CALIBER OF EVENTS .............................................................. 38

FROM THE EDITOR’S DESK ........................................................................................................ 41
Virginia Kessinger

THE LEGACY CONTINUES ........................................................................................................ 43
A. Jay Kessinger IV, DC, ND, DABCI, DACBN

SYSTEMIC MYCOSES:  
AN OVERVIEW FOR NATURAL HEALTH PROFESSIONALS ..................................................... 45
Robert Thiel, PhD.

SOUND OFF .................................................................................................................................. 59
Tim McCullough, DC, DABCI, APC

THOUGHTS AT LARGE: Issue 12
VITAMIN K1 VERSUS THE MK-7 VERSION OF VITAMIN K2  
SUPPLEMENTATION: WHICH IS BEST FOR YOUR PATIENTS? ............................................. 61
Jeffrey Moss, DDS, CNS, DACBN

FOURTEEN DIETARY SUPPLEMENTS THAT REDUCE  
SYSTEMIC INFLAMMATION AND COULD POTENTIALLY HELP MANAGE TYPE II DIABETES MELLITUS:  
A REVIEW OF THE AVAILABLE EVIDENCE ............................................................................. 67
Adrian Isaza, DC, DACBN, CCAP

DABCI s AND WHERE THEY ARE .............................................................................................. 74

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News items and/or letters pertaining to natural health care are welcome. The editorial staff reserves the right to edit and/or reject all material received. Letters to the editor may be condensed in order to fit the allotted space. An address and telephone number where the author may be reached during normal business hours should also be included for verification purposes. Deadline for article submission is the 5th of the month preceding publication.

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### CALENDAR OF EVENTS

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<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Event Description</th>
<th>Speaker</th>
</tr>
</thead>
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<tr>
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<td>Neoplastic Diseases: Diagnostics and Treatment</td>
<td>Dr. Kleber, Dr. Lundell, Dr. Wisniewski</td>
</tr>
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<td>Dr. TJ Williams</td>
</tr>
</tbody>
</table>

### SAVE THE DATES

**Symposium**  
March 13-15, 2020  
Denver, CO

**ACA Nutrition Council**  
April 30 – May 3, 2020  
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# 300 HOUR DABCI DIPLOMATE PROGRAM (WEEKENDS 1-26)

<table>
<thead>
<tr>
<th>Weekend</th>
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<td>February 15-16, 2020</td>
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<td>Dr. Robert Kessinger</td>
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<tr>
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<td>June 20-21, 2020</td>
<td>1010</td>
<td>EKG Interpreting EKG-ECG</td>
<td>Dr. Delilah Renegar</td>
</tr>
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<td>Dr. Chris Murray</td>
</tr>
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<td>1021</td>
<td>Diagnostic Training for Cardio-Respiratory Disorders</td>
<td>Dr. Delilah Renegar</td>
</tr>
<tr>
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<td>October 17-18, 2020</td>
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<td>November 14-15, 2020</td>
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<td>Dr. Cindy Howard</td>
</tr>
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<td>December 12-13, 2020</td>
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<td>Pharma Reactions - Nutritional Supplements and Pharma</td>
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</tr>
<tr>
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<td>February 20-21, 2021</td>
<td>1027B</td>
<td>Advanced Endocrinology</td>
<td>Dr. Robert Kessinger</td>
</tr>
<tr>
<td>22</td>
<td>April 17-18, 2021</td>
<td>1022</td>
<td>Neoplastic Disease &amp; Cancer I</td>
<td>Dr. Robert Kessinger</td>
</tr>
<tr>
<td>23</td>
<td>May 15-16, 2021</td>
<td>1023</td>
<td>Neoplastic Disease &amp; Cancer II</td>
<td>Dr. Michael Taylor</td>
</tr>
<tr>
<td>24</td>
<td>June 12-13, 2021</td>
<td>1004</td>
<td>Male and Female Pelvic Classroom</td>
<td>Dr. Cindy Howard</td>
</tr>
<tr>
<td>25</td>
<td>July 10-11, 2021</td>
<td>1005</td>
<td>Male and Female Pelvic Workshop** - Must Attend in Person at NUHS</td>
<td>Dr. Cindy Howard</td>
</tr>
</tbody>
</table>

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Everyone is looking for a shortcut to optimal health. If we could discover a magic pill for instant health, we could not keep them in stock. Money would be no object!

Shortcuts in life usually don't work out as well as a well-planned strategy. How many times do we see advice on television for financial planning? Long-range plans tend to have better outcomes. This is more important when it comes to health than it is for wealth. All the money in the world cannot restore a serious health condition. It is a much better plan to include long-term health goals, along with that financial planning.

If we wait until there is a looming prospect of a disease process entering our life, it is often too late to avert disastrous results. Planning ahead is a better strategy. And….. it takes much longer than a two week window! The panic doesn’t have to be an issue unless a person is ill prepared.

The health habits we establish before we are in our 40’s set our health status in later years. If a person has practiced good diet, proper exercise, proper rest and an acceptable healthy lifestyle in general, they are more likely to enjoy a better outcome in their retirement years.

The body adapts to most situations. If a person prefers to consume mostly sugars, breads, junk food and soda pop when young, they can probably stay upright due to the body’s ability to balance all issues at those ages. But, there is a pattern of behavior that changes the body physiology. If the body has to keep going to reserves to handle the assaulting intake of foods and drinks, it has to alter patterns of how it adapts. This is like running as fast as you can when you start a long distance marathon race….. you may not be able to finish strong. I always tell patients to think of what they consume as gas they put in their car. If they put kerosene in their car…. It may run for a bit but it will not last. Fuel in the car is no different from the items we put in our mouth. It is the fuel that make the body run.

When a person is young, it is hard to relate to being old. That concept seems so far away. It is not top priority. A long time ago someone said to me, “if I had known I was going to live this long, I would have taken better care of myself.”

It was great to see the decline in smoking cigarettes a few years back. Now I am seeing more young people back on the ciggy train. They must have not gotten the memo? Cigarettes will shorten your life. They will take your health down. Now, it seems it is vogue to smoke. It isn’t that great when the lungs have failed and the patient is tethered to an oxygen tank.

That brings up another misconception on health habits. What about the new marijuana trend? Can that smoke be better for the lungs. Can it be a smarter choice than abstinence from smoking at all?

How about the shortcuts in foods consumed by most in this day and age? One of my staff asked me if I knew how to make homemade food. She said they call it “cooking from scratch.” After I figured out what she meant, I said “yes”. Many young adults now do not realize that you can construct your own potato salad or cut up your own salad. They assume it comes from a super market deli or drive through window. It is little wonder that we are experiencing a decline in healthy people. The obesity in our nation is startling.

Does it make sense to skip exercise and just take a diet pill that “melts away fat while a person sleeps?” I think the body is created to move. Exercise puts all systems into gear. Don’t get me wrong. I love this concept but it is a shortcut that will not give long range great results.

Our Creator didn’t plan on modern day scientific sources outsmarting his master plan. As much as the medical profession discovers shortcuts to good health, the basic principles will still prevail. A good diet, exercise, proper rest and healthy habits will always be a constant.

“If you do not make time for your wellness, you will be forced to make time for your illness.”

2019 Facebook post
## 300 Hour DABCI Diplomate Program

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<td>Neoplastic Disease &amp; Cancer II</td>
<td>Dr. TJ Williams</td>
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<td>24</td>
<td>May 9-10, 2020</td>
<td>1004</td>
<td>Male and Female Pelvic Classroom</td>
<td>Dr. Cindy Howard</td>
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<tr>
<td>25</td>
<td>June 6-7, 2020</td>
<td>1005</td>
<td>Male and Female Pelvic Workshop** - <em>Must Attend in Person at NUHS</em></td>
<td>Dr. Cindy Howard</td>
</tr>
<tr>
<td>26</td>
<td>July 11-12, 2020</td>
<td>1026</td>
<td>Review of Systems, History and Physical Exam - <em>Not Available Online</em></td>
<td>Dr. Robert Kessinger</td>
</tr>
</tbody>
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I’m in the fourth decade of practicing health care professionally. I have found much personal fulfillment in this for the health and well-being of my own family and for the health and well-being of so many other families. As a birthday card I once received stated, “the best part of being over the hill is that you made real good time,” I am reminded how easily it seems that Monday becomes Friday and September becomes January. It’s a journey taken one step at a time, day by day time passes by, and changes grow. There is never the option of status quo.

Life is a humbling experience filled with ever changing lessons set before us. Looking back, progress seems to be hastened if the past experiences can be effectively used to aid positively in the progression. In spite of our own direction, provided personal catastrophe can be avoided, five years from now we’ll have experienced another five years of life, and the lessons afforded us.

