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From the Archives of Jack Kessinger
DC, ND, DABCI

Editor’s note: I am amazed to see how many things change over time and how many things remain current. Over the years, since Dr. Jack Kessinger’s death, I have read many papers he wrote. Some basic statements are constant. I love to read some of his concepts and ideas that were such forward thinking.

When Treating Human Illness, Think Like a Gardener

When treating human illness, think like a gardener. Growing great organic vegetables takes rich, humid top soil, proper sunlight, oxygen, and adequate water. To insure the proper nutrients and water are available, it is necessary to analyze the soil periodically. Keeping weeds from multiplying and robbing the soil of its precious nutrients is also an important step. As with cancer, it is most beneficial to identify and destroy weeds while in the earliest stages of development.

Life is an ever-evolving scheme of predation, involving both animals and plants. Plants rely on other predators for nutrition and oxygen. Plants get their nutrients from the soil, which are provided by microbes who in turn are predators. With adequate oxygen and water, microbes leach the minerals out of rock and decaying matter, and their waste products become humus which is eventually used by growing plants.

Human tissue and body organs have much in common with the ecology of garden plants. Good health begins at the cellular level. Just as healthy garden plants require adequate nutrition, minerals, water, air and sunlight, so does human tissue.

Historically our bodies have matured to withstand constant attacks, chiefly from viruses, bacteria and fungi. In order to keep up with the monumental task of staying healthy (avoiding infections while maintaining overall health), it is necessary for all cells to have a proper nerve supply, receive optimal nourishment, get an ample supply of oxygen and utilize it efficiently, have a slightly alkaline state of blood, and properly detoxify and eliminate cellular and bowel debris. However, during the past few decades, our immune system has been additionally challenged by the accumulation of combinations of tens of thousands of hazardous chemicals, pollutants, pesticides, fungicides, herbicides, food preservatives, free radicals, and more. It is impossible to avoid these pollutants since they are found in the air we breathe, the water we drink and the food we eat.

So, is it any mystery that degenerative conditions, like cardiovascular disease, cancer, arthritis, kidney failure, chronic infections, AIDS, diabetes mellitus, fibromyalgia, chronic fatigue syndrome, etc., abound when the human body exists in such a hostile environment? The damage begins with an overload of the organs of detoxification (primarily the liver), and the organs of elimination (kidneys [50%], lungs [28%], skin [20%] and bowel [2%]). Refined (nutritionally depleted) sugars and flour, food preservatives, tobacco smoke, hazardous environmental materials, industrial pollution and solvents, pesticides, most medicines (including antibiotics), synthetic hormones, etc., in addition to bacteria, parasites and fungi, add extra work to our detoxification and elimination systems, thus weakening our cellular ecosystem. The organ that eventually shows up as a disease process is often a matter of individual genetic make-up.

In our modern world, children begin overloading their bodies early in life with sugar and caffeine (from chocolate, soft drinks, many over-the-counter medications, etc.) and antibiotics. This persistent bombardment causes them to suffer from constant infections (usually ear or throat) and other maladies. As a result, microbes become predators, and the host’s own cells become the prey.

Our vision is limited by our ideas which, in turn, are dictated by our experiences. Doctors who have never been exposed to the possibilities of natural health care

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We’ve all had these type people in our lives. A bottom-line is whether we kept them in their time of need or did we shun from the challenge of taking a humble/earnest look under the hood to fervently find if we could be a positive influence on them. As “the bottom line” when using this scenario to describe a patient, this is not the only marker of a successful professional practice of healthcare, but it is one.

Who is the “them” to which reference is being made? Don’t you just love acronyms because they communicate so much, so well, in such a short amount of time, and seriously time is our only unalterable limiting factor. Acronyms are effective as time saving communication tools if the accurate interpretation is understood by at least two parties, but they can also be used as secret encoded messages if they’re not widely understood.

There are a lot of parallels in life. P.I.T.A. (Pain in the asterisks*) has been used within the confines of health care clinics and the corridors of educational institutions as well… to describe standout patients or children with a history of trouble, respectively. Regardless of which context, the assessment is nearly identical. My wife spent many years as a fifth-grade teacher, so our conversations often concerned the reasons behind anyone categorized in the “PITA” pile.

The first thing that must be done is to listen. Really listen. Eyerolls and interruptions too often are easily seen through and hinder the trust/bond formation that is ever so often necessary to successfully meet the first obstacle of the challenge at hand.

Distinct differences in patients and students; e.g. age, voluntary vs. involuntary participation, etc., make dealing with the two groups individually unique, but the primary crux of the matter is parallel. Most often when dealing with disgruntled, downtrodden, negatively obstinate people of any age, the first challenge is to understand that there is an underlying cause/irritant in their external/internal life that is manifesting their PITA persona. The next challenge is to gain their trust so that you can be of help to them in effectively dealing with their dilemma.

In our clinic, my Dad used to always tell staff to never judge anyone seeking healthcare for at least three months. Sometimes the patient is overwhelmed with pain or anxiety and that overrides a pleasant disposition. Dad’s assessment of these situations was…if, after three months, their demeanor remains unchanged, they are probably a genuine PITA patient. But, we need to love them anyway!

When I learn my staff’s view on some of my patients as not being as jubilant as others, or even having a PITA status, I always enjoy the challenge of getting to the bottom of “the issue”. Ultimately, I gain the most enjoyment in overcoming the initial barriers and gaining their trust, and thereby become better enabled to serve them. Experience has shown that to be most effective. I’m not burdened with any pre-constructed impression, other than the preliminary patient questionnaire before the work begins. This allows me to not be biased by any undo preconceived notions of others perceptions.

Since my spouse is a retired educator, I understand this perception from a couple of angles. New teachers can only give individual students an honest “do-over” if they are not burdened with previous teachers perceptions. It is best for new teachers to only review such records after the honeymoon phase is over. If we let this principle trickle over into everyday life, couldn’t we make a difference? Non-judgemental and tolerant. What a concept!

Without the challenge placed upon the mighty-oak by the wind and the storms, it wouldn’t grow to be strong. Challenges are what makes life’s endeavors inclusive and gives our efforts an opportunity to grow into fruition. Unlike the mighty oak, it is spiritually fulfilling for us to humbly meet life’s challenges head-on and then look back upon the positive differences that we’ve made. Life is a growing experience.
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Avoiding Joint Replacement Therapy by Eliminating Osteoarthritis Pain:

The Research of William Kaufman, PhD, MD

by: Jonathan V. Wright, M.D.

Research done in 455 individuals with osteoarthritis

Niacinamide eliminated or significantly reduced osteoarthritis pain in the large majority of individuals

Niacinamide can prevent joint replacement surgery

Why cigarette smoking also prevents joint replacement surgery

Sometime in the 1980s (don’t remember exactly when) a 74-year-old man (we’ll call him Joe) came to Tahoma Clinic bringing copies of X-rays of his knees. He walked slowly with a cane, putting almost all his weight on one knee. He told me he’d been told that his only option was knee joint replacement surgery. We looked at his X-rays together; he said the orthopedic surgeon he’d consulted remarked that they showed “bone-on-bone” on one side, and “almost bone-on-bone” on the other. I couldn’t argue with that.

He’d refused to take any prescription painkillers or even aspirin—which, the naturopathic doctor his mother consulted “only when really necessary” had told him, was an unnatural (and of course patentable) derivative of white willow bark. White willow bark has been used for thousands of years to relieve pain. Even though he had taken increasingly large doses of white willow bark over the past few years, he’d done what the naturopath had told him—he had always taken it with food and never on an empty stomach, so he did not have any gastrointestinal irritation.

But, during the last year, even the large doses of white willow bark “weren’t doing the job.” Observing his pain, his wife persuaded him to see the orthopedic sur-

geon, who checked his knees, had the X-rays taken, and told him his only choice was knee replacement surgery. However, he’d never had any surgery, “not my tonsils or appendix or anything else,” and was at Tahoma Clinic as a last resort, just in case there was a more natural alternative. He had no other health problems, he said.

His health history showed that except for the knee problem, he’d indeed had very few health problems. He credited his mother with that, telling me that because of “the way she’d lived and raised us, she’d had very few health problems in her entire life and she’s still going strong at 94.” He’d continued to follow all of her health recommendations: “eat right, exercise, get a good night’s sleep, see only naturopathic doctors, and never ever take any drugs unless you’d die without them.”

He told me his younger brother had “taken a different path” after leaving home. He said his brother ate Twinkies and doughnuts a lot, didn’t eat very many vegetables at all, and had become a chain smoker. He also drank alcohol regularly—but wasn’t an alcoholic—and didn’t exercise much. Joe’s brother went to regular doctors who had him taking statins for high cholesterol, other patent medicines to lower blood pressure. “But one thing he doesn’t have is arthritis in his knees,” Joe remarked.

After finishing Joe’s health history and doing a physical exam, it was apparent that other than the condition of his knees, Joe’s health was indeed quite good, especially for age 74. After hearing that, Joe looked disappointed, and asked if that meant there was nothing else to do except surgery. So, I told him about Dr. William Kaufman, who in the 1940s thoroughly researched and proved a safe, effective remedy for osteoarthritis pain. This remedy also improved joint mobility significantly.

