic medicines be regulated in the same fashion as conventional drugs, according to a risk based approach. Under the direction of Americans for Homeopathy Choice, a consumer organization, the entire homeopathic community has risen together to voice opposition to the draft guidance in its current form. A limited extension of the comment period has been granted and it is currently set to expire on May 23, 2020. The new draft guidance can be downloaded or read and comments can be submitted by anyone (including those who reside internationally) here: https://www.fda.gov/regulatory-information/search-fda-guidance-documents/drug-products-labeled-homeopathic-guidance-fda-staff-and-industry.

While it is unlikely that homeopathic remedies will be completely eliminated from the marketplace, and possibly from prescribing physicians, in 2020, if FDA decides to require New Drug Applications (NDA) for any homeopathic medicines, this would probably result in the permanent removal of those medicines from the US marketplace since the process would be unaffordable and extremely arduous.

Judyth Reichenberg-Ullman, ND, MSW, DHANP

Clarification on the Use of Intravenous Vitamin C for COVID-19

In "Hospital-Based Intravenous Vitamin C Treatment for Coronavirus and Related Illnesses" by Andrew Saul and Atsuo Yanagisawa in the May 2020 issue, the recommended protocol included 20 ml of 0.5M magnesium sulfate, infused over 40-60 minutes; 20 ml of 0.5M magnesium sulfate would contain a reasonable dose of 10 mmol of magnesium.

In the US, however, magnesium sulfate for IV use comes as a 50% solution (not 0.5M solution), which translates to 2 mmol per ml. A dose of 20 ml of a 50% solution would provide 40 mmol of magnesium, which could be dangerous to infuse over 40-60 minutes.

Pharmacokinetics of Ascorbic Acid

These notes are in reference to Owen Fonorow's article entitled "Unexpected Early Response in Oral Bioavailability of Ascorbic Acid."

1. The experimental PK profile data in all five experiments/measurements performed come only from a single insulin-dependent diabetic subject. Therefore, there is no criterion for determining the intersubject variability in the observed PK results. They could be anecdotal.
2. Blood ascorbate measurements are indirect, using glucometers. It would be nice if confirmations using a second, more robust method, such as HPLC type, or a colorimetric method would also be done. Although the author mentions that the Abbott FreeStyle® Lite glucose meters has been properly calibrated for measurements in the range of 0.5 to 1.5 mg/dL, sharp increments such as those observed in experiment #3 via oral (where "blood levels spiked as early as 3 levels to higher levels than IV infusion") are observed are out of that range. All of this could raise doubts in terms of possible incorrect measurements or confounders in PK characterization.
3. Regarding the highest levels after oral administration versus continuous IV infusion, it is no surprise since precise oral administration (if the product is in solution and has good permeability, solubility and distribution) will generate high levels immediately in the blood, with those typical peaks within a few minutes of administration. Meanwhile, by IV infusion if continuous (long-term), the same drip administration will generate levels that are lower and build-up more slowly (pseudo order 0), thus the plasma concentrations are generally lower (compared to PO) but more sustained over time (longer duration).

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Jorge R Miranda-Massari,[1] PharmD
Michael J Gonzalez,[2] DSc, NMD, PhD, FACN
University of Puerto Rico, Medical Sciences Campus
School of Pharmacy[1] and School of Public Health[2]

Re: Acetyl-Glutathione and COVID-19

My name is Ted Keller, the owner of the Maplewood Company, one of *Townsend Letter*'s advertisers for many years. I would like to provide additional information about acetyl-glutathione, which was mentioned in "Letter from the Publisher" (May 2020).

I was the first company to introduce acetyl-glutathione as a readily available, orally absorbable glutathione supplement to the world market in 1998. I have sold many thousands of bottles of this supplement and have tremendous amount of feedback from users.

With regard to COVID-19, Dr. Collin's column indicates that the use of high-dose intravenous vitamin C, to control interstitial inflammation, is essential. As you may know, acetyl-glutathione given orally in high doses seems to do that as well. I have recommended doses of 1 gram to 1.5 grams orally daily as the lungs, liver, and kidneys are major consumers of glutathione; and I believe this protects those organs from inflammatory damage. Ibuprofen, as in some recent studies, exacerbated the damage of the virus and not coincidentally depletes glutathione. Alcohol and acetaminophen, as well as many pharmaceutical drugs, also rapidly deplete glutathione (GSH).

Glutathione deficiency contributes to oxidative stress, which plays a key role in aging and pathogenesis of many diseases – for example, Alzheimer's, Parkinson's, liver disease, cystic fibrosis, sickle cell anemia, HIV/AIDS, cardiovascular disease, stroke, kidney disease, and diabetes.

This past decade witnessed the discovery of novel roles of glutathione in signal transduction, gene expression, apoptosis, protein glutathionylation, and nitric oxide metabolism. Glutathione is essential for the activation of T-lymphocytes and polymorphonuclear leukocytes, cytokine production, and for mounting a successful immune response when the host is immunologically challenged.

Glutathione (GSH) has been shown to inhibit the following viral conditions: herpes simplex viruses 1 and 2, herpes zoster, HPV, influenza viruses, and possibly hepatitis C.

Patients in the late 1990s that did not respond to conventional hepatitis C protocols were literally kept alive by taking high doses of acetyl-glutathione until the newer antiviral meds were available. I believe COVID-19 infections would respond to this supplement as well. I have personally been taking high doses of acetyl-glutathione for 22 years, and I am submitting personal testimonial of my experience with this regimen. Maintaining glutathione levels is necessary in the slowing of the aging process and extending longevity. GSH has been shown to maintain telomere length.

Accumulated toxins must be eliminated to ensure a long and healthy life. One of the past issues of the *Townsend Letter* suggested that the amount of pesticides and the herbicide glyphosate in our food and water has become problematic. Not only is glyphosate a toxin, but it is more insidious as it destroys the ability to synthesize GSH.

Cardiovascular inflammation, I believe, is the cause of plaque buildup in the veins and arteries. GSH is the only supplement I know that can reverse atrial fibrillation in non-damaged hearts. GSH can, over time, reverse COPD symptoms as well – along with cessation of smoking and regular exercise. Nothing else seems to do so.

Glutathione supports hormone synthesis, and women with higher GSH levels suffer less with menopause symptoms. Women in third world countries have fewer problems with menopause, and I believe that is due to higher blood levels of glutathione, as opposed to women in highly polluted, industrial countries.

Acetyl-Glutathione Personal Testimony

I did not invent acetyl-glutathione; however, I have taken acetyl-glutathione longer than anyone on the planet, 19 years to be exact, and I am the first person to bring this product to the market.

I am 74 years old, male, 5'9", weigh 165 lbs, 34" waist. I have normal blood pressure, normal blood sugar, normal free hormones (same levels as a 40-year-old male), suffer no erectile dysfunction, no joint pain, no loss of bone or muscle mass, normal telomere length for 40-year-old, normal growth hormone levels, and normal thyroid levels. I have had no bone or muscle loss in the 19 years. I train in martial arts and regularly spar with men 50, 40, and 30 years younger than me, and I can compete. I have 27% less heavy metal concentration on average and no calcification of coronary or carotid arteries. I have not had any cold sores in 22 years. As an aside, people with herpes simplex 1 are more prone to Alzheimer's disease, according to the Cleveland Clinic. I have no macular degeneration, better hair growth, normal hearing, and few eyeglass prescription changes – two in 22 years. I have longer eyelashes, fewer wrinkles and younger looking skin. I require no sunscreen when exposed to the Colorado sun; I don't burn. I have not had any significant dental work in 20 years; my gums are in excellent condition. No COPD symptoms even after smoking for 25 years.

Before starting the daily dose of acetyl-glutathione, these were the problems that I faced: blood sugars slightly above normal, blood pressure slightly elevated, gout, occasional atrial fibrillation, elevated cholesterol, elevated triglycerides, occasional insomnia, the beginning of COPD problems, low energy, adrenal fatigue, 3 pm crash daily, no physical stamina, heavy metal contamination, one or two cold sore outbreaks per year, very thin eyebrows and eyelashes, and soft, receding gums.