It’s hard to sell career aspirations to someone who’s only looking for a free meal. But with whole hearted enthusiasm, a pauper can be converted to an entrepreneurial enthusiast with their eyes set on the future. It’s a matter of visualization and excitement of being enabled to work toward a realistic goal of success. There is a parallel in this and in the seeker of symptom relief only to becoming transformed into a health and wellness crusader. Sometimes we just need a great motivator!

As a chiropractic internist, I am versed in the absolute advantages of working within nature’s physiological system. Every patient that I have the privilege to serve, deserves the very best care naturally available. I am the coach and they are the team.

“You can have it in any color you want, as long as it’s black.” This is a quote attributed to Henry Ford, who introduced the efficient assembly line production of the Model-T automobile from 1908-1927. Out of necessity, this was the economically feasible, one size fits all approach envisioned, then implemented, by Mr. Ford.

Our nation’s first professional health provision industry, i.e., the AMA, paralleled Henry’s one-size fits all stance, with an added, “because we said so” mantra. The evolving necessity of pro-life/individual choice health care deliverance, in regards to the public’s health, and the necessity coupled with desire of America’s Jon and Jane Q Public, is coming full circle.

From the blood-letting practices of the time of the American Revolution, to the present-day opioid crisis, we’ve endured and learned. From the Civil War gangrenous aseptic disastrous application of attempted life-saving measures to the post polio-epidemic period, through the more current AIDS tragedy, we continue to learn.

There are still battles on many fronts within the American health delivery system, but the forward thrust within the health industry’s evolving landscape is fueled by our freedom to choose our own destiny. Regardless of our choices and decisions of today, or more accurately in spite of today’s answers, tomorrow’s solutions will be based on the things we’ve learned from the past.

It is widely acknowledged and accepted that we are largely the master of our own domain. When it comes to health, as well as with success, the end result is up to each individual. The most important service that we can provide one another, whether we are in the entertainment, home improvement, or health industry is one of direction and encouragement.

Health should be top priority to every living person. All else means nothing without good health to enjoy your life.

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–Lyn Patrick ND

Systemic Mycoses:
An Overview for Natural Health Professionals

by: Robert Thiel, Ph.D., Nutrition Scientist

ABSTRACT
Systemic mycoses can cause a tremendous variety of health problems including digestive difficulties (diarrhea, bloating, discomfort, flatulence, constipation, colitis, etc.), skin problems (rashes, eczema, psoriasis, dry skin patches, intense itching, hives, open cut-like sores, etc.), bronchopulmonary disorders, asthma, breathing difficulties, fatigue, seasonal allergies, multiple food allergies, weight loss, fever, chronic sinusitis, irritable bowel syndrome, migraine headaches, autoimmune disorders, fibromyalgia, arthritic complaints, chills, malaise, mental cloudiness, inability to lose weight, sweet and other food cravings, and depression.

Although Candida albicans tends to get the most attention, it is only one of 150 fungal species which are known to be pathogenic to humans. In addition to skin, respiratory, or genital areas, mycotic infections often settle in the digestive system. Some with suspected gluten-intolerance are really dealing with them. Understanding the various types of mycotic organisms can be helpful for health practitioners who are interested in natural interventions to help restore their infected patients to health.

INTRODUCTION
There are over 100,000 different species of fungi, of which approximately 150 are known to be pathogenic to humans. Those which are pathogenic have been classified into three broad categories: superficial, cutaneous, and systemic. Superficial mycoses (systemic fungal infections) normally are confined to the keratinized layer of the skin and its appendages.

Cutaneous/subcutaneous mycoses enter the skin and cutaneous tissue usually in a traumatized area (such as a wound); they usually remain localized, but can spread through the lymphatics to other sites. Systemic mycoses are medically believed to usually have a pulmonary inception, but can affect most areas of the body.

Amazingly, even though hundreds of peer-reviewed scientific articles, the Merck Manual, and Mayo Laboratories all document common problems due to systemic mycoses, many medical practitioners ‘do not believe in them,’ will not test for them, and will not treat them, while some others treat mycotic infections for too short of period of time to be effective. Partially due to this medical disbelief, many natural health professionals see people with a variety of mycotic infections on a regular basis. Some scientists have published that because of the variety of systemic mycoses that medical professionals are not likely to be able to properly identify and treat them.

Many have been alarmed by the rise of often fatal forms such as Candida auris which seems to have been triggered by the excessive use of antibiotic products. It is also resistant to multiple medications normally used to treat fungal infections.

Some people who have mycotic infections have been told that the symptoms are ‘all in their head’ or something just as useful. Mycotic infections, though not normally fatal, are so under diagnosed, that an autopsy-based study found that in 22% of cases where the primary diagnosis was incorrect, the deceased had some type of fungal infection. Furthermore, this study stated, “autopsy findings revealed a major diagnosis that, if known before death, might have led to a change in therapy and prolonged survival.” The most frequent class I missed major diagnoses were fungal infections. In most “immuno-competent patients, systemic mycoses typically have a chronic course,” instead of being life threatening.

Most systemic mycoses are from opportunistic fungi. They are saprocyctes (organisms which live on decaying matter) that are usually innocuous, but become pathogenic when the host becomes abnormally susceptible to infection. To state it less technically, some yeast are present in the body in small quantities and are considered harmless; it is generally only when they get out of control and multiply excessively that problems are caused.

During the last several decades there have been alarming increases in Aspergillosis, Candidiasis, Cryptococcosis, Nocardiosis, and Zygomycosis; which to some degree appears to be related to medical treatments such as chemotherapeutic agents, irradiation, immunosuppressive agents, broad spectrum antibiotics, and hyperalimentation as well as conditions such as malignancies, AIDS, malnutrition, metabolic diseases, receipt of multiple injections, certain surgeries, burns, inavenous hyperalimentation, and certain malignancies.

(Continued on next page)
The use of antibiotics and certain types of highly processed diets can be a factor even for children to develop them.15 Heavy metals, like mercury, may contribute to these infections.18 Intense periods of stress or incomplete recovery from infection are other causes of yeast overgrowth. Having gall bladder surgery seems to be a factor for some people. And the gall bladder itself, as well as the kidneys, can also get infected with various fungi.19

Systemic mycoses can cause a tremendous variety of health problems including digestive difficulties (diarrhea, bloating, discomfort, flatulence, constipation, etc.), skin problems (rashes, eczema, psoriasis, dry skin patches, intense itching, hives, open cut-like sores, etc.), bronchopulmonary disorders, asthma, breathing difficulties, fatigue, allergies, weight loss, fever, chills, malaise, depression, and chronic sinusitis;1,6,13-16,19-21 some of them may be risk factors in developing autoimmune disorders.7,22 This investigator has also observed that many with irritable bowel syndrome, migraine headaches, autoimmune disorders, itching, fibromyalgia, alternating constipation and diarrhea, mental cloudiness, certain types of anxiety, inability to lose weight, and even certain forms of arthritis frequently appear to have some type of mycotic overgrowth—another clue is that many report multiple food intolerances (or have been told they have at least a dozen food allergies from an IgG test). Of course, it needs to be understood that nearly all the symptoms and most of the conditions listed in this paper can be caused by something other than mycotic organisms (and that most people do not have most of the symptoms).

The following conditions have also been reported to be at least partially caused by fungi: “malignancies to organs including the esophagus, lung, colon, kidney, breast, uterus, blood, lymph nodes, brain and skin. Also; some autoimmune disorders, scleroderma, diabetes, rheumatoid arthritis, Sjogren’s syndrome, psoriasis and systemic lupus erythematosus. Dr. Constantini also listed Raynaud’s Syndrome, sarcoidosis, Duchéne’s muscular dystrophy, and Cushing’s Disease (excess secretion of adrenal hormone)”; whereas a registered nurse also reported, “Multiple Sclerosis, fibromyalgia, Chron’s disease, endometriosis, infertility, migraines”.5 Many mycoses are polysymptomatic24 which means they can cause a variety of different types of problems—and of course, not everyone has all or the same symptoms.

It has also been reported that systemic mycoses can predispose one to develop celiac disease.24 And while this is apparently true, it is also true that many who think that they may have celiac disease actually have some type of systemic mycotic infection. Many with Down syndrome or autism tend to have wheat sensitivities and may be more susceptible to mycotic infections than the general public.