Dr. Kaufman’s first observations concerning joint pain were made at a time when the large majority of Americans ate large quantities of processed, canned, and refined foods, purely white flour, and large quantities of sugar. Many people were so low in one or another essential nutrient that even a very small amount could make an observable difference within an hour or less. In 1943 Dr. Kaufman published a book1 describing the mental and physical effects of a single vitamin deficiency—niacinamide, one form of vitamin B3—in 150 patients he had seen within the prior year. In a 1998 interview2, he described some of them:

“Any patient I gave niacinamide had to sit in

(Continued on next page)
my office for at least an hour, so I could observe what happened. My first observations were made in the days before bread and other white flour products were ‘enriched’ . . so I really got a chance to observe the difference that niacinamide could make, starting from a position of real deficiency verses semi-deficiency.”

“There are many more details in my 1943 book, but let’s cover a few. Within 2½ to 5 minutes after taking the first 100 milligrams of niacinamide there was a degree of physical and mental relaxation which became marked in the next 20 minutes. The first objective change, apparent within the first 5 minutes, is the relaxation of previously tense muscles, and the replacement of a drawn facial expression by a more calm one, or even a smile. Without suggestion, patients began to sit, walk and stand more erectly. Within the first 5 to 10 minutes, the color of the hands and feet might change from a sallow yellow to a healthy pinkish or ruddy color, and the hands and feet are frequently subjectively and objectively warmer. There are many more changes detailed in that book.”

Chapter 3 of this book is titled “The Arthritis of Aniacinamidosis.” In it, he describes improvements in arthritic pain and mobility experienced by these patients using relatively small doses of niacinamide. These observations inspired him to do a much larger and exacting study of niacinamide’s effects on arthritis. Quoting Dr. Kaufman again: “In 1944, looking for objective data, I started precise measurement of the ranges of joint motion of every patient who had obvious arthritis, at the time of their first examination.”

He designed exacting measurement of twenty joints or groups of joints that could be observed and recorded in five minutes on a specially designed form. Dr. Kaufman’s 1949 book describes the results of this study in 455 patients with significant osteoarthritis. He explained that the changes in range-of-motion measurements were very necessary as they were objective measurements, and unlike changes in pain, could not be criticized as being placebo effects.

All 455 individuals had significantly less arthritis pain, and all had significant improvements in range of motion of their joints. Dr. Kaufman explained that improvement started after three to four weeks of niacinamide use, and were maximized in three to four months. He also reported that taking higher quantities of niacinamide, and taking them every few hours, worked best. Although all arthritic joints could experience relief, knees, and shoulders responded best and most often, followed by neck, and then wrists and fingers.

From repeated physical examinations, Dr. Kaufman observed that continuous use of niacinamide significantly reduced swelling in connective tissue and cartilage. Laboratory testing of the “sedimentation rate” (a test still used frequently by physicians in 2018) demonstrated a significant reduction in inflammation.

He’d also observed that it was more effective if the same total daily dose of niacinamide was split into three or four smaller quantities. As Dr. Kaufman’s research progressed, he gradually increased the overall daily amounts to be used and found that more niacinamide was more effective.

Of course, Joe heard from me only a summary version of the research findings above. But after hearing that niacinamide was most effective for knees, he looked more optimistic, rapidly asking several questions: “Where do I get that niacinamide? Is it the same as niacin? How much do I take? Is it expensive? Can it hurt anything?”

Fortunately for us, if we take more niacinamide than our bodies want to process, our livers send us a signal: nausea! At first, it’s usually just a low-grade nausea, like being on a boat and starting to be seasick. If we stop the niacinamide entirely until the nausea is gone—at most a few hours to twenty-four hours—and then resume at a lower amount, we can cautiously find what the maximum dose is for us.

Niacinamide and niacin are very similar, so they’re both called vitamin B3, but their effects can be quite different. Niacin dilates blood vessels quite markedly for some of us, making us hot all over, and sometimes itchy too! Niacinamide never does this. Niacin can lower cholesterol, but too much for any one person can raise blood sugar without giving any symptoms. Niacinamide never does that either. Niacinamide controls osteoarthritis pain, often completely. Niacin doesn’t do that.

A usually effective quantity for both men and women is a total of three grams (3,000 milligrams) daily, perhaps one gram three times daily. A few individuals have taken a total of four grams daily and reported better results. Niacinamide is available in five hundred, one thousand, and in a time-release form of fifteen hun-

(Continued on next page)
dried milligrams, which makes it easier for some (mostly men) to remember. But, at the time Joe was first at Tahoma Clinic, no time-release form was available, so he chose to use one gram three times daily, which is rarely associated with nausea and is often enough to be quite effective.

Niacinamide in the regular (not time-release) form is available at all-natural food stores, compounding pharmacies, and the Tahoma Clinic Dispensary. It’s very inexpensive (Joe was really happy to hear that, as he said his funds were very limited). The time-release form available now costs more, but still isn’t at all expensive, and is for many more, convenient.

Dr. Kaufman’s second book\(^3\) was published in 1949. Even though he was a 1938 graduate of the University of Michigan Medical School, none of us who attended that medical school—starting in 1965, and escaping (sometimes called “graduating”) with an MD degree in 1969—were informed about Dr. Kaufman, his research, or his book, in either classes or in our work with patients. In 1997, I asked Dr. Kaufman about that. Here’s his answer:

“In my medical school years, we were drilled in great detail about vitamin deficiency disorders during our lectures in internal medicine, pediatrics, public health, neurology, psychiatry, and pathology. But after synthetic vitamins became available to treat florid deficiency diseases, not teaching about nutrition and vitamins became a national trend.”

“I’m not surprised they didn’t refer to my books. The reviews of my 1943 book were dismissive, because the “experts” couldn’t believe that the larger amounts of niacinamide mobility, muscle strength, maximal muscle working capacity, and mental functioning.”

Fortunately, Dr. Kaufman’s book had “come my way” in 1976, three years after starting Tahoma Clinic. By the time Joe came in, over a hundred people I’d seen with degrees of osteoarthritis varying from mild to severe had proven to me what Dr. Kaufman had already proven in the 1940s.

Back to Joe. He didn’t return to Tahoma Clinic for over six months. He walked normally through the hallway to my office; no cane, no limp. He smiled and said, “Sorry I didn’t come back sooner; like I mentioned, finances, and Tahoma Clinic doesn’t take Medicare or insurance.”

I apologized for that, answering that at Tahoma Clinic we work only for the individuals who consult with us, and not for any “third party,” because our job is to do the best we can for each individual, not follow “standards of care” dictated by an insurance company or government agency which had never, ever worked with that individual. Joe smiled again, saying, “Just teasing you, doc. I’m very familiar with the old saying. ‘He who pays the piper calls the tune!’”

He reported what I’d mentioned might happen: he didn’t feel much less joint pain until the third week after he started the niacinamide at the rate of one thousand milligrams, three times a day. That third week he noticed a little improvement; by the third month the pain was nearly gone, and from the fourth month until now he’d had no pain. The fifth month he’d been back to the doctor who recommended surgery. “He takes Medicare and insurance,” Joe said, smiling a big smile again, letting me know he was teasing.

“He couldn’t believe it,” Joe said. “No cane, no pain, I was walking like normal! He insisted on taking more X-rays and when he saw them, he shook his head and told me this couldn’t be happening—my ‘bad knee’ was still ‘bone-on-bone.’ He asked me what I’d done; I told him, and he just walked out of the room, shaking his head.”

Joe had previously mentioned his brother’s health, so I asked him about him again. Joe said the doctor had told his brother he might be developing type 2 diabetes. “He’s taking the same drugs as before,” Joe said. “Apparently they haven’t cured his basic problem. I keep telling him about diet and exercise and the right supplements being able to prevent type 2 diabetes and lower blood pressure and cholesterol, all at the same time, because they all have the same cause—which isn’t a lack of drugs! But all he does is keep telling me he doesn’t have bad knees!”

Joe never returned to Tahoma Clinic. In the late 1990s, one of Joe’s children who was seeing me about bioidentical hormone treatment told me that he had died at age 87, …walking normally until the very end.”

A large majority of those who use niacinamide for osteoarthritis—most usually the one-gram-three-times-a-day amount, although a few use more—that large majority achieve complete control of the pain after three to four months. A small minority has only partial relief. As documented so well by Dr. Kaufman, everyone achieves significantly greater range of motion. Joint replacement surgery is usually avoided.

One thing I couldn’t tell Joe was why—with all of his other health problems—Joe’s brother didn’t also suffer from osteoarthritis. Research reported in 2007, \(^4\) 2008, \(^5\)

(Continued on page 61)
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- Pleasant tasting – suitable for both children and adults

Rate of Borrelia Cell Death After Application

```
<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Cells/ml</th>
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<td>1,200,000</td>
</tr>
<tr>
<td>120</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>
```

“We have studied many possible treatments for Lyme at our research facility in Europe, and this is one that is a most promising candidate. Both the Liposomal format and original liquid version were tested. I think that our research supports the clinical feedback from physicians like Dr. Richard Horowitz. These formulas are a breakthrough in addressing Lyme disease, and should be considered a valuable addition to our integrative approach.”