I attribute my excellent health to the acetyl-glutathione supplement!

Ted Keller, RPh
Maplewood Company

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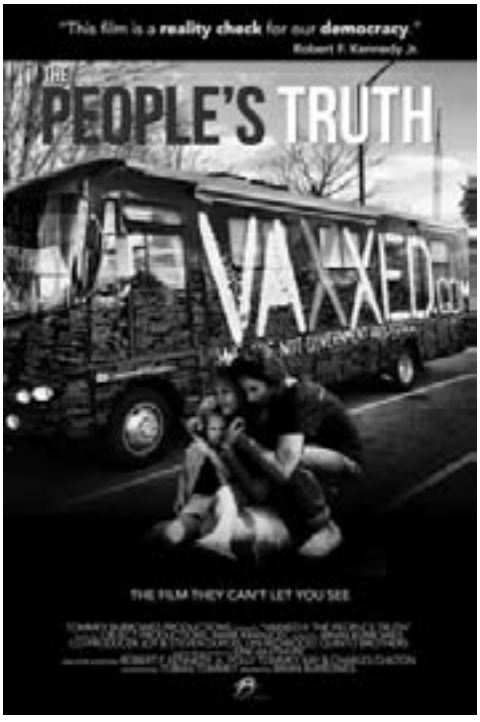

The People's Censored Truth

review by Jule Klotter

Vaxxed II: The People's Truth, a film by Brian Burrowes and Tobias Tommey
DVD and streaming at www.vaxxed2.com
90 minutes; c. 2019; $20 (US) DVD in NTSC and PAL versions

The documentary *Vaxxed II: The People's Truth* begins with the media storm that occurred after the documentary *Vaxxed: From Cover-Up to Catastrophe* was removed from the Tribeca Film Festival in 2016. *Vaxxed* was about whistleblower William Thompson's assertion that CDC scientists had destroyed data that showed a significant increased risk in autism diagnosis among Black boys who received an MMR vaccine before age 36 months. *Vaxxed* also featured parents of three boys who developed autism after the MMR: Brian Hooker, Sheila Ealey, and Polly Tommey (a producer of the film). Excoriated by corporate media across the US for being "anti-vaccine" – before it had ever been shown – *Vaxxed* actually requested four very reasonable actions:

1. That Congress subpoena Dr. William Thompson and investigate the CDC fraud;
2. That Congress repeal the 1986 National Childhood Vaccine Injury Act and hold manufacturers liable for injury caused by their vaccines;
3. That three separate, univalent vaccines for measles, mumps, and rubella be made available immediately;
4. That all vaccines be classified as pharmaceutical drugs and tested accordingly.[1]

Days after the Tribeca story made headlines, *Vaxxed* opened at Angelika Film Center in New York City on April 1, 2016, where it played to large audiences for several weeks. Director Andrew Wakefield, producers Del Bigtree and Polly Tommey, and other members of the Vaxxed team took part in question-and-answer sessions after film showings across the country. After these sessions, people invariably lined up to tell Polly their own stories of vaccine injury. She began live-streaming the stories, unedited, on Facebook (until she was censored) and Periscope TV. (All interviews are posted on the Roku channel, Peeps TV.)

The Vaxxed team were astounded at the numbers of people who wanted to share their experience with vaccine injury and how it had affected the lives of their loved ones and themselves. The film let people, who had been castigated by doctors, family members, and friends for questioning vaccine safety, realize that they were not alone; they were not "one in a million."

Tommey soon acquired a used RV, and the 'Vaxxed Nation' bus tour began. She and other members of the Vaxxed team recorded hundreds and hundreds of stories. Names of the injured were written on the outside of the bus: a total of 7044 names by the end of the *Vaxxed* tour. Brian Burrowes, who edited *Vaxxed*, and Tobias Tommey, Polly's son, used these videos as the basis for *Vaxxed II: The People's Truth.* This new film documents what they learned from the parents, patients, and doctors who agreed to be interviewed.

Over and over and over, parents reported that their child was "hitting all the milestones," "perfect," "talking and walking," "laughing" before being vaccinated. Then, within hours, the child experienced fevers, seizures, diarrhea, vomiting, or inconsolable high-pitched crying. The child "completely shut down." Children lost the ability to speak and walk. Parents of triplets shared pictures of the two boys and a girl holding hands and smiling at each other before injury. After a single pneumococcal vaccination, the daughter and then the two boys "shut off" within hours. Their mother, who is an audiologist, found that they no longer displayed the stapedial reflex (a muscle in the inner ear that dampens sound as a protection) and had lost other reflexes as well. The triplets no longer engaged with others, held hands, and they lost their smiles. Seven years later, they had not recovered. Mothers – responsible for 24/7 care of adult, vaccine-injured, non-verbal

children with seizures and in diapers – talked about the impact their child's injury has had on themselves and their marriages. They worry about who will care for their child when they no longer can. Parents also shared their grief about the death of their healthy child within hours or a few days after being vaccinated.

The Vaxxed team was particularly disturbed by the teens and young adults who experienced severe injury after receiving the HPV vaccine Gardasil. Unlike infants and toddlers who do not have words to express how their body feels, these young people could tell their own stories of seizures, paralysis, pain, neurological injury, and multiple hospitalizations. Many had been very athletic and high functioning before Gardasil. Some of the Gardasil-injured eventually died or, like Colton Barrett, committed suicide.

Heartsick by the numerous stories of injury and death, the Vaxxed team began talking with the unvaccinated people who showed up at the bus with their families "to support the injured." Contrary to their own expectations, Polly Tommey and the team discovered that the unvaccinated reported having no major/chronic health issues in their children – no recurrent ear infections, no ADHD, no eczema, no autism. The unvaccinated recovered quickly from colds and other infections. Doctors who were interviewed on the bus concurred. Pediatricians reported that after a vaccine injury parents would often decrease or stop vaccinating their other children; those who had received the most vaccinations had the most health issues, and the totally unvaccinated were the healthiest. Suzanne Humphries, an internal medicine and kidney doctor who toured with the bus for a time, said, "I had never seen health like that. I didn't know health like that was possible – not needing an antibiotic in one's entire life."

The injury and death evidenced by these patient stories is disturbing, but what bothered me the most is how often parents reported being bullied and badgered into getting their child vaccinated – even if the child had reacted badly in the past or, as in one case, had recently been hospitalized. Using guilt and fear, telling parents that their child would surely die without a vaccine and threatening to call CPS, is misuse of power at its worst and defiles the concept of informed consent. And when a parent or patient reported an adverse reaction, too often physicians refused to acknowledge the possibility.

The courageous doctors, interviewed by the Vaxxed team, all stated that their education regarding vaccines in medical school was limited to how to follow the vaccine schedule and how to administer them. They were taught that vaccines are safe and effective. There was no discussion about vaccine ingredients or adverse effects. But these doctors listened to their patients. Suzanne Humphries, for example, was a vaccine believer until one of her kidney dialysis patients reported having normal kidney function before getting a vaccine. Instead of discounting the patient report, she examined the patient's medical records and then began a deep dive into vaccine inserts and medical literature.

Vaxxed II: The People's Truth is being heavily censored. Since its premier on November 6, 2019, at over 50 venues across the US, most movies theaters have refused to show it – even for a one-time event. The documentary is being streamed on vaxxed2.com and on Peeps TV. It is also available on DVD. To publicize this new film the Vaxxed bus is on the road again, and Polly Tommey is still live-streaming the interviews. She told Catharine Austin Fitts that the bus now has over 9400 names written on it, as of March 17, 2020.[2]

References

1. The Four Requests of Vaxxed. https://vaxxedthemovie.com/four-requests-vaxxed/
2. Fitts CA. Solari Special Report: *Vaxxed II: The People's Truth* with Polly Tommey. March 17, 2020. www.solari.com

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Environmental Medicine Update

by Marianne Marchese, ND
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Immunotoxicity – Toxicants' Effects on the Immune System

Introduction

Environmental chemicals can alter the immune response and function and increase immune-mediated diseases, such as asthma, allergies, type 1 diabetes, chronic illness, fibromyalgia, and rheumatoid arthritis. The pro-inflammatory immune response induced by exposure to some toxicants contributes to immune dysfunction and is a common factor in many autoimmune diseases. The immune system is composed of multiple organs and cells and an appropriate immune response involves the interaction of multiple cell types, immunoglobulin, and cytokines. These responses are altered by exposure to certain chemicals and/or toxicants.[1]

The Basics

The way an individual comes into contact with a toxic substance is called the route of exposure and is important in determining the level of toxicity. Different cells and organs often are affected by different routes of exposure. Some chemicals may be highly toxic by one route of exposure but not by others. Two major reasons are differences in absorption and distribution within the body. For example, ingested chemicals, when absorbed from the intestine, distribute first to the liver and may be immediately detoxified. Inhaled toxicants enter the general blood circulation and can distribute throughout the body prior to being detoxified by the liver. Sometimes a person's genetic make-up determines the effects of chemical exposure on the immune system; this is called epigenetics and is always a factor in determining toxicity. Regardless, it is clear that toxicant exposure does affect the immune system as seen by changes in immune biomarkers and in the development of immune-mediated conditions.

