Cancer Treatment and Prevention

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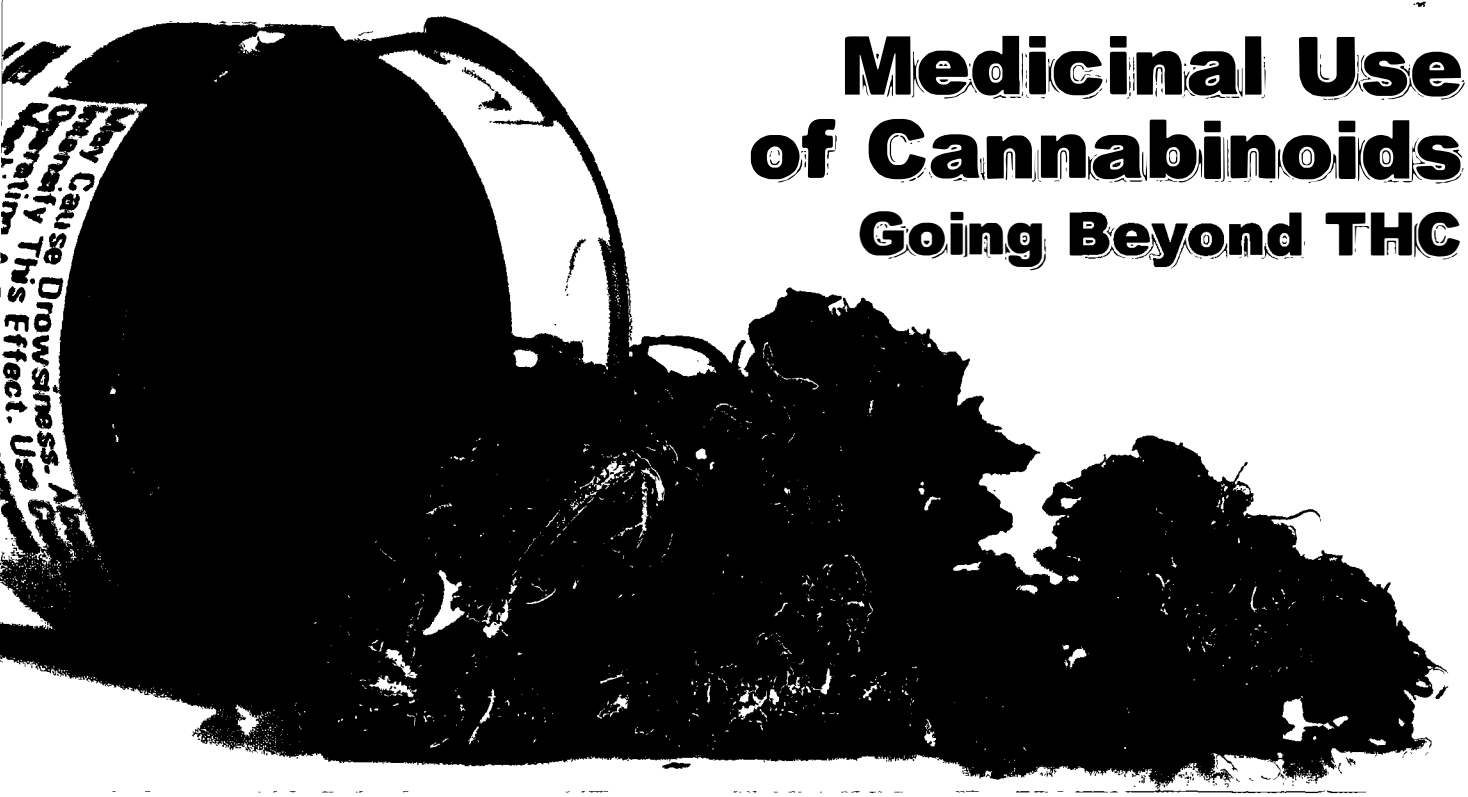

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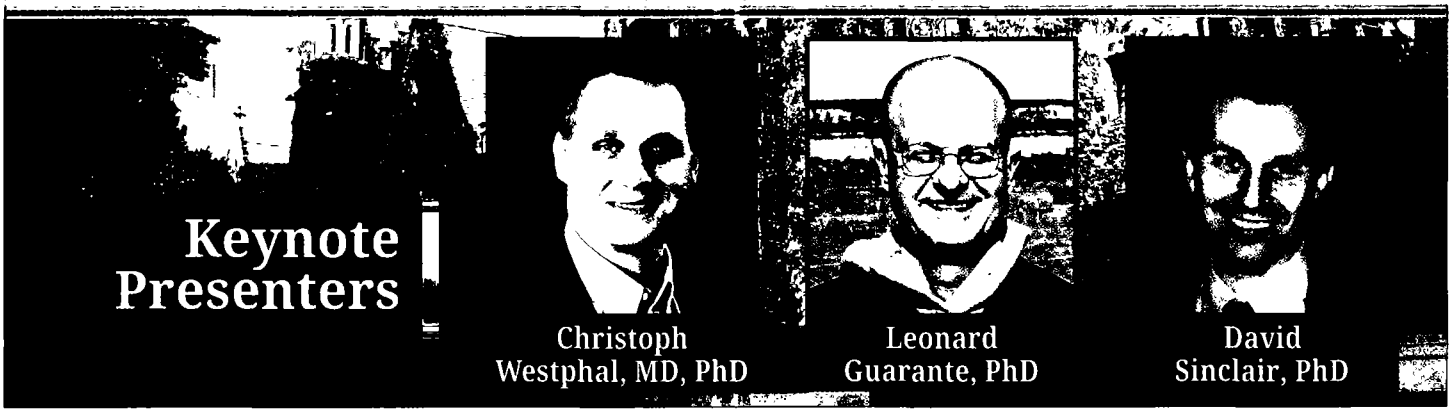

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Leonard Guarante, PhD

David Sinclair, PhD

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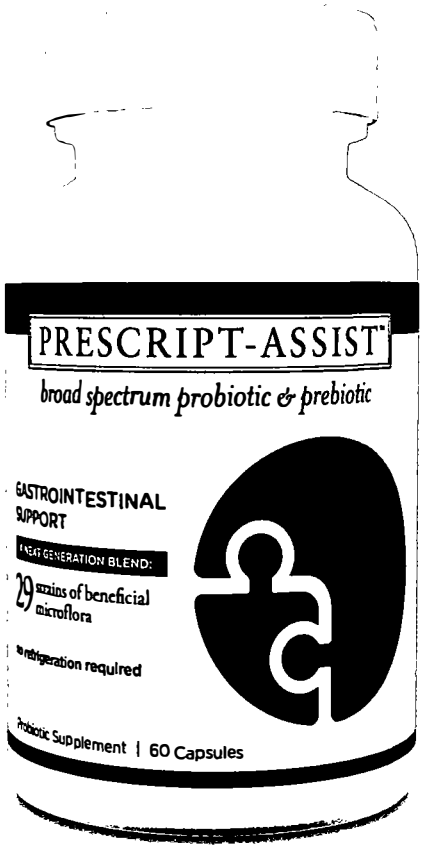

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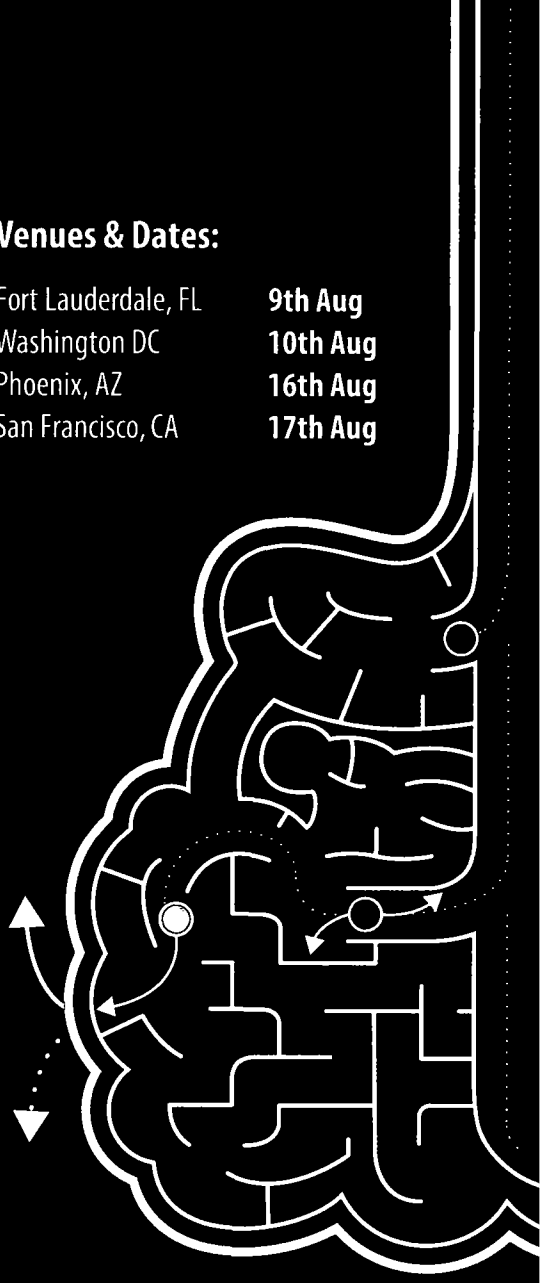

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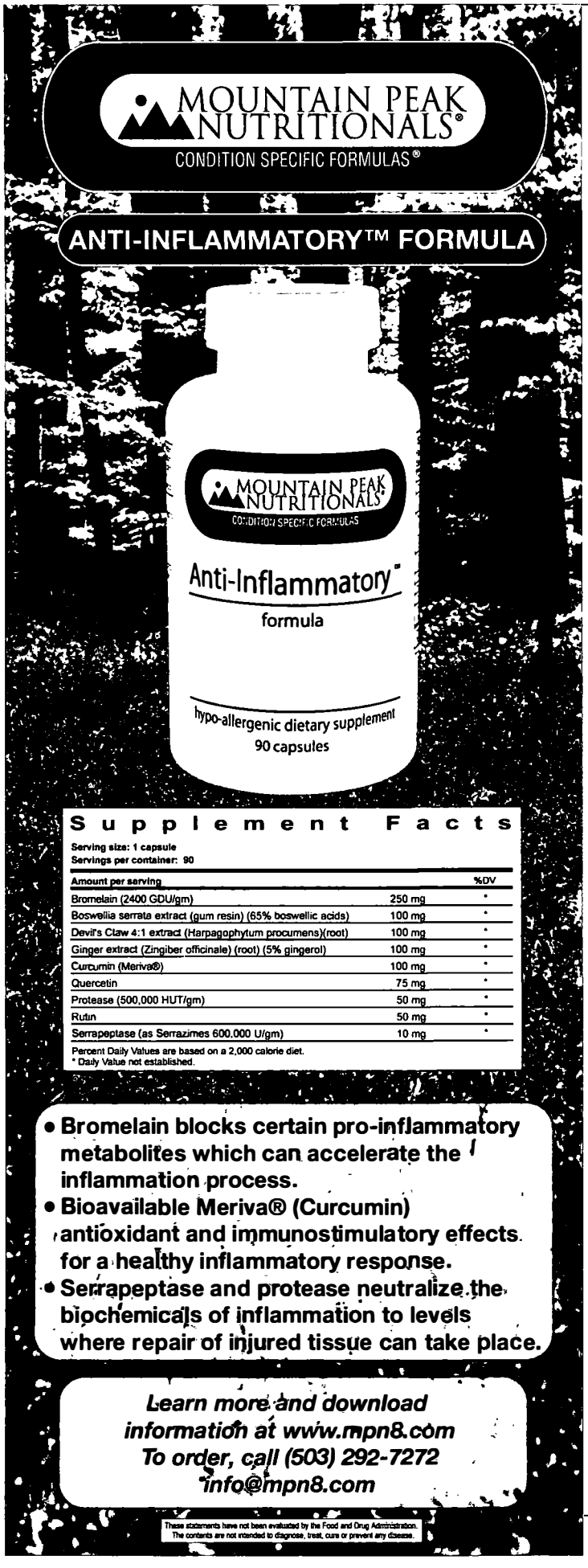

Letter from the Publisher

➤ continued from page 6

10,000 codes replete with ambiguous diagnoses such as "fatigue," "abdominal pain," "arthralgia," "depression," and "atherosclerosis." ICD-10, which actually was adopted by WHO in 1990 and is current in use by most countries in the world, will have 69,000 diagnostic and procedural codes, and these codes are by and large very specific. For those of you who wish to continue coding with "abdominal pain," there is such a code in ICD-10 as well. However, once Medicare and the insurance companies begin processing claims in October 2015, they will be able to easily sort out whether a doctor's diagnostic code justifies the examinations and procedures done. Nonspecific and ambiguous diagnoses will be an immediate red flag to insurance carriers and Medicare-auditing companies that they are being billed for inappropriate and potentially fraudulent medical care.

For most practitioners involved in integrative and naturopathic medical care, ICD-10 coding will not be required to the same degree of specificity as that demanded of the orthopedic surgeon or the obstetrician. For the orthopedist, ICD-9 was "limited" to nearly 750 diagnostic codes for a fracture; ICD-10 will include more than 17,000 codes. For the obstetrician, ICD-9 was limited to about 250 diagnostic codes, while ICD-10 will include more than 4500 codes. In ICD-9 an orthopedic diagnostic code of 82111 would be for an "open fracture of the shaft of the femur"; in ICD-10 the specific orthopedic diagnosis would be for a "fracture that is for the right femur, comminuted, displaced, the femur shaft, open, and grading of abnormality with a code of S72351C."[1] Fortunately, general practitioners will not be obligated to diagnose so many separate parameters to establish a correct code.

However, medical diagnoses will still require specific codes that indicate degree of abnormality, condition being treated, and risks associated with managing care. For example, the nonambiguous coding of diabetes would need to indicate if it were for diabetes type 1 or 2; insulin requiring or not; and complicated with renal, ophthalmic, hypertensive, coronary, cerebrovascular, or neurologic disease. Of course, there should be corresponding documentation in the chart discussing each of these factors in the diabetes diagnosis. However, the challenge will be to determine the precise ICD-10 code that covers each of the diagnostic findings, not the symptomatic findings. In other words, it would not be diabetes with limb pain, but diabetes with neuropathy; not diabetes with chest pain, but diabetes with coronary artery disease.

As one can imagine, the number of diagnostic entities associated with diabetes or other conditions can be

continued on page 15 ➤

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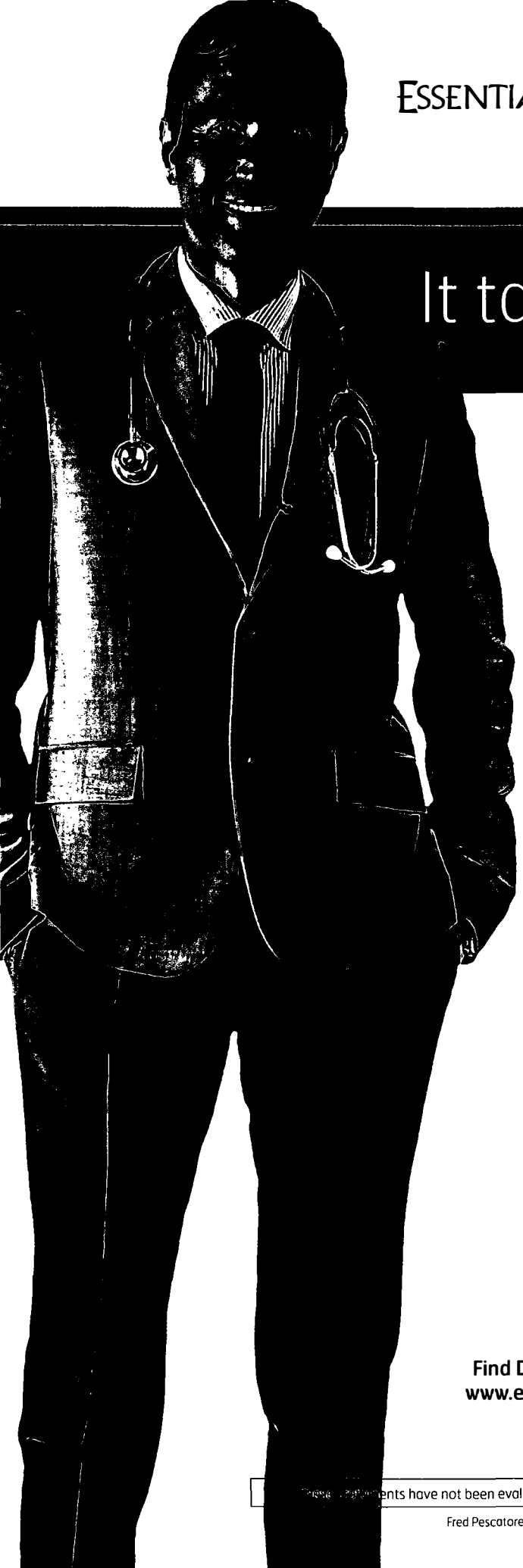

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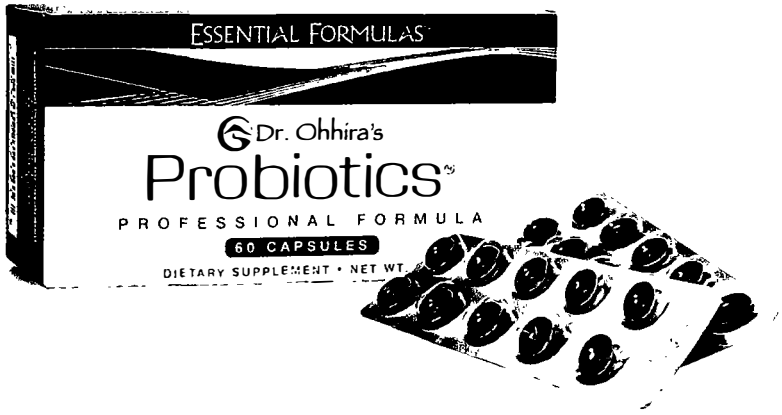

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1) Enhanced glutathione levels in blood and buccal cells by oral glutathione supplementation. J.P. Richie. Published in the European Journal of Nutrition, May 2014

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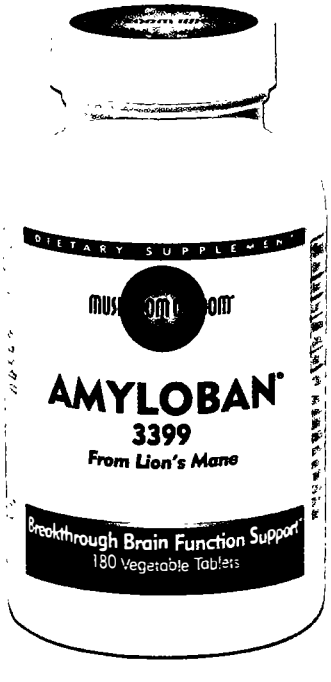

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Letter from the Publisher

➤ continued from page 8

numerous – more than 200 diagnostic combinations exist in ICD-10 for diabetes, whereas there were less than 70 in ICD-9. This means that not only must ICD-10 software offer a speedy means to combine the diagnostic conditions into one code, but the physician will also need to provide evidence in the chart that these diagnostic conditions were the focus of the office consultation, exam, and procedure. ICD-10 wants the physician to diagnose conditions, not to itemize patient complaints like "pruritus." The physician should be documenting that the patient has congestive heart failure, not coding for peripheral edema. The challenge of bringing together in the short office visit a correct diagnosis with all the associated conditions also means that additional ICD-10 codes should not be listed if they were not specifically addressed. If the patient has untreated cataracts, listing the ICD-10 code for cataracts when the patient was seeking a refill of his antihypertensive medication would be considered inappropriate and would trigger an inquiry.

The implications of ICD-10 coding extend far beyond proper diagnosis and billing. Medicare and the insurance carriers will be able to gather data on what conditions are being treated, how much the treatments cost, and what risks and adverse events are associated with the conditions and treatments. Currently ICD-9 does not offer a reasonable means to precisely understand costs. ICD-10 should provide excellent data to understand the costs required to treat a condition, especially in the hospital setting. ICD-10 should provide comprehensive data to determine the prevalence of conditions that have never undergone census such as hypertension, diabetes, osteoporosis, and GERD; statisticians can also determine the numbers for the conditions complicating these disorders. Associated conditions such as smoking, asbestos exposure, obesity, and hypercholesterolemia would have diagnostic ICD-10 coding that would provide data showing how these factors affect disease diagnoses.

For the integrative and naturopathic practice, ICD-10 coding poses its own set of challenges. While celiac disease has an ICD-10 coding, gluten sensitivity and milk allergy do not. While metal poisoning has ICD-10 coding, elevated but not toxic levels of lead and mercury do ➤

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not. While menopause has several diagnostic codes, bioidentical hormone treatment and monitoring do not. For the practitioner who has spent the consultation time discussing a gluten-free diet, chelation treatment, or hormone prescription and monitoring, there will not be ICD-10 coding. This will obligate the practitioner to attempt to code with an ICD-10 number describing possibly an unrelated medical diagnosis; however, the purpose of ICD-10 coding is to provide an accurate description of the diagnosis and treatment accomplished during the exam. While we might use codes for irritable bowel syndrome, metal toxicity, and menopause, they do not accurately describe the visit. Each of the aforementioned are also "ambiguous" diagnoses that Medicare and insurance carriers consider questionable for reimbursement, especially if the diagnoses are used repeatedly for frequent treatment visits. ICD-10 will also offer the opportunity for Medicare, insurance carriers, and other parties (such as the FDA and state medical boards) to get a sense of a practitioner's pattern of diagnosis and treatment. A doctor who is consistently diagnosing symptoms such as "cough" and "dyspnea" may find him- or herself under the microscope for medical overtreatment and diagnostic incompetency.

ICD-10 coding is the new billing and record-keeping frontier for 2015. Integrative and naturopathic physicians who intend to bill Medicare and insurance companies for services need to initiate training and work with software developers to create appropriate algorithms for determining ICD-10 codes for their practices. With the October 1, 2015, deadline approaching, ICD-10 training needs to begin soon.

Integrative and Naturopathic Oncology

During the past two years, integrative and naturopathic physicians have begun to organize societies focusing on oncology. Naturopathic Physicians have specialty training in cancer care leading to a diplomate as fellow of the American Board of Naturopathic Oncology. A4M offers a lengthy training fellowship in integrative oncology. There are numerous organizations now offering annual meetings dedicated to integrative and naturopathic oncology: Society for Integrative Oncology, Oncology Association of Naturopathic Physicians, and Best Answer for Cancer. Complementary alternative medicine (CAM) approaches to cancer treatment are presented each year at the Cancer Control Society meeting. With the ever-increasing requirements for meeting "standard of care" and treating with "evidence-based medicine," alternative cancer treatments are receiving greater scrutiny by the alternative and conventional medical communities.

Jeanne Drisko, MD, and Qi Chen, PhD, have made great strides in verifying the safety and effectiveness of intravenous ascorbic acid in the treatment of cancer. While Linus Pauling, PhD, and Ewan Cameron, MD, theorized that IV vitamin C was an important cancer treatment, Charles Moertel, MD, of the Mayo Clinic set back the treatment by reporting negative outcomes in studies done during the 1980s. Hugh Riordan, MD, PhD, studied and treated cancer patients, establishing protocols and laboratory monitoring. Drisko studied with Riordan and continued his work as director of the Integrative Medicine center at the University of Kansas Medical School. In this issue, Nancy Faass interviews Drisko, who describes her recently published work. When chemotherapy treatment was combined with intravenous ascorbate (administered in separate sessions, not together) compared with the group receiving chemotherapy alone, ovarian cancer patients had greater survival time and less toxicity.

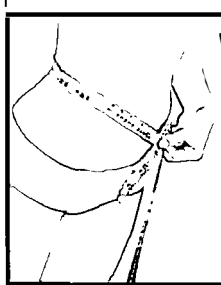
Can lifestyle changes improve survivorship in breast cancer patients? Barbara MacDonald, ND, coauthor of *The Breast Cancer Companion: A Complementary Care Manual,* reviews the evidence that lifestyle strategies will reduce recurrence and increase survival. Her article includes a "handout" chart convenient for patient consultations. For readers who would like a primer on naturopathic support for after a woman has had surgery, chemotherapy, and radiation, go to townsendletter.com for MacDonald's article titled "Healing After Breast Cancer Treatment," originally published in February/March 2012.

Jonathan Collin, MD

Notes

1. Statistics were presented at a May 2014 Evergreen Hospital lecture by Joe Nichols, MD, of Health Data Consulting.

◆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Lise Alschuler Honored by CCNM with Honorary Degree

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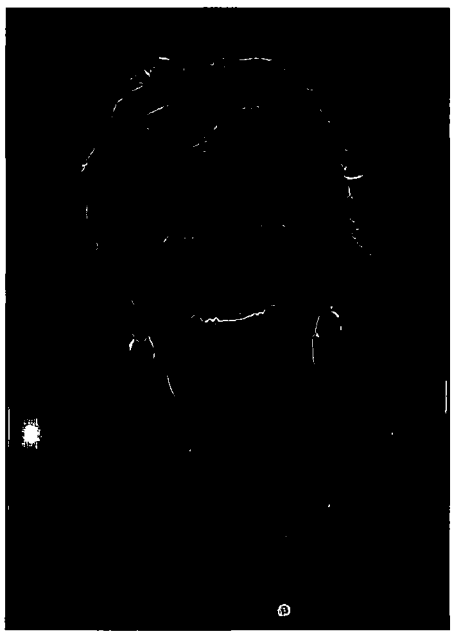
In our lives, now and then, we meet extraordinary people, individuals who seem to do more, care more, be better at this whole living life thing than we can ever imagine ourselves to be. They are the people whom we emulate, whom we strive to be more like, whom we wish, if nothing else, to imitate.

All too often these people go through life not knowing the high esteem that others hold them in, just plodding along day to day, unaware that they are anything special. We humble bystanders may rank them high in our own internal hierarchies but don't speak of this ranking out loud; perhaps a fear of hubris or an inherited (if you are Danish) form of *Janteloven* holds us back.

Thus it was with pleasure that I found out that on May 22, 2014, the Canadian College of Naturopathic Medicine (CCNM), for the first time in its 36-year history, chose to award an honorary degree and to give it to Lise Alschuler, a colleague whom I have long held in high esteem. I cannot think of a more appropriate choice for this award than Dr. Alschuler. She has contributed and continues to contribute to our profession, to health care and to patient self-care in so many ways that I don't know where to begin listing all the things that she does. Not just does, but does so well.

In our naturopathic profession many of us wear multiple hats, sit on multiple committees, contribute in multiple ways, all in the name of doing our share. The thing about Lise, though, is that her contributions are more valuable than those of anyone else on that committee. Many times I've sat through seemingly endless meetings that were going nowhere, or at best in circles, up until the moment Lise raised her hand and set the agenda back in motion, moving forward and getting the job done.



Lise Alschuler

Dr. Alschuler graduated from Brown University with a degree in medical anthropology and received her doctorate in naturopathic medicine from Bastyr University in 1994. She was among the first naturopathic doctors to become board certified in naturopathic oncology.

She is a past president of the American Association of Naturopathic Physicians, a founding board member and current vice president of the Oncology Association of Naturopathic Physicians, and currently director of the Naturopathic Post-Graduation Association. Dr. Alschuler also works as an independent consultant in the area of practitioner and consumer health education. Previously, Dr. Alschuler was the vice president of quality and education at Emerson Ecologics. Prior to this position, she headed the Department of Naturopathic Medicine at the Cancer Treatment Centers of America hospital in Zion, Illinois. Dr. Alschuler has also served as the clinic medical director and chair of botanical medicine at Bastyr University. Lise was diagnosed with breast cancer in 2008. While undergoing standard-of-care medical treatment, she had the opportunity to truly walk her talk. It is one thing to talk about integrative oncology to your patient, it is quite another when you are the patient. Her own experience with cancer has added an empathy and authenticity to her work with patients that is hard earned. For years she has long been one of the best-known and sought-after speakers at naturopathic conferences. In recent years, she has expanded her reach and now speaks and teaches internationally. In addition to being a leader in the field of naturopathic medicine, Lise is the creator of the Five to Thrive Plan, which is featured in her book *The Definitive Guide to Thriving After Cancer*. Lise works to educate health-care professionals; her work inspires patients to be proactive participants in their care. She inspires her colleagues. She inspires me.

CCNM is one of Canada's two colleges to offer training in naturopathic medicine. CCNM offers a rigorous four-year, full-time naturopathic medicine program.

This award is well deserved and I am happy to add my voice to those others who offer her congratulations.

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The Art and Science of Compounding: Where Are We Now, and How Did We Get Here?

by Carol Petersen, RPh, CNP
Women's International Pharmacy

In the evolution of the practices of pharmacy and medicine, the preparation of "therapies" typically predates even the naming of the therapy. In primitive societies, the healing arts were practiced by a combination of sorcerer, priest, and medicine man, someone who was armed with "materia magica" rather than "materia medica."

Looking back at the intertwined histories of pharmacy and medicine may help build a framework for understanding some of the issues that we are grappling with today.

Historical Benchmarks

The earliest written medical texts were in fact a pharmacopeia written in the Sumerian language, dating around 2100 BC. These recipes described the use of oils, alcohols, wines, fats, honey, milk, and wax as vehicles, as well as processes such as extracting with water and oil, infusing with wine, pulverizing, boiling, filtering, and spreading. Tablets found from the 7th century BC provide evidence of approximately 250 drug substances of vegetable origin, 120 of mineral origin, and 180 of other origin.

Fast forward to the vast advances in the Persian world, and we find evidence of syrups, confections, plant oil extractions, and other combinations of materials. By then, weighing and measuring tools were also developed and subsequently documented by the great physician and philosopher Avicenna, who unified all known medical science into his *Canon Medicinae*. Translations of these texts into Latin eventually brought this knowledge to the Western world.

Medicine and pharmacy (as well as many other practices) have their roots in the medieval guild system, which served to protect the artisans who held a particular expertise. Modern-day professional organizations replicate the guild structure, and continue to exist primarily to protect the art and craft of their respective industries (see sidebar). In pharmacy, the guild philosophy of preparing for a single use still applies to the process of compounding, where a preparation is completed only at the request of a prescriber (i.e., a prescription).

However, the industrial revolution had a huge impact on the practice of pharmacy. The process of manufacturing demanded that institutions be capitalistic, and that production generated a profit. Rather than production for single use, some preparations lent themselves to the efficiencies that manufacturing could supply. These manufactured products could be produced in quantities, making the process less expensive, as well as becoming more easily standardized.

In 1820, the United States Pharmacopoeia (USP) was established to promote the standardization of formulas. While compounding was still the most prevalent way of formulating medications, it became less common as the pharmaceutical industry began providing standardized doses and dosage forms.

Another benchmark in the evolution of pharmacy in the US occurred in the 1870s, when patent and trademark laws allowed companies to advertise to ensure the creation of markets for manufactured

Original Pharmacy Professional Organizations

The American Pharmaceutical Association (APhA) was founded in 1852, and evolved into the American Pharmacist Association. In 1898, the organization now known as the National Community Pharmacists Association (NCPA) was established.

products. Eventually, the promotional free-for-all that ensued led to the passage of the first Pure Food and Drug Act in 1906, which was replaced by the Food, Drug and Cosmetic Act, first established in 1938.

While pharmacists were still using a broad knowledge of compounding to serve their customers, by the 1920s the so-called patent medicines accounted for approximately 20% of their business. The first third of the 20th century ushered in even more radical changes in manufacturing that affected the practice of pharmacy. Chemistry and biochemistry had advanced such that new molecular entities could be created. The emergence of antibiotics, chemotherapeutic agents, hormones, radioactive agents, and vaccines created new fields in pharmaceutical science.

Over time, the traditional art of compounding began to fade away. By the 1960s, the concept of a "clinical pharmacy" had taken hold. Rather than being tied to the creation of preparations, pharmacists became more focused on dispensing drug products, in consultation with patients and practitioners. As a reflection of that change in thinking, compounding course work started to be eliminated from or minimized in the professional curricula.

A Revival, of Sorts

Although many in the profession considered compounding to be a dead end, credit is due to the formation of a company called the Professional Compounding Centers of America (PCCA). Its mission statement includes these words:

> One patient. One prescriber. One pharmacist. A triad relationship with a common goal: achieving a positive therapeutic outcome for the patient. And in the midst of this relationship and this common goal is PCCA, the leader in pharmacy compounding since 1981.

PCCA recognized that manufactured medications could not always meet individual patients' particular needs, and some pharmacists began to embrace the challenges with great enthusiasm.

Moreover, the tools of the trade for compounding pharmacists had also evolved far beyond the mortars and pestles and balances of yesteryear. Automated mixing devices and instruments for qualitative and quantitative analyses were adapted to the compounding of smaller batches of individualized preparations. Now, there are precision electronic balances, which even allow for recording the weights of each active and nonactive ingredient. Computers are used to document all instructions and transactions.

More and more companies began to participate in the ancillary services spurred by the resurgence in compounding. Companies that supply the active ingredients, new dosage and delivery forms, specialized packaging, computer programming, specialized equipment, educational programs, training programs, laboratories and equipment to verify process and quality, and monitoring equipment flourished. Specialized sterile equipment even became affordable for pharmacy businesses.

The FDA and Other Challenges

The first sign of trouble for this burgeoning resuscitation of compounding came in 1989 with an internal Food and Drug Administration (FDA) document stating that, although the FDA probably did not have the authority within its statutes, it intended to regulate pharmacy compounding. By 1992, the FDA put its full force behind this position by issuing its first *Compliance Policy*

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The DEA's View of Compounding for Office Supply or Administration

The Drug Enforcement Agency (DEA) contends that any pharmacy that supplies a compounded controlled drug to another DEA registrant's office (such as a physician) cannot be dispensing because, under its definitions, the drug must be delivered to the final user. Therefore, the DEA believes that the compounding pharmacist is illegally manufacturing a drug. On the contrary, manufactured drugs can be provided for office supply and administration. Legislative relief is currently being sought for office supply of compounded preparations.

The current DEA definitions, as extracted from the Controlled Substance Act, Subchapter 1, Control and Enforcement, are:

- The term "dispense" means to deliver a controlled substance to an ultimate user or research subject by, or pursuant to the lawful order of, a practitioner, including the prescribing and administering of a controlled substance and the packaging, labeling or compounding necessary to prepare the substance for such delivery. The term "dispenser" means a practitioner who so delivers a controlled substance to an ultimate user or research subject.
- The term "manufacture" means the production, preparation, propagation, compounding, or processing of a drug or other substance, either directly or indirectly or by extraction from substances of natural origin, or independently by means of chemical synthesis or by a combination of extraction and chemical synthesis, and includes any packaging or repackaging of such substance or labeling or relabeling of its container; except that such term does not include the preparation, compounding, packaging, or labeling of a drug or other substance in conformity with applicable State or local law by a practitioner as an incident to his administration or dispensing of such drug or substance in the course of his professional practice. The term "manufacturer" means a person who manufactures a drug or other substance.

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Guide regarding compounding and beginning to inspect pharmacies.

To avoid the limitations of the FDA regulations on their authority to inspect, FDA inspectors enlisted the aid of state pharmacy inspectors to conduct their visits. Often, the results were citations and warning letters applying manufacturing regulations to pharmacy compounding – regulations that were impossible to meet in the context of a pharmacy. Of importance to note is that this action by the FDA was a serious incursion into the question of state versus federal rights. Up to this point, regulatory activities in the health sciences had traditionally been the responsibility of the individual states.

The FDA position became more solidified in the passing of the FDA Modernization Act (FDAMA) in 1997, which extended FDA regulations to include oversight of pharmacy compounding. In the following years, several lawsuits were initiated challenging the regulations. Of prime importance was a case that went before the US Supreme Court challenging the restrictions on commercial free speech when compounding. The outcome was a 5–4 decision preserving commercial free speech.

In the intervening years, a profusion of lawsuits, skirmishes, petitions, and challenges surfaced. In response, the compounding pharmacy industry formed another professional association, the International Academy of Compounding Pharmacists (IACP), to represent its segment of pharmacy practice. Professional pharmacy organizations came together to found the Pharmacy Compounding Accreditation Board (PCAB). PCAB is a voluntary quality accreditation designation for the compounding industry.

Almost all states made changes in their pharmacy practice acts to include regulation of any pharmacies that sent prescriptions into their states. The USP also made changes to its compendia, in addition to making recommendations for processes and procedures enforceable upon the practice, and particularly upon pharmacy compounding.

Yet somehow the layers of regulation and safeguards did not prevent the tragedy involving vials of methylprednisolone distributed between May and October 2012 by the New England Compounding Center (NECC) that resulted in many cases of fungal meningitis and a

What is the Current Definition of Compounding?

In addition to the confusion generated by the tortuous definitions of "dispense" and "manufacture" supplied by the DEA, some of the various regulatory entities involved have their own definitions of "compounding." On top of that, each state has a definition of compounding in its pharmacy practice act. The following definitions were published in the May 23, 2014, Compounding This Week, an e-newsletter by Dr. Loyd Allen, editor in chief:

- **H.R. 3204 Definition** (now in the Drug Quality and Security Act)

"The term 'compounding' includes the combining, admixing, mixing, diluting, pooling, reconstituting, or otherwise altering of a drug or bulk drug substance to create a drug."

- **FDA Note**

"... the term 'compounding' does not include mixing, reconstituting, or other such acts that are performed in accordance with directions contained in approved labeling provided by the product's manufacturer and other manufacturer directions consistent with that labeling."

- **USP Definition**

"The preparation, mixing, assembling, altering, packaging, and labeling of a drug, drug-delivery device, or device in accordance with a licensed practitioner's prescription, medication order, or initiative based on the practitioner/ patient/ pharmacist/ compounder relationship in the course of professional practice. Compounding includes the following:

- o Preparation of drug dosage forms for both human and animal patients
- o Preparation of drugs or devices in anticipation of prescription drug orders based on routine, regularly observed prescribing patterns
- o Reconstitution or manipulation of commercial products that may require the addition of one or more ingredients
- o Preparation of drugs or devices for the purposes of, or as an incident to, research (clinical or academic), teaching, or chemical analysis
- o Preparation of drugs and devices for prescriber's office use where permitted by federal and state law."

- **NABP Definition** (National Association of Boards of Pharmacy)

"Compounding' means the preparation of Components into a Drug product (1) as the result of a Practitioner's Prescription Drug Order based on the Practitioner/patient/Pharmacist relationship in the course of professional practice, or (2) for the purpose of, or as an incident to, research, teaching, or chemical analysis and not for sale or Dispensing. Compounding includes the preparation of limited amounts of Drugs or Devices in anticipation of receiving Prescription Drug Orders based on routine, regularly observed prescribing patterns."

significant number of deaths. As it was established later, NECC was operating in violation of the Massachusetts pharmacy practice act by sending thousands of vials to practitioners and hospitals without patient-specific prescription orders. Sending non-patient-specific medication for office supply was not allowed by Massachusetts regulations. Both the Commonwealth of Massachusetts and the FDA had previously inspected and found problems with NECC, and both failed to take action. A public outcry for more regulation of compounding pharmacies resulted. Many in the industry pointed out that adequate regulations were already in place, but the regulators had simply failed to enforce them.