~Dr. Leona Gilbert, Ph.D.

“Biocidin has been the most comprehensive natural combination that I’ve encountered. I have been very pleased with the consistent results using it for our patients, and we put every Lyme patient on it. The new Liposomal Biocidin is a welcome addition.”

~Dr. James Roach, MD

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2009, 2010, and 2012 all reported that osteoarthritis is a component of metabolic syndrome, the immediate precursor of type 2 diabetes. So how did Joe’s brother escape this fate?

By smoking cigarettes containing tobacco! Not kidding! But how could tobacco actually be good for anything? A little background first. In the early 20th century, when the cause of pellagra was discovered to be complete or nearly complete deficiency of vitamin B3, the biochemical structure of the two different forms of vitamin B3 was also being determined. The two were found to be so similar to nicotine (the addictive component of tobacco) that in the United Kingdom the two molecules were named “nicotinic acid” and “nicotinamide,” and are still called that today.

In these United States, “regulators” decided that these names were unacceptable. The excuse was that many of us would think we could get our vitamin B3 by smoking cigarettes! Apparently, these “regulators” thought that Americans were not as smart as citizens of the United Kingdom, who all learned—and still know—the difference. So, in these United States, nicotinic acid was renamed niacin, and nicotinamide was renamed niacinamide, and both are closely related to nicotine.

But how does that explain why Joe’s brother didn’t develop osteoarthritis? In 2011, researchers reported that in 11,388 men, those who had smoked cigarettes for forty-eight years or longer were 42% to 51% less likely to undergo total joint replacement than men who had never smoked. In 2013, the same research team reported about total joint replacement in 54,288 men and women. They wrote, “Compared to non-smokers, male and female smokers were respectively 40% and 30% less likely to undergo a total joint replacement.” They concluded, as they did in the first research report, that further investigation should be done about how smoking tobacco cuts the risk of osteoarthritis and consequent joint replacement surgery.

I could be wrong, but the answer seems obvious: there’s enough structural similarity between the nicotine and nicotinamide (same as niacinamide) molecules to explain the effect of both in significantly reducing joint replacement surgery. But please don’t start smoking if joint replacement surgery has been recommended for you! Lung cancer, emphysema, COPD, or higher risk of heart attack, anyone?

Lastly: remember that osteoarthritis has now been identified as part of metabolic syndrome (which proceeds to type 2 diabetes). As this article is very long already, we’ll save for another time reviews of the benefits of vitamin B3 for individuals with type 2 diabetes.

About the Author
Jonathan V. Wright, MD, ND (hon)
A Harvard University (1965) and University of Michigan School graduate (1969), Dr. Jonathan V. Wright was awarded an honorary ND by Bastyr University (1993). He is a pioneer in research and application of natural treatments for health problems not requiring surgery, and in the theory and use of natural substances to promote healthy aging. Since 1983, he has regularly taught these methods to physicians in the United States and abroad.

Internationally known for his books and medical articles, Dr. Wright has authored thirteen books, selling over 1.5 million copies, with two texts (Book of Nutritional Therapy and Guide to Healing with Nutrition) achieving best-seller status. Since 1996 he has written a popular monthly newsletter, emphasizing nutritional medicine.

Dr. Wright is in private practice in Washington State. He founded the Tahoma Clinic in 1973. Remember the Great B-Vitamin bust by the FDA?

References:

◆
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The Use of Intravenous Magnesium and Alpha Lipoic Acid

SHOULD MORE CHIROPRACTORS PERFORM INTRAVENOUS INFUSIONS AS ADJUNCT THERAPY?
A COMMENTARY ON THE AVAILABLE RESEARCH

by: Adrian Isaza, DC, DACBN, CCAP

Two surveys were conducted on 199 complementary and alternative medicine practitioners for the years 2006 and 2008. The surveys showed that out of 199 practitioners, 172 administered intravenous vitamin C and over 19,000 patients received IV vitamin C. These surveys revealed that the use of intravenous infusions among complementary and alternative medicine is common.

The purpose of this commentary is to evaluate the benefits of intravenous magnesium and alpha lipoic acid in order to evaluate whether more chiropractors should perform intravenous infusions as adjunct therapy to spinal manipulation.

Intravenous Magnesium vs Long Acting Beta Agonists for Asthma
In 2012, Song, et al, conducted a systematic literature review on the effect of intravenous magnesium in asthmatic patients. The study concluded that intravenous magnesium as an adjunct to standard treatment may be beneficial in the treatment of adult patients with severe or life-threatening exacerbation. The review also concluded that use of magnesium has an excellent safety profile if administered properly.

A few studies discussed the safety burden of long acting beta agonists in the treatment of asthma or COPD and one cohort study questioned their efficacy. In 2006, Salpeter, et al conducted a meta-analysis on the safety of long acting beta agonists. The meta-analysis included 19 trials with 33,826 participants and found that long-acting beta-agonists increased exacerbations requiring hospitalization and life-threatening exacerbations compared with placebo.

In 2007, Cazzola, et al, conducted a literature review and concluded that the salmeterol multi-center asthma research trial (SMART) found more asthma deaths (13 vs 3) and life-threatening asthma events (37 vs 22) in the salmeterol-treated asthmatic patients, although it was documented that among African-Americans, 5 times as many deaths and near-deaths from asthma occurred in those given salmeterol than in those given placebo, and among patients with asthma not using an inhaled corticosteroid (ICS) as a preventive (controller) medication, again more deaths and near-deaths from asthma occurred in those given salmeterol than those given placebo.

In 2010, Salpeter, et al, conducted another literature review that included 36,588 participants and found that long-acting beta-agonists increased catastrophic events 2-fold. The review concluded that long-acting beta-agonists increase the risk for asthma-related intubations and deaths, even when used in a controlled fashion with concomitant inhaled corticosteroids.

Finally, in 2014, Lindemauer, et al, conducted a retrospective cohort study at 421 U.S. hospitals of patients hospitalized with exacerbations of COPD. The study concluded that long acting beta agonists are not associated with better clinical or economic outcomes.

Forced Expiratory Volume (FEV 1):
Two systematic reviews with low heterogeneity found similar outcomes when measuring the effect of intravenous magnesium on forced expiratory volume. In the year 2000, Rowe, et al, conducted a systematic review on the therapeutic effects of intravenous magnesium and found that the absolute FEV1 improved by 10% in patients with severe acute asthma. The study also concluded that magnesium sulfate appears to be safe and beneficial for patients who present with severe acute asthma.

More recently, in 2014, Kew, et al, performed a systematic review which provides evidence that a single infusion of 1.2 g or 2 g IV MgSO4 over 15 to 30 minutes reduces hospital admissions and improves lung function in adults with acute asthma who have not responded sufficiently to oxygen, nebulized short-acting beta2-agonists and IV corticosteroids.

When evaluating table 1 intravenous magnesium and long acting beta agonists appear to have a similar effect on FEV 1.

(Continued on next page)
**PERCENT PREDICTED PEAK EXPIRATORY FLOW:** Kew, et al, measured the effect of intravenous magnesium over percent-predicted peak expiratory flow. Based on three randomized controlled trials with over 1,000 patients the percent predicted peak expiratory flow was 4.78%. Similarly, in 2010, Ducharme, et al, evaluated five randomized controlled with over 1,600 patients and found an overall effect of LABA over percent predicted peak expiratory flow of 3.45% as depicted on table 2.10

TABLE 1. Comparison of Efficacy Between Intravenous Magnesium and Long-Acting Beta Agonists
Measured by Forced Expiratory Volume

<table>
<thead>
<tr>
<th>INTERVENTION</th>
<th>INTRAVENOUS MAGNESIUM</th>
<th>LONG-ACTING BETA AGONISTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR</td>
<td>2014</td>
<td>2009</td>
</tr>
<tr>
<td>CONDITION</td>
<td>Asthma</td>
<td>Asthma</td>
</tr>
<tr>
<td>STUDY</td>
<td>Systematic review</td>
<td>Systematic review</td>
</tr>
<tr>
<td>INCLUSION</td>
<td>Randomized controlled trials</td>
<td>Randomized controlled trials</td>
</tr>
<tr>
<td>NUMBER OF STUDIES</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>MEASURES</td>
<td>FEV 1</td>
<td>FEV 1</td>
</tr>
<tr>
<td>RESULT</td>
<td>4.41</td>
<td>4.39</td>
</tr>
</tbody>
</table>

**TABLE 2. Comparison of Efficacy Between Intravenous Magnesium and Long-Acting Beta Agonists**
Measured by Peak Expiratory Volume

<table>
<thead>
<tr>
<th>INTERVENTION</th>
<th>INTRAVENOUS MAGNESIUM</th>
<th>LONG-ACTING BETA AGONISTS</th>
</tr>
</thead>
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<tr>
<td>YEAR</td>
<td>2014</td>
<td>2010</td>
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<td>CONDITION</td>
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</tr>
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<td>STUDY</td>
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</tr>
<tr>
<td>INCLUSION</td>
<td>Randomized controlled trials</td>
<td>Randomized controlled trials</td>
</tr>
<tr>
<td>NUMBER OF STUDIES</td>
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<td>5</td>
</tr>
<tr>
<td>MEASURES</td>
<td>Peak expiratory flow</td>
<td>Peak expiratory flow</td>
</tr>
<tr>
<td>RESULT</td>
<td>4.78%</td>
<td>3.45%</td>
</tr>
</tbody>
</table>

**Alpha Lipoic Acid vs Amphetamines for Weight Loss:**
Historically, anti-obesity and amphetamine-related drugs have been found to be unsafe. Fen-Phen, which is a combination of fenfluramine and phentermine, was removed from the market in September of 1997, after reports showed that is caused valvular heart disease and pulmonary hypertension.