A major clinical characteristic of virtually all mycotic infections is their chronic course.5,13 Symptoms often develop slowly; though many are asymptomatic. Months or years often elapse before medical attention is sought.5,25 Medical interventions for systemic mycoses include various medications, surgery, and chemotherapy.1,5,13,14,26 Progress in the diagnosis and medical treatment of many mycoses has been unsatisfactory:5,7,27 “Immunoserologic tests are available for many systemic mycoses, but few provide definitive diagnoses by themselves.”5 While localized yeast infections are relatively easy to treat, systemic mycoses, including those referred to as Candida Related Complex (CRC), are much more difficult.5,7

It needs to be emphasized that it is not necessary to have a vaginal yeast infection to be suffering from a systemic mycotic infection. Based on other research, Jonathan Collins, M.D., wrote, “that the bowel or digestive system is the primary site where yeast settle in the body and produce toxic by-products which bring on the vast array of symptoms throughout the body...an unhealthy lower bowel is the breeding ground for infections and inflammation and will cause illness throughout the body.”7

Although there exists a tremendous amount of natural health literature regarding interventions to be considered for people with an overgrowth of Candida albicans [i.e. 5,27-36], the literature regarding natural interventions for other mycotic organisms is less available. The purpose of this paper is to discuss selected forms of systemic mycoses and provide some information to help the naturally-oriented practitioner deal with them.

**SYSTEMIC MYCOSES**

**Aspergillosis**

“Aspergillus sp are among the most common environmental molds, found frequently in decaying vegetation (compost heaps), on insulating materials (in walls or ceilings around steel girders), in air conditioning or heating vents, in operating pavilions and patient rooms, on hospital implements, or in airborne dust” [5]. Aspergilli are the second most common systemic mycoses and account for nearly 30% of fungal infections found

(*Continued on next page*)
at autopsy.\textsuperscript{1} They often appear after antibiotic or anti-fungal therapy (to which they are usually resistant);\textsuperscript{13} this is one distressing area of fighting systemic mycoses—sometimes when eliminating one type, another becomes prominent.\textsuperscript{13}

“Invasive fungus infections caused by aspergillus spp. occur most frequently in immunocompromised patients. A high infection-associated death rate of up to and over 50\% is attributed even today to these fungi. The disease in humans is caused mainly by Aspergillus fumigatus, Aspergillus flavus and Aspergillus niger.”\textsuperscript{37}

Clinical findings are usually nonspecific and standard sputum cultures are positive only 1/3 of the time aspergilli are present.\textsuperscript{1} “Sputum from patients with aspergillomas often does not yield Aspergillus in cultures because cavities are likely to be walled off from airways.”\textsuperscript{38} They often are implicated in respiratory conditions,\textsuperscript{1,20} including sinusitis;\textsuperscript{38-39} it appears that sometimes, Candida albicans-IgE and IgG subclasses may participate in worsening pulmonary infiltrates when bronchopulmonary Aspergilliosis is present.\textsuperscript{40} Aspergilli are often mistaken for Zygomycetes.\textsuperscript{1} As enzymes appear to play a role in the reproduction of various species of Aspergilli,\textsuperscript{41} it is possible that enzyme inhibitors may play a role in diminishing their reproduction and growth.

Some have correlated consumption of fatty foods to asthma,\textsuperscript{42} and it is possible that some of those people actually have an undiagnosed mycotic infection (perhaps from Aspergillus).

Aspergillus fumigatus is the most common form.\textsuperscript{1,2} Aspergillus flavus is commonly associated with aflatoxins,\textsuperscript{9} such as on peanuts.\textsuperscript{38} Restrictocin and mitogillon are two other toxins produced by aspergilli—they inhibit host cell protein synthesis by degrading mRNAs.\textsuperscript{38} “Molecular epidemiologic studies of Aspergillus isolated from opportunistic infections show many different strains of Aspergillus, suggesting that characteristics of the host are more important than characteristics of the fungi...Aspergillus has a tendency to invade blood vessels”\textsuperscript{38}—this is probably true of most situations when a systemic mycotic infection is present. Invasive Aspergilliosis in usually confined to invasive suppressed and debilitated hosts.\textsuperscript{38} Some with gastrointestinal upset have Aspergillus\textsuperscript{1} and some with intense itching may have some version of it (superficial lesions are also a symptom).\textsuperscript{5} Aspergilli “Fungus balls neither require nor respond to systemic antifungal therapy”, though some other Aspergilli forms do.\textsuperscript{5} Mayo Clinic researchers found it was one of the most common fungal organisms associated with fungal sinusitis.\textsuperscript{22} This investigator’s clinical experience suggests that some people with Aspergilliosis seem to improve when dairy is removed from the diet, but whether this improvement is related to a general intolerance or is specific to any Aspergilli is unclear.

In 2010, German researchers concluded, “Recognition of and therapy for fungal infections of the lungs still presents problems even for the experienced clinician. The clinical distinction between invasive mycoses of the lungs and fungal colonisations that do not require therapy is clinically difficult and can often not be made satisfactorily even with advanced microbiological diagnostics.”\textsuperscript{43} Hence there is still trouble in the identification and treatment of fungal infections that affect the breathing process.

Blastomycosis
“A disease caused by the inhalation of mold conidia (spores) of Blastomyces dermatitidis, which convert to yeasts and invade the lungs, occasionally spreading hematogenously to the skin or focal sites in other tissues...Blastomyces dermatitidis grows as a mold at room temperature...Inhaled B. dermatitidis conidia convert at...98.6...F...in the lungs into invasive large yeasts.\textsuperscript{45} It can produce dry hacking and affect the prostate, testis, kidneys, vertebrae, brain, nose, thyroid, lymph nodes, and bone marrow, but skin lesions are probably most common.\textsuperscript{5} Men (especially over age 40)\textsuperscript{5} are afflicted with it more than women, with wart-like lesions on the skin and sometime internal organs.\textsuperscript{44} There is also a South American form called Paracoccidioidomycosis which mostly effects men aged 20-50 who work as coffee growers.\textsuperscript{5}

Candidiasis
Candida albicans is the most common cause of Candidiasis.\textsuperscript{1,2,14} Candidiasis is an infection involving every part of the body. It exists in the normal flora of the oral cavity, upper respiratory tract, digestive tract, and vagina. Severe, invasive Candidiasis involves the kidney in 90\% of cases.\textsuperscript{39}

Candida auris has proven fatal, particularly with the elderly and the immune compromised. The CDC states “It is difficult to identify with standard laboratory methods. C. auris has caused bloodstream infections, wound infections, and ear infections.”\textsuperscript{45}

Candida hyphal growth (the more virulent form) requires a pH of 7.4 (slightly alkaline) for optimal growth and can be completely inhibited at a pH of 4.5 (fairly acidic)\textsuperscript{46,47} and “is now the fourth most prevalent or-
ganism found in bloodstream infections.”

It can be a superficial, mucocutaneous, or systemic mycosis. Infection by any of the species of *Candida* is nearly always preceded by a compromise of the host defense mechanisms, such as a selective defect in the functioning of T lymphocytes. It can exist as both yeast forms without hyphae as well as with hyphae and the transition from yeast to hyphal forms can increase problems eliminating it as the hyphae can spear their way out of cells which engulf them. *Candida* has molecules on the surface that mediate its adherence to human tissues which are the main ways it negatively affects health. “Pathologists studying disseminated candidiasis find tiny abscesses throughout the body. These consist of *Candida albicans* surrounded by fibrin (a protein able to clot) and a connective tissue shell. This shell isolates *Candida* from elimination by the immune system.”

“All forms of disseminated candidiasis should be considered serious, progressive, and potentially fatal. Predisposing conditions such as neutropenia, malnutrition, or uncontrolled diabetes should be reversed or controlled where possible.” All forms of *Candida* do not respond to the same medical or other interventions. *Candida albicans* and *C. glabrata* tend to respond similarly, whereas *C. cruzi* does not.

However, many nutritional interventions have been reported to be effective for *Candida*. Since *Candida albicans* is often grown in a culture of various saccharides, it is not surprising that reductions in the consumption of refined sugars has been effective. Sometimes, this investigator and others have had success having subjects also avoiding most fruits. Interestingly, it appears that *Candida albicans* cannot grow in human saliva unless it is supplemented with glucose.

It was written that, “CRC is the most dreaded complication of fungal infections, because it is hard to recognize and even harder to treat...This spread of *Candida albicans* has been described as a domino-effect—one body system after another falls prey to CRC, unless it is stopped or reversed...Another name for CRC is mycotoxins.”