New Regulations and New Challenges

The NECC tragedy led to the passage of the Drug Quality and Security Act (DQSA), which was signed into law on November 27, 2013, amending the Food, Drug and Cosmetic Act. Many of the provisions of the earlier act under FDAMA were restored, with the constraints against free speech removed. Specifically, it restores the FDA's right to create both positive and negative formularies, to put restrictions on interstate provision of compounded medications, and to determine if a compounded medication is "too difficult to compound."

Recently, the IACP hosted its annual "Compounders on Capitol Hill" event, designed to facilitate member visits with their congressional representatives. The focus this year was on discussing the newly passed DQSA. The intent of Congress in passing the DQSA was to improve patient safety by preventing future occurrences such as the one that happened at NECC; however, there is concern that the FDA will ignore congressional intent in its implementation of the DQSA.

As of this writing, there are a number of areas within the DQSA that have yet to be clearly defined. For example, it is unclear whether compounding pharmacies may compound non-patient-specific medications for practitioners to administer to patients in their offices. The FDA contends that compounding for office administration is not allowed; however, it is not clearly addressed in the regulations. Further complicating the matter, some states already have clear regulations permitting the compounding of medications for office administration. A second example is whether or not states will have the authority to license FDA-regulated outsourcing facilities. A number of states have started enacting laws under the belief that they have the right to oversee any delivery of drugs within their borders.

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Another section of the law (503b) creates a new entity called an "outsourcing facility," which may or may not be a pharmacy, and which compounds sterile drug preparations to be sent directly to hospitals and practitioners. Outsourcing facilities are directly under FDA oversight. Physicians, as well as pharmacists, are allowed to compound under this act.

Questions arise regarding the standards that a practitioner must follow if compounding is done in a medical office setting. For example, the USP has delineated the processes to follow when even low-risk sterile compounding is done. Low-risk sterile compounding is performed when two or more sterile products are mixed together.

Will physicians be required to write procedure manuals, certify sterile procedures, and document the environment, as pharmacists involved in sterile compounding must already do?

Yet another area of concern is the recent restoration of the FDA's charge to create memoranda of understanding (MOU) with each state to determine the conditions governing the rights of compounding pharmacists to send their preparations into another state. Without a MOU in place, the law limits the distribution to 5% of total prescription orders dispensed or distributed. This provision was first introduced to clarify the authority of the state with regard to interstate transactions. Since this provision appeared in the FDA Modernization Act in 1997, almost all states have passed regulations requiring the licensing of pharmacies that regularly supply preparations to their residents, thus closing this gap. Whether the FDA deems the measures by the states to be adequate remains to be seen.

To add to the confusion regarding DQSA interpretation, the Drug Enforcement Agency (DEA) has its own viewpoint on the dispensing and manufacturing of drugs (explained in the sidebar on p. 19) and some of the entities involved have their own definitions of compounding (see the sidebar on p. 20).

More challenges, lawsuits, and potentially conflicting interpretations of the regulations are likely to continue. Nevertheless, as pharmacy law changes, the practice of compounding will continue to evolve. The USP has even begun to standardize some of the most commonly used formulas. Compounding pharmacists also continue to bridge an important gap by preparing formulas that manufacturers are temporarily unable to supply, or choose not to supply for economic reasons.

Despite the current disarray in regulations, Dr. Loyd Allen of the *International Journal of Pharmaceutical Compounding* points out that the future is very bright for compounding. With rapid increases in our body of knowledge about the uniqueness of our biology, physiology, and genetic expression, the demand for individualized solutions for health problems can only increase. And with the practice of pharmacy compounding geared up with 21st-century technology, there are plenty of pharmacists who are not content to be purveyors of mass-produced medicine and stand ready for the challenges ahead.

For additional information, please consult these resources:

- The International Academy of Compounding Pharmacists (IACP): www.iacprx.org. This organization sponsors an advocacy group for patients and professionals, Partnership for Personalized Prescriptions.
- Patients and Physicians for Rx Access: saverxaccess.org.
- American Pharmacists Association (APhA): www.pharmacist.com. Pharmacists can join the Compounding Special Interest Group by clicking on "E-Communities" under the "Get Involved" menu option.
- CompoundingToday.com, produced by the *International Journal of Pharmaceutical Compounding*.
- Women in Balance Institute, www.womeninbalance.org, an advocacy group for customized care in women's health.
- Alliance for Natural Health, www.anh-usa.org, a strong ally for customized care and integrative medicine.

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Ray Behm DDS, Kirk Youngman DMD Clearwater FL 727 446.6747

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Changing the Paradigm of Cancer Treatment

by Mary Budinger

The progression of medicine moves slowly. Maybe too slowly in terms of cancer treatment? It depends on who is making that judgment call – the clinician, the researcher, the patient, the caregiver, the medical center CEO. ...

Conventional chemotherapy sprang from a post–World War II arsenal of drugs known to kill fast-replicating cells. Chemotherapy, radiation, and surgery are still the gold standard of treatment, even though the death rate for cancer, adjusted for the size and age of the population, dropped just 5% from 1950 to 2005.

Since the 1950s, we've landed on the moon, created cordless tools, put satellites in space, developed computers and the Internet, invented MRIs and PET scans, made DNA fingerprinting a courtroom standard, and mapped the human genome. Yet we have not come close to winning the "War on Cancer."

Frustrated patients and doctors are searching for better outcomes. "There are maybe 200 clinicians in the world who do progressive integrative oncology with a variety of modalities," said Dr. Sean Devlin of the Sierra Integrative Medical Center in Reno, Nevada. "We take advantage of the readily available and useable research coming out of the scientific literature – everything from insulin potentiation chemotherapy (IPT) to nutraceutical regimens, lifestyle modifications, mind/body work, intravenous infusions (oxidation therapies including ozone, hydrogen peroxide, DMSO, and nutraceuticals and multivitamins), immunotherapies (dendritic cell vaccine therapy, bee venom therapy, Coley's toxins, virotherapy), metabolic approaches (dietary changes, medications like metformin and cimetidine used in an off-label fashion to influence cancer cell regression and apoptosis), targeted and biological therapies (monoclonal antibodies, tyrosine kinase inhibitors, and protease inhibitors), whole body hyperthermia, and immune modulation (low dose naltrexone, melatonin, AHCC mushroom extract, vitamin D3), and interleukin and interferon to help stimulate and support the immune system."

Dr. Sean Devlin (standing), Dr. Robert Rowan (seated), and Cheryl Campbell from Dr. Jerry Tennant's office, Synergy Medical Group.

Devlin is a member of the International Organization of Integrative Cancer Physicians (IOICP). He believes that physicians taking an integrative, progressive approach need to work with those utilizing traditional therapies in an effort to bring transparency and progress to the patient's care. "The ultimate goal being that as a team of caregivers we are able to bring cutting edge research from the lab and evidence-based research being done worldwide into the clinical arena for the patients' benefit – and in a timely manner."

The doors to new approaches need to be opened and a wider variety of techniques accepted so that more therapeutic approaches will be covered by insurance and employed by mainstream clinicians.

But so far, when the conventional world looks in the integrative toolbox, it looks to many practitioners that the tools lack rigorous research and appear anecdotal at best.

Reductionist Versus Holistic

"Allopathic medicine was formed during a time when we wanted to be specific and understand cause and effect – that was the last 100 years," said Dr. Bob Ellis, an oncologist at Kaiser Permanente in Portland, Oregon. "The Flexner report of 1910 took all the different approaches toward disease and illness and applied a strict definition of legitimacy based on which approaches were supported by reductionist science. Systems of care not supported by this approach were eliminated from the canon of health care. There is one cause, one disease, and one treatment. The Flexner report was narrow minded and based on a reductionist science of the day. If medical schools wanted funding and authority to grant licensure, they converted to this standardization treatment. We embraced a type of scientific paradigm to figure out how disease works by isolating variables."

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And therein lies the rub. As Dr. Thomas Seyfried documented in his 2012 book *Cancer As a Metabolic Disease*, treatment requires much more than the limited toolbox of surgery/radiation/chemo that we call "standard of care." Seyfried provided detailed evidence that the traditional view of cancer as a genetic disease has been largely responsible for the failure to develop effective therapies and preventive strategies. Cancer is a syndrome, not one disease, so there is more than one way to treat it. The 200 or so integrative, progressive clinicians are moving the metabolic viewpoint forward, and their protocols reflect the idea that cancer can require many approaches. It is the use of a large cookbook of protocol options, not any one element, that brings them success.

IOICP member Dr. James Forsythe of the Century Wellness Clinic in Reno, Nevada, spoke at the annual Best Answer for Cancer Foundation conference in April. He has been conducting an outcome study for the past 46 months on 500 stage IV adult cancer patients using IPT with a mix of integrative therapies. Forsythe reported a 60% survival rate to date. Statistics suggest that had these patients been subjected to conventional protocols, perhaps 3% or less would be alive after 5 years.[1]

The integrative protocols are not yet what might be described as plug-and-play.

"There was an issue at the Best Answer for Cancer conference about standard protocols and therapies and techniques," Ellis said. "People want to see research about outcomes and potential side effects and the answer they get back is that there is a paucity of both, mostly because of lack of money to do research. That is a political problem. You need to force government to give the money. When AIDS came along, there was crazy advocacy. That forced Congress and the FDA to give funding and increased access to drugs and other treatments."

Patient Advocacy

The picture of cancer patient advocacy is different than what we saw with AIDS, however. Cancer patients tend not to march on the National Mall. They are more likely to turn to Google.

"People who experience a recurrence of cancer are the savvy cancer patients," said Al Sanchez, Jr., CEO of AMARC Enterprises (Poly-MVA). "They get on the Internet groups and learn to minimize what they eat the day before their chemo appointment, they don't eat late in the day, and they walk into the doctor's office with a lower than normal blood sugar level. They find it works better."

In other words, these patients are attempting to mimic the IPT portion of the integrative protocol by fasting prior to chemotherapy.

With IPT, insulin is first used to drop the blood sugar level, then chemo drugs and sugar are administered. The drugs so effectively target the cancer cells that most IOICP physicians use only $^1/_{10}$ the amount of chemo drugs.

The principle underlying IPT is well understood and could be readily accepted because it is the same principle used with PET scans to diagnose cancer. When a radioactive tracer is combined with sugar, cancerous cells take up the sugar much better than healthy cells. The radioactive tracer thus concentrates in the cancer cells and the result is an image of the tumor, reflecting its metabolic activity.

The IPT technique has a real upside for patients because they are spared the toxicity of full-dose chemo – they experience minimal if any hair loss, nausea, organ damage, and harm to healthy cells. But the technique has what the pharmaceutical industry sees as a real downside – selling a lot less product.

New ideas and new protocols are often met with a brick wall.

Annie Brandt, who founded the Best Answer for Cancer Foundation to foster progressive change in cancer treatment, wants to take down that brick wall.

"Thirteen years ago I had cancer in my breast, my lymphatic system, my brain, and my lungs," Brandt said. "I did nothing conventional except for one lymph node biopsy and an estrogen blocker. I used diet, mind-body medicine, spirituality, detoxification, lifestyle changes, many holistic therapies, and IPT. I still see a conventional oncologist every three months and he still recommends that I get a double mastectomy, high-dose chemotherapy, and radiation. He tells me I am taking unnecessary chances and risks. I ask him how many survivors he has whose breast cancer involved the lungs and brain who are still alive after 13 years?"

Medical history books have entire chapters about brick walls and deaf ears. Let's speed through just three: Dr. James Lind discovered that sailors wouldn't get scurvy if citrus was added to their rations; it was some 50 years before the British Navy made it a policy to do so. It took some 40 years for incubators for premature babies to catch on after Dr. Martin A. Couney made an exhibit of the practice at Coney Island to gain public acceptance. Drs. Barry Marshall and Robin Warren identified *Helicobacter pylori* as the cause of ulcers in the 1980s; they were initially sneered at and more than a decade passed before clinicians stopped prescribing antacids and started prescribing antibiotics.

What, one might ask, would have been the harm in embracing lime juice, incubators, and the idea of a bacterial infection? According to Lind, scurvy killed more British soldiers than enemy action. Couney is credited with saving the lives of some 6500 premature infants. Marshall and

Warren turned peptic ulcer disease from a chronic, frequently disabling condition into something cured with a short regimen of antibiotics.

While medicine changes ever so slowly in the arena of cancer, patients continue to die. An estimated 580,350 Americans died of cancer in 2013.[2]

An Individual Can Be a Game-Changer

Dr. Edward Gilbert of Texas, board certified in therapeutic radiology, knows a thing or two about moving medicine forward. In 1976, he worked with Dr. O. Carl Symington, the radiation oncologist who popularized the mind-body connection in fighting cancer and helped push the once-controversial notion into mainstream medicine.

"Mind-body was on the American Cancer Society blacklist at the time as quackery," Gilbert explained. "But I was the fair-haired boy from Stanford, head of the largest private radiation therapy practice in the country at age 33. I was impeccable in my presentation, what we wanted to achieve, and my study of it. Today nobody would question a mind-body connection to illness. But it took time for the human evolution to recognize the connections."

Ellis points to Dr. Dean Ornish as one of the more recent game-changers. "He said, 'Let me test my whole-body paradigm in a scientifically valid way then we can critique it and we'll see if we get positive health outcomes.' He documented it objectively in a way anyone could reproduce and now it is reimbursable by insurance."

The advice that Drs. Gilbert and Ellis have for integrative oncology: Do rigorous therapeutic outcome-driven research to advance the field of integrative protocols.

"Many of us are closet integrative oncologists," Ellis said. "It is significant that Sloan-Kettering and all the National Cancer Institute centers are developing integrative medicine departments. We are figuring out from the baseline in a reductionist way that when we put all the elements of the combustion engine together, we will know how to fix the problem of traffic. But you won't solve the problem of traffic. Cancer is more of a whole-body problem in a very similar way to the relationship between combustion engines and the problem of traffic. Cancer is systemic illness and although there will be exceptions to this (such as specific mutations causing specific cancers such as the role of the BCR-ABL in CML), positive outcomes in cancer will depend on an integrative whole-body approach to this illness."

The Pace of Change

Money, it seems, does not affect the pace of change, at least in terms of turning around cancer mortalities. US spending on cancer research, estimating both public and private investments, is now at $16 *billion* each year.[3] What the conventional community seems to react to best is statistics.

Clinical trials have been discussed at integrative oncology meetings. The consensus of opinion, based on history, was that a clinical trial of just IPT would be an uphill battle, as the drug companies are fearful for the bottom line. Who else would fund the trials? And going back to Seyfried, would testing just IPT be valid since it is only part of the toolbox? Would IOICP practitioners find an ethical issue in withholding other integrative protocols with patients so just IPT could be tested? And how next to test the entire toolbox, the many therapies that Devlin described above, wherein there are many variables and differences in how doctors do things?

"We are preparing to boldly go where no one has gone before," Brandt said. "At our April conference, we began mapping out how to test integrative protocols for both better quality of life as well as better patient outcomes overall. The trials on chemo drugs have been done. The value of mind-body medicine and spirituality has been proven. We want to look now at combinations of targeted cancer therapies and integrative protocols. We are also embarking on that cookbook – putting in writing what the IOICP considers standard protocols for the various complementary and alternative medical therapies."

The integrative oncology movement has staked out new techniques, and is now poised to define its best practices.

"With camaraderie among the different doctors, researchers, and universities, the architecture can be created and subsequently analyzed by statisticians to determine best outcomes," Devlin said. "We as integrative oncologists must develop individualized treatment programs that reflect a personalized approach for each patient, reflective of their personal history, personal background, genetic type, cancer type, etc. We need to offer more than a cookie-cutter approach with 60-year-old poisons to someone with any particular kind of cancer."

Patients are increasingly demanding a better standard of care. Baby Boomers are hitting that time of life when they are most likely to receive a cancer diagnosis; the number of new cancer patients is expected to more than double between 2000 and 2050.[4] There will be even more voices crying out for better options.

Mary Budinger is an Emmy Award-winning journalist in Phoenix who writes about nutrition and integrative medicine.

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Shorts

briefed by Jule Klotter
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Ayahuasca and Cancer

Ayahuasca, a botanical decoction used by South American healers and shamans, has been credited with curing some types of cancer in a few medical case reports. Although scientific evidence for ayahuasca as a cancer treatment is sparse, patients continue to seek this age-old medicine from traditional healers. Patients in case studies found their experience with ayahuasca to be valuable, even "life-changing," and credited it with improving their general well-being even when ayahuasca had no effect on the cancer itself. Ayahuasca is most known in the US for its psychological and hallucinogenic effects, but Brazilian researcher Eduardo E. Schenberg says that compounds in the decoction have medicinal properties, including anticancer effects.

The decoction is usually made with *Banisteriopsis caapi* and *Psychotria viridis* or *B. caapi* and *Diplopterys cabrerana*. *B. caapi* contains β-carbolines such as harmine, harmaline, and tetrahydroharmine in the stem. β-carbolines inhibit cell proliferation and tumors' blood vessel formation, according to in vitro and animal studies. They also trigger apoptosis in some cancer cell lines, including B16F-10 melanoma, human leukemia cell line HL60, and human hepatocellular carcinoma cell line HepG2.

β-carbolines may work synergistically with N,N-dimethyltryptamine (DMT), a compound in the leaves of *P. viridis* and *D. cabrerana*. DMT, a normal component of human blood and cerebrospinal fluid, binds to sigma-1 receptors located in the brain, lung, and liver. Many human cancer cell lines, including lung, prostate, colon, ovaries, breast, and brain, have high numbers of sigma-1 receptors. Schenberg hypothesizes that β-carbolines inhibit the enzyme monoamine oxidase (MAO) and thereby facilitate DMT's entry into cancer cells to bind with sigma-1 receptors. "Once activated, these receptors mediate calcium ion influx into the mitochondria ... " Schenberg explains, "[which] may attenuate the Warburg effect, balancing the cellular energetic metabolism." With sufficient calcium ion influx, cell death may also occur.

In vitro and in vivo studies on the anticancer effects of DMT and harmine indicate that ayahuasca may be more than a psychoactive agent, a hypothesis that Schenberg would like to see tested "by rigourous scientific experimentation."

Schenberg EE. Ayahuasca and cancer treatment. *SAGE Open Med.* 2013. Available at smo.sagepubl.com/content/1/2050312113508389.full.pdf+html. Accessed May 15, 2014.

Fermented Wheat Germ

Fermented wheat germ kills cancer cells, inhibits metastasis, and extends life, according to recent laboratory and clinical studies. Many of these studies have involved a yeast (*Saccharomyces cervisiae*) fermented wheat germ extract (Avemar). One year's treatment with the extract along with conventional treatment produced an average survival time of 66 months in "high-risk" patients with melanoma compared with about 45 months in patients receiving conventional therapy alone in a 2008 phase II Russian study. Fermentation makes nutrients in a whole food more accessible and biologically active.

Quinones, specifically 2-methoxy benzoquinone (2-MBQ) and 2,6-dimethoxybenzoquinone (2,6-DMBQ), are the primary compounds responsible for fermented wheat germ's antiproliferative, antimetastatic, and immunological effects. Instead of using *Saccharomyces cervisiae* to make quinones and other nutrients in raw wheat germ accessible, an Italian-German research team recently investigated lactic acid bacteria used when making traditional sourdough bread. The researchers screened over 40 fermenting bacteria naturally found in the wheat germ for β-glucosidase activity (the enzyme process responsible for breaking down plant matter and releasing nutrients). They then used two bacteria with the highest enzyme activity – *Lactobacillus plantarum* LB1 and *Lactobacillus rossiae* LBS – to ferment wheat germ using traditional sourdough methods. In about 24 hours, physiologically active 2-methoxy benzoquinone increased fourfold compared with raw wheat germ and 2,6-dimethoxybenzoquinone increased sixfold.

The researchers exposed a variety of human ovarian, colon, and germ cell cancer lines to the fermented wheat germ and to raw wheat germ (control). Raw wheat germ had no antiproliferative effect, but the sourdough-fermented wheat germ "markedly and variously affected

the human tumor cell lines." The authors say, "These results are comparable to those found for other well-known pharmaceutical preparations, and may disclose the use of the sourdough fermented wheat germ as an ingredient, nutritional supplement and/or anticancer drug." These results, of course, need to be confirmed with controlled clinical studies.

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Fukushima-Related Illnesses

About 100 young sailors and marines, serving aboard the *USS Ronald Reagan* in March 2011, are suing Japan's TEPCO (Tokyo Electric Power Company) for hiding the severity of its Fukushima nuclear plant meltdown after a devastating earthquake and tsunami. The crew members developed radiation-related illnesses within months after taking part in rescue efforts off Japan's coast. Sailors in their 20s and 30s have developed thyroid cancers, testicular cancers, leukemias, unexplained fevers, swollen glands, muscle weakness, rectal and gynecological bleeding, and other problems unrelated to their personal or familial medical histories. Delayed effects of radiation exposure include cancer, genetic issues in offspring, vascular changes, fibrosis, atrophy, thyroid dysfunction, cataracts, and infertility, according to the Radiation Emergency Assistance Center/Training Site (Oak Ridge, Tennessee).

Radiation detectors on the *Reagan* measured levels 30 times higher than background, according to documents that sociology professor Kyle Cleveland obtained from the US Nuclear Regulatory Commission using the Freedom of Information Act. Cleveland wrote the report "Mobilizing Nuclear Bias: The Fukushima Nuclear Crisis and the Politics of Uncertainty," published in the *Asia-Pacific Journal*. Cleveland told *Democracy Now*, "I've interviewed some 160 people, including diplomats and diplomatic staff and people within the various nuclear agencies. It's been quite interesting to see that at that period of time, particularly in about the first 10 days or so after the crisis began, there was a great deal of disagreement and a great deal of debate backstage about just how bad this was and what those rates represented and whether or not they could verify this." Meanwhile, the *USS Reagan* was positioned just off the coast of Fukushima. "At one point, we had actually sat in the plume off the reactor for approximately five hours," Lt. Steve Simmons told *Democracy Now*. "And another time, we actually had to secure the water system, because we actually had brought contaminants up into the water." Sea water is desalinated aboard ships and used for drinking and bathing.

A Navy representative told *Democracy Now*, "There's no indication that any US personnel supporting Operation Tomodachi [the rescue effort] experienced radiation exposure at levels associated with the occurrence of long-term health effects." The Navy does not see a need for a long-term medical surveillance program, according to the Defense Information Systems Agency. Officials are apparently looking at emission numbers and ignoring the high incidence of unexplained health problems among this crew.

This ostrich-head-in-the-sand reaction to the sailors' reports is not unprecedented. Joseph J. Mangano and Janette D. Sherman report that the World Nuclear Association's official number of deaths from the 1986 Chernobyl meltdown was just 40, as of early 2011 – even though the World Health Organization and International Atomic Energy Agency presented an updated estimate of 9000 deaths in 2005. A 2009 report that included data from Slavic language studies estimates that the meltdown was responsible for 985,000 deaths worldwide from 1986 to 2006 (Yablokov AV et al. *Chernobyl: Consequences of the Catastrophe for People and the Environment*. New York: New York Academy of Sciences; 2009).

Thirty-five years have passed since the 1979 Three Mile Island meltdown in Pennsylvania, and scientific data on its health effects are still obscure. A study linking Three Mile Island emissions to increased cancer incidence among nearby inhabitants wasn't published until 1990. The authors of this study refuted their initial conclusion and blamed the cancer increase on psychological stress in a 1991 paper. Another research team reevaluated the data, concluded that increased cancer risk was linked to radiation exposure, not psychological stress, and questioned the first team's motives for changing its conclusion. The ensuing controversy obscured the primary issue: the relationship between radiation exposure and cancer incidence. "Unfortunately, the issue of whether Three Mile Island emissions are linked with excess local cancer risk remains contentious, 33 years after the meltdown," write Mangano and Sherman. "We

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hope that attempts at understanding Fukushima health consequences do not encounter a similar fate."

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Intravenous Ascorbic Acid and Cancer

A 2013 study, led by Nina Mikirova at Riordan Clinic (Wichita, Kansas), shows a correlation between inflammation, tumor burden, and the peak plasma ascorbate concentration achievable in cancer patients who receive intravenous vitamin C (IVC). "Inflammation plays a key role in tumor development, affecting tumor proliferation, angiogenesis, metastasis, and resistance to therapy," the authors state. For this retrospective study, the researchers used medical records from 538 patients who had received IVC during cancer treatment at Riordan Clinic. Pre- and post-IVC plasma ascorbate concentration measures, C-reactive protein (CRP) levels, and cancer marker levels were available for all patients.

People with cancer are known to have lower plasma ascorbate levels than healthy people. In this study, the lowest average ascorbate concentration before the first 15 gram IVC infusion was 0.045 mM in 7 patients with sarcoma, and the highest pre-IVC average was 0.080 in 5 patients with esophageal cancer. Both values are considerably lower than 0.20 mM (200 μM), which was "roughly" the highest plasma concentration obtained in healthy subjects taking oral supplements in a 1996 study (Levine M et al. Vitamin C pharmacokinetics in healthy volunteers: evidence for a recommended dietary allowance. *Proc Natl Acad Sci USA.* 1996;93:3704–3709).

In addition to low plasma ascorbate levels, people with cancer also exhibit lower peak plasma concentrations after receiving IVC than healthy people. Vitamin C blood levels just don't rise as high in people with cancer. Plasma concentrations tend to increase with additional treatments as ascorbate deficiencies in body tissue resolve. However, inflammation increases the tissue's need for ascorbate. Mikirova and colleagues report a correlation between inflammation (measured by CRP) and lower peak plasma ascorbate levels after IVC. Patients with C-reactive protein levels greater than 70 mg/L (indicating severe inflammation) achieved significantly lower plasma ascorbate levels after infusion ($p < 0.01$). Postinfusion ascorbate levels are also lower in patients with high tumor antigen levels and/or metastatic tumors.

In addition to looking at patient response to initial IVC treatment, the authors analyzed data from 48 patients who received long-term IVC treatment (mean follow-up time of 7 years). The patients had between 3 and 100 treatments. Both CRP levels and tumor markers, such as PSA for prostate cancer, decreased in most patients.

"The properties of ascorbic acid as antioxidant and an enhancer of immune function, as well as the correlations between ascorbate depletion in cancer patients and prognosis, suggest that vitamin C may have a beneficial effect on inflammation in cancer patients," the authors state. They point out that previous research shows that intravenous vitamin C therapy is safe and does not interfere with chemotherapy or radiation therapy: "Patients given IVC in addition to standard oncologic treatments benefited from less fatigue, reduction in nausea, improved appetite, reductions in depression and fewer sleep disorders, and their overall intensity scores of adverse symptoms during therapy and aftercare were half those of the control (no IVC) group."

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Boosting the Anticancer Effect of a Ketogenic Diet

Hyperbaric oxygen therapy (HBOT) enhances the anticancer effect of ketogenic diets, according to a 2013 mouse study led by Angela M. Poff. Unlike normal cells, cancer cells need glucose for energy (Warburg effect) and are unable to use ketones (result of fat metabolism) when sugar is unavailable. High-fat, low-carbohydrate ketogenic diets, an accepted treatment for hard-to-control epilepsy, have produced tumor stability and regression in animals and people with colon, breast, gastric, prostate, brain, lung, and pancreatic cancers. In addition to glucose, cancer cells prefer low-oxygen environments. Poff and colleagues hypothesized that using hyperbaric oxygen therapy (HBOT) to boost oxygen delivery might work synergistically with a ketogenic diet. HBOT delivers 100% oxygen in a pressurized chamber to increase tissue uptake of oxygen.

Poff et al. conducted an experiment with four groups of mice. A control group ($n = 13$) ate a standard diet (18.0% of calories from fat; 58.0% carbohydrates; 24.0% protein). The second group ($n = 8$) had the same diet but were also given three 90-minute HBOT treatments per week. The third group ($n = 8$) ate a ketogenic diet (89.2% of calories from fat; 2.1% carbohydrates; 8.7% protein). The fourth group ($n = 11$) received both the ketogenic diet (KD) and HBOT.

The control mice had a mean survival time of 31.2 days. Mice receiving HBOT alone lived somewhat longer than the control (mean 38.8 days), but the difference was not statistically significant. Mice on the ketogenic diet, however, had a 48.9-day mean survival, an increase of 56.7% compared with control. When ketogenic diet and HBOT were combined, the mean survival time increased to 55.5 days (77.9% greater than control's mean survival time). As expected, blood glucose was lower in mice on

continued on page 33 ➤

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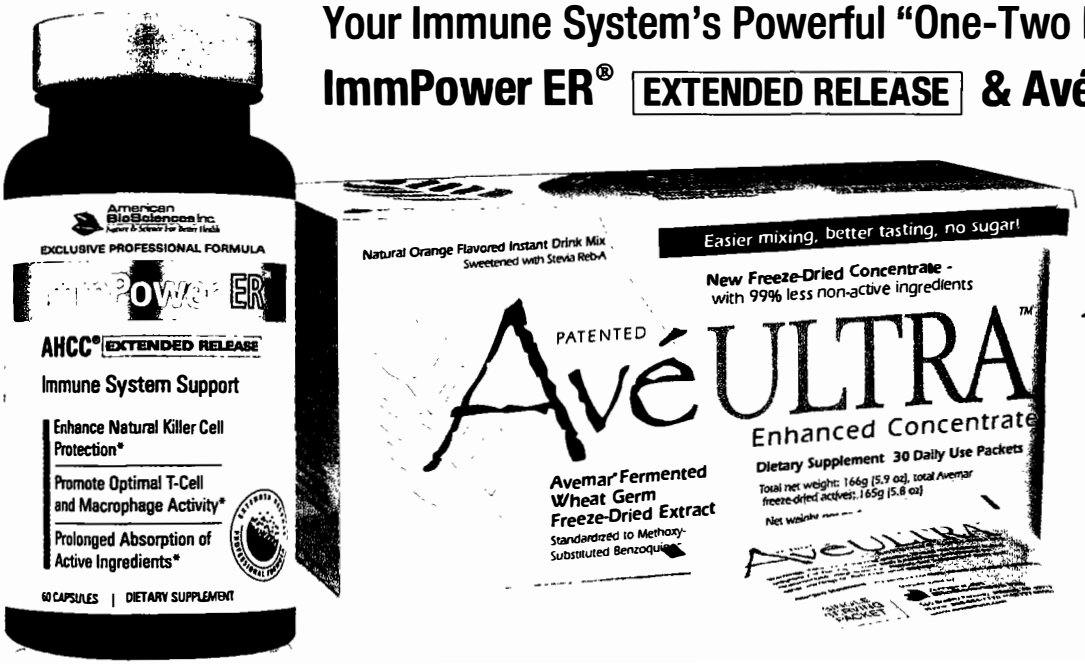

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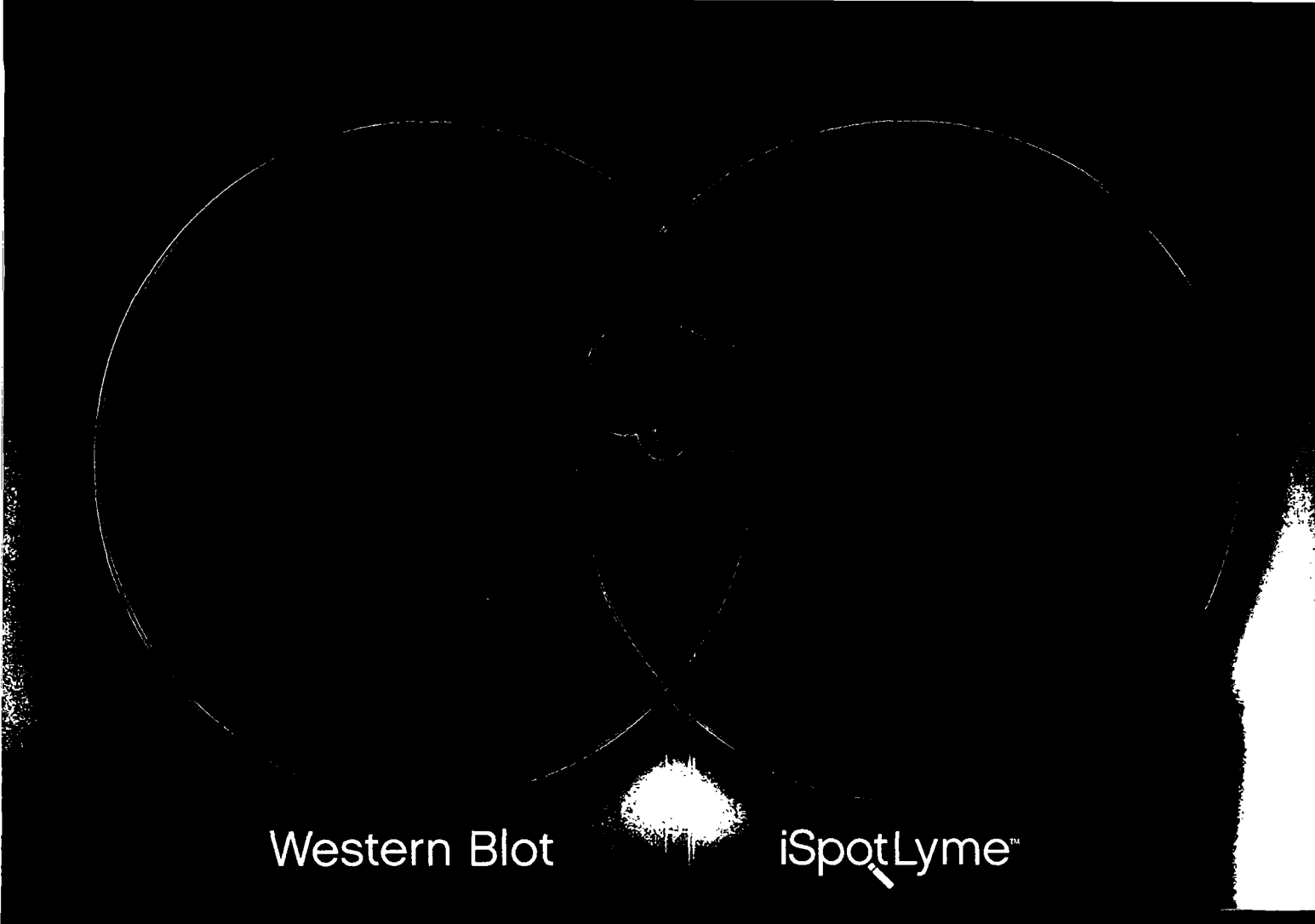

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➤ *continued from page 28*

the ketogenic diet. However, blood ketone levels were significantly higher than controls only in the KD + HBOT group by day 7 ($p < 0.001$).

Poff and colleagues report that both KD and HBOT have improved the efficacy of standard cancer treatment in animal trials. In conclusion, they say, "We suggest that the addition of these non-toxic adjuvant therapies to the current standard of care may improve progression free survival in patients with advanced metastatic disease."

Poff AM, Ari C, Seyfried TN, D'Agostino DP. The ketogenic diet and hyperbaric oxygen therapy prolong survival in mice with systemic metastatic cancer. *PLoS ONE*. June 2013:8(6); e65522. Available at www.plosone.org. Accessed May 15, 2014.

Photodynamic Therapy and Sonodynamic Therapy

Photodynamic therapy and sonodynamic therapy are minimally invasive treatments that target cancerous tumors without the negative effects of conventional chemotherapy or radiation. Photodynamic therapy is clinically approved for use by FDA. Sonodynamic therapy is experimental. Both are now available at some US clinics to treat early-stage cancers.

Photodynamic therapy (PDT) is a two-step procedure. First, patients receive an intravenous injection of a photosensitizing agent. After 24 to 72 hours, a wavelength of light that corresponds to the sensitizer's absorbance band is directed at the tumor. Light waves can pass only about one-third of an inch into the skin, so PDT's use is limited to accessible cancers such as skin, breast, and prostate. FDA has approved the photosensitizer porfimer sodium to treat esophageal and non-small cell lung cancers. In these cases, light from a LED diode or a laser is delivered to tumor sites with an endoscope.

The combination of light and photosensitizer produces oxygen free radicals that kill the cancer cells and damages tumor blood vessels. In addition, PDT can produce "a robust inflammatory reaction that can lead to the development of systemic immunity," according to a 2011 report by Patricia Agostinis et al. Pain and swelling may occur at the treatment site. Patients can also experience photosensitivity to skin and eyes for about 6 weeks after treatment. PDT has cured early-stage cancers in clinical trials. For patients with inoperable cancers, PDT offers greater life quality and a longer life.

Instead of using light energy, sonodynamic therapy (SDT) uses ultrasound (sound waves above human hearing range) and sonosensitizers. Like photodynamic therapy, SDT can kill cancer cells; but sound waves penetrate more deeply than light. SDT also makes cell membranes permeable. Wen-Kin Bai and colleagues suggest that SDT can be use to deliver chemotherapy drugs directly into cancer cells using drug-filled microbubbles. The most effective way to use SDT is still being researched.

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OPTIMAL NUTRITIONAL SUPPORT

Pathways to Healing

by Elaine Zablocki

We Will See a Broader Health-Care Workforce

For the past decade, the American Association of Medical Colleges (AAMC) has held an annual meeting on the doctor shortage, called the Physician Workforce Research Conference. This year, it changed the name. Experts gathered in May in Washington, DC, at AAMC's Annual Health Workforce Research Conference. The announced theme was "Finding the Right Fit: The Health Workforce Needed to Support the Affordable Care Act."

This name change signals a significant change in underlying attitudes. Researchers, educators, policymakers, and leaders from various health-care segments are now looking at the ways that all the health professions could contribute to the US health-care system in coming years.

One of the current bottlenecks is that while medical schools train young physicians, some US medical graduates end up without a residency slot. At a May 6 briefing on Capitol Hill, organized by AAMC, speakers emphasized the need for increased support for residency programs, and three bills in the current Congress would address this need. "In addition to expanded federal support for residency training, AAMC also has supported studying and investing in team-based approaches and new models of care as part of a comprehensive strategy to address physician shortages," the organization says.

Growing Disease Burden Requires Inclusive Workforce

Tim Dall

Tim Dall, a speaker at the AAMC conference, is the lead author of an article in the prestigious journal *Health Affairs*, titled "An Aging Population and Growing Disease Burden Will Require a Large and Specialized Health Care Workforce by 2025."

Over the past few year, the predicted shortage of primary care physicians as the US population ages has been widely discussed. In this paper, Dall and his coauthors project demand for specialty services, based on changing demographics and expanded medical coverage under the Affordable Care Act. They conclude that we can expect increased demand for many specialty services such as vascular surgery, cardiology, radiology, and neurological and general surgery.