Unlike fenfluramine and dexfenfluramine, phentermine was not withdrawn from the market at that time. Phentermine is classified as a controlled substance (Schedule IV drug) and is only recommended for short-term use.

In 2000, phenylpropanolamine, an over-the-counter sympathomimetic weight loss drug, was found to be a risk factor for hemorrhagic stroke in women. Also in 2000, the European Medicines agency (EMA) recommended the market withdrawal of several anti-obesity drugs, including phentermine, diethylpropion, and mazindol, due to an unfavorable risk to benefit ratio.

In October 2010, sibutramine, a sympathomimetic drug structurally related to amphetamines, was withdrawn from the market due to its association with increased cardiovascular events and strokes. Recently, other safety concerns with sibutramine have also been reported with some reports and case studies of neuropsychiatric disorders attributed to its use.11,12,13

Newer non-amphetamine drugs include the drug orlistat. Gastrointestinal side effects for Orlistat include abdominal pain and discomfort, oily or liquid stool and fecal urgency which are very common; thus, long-term tolerability remains an issue.13

(Continued on page 66)
CLINICAL NEURO: *Brain Examination with clinical pearls and protocols*

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Recently, in 2017, two studies have shown positive outcomes using intravenous alpha lipoic acid for the treatment of obesity. Namazi, et al, conducted a systematic review and meta-analysis of twelve randomized controlled trials which revealed that supplementation with alpha lipoic acid slightly but significantly decreased body weight and body mass index.\textsuperscript{14} Kucukgoncu, et al, conducted a meta-analysis of ten randomized controlled trials which showed small, yet significant short-term weight loss compared with placebo.\textsuperscript{15}

When comparing the short-term effect on weight between alpha lipoic acid and amfepramone (amphetamine) there seems to be a similar short-term effect between the two interventions. (See table 3)

**Intravenous Alpha Lipoic Acid for Diabetic Neuropathy**

In the year 2012, Mijnhout, et al, conducted a meta-analysis of randomized controlled trials and found that when given intravenously at a dosage of 600 mg/day over a period of 3 weeks, alpha lipoic acid leads to a significant and clinically relevant reduction in neuropathic pain (grade of recommendation A).\textsuperscript{17} Also in 2012, Han, et al, conducted a systematic review and meta-analysis of fifteen randomized controlled trials and found that treatment with alpha lipoic acid (300-600 mg/day intravenous for 2-4 weeks) is safe and that the treatment can significantly improve both nerve conduction velocity and positive neuropathic symptoms.\textsuperscript{18} Finally, in 2016, Cakici, et al, conducted a systematic review of 27 randomized controlled trials and found that alpha lipoic acid among other treatments had significant beneficial results for diabetic neuropathy.\textsuperscript{19}

In a few states including Alaska, Arizona, Colorado, Idaho, Missouri, New Mexico, Oklahoma, Oregon and Utah chiropractors administer intravenous infusions upon completion of additional training through a degree program called advanced clinical practice. Currently, it is up to these few states to document the findings of a combination therapy between chiropractic and intravenous magnesium or alpha lipoic acid as adjunct therapy for patients who are asthmatic or obese. This could potentially avoid the side effects associated with long acting beta agonists and amphetamines.

In 2013, West, et al, published a case report on a chiropractic patient who was experiencing headaches. The patient was treated with IV treatment as adjunct therapy. The intravenous infusion included carrier solution (100 mL saline), vitamin C (7-10 g), magnesium chloride (1200 mg), and pyridoxine HCL (B6, 400 mg).\textsuperscript{20}

In conclusion, it is plausible that more chiropractors will perform intravenous infusions as adjunct therapy given the aforementioned research. However, this may cause conflicting opinions among chiropractors and state legislators delineating the scope of practice.

**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” which will be published in the fall of 2018. He also wrote an anatomy and physiology book using his own teaching technique and recently earned his degree as a Doctor of philosophy.

As a physician Adrian holds a diplomate in Nutrition and he’s part of the item writing committee for the American

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**TABLE 3 COMPARISON OF EFFICACY BETWEEN ALPHA LIPOIC ACID AND AMFEPRAMONE IN PATIENTS WITH OBESITY**

<table>
<thead>
<tr>
<th>INTERVENTION</th>
<th>ALPHA LIPOIC ACID\textsuperscript{15}</th>
<th>AMFEPRAMONE\textsuperscript{16} (Amphetamine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR</td>
<td>2017</td>
<td>2017</td>
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<tr>
<td>CONDITION</td>
<td>Obesity</td>
<td>Obesity</td>
</tr>
<tr>
<td>STUDY</td>
<td>Systematic review</td>
<td>Systematic review and meta-analysis</td>
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<tr>
<td>INCLUSION</td>
<td>Randomized controlled trials</td>
<td>Randomized controlled trials</td>
</tr>
<tr>
<td>NUMBER OF STUDIES</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>MEASURES</td>
<td>Short term (under 180 days) mean difference in weight loss</td>
<td>Short term (under 180 days) mean difference in weight loss</td>
</tr>
<tr>
<td>RESULT</td>
<td>1.27 kg</td>
<td>1.281 kg</td>
</tr>
</tbody>
</table>
Clinical Board of Nutrition. He’s certified in acupuncture and practices medicine in Florida. He’s written over 20 papers advocating the use of Chiropractic medicine.

References
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THOUGHTS AT LARGE:
CONTROVERSES IN
CLINICAL NUTRITION

Issue #9

WHAT AMOUNT OF PROTEIN WILL GIVE THE BEST ANABOLIC RESULT? WHY IT IS MORE THAN YOU MIGHT SUSPECT?

by: Jeffrey Moss, DDS, CNS, DACBN

INTRODUCTION

In this third installment of my series that is devoted to convincing you that protein, not micronutrients, may be the most underappreciated supplement from both a preventive and therapeutic standpoint, I would like to discuss two papers that examine in great detail the ideal amount of protein needed to build muscle and maximize anabolic tissue growth/tissue repair mechanisms in many other parts of the body.

The first paper is entitled “Update on Maximal Anabolic Response to Dietary Protein,” and is written by Kim et al (Kim IY et al. Clin Nutr, Vol. 37, pp. 411-418, 2018). The first quote I would like to feature from this paper emphasizes what I have discussed before concerning the definition of an anabolic response:

“A net gain in protein balance (i.e., synthesis minus breakdown) is called an anabolic response, as opposed to a catabolic response caused by the rate of protein breakdown exceeding the rate of protein synthesis. An anabolic response refers to a gain of muscle protein, but can involve the entire body.”

Before continuing, please note again the last sentence of the above quote. Optimal protein intake and the optimal anabolic response that follows, which is generally considered only in terms of muscle mass, is actually important for virtually any part of the body. As I will discuss shortly, one part of the body that is particularly responsive to optimal protein intake is the gut. More specifically, leaky gut and gut integrity, an issue that has become a major clinical issue in functional medicine and clinical nutrition today, is more than just a function of diet, hydrochloric acid/enzyme production, microflora and the numerous other factors upon which we typically focus. While I do not want to, in any way, minimize these important factors, I do feel that the need for optimal protein intake has been greatly under-appreciated in terms of gut integrity and optimal gut health.

Optimal Anabolic Response is More Than Just an Issue of Building Muscle

Over the years it has been a general convention in clinical nutrition to consider optimal protein intake strictly in terms the amount needed to optimize muscle mass. However, the term “lean body mass,” which has been usually considered as a phrase synonymous with muscle mass, is, as will be demonstrated, much more than just muscle mass. Therefore, it stands to reason, if lean body mass is more than just muscle, and since we have traditionally only considered protein intake in terms of building muscle, much more dietary protein will be needed than the usual amounts that have become nutritional dogma to truly optimize health.

This key, misunderstood and poorly appreciated aspect of protein intake and optimal anabolic response was addressed by Kim et al, starting with the following quote:

“The determination of the anabolic response to dietary protein intake at the muscle level is obviously important, since muscle is a major fate of essential amino acids (EAAs) absorbed from dietary protein. However, tissues other than muscle account for more than half of the total protein turnover. Consequently, determination of the anabolic response at the muscle level could underestimate total anabolic response.”

Again, please note that total protein turnover that we are trying to optimize with dietary protein primarily involves tissues other than muscle. One tissue, in particular, as noted in the following quote, is the gut:

“In the fasted state there is a net amino acid efflux from muscle, i.e., a catabolic state. Consumption of dietary protein stimulates muscle protein synthesis (MPS) within an hour. In addition, a significant portion of the amino acids absorbed from the meal will be retained in the splanchnic area, mainly the gut.”