As an example of changes in immune biomarkers induced by chemical exposure, when people with asthma inhale pesticides they not only experience wheezing and inflammation but there are alterations in blood intracellular IFN-γ and IL-4 in T-helper cells. Another example involves high-dose occupational exposure to pesticides, which creates decreased B-lymphocytes, higher serum IgE, and low levels of albumin and serum protein. Lastly, it has been shown that persons with COPD and chronic bronchitis who are exposed to pesticides, dust, gases, fumes, and solvents do worse on pulmonary function tests with lower level of forced expiratory volume and forced vital capacity.[2-4]

Toxicants That Effect the Immune System

Exposure to mercury, bisphenol-A, and dioxin increases anti-nuclear antibody (ANA), reduces B-cells and T-helper cells, creates mitochondrial damage, depletes glutathione in immune cells, and creates oxidative stress and hypermethylation of leukocytes. These toxicants also trigger conditions such as multiple sclerosis, asthma, allergies, thyroid, lupus, autoimmune hepatitis, scleroderma, and low lymphocyte subsets.[5] These toxicants are not uncommon nor are these conditions. People are exposed to methylmercury from eating fish, mercuric acid from skin lightening cream, and mercury vapor from standard dental fillings. Bisphenol-A is present in canned food, paper receipts, hard plastic beverage bottles, and more. Small amounts of dioxin are in food such as meat and dairy, which is the main source of exposure.

Metals such as mercury, cadmium, lead, arsenic from food, water, air and products increase serum immunoglobulin levels and antibody responses to T cell-dependent and T cell-independent antigens and worsening of autoimmune disease. They create increased production of the proinflammatory cytokines, tumor necrosis factor-alpha (TNF-α), IL-1β and IL-6, and production of reactive oxygen intermediates and increased eosinophil degranulation.[6] Pesticide exposure in low doses from food can trigger lupus and Hashimoto's disease.[6] Bisphenol-A is also linked to lupus and worsening of other autoimmune conditions.[6]

These toxicants that alter the immune system are common and exposure is widespread. A person's genetic make-up can determine how well they process and eliminate these chemicals. Gene and environmental interactions contribute to disease etiology. Because the immune system is immature during development, it's believed that adult-onset autoimmunity may

originate when the immune system is sensitive to exposure such as in-utero. Toxicants impart epigenetic changes (e.g., DNA methylation) that may alter immune function and promote autoreactivity.[5]

Evaluation of a patient with an altered immune system, chronic illness, or autoimmune condition should include an in-depth environmental exposure history along with general medical history. Laboratory testing may include not only immune and inflammatory markers but also testing for toxicants. Numerous labs now include testing for metals, solvents, pesticides, BPA, parabens, and phthalates. Based on the patients' symptoms, disease condition, medical and environmental exposure history, and toxicant testing, the treatment may include an environmental medicine approach. Education on avoidance of immune-disrupting compounds is the key to prevention and treatment.

Case

A 42-year-old female presented in 2019 with fatigue, muscle pain, and a sense of being inflamed for nine months. She was told by another doctor that she had fibromyalgia but not offered any treatment other than rest and magnesium. She had Graves' disease years ago, and the thyroid gland was ablated; she has been on thyroid medication ever since. She had complete hysterectomy (at age 39) for abnormal uterine bleeding and has been on hormone replacement therapy since the hysterectomy. Her medication list included Biest cream 2.5 mg, testosterone cream 0.75 mg, and levothyroxine 75 mg. Her supplements list included lavender oil, magnesium, methyl B12, vitamin-D3, iron, nattokinase, stress formula and thyroid support formula from the store.

She has lots of allergies and many of them she has had for years and some newer. Her allergies include sulfa drugs, cipro, penicillin, morphine, grasses, trees, flowers, and lots of foods like dairy, eggs, peanuts, and gluten. Sometimes the inhalant allergies induced wheezing, but her pulmonary function tests in the past were normal and she was not diagnosed with asthma. She managed these symptoms with OTC antihistamines as needed and avoidance.

The patient's vitals and physical exam were within normal limits. Initial labs were done by another doctor two weeks prior to the appointment and included CBC, CMP, TSH, HgA1C, lipids, iron, ferritin, testosterone, estradiol, progesterone, GGT, CK, DHEA, cortisol, TPO Ab, thyroglobulin Ab, ANA, CMV, and EBV; all were normal and appropriate for medication dosages.

Her intake revealed that her mother had Lyme disease and active EBV in the past and positive for MTHFR mutation. Her sister has Hashimoto's disease and takes medication. In-utero and childhood exposures were minimal based on in-depth environmental exposure intake and scorecard.org data. No significant exposures from living environment over the years, occupation, or hobbies. Two years ago, she got breast implants and thinks her symptoms really started around that time but seem worse and more significant the past nine months.

A diet intake revealed she eats lots of fish, tuna in particular. Since she had already had a thorough lab work-up, the only additional testing done at the first visit was blood mercury and a sedimentation rate. The results were blood mercury 16 and ESR 22. Both of these levels are elevated. The patient didn't want to do metal chelation because she decided to get implants removed right away and didn't want to add a chelator that might affect if she could do surgery or not. So, she started avoidance of all fish and detoxification supplements with sauna therapy.

Specifically, she commenced the following:

1. Supplement to provide vitamin and mineral co-factors for liver phase one and two metabolism, four a day. The product contained vitamins A, D3, K1, B-1, B-2, B-3, B-5, B-6, B-12 (as methylcobalamin), C, and E; biotin; folate (5-methyl-tetrahydrofolate); calcium; chromium; copper; iodine; magnesium; manganese; molybdenum; potassium; selenium; zinc; choline; inositol; boron; vanadium; green tea extract; and turmeric.
2. Liver herb product, two a day (milk thistle, beet root, dandelion, burdock and artichoke)
3. NAC 600 mg a day
4. Sauna therapy one or two times a week for eight weeks. This was done as 7-10 minutes in the heat, then 30 second cold shower, repeat five-to-six times and end on cold.

She had implants removed and started a turmeric supplement on her own after the surgery. She then did repeat labs Dec 2019. The mercury lowered to 6 and ESR to 13. Then a repeat mercury in 2020 showed mercury lowered to 3. The mercury lowered without chelation. She continued to avoid eating fish, did sauna therapy, and the three supplements. More importantly, her symptoms of fatigue, muscle pain, and sense of being inflamed were 90% better. She also felt her inhalant allergy symptoms were reduced and had not had any wheezing.

Summary

The environmental contribution to autoimmune disease and alterations to the immune system is a wide-ranging concept. This includes an understanding that exposure to environmental chemicals can affect the immune system. Toxicants play a role in immune-mediated diseases such as asthma, allergies, type 1 diabetes, chronic illness, fibromyalgia, and rheumatoid arthritis. It is important that physicians and other health care providers consider an environmental approach with autoimmune conditions, chronic illness, and disease.