There have been substantial increases of candidemias caused by species other than *Candida albicans*. *Candida tropicalis* is probably the second most common cause of candidiasis. Infections with *Candida glabrata* and other Candida species are increasing with frequency. *C. glabrata* can cause fungemia, urinary tract infections, sometimes pneumonia or other focal lesions. *Candida paratropicalis* is quite similar to *Candida tropicalis* and is often confused with it. A significant difference is that paratropicalis does not thrive with sucrose, although tropicalis does. *Candida krusei* (also spelled cruzi) seems to be less affected by refined sugars (other than dextrose) than most other Candida species, thus this investigator rarely encourages reduction of fruit consumption when it is suspected. Other Candida species such as *C. guillermondii, C. parapsilosis, and C. pseudotropicalis* can cause infections in humans, but (other than any differences their shape may account for) this investigator is not aware of adequate reasons to differentiate the dietary restrictions from those of *C. albicans*. One of the newest discovered forms, *Candida dubliniensis*, has a lot in common with *C. albicans*, but is still different.

Although chlorine can kill various fungi, some believe that chlorine in swimming pools can be a factor in worsening various *Candida* species.

In the past, *Candida zeylanoides* was not considered to be much of a pathogenic yeast for humans, but can occur in individuals who do not have the “usual risk factors for systemic candidiasis.” Case reports have suggested that it can cause arthritis, infective endocarditis, onychomycosis (nail infection), and gastrointestinal disturbances. It may be implicated in Scleroderma. An animal study suggests that it also can cause tinea cruris (jock itch). *C. zeylanoides* is a predominant form of yeast found in poultry, raw sausage, and some hams.

**Cryptococcosis**

Cryptococcosis is normally due to the fungus *Cryptococcus neoformans* also called *Filobasidiella neoformans* or *Torula histolitica*. It is an encapsulated yeast and is present in soil and bird (especially pigeon) droppings. Symptomatically it is quite different from the other systemic mycoses in that meningitis with headache is the way it is most commonly presented; blurred vision is also common. Infection tends to occur via the respiratory route by inhalation of *Cryptococcus neoformans*. Consumption of high-dose corticosteroids is a major risk factor for it. *Cryptococcosis* frequently affects the central nervous system. As *Cryptococcus meningitis*, it is found in some with AIDS where it tends to increase the mortality rate.

The lungs, kidneys, and sometimes skin tend to be affected. It is resistant to killing by alveolar macrophages. It produces the enzyme phenol oxidase which tends to consume the hosts epinephrine, thus adrenal support may be helpful for the sufferer. Adrenal sup-

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port would not help eliminate Cryptococci, but at least may make the sufferer feel better through the process. Adverse reactions to medical interventions for it include gastrointestinal disturbances, thus probiotic intervention possibly should be considered as an adjunct.

**Histoplasmosis and Coccidioidomycosis**

Histoplasmosis and Coccidioidomycosis are similar fungal organisms that both produce a disease that resembles tuberculosis. Both are caused by fungi that grow as spore producing hyphae at environmental temperatures, but as yeasts (spherules or ellipses) at body temperature within the lungs. Histoplasma capsulatum is acquired by inhaling dust particles which contain bird or bat droppings that contain small spores (microconidia), the infectious form of the fungus. *H. capsulatum* grows as a mold in nature or...at room temperature but converts to a small yeast cell at 98.6 F and when invading host cells [5]. AIDS patients are particularly susceptible to disseminated infection with Histoplasma. Histoplasmosis “occurs primarily in the East and Midwest” and primarily affects the lungs—in acute forms it can cause ulcers of the pharynx, spleen enlargement, and liver enlargement. Coccidioides immitis has a high infection rate and usually resides in desert soils, and in the US is mainly confined to the Southwest. Similar to Histoplasma, most primary infections with Coccidiodes immitis are asymptomatic, but about 10% develop lung lesions, fever, cough, excess sputum, and pleuritic pains along with San Joaquin Valley fever complex. Once inhaled, *C. immitis* conida (spores) convert at 98.6 F to form large invasive spherules. Coccidioidomycosis is also called “Valley Fever.” Untreated disseminated coccidioidomycosis is usually fatal. Treatment for primary coccidioidomycosis is unnecessary in low-risk patients. Treatment for meningeal coccidioidomycosis must be continued for many months, probably lifelong.

**Mycobacilli: Nocardiosis and Actinomycosis**

Although Actinomycosis and Nocardiosis are often considered together when discussing systemic mycoses, they are filamentous, gram-positive, bacteria in the order of Actinomycetales, and not true fungi. These infections are consistently found in the U.S., but the diagnosis is difficult since they resemble other bacterial, mycobacterial, and fungal infections. Nocardiosis and Actinomycosis are symptomatically similar to tuberculosis. Actinomycosis affects males three times as often as females. Nocardiosis, normally in the form of *Nocardia asteroides*, is increasingly found in patients with systemic lupus erythematosus (SLE) and is probably higher than the reported incidence of 2.8% in the SLE population. “Without treatment, nocardiosis caused by *N. asteroides* is usually fatal.” When actinomycosis or nocardiosis is present, it is sometimes wise to avoid bovine dairy and/or refined carbohydrates. Nutritional support such as used by people with “streptococci-type” bacteria can sometimes be helpful for some with some mycobacilli.

**Zygomycosis/Mucomycosis**

Zygomycosis (also called Mucomycosis) is a generic term which refers to infections of the class Zygomyetes (also called Phycomycetes); they tend to be both opportunistic and invasive. It is defined as “Infection with tissue invasion by broad, non-separate, irregularly shaped hyphae of diverse fungal species.” “Infection is most common in immune suppressed persons, in patients with poorly controlled diabetes, and in patients receiving the iron-chelating drug desferrioxamine” (plus people on immunosuppressive therapies or who have chronic renal conditions). It can cause pulmonary or gastrointestinal lesions. The three most common areas of invasion are the sinuses, lungs, and gastrointestinal tract. *Rhizopus* species may be the most common; others include *Absidia corymbifera, Mucor amorphus, Rhizomucor pusillus*, and more.

Infection is believed to be less common than some of the other systemic mycoses mentioned in this paper, but is the third most frequent opportunistic mycoses in patients with neoplastic disease as well as for ketoacidotic diabetics. It appears to this investigator that some with *Rhizopus* often have problems with bile flow; as do some with intense itching. *Rhizopus nigricans* produces opportunistic infections and hypersensitivity states; it seems to cause the body to produce additional IgG and IgE. A recently identified strain, *Rhizopus azygosporus*, was isolated from premature Australian babies, all of which died. Patients with diabetic acidosis or leukemia can be predisposed to rhinocerebral infection caused by *Rhizopus oryzae*; increased consumption of most fresh fruits and vegetables has been reported to help reduce acidosis.

**Mold, Fungus, Yeast, and Interventions**

“Mold is caused by fungus which in turn causes disintegration of organic matter. Whether it is caused by Candida albicans or any of its related species, fungus causes a weakening of the cellular structure in which it lives. This explains why patients afflicted with this type of infection become very ill and are difficult to treat; many of their cells become weak. Fungus is tenacious” (it should be understood that molds are multi-cellular organisms, whereas true yeasts are single-cell organisms). These days there are many reports of homes and office buildings having mold problems which require...
decontamination (such decontamination measures are beyond the scope of this paper).

“Yeast, in its many varieties, is a unicellular fungus that reproduces by budding spores” — it is the budding process that is one of the reasons that elimination is most difficult. This ability to froth/bud makes it difficult for mycotic infections to be controlled as the quantity of yeast can go from little to overwhelming in a rather short period of time — under optimal conditions one yeast cell can produce multiple millions of offspring in 24 hours; and 24 hours later each of those can produce multiple millions of offspring. Elimination of yeast is often an up and down process which makes it difficult for the one fighting it. Actually, one of the problems when mycotic infections are dealt with medically, chiropractically, or naturopathically, is that the sufferer will sometimes feel better before the problem is gone, will skip some interventions (not take supplements, violate dietary restrictions, etc.), do fine, and then ‘suddenly’ notice that symptoms which had left have returned.

Another reason it is difficult to eliminate yeast is because some are dimorphic and many have pleomorphic hyphae. “The ability to switch between a yeast-like form and filamentous form is an extended characteristic among several fungi. In pathogenic fungi, this capacity has been correlated with virulence because along the infectious process, dimorphic transitions are often required” — this dimorphic tendency may at least partially explain why changing interventions is often necessary when dealing with mycotic infections. Phaeomorphic hyphae have been found to be affiliated with most types of mycotic yeasts. These abilities to change shapes (dimorphism and pleomorphic hyphae) make it harder to eliminate mycotic organisms (and is one reason why the same intervention does not always work) — pH (both acid or alkaline) is also a factor.

It may be of interest to note that according to at least one doctor, “Gas-forming organisms only flourish in an alkaline environment. We’ve been brainwashed to think that digestive acids produced in the stomach are the root of all digestive problems.”