"The disease burden associated with a growing elderly population will require a large and diverse healthcare workforce," the authors write. "Expanding the scope of practice of allied health professionals – to include services that currently require a physician's supervision but that evidence demonstrates can be safely performed by non-physicians – could help meet increased demand for both primary care and specialty services. ... Emerging care delivery models also have the potential to change the number and mix of providers required to provide the level of services demanded."

In an interview, Dall emphasizes that we need a more appropriate number and mix of providers, and we also need to alter the way that people relate to health-care services. "Public expectations are changing," he says. "A couple of decades back, if a child hurt his ankle, the parents would say 'go sit on the couch for a while.' Nowadays, if we don't take the child to get an X-ray, we are considered bad parents. In general, we are using more and more services." Dall is the managing director of the life sciences consulting team at IHS, a global information services company.

He notes the important role of lifestyle choices in determining each person's health status. "There are important things we as patients should be doing," he says. "Right now we pay a physician or another practitioner to talk with us about things we know we should be doing: to stop smoking, eat better, exercise more. These are things we know we should change, but it's very difficult to alter these behaviors. If the population generally changed its habits, we would see less disease and of course we would need less from our health-care system in terms of numbers of providers."

Dall predicts that we will see greater use of new technologies, such as a wristband device that tracks your caloric intake, blood pressure, and glucose levels, and automatically sends important biometric readings to your physician's office. He also emphasizes the need for reimbursement reform. "Often our current system does not pay adequately to have someone other than the physician to see the patient, or to offer care in the most efficient way," he says. "Our system is set up so the doctor gets paid based on each face-to-face visit. That means we can't simply correspond by e-mail, even though that might be most efficient. Or you may have a situation where the patient is counseled by a physician to improve his or her diet, while a nutritionist would do a better job and at lower cost – but nutritionists can't bill directly for their services."

ACCAHC Reaches Out to Workforce Planners

John Weeks, executive director of the Academic Consortium for Complementary and Alternative Health Care (ACCAHC), was invited to speak on a panel during one of the plenary sessions. He displayed a chart showing the five licensed disciplines at the center of ACCAHC's work: acupuncture and Oriental medicine, chiropractic, naturopathic medicine, massage therapy, and direct entry midwifery.

The chart included statistics on schools, accreditation, and licensure for each discipline, showing that they are licensed in most states. "There are millions of people in the United States who consider these people part of their health workforce. If something ails them, they go to someone from one of those disciplines. In doing so, they relieve the burden on our mainstream delivery system," Weeks told the conference. "I urged the workforce experts in the room to appreciate this unacknowledged part of our US health workforce, and to move towards affirmatively engaging them."

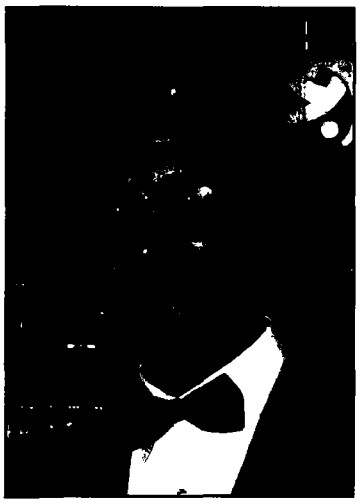
ACCAHC had an exhibit booth throughout the conference. Through a special grant from the NCMIC Foundation, ACCAHC was able to distribute printed copies of its recent report, "Meeting the Nation's Primary Care Needs: Current and Prospective Roles of Doctors of Chiropractic and Naturopathic Medicine, Practitioners of Acupuncture and Oriental Medicine, and Direct-Entry Midwives." Weeks says, "One of our goals was to put a copy of that useful book in everybody's hands. We distributed 175 copies to the roughly 210 workforce researchers present."

Weeks observes that people who attended this conference were generally statisticians and other quantitative thinkers, not clinicians. "It was not a real touchy-feely crowd," he says. "However, I found that in one-on-one discussions, quite a number of people might mention that their sister-in-law sees an acupuncturist and it has helped her a lot, or that their last two children were born at home with a midwife. You might say there was a quiet undercurrent of interest."

Several speakers at the conference emphasized the way that increasing interest in broad-based health care was sparked by the Affordable Care Act and its support for team-based care. "In 2010 AAMC began including content about nurses and physician's assistants in these meetings," Weeks says. "Then they added health coaches and community health workers. I truly appreciate AAMC's action in changing the name of the conference. It's interesting that they changed the name to 'health workforce,' putting the accent on health. This is a very positive, inclusive development."

One of ACCAHC's current top priorities, the Project for Integrated Health and the Triple Aim (PIHTA), is developing a website of published research and practical examples to support engagement with complementary and alternative medicine in the emerging payment and delivery system. The materials on the site focus on specific outcomes, especially from studies in real world environments.

"Our goal is to offer resources so anybody with an interest in the intersection between integrative health and mainstream medicine will find a home to explore best practices," Weeks says. (The "Triple Aim" approach, developed by the Institute for Healthcare Improvement, simultaneously pursues three dimensions: improving the patient experience of care, improving the health of populations, and reducing the per capita cost of health care.)



John Weeks

Throughout his talk, Weeks cited nuggets of information drawn from the PIHTA materials. Most importantly: a few years ago, health-care leaders used to think of integrative medicine as a cost center, added to a hospital or health system in hope of attracting more customers. Now, he says, based on the data, health-care decision makers are starting to perceive integrative medicine as an integral part of the organization that cuts costs and helps people stay healthy. "I ended my talk with quotes from Mayo, from the American Hospital Association and the former head of CMS, all of them saying that it is time to start focusing on a system that truly supports health," Weeks says. "That is a pretty strong triumvirate of forces all speaking in favor of the new viewpoint which our integrative health and medicine disciplines embrace."

Resources

Project for Integrative Health and the Triple Aim
optimalintegration.org/project-pihta/pihta.php
optimalintegration.org/contact-us/contact-us.php

PIHTA Poster
accahc.org/images/stories/poster_042114_pihta_aamc.pdf

John Weeks's Slides Presented at AAMC
accahc.org/images/stories/pres_aamcworkforce_may2014.pdf

Health Affairs article on Health Care Workforce
Abstract: content.healthaffairs.org/content/32/11/2013.abstract

Full article: www.michigan.gov/documents/mdch/An_Aging_Population_and_Growing_Disease_Burden_will_Require_A_Laqrge_and_Specialized_Health_Care_Workforce_by_2025_441004_7.pdf

Elaine Zablocki has been a freelance health-care journalist for more than 20 years. She was the editor of *Alternative Medicine Business News* and *CHRF News Files*. She writes regularly for many health-care publications.

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Optimizing Metabolism

by Ingrid Kohlstadt MD, MPH
www.INGRIDients.com

Frontiers in Cancer Prevention

Introduction

Discoveries, especially very innovative breakthroughs that take place at frontiers beyond the usual structure of big medicine, seldom make front pages. The press that they do receive may be falsely negative, purveyed by the naïve and by establishments who place the interest of shareholders and stakeholders above the common good. Embedded in the basalt of Internet medical claims are diamond-class discoveries in cancer prevention.

Applying Research Methodology at the Frontiers

A key component of my profession as a physician, scientist, and editor of medical textbooks is to evenhandedly apply the scientific metrics of public health, epidemiology, and preventive medicine. Through this diligent process, I can attest to several scientific breakthroughs that were delayed in the fringes of skepticism.

My passion for "diamond-mining" stems from my early-career mentors:

- As a medical student at Johns Hopkins, I witnessed the value of critical thinking and being dog-bone tenacious about discovery, no matter how underappreciated it was at first. One mentor was the first to submit a clinical research proposal on probiotics. There wasn't even a place for them then. Decades later while working at the FDA, I had to recuse myself from a meeting on probiotics in infant formula of because the same researcher's multidecade perseverance. He prevailed, and now probiotics are among other applications and are studied for cancer prevention.
- Another research mentor invited me to participate in one of the first studies of *Helicobacter pylori* infection and gastric cancer risk in an endemic country.
- While I was serving as the station physician in Antarctica, a series of events took place that made my station an unanticipated observational study of vitamin D. Consequently, by 1997 I was convinced that vitamin D was a powerful and underutilized modulator of the immune system in keeping with the vitamin's recently identified roles in cancer prevention.

Very Early Detection

Discoveries in early detection are especially difficult to advance. Large population studies are needed and are usually only feasible with large, well-funded teams.

The greater challenge may be the perceived lack of need for earlier detection. A commonly held view among health-care professionals is, "Cancers come and cancers go. Detect them too early and you'll be unnecessarily treating many patients, disrupting their lives and subjecting them to harmful procedures for a condition which would have resolved on its own."

As I wondered what it would take to renew an inculcated medical structure's interest in early detection, a temblor struck. It did not originate from the center of the earth, but from the stars – the Hollywood kind. Movie stars are choosing prevention, even at shockingly great cost. Imagine medical grand rounds where Angelina Jolie defines patient choice. It might put the medical community on notice, changing the rubric to, "Doctors come and doctors go ...."

My personal temblor was one of excitement when Yoshiaki Omura, MD, ScD, invited me to attend his international symposium at Columbia University in 2011. He received his training in cancer diagnosis and treatment at the Columbia University Cancer Institute and is a distinguished adjunct professor at New York

Medical College. Dr. Omura holds a 1993 US patent for his multidecade career work in early cancer detection. An objective university study in Japan found a true positive rate of approximately 30% not combined with any other screening methods – remarkable for a noninvasive technique requiring minimal cost and no patient discomfort. Thousands of practitioners worldwide have come to see his lectures, and his technique is being thoroughly studied at major hospitals in Japan.

Yet Dr. Omura's work is criticized based not on his work but on a misrepresentation on the Internet where anonymous bloggers make it sound as if one can simply take the Washington, DC, metro to Crystal City, Virginia; be the first to fill out a few papers with an original idea; and receive the US Patent Office's seal of approval in the mail. Of note, the most forward-thinking inventions take more time to receive a patent because meticulous research is required to prove that the invention can work. Another requirement for receipt of a patent is that the technology can be transferred and learned by those in the field. Affidavits from physician scientists worldwide reviewed by the US Patent Office can be found at Dr. Omura's website Bi-Digital O-Ring Test (BDORT.org), as can the description of his patented invention. Opportunities for continuing education can be found at the International College of Acupuncture & Electro-Therapeutics (icaet.org).

Early Detection + Treatment = A Call to Action

Dr. Omura's work caused seismic shifts in my practice of preventive medicine, wherein I frame patient choice to reflect his findings.

> Would you like to be screened for cancer? The screen itself if not associated with any risk. However, it may identify a cancer that one would otherwise never have known about. However, it can also identify cancer at an early, treatable stage so that it never results in relatives' and friends' lowering their voices to a faint whisper.

The second shift in my practice has been translating early cancer detection into meaningful clinical actions. Detecting cancer at a stage earlier than can be corroborated by conventional diagnostics (i.e., breast imaging, serology, and colonoscopy), while fascinating, can only lead to prevention if treated. Without clear treatment approaches, early detection might be considered the sound of one hand clapping. However, early detection that informs a personalized treatment plan is an extraordinary tool for prevention.

A Meaningful Biomarker Coupled with a Biologic Treatment

Dr. Omura's method of cancer detection can often be corroborated with a biomarker and corresponding treatment. The enzyme alpha-N-acetylgalactosaminidase, known as Nagalase, is produced by viruses and cancer cells to invade human cells. Nagalase can be measured in human serum, where it is a marker for viral infection and cancer. Nagalase inactivates the D3 binding protein (Gc protein) which signals human immune production of the macrophage activating factor (GcMAF). Dr. Nobuto Yamamoto of Japan first reasoned and demonstrated that if GcMAF production is impaired by viruses and invading cancers, administering GcMAF as a biologic treatment could potentially allow the immune system to regain control. GcMAF is currently in preclinical trials, and additional resources can be found at the website GcMAF.eu.

Genetic Risk Potentially Reduced by Dietary Supplementation

Genetic screening can personalize cancer prevention. Gilbert's syndrome is a genetic (inborn) metabolic condition associated with decreased activity of UGT1A1. In contrast to most inborn errors of metabolism, Gilbert's syndrome is very common, with a prevalence of 1 in 10 Caucasian Americans and 1 in 7 African Americans and less in other races. The most noted and for some time only known consequence was jaundice in newborn babies. However, with increased research and rise in environmental toxins, Gilbert's is associated with difficulty in eliminating carcinogens and certain synthetic drugs. Now published medical studies show epidemiologic data linking Gilbert's syndrome with increased risk of hormonal cancers.

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Calcium-D-glucarate is a dietary supplement that promotes removal of environmental toxins and biochemically appears to ameliorate the metabolic blockages of Gilbert's syndrome, as well as broader use for elimination of environmental toxins. I am not aware of any clinical studies of risk reduction, but support of liver metabolic pathways in general is relevant to cancer prevention.

Expanded Medical Partnership with Dentistry

Dentistry is emerging as a field with several cancer-prevention tools. Cancer is associated with inflammation which can be from nerve stimulation through pathways delineated by ancient medical practices. The nerves in teeth interconnect with the body through these meridians, so that a toothache, cavitation, or root canal promotes inflammation and carcinogenic potential in distant body parts.

Dr. Alireza Panahpour has focused his West Coast dental practice on treating patients with dental conditions exerting adverse effects on distant body organs. With a similar practice model, Dr. Mark McClure of National Integrative Health Associates in Washington, DC, offers an interactive chart of teeth and meridian, found on the Web at Nihadc.com/biological-dentistry/interactive-meridan-tooth-chart.html.

Periodontal disease is associated with heart disease because of the associated inflammatory pathway. Now a similar association between periodontal disease and cancer is being established. No dental work is completely accepted by the body, but some such as mercury amalgams and bisphenol-A, asbestos, and phthalate-containing appliances would be appropriately replaced.

Dr. McClure's colleague Dr. Lowell Weiner raises an important point about the jaw and the messages that it signals systemically, especially during sleep. Oral appliances can correct a cancer-related deficiency of a vital nutrient – oxygen. Sleep apnea can be treated by dentists, sometimes with higher patient satisfaction and adherence than through pulmonary medical approaches, depending on the underlying disturbance.

Removing a Specific Carcinogen

Dr. Omura's technique not only detects cancer at early stages, it also can be used to detect asbestos, which is suspected in more cancers than mesothelioma, where it is the primary carcinogen. The same physical properties that make asbestos a fire retardant and insulator confer its carcinogenecity and its ability to be detected as tiny nanoparticles using Dr. Omura's technique. More can be found in Dr. Omura's chapter on asbestos in *Advancing Medicine with Food and Nutrients*, 2nd edition, which I edited.

Dr. Omura's interest in the herb cilantro was piqued when he found that cilantro promoted the excretion of asbestos from the body. He recommends eating cilantro, and also taking a cilantro supplement to facilitate removal of heavy metals and asbestos, to prevent cancer. Cilantro is high in folate, a vitamin with established anticancer properties. This adds to the rationale to use it strategically in cancer prevention.

Conclusions

Tools exist to profoundly reroute a life journey from the cancer that would have been to the vibrant health that is. While I make no claims or endorsements of the efficacy of the cancer-prevention tools presented here, each has demonstrated merit with scientific criteria. These discoveries may be the vitamin D, infection-induced cancer, and the microbiome of the next decade. The research needed for these discoveries to reach their full potential is a forward-thinking investment that sparkles with the promise of vibrant health for many.

Ingrid Kohlstadt, MD, MPH, FACPM, FACN
Faculty Associate, Johns Hopkins Bloomberg School of Public Health
Executive Director, NutriBee National Nutrition Competition Inc.
Editor, *Advancing Medicine with Food and Nutrients* (CRC Press; 2013)

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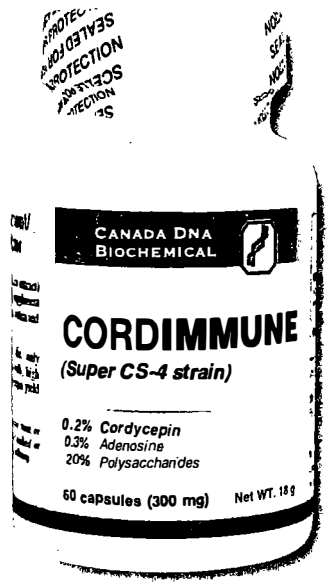

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Literature Review & Commentary

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

Selenium Decreases Toxicity of Chemotherapy Drug

One hundred twenty-two cancer patients (aged 14–82 years) being treated with cisplatin were randomly assigned to receive, in double-blind fashion, 400 mcg of selenium or placebo on the day before chemotherapy. The primary end point was cisplatin-induced renal injury, as documented by an increase in plasma creatinine above 1.5 mg/dl in men and 1.4 mg/dl in women, an increase of plasma creatinine more than 50% above the baseline value, or urine flow rate less than 0.5 ml per kg of body weight per hour. Creatinine levels were measured initially and on the 5th day after cisplatin therapy. The primary end point occurred in 11.5% of patients in the placebo group and in 0% of patients in the selenium group ($p = 0.013$).

Comment: The results of this study demonstrate that selenium supplementation can decrease the nephrotoxicity of cisplatin. As with other antioxidants, there is a theoretical possibility that administration of selenium could interfere with the anticancer effect of chemotherapy, although to my knowledge such an interaction has not been shown to occur. However, by preventing or decreasing the severity of chemotherapy side effects, selenium could improve clinical outcomes by allowing cancer patients to receive a higher cumulative dose of chemotherapy.

Ghorbani A et al. Protective effect of selenium on cisplatin induced nephrotoxicity: A double-blind controlled randomized clinical trial. *J Nephropathol*. 2013;2:129–134.

Antioxidants Improve Tolerance to Radiation Therapy and Chemotherapy

One hundred three women (mean age, 48 years) with cervical cancer treated with radiation therapy and cisplatin chemotherapy were randomly assigned to receive, in single-blind fashion, daily antioxidants (4.8 mg of beta-carotene, 200 mg of vitamin C, 200 IU of vitamin E, and 15 mcg of selenium) or placebo throughout the course of treatment. The mean decrease in the hemoglobin concentration was significantly less ($p = 0.003$) and the mean score on a quality of life questionnaire was significantly higher (better) in the antioxidant group than in the control group.

Comment: This study, combined with the study described above and earlier research, supports the concept that supplementing with selenium and other antioxidants can decrease the deleterious effects of conventional cancer therapy. Longer-term studies are needed to determine whether taking antioxidants along with conventional therapy influences end points such as tumor recurrence and mortality. However, at present there does not appear to be any evidence that supplementing with moderate doses of antioxidants (as used in the present study) has an adverse effect on those end points.

Fuchs-Tarlovsky V et al. Antioxidant supplementation has a positive effect on oxidative stress and hematological toxicity during oncology treatment in cervical cancer patients. *Support* Care Cancer. 2013;21:1359–1363.

Curcumin for Radiation Dermatitis

Thirty women (mean age, 58 years) with non-inflammatory breast cancer or carcinoma in situ who were undergoing radiation therapy without concurrent chemotherapy were randomly assigned to receive, in double-blind fashion, curcumin (2 g 3 times per day) or placebo during the course of radiation therapy. Radiation dermatitis was assessed by the Radiation Dermatitis Severity (RDS) score, a 4-point scale, with 0 indicating no dermatitis and 4 indicating severe dermatitis. At the end of the treatment period, the mean RDS score was significantly lower in the curcumin group than in the placebo group (2.6 vs. 3.4; $p < 0.01$).

Comment: Radiation dermatitis occurs in approximately 95% of patients receiving radiation therapy for breast cancer. Curcumin is a compound present in turmeric that has anti-inflammatory activity, and may also have anticancer effects. The results of the present study indicate that oral

administration of curcumin can decrease the severity of radiation-induced dermatitis in women with breast cancer.
Ryan JL et al. Curcumin for radiation dermatitis: a randomized, double-blind, placebo-controlled clinical trial of thirty breast cancer patients. *Radiat Res.* 2013;180:34–43.

Glutamine Also Helps Prevent Radiation Damage

Seventeen women with breast cancer who were undergoing 6 weeks of radiation therapy were randomly assigned to receive, in double-blind fashion, glutamine (0.5 g per kg of body weight per day) or placebo (dextrose), in 3 divided doses per day, taken with liquid, for 8 weeks. Glutamine supplementation was begun 1 week before the start of radiation therapy and was continued until 1 week after the end of radiation therapy. The severity of radiation damage to the skin was measured by the 4-point Radiation Therapy Oncology Group (RTOG) scale, in which a score of 0 indicates no change and a score of 4 indicates necrosis. One week after the end of radiation therapy, the mean score on the RTOG scale was significantly lower in the glutamine group than in the placebo group (0.9 vs. 1.4; $p < 0.05$). Blood levels of glutathione were significantly higher in the glutamine group than in the placebo group. At 12 months after radiation therapy, pain was significantly less in the glutamine group than in the placebo group ($p = 0.01$). At 5-year follow-up, 2 patients in the placebo group and none in the glutamine group had a local recurrence of cancer.

Comment: Glutathione is a potent antioxidant, which may prevent radiation-induced cell damage. In animal studies, oral glutamine supplementation increased intracellular glutathione levels in normal breast tissue while depleting glutathione in breast tumors. If those same effects occur in humans, glutamine supplementation might decrease the adverse effects of radiation therapy while enhancing its efficacy. The results of the present study are consistent with that possibility. It is likely that the mechanism of action of glutamine differs from that of curcumin (discussed above). Therefore, using these treatments in combination could be more effective than using either one by itself.
Rubio I et al. Oral glutamine reduces radiation morbidity in breast conservation surgery. *JPEN J Parenter Enteral Nutr.* 2013;37:623–630.

Food Supplement Slows Progression of Prostate Cancer

One hundred ninety-nine men (mean age 74 years) with localized prostate cancer were randomly assigned in a 2:1 ratio to receive a capsule 3 time per day that contained (per capsule) 100 mg of broccoli powder, 100 mg of turmeric powder, 100 mg of pomegranate whole fruit powder, and 20 mg of 5:1 green tea extract (equivalent to 100 mg of green tea) or placebo for 6 months. The median percent rise in the prostate-specific antigen (PSA) level was significantly less in the active-treatment group than in the placebo group (14.7% vs. 78.5%; $p = 0.0008$).

Comment: Polyphenol-rich foods such as pomegranate, green tea, broccoli, and turmeric have demonstrated anticancer properties in laboratory studies. Mechanisms of action include inhibiting angiogenesis, decreasing cell proliferation, and promoting apoptosis (programmed cell death). In the present study, the use of a supplement that

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Incontinent after Brain Trauma – 30 Years Later

A Mother's Letter

Dear Dr. Wishnow:

My son, Ron, has been Incontinent for the last 30 years after a severe auto accident when he was 18. His brain was so traumatized that he was in a coma for about 4.5 months. His doctor lost hope and said he would not make it, or became bed ridden in a persistent vegetative state.

My husband and I refused to accept that 'reality'. We brought Ron back, cared, and prayed for him at our home. We tried everything to help him recover. Ron was in a wheelchair for 6 years, gradually progressed to using a walker, and then finally was able to walk. Now Ron is mobile, loving, upbeat, and has a great sense of humor. But Ron still has problems: he has no short term memory, and he is incontinent at night.

When I saw your ***BetterMAN*** *ad for men's bladder control, I thought this remedy sounded very interesting for Ron to try. If nothing happened after 6-12 months, we could always move on to try something else. So I started Ron on BetterMAN at two capsules daily on 12/20/2011.*

To our big surprise, we started to see improvements almost in two weeks. We were thrilled to death! Enclosed is the copy of the January calendar we use to record Ron's condition and communicate among several shifts of caretakers. As you can see, in January, Ron was DRY 21 nights! Before he started BetterMAN, he was dry only about 1-2 nights in one month.

Wearing Pull-Ups is a humiliating experience for adults. I said to Ron 'If you can make one month dry, I will let you wear whatever you like when you go to sleep.' Ron is very proud of his progress.

I also noticed that last Sunday Ron sat through a two-hour church service without using the restroom.

(Peipei Wishnow, PhD, is the president of Interceuticals)

We are very thankful!
Mrs. Kate, B. (2.5.2012)

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contained extracts of these foods slowed the rise in PSA levels, which suggests that the supplement slowed the progression of prostate cancer.

Thomas R et al. A double-blind, placebo-controlled randomised trial evaluating the effect of a polyphenol-rich whole food supplement on PSA progression in men with prostate cancer - the UK NCRN Pomi-T study. *Prostate Cancer Prostatic Dis.* Epub 2014 Mar 11.

Amino Acids Promote Postoperative Healing

Twenty-eight patients (mean age, 69 years) undergoing total knee replacement were randomly assigned to receive, in double-blind fashion, 20 g of essential amino acids or placebo (alanine) twice a day between meals for 1 week before and continuing for 2 weeks after surgery. The decrease in quadriceps muscle volume at 2 weeks after surgery was significantly less in the active-treatment group than in the placebo group (−3.4% vs. −14.3%; $p < 0.04$). The decrease in quadriceps muscle volume at 6 weeks after surgery compared with baseline was also significantly less in the active-treatment group than in the placebo group (−6.2% vs. −18.4%; $p = 0.001$). Compared with the placebo group, the active-treatment group performed better at 2 and 6 weeks after surgery on functional mobility tests (all $p < 0.05$).

Comment: Essential amino acids are required for protein synthesis, which is important for recovery following surgery. In this study, supplementing with 20 g of essential amino acids twice a day decreased muscle atrophy and accelerated the return of function in older adults following total knee replacement. It is possible that increasing dietary protein intake by 40 g per day (which is considerably less expensive than supplementing with essential amino acids) would have a similar effect. However, protein digestion is often suboptimal in elderly and chronically ill individuals, so predigested protein in the form of free-form amino acids might be more effective for some patients. A study comparing the effect of a high-protein diet with that of essential amino acid supplementation would be worthwhile.

Dreyer HC et al. Essential amino acid supplementation in patients following total knee arthroplasty. *J Clin Invest.* 2013;123:4654–4666.

Don't Eat Late at Night if You Want to Lose Weight

Twenty-nine healthy young men (mean age, 21 years) were divided into 2 groups. Half of the subjects eliminated all caloric intake between 7 p.m. and 6 a.m. for 2 weeks, while the other half followed their usual dietary patterns. After a 1-week washout period, the diets were reversed for an additional 2 weeks. Mean total daily energy intake was significantly lower by 9.2% during nighttime energy restriction than during the control period (2420 vs. 2664; $p < 0.02$). During the control period, mean energy intake between 7 p.m. and 6 a.m. was 698 kcal per day. Mean body weight fell by 0.4 kg during nighttime energy restriction and increased by 0.6 kg during the control period ($p < 0.001$ for the difference in the change between diet periods).

Comment: It has previously been shown that calories consumed in the morning are particularly satiating and that higher caloric intake in the morning can reduce the total amount of calories ingested during the entire day. In contrast, calories consumed late at night lack satiating value and can result in greater overall daily caloric intake. The present study confirms those findings and further demonstrates that restricting nighttime caloric intake could be a successful strategy for losing weight.

Lecheminant JD et al. Restricting night-time eating reduces daily energy intake in healthy young men: a short-term cross-over study. *Br J Nutr.* 2013;110:2108–2113.

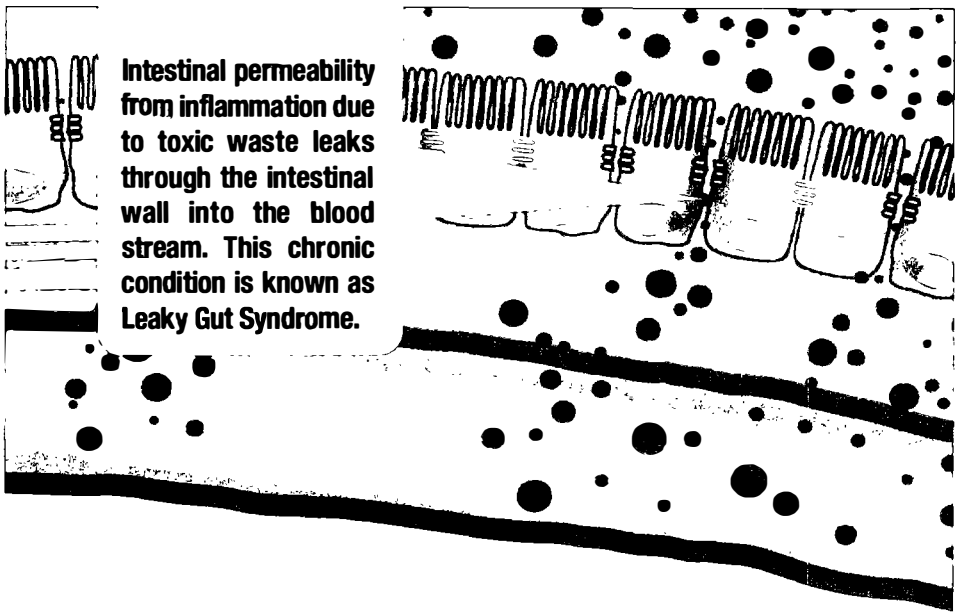
Vitamin B12 Improves Motor Development and Regurgitations in Infants

One hundred five infants less than 8 months of age who were referred to a pediatric clinic in Norway because of feeding difficulties, subtle neurologic symptoms, or delayed psychomotor development were assessed for vitamin B12 status, by measuring serum vitamin B12, plasma homocysteine, and plasma methylmalonic acid. Seventy-nine of the infants who had evidence of impaired vitamin B12 function (defined as a plasma homocysteine level of 6.5 μmol/L or greater) were randomly assigned to receive, in double-blind fashion, a single dose of 400 μg of hydroxocobalamin intramuscularly or placebo (a sham injection, in which the skin was punctured by a needle). The patients were then followed up after 1 month. Vitamin B12 supplementation decreased the mean homocysteine concentration by 54% and the methylmalonic acid level by 84%, whereas no significant changes were seen in the placebo group. The median improvement in motor function (as determined by the Alberta Infants Motor Scale) was significantly greater in the vitamin B12 group than in the placebo group ($p = 0.003$), and a higher proportion of infants receiving vitamin B12 than placebo showed improvement in regurgitations (69% vs. 29%; $p = 0.003$).

Comment: During infancy, minor developmental delays and gastrointestinal complaints are common, as is a biochemical profile suggestive of low vitamin B12 function. Breast-fed infants tend to have lower B12 status than non-breast-fed infants. A biochemical profile suggestive of low vitamin B12 function that could be corrected by vitamin B12 supplementation has been observed in more than two-thirds of mainly breast-fed Norwegian infants between ages 6 weeks and 4 months. The results of the present study suggest that mildly impaired vitamin B12 function is common in breast-fed infants, and may contribute to subtle abnormalities of neurological development and gastrointestinal function. These abnormalities can be corrected in part by a single intramuscular injection of hydroxocobalamin.

Elevated homocysteine levels are also seen with folate deficiency, and folate works together with vitamin B12 in supporting normal neurological development and function. Therefore, folate supplementation should be considered along with vitamin B12 for infants with elevated homocysteine levels.

Torsvik I et al. Cobalamin supplementation improves motor development and regurgitations in infants: results from a randomized intervention study. *Am J Clin Nutr.* 2013;98:1233–1240. ◆



Intestinal permeability from inflammation due to toxic waste leaks through the intestinal wall into the blood stream. This chronic condition is known as Leaky Gut Syndrome.

The One-Two Punch for Chronic Conditions

Colostrum is the only substance proven to prevent and repair Leaky Gut Syndrome, and healing a patient's permeable gut halts the progression. But, that's only half the solution, and there's more work to be done. Existing cellular and tissue damage caused by Leaky Gut Syndrome still remains, and inflammation resulting from a hyped-up immune system must be attenuated if true healing is to occur.

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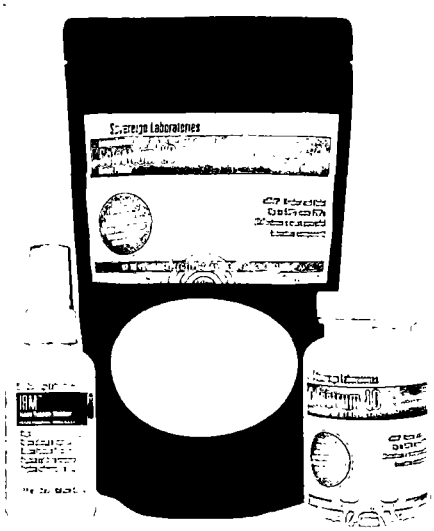

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Sovereign Laboratories

Intravenous Ascorbate in the Treatment of Ovarian Cancer

THE WORK OF JEANNE DRISKO, MD and QI CHEN, PhD

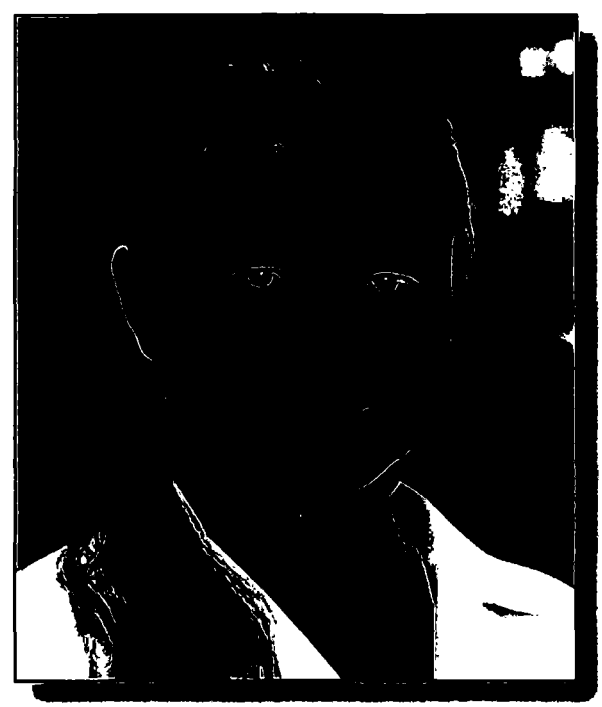
Based on interviews with Nancy Faass

Jeanne Drisko, MD

The Integrative Medicine Center at the University of Kansas is an outpatient clinic located in the heart of a large university medical center. The primary focus of our work is care for patients with chronic health conditions. What we learn from our patients informs our research in both basic science and clinical trials. Understandings we gain from the research improve our treatment protocols, so the process comes full circle. This is definitely translational medicine at work, translating research findings into new therapies and treatment guidelines. One of our goals is to expedite the transmission of biomedical research outcomes into clinical practice.

Our services range from wellness check-ups to cancer treatment, and we see every age group from pediatric to adult and geriatric. Our staff includes medical doctors, naturopathic doctors, advanced practice nurses, nutritionists, and neurofeedback practitioners, and the center provides more than 4,000 patient visits a year. We have a fellowship program for primary care physicians in integrative medicine and a master's degree and certificate program for nutritionists.

In our clinic, we may have an infinite number of diagnoses walk through the door, but everything comes down to the biochemistry of the individual patient. We look at diet, nutrients, and metabolism, at genetics, detox, and heavy metals. We have found that if we do not first understand the dynamics of the patient's biochemistry, we can try treatment after treatment, but we are not going to be able to make them better.



Qi Chen, PhD

Humble Beginnings

I [Jeanne Drisko] initially trained with Dr. Hugh Riordan two decades ago, when he was director of the Biocenter in Wichita, Kansas (now the Riordan Center). When I completed my training, I was asked by the Dean of the School of Medicine, Dr. Deborah Powell, to come to Kansas City and establish an integrative medicine program at KU Medical Center. That was in 1997, but at the time, no one in the institution wanted to have the program in their department. In 1998, Dr. Sterling Williams came to the university from Columbia Presbyterian in New York, where Dr. Mehmet Oz also practiced, so Dr. Williams was well versed in integrative medicine. When he assumed leadership of Obstetrics and Gynecology, he knew that he wanted integrative medicine services to be available to his patients, so he invited me to develop this program in 1998.

I had a little closet that had been a storage room. It was really gross, but I outfitted it quite well and started working out of this little closet without even a budget. (They did pay a modest salary.) I developed an education program, teaching medical students and started writing research grants. The grants began coming through, one after another, so that built the program. Then the clinical practice was added, and we moved to this wonderful space. (integrativemed.kumc.edu)

At the time we moved to the new clinic space, I had grateful patients who were very interested in seeing this work established at the University of Kansas and continue beyond me. They raised the money to create an endowed chair, the Riordan Endowed Chair of Orthomolecular Medicine, and I was appointed the first recipient. After I retire, the role will be passed on to someone else, so this work will continue, hopefully, into perpetuity.

Intravenous Ascorbate and Cancer

We are especially pleased to have had the opportunity to perform in-depth research on intravenous vitamin C (ascorbate). We had a paper published recently in *Science in Translational Medicine* that has been very well received by our conventional colleagues.

Translational research. The study included cell tissue, animal studies, and human clinical trials, all linked. The basic science research for these studies was performed primarily by Mark Levine, MD, at the NIH and by Qi Chen, PhD, here at the University of Kansas. These studies have been subsequently replicated and validated all around the world. In this research, we exposed cancer cell lines *in vitro* to concentrations of ascorbate and to various types of chemotherapy. We screened 48 different cancer cell lines and found that more than 75% were reduced by ascorbate exposure

Animal models. Our research showed that intravenous ascorbate provided therapeutic benefit in animal models of cancer and that there is promise of benefit in humans. The research found that high concentrations of ascorbate, at concentrations easily achievable in humans, can kill cancer cells without the addition of chemotherapeutic agents, through physiological processes that include autophagy, apoptosis, and necrosis. Normal cells remain unharmed.

We also investigated four cell lines in various animal models using ovarian, pancreatic, and prostate cancers and glioblastoma, injecting these cell lines into mice and then treated them with high-dose ascorbate alone. The ascorbate injections inhibited cancer growth in all four types of cancer. In the pancreatic cancer model, which is exceptionally resistant to gemcitabine treatment, ascorbate alone reduced the cancer growth by 30% to 40%, before we combined it with chemotherapy. (All this work has been published and these citations appear at the end of the article.) The ascorbate leaves the bloodstream, penetrates the interstitial space, and is converted into hydrogen peroxide, which functions as chemotherapy. The beauty of it is that normal cells have the mechanism to eliminate hydrogen peroxide, but cancer cells do not. They have lost certain normal protective mechanisms, so when a huge oxidative burst occurs, the cancer cells go into cell death.

Clinical trial. In the human component of the study, our first priority was to show that the treatment was safe. In the foundational research, there have been decades of use showing that no harm is incurred with therapeutic doses of IV vitamin C. This was the first time a study had been performed in which human subjects received intravenous infusions at 75 or 100 grams twice a week for a year. No one knew with absolute certainty whether the intravenous vitamin C was going to be safe. No significant adverse events occurred.