References

1. Duramad P, Holland NT. Biomarkers of Immunotoxicity for Environmental and Public Health Research. *Int. J. Environ. Res. Public Health* 2011; *8*:1388-1401
2. Aroonvilairat S, et al. Effect of Pesticide Exposure on Immunological, Hematological, and Biochemical Parameters in Thai Orchid Farmers – A Cross-Sectional Study. *Int. J. Environ. Res. Public Health* 2015:*12*:5846-5861.
3. Corsini E, et al. Pesticide induced immunotoxicity in humans: A comprehensive review of the existing evidence. *Toxicology.* 2013;10(307):123-35.
4. Alif SM, et al. Occupational exposure to pesticides are associated with fixed airflow obstruction in middle-age. *Thorax*. 2017;72(11):990-997.
5. Blossom SJ, Gilbert KM. Epigenetic underpinnings of developmental immunotoxicity and autoimmune disease. *Curr Opin Toxicol*. 2018 Aug; 10: 23–30
6. WHO Library Cataloguing-in-Publication Data. Guidance for immunotoxicity risk assessment for chemicals. 2012. Accessed online http://www.inchem.org/documents/harmproj/harmproj/harmproj10.pdf

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Pediatric Pearls

by Michelle Perro, MD

To Treat or Not to Treat? An Approach to Tick Bites and Kids

Recently, while deep into the literature regarding kids and COVID, a call came in from a colleague. Her five-year-old son had just been bitten by a tick. The parents sent it to the lab for testing, and it came back positive for two Borrelia species. I quickly switched gears into Lyme mode and created a plan with the parents on what to do next.

So many articles, so many opinions and so many treatment options! For those of us who have treated Lyme disease and co-infections, (tick-borne infections or TBI), we have had to battle colleagues, fight with insurance companies for drug payment coverage, and watch countless numbers of patients fail to thrive or remain chronically ill after their three-week incomplete courses of treatment. Scars and bruises can't deter us from the question that remains: what is the best integrative approach of dealing with infection-positive tick bites in kids?

Putting the case together so far, we've simply got an asymptomatic healthy kid, a Borrelia-positive tick and worried parents. Heading to the conventional medical literature, one encounters the same tired falsehoods of seasonal biting, the infrequency of ticks carrying the organisms that cause TBI, the lack of discussion regarding co-infections, the myth that three weeks of antibiotics will "cure" infection and the very concerning inaccuracy of "...post-Lyme disease syndrome... symptoms last longer than 6 months and does not respond to antibiotics" (From Cedars-Sinai Health Library, "Lyme Disease in Children").

One of the first dilemmas to tackle is tick-testing. Bravo that the family was able to get the tick out in one piece and send it to the lab. The first step is removing the tick intact, preserving it carefully and getting it to a lab that does complete testing. An excellent reference for tick removal can be found at the Lyme Disease Association website: https://lymediseaseassociation.org/about-lyme/tick-removal-a-testing/tick-testing-2/.

Which lab to use is paramount since ideally you want both a quality laboratory that also tests for co-infections as well. This family utilized their local public health laboratory, which only tested for Borrelia species. There are many labs offering testing, and I recommend IGeneX Labs (Palo Alto, CA; 800-832-3200; www.IGENEX.com). I also find Tick Report to be a good resource (https://www.tickreport.com).

As many of my colleagues do, I value and lean on the publications and conferences by ILADS as well as their recommendations.[1] However, many of the integrative tools we employ are not presented in detail for kids, so we turn to our favorite complementary journals.[2] My first approach is to deal with the fresh bite. I generally like to use homeopathic *Ledum* 1M for five-to-seven days. If the site is inflamed and pruritic, I'll bring in *Apis* 30c and *Histaminum* 30c while awaiting the tick testing results.

Experience has taught me to be aggressive with treatment for this type of potential infection, born from the reasoning that the tick is known to be infected with Borrelia and there was attachment as per the history. (Another myth is that there needs to be prolonged attachment for disease to occur.) Treatment for chronic TBI in children is no less challenging than for adults and something better to avoid when possible. A clinical-experience-based approach, reading the research, and talking to Lyme-literate colleagues allows me to employ a multipronged therapeutic approach utilizing the magical blend of homeopathics, herbal medicine, and pharmaceuticals.

In addition to *Ledum*, homeopathic nosodes can be an effective adjunct to therapy. I gave the child Tick Pathogen Nosode (Professional Formulas), five drops, twice a day for three days, and then I'll give it once a week for three months. The combination of Bartonella and Borrelia herbal formulas together can be effective and well-tolerated by children. They tend to do well on the Beyond Balance formulas, which are also tasty. Covering at least both organisms (and potentially others), I prescribed MC-BB2 with MC-Bar1, both five drops twice a day in an ounce of filtered water for six weeks. At all costs, I try to introduce Bartonella coverage with the initial treatment since it can be difficult to eradicate when the child becomes chronically infected. There shouldn't be any Herx reactions/die-off in a child with a new bite without an underlying pre-existing infection, but Tox-Ease GL is also something to have in the toolbox to off-set herxing if that issue should arise.

Additionally, I use pharmaceutical antibiotics; and in children under eight years old, amoxicillin (50 mg/kg 2x/day) or cefuroxime (30 mg/kg 2x/day) for three weeks are my go-to's for prophylactic treatment as based on ILADS recommendations.[3] In children older than eight years, doxycycline is my first choice (100 mg 2x/day) for the same time period. This child was prescribed three weeks of amoxicillin. If a child is symptomatic, I will recommend both herbal and pharmaceutical antibiotics for three months along with immunologic testing.

Some might argue that this strategy is overly aggressive. In consideration of the insidious nature of these organisms coupled with the underlying fragile overall status of our children's health and immune systems, employing a broad therapeutic regime to target multiple organisms has had the most favorable outcomes historically in my experience. There is a window of opportunity that exists to treat before the organisms disseminate, take hold, and begin their business of immunological hijacking.

Some of our readers might be thinking that this is an easy-peasy case; you have the actual tick, which was tested, and it was positive for infection. How often does that happen? Should we treat when the tick has been mashed and can't be tested or unidentified as the blacklegged tick? Good questions! I've pondered what to do in those situations, and I still maintain treatment with the prophylactic protocol as written above.

Of course, we are employing all the other holistic treatment requirements simultaneously including nutrient and immune support. A special mention should be made about providing an organic diet rich in prebiotics, fermented foods, and probiotics. There is no doubt that the combination herbal and pharmaceutical antibiotic therapy will create havoc for the gut microbiota, and I began probiotics soon into therapy. I chose an alternating schedule of sporebiotics and combination probiotics with beneficial lactobacilli/bifidobacteria. An interesting treatment was proposed in an Israeli study using autologous fecal microbiome transplantation,[4] collecting poop before treatment and then administering it back to the patient after treatment. Whether we should be making this recommendation to our patients is something we might consider.

There are many ways to approach tick bites in children, and the reader undoubtedly will introduce their own experiential treatment strategies into the mix. The outcome of this child's treatment is yet to be determined so stay tuned to future Pearls for follow up.

References

1. Cameron DJ, et al. Evidence assessments and guideline recommendations in Lyme disease: the clinical management of known tick bites, erythema migrans rashes and persistent disease. *Journal Expert Review of Anti-infective Therapy*. 2014;12(9).
2. Bachewich J. How Lyme and Hidden Infections Sabotage Our Clinical Outcomes. *Townsend Letter*. July 2019; 432.
3. International Lyme and Associated Diseases Educational Foundation; https://iladef.org/education/how-to-handle-a-tick-bite/
4. Suez J, et al. Post Antibiotic Gut Mucosal Microbiome Reconstitution is Impaired by Probiotics and Improved by Autolgous FMT. *Cell*. September 6, 2018; 174(6):1406-1423.