The main virulent mycoses, such as Candida and Aspergillus, do not thrive in an acidic environment, but some others do. Thus, the frequent consumption of anti-acids by many with ‘acid reflux’ (GERD) or ‘irritable bowel syndrome’ helps create an environment that the two major mycotic organisms can thrive in (this is not to say that there is no place for antacids, as they can help prevent ulceration and other problems).

Actually, researchers have concluded that many people who think that they have food allergies actually have acid reflux and the reality is that many with acid reflux actually have a mycotic infection as the real cause. Hence many “food allergies” are likely to be assumed because of how the body reacts to certain foods because of mycotic infections.

“With the continuing increase in clinically important fungal disease...the need for new and improved antifungal agents marches on.” This is partially because the commonly used pharmaceutical antifungal agents are not always effective. Emerging cases of drug resistance to currently available drugs has limited the spectrum of currently available antifungal agents. “Drugs for systemic antifungal treatments include amphotericin B, various azole derivatives, and flucytosine.”

While drugs remain the preferred standard treatment there are concerns about their safety, effectiveness, and cost. “Ketoconazole was the first broad-spectrum oral antifungal agent available to treat systemic and superficial mycoses. Evidence of hepatotoxicity associated with its use emerged within the first few years of its approval...Due to its hepatotoxic side effects, oral ketoconazole was withdrawn from the European and Australian markets in 2013. The United States imposed strict relabeling requirements and restrictions for prescription, with Canada issuing a risk communication echoing these concerns. Today, oral ketoconazole is only indicated for endemic mycoses, where alternatives are not available or feasible.”

“Opportunistic systemic mycoses due to yeasts and yeast-like fungi have become more common than those due to filamentous fungi, occupying fourth position in the list of bloodstream pathogens in some centers in USA. Also, their incidence, pattern of clinical presentations and species spectrum have significantly changed, largely due to more frequent and prolonged therapeutic or prophylactic use of antifungal drugs and subsequent development of resistance. Consequently, infections with resistant yeast-like fungi such as C. lusitaniae, C. krusei, C. tropicalis, C. glabrata and Trichosporon ovo-ides (T. beigelii) have recently been reported with greater frequency. Since respiratory and systemic mycoses have no pathognomonic clinical or radiologic syndrome and mycological diagnostic facilities are restricted to only some of the major metropolitan centers, these diseases may be frequently confused... Further studies should focus on the development of rapid techniques for selective isolation and identification of systemic pathogenic fungi. The problem of antifungal resistance is likely to become more serious in...”

(Continued on page 53)
Presents

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**Artichoke** *(Cynara scolymus)*
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One of the necessary ways our body maintains good health is through proper detoxification.

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The movement of conjugated toxins into the bile, coupled with the movement of bile salts and phosphatidylcholine is referred to as **Phase 2.5 Detoxification**. Often times the process of **Phase 2.5 Detoxification** is not functioning properly due to inflammation, endotoxins from pathogenic intestinal flora, and hormone imbalances. Toxins will then be forced to be excreted back into the blood where they may cause further damage and increase stress on the kidneys.

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The movement of toxins (in bile) through the intestine is referred to as **Phase 3 Detoxification**, the endpoint being elimination through defecation. It is imperative to bind these toxins properly with intestinal binders to prevent reabsorption in the intestines. Doing so will prevent Enterohepatic Recirculation. Toxins manufactured de novo from pathogenic gut flora can be absorbed into the body again causing ill-effects like; inflammation, oxidative damage and activating Mast Cells.

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“Innate and cell-mediated immunity are considered as the principal defense line against fungal infections in humans.”

Thus, natural health professionals tend to focus more on dietary restriction, herbs, nutraceutical formulas, heavy metal detoxification, and even electricity to help their clients’ immune systems overcome many of the problems associated with systemic mycotic infections. Regarding diet, as shown above, there is no single diet that helps all the people who have various types of mycotic infections. Yeast can grow at an astronomical rate. Avoiding refined sugar, as a general rule, is good for most people with systemic mycoses (even some published medical research concurs:23 many with mycotic infections strongly crave sugar—but to submit to these cravings can make elimination more difficult (or can cause set-backs). The same can often be said for other refined carbohydrates (white flour, white rice, white pasta, alcohol, etc.). Even as far back as 1921 researchers realized that alcohol and refined sugar greatly increased the growth rate for yeast.80 Cheating, even a little bit, with these substances can set one’s progress back who is attempting fight mycotic problems.

Although there are some people who need to avoid vinegar, most fruits, or mushrooms, this investigator has found that effects most can consume them without any apparent adverse affects. On rare occasions, some people who get severe diarrhea improve when they avoid lettuce as apparently some forms of this vegetable can contain some type of external mold spores. It should be noted that since some digestive symptoms associated with systemic mycoses are similar to those associated with gluten-intolerance or celiac disease, some who feel they have those disorders never realize that they are fighting a mycotic infection. The fact that avoiding high-gluten foods improves symptoms is not a guarantee that gluten, for example, is the problem as some chronic mycotic organisms may raise the level of gliadin antibodies81 and avoiding carbohydrates in general can tend to improve mycotic-related symptoms in some.

There is a misconception that people with mycotic infections must always avoid yeast-containing foods. While this may be true in some cases, it is most often white flour and not the fact that bread has been leavened with yeast that is the problem. Saccharomyces cerevisiae (the primary yeast used in baking and brewing) is beneficial to humans and can help combat various infections,79 including according to the German E monograph Candida albicans. In the text, Medical Mycology John Rippon (Ph.D., Mycology, University of Chicago) wrote, “There are over 500 known species of yeast, all distinctly different. And although the so-called ‘bad yeasts’ do exist, the controversy in the natural foods industry regarding yeast related to health problems which is causing many health-conscious people to eliminate all yeast products from their diet is ridiculous.” It should also be noted, that W. Crook, M.D., perhaps the nation’s best known expert on Candida albicans, wrote “yeasty foods don’t encourage candida growth. Eating a yeast-containing food does not make candida organisms multiply.”28 Some people, however, are allergic to the cell-wall of yeast28 and concerned supplement companies which have nutrient-containing yeast normally have had the cell-wall enzymatically processed to reduce even this unlikely occurrence.

There is no herb or other natural intervention that this investigator has seen which always works. Basically, most of the substances practitioners recommend help create an environment that hyphal yeast forms do not thrive in or that the body’s own defenses do.

Some of the more common natural substances this investigator has considered include aloe vera, arginase, astragalus, basil, beet root, bentonite, berberis root/berries, beta-glucanase, betaine hydrochloride, bile, biotin and other B vitamins, caprylic acid, castor oil, Chinese herbs (various, included certain ones often considered to have anti-viral effects), cinnamon extracts,82 chlorophyll, citrus seed extract, cinnamon, cloves, colostrum, deer antler velvet, digestive enzymes, DPPIV, echinacea, endo/exopeptidases, essential monosaccharides, flowers (various), food multiple vitamins, garlic, goldenseal,83 glandulars, green vegetables, homeopathic & isopathic remedies, horsetail, l-glutamine, l-valine, lactoferrin, licorice, n-acetyl glucosamine, magnesium, manganese, molybdenum, oxygen (in various forms), pau d’ arco (and other South American herbs), probiotics (including non-traditional ones),84 olive leaf,85 oregano (wild and oil forms),86 psyllium (seeds and/or hulls), Saccharomyces cerevisiae,83 serrapeptase, silver (in various forms), thyme, tillandsia, una de gato (cat’s claw), vitamin C, wheat germ, wheat grass, white fish, and zinc.

If heavy metals toxins are suspected and/or if recovery takes too long, then some of the additional natural substances this investigator has considered have included acerola cherry, apple pectin, chlorella, cilantro, l-methionine, modified citrus pectin, N-acetyl-l-cysteine, and slippery elm.
Caution about self-treatment needs to be stated: not everyone tolerates all these substances well, no one probably needs all of them, and perhaps most importantly, inadequate treatment seems to often leave the stronger fungal strains to become dominant. And no matter what “experts” on the internet may claim, the reality is that there is not a single formula that is helpful for everybody struggling with yeast.

Because a compromised immune system or hormonal cycles can be involved (symptoms sometimes worsen near a woman’s menstrual cycle), nutritional support for the thyroid is quite often a useful adjunct (this is true for males and females). Stress GREATLY affects this condition and this is another reason that thyroid and sometimes adrenal support is helpful. Someone can be improving, then if faced with one or more stressful events, relapse. This can be quite frustrating for them and their practitioner.