This was also the first time we were able to show that giving intravenous ascorbate in conjunction with chemotherapy was safe in advanced ovarian cancer patients. The study consisted of two arms, one receiving chemotherapy alone, and the other receiving chemotherapy (paclitaxel and carboplatin) with intravenous ascorbate. One unexpected finding was that the ascorbate seemed to reduce some of the side effects of chemotherapy. The women who received IV C seemed to tolerate the chemotherapy better, with fewer side effects. This was an unanticipated, but significant finding that we could really celebrate.

Although we cannot make definitive statements regarding efficacy, because the study was not powered for effects, there was a trend. The women who received the IV C seemed to do better than those who did not. This was a small clinical trial, and you never know for certain what you will find when you do a large human study.

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Contraindications. When using intravenous ascorbate, we screen patients for two specific health issues. One is a low G6PD blood test which correlates with the potential for hemolysis of red blood cells when the ascorbate is administered. The second finding is oxalate kidney stones, because IV C does have the potential to worsen or precipitate oxalate kidney stones. We do not infuse these two groups of patients in our clinic with vitamin C.

Oral versus intravenous ascorbate. Authors such as Tom Levy have suggested that the effects of oral ascorbic acid are the same as those of intravenous ascorbate. Qi Chen's work, when she was at the NIH, showed clearly that ascorbate must be administered intravenously (or in the case of animals, in the peritoneal cavity), or it cannot reach the correct levels in the bloodstream. This was also the finding of Mark Levine at the NIH, prior to the work of Qi Chen. The initial studies were performed in healthy people, and later in conjunction with cancer patients, confirming that intravenous administration of vitamin C is necessary to reach concentrations high enough to be effective.

Future directions. The ground work has been laid for the use of IV ascorbate in clinical practice, and also in research. At this point, we would like to have the support of the National Cancer Institute to provide federal funding for this research to go forward.

More conventional oncologists are becoming interested in providing intravenous ascorbate with chemotherapy. Typically the oncologist administers the chemotherapy and enlists an integrative physician in the community to perform the IV C infusions. This appears to be the beginning of a synergism between the two types of providers, which I find very exciting. I receive more requests now from conventional oncologists asking for the names of people in their community or their region who might be able to provide IV vitamin C.

In terms of the research, one of our priorities is to clearly establish the details of the mechanisms by which vitamin C kills cancer cells, but conserves normal cells. We believe that is a major question to answer, one that will help us establish biomarkers to identify which patients are most likely to respond well to treatment, and those least likely to benefit.

We also need clinical trials to test the efficacy of IV C. Our research and that of many other phase 1 trials have shown that intravenous ascorbate is non-toxic and that it reduces the toxicity of chemotherapy. Although we just published a trial on specific effects on tumor tissue, there have been no formal trials to track tumor response and clinical outcomes, which are true measures of efficacy. We need a larger trial to establish those clinical benchmarks. I also want to look

Outcomes and Impact

- *Survival* – Of 22 individuals in the final study group, those receiving chemotherapy plus intravenous ascorbate had time-to-disease progress delayed for 8.75 months compared to those receiving chemotherapy alone (25.5 months compared with 16.75 months) based on five-year follow-up data.
- *Destruction of cancer cells* – In cell culture studies of seven different ovarian cancer cell lines, all of the cell lines exposed to ascorbate were destroyed by the exposure.
- *Reduction in tumor weight* – Ascorbate reduced tumor weight by approximately 32%, whereas chemotherapy (carboplatin) reduced weight approximately 56%. Carboplatin in combination with ascorbate caused on average 86% reduction in tumor weight in an animal model.
- *DNA damage to tumor cells* – Ascorbate damaged DNA of approximately 36% of cancer cells, compared with 11% impact or less by chemotherapy agents (in a cell model).
- *Severity of DNA damage* – In dosing with ascorbate and three chemotherapeutic agents, in nine different combinations, only the presence of ascorbate correlated with grade 3 and 4 toxicity to cancer DNA.
- *Reductions in cancer cell ATP* – In some cancer cell lines but not normal cells, ascorbate resulted in greater than 50% reduction in cellular ATP within an hour.
- *Toxicity* – Ascorbate was notable for decreases in toxicity resulting from chemotherapy in all physiologic systems, with some reductions as great as 33%.

Trends in the study outcomes, extrapolated from the raw data.

at pharmacokinetic evaluation of ascorbate in children. Although IV vitamin C has been given to children, no one has done a formal study with children to date.

We're planning a trip to China in June to expand this work in populations there. There is definitely interest. For our next research project we want to explore the possibility, the feasibility, of a clinical population-based study in China. Given the environmental effects of pollution, this is of major concern to the Chinese government. There is also interest in Japan, Canada, and in European countries. This is a topic of universal interest that has generated research all over the world.

The TACT Study

The KU Integrative Medicine Center was an active participant in the Trial to Assess Chelation Therapy. This study, funded by the NIH, involved more than 1700 adults with a history of cardiovascular disease and myocardial infarction. The research was performed by conventional cardiologists with the participation of integrative medicine physicians.

Patients were randomized to receive either EDTA chelation or a placebo. The formula consisted of EDTA as the chelator, as well as vitamins, minerals, and other nutrients. Since chelation can remove not only harmful heavy metals, but also beneficial minerals, it was important to follow patient blood levels, to assure that the excretion of heavy metals was not damaging the kidneys.

The chelation formula. The IV infusion included 7 grams of vitamin C. We believe that IV C is an important component of the formula due to its beneficial effects on the vasculature. It is of concern that some physicians now see chelation strictly as an antioxidative therapy and believe they should be taking the pro-oxidative IV C out of the chelation formula. Two important findings indicate otherwise. First, the pro-oxidative burst of IV C can be a highly effective tool in supporting mitochondrial health. Secondly, the study clearly defined improvements in the vasculature. (I cannot describe those benefits in detail here because we have not yet published our findings, but I can tell you that they are clinically important.)

Patient subsets within the study. We do know that diabetic patients in the study experienced a significant reduction in the incidence of recurrent heart attacks, angina, and stent placement. These patients were largely on maximal therapy and yet of all the study participants, diabetic patients benefitted most. There was another sub-group of participants who could not tolerate statin medication or did not take statins and they also benefited significantly from IV vitamin C use.

Ketogenic Diet

One of our upcoming research projects is to develop animal models using ketogenic diet, intravenous ascorbate, and hyperbaric oxygen to establish baselines on each of those therapies individually, and then combine the therapies to determine if there is synergistic benefit. These are areas in which we developed interest as a result of what we have been seeing in the clinic.

Epilepsy. Traditionally, the ketogenic diet is a high-fat, moderate-protein diet with either no carbohydrate or minimal carbohydrate. The most extreme ketogenic diet is used for people with epilepsy, and it is currently provided in pediatric hospitals around the country.

Alzheimer's disease. We are also finding benefit in use of the ketogenic diet for Alzheimer's disease patients to support brain health.

Cancer care. In our clinic we have observed that cancer patients on the ketogenic diet do better; and we are also finding that intravenous ascorbate augments that process. The concept is to use ketosis to change the metabolism of cancer patients, based on the work of Dr. Thomas Seyfried and his colleague Dr. Dominic d'Agostino at the University of South Florida, as reported in his book, *Cancer as a Metabolic Disease*.

Neurofeedback

This form of EEG therapy uses diagnostic brain mapping to establish a baseline of the patient's brainwave patterns. Neurofeedback training is subsequently used to help the patient shift those patterns. A colleague in California, Jay Gunkelman, is beginning a study under a Defense Department grant with Gulf War veterans. We are interested in duplicating some of that research here at KU Integrative Medicine Center.

Traumatic brain injury. Using neurofeedback, patients who have suffered significant traumatic brain injury with bleeds or stroke have achieved tangible gains in their functioning.

Autistic spectrum disorder. Children on the autism spectrum have a certain characteristic pattern evident in the mapping. The neurofeedback enables us focus our training in a way that helps them reengage. Like all therapies, it does not work for everyone: it is not a panacea. However, for the people we help, it can be life-changing.

Substance abuse. Some of this work came out of the Menninger Clinic in Topeka with Elmer Green, Patricia Norris, Keith Farian, and Jim Peniston, in a vast body of work on altered states. When Jim was at the Menninger Foundation with the Greens, he had a flash of insight

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during one of these deep state trainings that led to the development of a therapy called *alpha-theta crossover*, which he then used successfully with a group of Vietnam vets for substance abuse. In that initial study, at the two year follow-up, only three of the twenty participants had relapsed.

Post-traumatic stress disorder. Jim Peniston subsequently observed that this type of neurofeedback also seemed to help people with PTSD. Another psychologist/researcher, Eugenia Bodenhamer-Davis at the University of North Texas does primary research and offers neurofeedback in her clinic. She and her husband, Richard Davis, a therapist in private practice, have documented exceptional benefits using this therapy.

Essentially the process involves reducing alpha waves and elevating theta waves while maintaining beta waves. During the state that results, individuals may experience a release of stored memories throughout the body. This is not like reliving trauma – rather it is the experience of an adult in a safe place looking at that experience and being able to work through it. The benefits can be remarkable.

The Research Agenda

The primary roadblock to integrative medicine research today is funding. We are not going to see the exciting breakthroughs we know are possible until federal agencies like the NIH and National Center for Complementary and Alternative Medicine find a way to fund the research more fully. That must be done if we are going to get the attention of our conventional colleagues and change their current mindset. I see the greatest potential at the intersection between integrative and conventional medicine, with the two groups working together to determine the most effective approaches to the research.

There has been some progress over the years in academic institutions, in their leadership, and among the journal editors. Although they are not embracing integrative medicine whole-heartedly, they are very interested in how an integrative approach can be helpful in the management of chronic disease. The real change I see is in the medical students. This next generation of healthcare practitioners is so enthusiastic, and their ideas are so exceptional, I feel honored to work with them. They tend to be attracted to core disciplines within medicine, such as internal medicine, pediatrics, and nutrition, so I am hopeful that in the future, integrative medicine is not going to be separate, it will simply be standard medicine.

Nancy Faass, MSW, MPH

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Jeanne Drisko, MD

Dr. Drisko is Director of the Kansas University Integrative Medicine Center, the Riordan Endowed Professor of Orthomolecular Medicine, and full-time faculty at the University of Kansas, School of Medicine (KUMC). In addition to patient care, research, and teaching, Dr. Drisko has worked closely with Kansas legislators and the Kansas Medical Society to develop and pass legislation and public policy in the area of naturopathic practice. She has served as President and as Program Director of the American College of Advancement in Medicine (ACAM), is a faculty member of the Institute for Functional Medicine, advisory board member for the Consortium of Academic Health Centers for Integrative Medicine, and board member of the Alliance for Natural Health.

Qi Chen, PhD

Dr. Chen has served as a researcher and an Assistant Professor at the University of Kansas Medical School for more than five years. Trained at Sun Yat-Sen University in China , she also served as a postdoctoral fellow at the National Institutes of Health for more than four years performing cancer research.

Resources

Integrative Medicine Fellowship at the University of Kansas

The objective of the Integrative Medicine fellowship is to create practitioners who are knowledgeable enough regarding integrative care to function as skilled advisers to patients and as collaborative members of multidisciplinary and integrative patient care teams. The fellowship provides a year's intensive exploration of clinical, educational, and research activities related to integrative medicine for MDs or DOs who have satisfactorily completed their residency training.

We are also planning to offer an online fellowship for MDs, DOs, naturopaths, nutritionists, dieticians, and pharmacists that will include on-site visits at the university. For additional information, contact:

Integrative Medicine Center
University of Kansas Medical Center
3901 Rainbow Boulevard
Kansas City, Kansas 66160
913-588-5000 | 913-588-7963 TDD

Workshops

Infusion therapy. Organizations that provide training in infusion therapy include the American College for Advancement in Medicine and organizations within the naturopathic community such as Bastyr University. The Integrative Medicine Center at KU has a written infusion protocol, available at no charge to licensed physicians if requested on their letterhead.

Chelation therapy. Training and protocols are available through the International College of Integrative Medicine and the American College for Advancement in Medicine. For additional information see:

www.acam.org
www.icimed.com

Editorial and Interview

Nancy Faass, MSW, MPH, is a writer and editor in San Francisco who supports authors in their publishing endeavors, including books, articles, white papers, and writing for the Web. For more information, contact info@HealthWritersGroup.com.

Technical Consultant

Jerry Stine, NC, Director of the Lifespan Institute, with 20 years of experience in Functional Nutrition, biochemistry, ketogenic diets, and anti-aging therapies. Specializing in phone consultations – 415-883-9033.

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Improving Breast Cancer Survivorship with Lifestyle Changes

by Barbara MacDonald, ND, LAc

I hope to inspire an uprising among the 2.5 million American breast cancer survivors – a campaign shouted from the rafters, or at least tweeted and posted, with slogans such as "Take control of your survivorship, sister!" or "You can help yourself if you only knew the truth." OK, perhaps that is a bit dramatic, but everyone who has breast cancer deserves to know this information. There are things you can do to lower your risk of recurrence that may also improve your prognosis. If you can achieve even one of these lifestyle changes, research shows that the benefits could be well worth the effort. So, grab a friend and get walking, learn to mix a cup of organic miso soup or green tea, eat lots and lots of veggies and fruit, drink less alcohol, and/or hire a weight-loss coach to create your own survivorship strategy.

"What now?" is a common question asked after cancer treatment ends. Survivors want to *do* something to help prevent cancer from coming back. When empowered to do so, they reflect that "If it does come back, I will feel like I've done everything I could to prevent it."

For years, we referred to primary prevention data (studies of things that reduce the risk of ever getting breast cancer) because there weren't any studies on what you could do to reduce recurrence or improve survival. Now, we have studies showing that lifestyle changes improve prognosis. I will review the evidence-based recommendations that breast cancer survivors can choose from in creating their own survivorship strategies.

Exercise 3 to 5 Hours Weekly

Exercise holds the greatest promise to those who wish to make their own impact on breast cancer prognosis. The Women's Healthy Eating and Living (WHEL) study reported a 50% greater chance of survival in those who did the equivalent of 30 minutes of exercise 6 days weekly, regardless of obesity.[1] The amount does matter. The Nurses' Health Study showed that women who did 3 to 5 hours of weekly exercise were 30% more likely to survive compared with those who did only 1 to 3 hours.[2] In addition, simply increasing the amount of exercise after treatment increases survival by 45%, while reducing posttreatment activity had a 4-fold higher risk of mortality (death).[3] In study after study, moderately strenuous, regular physical activity has been found to improve breast cancer prognosis. However, the vast majority of women treated for breast cancer do not meet the recommended guidelines. Only 34% of survivors exercised 3 hours weekly before diagnosis and only 21% report doing so when asked 10 years after diagnosis.[4] Hopefully, we can inspire more and more survivors to make physical fitness their number one health-related goal.

Drink 3 to 10 Cups of Green and White Tea Daily

Another powerful tool to reduce the risk of recurrence of breast cancer is to drink high-quality green and white tea or take standardized green tea extract in capsule form. A 1998 study found that drinking 4 or fewer cups of green tea daily resulted in a 24.3% recurrence rate among early-stage (I–III) breast cancer survivors. Those who drank 5 or more reduced their risk of recurrence to 16.7%.[5] This was the first study to show that more is better. A 2001 Japanese study reported that early-stage survivors who drank an average of 5, but at least 3, cups of green tea daily had a 31% reduced risk of recurrence compared with those who didn't drink any.[6] Systemic reviews and meta-analyses in 2005 and 2010 affirmed the results of the earlier studies.[7,8]

The type and quality of tea makes a difference, however. Green and white tea (*Camellia sinensis)* contain the most cancer-fighting flavonoids, such as polyphenol catechins. This includes the powerful epigallocatechin-3-gallate (EGCG). According to the USDA, the amount of EGCG in green tea varies greatly. Low-quality teas have been found to contain as little as 2.31mg/100 ml of tea, while higher, quality types

contain up to 200 mg/100 ml of tea.[9] Among tea industry experts, it is thought that the freshest loose-leaf teas are higher quality than the dust found in many conventional tea bags. Products with the best quality pluck, processing, and storage will yield the strongest cancer-fighting constituents.

Green tea contains approximately 25 to 40 mg caffeine per cup compared with less than 20 mg in white tea.[10] Consuming enough green tea to get the health benefits (3–10 cups daily) may involve ingesting more caffeine than some people can handle without side effects. A study comparing green and white tea for total catechin content (TTC) and total antioxidant capacity (TAC) found that the TTC of white tea ranged from 14 to 369 mg/g dry plant material compared with green tea, ranging from 21 to 228 mg/g. It also found that while certain white teas had comparable TTC, some had lower antioxidant capacity. The study concluded that "the results suggest certain green and white tea types have comparable levels of catechins with potential health promoting qualities."[11]

If drinking green tea doesn't appeal at all, you can purchase standardized green tea extract (GTE) in capsule form. The average 300 mg capsule (standardized to 80% catechins of which 45% is EGCG) yields 135 mg of EGCG per capsule, equivalent to 3 cups of green tea daily.[12] Most health-care practitioners recommend 1 to 3 capsules daily for better breast cancer outcome, depending on how many cups of green tea one drinks. The maximum tolerated dose of EGCG is nearly three times this amount (600 mg twice daily over a 6-month study period). Side effects at these very high doses define the dose-limiting toxicity and include rectal bleeding, weight gain, indigestion, insomnia, and liver function abnormality.[13] One would have to consume 25 cups of green tea daily to reach this level of toxicity. It should also be noted that green tea has blood-thinning properties. Consult your physician about reducing intake prior to surgery and be monitored regularly if on Coumadin or with bleeding disorders.

Eat a Diet High in Vegetables, Fruit, Fiber, and Soy and Low in Saturated Fat

Healthful Diet in General

The research on using therapeutic dietary recommendations is conflicting and often confusing for patients and practitioners. As a naturopathic doctor, I generally recommend individualized nutritional plans. In designing a plan, we can consider this information from breast cancer outcome studies and personalize it from there. Several studies have looked at the association between eating a "more healthful diet" in general after breast cancer diagnosis, and breast cancer recurrence, disease-free survival, and all-cause mortality. The problem is that studies define "healthful" differently.

In 2013, the *British Journal Cancer* reported that increasing "healthy" dietary pattern (vegetables, fruits, vegetable oil, and soups) compared with "unhealthy" (red meat, processed meat, and deep-frying) reduced the risk of overall mortality (26%) but not breast–cancer specific mortality. Breast cancer recurrence was reduced by 29% in stage I–IIIA patients eating the "healthy" diet.[14]

The Healthy Eating and Living Trial (HEAL) found that African American and Hispanic participants who had early-stage breast cancer and ate a "healthier" diet (less calories, added sugar, alcohol, and saturated fat) had a 60% lower risk of all-cause mortality and 88% lower risk of breast–cancer related mortality.[15]

There was a positive association between healthful diet and overall survival in a study measuring the role of fiber, fat, vegetable, and fruit intake among 516 postmenopausal breast cancer survivors (average 80 months postdiagnosis). They found that participants who ate the fewest dietary calories from fat, compared with the most, have a 3-fold improved chance of survival. They also reported reduced risk of death among participants who ate the highest amount of the following compared with the lowest: fiber (48% higher survival rate), vegetables (57%), and fruit (63%). In addition, other nutrients including folate, vitamin C, and carotenoid intake were also significantly associated with reduced mortality. These results suggest that postmenopausal women diagnosed with breast cancer who reduce dietary fat and increase nutrient intake associated with a plant-based, high-fiber diet improve their overall survival after breast cancer diagnosis.[16]

Eat More Fruits and Vegetables

Many studies, with thousands of participants, have found an association between breast cancer recurrence, breast–cancer specific, mortality and overall mortality among those who increased postdiagnosis vegetable and fruit consumption.

The WHEL study set out to determine the effect of a diet very high in vegetables, fruits, and fiber, and low in fat on risk of recurrence and likelihood of survival in women aged 18 to 70 years diagnosed with early-stage (I–IIIC) breast cancer.

The participants were given the following specific daily dietary goals: 5 servings of vegetables, 16 ounces of vegetable juice or vegetable equivalents, 3 fruit servings, 30 grams of fiber, and 15% to 20% energy intake from fat compared with a control group given handouts suggesting that they consume 5 fruit and vegetable servings daily, >20 g fiber, and less than 30% of calories from fat. The authors found that the study group substantially increased their vegetable and fruit intakes and that plasma carotenoid concentration increased accordingly.[17]

The authors concluded that higher exposure to carotenoids, indicative of greater fruit and vegetable consumption, was associated with greater likelihood of breast–cancer free survival but not with fewer second

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breast cancer events or mortality.[18] A 2005 study, however, did find that having a higher plasma carotenoid concentration was significantly associated with reduced risk for a new breast cancer ($p < 0.05$).[19]

The survival benefits of eating fruit in general had been previously established by Ingram, who followed 103 survivors for 81 months, reporting that intake of more fruit in general affords a survival benefit. Overall, there were 12 deaths in the group who ate the lowest amount of fruit, 5 in the moderate group, and only 3 in the group who ate the most fruit (oranges, melon, apple, banana, berries, grapes, and dried fruit.)[20]

In a group of WHEL trial participants taking tamoxifen, women who ate the most servings of cruciferous vegetables daily had a 52% lower recurrence rate than those who ate the fewest servings.[21] However, there was no association between cruciferous vegetable intake and breast cancer outcomes, even among tamoxifen users, when reviewing the data collected by the After Breast Cancer Pooling Project of 11,390 US and Chinese survivors from 1990 to 2006.[22]

Eat More Soy Foods

The consumption of soy foods after being diagnosed with breast cancer

Table 1: Lifestyle Strategies For Reducing Recurrence and Increasing Survival of Breast Cancer

Action Step	Study Benefit	Citation
Exercise 3–5 hours a week at a moderate pace or at least more than you did before diagnosis.	There is a 50% greater chance of survival in those who did the equivalent of 30 minutes of exercise six days weekly, regardless of obesity.	WHEL Study: Pierce JP, Stefanick ML, Flatt SW, et al. Greater survival after breast cancer in physically active women with high vegetable-fruit intake regardless of obesity. *J Clin Oncol.* 2007;25(17):2345–2351.
Drink at least three cups of green or white tea daily or take 300–600 mg capsules of standardized green tea extract.	Early-stage survivors who drank an average of 5 cups of green tea daily had a 31% reduced risk of recurrence.	Inoue M, Tajima K, Mizutani M, et al. Regular consumption of green tea and the risk of breast cancer recurrence: follow-up study from the Hospital-based Epidemiologic Research Program at Aichi Cancer Center (HERPACC) Japan. *Cancer Lett.* 2001;167(2):175–182.
Eat a "healthful diet" (defined differently in each study but consistently includes reduced dietary fat and increased fiber, vegetables, and fruit).	Postmenopausal women diagnosed with breast cancer who reduced dietary fat and increased fiber and a nutrient intake associated with a plant-based, high-fiber diet improved overall survival after breast cancer diagnosis.	McEligot, AJ, Largetn J, Ziogas A, et al. Dietary fat, fiber, vegetable, and micronutrients are associated with overall survival in postmenopausal women diagnosed with breast cancer. *Nutr Cancer.* 2006;55(2):132–40.
Eat 5 servings of vegetables, 16 ounces of vegetable juice or vegetable equivalents, and 3 fruit servings daily.	Carotenoid content (CC) measures veggie/fruit intake. Those with a higher cc had a greater likelihood of breast-cancer-free survival. Another study found found CC significantly associated with reduced risk for a new breast cancer.	Pierce JP, Natarajan L, Caan BJ, et al. Influence of a diet very high in vegetables, fruit, and fiber and low in fat on prognosis following treatment for breast cancer: the Women's Healthy Eating and Living (WHEL) study. *JAMA.* 2007;298:289–298. Rock, CL, Flatt, SW, Natarajan L, et al. Plasma carotenoids and recurrence-free survival in women with a history of breast cancer. *J Clin Oncol.* 2005;23(7):6631–6638.
Eat 1 daily serving of (preferably organic) soy foods.	Eating more soy foods is associated with lower risk of breast cancer recurrence (15%–35%) and reduced all-cause mortality (15%–30%).	Chi F, Wu R, Zeng YC, et al. Post-diagnosis soy food intake and breast cancer survival: a meta-analysis of cohort studies. *Asian Pac J Cancer Prev.* 2013;14(4):2407–2412. Guha N, Kwan ML, Quesenberry CP Jr, et al. Soy isoflavones and risk of cancer recurrence in a cohort of breast cancer survivors: the Life After Cancer Epidemiology study. *Breast Cancer Res. Treat.*2009;118(2):395–405.
Drink fewer than 3 alcoholic beverages weekly.	Survivors who consumed 3 to 4 alcoholic beverages weekly had a 1.3-fold increased risk of recurrence and 1.5-fold if higher risk of mortality if they were obese. The results of different studies vary, however.	Kwan ML, Kushi LH, Weltzien E, et al. Alcohol consumption and breast cancer recurrence and survival among women with early-stage breast cancer: the life after cancer epidemiology study. *J Clin Oncol.* 2010;28(29):4410–4416.
Optimize your body mass index, reduce body fat and/or waist:hip ratio.	Survivors who had a body mass index (BMI) of less than 25 or a waist-hip ratio of less than or equal to 0.85 were 38% more likely to be survivors than those whose BMI was greater than 30 or who had a waist:hip ratio of <0.80.	Dal Maso L, Zuchetto A, Talamini R, et al. Effect of obesity and other lifestyle factors on mortality in women with breast cancer. *Int J Cancer.* 2008;123(9):2188–2194. Lace Trial; 2009.

was highly controversial for years. Finally, in the 2009, the issue was clarified when breast cancer survivors themselves were studied. Eating more soy foods is associated with lowering the risk of breast cancer recurrence and all-cause mortality. [23]

In 2009, two cohort population studies confirmed the safety and benefits of soy consumption among breast cancer survivors. The Shanghai Breast Cancer Survival Study followed women aged 20 to 75 for nearly 4 years. The women who ate the most soy isoflavones (>6 mg/day) had nearly 30% reduced risk of mortality and 32% lower risk of recurrence than those who ate the fewest (<2 mg/day).[24] According to the USDA, there are between 17 to 33 mg of isoflavones per ½ cup tofu and between 3 to 10 mg per cup of soymilk.[25] The results were independent of hormone receptor and menopausal status. The benefit of consuming soy foods was nearly the same as that of taking tamoxifen, and doing the two together afforded no further benefit than either alone.[26]

Also published in 2009, the Life After Cancer Epidemiology (LACE) study, of nearly 2000 breast cancer survivors, reported on the daily consumption of soy isoflavones such as daidzein. It reported an inverse relationship between highest daidzein consumption (9.6 mg/day) and risk of breast cancer recurrence in postmenopausal women. There was benefit even at 1.5 mg/day of daidzein consumption. Among those using tamoxifen, the risk reduction was nearly 60% lower among those who consumed the most vs. least daidzein.[27] This relationship was not seen in a later study.[28]

Finally, a meta-analysis of soy studies published in 2013, combining data from five cohort studies, found that soy food intake after diagnosis was associated with reduced mortality by 15% and recurrence by 21% regardless of hormone receptor or menopausal status. In comparing highest vs. lowest dose of isoflavones, soy food intake after diagnosis was associated with a 16% reduced mortality and a 26% reduced risk of recurrence.[29]

It should be noted that soy consumption among those with HER2-positive breast cancer remains controversial, as a result of a Korean study (2012) that reported high intake of soy isoflavones increased the risk of cancer recurrence in HER2-positive breast cancer patients.[30]

Drink Fewer than 3 Alcoholic Beverages Weekly

Enjoying a couple of drinks a week does not increase or decrease the risk of recurrence of breast cancer. However, drinking more appears to. For example, survivors who consumed 3 to 4 alcoholic beverages weekly had a 1.3-fold increased risk of recurrence. That is 130 times higher risk than in those who drank fewer than 3 alcoholic beverages weekly. In addition, survivors who were overweight or obese and who had 3 to 4 drinks weekly had a 1.5 times higher risk of mortality.[31] Other studies have found no relationship to survival.[32] Some, however, found a dose-dependent relationship. In a 2013 meta-analysis, including 25 cohort studies, only alcohol consumption of greater than 20 g/day was associated with higher risk of mortality but not recurrence.[33] (There are 10 grams of alcohol in a standard drink.) It has been reported that 18% of breast cancer survivors have more than 1 drink per day.[34] Another study found that 58% of women previously diagnosed with breast cancer drink an average of 4 alcoholic beverages weekly – an amount that resulted in a 19% higher risk of recurrence among postmenopausal survivors.[35] Other studies demonstrated increased risk of breast cancer recurrence associated with premenopausal but not postmenopausal status.[36] To be on the safe side, drinking fewer than 3 alcoholic beverages weekly is advised.

Reverse Obesity, Reduce Body Fat, and Optimize BMI

Losing weight and getting in shape may be the most difficult of the recommendations to achieve. The benefits of finding a successful long-term strategy for optimizing body mass index are great. An Italian study found that women who had previously been treated for breast cancer and who had a body mass index (BMI) of less than 25 or a waist:hip ratio of less than or equal to 0.85 were 38% more likely to be survivors than those whose BMI was greater than 30 or who had a waist:hip ratio of <0.80.[37] That means that a woman who is 5 feet 5 inches tall should reach a goal weight of less than 143 pounds. Unfortunately, gaining weight after diagnosis is common among survivors and is associated with increased recurrence and mortality.[38] Every 11 pounds of weight gain is associated with 13% increase in breast cancer mortality.[39] Achieving optimal body weight and reducing body fat and waist:hip ratio are not easy for most women and often require the guidance and support of professional trainers and health-care practitioners. The benefits are very real. If this seems daunting, consider doing all the other recommendations first. Eating more healthfully, increasing activity, and drinking more green tea and little alcohol are a good combination that may result in optimal body mass index and level of fitness.

Conclusion

So, the answer to the question "what now?" is to make at least one positive choice toward posttreatment self-care. It is unlikely that you will be able to do them all. Be kind to yourself and create realistic goals that will be long lasting. If these healthy survivorship strategies seem too much to achieve, ask a licensed naturopathic doctor to help you to help yourself. If someone you care about has had breast cancer, let her

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know this empowering information. If you are a practitioner, make this article and chart (Table 1) into a handout for patients. This information is free and easy to distribute, so tweet, post, or shout from the rafters, "Take control of your survivorship, sister!"

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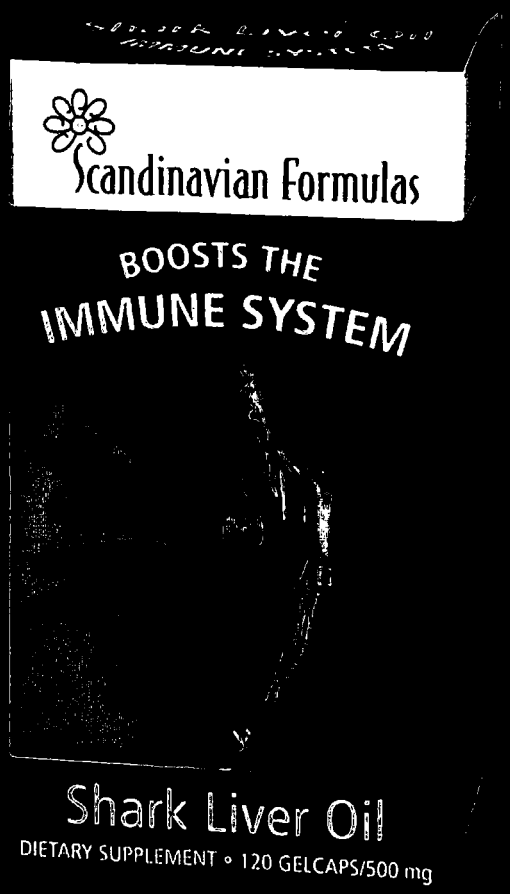

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Anemia in Cancer: Assessment, Management, and Naturopathic Considerations

by Stacy Dunn, ND, MSOM, FABNO

Introduction

Anemia is a common finding in cancer patients, occurring in >40% of patients with solid tumors and in >70% of patients with hematological malignancies.[1] In patients receiving chemotherapy, the incidence of anemia is even higher.

Consequences of anemia can be profound, affecting both quality of life and survival. Impaired tissue oxygenation leads to symptoms such as fatigue, dyspnea, palpitations, and dizziness. Compromised oxygen delivery also influences tumor behavior, inducing changes in genetic expression that can increase tumor aggressiveness, promote angiogenesis, decrease sensitivity to chemotherapy and/or radiation, and decrease survival.[2,3]

Evaluating anemia in cancer patients is challenging. The etiology is often multifactorial and may be attributed to the malignancy itself, cytotoxic treatments, and underlying comorbidities. Most commonly, anemia in cancer is due to the production of inflammatory cytokines and/or the effects of myelosuppressive chemotherapy. Correctly identifying the source(s) of anemia is essential for appropriate treatment.

Pathophysiology

Cancer-Associated Anemia

Inflammatory cytokines such as interleukin-1 (IL-1), interleukin-6 (IL-6), and tumor necrosis factor (TNF-α) play a major role in the pathophysiology of anemia in cancer, also known as anemia of chronic disease (ACD).[4] Inflammatory cytokines induce changes in iron homeostasis and suppress production of erythropoietin (EPO), leading to a reduction in red blood cell production in the bone marrow.[5] Erythrophagocytosis induced by inflammatory cytokines may also contribute to ACD.[6]

The identification of hepcidin has enabled a better understanding of the relationship between iron homeostasis and anemia of chronic disease.[7] Hepcidin is produced by hepatocytes and plays a central role in the regulation of iron balance and transport. In cancer and other chronic inflammatory conditions, IL-6 induces hepcidin production, resulting in inhibited iron absorption by duodenal enterocytes and the blocking of iron release from macrophages and hepatocytes.[8] In addition, IL-1 and TNF-α induce ferritin transcription, which increases iron storage in the reticuloendothelial system. The combined effect results in reduced iron availability for erythropoiesis, creating a "functional iron deficiency."[9]

Under normal physiological conditions, EPO levels vary inversely with hematocrit. Hypoxia stimulates EPO release, which stimulates bone marrow erythrocyte production. However, in ACD, the EPO response is thought to be blunted by IL-1 and TNF-α, leading to a relative decrease in EPO production.[10]

Table 1: Laboratory Differentiation of Anemia of Chronic Disease versus Iron Deficiency Anemia

Biomarker	ACD	IDA	ACD + IDA
Serum iron	*Low*	*Low*	*Low*
Transferrin (TIBC)	*Low*	*High*	*Low*
Transferrin saturation	*Low*	*Low*	*Low*
Ferritin	*High*	*Low*	*High or normal*
Inflammatory markers	*High*	*Negative*	*High*
sTFR/log ferritin ratio	*Low*	*High*	*High*
Serum hepcidin	*High*	*Low*	*High*

Chemotherapy-Associated Anemia

Chemotherapy is another common cause of anemia in cancer patients with cumulative effects over the course of treatment. Chemotherapy agents can induce anemia by impairing hematopoiesis as well as damaging mature hematopoietic cells.[11] Nephrotoxic chemotherapy agents, such as platinum-based regimens, can also lead to anemia through decreased erythropoietin production by the kidney.

Assessment

The National Cancer Institute categorizes anemia as follows.[12] An Hgb level below 11 g/dl warrants evaluation according to National Comprehensive Cancer Network (NCCN) guidelines:

- mild (grade 1): Hgb 10 g/dL – lower limit of normal
- moderate (grade 2): Hgb 8–9.9 g/dL
- severe (grade 3): Hgb 6.5–7.9 g/dL
- life-threatening (grade 4): Hgb < 6.5 g/dL

An initial assessment should include a complete blood count, peripheral blood smear, detailed history, and physical exam. The goal is to characterize the anemia and identify underlying comorbidities that can be corrected. Coagulation disorders, hemolysis, bleeding, renal insufficiency, and nutritional deficiencies should all be considered.

Differentiating between ACD and iron deficiency anemia (IDA) and identifying coexistence pose a challenge. However, an accurate diagnosis is necessary for appropriate and effective treatment. Bone marrow biopsy is considered gold standard for assessing iron stores, but due to invasiveness and cost, the test is not routinely performed. Additional measurements, such as serum transferrin receptor (sTFR) and sTFR/ferritin may help differentiate between ACD and IDA. Serum transferrin receptor is primarily expressed in cells that require iron, and in contrast to serum ferritin, levels are unaffected by inflammation.[13] The ratio of sTFR to the log of ferritin has been shown to increase the diagnostic accuracy; a ratio <1 indicates ACD, whereas ratios >2 suggests IDA. Measuring hepcidin levels would be another useful diagnostic tool, but assays aren't yet readily available.

In ACD the serum iron concentration, the transferrin saturation, and the transferrin level (TIBC) are all decreased. The serum ferritin concentration is usually elevated, but may not accurately reflect iron stores because ferritin is also an acute phase reactant. ACD may also be accompanied by an increase in inflammatory cytokines such as IL-6 and elevated inflammatory markers such as fibrinogen, erythrocyte sedimentation rate, and C-reactive protein.

IDA is characterized by low serum iron, low transferrin saturation, and elevated transferrin levels. A serum ferritin of less than 15 ng/ml is diagnostic for iron deficiency anemia.

Conventional Treatment

While definitive treatment for cancer-related anemia relies on eradication of the underlying malignancy, in many cases this is not possible. Current treatment options include transfusion of packed red blood cells and the use of erythropoiesis-stimulating agents (ESAs).

Transfusion of packed red blood cells (PRBC) provides the best option for patients requiring rapid correction of anemia, as it results in the quickest increase in hemoglobin levels.[14] Transfusion of 1 unit of packed red blood cells is estimated to increase the Hgb level by 1 g/dl in a normal-sized adult.[15] A number of studies have evaluated the impact of transfusion on survival and disease progression in cancer patients, with conflicting results. One study of 56 esophageal cancer patients, receiving chemoradiation therapy and PBRC, demonstrated an increase in overall survival. However, other evidence suggests that blood transfusions may promote cancer progression.[16]

Risks associated with transfusions include transfusion-related reactions, congestive heart failure, bacterial contamination, viral infections, and iron overload.[17] Improvements in donor screening have dramatically reduced the risk of infection. In addition, incidence of transfusion-related reactions has decreased considerably due to prestorage leukoreduction.[18] Iron overload occurs most frequently in patients with myelodysplastic syndrome, as they require frequent transfusions over a long period of time.[19]

ESAs, synthetic recombinant human erythropoietin, were initially used to treat anemia in patients with chronic renal failure. In cancer patients, treatment with ESAs has been shown to raise Hgb levels and reduce transfusion rates, but there are concerns over safety of ESAs in terms of mortality, disease progression, and risk of thromboembolism.[20]

In 2007, the FDA added a "black box" warning to the safety labeling of ESAs based on the results of 8 randomized studies showing a decrease in overall survival and/or decreased disease control with ESA usage in patients with advanced breast, cervical, head and neck, and non-small cell lung cancers.[21] All 8 trials, however, had an off-label target Hgb level of 12 g/dl. When a 2010 meta-analysis was done considering only patients with a target Hgb of <12 g/dl, no increase in mortality risk was found.[22]

The use of ESAs carries a significant risk of thromboembolism. The most recent Cochran meta-analysis of 91 controlled trials using ESAs to manage anemia in cancer patients demonstrated a significantly increased risk of thromboembolism in patients receiving ESAs.[23] Patients should be monitored for other risk factors for thromboembolism such as history of venous thromboembolism, heritable mutation, hypercoagulability, elevated platelet counts, recent surgery, hormonal agents, prolonged inactivity, steroids, and comorbidities

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such as hypertension.[24] Risks of death from thromboembolism should be weighed against possible benefit of ESA usage.