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Ask Dr. J

by Jim Cross, ND, LAc
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No Man's Land

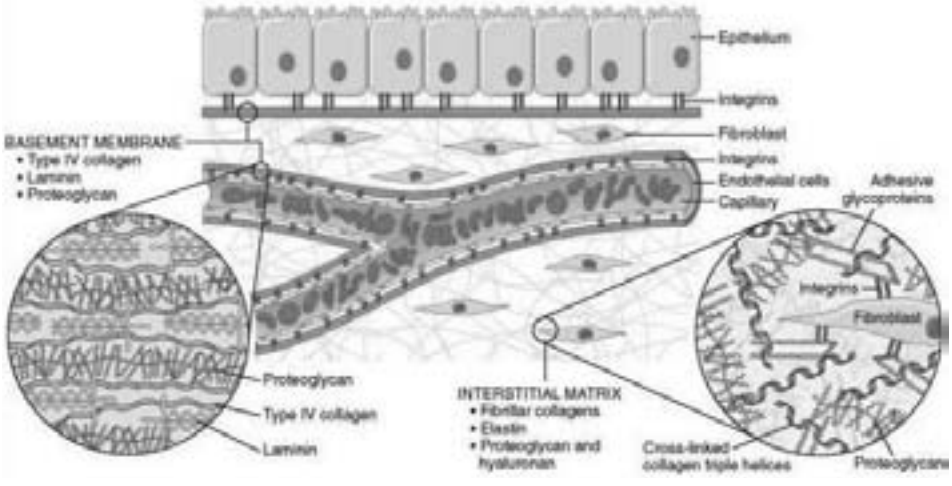
There existed a place in World War I between the English and German armies that was controlled by neither side. There were no positive energetic exchanges between the two warring armies. This area was stagnant and teemed with decaying, dead bodies and spent munitions and resisted either side from conquering it. It was called No Man's Land. For me, there is a No Man's Land in the human body. It is the local area between the capillary and the surrounding cells and is called the extracellular matrix or ECM.

This region separates the cells of every body's region from the capillary, and it also surrounds and bathes the local cells. For me, this is where dis-ease begins. The ECM becomes clogged with debris: heavy metals, chemicals from the environment, negative emotions, etc. The situation present in the ECM is analogous to standing on a beach, knee deep in salt H2O, with the waves continually washing over your legs, and then the saltwater returning back to the ocean. In my metaphor, your legs are the cells; they are standing in shallow ocean water or ECM. The incoming waves are bringing nutrients and oxygen from the capillaries, and the outgoing waves are returning waste products and carbon dioxide back to the capillaries. The focus of last month's *Townsend Letter* was kidney and liver disease; and since I feel that you can't have a healthy liver or kidney without the liver and kidney cells bathed in a nutritive, healthy ECM, I will focus my article on describing the ECM and what can develop pathologically to hamper the functionality of the local ECM and as a result the local cells and their respective organs.

Basically, a cell cannot be considered alone. One must always take its local environment into consideration. One could then call a cell a morphological abstraction, not an autonomous, functioning unit of life. For a cell to be effective and in excellent metabolic condition, it requires an unimpaired and undamaged triad. This triad I will call the Holy Trinity of Life: the local cells, their ECM, and the capillary that nourishes them and takes out their garbage. For the cell to receive the nutrients from the capillary and send the waste back to the capillary, it requires an ECM that will act like a molecular sieve, allowing free passage in both directions.

The ECM has many functions. One very important one is the transmission of environmental signals, nutrients, and wastes to and from the cells, which ultimately leads to optimal cellular function or optimal cellular dysfunction. In addition, the ECM acts a local anchor for the cell, allowing it to remain in a fairly consistent position. During wound repair and embryonic development, it also can act as a scaffold and guide cell migration to the points of growth and restoration.[1,2]

Extracellular Matrix and Collagen.[3]



Next, what is the actual composition of the ECM. Its major components are protein fibers, ground substance, and connective tissue cells. Ground substance consists of varying degrees of extracellular fluid, which contains water at different concentrations, and proteoglycans, a class of proteins that are heavily glycosylated and regulate the movement of molecules through the ECM, cushion cells, and serve as

lubricants. These proteoglycans include chondroitin sulfate, keratan sulfate, and heparan sulfate. The protein fibers are divided into two functional categories: structural and adhesive. Structural fibers include insoluble collagen and elastin fibers that provide strength, resilience, and stretch ability. Adhesive fibers are comprised of soluble, multi-adhesive proteins (fibronectin and laminin) that bind proteoglycans and collagen fibers to receptors on the cell's surface. The main type of cell is fibroblasts, which secrete the various protein fibers and ground substance. Different combinations of the above ECM components will be dynamically remodeled and specifically tailored to the structure and function of the cells of each organ.[1,2]

Every individual, then, will have a unique ECM compilation that will contribute either to the health or the dis-ease of their various cells and organs. We cannot artificially separate the functions of individual cells from their surrounding environment because each cell is intimately linked to its ECM. Much of modern medicine, in its futile attempt to pharmaceutically suppress symptoms and not discover the true cause of an illness, divorces the illnesses of its patients from their true individuality: the health of their ECM!

So, how does a healthy ECM work? Remember its goal is to transport necessary substances to the cell from the capillary and send the garbage of the cell back to the capillary. The proteoglycans/PG's, due to variabilities in their structural organization, create a type of tunnel system where the interior of the tunnels allows lipophilic and hydrophobic substances to be transported through the ECM while attached to hydrophilic compounds due to the aqueous nature of the ground substance.[4] Hydrophilic substances would be able to pass through unhindered also owing to the same aqueous nature of the ground substance. Essentially no cellular energy or ATP is required for this transport because concentration differences at each end provide the incentive for the flow of each molecule.

As it has been acknowledged that re-modelling of the ECM is important for homeostasis, alteration of the ECM has been implicated in multiple pathological conditions, including cancer.[5] In the beginning stages of toxin deposition in the ECM, the substances are effectively intercepted and eliminated. When the toxic burden is excessive, nutritional deficiencies and/or genetic polymorphisms prevent successful removal of these toxins; the person cannot sufficiently eliminate these toxins from their ECM.[5] This point signifies the beginning of the pollution of the ECM's all over the body. Unfortunately, this unfolding scenario is not visible to the patient or doctor and has not yet altered any available lab testing. What is happening is a maladaptation of the ECM. Essentially the individual is outwardly healthy but inwardly polluted.[6]

What are some actual microscopic signs that the ECM is aging? One sign is crosslinking of the collagen fibers through glycation or excessive binding of sugar to the collagen. This leads to stiffening of the ECM, which makes it weaker and less elastic and more rigid than younger ECM. This state makes transmission of molecules a much more strenuous chore.[7,8] Another sign is that fibroblasts become senescent and express elevated levels of interleukins and cytokines leading to a chronic state of inflammation in the EMF, which also begins to hamper the ability of the EMF to function optimally.[9]

So, what can we do to assess if this outwardly invisible damage is occurring and to what extent damage has already manifested? This requires using energetic diagnostic equipment. One such modality is EAV or electroacupuncture according to the German MD Reinhard Voll. Dr. Voll found that general areas of the body had low levels of electrical conductivity which was strange due to the large quantity of ions present in the body. He did find specific points where the electrical flow was much stronger, and these areas correspond to acupuncture points and meridians. Basically, Voll machines are conductivity meters that measure the flow of electricity through individual points and meridians. You are essentially not testing the actual liver but the energetic component of the liver.[10]

A diverse selection of energetic testing methods abounds in our world. Other examples are the Zyto Machine and the NES/NutriEnergetics System. Many individuals doubt the validity of this type of testing, but I have found it to be invaluable in helping me assist sick clients and, personally, with premature ventricular contractions that were becoming extremely severe.

I have given you information so that you can begin to understand where actual organic diseases originate in the microscopic ECM. Hopefully, your ECM cups will not runneth over with toxins and spill over into the general body. If so, please trust that there are practitioners out there with the diagnostic capability to help you turn your ECM back from shark-infested fluid to the clear, blue water of a Sierra mountain lake.