Dealing with biofilm can help people deal with these infections.87

“Microbes in your gut can produce neurotransmitters that alter your mood; some scientists have even proposed that the microbes may sway your appetite, so that you crave their favorite food.”78 This investigator’s clinical experience confirms this happens in real life, which not only delays the efficacy of treatment, makes it makes weight management issues more difficult.

Real food B vitamins (which are not in most vitamin formulas, including ones that say that they are “natural”) can often help as they decrease the overwhelming craving that some with this condition develop towards carbohydrates. Similarly, chromium in the GTF form can help some with overwhelming sweet cravings.

In addition to herbs and nutrition, this investigator has also had some success using other naturopathic interventions, such as bioelectrical stimulation, proper food combining, fasting, and hydrotherapy.89,90 Those with dual infections perhaps take the longest amount of time to help get back to normal, and dual-infections (like yeast with a parasite) seem to present relatively frequently in this population.

There are normally ups and downs associated with treatment. Yet, many “treatments” have “downs” for a long time and never have the “ups” for a significant time. Hence, it is important that the health professional be highly skilled in making recommendations related to treatment.

‘Die off’ and other adverse reactions sometimes are encountered when interventions are successful5—normally these are frustrating as opposed to detrimental. Some ‘holistic literature’ words it, “When yeast cells are rapidly killed by the immune system, drug treatment, or dietary intervention, a ‘die-off’ or Herxheimer reaction occurs. This reaction is caused by the massive release of toxins from dying candida cells. Toxic proteins from the dead yeast cross cell membranes, enter the bloodstream, and trigger an intense immune reaction...Die-off reactions may last from a few days to a few weeks but usually less than a week...A die-off reaction is especially pronounced when using powerful antifungal drugs like Nystatin that literally cause yeast cells to burst apart;”91 whereas medical literature has stated, “For the 3 oral antifungal agents the more common adverse reactions (are)...nausea, gastrointestinal distress, diarrhoea, abdominal pain92 and “administration of nystatin became impossible in three patients because of vomiting.”93 Tiredness sometimes accompanies ‘die-off’.

Stressful situations, ‘die-off’, dimorphism, and the tendency of one type of yeast to become dominant while another is being controlled, all make successful interventions complicated (as does use of antibiotics or multiple infections). But naturopathic interventions are often the most appropriate ones to help the body naturally fight the fungi itself and regain control of health. Weight-loss is difficult to sustain for overweight people while most are combating a mycotic infection and that much of the progress in this arena does not take place until the infection is controlled.

Mycotic Observations

“Invasive mycoses continue to be a major problem in the growing population of immunosuppressed patients.”94 Much research in the USA and Germany is being conducted related to them.

As there are 100,000 known types of fungi,1 there is little doubt that more will be found to be pathogenic to humans. Additional mycobacilli species are also being found to have clinical importance.95 Candida, Aspergillus, and Mucor are ubiquitous contaminants which colonize normal skin or gut without causing illness—it is only in immunosuppressed individuals that these opportunistic fungi give rise to life threatening infections.2 “Malassezi yeast, a type of fungus, inhabits everyone’s scalps, but some people have more of it, and their immune systems react to it97 and can cause inflammation and itching.

(Continued on next page)
However, even though most of the symptoms are not life threatening, overgrowths of any of yeast/fungi can make human life miserable. All yeast produce toxins. It appears to this investigator that these toxins are responsible for symptoms such as itching, mucus, bowel difficulties, and can trigger autoimmune reactions. Triggering of autoimmune responses then seems to cause arthritic and some other pain-related symptoms. If one can reduce internal yeast populations, then the amount of toxins will be reduced and ultimately the body will be able to shut-off (or at least seriously reduce) its autoimmune responses.

Practitioners need to understand that not all pathogenic mycotic organisms are known, few are ever tested for, relatively few are ever detected through the course of most medical appointments, some are not detected when tested for, and perhaps most importantly, all do not respond to the same dietary factors. Furthermore, there is no single herb, diet, electrical device, or naturopathic formula that this investigator has ever found that will always eliminate it. Getting systemic mycoses under control is a difficult and frustrating process, but the results are worth the effort; for many who are not leading normal lives now, can live normal (or near normal) lives after control.

About the Author
Dr. Thiel was an Idaho licensed naturopathic physician and is an Alabama licensed naturopathic scientist. He received his M.S. from the University of Southern California, Ph.D. (Nutrition Science) from the Union Institute & University. He is president of Doctors’ Research, Inc. and runs a natural health clinic in Grover Beach, California.

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(Continued on page 73)
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Going down in the elevator at the Nashville Symposium a young DABCI said to me, “You know, it’s hard to describe us. We are not regular chiropractors and we are not medical. I guess we are……………., DABCIs! Those words warmed my heart and I thought to myself, “Yes, they get it. They understand the DABCI vision. They know who we are.”

After 22 CDID Symposiums in a row I missed a couple and was curious to see how things had changed. I was so happy to see such an outstanding group of new leaders and doctors doing the DABCI work. Our new officers of the CDID/ABCI are chiropractic physicians with vision, dedication and an excellent understanding of who we are and where the Council needs to go in the future. The instructors and programs are excellent and incorporating new technology to keep DABCI education on the cutting edge of natural medicine and chiropractic as we have been for the past 30+ years. Our Council and the members who make it up are different and our specialty is one of a kind and unique.

Speaking of being unique. Have you DABCI students that have completed the course taken your DABCI exams to become Board Certified? Can you advertise and display the DABCI on your literature and on your website? Can you tell your patients that you are Board Certified? Can you advertise that you are a Board-Certified Chiropractic Internist? Do you think it really doesn’t matter? Have you told yourself that, “I can do the work without the DABCI” and that it just costs too much?

As a DABCI for over 25 years I would like to share with each of you that the DABCI exam and designation is more important than ever before. Trust me when I tell you that your patients know what Board-Certified means. They understand that Board-Certified guarantees that you have gone above and beyond and that you are not the regular chiropractor down the street. It eliminates any doubt that you have studied, dedicated yourself and passed examinations to prove you know something special and that you are an expert in your field.

Think about dentistry for a second. If you need oral surgery on a tooth and you can choose between from a Board-Certified Oral Surgeon or your General Dentist to operate on you, which would you choose? Dentist are just like chiropractors in that any dentist can perform oral surgery just like any chiropractor can practice nutrition. Don’t think for a second being Board Certified doesn’t have a huge impact on your patient’s and future patients decision on who to seek care from. It is critical to your success. Don’t play games in your head telling yourself it doesn’t matter; it does.

In addition, the DABCI is recognized nationally by every State Board of Examiners in the US and many state and national governmental agencies. Now, the exam is administered by the NBCE and carries with it the credibility of a federally recognized agency. This is something we didn’t have in the past. The NBCE testing is a critical step and adds a level of credibility that impacts our designation that has far reaching legal consequences. Thank your CDID and ABCI leaders for this decade of work to accomplish this fantastic achievement next time you see them.

Oh, just in case you are new to the CDID it might interest you to know that it was a DABCI that organized and implemented the initial testing program to help New Mexico to accomplish the Advanced Practice Chiropractic Physician designation (APC). One of the biggest legal advancements in chiropractic in 100 years. It was a DABCI that pioneered chiropractic OB-GYN. It was a DABCI clinic that the Chicago study used to study chiropractic primary care that the model was based. It was the DABCI system that the president of Blue Cross Blue Shield studied trying to figure out how to incorporate nutrition into preventive medicine. It was your DABCI/CDID leaders that worked tirelessly for years to get your name back, Council on Diagnosis and Internal Disorders.

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Issue # 12
VITAMIN K1 VERSUS THE MK-7 VERSION OF VITAMIN K2 SUPPLEMENTATION: WHICH IS BEST FOR YOUR PATIENTS?
by: Jeffrey Moss, DDS, CNS, DACBN

INTRODUCTION
It is now well recognized in the clinical nutrition community that vitamin K supplementation can be a valuable adjunct to vitamin D supplementation when optimization of bone health is a patient priority. Why? In simple terms, optimal vitamin K levels assure that the impact of vitamin D in terms of calcification will be primarily directed towards bone and not soft tissues. However, there is confusion in terms of what is the best form of vitamin K supplementation in this regard.

Because of this confusion about the different forms of supplemental vitamin K and which is best for your patient, this commentary will be devoted to a review of the paper “Vitamin K-containing dietary supplements: comparison of synthetic vitamin K1 and natto-derived menaquinone-7” by Schurgers et al (Schurgers LJ et al. Hemostasis, Thrombosis, and Vascular Biology, Vol. 109, No. 8, pp. 3279-3283, April 2007), which provides an excellent explanation of the most popular forms of supplemental vitamin K but a rationale as to why the MK-7 form of vitamin K may be best.