Naturopathic Considerations

Naturopathic medicine provides a safe and effective option to support cancer patients with anemia. Appropriate support relies on identifying the etiology of the anemia. If the underlying cause is inflammation, use botanicals and nutrients to control the inflammation. Consider lactoferrin, curcumin, boswellia, and omega-3 fatty acids for their ability to reduce inflammatory cytokines.[25-28]

If anemia is the result of myelosuppressive and/or nephrotoxic effects of chemotherapy, consider melatonin for its potential to help protect the bone marrow and the kidneys from the cytotoxic effects of chemotherapy.[29-31]

Assess and treat nutritional deficiencies such as iron, vitamin B12, and folic acid. If iron deficiency is suspected, confirm that it is not due to a functional deficiency prior to supplementation. Lactoferrin should also be considered for IDA. When given orally to patients with IDA, lactoferrin increased hemoglobin, serum iron, and ferritin.[32] Macrocytosis frequently occurs in those receiving antimetabolite chemotherapy agents. Testing for B12 and folic acid deficiency should be conducted prior to supplementation, as nutrient deficiency is rarely the cause. Folic acid supplementation is specifically contraindicated with many antimetabolite agents and so should be avoided.

Evaluate patients for known risk factors for cancer-associated anemia such as low-normal hemoglobin level, history of prior transfusion, previous radiotherapy, prior myelosuppressive chemotherapy, and comorbidities such as chronic inflammatory diseases. Those with higher risk require more aggressive intervention.

Conclusion

Given the prevalence and complications of anemia in cancer patients, it is important to understand the underlying etiology of anemia in cancer to order to provide the most effective treatment for individual patients.

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Beta-Blockers and Cancer: The Impact of Stress on Cancer

by Jacob Schor, ND, FABNO
www.DenverNaturopathic.com

Several studies have given us a greater understanding of how stress encourages cancer progression. A study by Botteri et al. published August 3, 2013, in the journal *Breast Cancer Research and Treatment* suggests that taking beta-blockers may have a beneficial effect in women with triple negative breast cancer. While these results in themselves are of great interest, especially to women with triple negative breast cancer, they have greater significance. They add weight to a theory proposed last January by Guillermo et al. in *Nature Communications* on the role of stress in cancer.[1]

The purpose of this review is not to convince you that cancer patients suffer from a β-blocker deficiency and must take these drugs. Rather it is to help further our understanding of the role that stress plays in cancer.

Let's hold off on Botteri's report for a moment and start with Guillermo's paper. It is a bit complicated, as it summarizes multiple studies. Earlier work had established that activation of β-adrenergic receptors on ovarian cancer cells turned on pro-survival pathways.[2-4] That is, stress hormones attach directly to ovarian cancer cells and make them harder to kill. Botteri's group examined stress and the risk of ovarian cancer progression via the activation of the Src pathway. For years both patients and forward-thinking doctors have believed that there is a link between stress and cancer progression but little evidence supported this feeling; certainly no clear mechanism of action had been identified. The Src pathway provides the biochemical explanation of how stress acts to push cancer's advance.

"Src is a non-receptor protein tyrosine kinase that transduces signals that are involved in the control of a variety of cellular processes such as proliferation, differentiation, motility, and adhesion. Src is normally maintained in an inactive state, but can be activated transiently during cellular events such as mitosis, or constitutively by abnormal events such as mutation ... Activation of Src occurs as a result of disruption of the negative regulatory processes that normally suppress Src activity, and understanding the various mechanisms behind Src activation has been a target of intense study."[5] In other words, this Src pathway when activated regulates many of the processes that allow cancer to grow. For cancer researchers, understanding this protein is high on their wish lists.

The first phase of Guillermo's study found that treating ovarian cancer cells in vitro with noradrenaline increased production of the proteins that encourage tumor cell growth. Ovarian cancer cells do not produce noradrenaline but they do have receptors that noradrenaline binds to. Exposing these cancer cells to amounts of noradrenaline similar to those found in ovarian tissues both under normal and stressed conditions showed that the noradrenaline levels during stress activated Src pathways that in turn caused a cascade of kinase pathways to be activated, including KIT, EGFR, ABL1, and IGF-1.

Src activation increased tumor cell invasiveness, migration, and proliferation.

This connection between stress, Src activation, and tumor progression was confirmed by using tumor-implanted mice. Stressing tumor-implanted mice was enough to activate Src.

Next, Guillermo's team demonstrated this connection between stress, Src activation, and ovarian cancer survival in humans. They looked at tumor tissue samples from 91 patients with invasive epithelial ovarian cancer and found a correlation between scores of psychological depression in the patients with Src activation in the tumors. Src levels were high in 88% of the 91 human ovarian tumor samples, and these elevations were associated with worse outcomes, as measured by shorter survival times. The more emotionally depressed the patients were as measured by psychological surveys, the higher their Src scores.

The authors took this research one step further. They already knew that β-blocker use would block stress activation of the Src pathway, so they compared use of β -blockers and the risk of death from cancer. Data were already available from the FDA's Adverse Event Reporting System that could be analyzed. In people using

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β-blockers, risk of death from any type of cancer was reduced by an average of 17% and risk of dying of ovarian or cervical cancer was reduced by almost 15%.

This wasn't the first paper to report as association between β-blocker use and improved outcomes in cancer patients. Paul Fitzgerald hypothesized that norepinephrine was an etiologic factor in some types of cancer back in 2009.[6] He argued that increased norepinephrine release in the body increased cancer occurrence.[7]

Over the last half-decade, a series of papers tell us that chronic use of β-blocking drugs is associated with lower recurrence and mortality of breast cancer or reduced progression and mortality of breast cancer and malignant melanoma.

In 2010 Powe reported that use of β-blockers was associated with a 57% reduced risk of metastasis and a 71% reduction in breast cancer mortality after 10 years.[8] In 2011, Ganze reported that use was associated with lower hazard of recurrence and cause-specific mortality.[9] In July 2011, Barron et al. reported that women taking propranolol prior to their BC diagnosis were significantly less likely to present with large or metastatic tumors. Interestingly, there was no benefit seen for atenolol use. This could certainly argue in favor of using propranolol over atenolol.[10] (Keep this in mind when looking at other studies that don't break down the data by type of β-blocker.) A study by Melhem-Bertrandt et al. reported β-blocker user is associated with improved relapse-free survival (RLS) in women with triple negative breast cancer.[11]

In October 2011, Lemeshow et al. reported a strong association between β-blocker use and reduced risk of death from malignant melanoma (HR for melanoma death was 0.87 and for all-cause mortality was 0.81).[12] De Giorgi also in 2011 reported that β-blocker use was associated with reduced progression in malignant melanoma, in this case what is called "thick melanoma" that is greater than 1 mm in depth. For each year of drug use there was a 36% risk reduction for progression.[13]

Guillermo et al.'s paper suggested a clear mechanism as to how stress helps cancer cells grow. Because this theory also suggests a benefit from using β-blockers, their work triggered an additional wave of studies in the last half year looking at β-blockers and cancer.

Botteri's paper, one of the more recent, looked for possible therapeutic effect of β-blockers in triple negative breast cancer patients. Triple negative breast cancer refers to cancer cells that test negative for estrogen and progesterone receptors (double-negative) and also do not over-express the Her-2-neu protein. These cancer types are relatively resistant to current forms of treatment.

Botteri's colleagues identified 800 postmenopausal women treated between 1997 and 2008 for early triple negative breast cancer. About 9% of these women were taking β-blockers at the time of diagnosis. Over the five years after diagnosis, nearly 28% of the women not taking β-blockers had their cancer recur or progress, while less than 14% of the women taking β-blocker did. In simple words, taking β-blockers seems to have reduced the risk of recurrence by half.

When the statisticians were done with the data, adjusting for all the other factors that might have influenced these patients' outcomes, the results were even better. Using β-blockers reduced risk of metastasis by 68% and risk of dying by 58%. (Adjusted HRs for metastases and for BC deaths were 0.32 [95% CI 0.12–0.90] and 0.42 [95% CI 0.18–0.97].)

The path of scientific research is rarely a straight line and while this study produced significant associations between this particular subset of breast cancers, not all data have been consistent.

Danish researchers reported in June that they could not find a benefit in using β-blockers or other blood pressure reducing drugs in breast cancer. Sørensen et al. analyzed data from 18,733 women diagnosed with nonmetastatic breast cancer and compared their 10-year-recurrence rate with the use of β-blockers, ACE inhibitors, and angiotensin receptor blockers. In the raw data, use of any β-blocker was associated with a 9% reduction in recurrence, but when the data was analyzed taking into account other risk factors, β-blocker use actually appeared to increase risk by about 30% (unadjusted hazard ratio [HR] = 0.91; and adjusted HR = 1.3). Two particular β-blocking drugs, metoprolol and sotalol, actually seemed to increase recurrence rates by 50% and 100% respectively (adjusted metoprolol HR = 1.5; adjusted sotalol HR = 2.0).[14]

So do we believe the Italian or the Danish data? Or can they both be true?

Perhaps we haven't been asking the right questions in these studies. In an August 7th discussion of this Nagaraja et al. from M.D. Anderson point out, "... all published studies so far are retrospective and most do not take into account the specific β-blocker used or address which is most likely to benefit cancer patients. The published epidemiological studies are correlative and have not examined the adrenergic receptor status of the tumors."[15]

Thus perhaps only specific β-blocker drugs will provide benefit in tumors that express the right β-receptors. Or it may simply be that β-blocker impact is easier to see in the "nastier" cancers; that is, in cancers with a worse prognosis and a more rapid progression.

Or it may be that benefit varies with when the drugs were used. A June 2014 paper by Cardwell et al. reports no benefit from β-blocker use after diagnosis with prostate cancer. Postdiagnostic β-blocker use was identified in 25% of 1184 prostate cancer-specific deaths and 26% of 3531 matched controls. There was little evidence ($p = 0.40$) of reduction in the risk of cancer-specific death

in β-blocker users compared with nonusers (OR=0.94).[16] The same researchers reported similar lack of benefit the year before in breast cancer. Just under 19% of 1435 women who died of breast cancer were using β-blockers after diagnosis while just over 19% of 5697 matched controls who died were also taking β-blockers, suggesting little evidence of benefit.[17,18]

Few of us are interested in prescribing β-blockers to our patients. What is important about these studies is that they affirm our intuitive belief that stress reduction will aid cancer patients. These studies also give us a rough estimate of how much impact stress reduction might have. (It may be that stress reduction just prior to and during chemo and radiation treatment may have the most profound impact.)

Now that the Src pathway has been identified as a potential target, we see papers that evaluate natural substances and drugs as to their cancer and Src inhibitory effects.[19] Recent reports range from telling us that *Naja naja* snake venom blocks breast cancer cell migration by preventing Src activation to discussing a plant flavonoid called isorhamnetin derived from a Mexican psychedelic plant and its possible role in treating colorectal cancer.[20,21]

We may soon be able to say that active stress reduction may have clearly measurable therapeutic benefit in cancer.

Yet at this point we cannot say this; there aren't enough data. There are certainly short-term studies suggesting that particular interventions will reduce stress levels or improve quality of life. For example, a study is underway in Japan treating patients with gynecologic cancers with massage.[22] Yet with only 8 massage sessions over a 2-month period it is unlikely that this study will generate the needed data on survival.

Beta-Blockers

A Danish study from April 2013 reported on 336 women who were randomized after breast cancer surgery and half were trained in the Mindfulness-Based Stress Reduction program (MBSR) for 8 weeks. At the end of 12 months, the "intervention had clinically meaningful, statistically significant effects on depression and anxiety."[23] The unasked question, though, was, did it change Src activation or, more important, change survival?

A 2010 study informs us that in a group of 162 breast cancer patients practicing qi gong several hours a week for 10 weeks was associated with improved quality of life, less fatigue, and lower C-reactive protein levels.[24]

A 2009 paper reported that practicing Transcendental Meditation improved various quality of life scores

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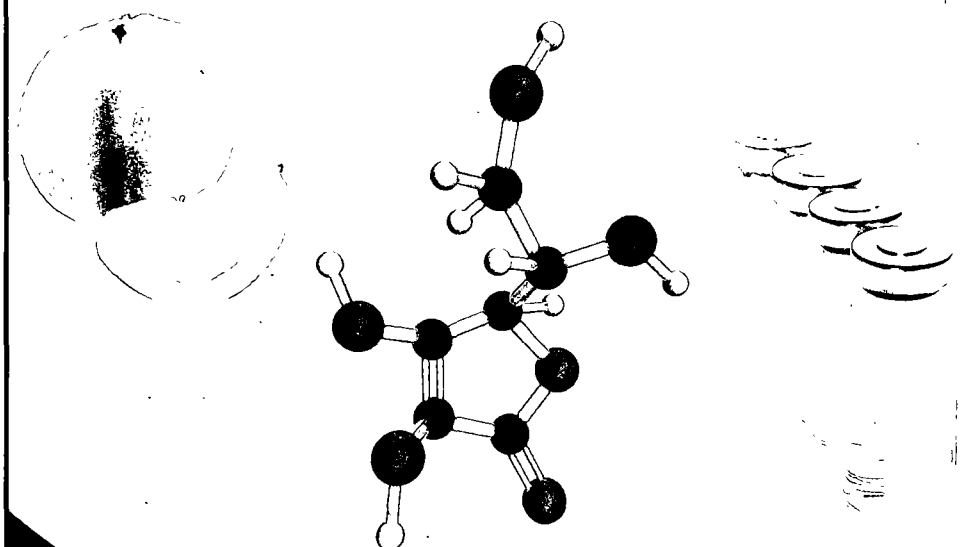

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in 230 women diagnosed with breast cancer. Again, they are not answering the questions we are interested in.[25]

In the future, measuring Src activity may have both a prognostic value and serve as a measure of benefit from stress reducing interventions. Yet not at this point in time. There is little published information on stress reduction and Src activation, only the assumption that it will help. Nor is this writer aware of human research on exercise and Src activation.

There is a kind of catch-22 with stress and cancer. Once someone has cancer, stress levels rise. Few patients will ever report that stress decreased post diagnosis.

Among a host of practical day-to-day worries, cancer survivors are plagued with the fear that their cancer will return. Not surprisingly, fear of cancer recurrence is common in survivors and is a major contributor to psychological stress.[26,27] An August 2013 paper that followed 1281 cancer patients assessing them at diagnosis and a year after treatment was completed. Those with moderate to high fear of their cancer's returning changed little over time: from 84.7% initially to 84.8% 12 months after rehabilitation was completed.[28]

Cancer in this way can become self-perpetuating process in that the diagnosis itself raises stress levels, which in turn increase risk of recurrence or progression. Breaking the cycle by decreasing stress's effect on the physiology is not about just feeling more comfortable and improving perceived quality of life; decreasing stress is about treating cancer. Seeking workable interventions to lower stress is important and may have lasting effects of the same magnitude as those prescribed by medical oncology.

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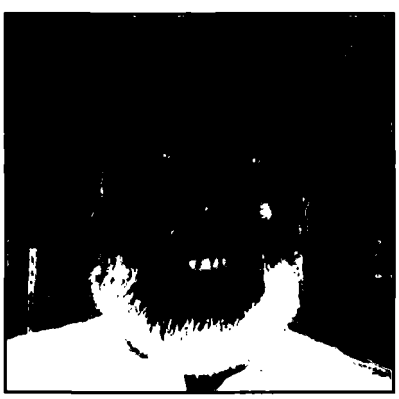

Jacob Schor, ND, FABNO, has practiced as a naturopathic physician in Denver, Colorado, with his wife, Rena Bloom, ND, since they graduated from National College of Naturopathic Medicine in 1991. He was humbled in 2008 when presented with the Vis Award by the American Association of Naturopathic Physicians (AANP). He has had the honor of serving the members of the Oncology Association of Naturopathic Physicians as a board member and currently as president. Dr. Schor began a term on the AANP's board of directors in January 2012. He is a frequent contributor to, and associate editor of, the *Natural Medicine Journal.*

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Inflammation and Breast Cancer: An Unwholesome Relationship

by Helayne Waldman, EdD, MS

An excerpt and update from the book *The Whole Food Guide for Breast Cancer Survivors*, by Helayne Waldman, EdD, MS, and Edward Bauman, PhD

We've known for quite some time that inflammation and cancer have shared some sort of functional relationship. In fact, it was in 1863 that a German pathologist named Rudolph Virchow first hypothesized that the origin of cancer was at sites of chronic inflammation. Now it seems that modern science has caught up with the observations of the 19th century. It wasn't easy.

It took 12 years and the creation of a highly sophisticated transgenic mouse for researchers to finally prove that inflammation in the breast is fundamental to the growth and progression of breast cancer. The researchers in this study specifically inactivated the NF-kappaB inflammatory pathway to test its effect on breast cancer – not an easy task, as this pathway is involved in several functions that actually helped keep the mice alive. They had to find a way to turn off inflammation in the breasts only. And, ingeniously, they did, paving the way to their discovery.

The protein NF-kappaB has attained prominence in recent years as it has surfaced as the central player in the relationship between inflammation and cancer. Scientists describe NF-kB as a "smoke sensor" that detects hazards such as free radicals and infectious agents. In reaction to these threats, NF-kB "turns on" genes that produce inflammation.

A noteworthy 2009 study also confirmed a link between chronic inflammation and breast cancer recurrence. Scientists at the Fred Hutchinson Cancer Research Center at the University of Washington noted that women with high levels of two markers of inflammation – C-reactive protein and serum amyloid A – were two to three times more likely to die early or have their cancer return than women with lower levels.

Understanding the need to keep a balance between the "pro-inflammatory" and "anti-inflammatory" forces at work in our bodies is critical, then, to an understanding of preventing recurrence.

Inflammation Enables Angiogenesis

Another important characteristic of chronic inflammation is its relationship to angiogenesis – the development of new blood vessels. As we learned earlier, the COX and LOX enzymes promote inflammation, and hormonelike chemicals from these enzymes play a major role in creating new blood vessels. While this is a natural and normal process, it's also a process that gets hijacked even by tumors too small to detect, to build a blood supply to feed their growing needs. Likewise, these new blood vessels transport nutrients and oxygen to the inflamed tissue by way of inflammatory cells. This process is a recipe for chronic inflammation, each process promoting the other.

On the flip side, research suggests that compounds that block inflammation also inhibit angiogenesis, so by inhibiting one, you are affecting both. We like that!

Factors That Influence Inflammation

A number of lifestyle factors play a role in contributing to chronic inflammation. Diet is one of its most important modulators, with foods having either "pro-inflammatory" or "anti-inflammatory" properties. Not surprisingly, packaged foods that are processed with a high sugar content, as well as trans fats, are among the most potent of pro-inflammatory foods. And the type of fat that you eat just might play the biggest role of all in determining levels of systemic inflammation, as we'll see shortly.

Oxidative Stress

Your body constantly interacts with oxygen as you breathe and your cells produce energy. Free radicals are unstable, highly reactive molecules that lose an electron as a result of this activity. Since electrons come in pairs, when molecules lose an electron, they "steal" electrons from other molecules. These molecules then "steal" electrons from other

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molecules, starting a dangerous chain reaction called free radical damage. In large amounts, free radicals damage cells indiscriminately.

If your body isn't able to stop the free radical chain reaction, oxidative stress follows, causing damage to cells, cell membranes, tissues, and organs. In an attempt to repair such damages, the body calls for an immune response, which in turn initiates inflammation. Chronic inflammation can likewise lead to free-radical generation. Therefore, one way to keep inflammation and oxidative stress under control is to eat a diet rich in antioxidants. Eight to 12 fruit and/or vegetable servings a day should do the trick.

Weight and Blood Sugar

Keeping your weight in check is crucial for preventing inflammation, as well as conditions associated with it and obesity, such as heart disease and diabetes. Research indicates that visceral fat (the fat located deep in the abdominal area) is more metabolically active than other types of fat, secreting large amounts of inflammatory cytokines. The good news? Maintaining a healthful weight greatly reduces and in some cases even eliminates inflammation.

Remember that the hormone insulin itself is an inflammatory agent. So, the lower you can keep your fasting glucose and insulin levels, the less you will have to worry about them as a source of unwanted inflammation.

Stress and Sleep Deprivation

In addition to diet, certain lifestyle choices may contribute to inflammation. According to Dr. Isaac Eliaz, who practices integrative medicine in Sebastopol, California, both stress and sleep deprivation can lead to inflammation through the elevation of the hormone cortisol. Chronic stress, Eliaz explains, leads to the overproduction of cortisol, the body's most abundant stress hormone. This rise disrupts normal hormonal function, raising blood sugar levels and contributing to the inflammatory cascade.

Excessive Exercise

Everyone feels better with regular exercise. It can improve physical fitness, enhance overall well-being, and may also strengthen the immune system. It's tempting to be impatient and ignore our bodies' protests when we are trying to reach a physical goal. But be careful! When combined with inadequate rest and other stresses, overexercise, sometimes called overtraining syndrome, can lead to an impaired immune system and inflammation. One theory behind what causes this chain reaction is that your overtaxed muscles and tissues trigger the release of pro-inflammatory cytokines – those proteins that act as messengers between the cells. When sufficient rest is allowed, pro-inflammatory cytokines can facilitate the healing process. That's why we often feel better resting after a long bike ride. And why it's best to alternate periods of exercise with periods of healing, recuperative rest.

Assessing Your Status

Other than some obvious signs – puffy gums, sore joints, chronic stuffiness – how can you tell if your inflammation levels are higher than they should be? Several tests can be useful here.

C-Reactive Protein

There is a simple blood test that measures levels of C-reactive protein (CRP), a powerful inflammatory marker. The production of C-reactive protein is an essential part of the inflammatory process, and the measurement of this substance reflects the level of inflammatory activity deep within the body. We believe that measuring inflammation with a high sensitivity C-reactive protein test is one of the most important steps that you can take if you have had cancer. If the results are elevated, above 1.0, then it's time to take action to bring levels down. You might want to keep running that test on a 3-month interval. If you don't have cancer but have risk factors, you may want to run the test annually as part of your regular physical exam.

Fibrinogen

An important contributor to blood clotting, fibrinogen levels rise in reaction to inflammation. For this reason, if inflammation levels are high, it may be wise to check fibrinogen levels as well. The Life Extension Foundation (www.lef.org) advises that optimal fibrinogen levels should range between 215 and 300 milligrams per deciliter (mg/dL) of blood. Bringing levels into normal range has the added benefit of keeping the blood flowing more smoothly, making it more difficult for metastases to develop.

Food Sensitivity Panel

If your inflammatory markers remain stubbornly high, consider the possibility of food allergies or sensitivities. Common allergens such as casein (from dairy) and gluten (from wheat) are known to spark an inflammatory cascade in sensitive individuals. So another measure to cool inflammation on a cellular level is to pay attention to foods that may cause headaches, digestive upset, or skin eruptions such as acne or eczema. Keep in mind that as we age, foods that may not have bothered us before, such as dairy and wheat, may trigger chronic low-grade inflammation. Even seemingly innocuous foods, when eaten repeatedly, can cause a sensitivity to develop. If you think you might have a food sensitivity, we recommend going on an elimination diet for 2 weeks to see how you feel. You might also consider doing a

continued on page 67 ➤

Albion builds a better chelated mineral

Our six-stage chelation process turns non-absorbable mineral forms into easily digested and absorbed nutrients.

Start with high quality raw materials

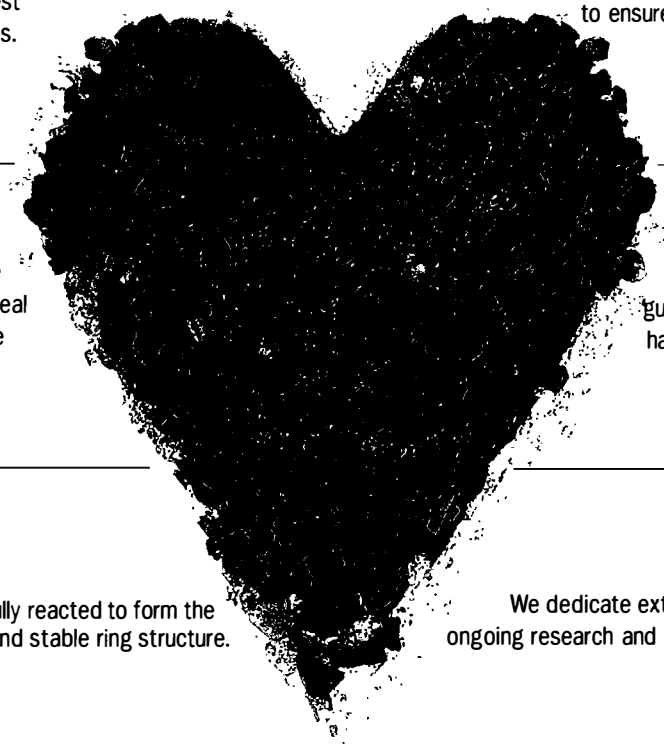
We use only the best food grade minerals.

Select quality organic ligands

Our organic glycine ligands have the ideal molecular structure and size.

Use patented chelation and bonding technology

Our minerals are fully reacted to form the most absorbable and stable ring structure.



We carefully control reaction conditions to ensure each mineral form is fully chelated.

Employ proven manufacturing processes

We use FT-IR to guarantee each batch has our signature ring chelation structure.

Validate structure using FT-IR

We dedicate extensive resources to ongoing research and educational efforts.

Continue research and development

Albion minerals support heart health.
Our Magnesium Bisglycinate Chelate and Potassium Glycinate Complex support healthy cardiovascular function through proper muscle contraction and nervous system communications. Our Ferrochel® iron bisglycinate chelates increase hemoglobin, which allows more oxygen to be delivered to body tissues per heart contraction, decreasing the heart's work load. These superior glycine chelated minerals provide essential support for healthy heart function.

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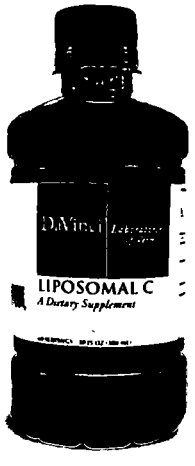

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➤ *continued from page 64*

food allergy panel available through your nutritionist or other holistic practitioner.

Thermography as an Assessment of Breast Inflammation

Breast thermography provides one of the best visual clues to the presence of inflammation in breast tissue. Since inflammation often accompanies precancerous changes to the breast, and since it always produces heat, measuring the temperature of the breasts can provide us with vital information.

Temperature measurement as a means of assessing health has its roots in ancient Greece, when Hippocrates covered his patients' bodies with a thin slurry of mud and observed temperature differences around diseased organs. With the advent of military infrared heat detection technology, specialized cameras were developed that could produce a detailed picture showing how the heat is distributed over the body. This picture could then be analyzed with computer software to determine regions of abnormal heat, suggesting injury or disease.

When it comes to breast health, here's how it works, according to Dr. Robert Kane, a board-certified clinical thermologist who maintains a busy thermal imaging interpretation practice in Redwood City, California. "Heat is produced in the breast by normal tissue metabolism and is carried to the surface by the blood supply," says Kane. "Our bodies naturally release heat to the environment in the form of infrared energy to maintain a normal body temperature of 98.6 deg F. This energy can be captured and visualized by a special infrared detector inside the thermography camera."

Normal breast tissue will produce a characteristic temperature pattern when visualized with thermography. On the other hand, fast-growing, abnormal breast tissue (cancer or precancerous) will always produce heat through its faster metabolism. This heat travels through the circulatory system to the surface of the skin, where it can be detected using a thermographic camera.

What's more, precancerous or cancerous tissue can dilate existing blood vessels and create its own blood supply via a process called neoangiogenesis, or new blood vessel formation. Both of these occurrences can translate into a temperature changes at the surface of the breast and provide a means of detection with the thermographic camera.

Thermography findings are less dependent on the *size* of the abnormal tissue and are more directly related with the degree of inflammation, growth rate of the tissue, and metabolic activity. The more inflamed, aggressive, and metabolically active the tissue, the more likely it will be seen on a thermogram, by a trained interpreter. Thus, a very small highly inflamed area is more likely to produce findings on a thermogram, while a larger less active region may potentially be missed.

Since highly inflamed precancerous growth represents the highest likelihood that cancer will develop, we consider thermography to be an excellent addition to standard breast imaging (mammography, MRI, or ultrasound) to help identify smaller lesions that are growing quickly and may appear between annual examinations. Perhaps even more importantly, it provides invaluable feedback if you're attempting to lower your risk of recurrence through lifestyle and nutrition, allowing you to see if your actions are effective.

Numerous studies have documented the presence of physiological changes consistent with breast cancer, prior to detection with mammography. Gautherie, for example, observed that 38% of the patients with "false positive" thermograms developed cancer within 4 years.[1] Stark further noted that 23% of the patients with "false positive" thermograms developed cancer within 10 years.[2] According to Gautherie, a high-risk thermogram is considered 10 times more significant than a first-order family history of breast cancer. Hobbins further states that a sustained high-risk thermogram carries with it a 22 times greater likelihood of developing breast cancer than a low-risk examination.[3]

In short, if thermography can be used to identify physiological signs that precede cancer and signal future risk, we can also use it to track the success of our anti-inflammatory strategies, adding a great deal to your peace of mind between conventional screenings.

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Helayne Waldman, EdD, MS, is a holistic nutrition practitioner who specializes in helping women through all phases of their breast cancer journey. She is especially interested in survivorship and helping to transform the posttreatment period into a proactive, thriving time in a cancer patient's life. Dr. Waldman sits on the board of the Annie Appleseed Project (for complementary cancer treatment); is an adjunct professor and instructor at Hawthorn University, Piedmont Public Schools and the Cancer Wellness Community; and speaks frequently on the topic of nutrition and breast cancer. Her book with Edward Bauman, *The Whole Food Guide for Breast Cancer Survivors* – a number 1 best-seller on Amazon.com – is available for sale at www.wholefoodguideforbreastcancer.com, as is a free chapter download.

A Complementary Approach to Breast Cancer: A Case with Multiple Liver Metastases is Free from Disease

by Professor Serge Jurasunas

Report presented at the 2nd annual International Conference on Oncology. 15–17 June 2012; Munich, Germany.

Abstract

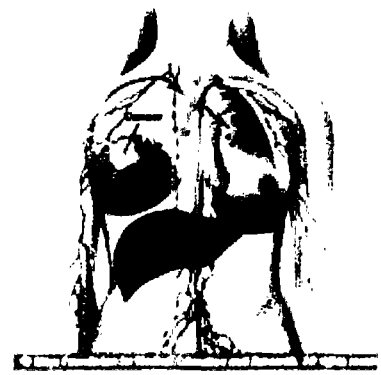
Breast cancer remains the number 1 killer among women, with over 250,000 patients yearly diagnosed in the US.[1] The incidence of this disease and the resulting deaths continue to increase in Western developing countries. Too many cases are diagnosed with a metastatic condition, while evidence has shown that primary cancer began releasing cancer cells into the circulation at an early stage. Chemotherapy (gold standard), palliative therapy, radiation, and surgery have not achieved the expected reduction in breast cancer mortality, and recurrence is still too high. 15% to 35% of breast cancer patients do not respond to chemotherapy but continue to receive treatment from which they do not benefit.

There is an urgent need to develop new effective ways to diagnose and treat cancer. New biomarker testing may not only be indicated in high-risk patients but may further serve as diagnostic, prognostic, and follow-up during treatment.[2] Complementary or integrative oncology is now attracting more interest among progressive medical doctors and oncologists. Many new lines of research have shown that integrative dietary agents have demonstrated efficacy in the prevention and treatment of cancer, as well as a support to chemotherapy agents, being safe and offering increased effectiveness.[3]

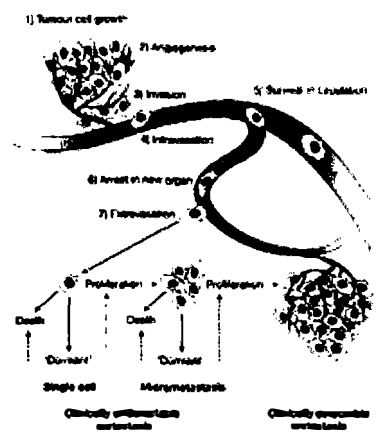
Therefore this new important concept now indicates that a tumor can no longer be viewed simply as an uncontrolled proliferative mass, but rather as a cellular community interacting with the microenvironment.[4] Thus a comprehensive treatment may more effectively target the disease according to this new concept, superseding the outmoded paradigm of using toxic therapy directed at killing the tumor.

Introduction: What is Cancer?

Cancer may be attributed to an accumulation of abnormal cells that divide without control; evade apoptosis; accumulate mutations; and can grow, invade tissues, and penetrate blood circulation. Cancer cell survival is totally dependent on defective P53, which is one of the main hallmarks of cancer.[5] More than 50% of all cancer harbors a P53 mutation or inactive P53 genetic expression.[6]



Immune defense is also associated with tumor growth and cancer cell invasion through blood circulation. Inhibition of apoptosis and immune suppression are two main keys responsible for tumor growth and cancer invasion. Indeed, the most dangerous aspect of breast cancer is its ability to spread to distant sites, while many cases are diagnosed only at the primary tumor, even with metastases to liver or bone.



A new emerging theory implicates inflammation being involved in cancer and links the tumor with the surrounding tissue that stimulates tumor growth and expansion.[7,8]

The tumor microenvironment is increasingly recognized as a major regulator of carcinogenesis

and has been implicated in both cancer progression and invasion.[9]

The inflammation process is boosted by chemokines and cytokines such as NF-kB and components of the extracellular matrix (ECM) such as macrophages, fibroblasts, and mast cells that may negatively influence the structure of ECM through the production of proteases, MMP2, and MMP14 that have shown elevated expression in situ, responding to invasive carcinoma transition (ICT). This process plays a key role in the destruction of the basement membrane. Macrophages respond to angiogenic signals from cancer cells to induce pro-angiogenic factors such as MM1–MMP12.[10]

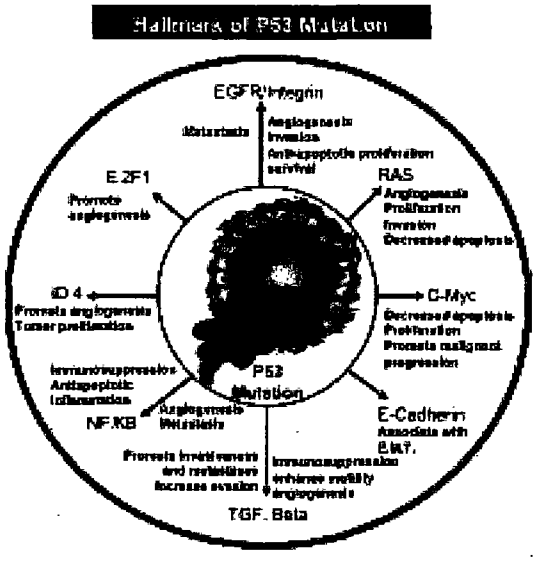
High oxidative stress may also damage cell membranes, including membrane polyunsaturated fatty acids, which disturbs the synthesis of prostaglandins, decreasing PGE1 and increasing PGE2 to excess, thereby promoting chronic inflammation.

PGE2 also has potent immunosuppressive effects, downregulating T-cell and B-cell proliferation and the cytotoxic activity of NK cells, including activation of MMP2–MMP9, a critical step for angiogenesis and the degradation of the ECM, an independent prognostic indicator of primary breast carcinoma.[11]

P53 Mutation

We know that the P53 tumor suppressor gene is mutated in approximately 50% to 70% of all human cancers. In fact, the research on new biomarkers in cancer leads to the study of P53.[12]

However, P53 mutation may not have major positive effects on tumor growth by itself. Recent data have shown that, in addition to losing transcriptional function, mutant P53 gains, independently of the loss of wild-type function, a new oncogenic function termed *gain-of-function* (GOF) that drives cell migration, invasion, and metastases.[13]



Mutant P53 may activate a network of specific transcription factors and other target genes such as E2F1, GOF, TGFB RAS, C-Myc, NF-kB, ID4, and E-cadherin that all contribute to accelerate tumor progression, angiogenesis, mobility, extraversion, and invasion.[13] For instance, less E-cadherin (which sticks cells together) is mostly associated with invasive breast cancer; one-half of the invasive ductal carcinomas that developed distant metastases have aberrant E-cadherin protein expression.[14] Transcription factors such TGF-beta, NF-kB, and GOF have strong immunosuppressive effects, which stimulate angiogenesis and inhibit apoptosis.[15,16]

Case Presentation

A 44-year-old Caucasian female was diagnosed in October 2011 with a cancer of the left breast, stage III with an extensive process of multiple metastases. About 30 lesions, up to 1.5 cm wide, were localized in the left lobe and in segment VIII and V of the right lobe of the liver. The tumor of 3 cm spread inflammation around neighboring tissues, making immediate surgery impossible. Many swollen lymph nodes were diagnosed on the left part of the neck, suggesting metastatic invasion.

The hospital delayed surgery for 2 months, while starting a chemotherapy regimen. The patient then came to my clinic in January 2012, in poor physical condition and feeling the adverse effects of chemotherapy such as fatigue, loss of appetite, nausea, and anxiety, yet confident about what I could do for her.

Complementary Diagnosis

Our total approach offers a whole view and more information about the disease and is a complement to the international TNM classification, including diagnostic, prognostic, and follow-up treatment.

(A) a complete molecular markers test

P53 Gene Expression – P53 protein level – BCL2 – BAX – Survivin – P21 – VGEF

In a stage III breast cancer with a tumor of 3 cm wide and metastases, usually the angiogenic mechanism is strongly active associated with overexpressed BCL2, increasing resistance to chemotherapy (www.sergejurasunas.com; Molecular Marker Tests).