References

1. https://biologydictionary.net/extracellular-matrix/
2. https://www.tocris.com/cell-biology/extracellular-matrix-and-adhesion-molecules
3. https://www.slideshare.net/DrSobiaKhalid/extracellular-matrix-n-collagen
4. http://www.biopathica.co.uk/documents/studies/Matrix_Heine.pdf
5. Mathivanan S. Extracellular Matrix and the Extracellular Environment. *Proteomics.* December 20, 2017.
6. Pischinger Alfred. Matrix and Matrix Regulation: Basis for a Holistic Theory in Medicine. Haug International, Brussels 1991.
7. Robins SP. Biochemistry and functional significance of collagen cross-linking. *Biochem Soc Trans.* 2007;35: 849-852.
8. Calleja-Agius J, Muscat-Baron Y, Brincat MP. Skin ageing. *Menopause Int*. 2007;13: 60-64.
9. Coppe JP, et al. The senescence-associated secretory phenotype: the dark side of tumor suppression. Annu Rev Pathol. 2010;5: 99-118.
10. https://eavresource.com/eav-articles/

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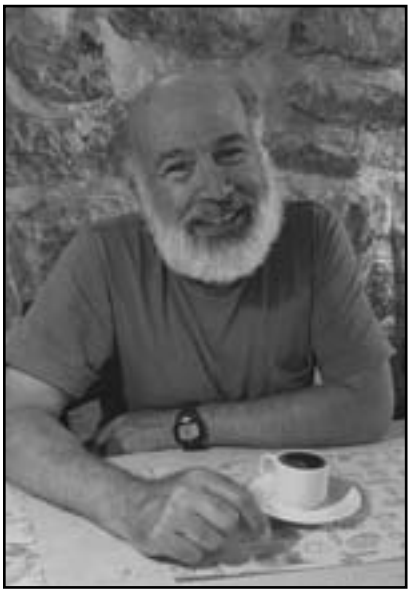

Curmudgeon's Corner

by Jacob Schor, ND, FABNO
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Homeopathic Prophylaxis of Poison Ivy

I have always appreciated reading catalogs. As a child much of what I knew of the outside world came from paging through Sears Roebuck and Montgomery Ward catalogs; all the things people could need or want were all listed with explanatory details. One could pause and study the information and photos and contemplate why someone might want to acquire a certain object. In my teenage years I switched to studying LL Bean and REI catalogs and can probably still recite the relative merits of the offerings in each catalog. Few things will ease me to sleep better than paging through a catalog, especially advertisements for things I have little interest in or use for.

My new favorite catalog comes from a company in Alabama called Forestry Suppliers. I have on my nightstand their 71st annual catalog. I chanced upon their company as they seem to be the only remaining manufacturer of a surveying tool called a Jacob Staff. It may be hard to believe but I sought one of these out – not because of the name, but for its function – even before I knew what it was called. It's a simple wooden staff used in a simpler time to balance either a compass or inclinometer on for surveying. In somewhat ancient times a slightly more complicated tool, a Jacob Cross, was used to calculate the height of objects at a distance, but I digress. I found this catalog by chance and have enjoyed reading descriptions of various tools and implements that I never knew existed.

Take for example skidding tongs. I count at least nine to choose from and that's not including the various (half dozen) timber carriers that are basically a similar shaped tong attached to a crossbar so two individuals can carry a tonged-log between them (the cross pieces are available in both wood or aluminum), or the cants used to roll logs, or pike poles, pickaroons, or hookaroons. There are photos of three dozen handheld compasses to compare. As one would expect there are axes; throwing axes (including a competition axe sold for $370), splitting axes, felling axes, Yankee hatchets, German-type hatchets, forest axes, Hudson Bay axes, boy's axes, double bit saddle axes, single bit axes, belt axes, Pulaski and Council Axes. Each are carefully illustrated and described. Reading any of this material is guaranteed to put me to sleep.

My friend Clark, who I kayak with, carries a handheld gadget on his boat deck that measures windspeed; and on particularly gusty days he aims it into the wind and quantifies what I already know, that it's really windy. If I was interested in such a gizmo, Forestry Suppliers offer the opportunity to choose between three dozen handheld 'atmospheric data centers', not to mention pages of weather monitors that will interconnect via Bluetooth in ways I do not understand but am saving up to study on a sleepless night. The catalog offers 15 different types of snake gaiters or chaps, most in a variety of sizes plus other gaiters designed to keep out ticks, chiggers, and what not.

I think you've got the idea by now. This catalog offers a compendium of reliable things needed by people who work in the woods, practical, pragmatic things that are used by people who expect and rely on performance.

The reason I'm writing this article is that just after the pages listing insect repellents, calamine lotion and other things to prevent itch, (including post-contact skin cleansers dispensed either as towelettes or by the gallon – the dispensing pump is extra), there is an interesting product called Oral Ivy™. Let me copy the catalog description:

> Natural protection from the irritation of poison ivy, oak and sumac. Taken as directed Oral Ivy™ helps the body safely and naturally fight off ivy, oak or sumac poisoning. Taken orally you can protect yourself from direct and indirect ivy poisoning. Just add 3 to 5 drops of Oral Ivy to ¼ glass of water or juice and drink it daily starting 1 to 2 weeks before exposure and continuing daily intake throughout the poison ivy season. Note: Oral Ivy™ is an over-the-counter homeopathic medicine extracted with alcohol from poison ivy leaves (Rhus Tox).

The catalog goes on to say that it is manufactured in accordance to homeopathic principles set forth in the homeopathic pharmacopeia of the United States, so on and so forth.

In fact, this is the classic Boericke & Tafel product, *Rhus toxicodendron* 3x.

I found it peculiar and kind of out of place to find Oral Ivy listed in my Forestry Suppliers catalog; it struck me to be something more likely to see at Whole Foods or Natural Grocers. Perhaps I'm revealing a cultural bias, but I'm not thinking that shoppers for hard hats, chain saws, and logging boots are the sorts who prefer homeopathic approaches to health care. The company does not hesitate to sell pesticide application equipment. One can find pages and pages of herbicides, insecticides, and various sprayers from dainty one-quart handheld misters, to sprayer backpacks, to 65-gallon sprayers that you tow behind your ATV (that's all terrain vehicle).

Those of us who work indoors might not appreciate what an occupational hazard poison ivy is to many people. Allergic contact dermatitis due to poison ivy (and poison oak and sumac) affects about 50 million Americans each year. This is the number one cause of allergic dermatitis.[1]

To understand why we find Oral Ivy listed in Forestry Suppliers, we need to go back some years.

Starting in 1953, the year I was born, Elmer Gross, MD, of Wilmington, Delaware, ran a series of studies testing Oral Ivy. Initially he enlisted 161 private patients from his medical practice; men, women, and children who had prior episodes of poison ivy reaction. Oral Ivy reduced the frequency and severity of poison ivy episodes in 75% of this group. Starting in 1955, Dr. Gross began enlisting individuals who were far more likely to be routinely exposed to poison ivy; he recruited one hundred employees of the Asplundh Tree Service Company. The results were similar: again 75% reported significant improvement. Of the 455 individuals (including 177 tree service workers) he eventually tested, Oral Ivy on 76.9% reported improvements.[2]

It's hard to argue with something that works, and we must suspect those Asplundh employees were a pragmatic bunch and just kept using Oral Ivy, no matter what the scientific critiques say about homeopathy. Nearly 70 years later they are still using it.

Reading Dr. Gross's paper one gets the idea that he experimented with various Rhus tox products. He notes that oil suspensions of the ivy toxin were judged unacceptable because they were slow to absorb and triggered pruritis ani. An alcohol dilution was absorbed faster and worked better.[2]

Now there are some who will say that because Oral Ivy is only a 3x dilution, which is one part in a thousand dilution, it isn't 'real homeopathy.' Thus, we might be tempted to make a distinction between its effectiveness and more dilute preparations.

Yet in 2003, Stein and Parsons reported that they had tested 56 subjects using a 6x/12x homeopathic preparation of ivy giving 3 ml orally once a week for three weeks and then 3 ml orally once a month for seven months. Twenty-seven of the 56 subjects reported less severe or fewer episodes of poison ivy and twenty-five reported no episodes.[4] These are clearly in the well diluted 'classic homeopathic' range.

Robert Signore added several anecdotal cases in support of using homeopathic Rhus tox prophylactically in an article published in 2017.[3]

I admit I was a bit surprised to find Oral Ivy in the pages of Forestry Suppliers. But Gross's early work using it with early customers of this company offers a plausible explanation. I reached out to the company; they have carried this product in their catalog since 1994.