In addition, a mixed macronutrient meal that contains optimal amounts of quality carbohydrate, in addition to protein, will further enhance gut uptake due to the impact of a mixed macronutrient meal on insulin production:

“The retention of amino acids in the gut may be amplified by a systemic insulin response to a mixed meal.”

(Continued on next page)
Therefore, it is important to appreciate that the many ultra-low carbohydrate diets that are now in vogue for so many in the nutritional community, while they may be beneficial for those individuals who have, for years, ingested a diet high in poor quality carbohydrates, can have an adverse effect on the gut when they are employed in excess for a significant period of time.

Kim et al go on to point out that, because of rapid turnover of the gut, significant losses of gut protein can occur if there is increased demand by muscles:

“Over time EAAs released from protein breakdown in the rapidly turning-over gut tissues can be released into peripheral blood and then be incorporated into new proteins in muscle.”

Kim et al continue:

“Our recent findings are consistent with the possibility that gut protein turnover plays a role in the anabolic response.”

Because of this, to supply the amount of protein needed for optimal total body health, more than what you might suspect is needed:

“In an acute metabolic study, we showed that muscle protein synthesis was stimulated to the same extent by two doses of protein intake (40 g vs. 70 g), while the higher protein intake resulted in a greater whole body protein synthesis (also net balance).”

More on the impact of insulin on protein metabolism and anabolic response....

As was mentioned above, ingestion of carbohydrate along with protein can increase insulin response above that derived from protein ingestion alone, thereby improving protein/amino acid uptake in key tissues such as muscle and gut. As you will see from the following two quotes, not only does insulin promote increased anabolic responses but it also suppresses protein breakdown:

“If insulin is infused locally into skeletal muscle at a rate low enough to avoid systemic reductions in plasma amino acids, MPS is stimulated. This indicates a potential anabolic stimulatory effect of insulin on MPS, which would seemingly amplify the maximal anabolic response to dietary protein as compared to the ingestion of protein alone.”

(Dietary protein is almost always accompanied by carbohydrate.)

Furthermore:

“...the suppression of breakdown due to insulin may amplify the net gain in the balance between synthesis and breakdown following a meal as compared to ingestion of protein alone.”

How much can a mixed protein/carbohydrate meal suppress protein breakdown? Kim et al state:

“With regard to the maximal suppression of breakdown, we have previously shown that intake of a mixed meal containing protein suppressed breakdown by approximately 60%...”

HOW MUCH PROTEIN IS NEEDED FOR A MAXIMAL ANABOLIC RESPONSE?

As was mentioned above, due to the fact that most calculations on protein need are based solely on the amount needed to optimize muscle mass, and due to the fact that, in reality, muscle accounts for less than half of the total body protein need, much more dietary protein is needed than what has been typically suggested by researchers and instructors in the nutritional community. However, knowing that half of the dietary protein goes to organs other than muscle, how much dietary protein is needed to maximize muscle protein synthesis? To answer this question Kim et al first point out that traditional thought was that the maximal protein intake per meal should be no more than 20-35 g because higher intake would not stimulate further MPS. However, the authors feel that this approach is faulty because of the following:

“...this concept was based entirely on the measurement of muscle protein synthesis and thus ignored the potential contributions of suppression of protein breakdown to the anabolic response, as well as the possibility that tissues and organs other than muscle may also play a role in the anabolic response.”

In contrast, Kim et al feel, based on current research, that there is no limit to the anabolic potential of any given amount of protein per meal:

“We conclude that it is not likely that there is a practical limit to the maximal anabolic response to a single meal...”

WHAT ARE THE BEST TIMES OF DAY TO INGEST PROTEIN?

Is there value to ingesting equal amounts of protein in each of three meals throughout the day? Kim et al state:

“In a recent acute metabolic study, we did not observe any beneficial effects of distributing the same amount of dietary protein equally over three daily meals as compared to the normal American pattern of 65% of dietary protein with dinner as evaluated by measure-
ment of whole body protein synthesis and breakdown as well as MPS.”

In contrast, given that whole body (not just muscle) protein synthesis is function of protein intake per meal at levels higher than 20 – 35 g, the authors suggest the following:

“…increasing the amount of dietary protein eaten with breakfast and lunch will benefit the overall anabolic response for the day, but in doing this there is no metabolic reason to decrease the amount of protein eaten with dinner.”

Of course, as we all know, from a practical standpoint, ever increasing amounts of protein intake, no matter how it is distributed throughout the day, will eventually lead to adverse results in some form. Therefore, even though Kim et al feel very safe in not recommending a maximum allowable dose of protein per meal, it is important that we as clinicians have some sort of target amount to maximize anabolic response without causing adverse results. With this in mind, I would like to briefly discuss the conclusions of another paper on this subject, “How much protein can the body use in a single meal for muscle-building? Implications for daily protein distribution” by Schoenfeld and Aragon (Schoenfeld BJ & Aragon AA. J Int Soc Sports Nutr, Vol. 15, No. 10, 2018). In terms of maximizing muscle mass and strength the authors state the following:

“The collective body of evidence indicates that total daily protein intake for the goal of maximizing resistance training-induced gains in muscle mass and strength is approximately 1.6 g/kg, at least in non-dietary (eucaloric or hypercaloric) conditions.”

However, in line with the comments on the need for additional protein based on the need for non-muscle anabolic responses, the authors point out:

“However, 1.6 g/kg/day should not be viewed as an ironclad or universal limit beyond which protein intake will be either wasted or used for physiological demands aside from muscle growth.”

In addition:

“This reinforces the practical need to individualize dietary programming, and remain open to exceeding estimated averages.”

Before leaving this paper, though, I would like to highlight a quote that also emphasizes the need for protein intake to serve needs beyond muscle, with emphasis on the gut:

“It…can be speculated that some if not much of anti-catabolic benefits associated with higher protein intake was from tissues other than muscle, likely the gut.”

**SOME CONCLUDING THOUGHTS**

I realize that what I have been suggesting in this journal, and the last two, goes directly against powerful, decades-long dogma that suggests there is much to fear about exceeding the generally accepted minimum daily protein intake amount of 0.8 g/kg/day, starting with risks for kidney damage and so much more.

However, current research has made it abundantly clear that the amount of daily protein intake that creates a clear risk for adverse health effects is, for most individuals, way beyond even double the usual amount mentioned above. Why? Probably the most important, underappreciated reason is that muscle, which, traditionally, was the only consideration in determining daily protein requirements, in reality accounts for less than half of the total protein need. Therefore, given that I would guess that the vast majority of your patients, at the very least, need to increase muscle mass and function, restore gut lining integrity, and so much more in terms of protein-based anabolic responses, 0.8 g/kg/day simply will not get the job done. Based on the research performed over the last five years or so, I would suggest that at least 1.2 g/kg/day is going to be needed if you want to optimize total body anabolic responses and, for many patients, 1.6 g/kg/day or more may be needed.

**About The Author**

Dr. Moss graduated from the University of Michigan Dental School in 1974 and practiced dentistry in Grand Rapids, Michigan up to 1985. For the last 25 years he has operated Moss Nutrition Products which supplies the Moss Nutrition Professional Line of supplements to practitioners. Since 2000 he has served as adjunct faculty at the University of Bridgeport Nutrition Institute, starting with the Vitamins and Minerals class and, most recently, adding the Assessment in Nutrition class to his teaching responsibilities.

Finally, his newsletters of review and commentary on different subjects relating to functional medicine and clinical nutrition are regularly featured in the journals Nutritional Perspectives and The Original Internist.

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Anxiety disorders affect as many as eighteen percent (18%) of Americans. Of these, mental disorders account for four out of the ten leading causes of disability in the US and other developed countries. While generalized anxiety disorder is the most common anxiety disorder that affects older adults, other disorders including obsessive compulsive disorder (OCD), panic disorder, post-traumatic stress disorder and social anxiety disorder are also common.¹

OCD is thought to affect between 2-3% of the general population and is the fourth most common psychiatric illness. In obsessive compulsive disorder, people become trapped in “endless cycles of repetitive thoughts and behaviors,” which can cause distress and anxiousness. Because of this, the disease can become potentially disabling. Although many of these patients are prescribed serotonin reuptake inhibitors (SSRIs), it is estimated that 40-60% of patients do not respond adequately to this type of therapy.³

Taurine is a sulfur-containing compound, produced in the liver. It is a major constituent of bile, and accounts for up to 0.1% of total human body weight. It is utilized by the body in the conversion of cholesterol to bile salts, and is a required component for normal functioning of multiple tissues, including the heart, brain, eyes, liver, kidney, intestine, adrenal glands and vascular system.⁴,⁵,⁶ Functionally, it is associated with the protection of tissues from damage resulting from inflammatory reactions, via a reaction with HOCl/OCI⁻ to form taurine chloramines, which confers cellular protection via the regulation of pro-inflammatory mediators, including TNF-alpha and NF-Kappa B.⁷,⁸,⁹,¹⁰,¹¹ Studies have also associated its use with other forms of cellular protection, including the inhibition of leukocyte apoptosis,¹² and it has also been noted to exert anti-anxiety effects.¹³

Vitamin B₆ and its derivative pyridoxal 5'-phosphate (PLP) are essential to over 100 enzymes, most of which are involved in protein metabolism. Supplementation with B vitamins, including vitamin B₆, could effectively reduce elevated homocysteine levels. Vitamin B₆ is a water-soluble vitamin first isolated in the 1930s. The term vitamin B₆ refers to six common forms, namely pyridoxal, pyridoxine (pyridoxol), pyridoxamine, and their phosphorylated forms. The phosphate ester derivative pyridoxal 5'-phosphate (PLP) is the bioactive coenzyme form involved in over 4% of all enzymatic reactions. P₅P is the coenzyme form of B₆ for most vitamin B₆ dependent enzymes in the body. Recent studies suggest that vitamin B₆ might help reduce the risk of late-life despair.