(B) alternative blood diagnosis to regular blood parameters

1. live blood microscopy analysis
2. oxidative dried blood layer testing

These two tests were defined by Robert Bradford as the peripheral blood analysis test, which we have been using in our clinic for over 34 years.[17]

The live blood microscopy analysis offers a direct view of whole blood, wherein you can observe conditions such as blood viscosity, microclots, and microplaques in real time, including excess toxins from poor liver function and platelet aggregation. It monitors the effect of poor diet, oxidative stress, and an intoxicated colon: ➤

➤

- abnormally shaped red blood cells
- lipid plaques
- platelet aggregation
- bacterial invasion
- WBC activation
- denatured WBCs and immune cells
- RBC aggregation

The oxidative dried blood layer test is prepared from a number of dried blood layers collected on a clean microscope slide, and the examination of the blood coagulation is done under a microscope after a few minutes have passed, allowing the fresh blood to dry and permitting the observation of a number of informative characteristics:

- chronic vs. acute conditions
- inflammation
- oxidative stress level
- degenerative disease indication
- allergy
- psychological stress

Both tests are of paramount importance to monitor the patient's whole body condition, the stage of the disease, and the follow-up of the treatment.

Our Complementary Approach to Cancer

The aim of the treatment is to target cancer in every direction as soon possible so as to obtain a better result with chemotherapy.

- Detox.
- Boost immune system.
- Increase apoptosis by targeting the molecular markers and transcription factors.
- Reduce oxidative stress.
- Inhibit angiogenesis.
- Support the body with an appropriate nutrition.

The Treatment

1. Enzyme Yeast Cells Preparation

From the beginning, I explained that enzyme yeast cells are the bedrock of my method; among various therapeutic applications utilized, enzyme yeast cells increase detox, activate the immune system, and increase cellular respiration.[18,19]

Posology (dosage): 60 ml per day divided in 3 dosages mixed in a glass of carrot and red beet juice.

2. Biobran MGn3

A biological response modifier made from modified arabinoxylan from rice bran cultivated on shiitake enzyme with anticancer effects. Biobran is a strong immunomodulator, activating T-cells, B-cells, macrophages, and especially NK cells.[20,21]

Posology: one sachet of 1 g, 3 times per day after meals

3. Liquid Cartilage Extract (LCE)

Inhibition of the angiogenic factor plays a crucial role in tumor inhibition, and LCE made from liquid molecules extracted from shark cartilage in frozen form has strong antiangiogenic properties by targeting VEGF and MMPs and reduces solid tumor size; chemotherapy combined with VEGF inhibition has shown a much better result in killing cancer cells.[22] LCE is absolutely free of toxic adverse effects, unlike trastuzumab (Herceptin), associated with significant adverse reactions including mortality.

Posology: 1 vial of 14 ml each day before breakfast.

4. Oligopeptide

A short chain of amino acids that demonstrate efficiency to activate or reserve mutant P53.[23]

Posology: 4 tablets of 300 mg 3 times per day

5. Curcuma

To target NF-kB, BCL2, P53; increase apoptosis; inhibit angiogenesis.[24]

Posology: 1 capsule of 500 mg 3 times per day

6. Venom Snake Therapy – Anticancer

This is an old therapy used in Europe to treat many diseases, including cancer, depending on the composition and different type of snake venom.

Specific of breast cancer:
Horvi 33
Horvi 300
Horvitrigon
Horvi × 44

1 ampoule of 1ml i.m. of each per week

To increase efficiency, each ampoule can be mixed with some modern homeopathic remedies from Heel (Germany). Example: Glyoxal – Coenzyme Q10 – Ubichinon.

Additionally, in case of a solid tumor, 2 ampoules of Horvi 33 and Horvi 300 can be injected directly S.C. around tumor to achieve a better result.

Finally, a tailored, aggressive anticancer diet that emphasizes plenty of fresh vegetables and fruits, whole grains, and vegetable juices increases the detox process by combating constipation, as well as increasing liver and kidney function. Suggested vegetables: orange and yellow peppers, radish, leeks, tomatoes, red beet, cauliflower, broccoli, asparagus, eggplant, onion, garlic, and artichoke.[25,26]

Hot Bath Therapy (Super Growth Energy Stone)

The energy sand bath (ESB) is important during the course of the disease, since it not only stimulates detoxification of heavy metals, lipids, and toxins but also increases energy level and disrupts cancer cells. Take an ESB 3 or 4 times per week or even more. In case of a solid resistant tumor, together with the ESB the application of the ceramic sand balls (CSB) directly on the tumor decreases inflammation and contributes to reduction in tumor size.[27]

Initially the patient followed the treatment during 2 months, although the first molecular markers test was not done before she started the treatment, yet we will see a significant modification between the first and the second test.

Result of the 1st Molecular Marker Test: 2/27/2012

P53 gene expression: 200 units/ul of plasma
Reference range: 10–50 units

P53 normal protein: N.D.
Reference range: 0.10–1.00 units

P53 mutated protein: N.D.
Reference range: N.D. units

BCL2 gene expression: **8.000 units/ul of plasma**
Reference range: 10 units

BAX gene expression: 167 units/ul of plasma
Reference range: 10–100 units Ratio: 0.02

Survivin gene expression: **171 units/ul of plasma**

P21 gene expression: 139 units/ul of plasma Ratio: 0.8

VEGF gene expression: **2.353 units/ml of plasma**
Reference range: 10–100 units

Comment

It would appear that the tumor suppressor P53 was only active to some extent, not able to produce normal protein, but we had no mutation. It could be the result of the treatment. However, the current level of its activity was not enough to control the BCL2 gene expression, which was very high and in all probability a major factor leading to disease progression. The BCL2/BAX ratio was very low, 0.02 representing a bad prognosis. The survivin/P21 ratio was 0.8, which needed to be improved. VEGF was very high, an indication of a very strong angiogenic activity leading to the growth of the tumor. The BCL2/BAX ratio (0.02), high VEGF expression, and lack of P53 protein level to induce apoptosis had shown a high resistance by the cancer cells to chemotherapy agents. Survivin was active to some extent but partially controlled by P21, although low in comparison. The ratio survivin/P21 was 0.8

At the second and third consultation, the patient significantly improved in her physical condition and the swollen lymph nodes had disappeared. We reduced the size of the tumor, demonstrating that our complementary approach was well tolerated by the patient, increasing chemotherapy effectiveness. (Clinical experimentation such at the M.D. Anderson Clinic Center, University of Texas, has shown that a combination of anti-VEGF agents as LCE together with chemotherapy was more efficient that chemotherapy alone.)

Finally, after obtaining a positive result and tumor reduction, the patient was operated on for a total mastectomy in July 2012. The result of the cytology showed that 6 out of 8 ganglions isolated were infected with metastases. After surgery, the patient quickly recuperated, continued with our treatment, and subsequently took chemotherapy. She developed some anemia and low WBCs, which were quickly balanced by an addition of 2 injections of umbilical cord extract and extra red beet juice, together with some fermented chlorella rich in iron and vitamin C.

Result of the 2nd Molecular Marker Test – 5/25/2012

P53 gene expression: 427 units/ul of plasma
Reference range: 10–50 units

P53 normal protein: 0.4 units/ul of plasma
Reference range: 0.10–1.00 units

P53 mutated protein: N.D.
Reference range: N.D. units

BCL2 gene expression: **796 units/ul of plasma**
Reference range: 10 units

BAX gene expression: 1.543 units/ul of plasma
Reference range: 10–100 units Ratio: 0.1

Survivin gene expression: **900 units/ul of plasma**

P21 gene expression: 738 units/ul of plasma Ratio: 0.8

VEGF gene expression: N.D.
Reference range: 10–100 units

Comments

Gradually the number of lesions had decreased as shown by scan. By the middle of 2013, the patient was totally free from liver lesions, which is in favor of our treatment.

The patient continues our treatment, except for the snake venom injection, which was unnecessary. A third complete molecular markers test done in April 2013 showed excellent results.

P53 gene expression: 874 units/ul of plasma
Reference range: 10–50 units

P53 normal protein: N.D.
Reference range: 0.10–1.00 units

BCL2 gene expression: 260 units/ul of plasma
Reference range: 10 units

BAX gene expression: 202 units/ul of plasma
Reference range: 10–100 units Ratio: 0.8

Survivin gene expression: 101 units/ul of plasma

P21 gene expression: 738 units/ul of plasma
Ratio: more than 1

Comment

The tests had shown antitumor genetic activities associated with the treatment program. The oncogenes BCL2 and survivin are now under the control of the antitumor genes P53, BAX, and P21. P53 tumor suppression gene is active from 200 units/ul of plasma at the beginning to 874 units/ul of plasma, although it now produces only a trace of normal protein. The BCL2 gene expression has

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decreased substantially from 8.000 units/ul of plasma to 260 units, and BAX/BCL2 ratio increased from 0.1 to 0.8 in the same period of time. Survivin decreased from 900 units/ul of plasma to 101 units/ul of plasma. P21 gene expression increased to 176 units/ul of plasma with a ratio of more than 1. Further reduction of BCL2 and survivin are necessary to sustain the state of remission through bioactive dietary supplementation, and a fourth test should be done shortly and could be included in the complete article (to be available on my website).

Conclusion

In this selected case, we have clearly demonstrated that a complementary approach together with mainstream chemotherapy is quite efficient and safe, does not interfere with chemotherapy, increases the quality of life of the patient, and increases the chance of remission by increasing chemotherapy effectiveness. We demonstrated how proapoptotic and antiapoptotic genes can be targeted with bioactive dietary agents to contribute to increased apoptosis and cancer cell self-destruction. While molecular markers still remain in the field of research, we believe that by translating basic knowledge into clinical practice, we have made one very important step toward better diagnosis and improving cancer cure.

Among our many papers, "Integrative Cancer: How to Improve the Present Situation and Open New Doors in the Field of Cancer" is recommended and available on my website. A longer version of this article, with a full illustration of peripheral blood analysis before and after treatment, is also available there, as well as a paper on integrative cancer and more information on the theory of cancer and treatment: www.sergejurasunas.com.

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Serge Jurasunas is an internationally well-known doctor of naturopathy and alternative medicine with over 40 years of experience in the treatment of cancer. He is developing innovative therapies in cancer treatment and is a pioneer in live blood analysis, dried blood oxidative stress, and iridology.

Dr. Jurasunas is busy working with P53 tumor suppressor gene and other molecular markers testing related to cancer patients and patients with high risk of cancer.

For more information and to learn about cancer treatment, molecular markers, and clinical cases at Holiterapias Clinic, please visit www.sergejuraunas.com; e-mail: info@sergejurasunas.com; phone: +351 213471117.

To a Friend with Cancer: Thoughts About Supporting Recovery from Cancer with Diet and Breathing

by Judith Ames

In my recent studies, I found an intriguing thread of logic. Here are some ideas that might help you feel better in the short run and, dare we hope, help your body's overenthusiastic cells to normalize.

This thread of thought comes from various sources. Here is an overview of where we are headed. Three authors from the early 20th century observed a significant increase in the incidence of cancer in populations transitioning from their ancestral diets to a modern diet. Also in the early 20th century, the Warburg hypothesis described the shift in metabolism on a cellular level as a fundamental cause of cancer. Our next authors draw a connection between diet and metabolic change. But, you might ask, how could I make a convincing case with such dated literature? Since the 1950s, with the discovery of the double helix, there has been a shift in the world of research toward a molecular understanding of health, specifically of the genome and its relationship to illness. The powerful effects of dietary change are complex and difficult to isolate and quantify. They do not have the elegance of a molecular understanding which to our modern way of thinking equates with true science. However, as I continued to study, I discovered to my delight that there is currently a renewal of interest in a biochemical understanding of cancer. This new focus is seen in the world of integrative medicine, but also in more mainstream corridors: a 2012 book from a professor at Yale and a review of recent work at Harvard's teaching college both herald the return of popularity of the Warburg hypothesis with its focus on metabolism.

Anaerobic metabolism means metabolism without oxygen. Having studied briefly the work of Buteyko practitioners, who work with breathing as a tool for health, I wondered if low oxygen levels might further contribute to the shift towards anaerobic metabolism. Not many people are familiar with the work of Ukrainian doctor Konstantin Buteyko. The practitioners trained in his approach contend that there has been, in the last century, increasing hypoxia (low oxygen in cells) due to changes in the way that we breathe. A look at the literature reveals an interesting interplay between hypoxia, metabolism, and cancer. In order to speak persuasively about this thread of connection, the writing becomes necessarily dense, but hang in there: in the end we return to the simple lifestyle solutions of breathing and diet.

The Shift from Ancestral to Modern Diets

Let's start with a look at changes in diet. Dr. Joseph Romig was a physician who worked with both primitive and modernized Alaska natives at the turn of the last century. In his 36 years of contact, he never saw a case of cancer among natives eating their traditional foods. Among those who *had* modernized their diet, he saw cancer frequently. Vilhjalmur Stefansson was both physician and anthropologist and also worked in Alaska. In his book *Cancer, Disease of Civilization*, he cites missionary records indicating that the Inuits did not suffer from cancer prior to the changes in their diet upon contact with American civilization. As civilization reached them at the turn of the century, they began to experience greater incidences of many diseases, including cancer. A dentist and pioneer in the world of nutrition, Weston Price made similar observations among South Pacific Islanders and others whom he visited during his extensive travels. Although many aspects changed in these diets at that time of transition, the increasing consumption of refined carbohydrates was a significant factor and the one relevant to this train of thought.

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Differentiated or Dedifferentiated

Christian Allan, PhD, and Wolfgang Lutz, MD, authors of *Life Without Bread* (2000; we are getting considerably more modern here) take the position that the increase of carbohydrates in the diet might be an essential factor in the increase in cancer. They start at the very beginning with a description of the evolution of cells.

In the beginning of life on earth, simple cells had not evolved to have differing functions in a larger organism. They were un*differentiated*. These cells are called prokaryotic cells. Prokaryotic cells are defined by not having internal organelles (nuclei or mitochondria, among others) and by relying on an*aerobic* forms of metabolism. Not relying on oxygen for metabolism was a good plan in an early atmosphere low in oxygen. As life evolved into more complex organisms, cells became *differentiated* to perform specific functions. These more evolved cells had a new and much more efficient way of generating energy that worked in an atmosphere with more oxygen in it: their primary source of energy was an a*erobic* process in the mitochondria. Allan and Lutz contend that mitochondria evolved to digest fats, a more efficient fuel than sugar. These more evolved cells with mitochondria are called eukaryotic cells. Eukaryotic cells are defined as having internal organelles (including mitochondria and nuclei) depending on oxygen for their metabolism and performing specialized functions (i.e., they are differentiated).

Why do we care about this esoteric information? In the early 1950s, according to Allan and Lutz, the understanding of cancer could be summarized by the following statement: "Cancer cells are cells that have reverted to more primitive cells that behave less like eukaryotic cells and more like prokaryotic cells."

This concept of *differentiation* is, in fact, currently used in the diagnosis of cancer. The level of cellular differentiation is used as a measure of cancer progression. The grade given to a cancer is a measure of how differentiated a cell in a tumor is. A lack of differentiation is considered a hallmark of an aggressive cancer.

Aerobic or Anaerobic

The relationship between aerobic and anaerobic as a key factor in cancer development was addressed in the 1956 by Nobel laureate Otto Warburg. In his "The Origin of Cancer" (*Science* magazine), he observed that most cancer cells predominantly produce energy in an an*aerobic* process rather than the a*erobic* process used by most normal cells. Known as Warburg's hypothesis, this understanding guided research about cancer at that time. It is currently recognized that tumor cells typically have glycolytic (the anaerobic or nonoxidative process) rates that are up to 200 times higher than those of their normal tissues of origin. What could be the cause of this change of energy production in the mitochondria? Warburg speculates about an "insult to mitochondria."

Anaerobic Metabolism and Genetic Instability

In his 2012 book Cancer as a *Metabolic Disease*, Thomas Seyfreid, PhD, of Yale draws on and develops Warburg's hypothesis with a new interpretation of the role of genetics. Although inherited genes do influence the growth of cancer, current theory looks more closely at the genetic change that happens during the course of a lifetime. The genes of cells can be injured by a series of mutations which make it possible for cancer to grow: they transform a quiescent cell into a proliferating cell. According to Seyfried, anaerobic metabolism is what causes genome instability. In his words, "All hallmarks of cancer including the Warburg effect can be linked to impaired respiration and energy metabolism." He adds that one of the "downstream effects of damaged mitochondrial function" is the inability of a cell to maintain its differentiated state. Seyfried's perspective differs from his colleagues' in that he regards the n*ormal cell* to be basically proliferative, like the primitive bacteria that it evolved from, not naturally quiescent, as most other biologists believe.[1] In his view, cancer involves a return to a former state and a *loss of control* rather than the acquisition of new mutations that cause the cell to replicate wildly.

Does Cellular Fuel Influence Cellular Metabolism?

But let's get back to Warburg's question of how the mitochondria might have been insulted. The use of PET scans to detect cancer draws attention to the role of fuel in cancer cells. PET scans involve radiolabeling of tissues with the highest glucose uptake, such as the brain, the liver, and *most* cancers. Some would argue that the cause for the high requirement of glucose in cancer cells is rapid growth, but could that characteristic requirement give us clues about both cause and treatment of cancer?

Researcher Sophia Y. Lunt from the Massachusetts Institute of Technology observes that "increased glucose metabolism is selected for in proliferating cells throughout nature ... ranging from microbes to lymphocytes."[2]

The carbohydrate theory, proposed by Allan and Lutz, suggests that a diet too high in carbohydrates, leading to high levels of glucose in the blood, can cause cells to dedifferentiate. They suggest that the ratio of fat to glucose in a cell's fuel is reflected in the number of mitochondria in the cell. (Remember: a defining attribute of a dedifferentiated cell is the loss of mitochondria.) As an example of this, they mention the cells around the heart, which have more mitochondria than other cells. Studies indicate that the heart's preferred fuel is fat.[3]

The effects of various energy sources on cell metabolism were studied by researchers who studied "cell lines" in France.[4] A cell line is a group of human cells that have

been conditioned to grow outside of the body in a medium. These are primarily cancer cells, as their level of dedifferentiation facilitates their ability to live outside the body. The researchers found that the more primitive cells used less oxygen and more anaerobic fermentation for their energy production. They also found that in these same, less differentiated cells, the respiration (the aerobic process) improved in the absence of glucose, suggesting the hopeful thought that a reduction of glucose may be a way to redifferentiate cells.

Seyfried's work supports this hopeful theory, noting numerous studies indicating that dietary changes lower circulating glucose and significantly reduce growth and progression of various different cancers: mammary, brain, colon, lung, and prostate.[5]

While writing this article, I received an article about the thrust of research at Massachusetts General Hospital, Harvard's teaching hospital. Mostoslavsky, a researcher there, states: "It took us 80 years to bring the revealing observations of Otto Warburg back from obscurity. ... Now that we widely acknowledge cancer metabolism as a main player in cancer, it will take much less time to exploit metabolism in tackling this devastating disease." A promising beginning, but the article continues with a statement that shows a distrust of a dietary approach: "It is impossible to deprive a patient's cancer cells of glucose, because the liver will synthesize additional sugar if the blood stream has an insufficient supply." It is certainly true that there cannot be a complete removal of glucose from the bloodstream, nor would one wish to do so. However, the statement shows a lack of understanding of the enormous impact of refined foods and sugar consumption in the modern diet. The consumption of sugar has risen in the US to a currerit average of 161 pounds per person per year, and other modern foods are quickly converted to sugars. The consumption of these foods often results in high and erratic blood sugar levels, as reflected in the dramatic increase in diabetes, among other health problems.

Breathing, Metabolism, and Cancer

We have been exploring the causal relationship between cellular fuel, anaerobic metabolism, and cancer growth; now let's take a side trip and look at how breathing might fit into the equation.

Recovery Support

Might the shift to anaerobic metabolism also be triggered by low levels of oxygen in the cells, known as hypoxia? The literature offers an interesting answer to this question. A study from the University of Georgia states that oxygen levels can be a key trigger for growth of some kinds ➤

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of cancer. "As oxygen decreases, the cells switch to glycolysis [anaerobic metabolism] to produce their energy. Glycolysis is drastically less efficient way to obtain energy, and so the cancer sell must work even harder to obtain even more food, specifically glucose, to survive. When oxygen levels dip dangerously low, angiogenesis, or the process of creating new blood vessels, begins."[6] Angiogenesis is essential for cancer to grow.

Several studies indicate a relationship between hypoxia and the *rate of growth* of cancer. A study from Yale University School of Medicine found: "The physiological effects of hypoxia and the associated micro environmental inadequacies increase mutation rates, select for cells deficient in normal pathways of programmed cell death, and contribute to the development of an increasingly invasive, metastatic phenotype."[7] Another study states: "Tissue hypoxia has been regarded as a central factor for tumor aggressiveness and metastasis."[8] Yet another study says: "Clinical evidence shows that tumor hypoxia is an independent prognostic indicator of poor patient outcome. Hypoxic tumors have altered physiologic processes, including increased regions of angiogenesis, increased local invasion, increased distant metastasis and altered apoptotic programs."[9]

Then D. J. Chaplin, author of one of the studies cited above, mused about the origins of hypoxia, "Surprisingly little is known, however, about the natural history of such hypoxic cells."[10]

Why the Increase in Hypoxia?

The perspective of Buteyko practitioners offers one answer to the question of why there is an increase in hypoxia. In the 1930s, Buteyko observed rapid breathing rates among severely ill patients. While working with these patients, he developed a method to slow their breathing which proved helpful in their recovery from various illnesses. Practitioners of his technique take the counterintuitive position that hypoxia is caused by rapid breathing rates. In their view, increased modern respiration rates of 12 to 20 breaths per minute (in contrast to breath rates of 6 top 8 breaths per minute in the 1890s as noted in older textbooks) are the cause of increased levels of hypoxia. This understanding is affirmed by the research of L. Bernardi and coresearchers at the University of Pavia in Italy.[11]

For an explanation of Buteyko's understanding of breathing and hypoxia, here is an excerpt from an article that I wrote for the *Nutritional Therapist* newsletter[12]:

> There is a surprising paradox at the core of Buteyko. When more air is breathed than is required, the cells are actually deprived of oxygen. With more rapid breathing, the partial pressure of oxygen does not significantly increase, but the levels of carbon dioxide become substantially lower. In 1903, Danish scientist Christian Bohr observed that the partial pressure of carbon dioxide in the blood affects the ability of hemoglobin to carry and release oxygen (the Bohr Effect). A low partial pressure of carbon dioxide in the blood causes hemoglobin cells to hold more tightly to the oxygen they are carrying. A high pressure of carbon dioxide allows the hemoglobin to release the oxygen into the tissues of the body. This is, of course, the exact opposite of how a person who is short of breath feels. A person who is hyperventilating feels that they cannot get enough air. In reality they have about the same oxygenation in their arterial blood but too little carbon dioxide. This leads to Buteyko's counterintuitive advice that to slow one's breathing will actually improve oxygenation.

Oxygenation and Cancer

The website of a Buteyko practitioner describes experiences that his fellow practitioners in Russia and a number of Western countries have observed: "When the index of body oxygenation gets up to 35-40 s [a measure of how long someone can hold their breath], tumors start to disappear"[13]

He cites a study indicating that higher oxygenation increased effectiveness of cancer treatments.[14]

A study in the Ukraine found that slowing breathing increased longevity of breast cancer patients: "It was established that elimination of hyperventilation and hypocapnia [low CO2] in patients with breast cancer (T1-2N1M0) after the completion of the special treatment led to increased three-year survival rate, better quality of life."[15]

One study indicated that breathing rates of cancer patients are an independent predictor of their survival rates.[16]

Best of Naturopathic Medicine 2015

The *Townsend Letter* is pleased to announce our seventh Best of Naturopathic Medicine competition. Naturopathic students, faculty, researchers, and practitioners are invited to submit research papers, reviews, and articles. Selected papers will be published in our February/March 2015 issue. The author of the winning paper will be awarded $850. Runner-up papers will be published and authors will receive an honorarium.

Papers submitted should be 1500 to 3500 words and referenced. Author guidelines are available at the *Townsend Letter* website: www.townsendletter.com. Papers should be submitted digitally, preferably as a Microsoft Word document. Papers authored by multiple writers are acceptable; the lead author should be an ND graduate or candidate of an accredited four-year naturopathic school. Papers submitted for the competition may not be submitted to other publications or have previously been published. All entries must be submitted by October 31, 2014.

Send papers to editorial@townsendletter.com. The subject line should read: "Paper for Best of Naturopathic Medicine 2015."

How to Translate These Ideas into Practice?

These studies suggest that low oxygen might indeed contribute, along with food, to the ominous shift toward anaerobic metabolism, and proliferative growth. Let's bring it home now to look at how daily lifestyle habits – how we breathe and how we eat – might have an effect on quieting cancer.

How we breathe and how we eat have a profound effect on general health. In fact, the best way to determine if you are on the right track as you make lifestyle changes is to notice if you are feeling better in the day to day. In my mere four years of practice, I have found that fine-tuning carbohydrate ratios is a prime tool for helping clients with various health issues. More significantly, Alan Gaby, an MD who has been practicing nutritional medicine for 30 years, and Phillip Maffetone, a nutritionist who has worked with world-ranked endurance athletes for decades, have both found that coaching clients to fine-tune their carbohydrate ratios has been one of the most helpful changes that they, as practitioners, offer. Maffetone is a believer in the beneficial effects of saturated fat in the diet, an unpopular view in the last 60 years in the US. The success that his internationally ranked endurance athletes have achieved lends credibility to his words. He finds that training athletes to metabolize fats as a fuel improves their performance. In his words: "Aerobic muscle fibers burn fat for energy. ... As the body gets better at burning fat for energy, the aerobic function improves. ... Too many athletes don't burn sufficient amounts of fat and because of this never achieve their athletic potential." As not everyone's needs are the same, a process of dramatically reducing carbohydrates and then increasing them to find an individual's preferred ratios is a helpful approach on this process of discovery.

What an extraordinary simple tool: slowing one's breath, but according to Buteyko practitioners and others, to do so could offer significant support for normalizing cancer cells. Rapid breathing is both an expression and a perpetuator of the stress response. As with dietary improvements, one finds an immediate benefit from breath work: slowing the breath is wonderfully calming.

If I had cancer, I would seek to answer both the question of whether I was eating too many carbohydrates for my constitution and the question of whether I was breathing more rapidly than was optimal. There is an aspect of self empowerment in this discovery process and much that one can achieve on one's own, but having support from a nutritionist and/or a Buteyko practitioner could be helpful in determining how significant these two issues are for you as an individual and the best steps toward making changes in your habits.

At worst, I suggest that modifications in breathing patterns and diet can help a person feel more calm and healthy. At best, they could perhaps aid in turning cancerous cells toward a more normal pattern of behavior.

Notes

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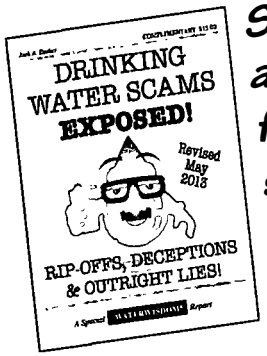

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Reactions to Sublingual Immunotherapy: An Analysis of a Group of Patients Who Developed Adverse Events over a Period of 5 Years

by Diego Saporta, MD

Introduction

Immunotherapy can be administered either by injections (subcutaneous injection immunotherapy; SCIT) or by the oral route (sublingual immunotherapy; SLIT). SLIT reactions (SRs), also called adverse events (AEs), are generally mild, but they appear to occur more frequently than reactions to SCIT. For example, SLIT AEs are reported with a variable rate of 9.6%, 20%, 23%, or even 78%, while systemic reactions after SCIT administration occur with a variable rate of 0.05 to 0.23 per 100 injections.[1-7]

In the last few years, several cases of severe reactions after SLIT administration have been reported wherein patients suffered asthma attacks, in some cases severe enough to require hospital care.[8-11] Despite these reports, SLIT safety is undisputed. While SCIT carries a risk of severe reactions, including mortality, there has not been a single report of mortality due to SLIT administration for the treatment of inhalant allergies.[12-16]

Usual reported AEs include labial or buccolingual edema, itching in oral cavity or other parts of the face, throat irritation, rhinoconjunctivitis, and gastrointestinal (GI) problems.[14-18] AE management usually involves dose adjustment or symptomatic treatment.[1,16,19,20] Treatment discontinuation because of SRs has been reported as less than 7% in several randomized controlled trials using oral tablets but as high as 31% despite symptomatic improvement in a clinical trial when using sublingual drops.[16,17] It has been reported that the majority of AEs occur during the induction phase and with low doses of allergen.[3,17,20]

Full article can be found on our website,

TownsendLetter.com

Methods

For a period of 5 years, records of any case where SLIT administration elicited any problems were collected. A brief analysis of those AEs is presented here (see below). Patients were adults or children of either sex with nasal allergy symptoms with or without asthma treated with SLIT according to our protocol.[21]

Results

Sixty-two patients were identified for analysis, 20 of them under 13 years old. AEs developed mainly during administration of the first treatment bottle. Two cases developed during the second bottle, 7 during the third bottle, and 6 during maintenance.

Reported Symptoms

Sixty two patients reported 39 symptoms. Table 1 shows those symptoms arranged according to their frequency of presentation for a total of 103 complaints.

Table 1: Reported Symptoms Arranged by Incidence

Rash skin	14	Cold sweat	1
Itchy skin	11	Diarrhea	1
Itchy throat	6	Dizziness	1
Stomach pain	6	Dry/chapped lips	1
Cough	5	Eczema	1
Tight chest	5	Feels weird	1
Headaches	4	Insomnia	1
Vomiting	4	Itchy lips	1
Itchy eyes	3	Lip tingling	1
Itchy face	3	Lips swollen	1
Nausea	3	Mood changes	1
Rash face	3	Nasal obstruction	1
Shortness of breath	3	Smell perversion	1
Throat tight	3	Sore throat	1
Swollen eyes	2	Throat burn	1
Tired	2	Throat dry	1
Taste	2	Tongue burn	1
Palpitations	2	Tongue tingling	1
Sneezing	2	Wheezing	1
Behavioral changes	1		

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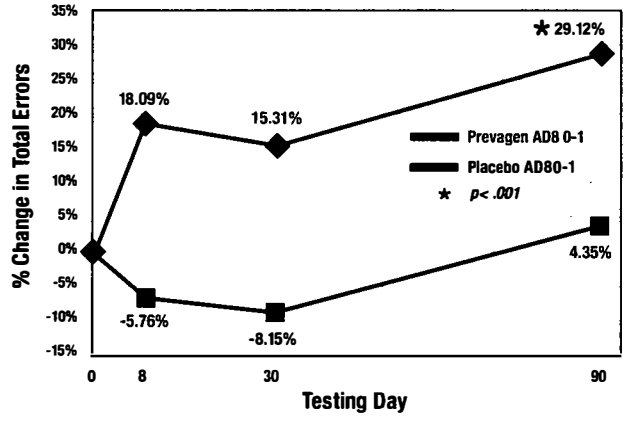

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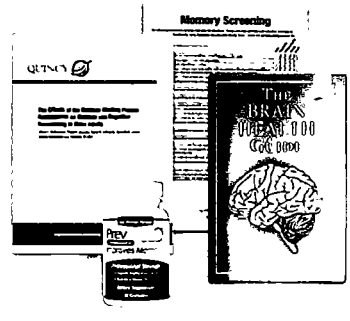

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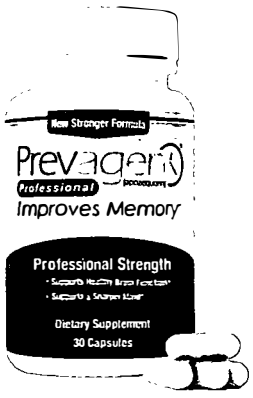

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NOTE: It is very important to use patients with significantly elevated lactic acid levels before doing this test or the test will only have marginal results. It is best to choose a severe diabetic, a patient with significant and ongoing weight problems, or a patient that has an infection with a lactic acid bacterium (Staph or Strep) and is not currently on antibiotics.

Assuming you have a patient with elevated lactic acid, simply draw a vile of blood to perform a lactic acid blood test from your preferred lab. Then give the patient 32 ounces of mineral-free or steam-distilled water to drink that has 1 ounce to 1 ½ ounces of pHenomenal mixed into it.

Have them consume the mixed pHenomenal in as short an amount of time as they can comfortably drink it. Between 10 to 15 minutes from the time they finished the mixed water draw a second vile of blood for another lactic acid blood test.

In almost all cases you will find a significant drop in blood lactic acid from the first test to the second and this is further confirmed by how the patient will report "feeling". Generally pain will go down dramatically and increased energy and the symptoms of lactic acidosis (or sepsis) which was mentioned earlier will dramatically reduce.

What's happening? Since the pH scale is logarithmic the advantage of drinking mixed pHenomenal, 32 ounces at a mixed ratio of one ounce of concentrate to 31 ounces of mineral-free or steam-distilled drinking water, yields approximately one liter (946 milliliters) at a remarkable 11pH. The cost to the patient is approximately $1.20.

Compared to a 500 milliliter bicarbonate drip at an 8.5 pH, the mixed pHenomenal taken orally is approximately 867 times more alkaline or **867 times stronger neutralizing acidity in the body.**

Some of this alkalinity may be neutralized in the stomach, but with the overwhelming power of this product the neutralizing action that occurs in the stomach has proven to be insignificant.

Because pHenomenal is a "Hydroxide" meaning an unstable water molecule that is no longer H2O but has been modified to H1O (or properly "OH") when it finds a free hydrogen it simply binds the hydrogen to the empty valance and becomes H2O or water again. You can further research this on http://www.naturalpartners.com

The results produced by drinking pHenomenal as outlined above cannot be duplicated by using water produced from "Alkaline Water Machines". Perform a comparison test if you wish to confirm this statement.

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Because pHenomenal is a "Hydroxide", meaning an unstable water molecule that is no longer H2O but has been modified to H1O (or properly OH), when it finds a free hydrogen - acidity in the human body - it simply binds the hydrogen to the empty valance and becomes H2O or water again.

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The first 5 symptoms in the table, involving the skin, oral area (OP), and GI system, account for 40.8% of the complaints (42/103). Itching/rash of the skin is by far the most common complaint and it is not necessarily limited to the perioral area.

Patient Management

AE management was based mainly on dose adjustment. The specific interventions included:

1. decreasing and subsequently increasing treatment dose
2. discontinuing and restarting treatment
3. diluting treatment bottle
4. dividing treatment dose in smaller a.m.-p.m. doses

Final Outcome

Defining "completion of the treatment" as 36 months, it was found that 53/62 (85.4%) of the patients did not complete the treatment after onset of AEs and that 23/53 (43.4%) of the patients who quit did so within 3 months after AE onset.

Conclusions

The most common complaints in this series are related to skin (reported as skin itching or skin rash).

The majority of the AEs occurred during the administration of the first bottle.

There were no life-threatening events.

This review suggests that patients who develop an AE during SLIT administration probably will quit the treatment.

Discussion

This is a retrospective analysis of all of the AEs developed during a certain period of time. While most of the published literature addresses the issue that in a certain group of SLIT patients a certain percentage will quit, this appears to be the only report that analyzes a group of patients who had already developed AEs, and it strongly suggests that once an AE develops, chances of quitting treatment are high.

The percentage of patients quitting SLIT is reported as no more than 7% in randomized control trials but up to 31% for patients attending an allergy clinic.[16,17] To further evaluate these figures, we reviewed 100 random SLIT charts and found a discontinuation rate of 27% to 34%. Certainly not having a prospective study with a control group is a shortcoming, but comparing figures of 27% to 34% of "spontaneous" discontinuation with almost 86% of AE-related discontinuation increases the possibility that the development of an AE will be a strong factor to determine treatment termination.

Our reported symptoms, in agreement with published literature, mainly involved the skin, OP, and GI tract.[14,15,17,18] In our case, itching of the skin was by far the most common complaint during SLIT administration. We also report symptoms (usually not reported in the literature) that occurred only once. We think that the length of time over which this sample was collected is a determining factor in recording infrequent occurrences.

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Dr. Saporta completed his training in 1990 at Columbia Presbyterian Hospital in New York City. He is board certified in otolaryngology and has been a fellow of the American Academy of Otolaryngic Allergy (AAOA) since 2001. His private practice in Elizabeth, New Jersey, is heavily oriented to the management of allergic conditions. Interested in the use of oral vaccines since early in his practice, Dr. Saporta presented a protocol for sublingual immunotherapy at the 64th annual meeting of the AAOA that since then has been successfully used for the management of allergic rhinitis with or without asthma.

Salicinium: Induced Apoptosis and Phagocytosis of Circulating Tumor Cells and Cancer Stem Cells

by Robert A. Eslinger, DO, HMD

Here at Reno Integrative Medical Center, since starting to use Salicinium in our protocol two years ago, we have seen a dramatic improvement in the outcome of our treatments. Salicinium, a natural plant extract, is a complexed glycome (sugar) molecule that enters into a metabolic reaction, shutting down the ability of the cancer cell to hide from the immune system. An active immune system can then recognize the cancer cell as abnormal and destroy it without harming any normal cells.

In 1931, German physician and scientist Otto Warburg received the Nobel Prize for proving that all cancer cells primarily use a very primitive method of producing energy from sugar.[1] It is called anaerobic metabolism or anaerobic glycolysis, which is very slightly different than aerobic (oxygen/respirative) glycolysis. It's actually a form of fermentation. It takes place in the liquid part of the cell called the cytoplasm without the use of oxygen. This process is 18 times less efficient at producing a given amount of energy from a given amount of sugar than normal aerobic metabolism using oxygen.

As an analogy: all glycolysis in all energy-producing cells is exactly the same – up to a point. Picture a manufacturing plant (the cytosol) in which parts are taken in at one end and many assembled goods exit the other end. Once going through the plant, the assembled parts make a right-hand turn into another plant called a "finishing" plant (the mitochondria). Everything is always wonderful for both the day and night shift until the supply of parts (nutrition and oxygen) goes awry. In this case we'll say it is the oxygen supply.

Oxygen is what keeps the door of the finishing plant open for business. Without oxygen, the door will automatically close and all those assembled parts made by the cytosol have nowhere to go. If allowed to pile up, the permanently operating cytosol plant would just explode and be destroyed. So very quickly the cytosol plant obligatorily makes the decision to rebox the products and send them out the door to the left to the recyclers (liver) for another day.

While the finishing plant is down, a lot of junk and debris are created by the still running cytosol (acids and enzymes). This begins to affect the next door manufacturing plants also, and slowly the neighborhood deteriorates. After a given amount of time (unknown), the workers in the finishing plant lose their jobs and the business is lost forever and cannot be replaced. Picture this happening time after time as the surrounding plants (cells) succumb to the blight until a complaint goes out to the controlling government (the immune system), which shows up without the right tools to help the businesses get back in operation.

So what does the government do, not having the right tools? "Well let's build a wall (tumor) around this ugly blight until we can bring in help from the outside." However, not realizing that help may not arrive until too late or maybe never at all, the workers in the manufacturing plant (cytosol) keep covering the whole mess up with a big tarp (alpha-N-acetylgalactosaminidase, or Nagalase) to keep the government (immune system) from seeing it and shutting the whole thing down.