The way Oral Ivy is used to prevent poison ivy puts it into a category called homeopathic prophylaxis. This is different than acute prescribing, using homeopathy to try to reduce symptoms already present. Prophylaxis is preventive. The homeopathic research found on PubMed can all be divided into one of these two categories.

There are quite a number of homeopathic preparations that are suggested for prophylaxis, though the research has not always come out in favor as it has with poison ivy products.

A Cochrane review published in 2018 looked at both prophylactic and acute use of homeopathy. The review by Hawke et al, searched the medical literature for clinical trials using oral homeopathic products in kids to prevent or treat acute respiratory infection. The researchers narrowed findings down to eight trials that included a total of 1,562 children who received either a homeopathic medicine or some type of a control treatment (placebo or conventional treatment) for upper respiratory infections. Four studies asked if the treatment could prevent the infections after one to three months of treatment during the year that followed. Many of these selected studies had significant weaknesses that included methodological inconsistencies, high attrition rates, protocol deviations, high risk of bias and other faults that those who perform these Cochrane reviews take to heart. The inconsistencies made combining the data to perform a meta-analysis difficult. The final results were not particularly favorable for the homeopathic treatments. The studies at low risk of bias showed no benefit from the homeopathic treatments. The high bias studies did report some mild beneficial effect. The most statistically significant effects were seen in the two pooled individualized treatment studies (n=155), but these results favored the placebo over the homeopathic medicine. In other words, these aren't the sort of results anyone will be in a rush to highlight.[5]

Still, we have long seen homeopathic flu products sold for prevention. Some of our colleagues promote homeopathic substitutions for standard vaccinations, though I have yet to see any evidence that argues doing so provides benefit. We see dentists and plastic surgeons who advise patients to take homeopathic *Arnica* before procedures. This apparently is a fairly common practice in India.[6] A 2020 review in the *Annals of Plastic Surgery* promotes a combination of homeopathic *Arnica* and bromelain (though I am unclear whether the authors know what they are talking about as bromelain is typically not used in homeopathic form but as an active enzyme).[7] I have long followed Dr. Jared Zeff's recommendation to prescribe a combination of homeopathic remedies pre- and post-surgery (200c of *Hypericum, Arnica, Phosphorous, Staphysagria,* and *Bellis*) and always thought it helpful for patients. Of course, one may easily write off such perceived benefit as placebo action.

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Curmudgeon's Corner

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It's harder to imagine placebo effects in veterinary practice: several recent studies suggest that a homeopathic product, DIA 100, is useful to protect newborn lambs[8] and calves[9] from diarrhea caused by gastroenteritis.

The way I see this is that some, but not all, homeopathic preparations work. Just because one particular homeopathic medicine is effective does not mean all homeopathic preparations are equally effective. Over the years I've described that later belief as Arnica Syndrome. People often get so excited about homeopathy after seeing *Arnica's* reliable action that they leap to the belief that all homeopathy works equally well; in fact, they sometimes take it a step further and justify believing that any implausible 'medicine' that they don't understand may also work.

Whatever the case, I plan to order a new wide brimmed aluminum hardhat from Forestry Suppliers, one that will protect me from falling acorns next fall. And I'm adding a bottle of Oral Ivy to my online cart.

References

1. Signore RJ. Prevention of poison ivy dermatitis with oral homeopathic Rhus toxicodendron. *Dermatol Online J*. 2017 Jan 15;23(1). pii: 13030/qt3rm4r9hk.
2. Gross ER. An oral antigen preparation in the prevention of poison ivy dermatitis; results in 455 cases of ivy sensitivity. *Ind Med Surg*. 1958: 27(3), 142-144.
3. Stein MF, Parsons E. Effectiveness in Oral Rhus toxicodendron Solution for Poison Ivy. *Int J Pharm Compd*. 2003 Jul-Aug;7(4):272-5.
4. Signore RJ. Prevention of poison ivy dermatitis with oral homeopathic Rhus toxicodendron. *Dermatol Online J*. 2017 Jan 15;23(1). pii: 13030/qt3rm4r9hk.
5. Hawke K, et al. Homeopathic medicinal products for preventing and treating acute respiratory tract infections in children. Cochrane Database Syst Rev. 2018 Sep 9;9:CD005974.
6. Ghosh S et al. Dental Practice Scenario in a Government Homeopathic Hospital in West Bengal, India. *J Evid Based Complementary Altern Med.* 2014 Jul;19(3):200-204.
7. Knackstedt R, Gatherwright J. Perioperative Homeopathic Arnica and Bromelain: Current Results and Future Directions. *Ann Plast Surg*. 2020 Mar;84(3):e10-e15.
8. Fortuoso BF, et al. Reduction of stool bacterial counts and prevention of diarrhea using an oral homeopathic product in newborn lambs. *Microb Pathog*. 2019 Feb;127:347-351.
9. Fortuoso BF, et al. Homeopathic treatment as an alternative prophylactic to minimize bacterial infection and prevent neonatal diarrhea in calves. *Microb Pathog*. 2018 Jan;114:95-98.

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research.[6] In contrast, some of the other commercially available *L. rhamnosus* GG products appear to have been manufactured by a different method.

Another well-studied probiotic is a proprietary product that consists of four strains of lactobacilli, three strains of bifidobacteria, and one strain of *Streptococcus salivarius* subsp. *thermophilus*. Originally sold under the name VSL#3, this product has been shown to induce remission and to prevent relapses in patients with ulcerative colitis,[7,8,9] and to prevent hepatic encephalopathy in patients with cirrhosis.[10,11]

VSL#3 was invented over 25 years ago by Dr. Claudio De Simone and was produced by a United States company, VSL Pharmaceuticals. In 2014, Dr. De Simone left VSL Pharmaceuticals and began working with another US company, ExeGi Pharma, to produce the same product as the original VSL#3 preparation. In 2016, VSL Pharmaceuticals announced that they had moved the production of VSL#3 to Italy and, unlike the original VSL#3 product, they no longer used dairy products in the manufacturing process. The new product made by ExeGi Pharma is sold under the brand name Visbiome in the US, Vivomixx in Europe, and DeSimone Formulation in Korea. The brand name VSL#3 is now applied to the formulation manufactured in Italy by CSL/Nutrilinea. Like the original VSL#3 product, Visbiome is manufactured using dairy products. A recent study found significant differences *in vitro* between the effects of Visbiome (the original VSL#3 product) and the new VSL#3 product made in Italy. Specifically, the production and metabolism of 1,3-dihydroxyacetone differed between products, resulting in a 40-fold higher 1,3-dihydroxyacetone concentration in the Italian product than in Visbiome. *In vitro*, 1,3-dihydroxyacetone reduced the viability and decreased the rate of repair of rat intestinal epithelial cells.[12] In addition, the VSL#3 product produced in Italy had adverse effects *in vitro* on several measures of epithelial barrier function. In contrast, Visbiome had either positive effects or no effect on these parameters.[13] These differences could conceivably be due to differences in epigenetic modulation of bacterial genes, which could influence the metabolic effects of the organisms. The available evidence suggests that Visbiome (not Italian-made VSL#3) should be used for conditions that have been reported in the medical literature to respond to VSL#3.

Safety Considerations

Probiotic organisms are well tolerated by most people, although individuals with milk protein allergy may experience allergic or anaphylactic reactions to probiotics grown on milk protein.[14] An analysis of 11 probiotic products available in Spain revealed that one contained milk protein despite claiming to be milk-free, and two others contained milk protein without providing such information on the label.[15] Allergic reactions to *Saccharomyces boulardii* (a probiotic yeast organism) have also been observed.[16] In addition, there have been reports of vaginitis due to *S. cerevisiae* (brewer's or baker's yeast), which presumably resulted from fecal-to-genital migration following oral ingestion of the organism. *Saccharomyces* vaginitis was clinically indistinguishable from vaginitis due to *Candida albicans*, and often required prolonged treatment, because of reduced sensitivity to common anti-fungal agents (with outright resistance to fluconazole).[17]

The most serious adverse effects of probiotics have been *Lactobacillus* bacteremia (from ingestion of *Lactobacillus* strains) and fungemia or invasive fungal disease (from ingestion of *S. boulardii* or *S. cerevisiae*). In some cases these infections were fatal or appeared to contribute to the patient's death. Predisposing factors to probiotic-induced bacteremia or fungemia include critical illness, severe underlying disease, compromised immune function, a damaged gastrointestinal barrier, prosthetic heart valves, indwelling central venous catheter, administration of multiple antibiotics, and prolonged treatment with probiotics or use of excessive dosages. Probiotics should be avoided or used with caution in patients who have these predisposing factors.