In addition to the above actions of the B-vitamins, vitamin B₆ can be particularly beneficial in the management of anxiety. Vitamin B₆ is important in the synthesis of the neurotransmitters γ-aminobutyric acid (GABA), serotonin, dopamine, norepinephrine and epinephrine. Messenger molecules or neuropeptides are thought to link the immune, endocrine and central nervous system, and these messenger molecules are transmitted through virtually all bodily fluids.

Additionally, vitamin B₆ plays an important role as a “physiological mediator of steroid hormone function.” For individuals requiring vitamin B₆, B₆ Phosphate may be a beneficial addition to the daily diet.

Other B vitamins, including vitamin B₁₂ and folate, also play many important roles in neurological function, including their participation in one-carbon metabolism. Most studies that relate hyperhomocysteinemia with Alzheimer’s disease and other causes of dementia report positive results with B₁₂ supplementation. Elevated levels of homocysteine in the blood increase the risk of these diseases. Added to this, “increased levels of homocysteine in the blood is also a recognized risk factor for stroke and other vascular complications. Thus, there is a possible relationship between vitamin B₁₂ deficiency and vascular diseases.”

L-Theanine was discovered as a constituent of green

(Continued on next page)
Theanine and GABA in the brain. It is recognized that theanine may help relieve stress by inducing a relaxing effect without drowsiness and may also possess immunologic attributes. Theanine may also have effects on the cardiovascular system and play a preventative role in malignancy; however, limited clinical information is available to support these claims. It is recognized that “individuals who take an l-theanine supplement have increased alpha-brain wave activity in the brain, which is sign of enhanced relaxation.”

Studies have also reported an anti-anxiety effect using a single dose of theanine, in the range of 200 to 250 mg. Although the bioactive compounds most known in tea are catechins and caffeine, L-theanine is now recognized as the component that contributes to tea’s positive effects, including relaxation, cognitive performance, emotional status, and sleep quality, along with immune, cardiovascular and metabolic support. It has also been recognized that “L-theanine exhibits a molecular structure nearly identical to glutamate, an excitatory neurotransmitter. While its molecular mechanisms await thorough delineation, scientists believe L-theanine’s structural distinction allows it to act as a “Trojan horse” at glutamate-responsive proteins and receptors.” As such, it may compete with glutamate to balance its excitatory effects. In preclinical studies L-theanine also supports healthy levels of serotonin, dopamine and GABA in the brain. Human clinical studies have also demonstrated the benefits of L-theanine in both objective and subjective indices of relaxation.

5-HTP is a compound synthesized from the amino acid tryptophan and is a precursor to the neurotransmitters serotonin and melatonin. Vitamin B6 is required as a cofactor in the conversion of 5-HTP to serotonin. In animal studies 5-HTP has been found to be taken up by the brain from the blood, and readily decarboxylated into serotonin. 5-HTP appears to have equal efficacy to antidepressant medication, but without the drug risks and side effects. One study demonstrated that 5-HTP strongly suppressed appetite for three days following dosing. During a 90-day open trial, 5-HTP alone was also found to be effective in reducing the number of tender points, anxiety, pain intensity, fatigue, and in improving the quality of sleep. (p < .01). 5-HTP has also been demonstrated to have a beneficial effect on migraine, but the drug propanolol was found to do a better job, while the combination of both, propanolol and 5-HTP did the best. In all studies examined, 5-HTP has been noted to not have the side effects found with medication.

NOTE: 5-HTP is not recommended with MAO inhibitors or other antidepressants.

Selenium is an allotropic metal, that can form many compounds with both oxygen and sulfur. Like Vitamin E, selenium plays an important role in detoxification of peroxides and free radicals. It is also an essential component in the selenoproteins, including selenophosphate and selenocysteine, with vitamin B6 as the catalyst. As noted previously, the enzyme glutathione peroxidase is also a selenoprotein, which has been widely studied as it plays an important function in cell membrane stability. Glutathione peroxidase is also of major importance to the maintenance of red blood cell redox state. A decline in the activity of Glutathione peroxidase is a sensitive indicator of selenium status. There are thirteen different selenoproteins, although it has been estimated that approximately 36% of the total selenium in the body is associated with glutathione peroxidase. “Selenium is also an integral part of the enzyme Type1 iodothyronine deiodinase, which catalyzes the deiodination of the iodothyronines, notably the deiodination of thyroxine (T4) to triiodothyronine (T3), the most active of the thyroid hormones. In selenium deficient animals type I synthesis is markedly impaired, which is reversed when selenium is restored to the diet.” Additionally, under these same conditions, the ratio of T3 to T4 is altered, with more T4 and less T3 in deficient animals. However, unlike iodine deficiency, in this deficiency state, there is no thyroid enlargement, typical of iodine deficiency. In one study, it was found that there was a “strong association between plasma selenium and tim-ed performance-based assessments, whereby lower levels of selenium were significantly associated with decreased performance in neurological tests of coordination among older adults.”

Potential critical roles of Se and selenoproteins in the brain have been suggested. Human studies have correlated plasma Se status as being “positively associated with coordination and motor speed in elders.” Additionally, in various brain regions of the Parkinson’s disease (PD) mouse model, studies have demonstrated “differential responses”, which provide critical selenotranscriptomic profiling for the future functional investigation of individual selenoprotein in PD etiology. Emerging evidence has linked Se and selenopro-
teins to PD. One study noted “a wide range of changes in selenotranscriptome in a manner depending on selenoproteins and brain regions. While Selv mRNA was not detectable and Dio1& 3 mRNA levels were not affected, 1, 11 and 9 selenoproteins displayed patterns of increase only, decrease only, and mixed response, respectively, in these brain regions of PD mice.”

The combination of these select nutrients support a positive neurological response, including soothing of brain activity, thus assists in providing an overall sense of well-being.

About the Author

Dr. Rachel Olivier serves as a Physician Advisor for Biotics Research Corporation, a position she has held for over sixteen years. As a Physician Advisor she serves to educate and provide professional leadership for physicians and practitioners, in an effort to improve product understanding. She serves as Biotics’ chief consultant, advisor and technical expert, and also writes technically oriented papers, training curriculum, and product support material for practitioners and members of the sales team. In addition to this role, she also maintains a part-time nutritional practice, Healthstone Wellness, where she guides patients on lifestyle interventions and provides nutritional consultations. She holds a Masters degree in Molecular Biology from University of Southwestern Louisiana (currently the University of LA), along with a traditional Naturopathic Degree from Honolulu University, and a PhD in nutrition from California University. She can be contacted at (800) 231-5777 or via email at rolivier@bioticsresearch.com.

References:


THE ORIGINAL INTERNIST SEPTEMBER 2018
Is it a Cold, or the Mold?

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Is it a Cold or the Mold?

by: Gordon Siek, PhD, Veronica Kent, BS, Joanne Sherman, MLS ASCP

Molds, a multicellular subset of fungi, are found in virtually every environment, indoors and outdoors. Fungi are organisms frequently found in the environment and may affect the well-being and health of an individual. Thousands of different species of fungi have been identified. Certain fungi can cause human disease with a myriad of symptoms including skin, systemic, allergic or hypersensitivity clinical manifestations. Immunosuppressed individuals are especially at risk for acquiring fungi related illnesses that may require life-saving measures.

In general, fungi grow as yeast or mold forms depending on external conditions that include temperature, water presence, and carbon dioxide concentrations. Some fungi produce mycotoxins which can be deleterious to human beings and are more fully described in the text below. Although the terms fungi and molds are not identical in meaning, both words are used in discussions impacting human health. The term mold is used primarily in this review.

Molds are found in virtually every environment, indoors and outdoors. While most molds are innocuous, some molds are capable of causing allergic reactions and respiratory problems. Patients exposed to molds may present with classic seasonal allergy symptoms throughout the year. The interesting characteristic of molds is their unique ability to adapt to different environments, acting as traditional allergens and/or potential pathogens. Molds grow and thrive in warm, damp and humid conditions. Living and/or working in water-damaged buildings are a common route of exposure.

Exposure to molds has been linked to a variety of health problems, including Allergic Rhinitis and Asthma. Extreme weather events such as thunderstorms can dramatically modify aerial antigen levels; this phenomenon is “thunderstorm asthma.” During a thunderstorm, various mold spores and pollens are lifted into the air. Moisture from the storms then causes these pollens to rupture into tiny particles that are small enough to enter the lungs triggering acute asthma symptoms. In November 2016, an evening thunderstorm in the state of Victoria, Australia triggered asthma attacks. Thousands of people experiencing respiratory distress were rushed to hospitals, at least nine died.