Cancer forms for only one reason: a lack of sufficient oxygen to a certain subset of the 210 different types of cells known to make up the human body. This is known as hypoxia. There may be a thousand things that cause hypoxia, but there is no cancer cell that does not commence and live by hypoxia. To survive and keep producing energy, these cells must switch over to anaerobic glycolysis alone as the source of their energy. At exactly the same time as fermentation starts, the now sickened, dysfunctioning cells must also start protecting themselves from the immune system. This is also exactly what our normal white muscle cells do when overworked and the oxygen level falls below a level necessary for respiration. They do this by producing the protective enzyme called Nagalase.

Nagalase has the ability to completely shut down the localized immune macrophage and natural killer cells, whose job is to destroy any cell that has been harmed or is not functioning normally. It effectively "cloaks" the cancer cells from detection by the immune system. This is the reason that someone can have a strong, functioning immune system and still be growing a tumor. Cancer cells live in a very acidic environment. The acidic environment does not create the cancer; it's the other way around. The process for this is NAD+, a coenzyme (nicotinamide adenine dinucleotide) in the cell, through an oxidation/reduction reaction attaches itself to hydrogen and becomes NADH+H+. This then by way of

fermentation becomes pyruvate and then on to lactate. The hydrogen then passes out through the cell membrane by way of lactate and into the milieu of the surrounding environment. This process takes hydrogen atoms from inside the cells to the outside and is repeated over and over. A lack of hydrogen is alkaline and an overabundance is acidic.

Utilizing the glycolytic pathway, the malignant cell senses Salicinium passing by in the bloodstream and invites it in by utilizing the GLUT4 receptor. Upon entering the cell, another enzyme known as the debranching enzyme, which is called beta-glucosidase in a fermenting cell and also the placental trophoblast cell, splits the sugar from the complex molecule. The nonglycome part of the molecule, when released, attaches to the NAD+ and disrupts the oxidation/reduction process that creates the NADH+H+. This causes the cell to cease production of Nagalase.[2]

Upon stopping the production of Nagalase, the macrophage and natural killer cells can resume their function that was "turned off" by the Nagalase. Once again they recognize the now-sick, unprotected, dysfunctional cells and dispose of them as they would any other cells at the end of their life cycle. Salicinium has simply removed the cloak, allowing the body's own natural immune response to work as it should. Since Salicinium is a complexed sugar, it is harmless to any normal cell in the body because a normal cell cannot assimilate a complex glycome due to having no GLUT4 receptors; and because Salicinium is a complexed molecule as discussed before and not a "free" glucose, it has no impact on the patient's blood sugar, making it beneficial for use in diabetics. Finger-stick glucose testing will quickly prove this important point.

The Salicinium molecule can go any place in the body that blood or other fluids go, including through barriers placed by the body for protection such as the blood–brain barrier. A daily dose of 3 grams, whether given IV or orally, allows the molecule to build up within the tissues, eventually saturating the patient. It is for this reason that circulating tumor cells (CTCs) and circulating stem cells (CSCs) can be reduced in as little as 5 days and control can be gained in as little as 3 weeks of IV and oral treatment.

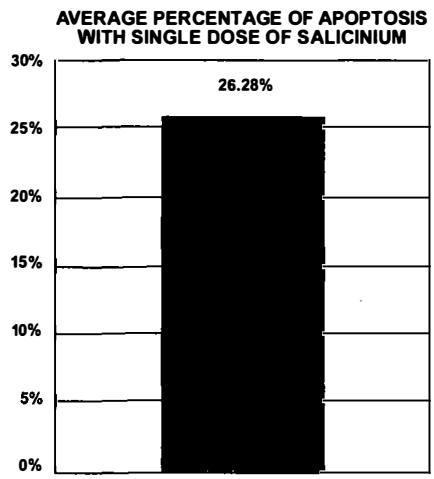
Salicinium is a prospective adjunct to orthodox chemotherapy, as neither interferes with the function of the other. However, by using Salicinium, the dosage of the chemotherapy can be reduced to a fraction (10%–15%) of a full dose. This is especially true when chemotherapy drugs are administered in the setting of IPT (insulin potentiated therapy). This combined type of therapy is dictated by the seriousness and stage of the malignancy.

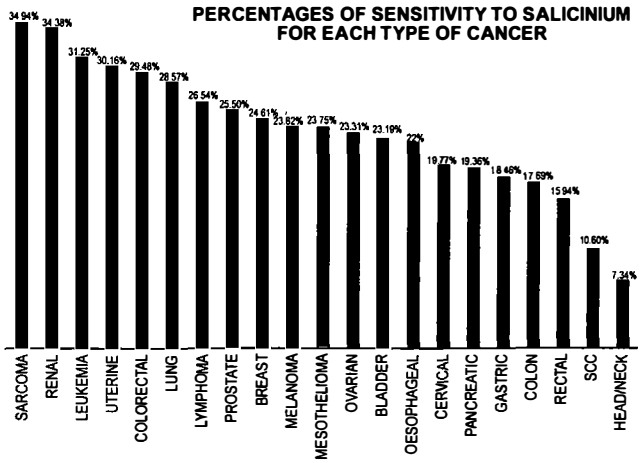
Salicinium has a half-life of approximately 24 hours and is administered by intravenous (IV) infusion 5 days per week for 3 consecutive weeks to start the therapy. Orasal is the encapsulated form and is started orally at the same time as the IV protocol. It has never had a known side effect other than those functions allowed or caused by the immune system, such as chills, localized fever in the area of the tumor, or swelling of the tumor being filled with lymphatic fluids to carry away the necrotizing tissue. Most of the time and in a short amount of time, many patients will find enough relief from pain to lower their intake of pain meds.

Testing for effectiveness of Salicinium has been performed by RGCC (Research Genetic Cancer Centre) in Greece. Its testing platform is known as ex vivo. *Ex vivo* (Latin: "out of living") means that which takes place outside an organism. In science, ex vivo refers to experiments or measurements done in or on tissues, in this case CTCs and CSCs in an artificial environment outside the organism with the minimum alteration of natural conditions.

RGCC uses powerful sorters and flow cytometers as well as negative–selection based interrogation to separate and harvest the CTCs and CSCs from a single blood sample. It then expands the population of these cells in cell culture while managing to keep intact both the genotype and phenotype of the cells.

The expanded cell population is then tested for sensitivity/resistance against 50 natural substances and 43 chemotherapeutic agents. The purpose of the test is to single out the best possible treatment options for each individual patient, and it is of note that the results found in this form of testing prove far more efficacious in vivo.[9] According to Larry Weisenthal, MD, PhD, patients treated with drugs active in these assays have on average a 7-fold greater chance of benefiting from treatment with drugs showing good results in the assays compared with treatment with drugs showing poor results in the assays.[10] Results of this testing using Salicinium can be found below. ➤





Salicinium

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It must be noted that RGCC's method of performing sensitivity testing with Salicinium uses only the equivalent of one *daily IV dose* to measure the amount of apoptosis. While it may at first glance appear that Salicinium has only a 26.28 % efficiency in stopping the metastasizing cells, one must realize this is per a single dose, while the Salicinium protocol calls for 15 IV doses plus the oral program at the same time and continuing on the oral protocol for some time thereafter.

Day after day the cancer cells are taking in the molecule, and day after day apoptosis and autophagy are reducing the total number of cancer cells until over time they can no longer be measured. It is for this reason that the oral protocol must be followed until *all* cancer cells are gone. At this point a person will have a normal Nagalase level just as a normal healthy person without cancer or other anaerobic disease. His immune system testing would appear normal, as there is nothing more for it to react to, his tumor markers will have returned to normal, and his scans would appear clear. It would now be appropriate to begin changing his underlying issues such as heavy metal toxicity, nutrient mineral deficiency, and more to help insure less chance of recurrence in the future.

A different study was performed by Biofocus Laboratory in Germany comparing natural killer (NK) cell activity before and after dosing with Salicinium. The test is performed in much the same way as the RGCC in Greece, but instead of looking for cancer cell death, it is for the purpose of seeing *what* enhances NK cells the most in each patient.[11]

It should be noted that by leaving numbers 4 and 5 out as controls, then adding the percentage of increases, you would arrive at a 29.9% average increase in phagocyte cell activity. Considering the RGCC apoptosis average of 26.28%, you can see how Salicinium does these two opposite activities both at the same time, the immune system increases as the cancer cells are destroyed, both at about the same rate due to Nagalase enzyme destruction.

Robert Eslinger, or Dr. Bob, as we fondly call him, finished his formal medical training in 1978. He has been in clinical practice for over 30 years. He is certified in family practice, osteopathic manipulation, and homeopathy.

For 13 years before coming to Reno, he was the medical director of the Medical Center in Cascade, Idaho. Before concentrating in the area of alternative/integrative medicine, Dr. Eslinger developed a broad background in traditional medical disciplines. Everything from being stationed on a remote Indian reservation in the Public Health Service to private practice and years of working in clinics and ERs has set him on a lifelong quest to find what works for his patients.

He presently focuses on a specialty in the field known as biological medicine, which combines classical treatments with modern technology.

Dr. Bob was appointed by the governor in November 2008 to sit on the Board of Homeopathic Medical Examiners for the state of Nevada.

Dr. Bob is a compassionate physician who takes time to listen to his patients' needs. He offers an abundance of life experience to his practice at Reno Integrative Medical Center, 6110 Plumas St., Ste. B, Reno, Nevada 89519; 775-829-1009; www.renointegrativemsdicalcenter.com

We have been more than pleased with this new adjunct to our treatment program. It is exciting to see our patients improve and prosper in health. In the last year, our patient load has increased dramatically and it's exciting to see our results backed up by the new 967 patient RGCC report. At a recent Cancer Conference in Reno, where I spoke on Salicinium, I had the opportunity to talk with several other physicians who were just as excited to see the same kind of recoveries in stage III and IV patients as we are. Salicinium is showing itself to be a great step forward in the search for a new, nontoxic, effective therapeutic in the ongoing fight to defeat cancer.

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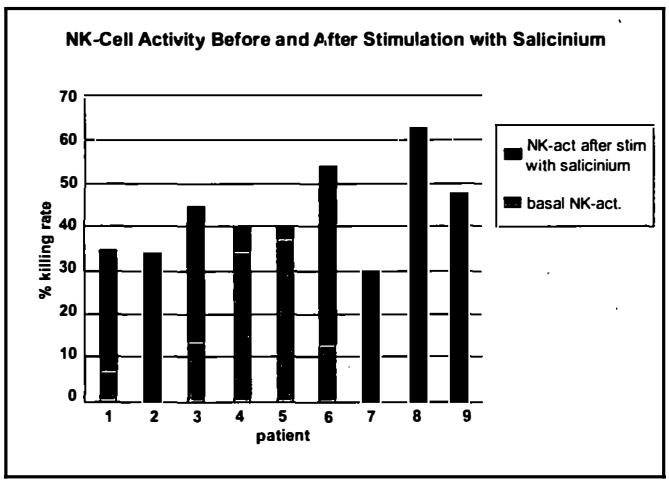
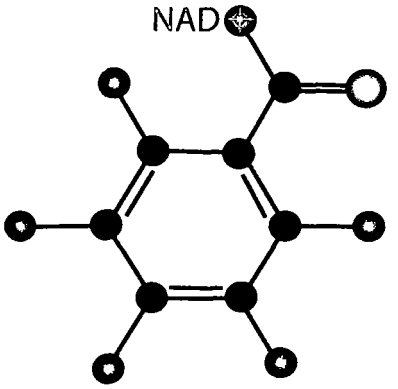
Immune-Stimulative Effect of Salicinium on Immune Cells from Cancer Patients
Dr. Lothar Prix, Biofocus GmbH, Recklinghausen, Germany. www.biofocus.de

Methods:
Immune cells were obtained from blood samples of cancer patients. The capability of these immune cells to kill tumor cells in vitro was determined by using a cellular NK-test (Neri et al., Clin Diagn Lab Immunol. 2001 November; 8(6): 1131–1135). The basal killing activity was compared to the killing activity after treatment of the immune cells with Salicinium and the mistletoe extract Lektinol.

Results:

Patient #	Tumor Type	Basal Killing Activity(% lysis)	Additional Killing Activity (%) After Treatment with Salicinium	Additional Killing Activity (%) After Treatment with Lektinol
1	Cervical	7	28	11
2	Stomach	17	17	15
3	Breast	14	31	8
4	No tumor	34	6	28
5	No tumor	37	3	10
6	Breast	13	41	36
7	Breast	9	21	18
8	Prostate	31	32	46
9	Breast	9	39	15





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Salicinium has recently been added to the R.G.C.C. Circulating Tumor Cell test as well as the BioFocus Labs Cellular NK test:

to order test: Research Genetic Cancer Center info@rgccusa.com or www.atmctx.com/cancer-test

to order test: Bio Focus Labs www.prix@biofocus.de

The Science of Glycobiology

Salicinium changes the way the macrophage of the immune system recognizes diseased cells through immune modulation. The Nagalase enzyme produced by anaerobic cells shuts down the natural function of the immune system providing safety for these diseased cells.

The composite Salicinium molecule will only affect anaerobic cells destroying the enzymatic "cloak" which allows them to hide from the immune system's NK cells. Salicinium stops the production of Nagalase and lactate removing their protection while simultaneously stimulating the the innate immune macrophage to eliminate these diseased cells.

Circulating tumor cells are at the forefront of an ongoing or escalating malignant process. CTC testing has shown Salicinium affects these cells first therefore halting the spread of malignancy. Continued use of Salicinium will allow the immune system to steadily attack remaining malignant cells. The same testing also induces the death of cancer stem cells and Salicinium therapy, whether I.V. or oral, should be continued without interruption until testing shows no further indicators of malignancy.

- **In a study by R.G.C.C. of 967 patients Salicinium showed a 26.28% average apoptosis rate from a single dose with 82% sensitivity. A much higher cumulative apoptosis rate is recognized with ongoing treatment as the level of Salicinium builds within the tissues.**
- **Salicinium can be used alone or as an adjunct to other complementary therapies or as an integrative therapy to allopathic treatments.**
- **Salicinium is completely targeted - it will only enter anaerobic cells.**
- **Salicinium allows Gc-Maf to resume operation, greatly increasing immunoglobulins**
- **Salicinium does not kill the malignant cells - the immune system does. Only the immune system can destroy anaerobic cells, Salicinium increases immune natural killer (NK) cells/Gc-Maf**

for more information about Salicinium:

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Cannabinoids: Healing Agent for Integrative Medical Cancer Treatment

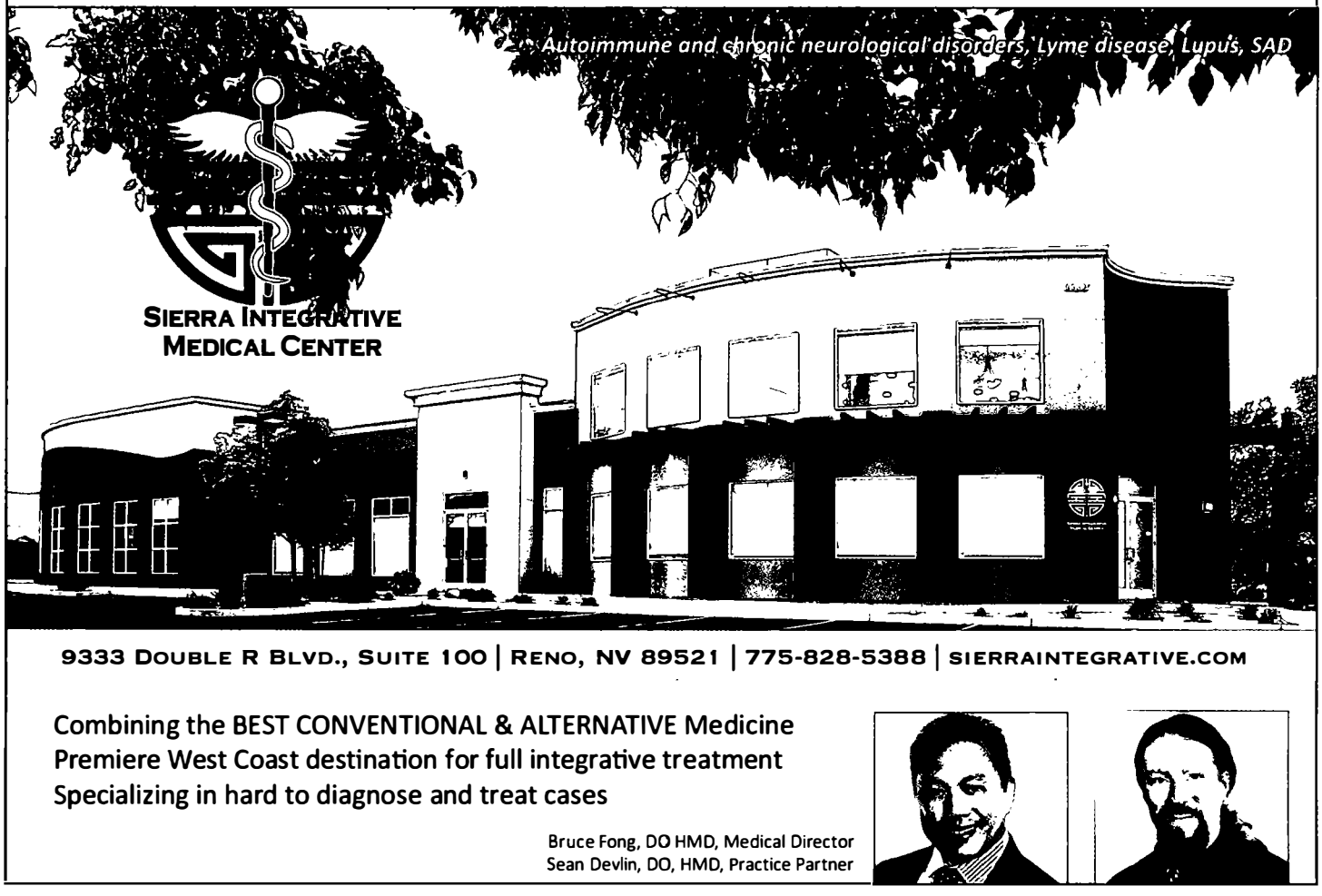
by Sean Devlin, HMD, DO

Introduction

Over the past several years, the politics and science of marijuana have been making headline news. Marijuana is categorized as a Schedule I drug by the Drug Enforcement Agency (DEA) under the Controlled Substances Act. As such, marijuana is described by the DEA as follows:

> Schedule I drugs are classified as having a high potential for abuse, no currently accepted medical use in treatment in the United States, and a lack of accepted safety for use of the drug or other substance under medical supervision.[1]

Despite the federal government's views on marijuana, many states have pushed through legislation making marijuana available for medicinal purposes.[2] These states have established laws that work to provide patients access to medical marijuana and to protect the doctors who recommend it. It should be noted that physicians do not write prescriptions for marijuana but make professional recommendations based on the patient's diagnosis and the scientific literature supporting marijuana's medicinal benefits.[3]



Recent changes in laws, such as the legalization of marijuana in Colorado and Washington, now allow for recreational use by decriminalizing possession of small amounts of marijuana.[4] This further normalizes use and reduces the stigma and difficulty in filling medicinal cannabis prescriptions. The CNN-produced documentaries *Weed* and *Weed2* feature Dr. Sanjay Gupta and the reversal of his position against marijuana.[5] Gupta now recognizes the medical benefits of cannabis. The position of this well-known, mainstream physician and neurosurgeon echoes the shift in attitude throughout much of the US medical population and highlights the politics of pot. Physicians and patients are asking politicians and lawmakers to stand down and allow the safe prescription of medicinal cannabis and productive, impartial research to continue. Pharmaceutical companies, such as GW Pharmaceuticals in England, are advancing production, testing, and standardization. Marijuana collectives are compiling comprehensive patient outcomes from quality-of-life surveys.[6,7]

Understanding Cannabinoids: Going beyond THC

The general public is for the most part familiar with tetrahydrocannabinol (THC) and its psychoactive qualities (euphoria, sedation, and appetite stimulation). Research is now blossoming around a lesser-known cannabinoid, cannabidiol, which is related to THC but does not share its psychoactive aspects.[8] Cannabidiol, known by its chemical compound identifier, CBD, is present in the cannabis plant and has a wide spectrum of therapeutic abilities. Cannabidiol contains anti-inflammatory properties; has antiproliferative/anticancer effects; and can act as an antispasmodic, antimicrobial, and antipsychotic agent. Other properties include the capacity to function as a bone stimulant, a neuroprotective agent, and a vascular relaxant. Cannabidiol has also demonstrated effectiveness as a stabilizer for blood sugars, providing a potential therapy in the treatment of diabetes.[9]

> Cannabidiol (CBD) is one of at least 60 active cannabinoids identified in the cannabis plant. It is a major constituent of the plant, accounting for up to 40% of the plant's extract, as a nonpsychotropic phytocannabinoid.[10] CBD is considered to have a wider scope of medical applications than THC. An orally administered liquid containing CBD has received orphan drug status in the US, for use as a treatment for Dravet syndrome, which causes a seizure disorder in children, under the brand name, Epidiolex.[11]

Both THC and CBD have antinausea, neuroprotective, anti-anxiety, anti-inflammatory, and anti-proliferative effects. These properties have been of great benefit to patients suffering from cancer and HIV.[12]

This once-maligned weed's medicinal effects may prove to be paradigm shifting over the next 5 to 10 years as more data are gathered and research completed. With more medical uses, an emphasis on cultivating high CBD cannabis is increasing.

Studies, Science, and Testimonials

Studies

Researchers are testing cannabinoids as a new family of antitumoral agents. Research by Arkaitz Carracedo, Meritxell Gironella, Mar Lorente, et al. is focused on pancreatic adenocarcinomas. Pancreatic adenocarcinomas are among the most malignant forms of cancer. It is of special interest to researchers to set new strategies aimed at improving the prognosis of this deadly disease. This study indicates that cannabinoid receptors are expressed in human pancreatic tumor cell lines and tumor biopsies at much higher levels than in normal pancreatic tissue.[13] Studies conducted with MiaPaCa2 and Panc1 cell lines showed that cannabinoid administration (a) induced apoptosis, (b) increased ceramide levels, and (c) upregulated mRNA levels of the stress protein p8. These effects were prevented by blockade of the CB2 cannabinoid receptor or by pharmacologic inhibition of ceramide synthesis de novo. Findings indicate that cannabinoids induce apoptosis of pancreatic tumor cell lines in vitro and exert a remarkable growth-inhibiting effect in models of pancreatic cancer in vivo. The stress-regulated protein p8 is involved in THC-induced apoptosis of pancreatic tumor cells. Cannabinoids induce apoptosis of pancreatic tumor cells via endoplasmic reticulum stress-related genes.

Science

Laboratory analysis, along with ongoing research taking place around the world, is helping us to better understand medical cannabis and the therapeutic effects of the various chemical compounds in cannabis. Understanding medicinal cannabis begins with the examination of the chemical compounds, in particular cannabinoids and terpenoids. The available chemical compounds change with how the plant is processed and administered. Potential therapeutic benefits will vary if the cannabis is processed/administered in raw (unheated), heated, or aged (degraded) form. Results also alter with the presence or absence of cannabinoid combinations. The diverse compounds in cannabis appear to modulate each other in synergistic or antagonistic ways. The California-based cannabis collective Elemental Wellness cites that the cannabinoid CBD lessens to some degree the psychotropic effects of the cannabinoid THC; however, the terpinoid a-pinene synergizes the bronchodilator effects of THC. The complexity of these chemical interactions means that medical cannabis would be best viewed as an herbal medicine, with sensitive interactions modifying the therapeutic effects as well as potential side effects. Beyond preparation and compounding considerations are ➤

the many varieties of cannabis, which includes a broad scope of variance in chemical composition. The situation is indeed challenging from the perspective of standardizing treatment.

In response to the mounting evidence and constant flow of scientific and antidotal reports, Steep Hill Halent Labs are systematically testing and publishing current information with Elemental Wellness. The collective offers educational material to its members, staff, and community physicians with the goal of educating those seeking objective input with latest scientific concepts and understanding of medical cannabis so that we may better benefit from its diverse medicinal properties. Their findings are published at www.steephillhalent.com/resources.

Testimonial Accounts

The highly publicized video *Run from the Cure* documents a cancer sufferer in Canada, Rick Simpson, who used an extract of cannabis to successfully treat his mesothelioma and who created Phoenix Tears, a high-potency cannabis oil treatment that many patients are taking into their own hands to manufacture and administer as a last resort for terminal cancer and other life-threatening diseases.[14,15]

Patients have been known to use raw cannabis as an ingredient in juices and smoothies. Unlike cooked cannabis products, raw cannabis does not appear to activate the THC compound, allowing for medicinal properties to be isolated without any psychoactive effects. There is an emerging groundswell of patient self-care filling the gap between doctors' ability to prescribe, lagging legal formulas, politics, and patients' needs. Cannabidiol can be used along with traditional cancer care in the treatment of side effects brought on by chemotherapy and radiation. Both THC and CBD have antinausea, neuroprotective, antianxiety, anti-inflammatory, and antiproliferative effects.[16] These characteristics may play an important role in helping patients endure some of the hardships faced during treatment.

Cannabis is now being referred to as a "pharmaceutical treasure trove." Active practitioners are using science to inform and instruct for the optimal utilization. Efficient and effective treatment is the underlying motivation in bringing this ancient herbal medicine into treatment modalities that reduce suffering, indicate curative properties, and can be safely combined with other therapies.

Partial List of Commonly Recognized Cannabinoids and Their Chemical Element Abbreviations[17]

CBGA	Cannabigerolic acid
CBGVA	Cannabigerivarinic acid
CBG	Cannabigerol
CBGV	Cannabigerivarin
THCA	Tetrahydrocannabinolic acid
THCVA	Tetrahydrocannabivarinic acid
THC	Tetrahydrocannabivarin
THCV	Cannabinolic acid
CBN	Cannabinol
CBDA	Cannabidiolic acid
CBDVA	Cannabidivaric acid
CBD	Cannabidiol
CBDV	Cannabidivarin
CBCA	Cannabichromic acid
CBCA	Cannabichromivaric acid
CBC	Cannabichromene
CBCV	Cannabichromivarin
CBLA	Cannabicyclol acid
CBL	Cannabicyclol

Cannabinoids in the Cancer Patient

The specific applications for the cannabinoids in the cancer patient may include[18]:

1. antiproliferation
2. antiemetic
3. neuroprotection (i.e., for patients on platin-containing drugs)
4. anti-inflammation
5. analgesic
6. bone stimulation

Six cannabis compounds have been documented to act as antiproliferative agents, reducing cancer cell growth: THCA, CBDA, CBD, CBC, CBG, and THC.[19]

Medical marijuana testing and use as a nausea suppressant and appetite stimulant has been around since the 1970s. As early as 2003, GW Pharmaceuticals and Bayer AG were looking toward a safer alternative to smoking cannabis and with a mechanism that allowed for the quantifiable administration of cannabinoids.[20] They developed a medicinal cannabis extract known as Sativex, which contains THC and CBD; it is administered by spraying it into the mouth. This drug is now legal in Canada under the name Nabiximols (USAN, trade name Sativex). This aerosolized mist for oral administration containing a near 1:1 ratio of CBD and THC. In 2005 Nabiximols was approved by Canadian authorities to alleviate pain associated with multiple sclerosis.[21]

Major laboratories are deeply involved in the pharmacokinetics of cannabis, yet in the US the results and formulas are often not readily available to practitioners today.[22] As the medical market develops, and more growers demonstrate their capacities to produce and reproduce cannabis strains with consistent cannabinoid profiles, a registry and further quantification of cannabinoids

Palliative Effect on Cancer Therapy	Cannabinoid	Stage in Clinical Trials	References
Inhibition of nausea	THC	Dronabinol/Marinol and Nabilone/Cesamat approved for cancer chemotherapy and emesis	6–10
Appetite stimulation	THC	Phase III with THC for cancer anorexia (however, Dronabinol/Marinol is approved for AIDS wasting syndrome)	8,10,13,18,19
Analgesia Inhibition of muscle	THC	Phase III with THC for cancer pain Nabilone/Cesamat/Cesamat Phase I/II with THC and Nabilone/Cesamat/Cesamat for cancer depression and anxiety	21,22,24–26 8,10
Mood effects (sedation)		THC (□□cannabidiol) Not for cancer, but Phase III with THC for multiple antidepression, hypnosis) sclerosis muscle-debilitating symptoms	7,28

may become more accessible for treatment.[23]

Here are some of the pharmaceutical cancer treatment applications that contain cannabinoids or their extracts approved or in the approval process today.

Drugs That Contain Chemicals Taken Directly from the Marijuana Plant[24]

Sativex

Manufacturer: GW Pharmaceuticals (GWPH on NASDAQ)

Sativex oral spray

Source: "Medical Marijuana aka Sativex Now Available in UK." examiner.com. June 19, 2010.

Cannabis-related properties: Mouth spray whose chemical compound is derived from natural extracts of the cannabis plant. Sativex contains two cannabinoids: THC (delta-9-tetrahydrocannabinol) and CBD (cannabidiol).

Suggested medical use: Treatment of neuropathic pain and spasticity in patients with multiple sclerosis (MS); analgesic treatment in adult patients with advanced cancer who experience moderate to severe pain.

Approval Status

Approved and launched in the UK on June 21, 2010, making it the first cannabis-based prescription medicine in the world (rescheduled from UK Schedule 1 to Schedule 4 on Apr. 10, 2013). Licensed to Bayer in the UK and to Almirall in Europe. Approved to treat spasticity caused by multiple sclerosis in Spain (July 28, 2010), Canada (August 31, 2010), Czech Republic (April 15, 2011), Denmark (June 8, 2011), Germany (July 4, 2011), Sweden (December 22, 2011), Austria (February 7, 2012), Italy (May 7, 2013), and Switzerland (November 27, 2013). Also approved in Finland, Israel, Norway, and Poland.

In the US, phase III clinical trials started in late 2006 for treatment of pain in cancer patients and were in recruitment in 2013. On April 20, 2011, a US patent was granted for Sativex in cancer pain. As of April 28, 2014, Sativex was still in phase III clinical development to treat pain in cancer patients, and the company expects to see results from the program at the end of 2014. On April 28, 2014, the FDA granted "Fast Track" designation to Sativex for the treatment of pain in patients with advanced cancer. The FDA website says, "Fast track is a process designed to facilitate the development, and expedite the review of drugs to treat serious conditions and fill an unmet medical need."

GW Pharmaceuticals worked with US licensing partner Otsuka Pharmaceutical to open a Phase III Investigational New Drug application in the US to treat spasticity due to multiple sclerosis on August 14, 2013. The US phase III trial was expected to begin in the second half of 2014.

Drugs That Contain Synthetic Versions of Chemicals Naturally Found in Marijuana

Dronabinol/Marinol

Manufacturer: Unimed Pharmaceuticals, a subsidiary of Solvay Pharmaceuticals

Marinol: Source: "Cannabis, Coca, & Poppy: Nature's Addictive Plants," deamuseum.org (accessed Nov. 12, 2013).

Cannabis-related properties: Synthetic Delta-9 THC.

Suggested medical use: Treatment of nausea and vomiting for patients in cancer treatment; appetite stimulant for AIDS patients; analgesic to ease neuropathic pain in multiple sclerosis patients.

Approval Status

FDA approved in US as Schedule I drug for appetite stimulation (1992) and for nausea (1985); moved to Schedule III effective July 2, 1999.

Approved in Denmark for multiple sclerosis (Sep. 2003). Approved in Canada for AIDS-related anorexia (Apr. 2000) and for nausea and vomiting associated with cancer chemotherapy (1988).

Cannabinoids

Drugs That Contain Chemicals Similar to Those in Marijuana but Not Found in the Plant

Nabilone/Cesamet

Manufacturer: Valeant Pharmaceuticals International (VRX on NASDAQ)

Cannabis-related properties: Synthetic cannabinoid similar to THC.

Suggested medical use: Treatment of nausea and vomiting in patients undergoing cancer treatment.

Approval Status

Originally approved by the FDA for use in the US in 1985, but removed from the market until reapproved by the FDA on May 15, 2006, and made available in US pharmacies on August 17, 2006. Also approved in UK and Australia (1982), Canada (1981), and Mexico (2007).

On May 15, 2006, the FDA approved safety labeling revisions for nabilone (Cesamet 1-mg capsules) to advise of warnings and precautions related to its use, such as its potential to affect the mental state of a patient. On February 22, 2007, Valeant announced the submission of an Investigational New Drug application to test Cesamet as a treatment for chemotherapy-induced neuropathic pain.

Dexanabinol

Manufacturer: Solvay Pharmaceuticals (acquired by Abbott Laboratories in 2010; ABT on NASDAQ)

Cannabis-related properties: Synthetic nonpsychotropic cannabinoid that blocks NMDA receptors and COX-2 cytokines and chemokines.

Suggested medical use: Neuroprotective (protects brain from damage) for use after cardiac surgery; regain memory and other high-level function following traumatic brain injury (TBI); possible future use as an anticancer drug.

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Approval Status

Not approved for use as of November 11, 2013.

The phase III clinical trial involving 846 patients was completed in December 2004; Pharmos said that the drug failed to show statistically significant improvement in the late-stage clinical trial; a phase I study to test for the treatment of brain cancer began in September 2012.

A Note on Potential Integrative Therapies

When dealing with patients with cancer or any life-threatening diagnosis, we must always work with our colleagues in traditional and conventional medicine. When treating cancer patients it is strongly advised that they all have a fellowship-trained oncologist on their medical team.

All patients need to be advised through written consent that any integrative, complementary, or alternative approaches that they chose to pursue may not be the standard of care as recognized by the AMA or the FDA. All patients should be advised of all the traditional treatments available to them and be referred to the appropriate specialists as needed and requested.

Transparency of care is extremely important when practicing integrative or functional oncology. Documentation must be detailed and should include rationale for care and reasoning for implementing integrative therapies (e.g., patient's refusal of traditional care). All health-care practitioners are encouraged work openly and collaborate with the whole care team.

Part of an Integrated Treatment Plan

Medicinal use of cannabis is not usually a stand-alone treatment plan. In my experience it can be successfully utilized as part of a comprehensive care program for any patient who may benefit from its wide range of attributes.

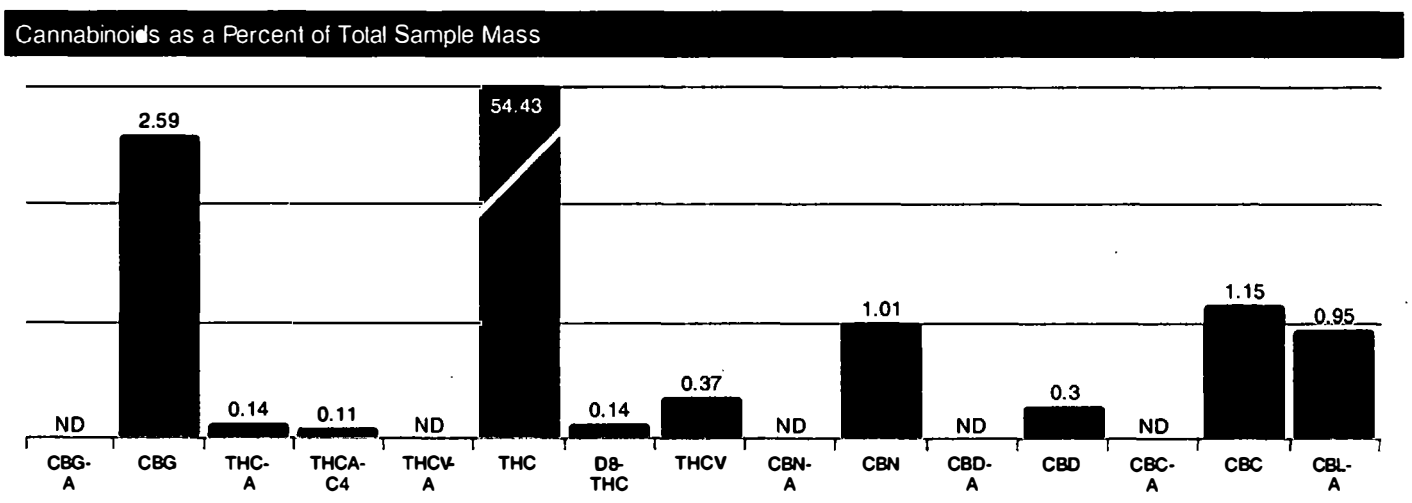
We are looking toward advanced clinical trials for palliative cancer care and bringing these into an integrative approach that includes both prevention and treatment. Nausea, vomiting, and appetite suppression are serious, potentially life-threatening side effects of chemotherapy. These effects can be so detrimental that patients may choose to discontinue therapy rather than face the rigors of the side effects. THC has been tested and is effective in nausea prevention, pain inhibition, and appetite stimulation.[25] THC, taken as a viable, encapsulated formula or tincture, or through smoke/vapor inhalation, has tested and is effective as an analgesic, antidepressant, and sedative and for the muscle spasms that can be a debilitating symptom of multiple sclerosis. [26]

Pharmacology Reduction

Many of the patients whom I routinely see are on a wide range of prescription medications. These drugs have many side effects, are expensive, and often compromise wellness in a number of ways. Physicians tread a delicate path, balancing side effects, complications, and adverse drug interactions. I encourage patients to examine places where their quality of life can be improved by reducing prescription drugs. Overall, by reducing the hazards of polypharmacy, some harm reduction can be achieved.[27]

Potential Side Effects and Minimizing Them

Cannabinoids have an overall stable and sound drug safety profile. There are no substantiated acute fatal cases due to cannabis use in humans.[28] Cannabinoids are usually well tolerated, both in treatment and study groups for humans and animals. Beyond this, cannabinoids do not produce the generalized toxic effects of most conventional chemotherapeutic agents. According to a study conducted by Manuel Guzmán, THC treatment tended to increase survival and lower the incidence of primary tumors. "Similarly, long-term epidemiological surveys, although scarce and difficult to design and interpret, usually show that neither patients under prolonged medical cannabinoid treatment nor regular cannabis smokers have



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marked alterations in a wide array of physiological, neurological and blood tests. The use of cannabinoids in medicine, however, is severely limited by their psychoactive effects."[29]

This underscores the significance of CBD based formulas, which reduce the THC and psychoactive qualities and expand potential applications for cannabinoid-based treatment options.

Conclusion

This is a case in which science and society are coming together to drive change. It is only a matter of time before cannabinoid pharmacology research and development will create a structured system for exacting cannabinoid dosage and delivery methods.