Alan R. Gaby, MD

References

1. Gardiner GE, et al. Persistence of Lactobacillus fermentum RC-14 and Lactobacillus rhamnosus GR-1 but not L. rhamnosus GG in the human vagina as demonstrated by randomly amplified polymorphic DNA. *Clin Diagn Lab Immunol*. 2002;9:92-6.
2. Martinez RC, et al. Improved treatment of vulvovaginal candidiasis with fluconazole plus probiotic Lactobacillus rhamnosus GR-1 and Lactobacillus reuteri RC-14. *Lett Appl Microbiol*. 2009;48:269-274.
3. Anukam K, et al. Augmentation of antimicrobial metronidazole therapy of bacterial vaginosis with oral probiotic Lactobacillus rhamnosus GR-1 and Lactobacillus reuteri RC-14: randomized, double-blind, placebo controlled trial. *Microbes Infect*. 2006;8:1450-1454.
4. Beerepoot MA, et al. Lactobacilli vs antibiotics to prevent urinary tract infection. A randomized, double-blind, noninferiority trial in postmenopausal women. *Arch Intern Med*. 2012;172:704-712.
5. Grzeskowiak L, et al. Manufacturing process influences properties of probiotic bacteria. *Br J Nutr*. 2011;105:887-94.
6. Haldeman M. Product Development, Scientific Affairs, i-Health, Inc. Personal communication, March 5, 2020.
7. Shen J, et al. Effect of probiotics on inducing remission and maintaining therapy in ulcerative colitis, Crohn's disease, and pouchitis: meta-analysis of randomized controlled trials. *Inflamm Bowel Dis*. 2014;20:21-35.
8. Miele E, et al. Effect of a probiotic preparation (VSL#3) on induction and maintenance of remission in children with ulcerative colitis. *Am J Gastroenterol*. 2009;104:437-43.
9. Sood A, et al. The probiotic preparation, VSL#3 induces remission in patients with mild-to-moderately active ulcerative colitis. *Clin Gastroenterol Hepatol*. 2009;7:1202-9.
10. Lunia MK, et al. Probiotics prevent hepatic encephalopathy in patients with cirrhosis: a randomized controlled trial. *Clin Gastroenterol Hepatol*. 2014;12:1003-8.e1.
11. Dhiman RK, et al. Probiotic VSL#3 reduces liver disease severity and hospitalization in patients with cirrhosis: a randomized, controlled trial. *Gastroenterology*. 2014;147:1327-37.e3.
12. Trinchieri V, et al. Efficacy and safety of a multistrain probiotic formulation depends from manufacturing. *Front Immunol*. 2017;8:1474.
13. Palumbo P, et al. The epithelial barrier model shows that the properties of VSL#3 depend from where it is manufactured. Endocr Metab Immune Disord Drug Targets 2019;19:199-206.
14. Moneret-Vautrin DA, et al. Probiotics may be unsafe in infants allergic to cow's milk. *Allergy*. 2006;61:507-8.
15. Martín-Munoz MF, et al. Anaphylactic reaction to probiotics. Cow's milk and hen's egg allergens in probiotic compounds. *Pediatr Allergy Immunol*. 2012;23:778-84.
16. Hwang JB, et al. Probiotic gastrointestinal allergic reaction caused by Saccharomyces boulardii. *Ann Allergy Asthma Immunol*. 2009;103:87-8.
17. Sobel JD, et al. Vaginitis due to Saccharomyces cerevisiae: epidemiology, clinical aspects, and therapy. *Clin Infect Dis*. 1993;16:93-9.

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Some Thoughts About Using Probiotics

Probiotics are bacteria or yeast organisms that may have beneficial effects on human physiology and health. Probiotic organisms are believed to work in part by enhancing digestion and immune function, by competing with pathogenic microorganisms for binding sites on mucosal surfaces, and by producing chemicals that inactivate or kill pathogens or have other desirable effects. Probiotics appear to be useful for preventing or treating a wide range of health conditions, including constipation, irritable bowel syndrome, inflammatory bowel disease, infantile colic, antibiotic-associated diarrhea, various types of infections, cirrhosis, nonalcoholic fatty liver disease, and vaginitis. This editorial provides some thoughts about how to use probiotics safely and effectively.

Different Strains May Be Preferable for Different Conditions

A wide range of probiotic strains are commercially available, and it cannot be assumed that their effects are the same or even similar. The normal bacterial flora differs substantially in different parts of the body, and the capacity of specific probiotic organisms to exert a beneficial effect may vary at different sites. For example, while *Lactobacillus rhamnosus* GG has been found to be useful for preventing and treating certain gastrointestinal conditions, it was not effective at colonizing the vaginal mucosa.[1] In contrast, *L. rhamnosus* GR-1 and *L. reuteri* RC-14 were relatively effective at colonizing the vaginal mucosa, and these organisms have been used successfully for preventing and treating vaginitis[2,3] and recurrent urinary tract infections.[4] It would seem that the most logical approach when treating a particular condition is to use the specific probiotic preparations that have been found to be effective for that condition. If those strains are not commercially available, a reasonable alternative might be to use a product that has demonstrated efficacy for other conditions in the same body system as the condition being treated (e.g., gastrointestinal, genitourinary, nasopharyngeal, or dermatological).

Same Strain, Different Manufacturer, Different Effects

While it is logical to recommend the same probiotic product that was found to be effective in clinical trials, identifying that product among the commercially available options is not always straightforward. For example, one study found that different commercial sources of the same probiotic strain (*L. rhamnosus* GG) differed to some extent in their biological properties. These differences may have been due to differences in the manufacturing process.[5]

L. rhamnosus GG (also called *L.* GG) is one of the most widely used probiotic strains. Numerous studies have found it to be useful for treating acute diarrhea in children, antibiotic-associated diarrhea (including *Clostridium difficile*), functional abdominal pain, irritable bowel syndrome, gastrointestinal symptoms associated with systemic sclerosis, and nonalcoholic fatty liver disease in children. It was also effective in some studies for preventing dental caries, respiratory tract infections in children attending daycare centers, and pulmonary exacerbations in people with cystic fibrosis. However, not all of the studies have been positive. It is possible that the conflicting results in different studies were due in part to the use of products from different manufacturers, although that possibility is difficult to investigate, because research papers often do not mention the source of the product. I have typically used the Culturelle brand of *L. rhamnosus* GG, because it is manufactured according to the original production method and it contains the preparation that has been subjected to the most

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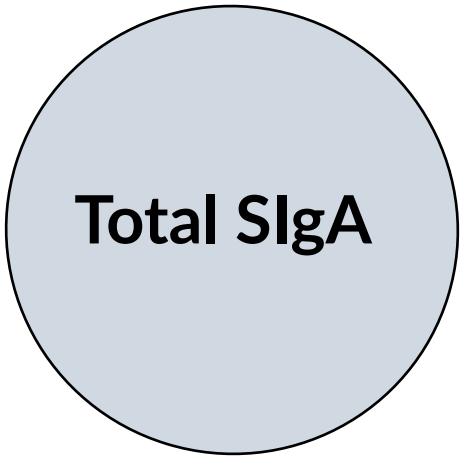

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Article

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MDPI

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tract: Cannabidiol (CBD), a phytocannabinoid compound of *Cannabis sativa*, shows limited oral vailability due to its lipophilicity and extensive first-pass metabolism. CBD is also known for igh intra- and inter-subject absorption variability in humans. To overcome these limitations a l self-emulsifying drug delivery system (SEDDS) based on VESIsorb® formulation technology porating CBD, as Hemp-Extract, was developed (SEDDS-CBD). The study objective was to te the pharmacokinetic profile of SEDDS-CBD in a randomized, double-blind, cross-over design the same Hemp-Extract

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