VITAMIN K: BASIC BIOCHEMISTRY AND PHYSIOLOGY
Schurgers et al begin their paper by discussing basic vitamin K biochemistry and physiology:
“Vitamin K is a group name for a number of structurally related compounds including phylloquinone (vitamin K1) and menaquinones (K2 vitamins). Menaquinones are classified according to the length of their aliphatic side chain and are designated as MK-n, where n stands for the number of isoprenoid residues in that chain.”

As will be discussed in more detail, the commercially available forms of vitamin K2 menaquinones are MK-4 and MK-7. As will also be discussed, there are distinct benefits to the MK-7 form. The authors continue with their discussion of vitamin K biochemistry and physiology:
“The function of all forms of vitamin K is that they serve as a cofactor for the posttranslational carboxylation of certain protein-bound glutamate residues, which are converted into gamma-carboxy glutamate (Gla). These Gla residues from calcium-binding sites that are essential for the activity of the proteins in which they are found.”

What does this mean in plain English? There are certain glutamate residues that are important for directing calcium where it is needed the most. These glutamate residues, though, cannot perform their functions unless a carboxyl group is added to them. Vitamin K facilitates addition of the carboxyl group to the glutamate residues so these residues can do their job in terms of calcium metabolism.

The next important clinical point made by Schurgers et al relates to the metabolic fate of vitamin K:
“During gamma-glutamate carboxylation, vitamin K is oxidized into its epoxide form (KO), which is reconverted to vitamin K quinone (K) by the enzyme vitamin K epoxide reductase (VKOR).”

What does this mean in plain English? During the process of donating the carboxyl group, vitamin K is oxidized to an inactive form. The enzyme VKOR converts oxidized vitamin K back to an active vitamin K form, thus conserving vitamin K. Why is it important clinically to know this? Blood-thinners such as warfarin inhibit VKOR, thus preventing oxidized vitamin K from being recycled:
“Derivatives of 4-hydroxycoumarin (including warfarin and acenocoumarol) specifically inhibit VKOR, thus preventing the recycling of vitamin K.”

In what organ systems do Gla-containing proteins play a role in terms of facilitating optimal calcium metabolism? One important area, as we know, is blood clotting:
“Well-known Gla-containing proteins are the blood coagulation factors II, VII, IX, and X, which are all synthesized in the liver.”

However, still other Gla-containing proteins facilitate optimal calcium metabolism in tissues outside of the liver:
“Gla-proteins not related with blood clotting are osteo-
WHY SUPPLEMENT WITH MK-7 RATHER THAN TRADITIONAL COMMERCIAL VITAMIN K FORM, K₁?

The remainder of the Shurgers et al paper discusses research that compares clinical benefit of MK-7 versus K₁. Probably the biggest clinical benefit, as noted in the quote below, is that MK-7 performs much better than K₁ in terms of promoting bone health.

“...if taken on a regular basis, there is no accumulation...”

However, as you will also see, it is more effective in promoting clot factors in the liver making it more effective in reducing the effectiveness of coumarin anticoagulants:

“In this paper we have compared the in vivo properties of 2 forms of vitamin K: MK-7 and K₁. We demonstrate that after oral ingestion, MK-7 is more effective in both catalyzing osteocalcin carboxylation in bone and counteracting coumarin anticoagulants in the liver.

The mechanism underlying this observation may be MK-7’s much longer half-life time in the circulation and its reported 6-fold higher cofactor activity in vitro." However, before continuing, as will be reported shortly, the adverse impact of MK-7 on efficacy of coumarin anticoagulants is dose-dependent.

The next quote discusses more reasons why MK-7 performed better than K₁. As you will see, the main reason is what was mentioned above – MK-7, unlike K₁, can be taken up and circulated via low-density lipoproteins:

“The higher menaquinones including MK-7 are much more hydrophobic, however, and in vivo they are handled very differently: they have longer half-life times, and in the circulation, they are incorporated into low-density lipoproteins.”

Of course, K₁ is the most well-known of the three, having been available for years. However, MK-7 is continuing to attract increasing interest:

“K₁ is by far the most common form of vitamin K in commercially available supplements, but because of the health claims for the regular consumption of natto that are repeatedly made in the scientific literature, MK-7 in the form of a natto extract is rapidly gaining interest.”

(Continued on page 65)

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of K₁, whereas MK-7 accumulates...during the first 2 weeks, after which a steady-state level is reached. At comparable intakes, the final level of MK-7 was 7- to 8-fold higher than that of K₁, suggesting that if taken on a daily basis, 25 µg/d of MK-7 is more efficacious than 100 µg/d of K₁.”

WHAT ARE THE CLINICAL IMPLICATIONS OF THE COMPARATIVELY BETTER BIOAVAILABILITY OF MK-7?
On the positive side, it appears that because, in many adults, there exists a fair amount of undercarboxylated osteocalcin (ucOC), which will not be optimally effective in promoting bone health, MK-7 will be much more effective in repleting what appears to be a very common state of vitamin K deficiency in bone:

“In the healthy adult population, about 30% of the circulating osteocalcin occurs in its undercarboxylated form, and increased vitamin K intake results in rapid decline of ucOC, suggesting a state of subclinical vitamin K deficiency in healthy bone tissue.

In a study designed to compare the efficacy of equimolar amounts of K₁ and MK-7, we measured the degree of osteocalcin carboxylation after a 6-week period of vitamin K intake. A small increase of osteocalcin carboxylation was visible for both forms of vitamin K at day 3, but whereas the effect of K₁ remained constant after that time, that of MK-7 inclined during the entire 6 weeks of treatment. At the end of the study, the change in the carboxylated OC/undercarboxylated OC ratio was 3 times higher for MK-7 than for K₁, suggesting that the higher serum levels of MK-7 reflect higher tissue levels and better utilization of MK-7.”

Of course, on the negative side, this increased tissue utilization of MK-7 can pose problems for patients using coumarin anticoagulants. One reason is that, unlike osteocalcin in bone, in the average healthy population clotting factors in the liver are fully carboxylated:

“The vitamin K-dependent clotting factors are all produced in the liver and, in contrast to osteocalcin, they are all fully carboxylated in the healthy population.”

What does this mean clinically in terms of anticoagulant medication? The authors state:

“It turned out that if expressed on a molar basis, MK-7 is a 3 to 4 times more potent antidote for oral anticoagulation than is K₁. If expressed per weight, the efficacy of MK-7 in the liver is still 2.5 times higher than that of K₁.”

What does this mean in terms of a dose of vitamin K that will not interfere with coumarin activity?

“In a previous paper we demonstrated that vitamin K₁ supplements containing no more than 100 µg/d are not likely to result in clinically relevant disturbances of oral anticoagulant therapy. Extrapolating these figures, it may be concluded that MK-7 supplements containing more than 50 µg/d may interfere with oral anticoagulant treatment, whereas doses of at least 50 µg are not likely to affect INR value in a relevant way.”

CONCLUDING STATEMENTS FROM SHURGERS ET AL PAPER
The first statement is a summary of the different properties of K₁ versus MK-7 and why MK-7 would be a preferable supplement:

“Taken together, these data demonstrate considerable differences between MK-7 and K₁: higher and more stable serum levels are reached with MK-7, and MK-7 has a higher efficacy in both hepatic and extrahepatic protein carboxylation. During recent years many studies have demonstrated that the extrahepatic vitamin K requirement exceeds the recommended daily allowance (100-120 µg/d) for vitamin K₁. For the food industry, an alternative to increasing the recommended dose would be introducing on a larger scale the more potent MK-7 instead of K₁ in functional foods and multivitamin supplements.”

Of course, as was mentioned, the downside of MK-7 supplementation relates to its impact on anticoagulant therapy:

“Hematologists, on the other hand, need to be aware that relatively low doses of MK-7 may have a larger impact on the stability of oral anticoagulation than vitamin K₁.”

With the above in mind, Shurgers et al make the following recommendation:

“...we propose to use an upper safety limit for intake of 50 µg/d for long-chain menaquinones (including MK-7) in patients on oral anticoagulant treatment. This dose is comparable with the menaquinone content of 75 to 100 g of cheese; such an amount would lead to a disturbance of the INR value of no more than 10% which may be regarded as tolerable in the management of oral anticoagulant therapy.”

Shurgers et al end their paper on a positive note in relation with the use of MK-7 with patients on anticoagulant medication:

“...its long half-life time suggests that regular intake of MK-7 in combination with properly adapted coumarin doses may result in more stable INR values.”