Recent analyses have found a number of fungi/molds especially Aspergillus, Candida, Fusarium, and others can be pathogenic and contribute to a variety of severe syndromes. When mold species invade the human body, less common but severe mold induced respiratory syndromes can develop, as seen in individuals with Allergic Bronchopulmonary Aspergillosis (ABPA) and Hypersensitivity Pneumonitis (HP). ABPA is an allergic or hypersensitive reaction to Aspergillus fumigatus. Fungal spores are inhaled and then colonize in the lower airways and alveoli. HP is a disease that causes your lungs to become inflamed as an allergic reaction to inhaled molds, fungus, chemicals or dust. A few molds under the right conditions produce mycotoxins; secondary metabolites that may cause harmful effects in various organ systems.

Symptoms of mold exposure are often overlooked because patient symptoms are very similar to virus or bacterial infection symptoms, as well as the flu (see figure 1).

Identifying the immune response to molds through serum testing may help distinguish the nature of an exposure. Measuring levels of Immunoglobulin E (IgE), Immunoglobulin G (igG) and Immunoglobulin A (IgA) to specific molds can identify if the patient is experiencing an acute or delayed hypersensitivity response.

Measuring IgE can assist in identifying if the symptoms are an acute allergic response to a mold. Positive IgG levels may suggest a recent, on-going or past exposure to a specific mold. Positive IgA levels suggest a strong mucosal response, usually associated with a recent respiratory or gastrointestinal exposure to specific molds.

It is important to recognize the sources of mold exposure are often hard to identify, unseen water leakage within walls or even houseplants can harbor large amounts of mold. Teachers working in a mold-damaged school for up to two years complained of symptoms of rhinitis. When tested for mold specific IgG, elevated levels were associated with the presence of rhinitis. Elevated IgG and IgA responses have been

(Continued on next page)
reported in sawmill workers exposed chronically to mold in lumber.\textsuperscript{18}

The ubiquitous nature of molds makes elimination of molds and mold spores improbable, however, many steps can be taken to significantly reduce the burdens of mold and fungi within indoor spaces. Reducing humidity to below 50\% through the use of air conditioning or dehumidifiers will inhibit growth. Ensuring that windows, doors, and ducting are properly sealed and the proper use of high-efficiency particulate air (HEPA) filters for air conditioners, ducts, and furnaces will reduce spore and mold levels. The use of paints containing mold inhibitors should be used. Keeping dust levels down by frequent cleaning reduces fungal spores that have been brought in the home. Moving and/or removing houseplants can reduce mold burdens. Molds and fungi should be physically removed from homes as dead mold can still trigger immune responses. Mold inhibitors should be considered for refrigerator, or air conditioner drip pans and other places water collects. If leaks occur replace damaged wallboard, wallpaper, insulation, carpeting, and other materials where molds can colonize and thrive.\textsuperscript{1}

In summary, exposure to fungi/ molds can result in a wide spectrum of clinical findings that include irritant effects, hypersensitivity conditions, or life-threatening disorders. In assessing individuals with possible mold/ fungi-related ailments, potential environmental exposures within the home and work settings should be considered. Serologic testing to identify the ‘culprit’ allergen source(s) can be accomplished by performing immunologic IgE, IgG, and IgA assays. Since immunosuppressed persons can be at risk for fatal opportunistic fungal infections, this sub-group of individuals may require a more comprehensive clinical work-up to identify specific fungi by culture, molecular assays, or other test methods.

About the Authors:

Dr. Gordon Siek has over 35 years of experience in Clinical Laboratories and diagnostic assay development. He received his PhD in Pharmacology from Boston University. Prior to becoming Laboratory Director at Alletess Medical Laboratory, Dr Siek was involved in several start-ups and was instrumental in getting CLIA and CAP certification for two laboratories, as well as the development of seven FDA cleared diagnostic kits.

After receiving her degree from University of Massachusetts Amherst, Veronica Kent, President of Alletess Medical Laboratory has worked in all areas of the company. She has over 30 years of experience working in high complexity laboratories and is excited to lead Alletess to its next level of success as the company’s leader.

Joanne Sherman, MLS ASCP\textsuperscript{cm} is our Laboratory Supervisor. She has over 43 years of experience working in various clinical laboratories, her expertise in compliance and laboratory protocols is essential to the day to day operations at Alletess Medical Laboratory.

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Editors Desk: (continued from page 53)

will naturally (innately) be limited in their experiences, and therefore their perceptions. Greed must also be recognized as a large part of worsening health problems. Pharmaceutical companies cannot patent neutral substances, such as air, water, etc., and, therefore, they cannot charge exorbitant prices for them. It is in their best financial interest to not promote natural therapeutic health care strategies.

It is important to appreciate that a non-drug approach to health requires careful attention to a number of interacting factors which may either enhance or weaken the body and its defense systems. It is also important to remember that no two individuals are exactly alike. Supportive treatment strategies and therapies should always be customized to the individual needs by employing a detailed history, followed by a good physical examination and proper laboratory procedures.

Optimal health begins (and ends) at the cellular level. Each and every cell in the body depends on blood for nourishment. Blood also acts as the most important vehicle for the defense system. The health of the vascular system is also dependent on proper blood supply. A simple venipuncture can easily produce the human tissue essential for biopsy which can provide information about the patient that cannot be obtained from any other source.

Other than a detailed history, a multichannel blood test, with a CBC with a differential, a thyroid screen, and ferritin can provide more information about the individuality of the person than any other single test or laboratory procedure. It is often necessary to consider allergies, which are best evaluated by blood tests.

The first step for any gardener attempting to grow a prize-winning vegetable or flower is to have the soil tested to insure that the proper nutrition is available for the particular plant. Likewise, the first step any doctor should take when evaluating a health and wellness patient is to order a complete blood examination to help evaluate any nutritional needs.

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**Phase 3 Detox**

*by: Kelly Halderman, MD, PSc.D*

Is one of the biggest mistakes you’re making as a practitioner not properly supporting phase 3 detoxification?

In this day and age, the air we breathe, the water we drink and the food we eat is chalked full of a multitude of toxins such as heavy metals, plastics, pesticides, volatile chemicals and other environmental toxins that place a large burden on our bodies. Our patients come to us seeking help for various health complaints but foundational support is typically where we all start in order to help set the stage for their healing. One of the most important foundations of health is detoxification. Lessening their toxic-load is key in order to begin to treat their health ailments.

Detoxification refers to the process of taking endogenous substances such as hormones and endogenous compounds such as heavy metals and making them water-soluble so that they will be able to be excreted from the body in the bile or urine.

Practitioners are typically good at supporting the organs of detoxification (liver & kidneys) but fail to “seal the deal” by not using intestinal binders properly or if they do use binders they are not broad-enough range to bind a plethora of toxins.

Selective intestinal binders used in tandem to cover a broad-range of toxins are a crucial part of any detox protocol. When the liver processes toxins, they get excreted through bile and into the small intestine. If the toxins are not bound to anything, most of them will get reabsorbed in the gut. This is called *enterohepatic recirculation*. Binders ensure the products of Phase 1, 2 & 2.5 Detoxification are actually excreted fully from the body through elimination.

There are a variety of intestinal binders available for safe use. Different binders have selective affinities for various toxins based on their net charge and molecular bonds. The following are some of the most commonly used binders and the substrates to which they bind:

**Activated charcoal:**
pathogenic bacteria, mold toxins, pesticides, herbicides, volatile organic compounds (VOCs).

**Chitosan:**
ochratoxin, polychlorinated biphenyls (PCBs), phthlates, BPA, endotoxin, metals, also has prebiotic activity *not indicated for those with shellfish allergy*

**Chlorella:**
metals, VOCs, pesticides, herbicides and mycotoxins.

**Silica:**
aluminum and other trivalent metals (thallium).

**Clays:**
mold toxins, bisphenol A (BPA), pesticides and herbicides, healing to GI lining.

**Cholestyramine and Welchol:**
These are prescription medications that were developed to bind cholesterol. Commonly used to bind to mycotoxins, but they can decrease absorption of fat-soluble vitamins over time.

**Humic and Fulvic Acids:**
These are made of decomposed plant matter, essentially dirt. They have been shown to detox glyphosate but can cause renal damage.

Selecting a binder that will actively bind many environmental and endogenous toxins is imperative in properly executing all phases of detoxification, which is part of a much-needed foundation of care in those with chronic illness.

**About the Author**
Dr. Kelly Halderman, MD, PSc.D completed a Family Practice Medical Internship with the University of Minnesota; has a Naturopathic Medical Degree from the Kingdom College of Natural Health where she is the current Academic Dean of Students. She is on the medical advisory board for NutriGenetic Research Institute and holds certification in MethylGenetic Nutrition® and Functional Neurology from the American Functional Neurology Institute. Dr. Halderman is currently completing her Ph.D in clinical nutrition and has a certification in Plant based Nutrition from Cornell University. Her practice interests include Chronic Lyme, of which she has personally had to fight and overcome, Cancer, & genetic optimization and mitochondrial restoration.
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Dr. Kelly Halderman, MD, PSc.D., completed a Family Practice Medical Internship with the University of Minnesota; has a Naturopathic Medical Degree from the Kingdom College of Natural Health where she is the current Academic Dean of Students. She is on the medical advisory board for NutriGenetic Research Institute and holds certification in MethylGenetic Nutrition® and Functional Neurology from the American Functional Neurology Institute. Dr. Halderman is currently completing her Ph.D in clinical nutrition and has a certification in Plant based Nutrition from Cornell University. Her practice interests include Chronic Lyme, of which she has personally had to fight and overcome, Cancer, & genetic optimization and Mitochondrial restoration.