(Continued on page 73)
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FOURTEEN DIETARY SUPPLEMENTS THAT REDUCE SYSTEMIC INFLAMMATION AND COULD POTENTIALLY HELP MANAGE TYPE 2 DIABETES MELLITUS

A REVIEW OF THE AVAILABLE EVIDENCE

by Adrian Isaza PhD DC MS

A study in 2013 showed that elevated CRP levels were significantly associated with increased risk of type 2 diabetes without publication bias. Sensitivity and subgroup analyses further supported the associations.

This commentary will review the effect of commonly used dietary supplements on inflammation in order to evaluate whether type 2 diabetes mellitus supplements can potentially reduce the risk of diabetes mellitus type 2.

INTRODUCTION

In 2013, Wang, et al, published a systematic review and meta-analysis of 22 cohorts involving over 40,000 subjects. This meta-analysis provided evidence that elevated levels of CRP are significantly associated with increased risk of type 2 diabetes. The following are dietary supplements with an anti-inflammatory effect:

RESVERATROL:
In 2018, Koushki, et al, who published a systematic review and meta-analysis of 17 randomized controlled trials totaling over 700 participants. This study suggests that resveratrol supplementation significantly reduced hs-CRP levels.

MAGNESIUM:
Two studies will be mentioned for the anti-inflammatory effect of magnesium. In 2014, Dibaba, et al, conducted a systematic review and meta-analysis of seven cross sectional studies involving over 32,000 subjects. This meta-analysis and systematic review indicates that dietary magnesium intake is significantly and inversely associated with serum CRP levels. In 2017, Simental-Mendia, et al, carried out a systematic review and meta-analysis of 11 randomized controlled trials. This study indicated that magnesium supplementation reduces CRP levels among individuals with inflammation.

PROBIOTICS:
In 2017, Mazidi, et al, published a systematic review and meta-analysis of 20 randomized controlled trials which indicated a that there was a significant reduction in serum CRP following probiotic administration.

VITAMIN C:
In 2018, Jafarneyad, et al, performed a meta-analysis of 12 randomized controlled trials with over 400 patients. This meta-analysis showed that vitamin C supplementation reduces serum CRP level, particularly in younger subjects, with higher CRP baseline level.

L-CARNITINE:
In 2015, Sahebkar conducted a systematic review and meta-analysis of six studies comprising over 1,000 patients. This study supports the clinically relevant benefit of L-carnitine supplementation in lowering the circulating levels of CRP.

ZINC:
In 2018, carried out a systematic review and meta-analysis of eight randomized controlled trials which showed greater improvement in CRP levels following zinc supplementation.

VITAMIN D:
In 2018, Mousa, et al, performed a systematic review and meta-analysis of 20 randomized controlled trials comprising over 1,200 participants. In this study vitamin supplemented groups had lower levels of C-reactive protein.

ALPHA LIPOIC ACID:
Two studies in 2018 will be mentioned for the anti-inflammatory effect of alpha lipoic acid. The first study was by Saboori, et al, who published a systematic review and meta-analysis of 11 randomized controlled trials comprising over 250 patients. This study showed that alpha-lipoic acid supplementation could significantly decrease CRP level in patients with elevated levels of this inflammatory marker. The second study was by Akbari, et al, who conducted a systematic review and meta-analysis of 18 randomized clinical trials which demonstrated the promising impact of alpha lipoic acid administration on decreasing inflammatory markers such as CRP, IL-6 and TNF-α among patients with

(Continued on next page)
metabolic syndrome and related disorders.\textsuperscript{11}

**PYCNOGENOL:**
In 2018, Nikpayam, et al, carried out a systematic review and meta-analysis of 5 trials involving over 300 participants. This study suggested that Pycnogenol consumption can decrease the level of CRP and have anti-inflammatory effect.\textsuperscript{12}

**MELATONIN:**
In 2018, Akbari, et al, performed a systematic review and meta-analysis of 6 randomized controlled trials showing the promising effect of melatonin administration on reducing CRP and IL-6 levels among patients with metabolic syndrome and related disorders.\textsuperscript{13}

**SELENIUM:**
In 2017, Ju, et al, published a systematic review and meta-analysis of 16 randomized controlled trials comprising over 43,000 participants. In this study decreased serum CRP suggests a positive effect on inflammation in coronary heart disease.\textsuperscript{14}

**CURCUMINOIDS:**
Two studies will be cited for the anti-inflammatory effects of curcuminoids. In 2014, Sahebkar carried out a meta-analysis of 6 trials involving over 170 subjects. Compared with placebo, supplementation with curcuminoids was associated with a significant reduction in circulating CRP levels.\textsuperscript{15} In 2019, Tabrizi, et al, conducted a systematic review and meta-analysis of 15 randomized controlled trials which suggests that taking curcumin-containing supplements may exert anti-inflammatory properties through a significant reduction in IL-6 and hs-CRP.\textsuperscript{16}

**GINGER:**
In 2016, Mazidi, et al, performed a systematic review and meta-analysis of 9 studies which suggests that ginger supplementation significantly reduces serum CRP and improves glycemia indexes and lipid profile.\textsuperscript{17}

**OMEGA 3:**
In 2016, Lin, et al, published a systematic review and met-analysis of 8 randomized controlled trials involving over 900 participants. In this study omega 3 significantly decreased CRP concentration in type-2 diabetes mellitus.\textsuperscript{18}

**CONCLUSION**
There seems to be a causal relationship between systemic inflammation and diabetes mellitus type 2 based on elevated c-reactive protein being a risk factor for DM type 2. The 14 dietary supplements discussed in this commentary could be used as adjunct therapy in diabetes type 2 to decrease systemic inflammation.

**About the author:**
Adrian Isaza is both a physician and an academic. As an academic he authored a chapter of the book “The Role of Functional Food Security in Global Health”. He also teaches graduate students at Everglades University for the Alternative Medicine Degree program. He recently obtained his degree as a Doctor of Medicine and practices medicine full time in Tampa, Florida. Dr. Isaza has published over 30 papers advocating the use of alternative medicine.

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<tr>
<td>1</td>
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<td>1001</td>
<td>Foundations of Chiropractic Family Practice</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1002-03</td>
<td>Patient Consultation and Evaluation</td>
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<tr>
<td>3</td>
<td>1</td>
<td>1006</td>
<td>Natural Strategies in Laboratory Testing</td>
</tr>
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<td>1024-25</td>
<td>Gastrointestinal Health and Protocols for a Healthy Gut</td>
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<td>1</td>
<td>1017-18</td>
<td>Allergies, Sensitivities and Autoimmune Response</td>
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<tr>
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<td>Cardiovascular Disease</td>
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<tr>
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<td>Endocrinology Clinical Application</td>
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<td>1011</td>
<td>Pharmacognosy - Utilizing Botanicals in a Functional Practice</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>1007</td>
<td>Additional Blood tests and Tumor Markers</td>
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<tr>
<td>11</td>
<td>1</td>
<td>1016</td>
<td>Detoxification and Diagnosis of Hepatic and Renal Systems</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>1029</td>
<td>Infectious Disease, Emergency Disorders</td>
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<tr>
<td>13</td>
<td>1</td>
<td>1010</td>
<td>EKG &amp; Phonocardiograph</td>
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<td>1</td>
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<td>Common Diseases Affecting the Arterial System</td>
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<td>Pulmonary Disease &amp; Lung Function</td>
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<td>1</td>
<td>1015</td>
<td>Geriatrics and Mental Health</td>
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<td>Pediatrics</td>
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<td>Pharma Reactions</td>
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<td>Advanced Endocrinology</td>
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<td>Neoplastic Disease &amp; Cancer I</td>
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Dr. Theil: Systemic Mycoses  (continued from page 56)

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THE ORIGINAL INTERNIST  JUNE 2019  73

Dr. McCullough: Sound Off:  (continued from page 59)

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Dr. Jeffrey Moss: Issue 12  (continued from page 65)

SOME FINAL THOUGHTS

Despite all the emphasis on vitamin D supplementation as an aid to the optimization of bone health, there is, in my opinion, a significant lack of emphasis on the need for optimal vitamin K levels to assure that vitamin D supplementation fulfills its primary intent for the osteopenic/osteoporotic patient, the optimization of bone health.

Unfortunately, due to the availability of different forms of vitamin K supplementation on the market along with the somewhat complicated interactions with the commonly prescribed drug, warfarin, there exists some confusion on how the nutritional practitioner should proceed in terms of making recommendations to patients about vitamin K supplementation.

Hopefully, this review and commentary of the Schurgers et al paper will add some much-needed clarity to the subject.

Dr. Theil: Systemic Mycoses  (continued from page 56)

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