Dr. Eric Balcavage DC, CNS, BCIM, CFMP, is a chiropractic physician who has been in private practice in Glen Mills, PA since 1996. He received his Bachelor's degree in 1990 from Kutztown University and his Doctorate degree in 1995 from Palmer College of Chiropractic. Dr. Balcavage is a Certified Nutrition Specialist (CNS.), a Certified Functional Medicine Practitioner, Board Certified in Integrative Medicine, along with being a licensed Chiropractor in Pennsylvania. Dr. Balcavage is continuously advancing his knowledge with - post graduate studies. Dr. Balcavage's Chronic Condition Recovery Center offers chiropractic care blended with Functional Neurology, Functional Medicine, Functional Nutrition, Brain Based Therapy, and Neurofeedback Therapy. Countless patients can now see relief from symptoms of conditions such as peripheral neuropathy, fibromyalgia, thyroid disorders, vertigo, diabetes, GI tract disorders, migraines and weight challenges.

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- Welcome Reception 7:00 pm (location TBD)
- Saturday Lecture 9:00 am - 5pm
- Sunday Lecture & Case Studies 9:00a.m. - noon

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Glandulars in Nutritional Supplements

by: Robert Thiel, PhD
Nutrition Scientist and Clinician

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

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

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

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

Vastly more enzymes humans use are in glandulars rather than in plants.

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

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

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

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

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

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

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

The ovaries are involved in female reproduction. Bovine ovarian tissue is sometimes advised to help some woman sleep at night, reduce the production of acne, improve mood, sometimes aid in menopausal issues, and for some women, increase fertility. As it has effects that differ from thyroid support, it is often advised to take ovarian tissue before bed.

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

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

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

Bovine thyroid tissue (note: bovine thyroid glands are thyroxine-free, thus do not result in a shutting down of the thyroid gland when taken). Thyroid tissue is used by people with symptoms associated with low thyroid such as afternoon tiredness, poor circulation, poor temperature tolerance, headaches, low metabolism, diminished female libido, weight concerns, and sometimes dry skin. It is normally best not to take thyroid tissue late in the day (at breakfast and lunchtime is best for most people), as any thyroid support product can affect sleep if taken late in the day.

Some people will find that their appetite will temporarily increase when taking it, but not only does this tend to normalize, it normalizes to the point that most people will find that they crave junk food, caffeine, and similar items less, but water, fruits, and even vegetables more.

General Information on Glandulars

Some of the best natural health products contain glandular ingredients and many doctors have used glandulars for years with great success. Glandular organs, such as heart, aorta and liver, have been a food source in the human diet for centuries. The consumption of glandulars is believed to provide nutritional support to the corresponding gland in the human body. Glandular therapy has alternative names such as: organotherapy, cell therapy where extracts are injected; and live cell therapy which normally uses extracts orally or intravenously.

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

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

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

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

Harrower, a pioneering researcher of oral glandulars, believed glandulars were effective because endocrine glands experienced something he referred to as "hormone hunger". Harrower wrote: "The practical application of this idea concerns the administration of combinations of glands in presumed pluriglandular disturbances. If, for instance, in the conditions mentioned above there is a noticeable deficiency in several of the glands of internal secretion, the thyroid, ovaries and pituitary gland for instance, there may be varying degrees of hormone hunger on the part of the organs involved, and this will influence very definitely the amount of hormones that may be missing or needed by the glands to be stimulated."

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

"There is a lot of controversy about the activity of glandulars given orally...It appears the effectiveness of glandulars comes in a multi-faceted way. These facets may be grouped into three basic categories: A. Hormonal; B. Enzymatic; C. Nutritive...Any gland given for therapeutic use should contain the whole non-denatured gland...The hormones are at the same strength as those found in the natural organ, except that the water has been removed leaving only the dried concentrated tissue. These hormones fall into various categories and forms: 1. Steroids; 2. Peptides; 3. Catecholamines; 4. Amino Acids; 5. Prostaglandins; 6. Nucleotides. Their hormonal factors can be broken down into two categories: A. Lipid soluble hormones; B. Water soluble amino bases and acids...The problem with steroid or prostaglandin therapy is that the medical sciences have removed them from the naturally occurring matrix which has a fine balance of steroids and prostaglandins. There is a natural law which applies in the universe and even more so in biochemistry. For every biochemical reaction or mechanism, there is an opposing 'feedback' mechanism. For this reason, the balance must be maintained and taking glandulars are both therapeutically and very safe since this balance is maintained. It is only when the hormones are isolated and given in large doses that side effects take place, such as ulcers in steroid therapy or liver destruction in synthetic testosterone therapy. The second class of hormones is more diverse, but just as effective and important. These are the polypeptides and phyogenic amines such as neurotransmitters and catecholamines...And the incredible thing about these peptides is that they become more active upon digestion. They are normally secreted in long chain proteins which are then broken down into endorphins which are then digested by specific proteases into the active hormones...Therefore, most of the protein is assimilated in peptide form not amino acid form. What this means is that glandulars can actually be activated by digestion. It should be noted that bovine thyroid does not itself contain substantial amounts of thyroxin which is why it is appropriate to feed the human thyroid gland. Many raw glandular preparations contain substances that can facilitate the conversion of various substrates into hormones.

Cooking destroys enzymes. The primary difference between raw and desiccated glandulars is the enzyme content. "1. Processing is very important in maintaining enzyme activity; 2. Digestion is required to activate enzymes and peptides...how are they absorbed?...they are absorbed through standard biological processes. Up to a third of your food is absorbed through the lymph system. This is basically an open portal system which permeates through the entire digestive tract allowing large molecules such as fat micelles, enzymes and other molecules to pass into the blood stream. Other routes of absorption are active transport mechanisms such as chemotaxis...another route is immune absorp-
tion where the protein or molecule combines with another protein and is carried in piggy back...The third category for glandular therapy is as a food...They are rich in protein and minerals and B-complex** 32. It should be noted that when, for example, an adrenal enzyme reaches the toes basically nothing happens as the adrenal enzymes (as well as others) are specific to, in this case, the adrenal glands. Once reaching the adrenal glands, they help the adrenal glands through various anabolic and catabolic reactions.

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

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

**Non-Heat Drying vs. Desiccation**

Glandulars supplements can be made in several ways. The cheapest way is through desiccation, which essentially dries the glandular at high temperatures. The biggest problem with desiccation is that it destroys all the enzymes that are in the tissue. Desiccation may also destroy other active substances contained within the gland. Some companies use a salt-drying process, but this tends to result in glands with a high sodium content which can cause digestive complaints for adrenal-containing products. One of the most expensive ways to produce glandulars is through a non-heat, vacuum-drying process (“freeze-drying”). This low temperature process helps preserve many of the naturally-present enzymes. Natural health doctors generally prefer non-heat drying methods to desiccation even though that does increase the cost of the product. Non-heat drying results in a glandular that is the closest to ‘whole food.’

**New Zealand and Argentine Glandulars**

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

**Ovine, Bovine, and Goat**

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

1) Doctors using them have a history of receiving positive results from people with a wide variety of disorders.

2) Bovine/ovine tissues are the most commercially available.

3) Ruminant glandulars have a long history of being safe to consume.

4) Ruminant tissues are considered to be dietary supplements under the Dietary Supplement Health and Education Act of 1994 (DSHEA) and as such are not considered to be food additives.

5) Earlier research has demonstrated that heterologous tissues (such as bovine/ovine for humans) do not produce the adverse and possibly toxic side effects that more homologous tissues can (such as simian for humans) 40.

6) Some earlier research suggested that immune response in humans was improved at a much greater rate with the use of substances from ruminant sources as opposed to non-ruminant sources (simian and feline)39.

At least one researcher reported long ago that rat tissue extracts also appear to cause a variety of problems when forced into some animals 40.

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

**Why Aren’t They Used More?**

Since glandulars combined with herbs tend to work faster and sometimes better than herbs alone, why aren’t glandulars used more?

One reasons is that, generally speaking, glandular ingredients cost more money than herbal ingredients.

(Continued on next page)
Many companies simply will not use them for that reason. Another reason is many people believe that plants are always the answer. And although for some problems they are, they are not always the best choice as plants almost never contain identical glandular enzymes.

Glandulars can help replenish enzymes, peptides, and other nutrients for the body in ways vegan supplements cannot.

Glandulars should be considered more by health care professionals.

About the Author
Dr. Thiel, Ph.D. is a nutrition scientist and president of Doctors’ Research, Inc. (www.doctorsresearch.com). He is a prolific author and researcher and has had over 70 scientific papers published. He is also the author of the book, Serious Nutrition for Health Care Professionals. He also runs a holistic health clinic in California. www.healthresearch.com

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