Expect measured, quantified dosages of pharmaceutical formulas containing marijuana chemical extractions within the decade. Both the pharmaceutical and tobacco industries have been eyeing medicinal and recreational marijuana for quite some time. As the political and social climate around marijuana evolves, we should expect to see both of these groups start to participate more in the development and manufacture of marijuana-based products. Meanwhile, there is ample opportunity to contribute to research and witness a new course of medicines being refined with testing analysis being compiled and released for public consumption.

The number of firsthand testimonials for cancer treatment resulting in remission, supporting chemotherapy and pain and symptom management is mounting. These accounts mesh with scientific data to make a powerful case for future research and clinical applications.

References

Steep Hill Halent Labs has conducted comprehensive research. See published reports and the 14-page document that it produced in partnership with Elemental Wellness, *Understanding Medical Cannabis*, at steephilllab.com/resources.

Additional information can be found at icurecancer.com.

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Sean Devlin, DO, HMD, is a board-certified family physician and board eligible in emergency medicine. Dr. Devlin is board certified and fellowship trained in anti-aging and regenerative medicine and fellowship trained in integrative cancer therapeutics.

He holds a master's degree in biochemistry and has pursued doctoral studies in pharmacology with an emphasis on the evaluation of novel antineoplastic agents. Dr. Devlin has been practicing integrative oncology for the past 10 years and is a certified instructor of IPTLD and sits on the advisory board of the IPTLD foundation.

He has traveled extensively working with cancer physicians and researchers internationally in an effort to better understand cancer and its treatment. Dr. Devlin currently teaches for and works with the AAAAM Integrative Cancer Therapeutics fellowship and master's-degree program through the University of South Florida. He is a frequent speaker and guest lecturer throughout the US and currently serves on the medical advisory board for the Best Answer For Cancer Foundation.

Dr. Devlin and his team also provide onsite training services for physicians, medical staff, and front office staff, and he works with a variety of integrative-oncology and specialty medicine groups around the country as a consultant.

He has been fellowship trained in neuromuscular medicine and has spent many years working with patients suffering from chronic pain conditions. He has focused on rehabilitating patients and getting patients transitioned off of narcotics and other controlled substances.Dr. Devlin is licensed in Nevada, California, and Colorado. He is the medical director of Highland Springs Wellness Center in Grass Valley, California, and is a consultant at Sierra Integrative Medical Center, Reno, Nevada.

The Role of Infections in Celiac Disease

by William P. Stuppy, MD

The health and welfare of any civilized population have always depended first and foremost on the detection, treatment, and prevention of contagion. The most common are enteric (gastrointestinal) pathogens, particularly those of a parasitic nature. Those who are infected experience chronic disability, fatigue, and malnutrition, and often present systemic-disease-like symptoms. They are the most likely source of transmission to others. A clear and current understanding of the true prevalence of endemic parasitosis in a patient population is essential to practice. So are the connections between enteropathogens and health conditions not commonly associated with infection, including and especially HPA/pineal dysfunction and celiac disease.

This article represents what was learned from a retrospective examination of 1336 medical records from a private practice centered in the Greater Los Angeles Metropolitan Area (GLAMA) from 2000 through 2013. Specimens of stool and saliva were collected cosynchronously and submitted by patients who presented with nonspecific gastrointestinal symptoms that would generally be characterized as colitis, irritable bowel syndrome, and so on.

Stool was examined by bacterial culture for enteric pathogens, *C. difficile toxins*, by microscopy for ova and parasites, and antigens for *Cryptosporidium parvum* and *Giardia lamblia*. Saliva was examined for detection of antibodies to antigens of pathogenic species of bacteria, protozoa, helminthes, and gliadin

Additional salivary specimens were collected in subjects every 4 hours over a 24-hour period and sent to Sabre Sciences (Carlsbad, California). Circadian panels of salivary cortisol and DHEA-S, and nocturnal measurement of salivary melatonin, were obtained in a cross section of those patients with enteropathogens and compared with normal controls. Patients with enteropathogens also commonly give a clinical history of sleep disorder, which suggests an abnormality of melatonin production by the pineal gland. Concurrent analysis of salivary cortisol, DHEA-S, and melatonin provides a noninvasive, easy, and accurate measure of circadian HPA and pineal function all at once.

(The full details of this study, including subject parameters, pathogens investigated, and methodology, are available in an abstract of the author's paper "Celiac Disease and Enteropathogens," *American Journal of Gastroenterology;* 2013. The abstract is available on the author's website: www.stuppymd.com/51.pdf.)

Results

Among the 1336 patient tested, the three most common infections were *T. gondii* (633), *E. histolytica/dispar* (346), and *H. pylori* (265). Of significance is the fact that 45% of all patients tested positive for more than one enteropathogen, with 13% testing positive for four or more.

Table 1: Analysis of Infections

Number of infections	0	1	2	3	>4
Total Number of Patients	390	342	274	159	171

A total of 441/1336 (33%) patients were positive for gliadin antibodies; of these, 55% also tested positive for an enteropathogen, demonstrating a more than casual relationship.

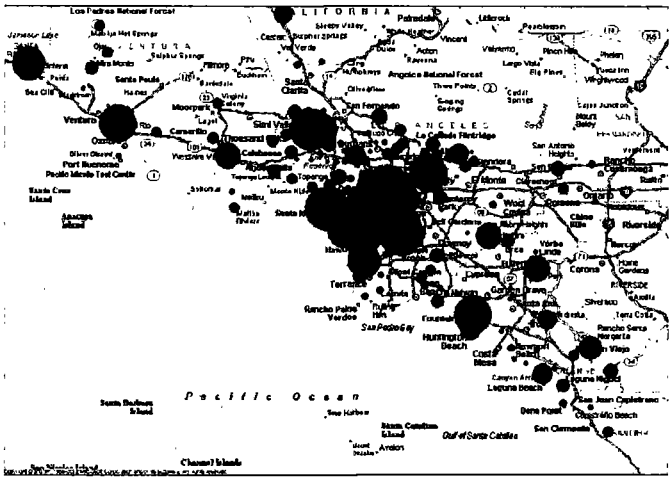
One hundred and forty-two of the subjects (11%) were positive for *Cryptosporidium parvum,* and 23% of these were positive for gliadin Ab, SIgA. These patients were all treated with the antiparasitic drug nitazoxanide. After a 2-week course of treatment, symptom resolution and normalization of antigliadin secretory IgA was found in 30/33 (91%) of patients. The overall cure rate of cryptosporidiosis in nitazoxanide-treated patients was 45/49 (92%).

Conclusions

Enteropathogen Infection and Economic Status

Unexpectedly, the likelihood of infection was directly proportional to socioeconomic status; the areas of greatest wealth had the highest number and density of infection. This is illustrated in Figure 1, in which the zip codes of residence for all tested in GLAMA were mapped. and geographical density of infection was determined.

Figure 1



This was layered over a similar map of GLAMA's urban amenities (Figure 2), creating a sort of cultural and socioeconomic axis for the region. Major cities of the world have their own unique urban character.

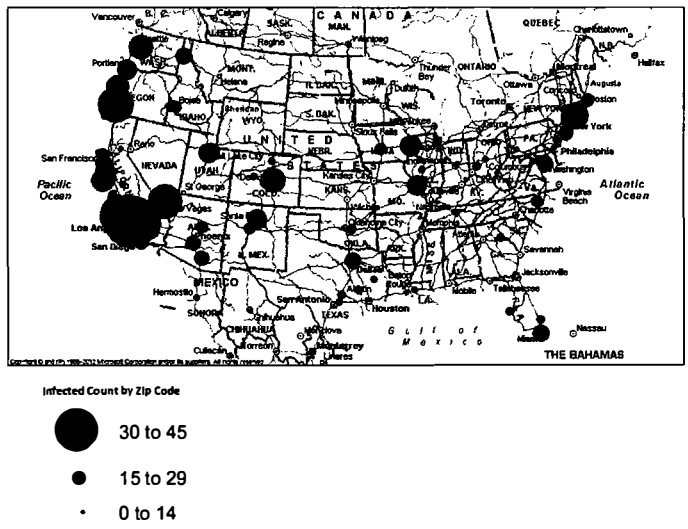
Figure 2

Map courtesy of *Trojan Family Magazine*, University of Southern California. Source: Krueger SG. Delimiting the postmodern urban center: an analysis of urban amenity clusters in Los Angeles. Master's thesis, University of Southern California, 2012. Available at TinyURL.com/SamuelKrueger.

The presence of enteropathogens is generally misconceived as the consequence of poor sanitation; inadequate inspection, choice, and preparation of food and water; poor personal or public sanitary habits or services; low socioeconomic status; the inadequacies of development; and/or response to natural or civil disaster/ turmoil. But note that the incidence and density of infection in GLAMA was high in affluent areas. The profession and public alike should be aware that *higher* economic status, even with the concomitant public and private health advantages, is associated with a high incidence of enteropathogens. (Ironically, it has been speculated that the high incidence for this demographic comes eating high amounts of organic raw food for health purposes.) Whatever the reasons for this, practitioners should be aware of an elevated risk of parasitosis in their more affluent patients.

The Greater Los Angeles Area is the quintessential 21st-century metropolis. As of the 2010 US Census, by population and area, it is the second largest metropolitan region of the country in one of the fastest-growing regions, and the most densely populated urbanized area in the US. It is one of the largest urban agglomerations in the world. These findings regarding enteropathogens from a retrospective analysis of practice are probably indicative of the current status of the health and welfare of the US in general now and into the future, as shown in Figure 3.

Figure 3



Enteropathic infection is common in patients seen for chronic nonspecific signs and symptoms of gastrointestinal dysfunction/disease in immune competent patients who reside in the US – it would not be an overstatement to describe it as endemic. Cosynchronous infection with more than one parasite is evident in the majority, which may indicate multiple sources of exposure (food, water, environment, intimate physical and/or familial contacts). It may also indicate a compromised immune systems, including dysregulation of gut flora, creating a vulnerable terrain for opportunistic bugs. In roughly one-third of intimate physical relationships, the same parasitic infection(s) were shared by the partners. It is not surprising that intimate contact is a very reliable way to transmit IGPs. Addressing the infection in one partner, only to have that person reinfected by the untreated partner – passing a bug

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back and forth – was the number one cause of treatment failure. It would be wise to also encourage testing of those in intimate contact with those infected regardless of symptoms or lack thereof.

HPA and Pineal Dysfunction

Patients with enteropathogens commonly demonstrate HPA and pineal dysfunction and dysregulation on the basis of elevated salivary cortisol and decreased DHEA-S and melatonin levels and patterns. Circadian salivary hormone panels clearly show that this happens especially between midnight and morning. This systemic neuroendocrine extraintestinal disorder in patients with a chronic enteropathogen infection has broad clinical significance in respect to prognosis and therapy. Patients with enteropathogens should be presumed to have HPA and pineal dysfunction and dysregulation. Those with the same neuroendocrine symptoms should again be thoroughly examined for enteropathogen infection using all methods available.

Celiac Disease

Celiac disease is currently considered an autoimmune disorder with increasing attention to the pathogenic role of food, gluten in particular. However, as long ago as the 1940s, the connection between giardia and celiac disease (or sprue) was known but seems to have been largely forgotten. The patient database was analyzed for a correlation of salivary antigliadin secretory antibody IgA2, indicative of celiac disease, to the presence of enteropathogenic infection.

More often than not, patients with infection by enteropathogens demonstrate evidence of celiac disease; for example, elevated levels of salivary antibody IgA to gliadins, gliadin Ab and SIgA. A search for parasitosis as a cause must be made before relegation by exclusion to the diagnoses of gluten enteropathy, sensitivity, or celiac disease with "no evidence of infection." The effect on nutritional assessment and dietary habits is enormous. With eradication of infection, cause and effect are obvious and of demonstrable benefit. Patients with the diagnosis of celiac disease should be thoroughly tested for enteropathogens using all methods available.

As with many of the patients with enteropathogens, those detected with cryptosporidiosis (the most common water-borne infection in the nation) often demonstrate concurrent evidence of celiac disease with abnormally elevated (positive) levels of salivary antigliadin secretory IgA. In these patients, eradication of infection is followed by return of elevated antibody levels to normal, along with resolution of symptoms and possibly the ability to resume dietary freedom from further restrictions. It is unsure what causes this association: it may be secondary to immune activation in the gastrointestinal tract. What is clear is a convincing case of cause, effect, and enduring relief without adverse effect of therapy. The presence and treatment of enteric pathogens should be the first step in the work-up of suspected celiac disease patients.

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William P. Stuppy, MD, is board certified in gastroenterology, pathology, internal medicine, and hyperbaric medicine. He has been in private practice in the Los Angeles area for over 30 years, with staff privileges at Good Samaritan and other hospitals. He is the owner of the Hyperbaric Oxygen Clinic of Santa Monica. He has had more than 50 papers published in peer-reviewed journals on a variety of medical topics.

Cancer and the Importance of Protein-Digesting Enzymes

by Mauris L. Emeka

I once heard it said that cancer is the final stage in years of acting against the laws of nature, and that as we nourish our bodies with a high percentage of cooked and refined foods, we are spending our lives preparing for this dreaded disease.

What is the nature of cancer as seen from the cellular level? Dr. John Beard, a leading professor of embryology in Scotland, posed that question sometime in the 1880s. He spent the rest of his life exploring the process of cancer and proposed his theories in a publication called *The Enzyme Treatment of Cancer and Its Scientific Basis* (1911).

We have in our bodies what scientists call primitive germ cells. In lay terms, these are undeveloped cells that remain after new life is first formed in a mother's womb. They are called "primitive" because these cells never did develop into mature cells to form various parts of the body; they are basically extra cells that were not needed in the formation of the fetus. They seemingly have no function until and unless the body experiences stress or injury of any kind. At that point, according to Beard's extensive research, the primitive cells become activated in order to help heal whatever stress or injury the body may be experiencing. Once activated, these primitive cells start maturing and behaving like trophoblast cells, and trophoblast cells are what house the fetus in an expectant mother. Beard found that these activated primitive germ cells continue their development until enough protein-digesting enzymes are brought to bear. Again, when there are enough protein-digesting enzymes in the body, the growth of activated primitive germ cells ceases. But if there are not enough of these enzymes, then the activated primitive germ cells continue growing and eventually form cancerous tumors.

The pancreas produces protein-digesting enzymes. But unfortunately, and all too often, it is heavily challenged due to our consumption of lots of meat and cooked foods. As a result, this important organ cannot produce enough protein-digesting enzymes. As our bodies are deficient in this important digestive enzyme, the activated primitive cells continue their trophoblastlike growth, eventually producing cancerous tumors.

Therefore, whenever healing is initiated by primitive germ cells, it is vital that the body have enough protein-digesting enzymes to halt the healing process once it has reached a certain point. Beard's most important discovery was that if there are not enough of certain digestive enzymes in the body then the growth of activated primitive germ cells will proceed unchecked, and that in turn leads to the formation of cancerous tumors. The present-day enzyme treatment of cancer available from some alternative medical clinics is based largely on this important discovery.

In essence, protein-digesting enzymes are truly our first line of defense against cancer. That is why it is so important that we nourish the body in a way that introduces protein-digesting enzymes into it every day. The pancreas has only a limited capability to produce the all-important protein-digesting enzymes. We generally eat a preponderance of cooked and processed foods, and they require that the body produce lots of enzymes to help digest them. Unfortunately, when food is cooked, it kills the enzymes, and when we eat the cooked foods the pancreas must try to supply enzymes to digest them. But the pancreas is limited in its ability to do so.

When someone has cancer, no matter where the malignant tumor shows up, it is vital that she consume foods whose enzymes have not been killed; that is, live foods. We would do well to eat an abundance of fresh plant-based foods. Beard and other researchers have discovered that protein enzymes in particular play a key role in halting the growth of cancer cells. It's no wonder that virtually every alternative cancer treatment program encourages patients to stop eating animal products and to eat more raw enzyme-rich fruits and vegetables. When someone has cancer, if he continues eating a diet heavy in animal products and refined and processed foods he is in effect giving cancer a free ride to do its dirty work. Cancer, no matter where it shows up, is a sure sign that the pancreas is not producing adequate enzymes. In addition, eating lots of animal products makes the body chemistry considerably more acidic, and cancer cells thrive in an acidic environment. We can think of cancer, any cancer, as an enzyme deficiency disease.

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Protein-Digesting Enzymes

But the good news is that we can each do something about this situation. We can change what we eat and start consuming more foods that introduce enzymes into the body, as opposed to eating foods that require the body to manufacture critically needed enzymes. One such food that is especially helpful in this regard is the papaya and papaya seeds, and another is pineapple. (See the book *Healing Power of Papaya* by Barbara Simonsohn). Both fruits contain protein enzymes (papain and bromelain, respectively) that are similar to the protein-digesting enzymes made by the pancreas. Another extremely beneficial food is sprouts (such as bean sprouts, broccoli sprouts); they are a rich source of beneficial enzymes and other nutrients that are known to suppress cancerous activity.

Protein-digesting enzymes are particularly important in that they can dissolve the protein coating that forms around all cancer cells, and this enables the immune system to finally be able to recognize the cancer cells and target them for destruction. These foods, along with other super foods to include garlic, turmeric spice, kale, blackberries, pomegranates, lemons, and collard greens, also make the body a lot less inviting for cancerous activity to thrive. Grant it, protein-digesting enzymes may not be the only answer to cancer, but they are definitely part of the body's frontline defense against this most dreaded disease.

Mr. Emeka lives in Port Orchard, Washington. He is the author of *Fear Cancer No More*, as well as *Cancer's Best Medicine*. His website is www.cancernomore.com.

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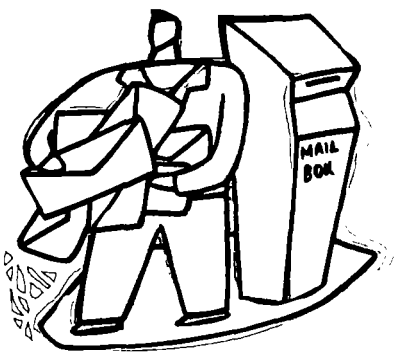

Letters to the Editor

We Need to Go Back to Glass IV Bottles

I appreciate your editorial on the IV bottles and bags. It was a slap in the face that the IV companies took all the glass IV bottles off the market. I took the initiative of measuring the solution in both the plastic bags and the glass bottles. The glass bottle fluid was totally clean, while the plastic bag fluid contained the petroleum-derived hexane, 2-methylpentane, and 3-methylpentane. We deal with chemically sensitive patients and immune-suppressed patients. It is not good to inject these substances with each IV. Now one of the three big IV companies want to add phthalates to these toxic substances because they are having more plastic-bag problems.

We need to find a way to go back to glass, which is inert. If you or your colleagues around the world know how to get glass IV bottles back into the routine, please let me know.

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PEO Solution Author's Response to Review

As a coauthor of *PEO Solution*, I was disappointed with Dr. Collin's review both subjectively and objectively. He closes by suggesting that the book deserves to be read, but without offering explicit reasons why. He also criticizes the book as "opinionated" on the part of my coauthor, stressing the Peskin "theory" rather than addressing the hard irrefutable science Peskin presented.

I'll tackle subjectivity first. Let's say the year is 1491. All signs point to the fact that the world is round. All the science suggests it, but it hasn't quite been "proved." Then the promoter of the theory might be regarded as "opinionated," though all science at the time realized that the world was round and revolved around the sun.

Peskin's "opinions" – better termed hypotheses – are backed by absolute hard science. I can't call that "opinionated." I'd call it a rational analysis of the data. Collin's review left out a key piece of data. A third-party cardiologist conducted a study on PEOs and vascular compliance. It was the very best kind of study – a proving, which matches up cause/effect. Fish oil users were measured for arterial stiffness and vascular age. Then they

were changed to a PEO formulation. Vascular compliance actually improved, and significantly! The review omitted this important piece, leading the reader to believe that there are no head-to-head comparisons. Renowned radiologist Robert Kagan, MD, detailed his remarkable case study showing how PEOs significantly reduced hard plaque in his (smoking) patient – a result he had never seen before – and the plaque came back after PEOs had been discontinued. This is a proving of only one case but certainly points to a valid cause/effect relationship.

Furthermore, contrary to the criticisms in the review, the book contained at least 6 references in which marine oil was compared with plant-derived oils. The latter won in all cases. Admittedly, such studies are rare, but the studies available demonstrate the superiority of parent oils to marine oils. The references/conclusions in *PEO Solution* were:

1. Page 246: Karlström, BE, et al., "Fatty fish in the diet of patients with type 2 diabetes: comparison of the metabolic effects of foods rich in n-3 and n-6 fatty acids," *Am J Clin Nutr* 2011;94:26–33. "The reduction in fasting blood glucose and in the glucose area under the curve during the day was *significantly greater with the n-6* [from lean fish] than with the n-3 [fatty fish] diet [Showing 21% less insulin production with fatty fish compared to lean, non-fatty fish containing more PEOs].
2. Page 206: O'Rourke, Eyleen, J., et al., ω-6 Polyunsaturated fatty acids extend life span through the activation of autophagy," *Genes & Development (2013)*. Published in advance February 7, 2013, http://genesdev.cshlp.org/content/27/4/429.full.
3. Page 257: Higher linoleic acid (Parent ω-6) was associated with reduced risks of low-grade and total prostate cancer. (Brasky, Theodore, M., et al., "Plasma Phospholipid Fatty Acids and Prostate Cancer Risk in the SELECT Trial," *Journal of the National Cancer Institute*, Vol. 105, No. 15, 2013, pp. 1132–1141.);
4. Page 375/376: Parent omega-3 is significantly lower in patients with dementia. Cherubini, A., et al., "Low Plasma N-3 Fatty Acids and Dementia in Older Persons: The InCHIANTI Study, *J Gerontol A Biol Sci Med Sci*. 2007 October; 62(10): 1120–1126;
5. Page 389: Wherever they saw fatty streaks (an early state of atherosclerosis), they also found a deficiency in EFAs (Parent Essential Oil's LA). Das, U.N., "A defect in the activity of D6 and D5 desaturases may be a factor in the initiation and progression of atherosclerosis," *Prostaglandins, Leukotrienes and Essential Fatty Acids, 76* (2007) 251-268
6. Page 414: In this study, a vegetarian diet was found to sensitize subjects to insulin. The researchers believed it to be related to a greater proportion of LA (Parent omega-6) in their serum phospholipids. (*Nutr. Diabetes*, 2013 Jun 17;3.)

I studied this issue for years before jumping on board with Peskin's analysis of the emerging data. He predicted marine oil danger. Then I found an article on primates fed marine oils. In short order, the animals suffered extensive liver membrane peroxidation, which exhausted the organ's vitamin E supply in defense of the damage.

Collin's review omitted my analysis of the resolution of the "French paradox." On a personal note, I would have appreciated even a "thumbs down" on my first-of-a-kind resolution to the dilemma rather than the omission of this important analysis.

Confirmation of Peskin's theory can be recently found in study after study confirming the protective effects of eating nuts on cardiovascular disease. And worse for the review was the omission of renowned cardiologist Eric Topol's major current study.[1] In this study, more than 12,000 very high-risk patients were followed by 860 primary care physicians. Topol said, "There's no difference. There's no difference on any end point: death, stroke, heart attack, hospitalization, you name it." You know, if marine oil doesn't do anything for those with high cardiac risk, in a *major* study, there clearly is a problem!

The review also omitted my admittedly subjective fatty metabolism analysis based on logic of the human diet and human physiology. Humans are not creatures in a low-

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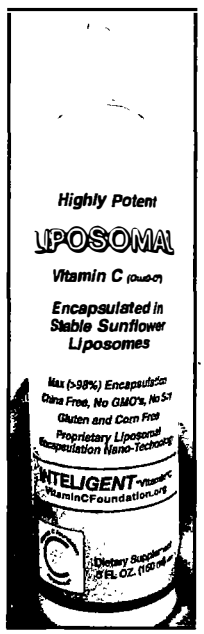

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Letters

oxygen environment at low temperatures like salmon. It's known that marine oils go rancid immediately upon ingestion in our warm, oxygen-rich environment, and Peskin referenced superb oxidative science in this area by the renowned scientist Dr. A. J. Hulbert. Additionally, we brought forward the logic that God/Nature doesn't make mistakes. Science has alleged that the conversion of essential fatty acids to derivatives is problematically low. This doesn't make logical sense. The rate of biochemical reactions is highly regulated for good reason. Our field of medicine recognizes that the goal of the nutritional physician is to *optimize* biochemistry, not *overcome* it.

So, I say to my friend Dr. Collin: This book was indeed based on *hard* science, with little opinion. Among the science was a major study proving that marine oils don't work, and a "proving" demonstrating that parent oils can reverse the excessive vascular aging in patients who were (innocently) using marine oils for the same purpose, in addition to studies using PEOs as controls showing PEO superiority! Peskin certainly deserves commendation for this work and for bringing physicians hard science that they likely haven't seen before.

If there is any bias in the book, it was mine regarding being a "living foods" vegetarian and also having limited data on this lifestyle practice. I believe that one can have strong opinions when firmly backed by sound science. And I believe that there is a subjective difference between one who forms these opinions based on science and the inference from Dr. Collin that there was no rationale for Peskin's (or my) "opinionated" writings. I urge Dr. Collin or anyone to please reread the absolute hard science in the book (and the extensive references in the "Scientific Support" section on the Internet).

A final note: I have a 10-plus respect level for Dr. Collin and the mission of the *Townsend*, and that is unchanged with this review. Marine oil is a tough topic to cover for a person or organization directly or indirectly financially connected with marine oil revenues. Peskin delivered an incredible presentation before a widely known large international organization and wowed the audience. He was mobbed afterwards. However, he was promptly informed that he would never be invited back because of the heat put on the organization by the marine oil exhibitors. Hmmmm. Knowing this, I think an independent review by someone from without the *Townsend* organization might have taken on considerably more potency on a really hot and important topic.

Robert Rowen, MD

Notes

1. The Risk and Prevention Study Collaborative Group. N-3 fatty acids in patients with multiple cardiovascular risk factors. *N Engl J Med.* 2013;368:1800–1808.

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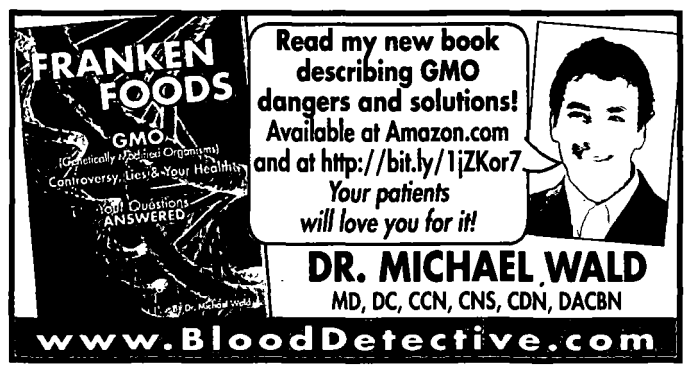

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The New Cardiovascular Risk Factor Guidelines Require Patient Decisions

During the early part of 2014, major guidelines have been issued on how to treat cardiovascular risk, based on cholesterol and blood pressure levels. Previously rigid targets for treatment such as LDL-C lower than 100 mg/dL have been eliminated. What is now suggested is an assessment of risk for having a heart attack or stroke during the next 10 years of a person's life, followed by a discussion with the patient to determine the measures that he or she wants to take to lower the risk.[1] The threshold for a physician to recommend a statin drug is a risk greater than 7.5%. Acceptable blood pressure control for patients less than 60 years old is now 150/90 or less, instead of 140/90.[2]

Several authors have expressed concerns that the equations used to estimate cardiovascular risk tend to overestimate the risk, which might result in unnecessary use of statin drugs.[3] A European study showed that the new guidelines could result in 96% of men and 66% of women over 65 years old becoming eligible for statins.[4] Others are alarmed that 6 million US adults will no longer require antihypertensive medications.[5]

Several cardiovascular risk equations have been validated in the medical literature and are in use clinically. Not only do they tend to overestimate risk, but they rely on only a few of the many factors that have been linked to cardiovascular risk. The most common one is the Framingham risk calculator, which uses only age, sex, total cholesterol, HDL, smoking status, and systolic blood pressure. Some of the calculators have been validated for only 5 years instead of the 10 required by the new guidelines. Commonly used risk factor calculations do not include such factors as weight, mental stress, inactivity, poor quality diet, sensitive CRP, homocysteine, iron overload, nonspecific ST changes on EKGs, and elevated lead levels. Since there is no consistent, comprehensive risk assessment, I contend that each physician should include the generally agreed-upon factors along with other factors that he or she thinks are important.

Similarly, a rigid cut-off percentage of risk at 7.5% cannot be supported. A 71-year-old white male nonsmoker with a cholesterol of 185, an HDL of 50, and systolic BP of 130 has a 10-year risk of a major cardiac event of 14% to 19%, depending on the risk calculator used. Does this person (it happens to be me) really need a statin drug? The other factors listed above could greatly influence the degree of risk that this patient faces. The point is that the doctor should use a basic risk factor calculation and interpretation that he feels most comfortable with and add additional factors she thinks to be important. Such adjustments are within the spirit of the new guidelines. Comprehensive therapeutic interventions such as lifestyle changes, targeted nutritional supplements, and intravenous chelation therapy would likely have a great impact in lowering the risk.

In a *JAMA* editorial, Krumholz lists a startling aspect of the new guidelines that will have a long-term influence on the practice of medicine.[6] My contention is that this influence could have a very positive impact on the practice of integrative medicine.

Both guidelines emphatically state that they are offering evidence-based recommendations, not rules that must be obeyed. They require that a physician has a discussion with the patient about risk factors and what possible measures could be taken to lessen the risk for that individual patient. The physician should explain the potential benefits, how much impact those benefits might have, the strength of the evidence, and the risks of side effects and complications for each choice that the patient has. Then the patient decides what action(s) or lack of action(s) he or she wants to take. Krumholz insists that "no single approach should be enshrined such that others cannot supersede it."[6] The blood pressure guidelines state that "these recommendations are not a substitute for clinical judgment, and decisions about care must carefully consider and incorporate the clinical characteristics and circumstances of each individual patient."[5]

In the past, many guidelines have been paternalistic. The physician has set the goals for the patient to seek, and the treatment plan has been spelled out by the doctor. Now the decision is clearly in the hands of the patient. The job of the physician is not to convince the patient to agree with his or her opinion, but rather to find out what the patient believes is best for him once the choices have been explained. If a patient's treatment is most compatible with her beliefs, it is most likely to be successful, even if the statistics point to another course of action.[7]

Many physicians consciously or unconsciously discourage patient use of alternative medicine. Some doctors tell patients to go elsewhere for treatment if the patients do not comply with the doctor's treatment plan. Other doctors make it clear that they do not want to know what supplements or other alternative treatments the patient is taking.

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Guest Editorial

Patients sometimes do not tell their conventional doctor what alternative treatments they are using, or even that they are seeing another practitioner. They are afraid that the conventional doctor will dismiss them if the doctor finds out.

These guidelines have shifted the power and responsibility of decision-making and personal medical care to the patient. Physicians now must encourage discussion, give comprehensive informed consent, make sure that each patient has the courage to express his feelings about all possible choices of therapy, and be supportive of the patient even if she rejects the opinion of the doctor.

A patient can refuse the recommendation to take a statin drug, or perhaps choose to take red yeast or cinnamon instead.

Undoubtedly, some physicians will feel uncomfortable with this new role. The new guidelines are very supportive for patients to initiate more open discussions with their conventional doctors. Patients and doctors must learn to work together better. All doctors must now have a frank and open discussion with their patients about risks and ways to alter them. Risk calculations should be used by physicians, but their limitations must to be recognized. They should be as comprehensive as possible. Alternative physicians are now on much stronger ground for defending their actions to conventional doctors and to regulatory agencies. If alternative doctors document that they have had the required discussion with the patient, and the patient chooses the road less traveled, that should now be considered the standard of care, according to some of the most powerful societies who make guidelines for the practice of medicine. This change is not likely to occur overnight, but the foundation for a broader acceptance of complementary and alternative medicine has been laid.

L. Terry Chappell

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Book Reviews | Book Reviews | Book Reviews

Revisiting Laetrile

review by Katherine Duff

Doctored Results: The Suppression of Laetrile at Sloan-Kettering Institute for Cancer Research
by Ralph Moss, PhD
Equinox Press Inc.; PO Box 1076, Lemont, Pennsylvania 16851
© 2014, softcover, $19.95, 241 pp.

"Laetrile stopped the spread of cancer to the lungs of the animals; it temporarily stopped the growth of small primary tumors by about three-quarters; and it improved their general well-being."

Those of us who were around during the 1970s may recall the controversy over the cancer treatment laetrile. It entered the public debate not long after Richard Nixon declared the War on Cancer in 1971. The three-person panel directing this new effort had two members who were Sloan-Kettering leaders, putting Sloan-Kettering in a most influential position in cancer research.

One of the first tasks of the panel was to respond to the public demand for clinical testing of laetrile. Amygdalin, or laetrile as it is popularly known, is a product made from the pits of apricots. It has been under debate since 1953 as to whether or not it is effective in treating cancer. Some considered it beneficial and others regarded it as quackery. It fell to Sloan-Kettering to research laetrile.

In 1974, Memorial Sloan-Kettering Cancer Center hired Ralph Moss to be a science writer in its Department of Public Affairs. Moss, a man with a background in the classics and awareness of the political issues of the day, found himself with an insider's view of research and testing of the controversial laetrile through his ability to interview administrators and researchers. This book, *Doctored Results*, is an historical account of Sloan-Kettering's research into laetrile.

One of Moss's first interviews was with a respected researcher named Kanematsu Sugiura, DSc, who in 1972 was asked to test laetrile in spontaneously occurring tumors in mice. Until this point, Sugiura's career was remarkable

for his dedication to his chemotherapy research that brought him accolades for his 60-year career and over 250 papers and articles. He took a hands-on approach to his research, which often meant that he was at his lab daily to tend to the lab animals – even as he was approaching his 80s.

Sugiura's first experiments with laetrile showed very positive results, especially with regard to stopping metastases. He was asked to repeat his experiments, and when a higher dose was used, the results were even better. Again he was asked to repeat using a different method of evaluating metastases, then again with a different source of laetrile, until his tests numbered nine. All had positive outcomes. His results showed that laetrile temporarily stopped the growth of small tumors, reduced the size of cancerous organs, stopped the spread of cancer, and improved the animal's appearance and well-being. Sugiura concluded that laetrile was not a cure for cancer but a "good palliative drug."

What followed Sugiura's experiments is really the crux of this book. Laetrile had entered the public dialogue as a quack remedy, so much of the response from the cancer institutions, lay press, science press, and individual researchers had to do with whether Sloan-Kettering was going to endorse a quack treatment. In the minds of some, including other researchers at Sloan-Kettering, Sugiura's research must not stand.

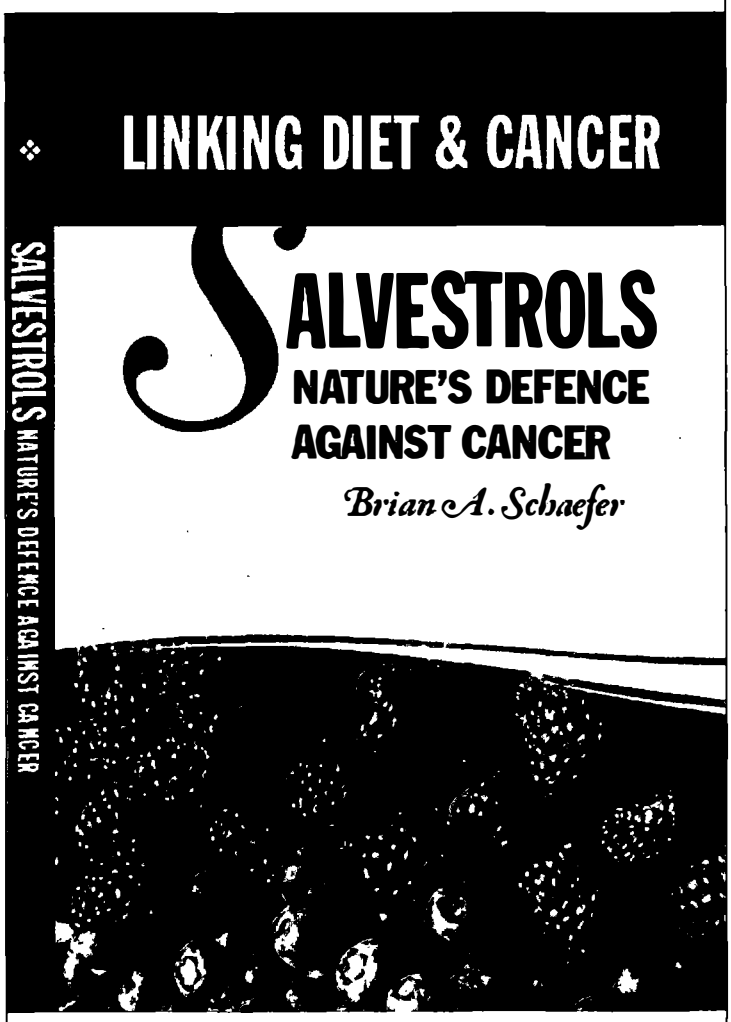
One example of how Sugiura's research was smeared had to do with the same techniques that he had always used without controversy and are still used today. First, he made a visual inspection of the lungs excised from the mice, using the naked eye and a magnifying lens. This is called a macroscopic examination. An independent pathologist would then verify using slides of the same lungs, but under a microscope. There was a high degree of agreement between them. Nonetheless, Sloan-Kettering found this method too subjective but not that of researchers Elisabeth Stockert, DPhil, and Franz Schmid, DVM, who used only the naked eye examination. As a result they concluded that they could not duplicate Sugiura's results.

In a more interesting challenge, Daniel Martin, MD, a fervent quack-buster, used his novel method that he called bioassay. This method did not rely on visual examination at all but rather called for mincing the lungs from each mouse, dividing that material into portions, and injecting it into two male mice. The test was positive if a tumor, detected by palpation, developed at the injection site. Using this method, Martin could not duplicate Sugiura's research. Even though the bioassay was invented by Martin and had never been verified by any other source, Sloan-Kettering lauded this method as less subjective than macrovisual or microscopic examination. Eventually, it turned out that the results of the bioassay method were not really valid because what could be identified as a tumor was found sometimes to be an inflammatory response to the injection. The bioassay's utility apparently was only for refuting Sugiura's work and it was not used again.

The administrators and officers of Sloan-Kettering kept up their campaign against Sugiura, his research, and laetrile itself at various hearings, meetings, and press conferences. At these events, Moss was able to track the changing behavior of the very scientists and administrators whom he had interviewed and come to know. The message became less nuanced and more absolute – laetrile has no value in the struggle to cure cancer and does not deserve further research.

Moss presents this story as a chronological narrative. He does not sensationalize the topic but rather provides a detailed historical record. Other than the fact that laetrile was considered a quack remedy, he does not say much about the reasons that it was so despised. For that discussion, he directs readers to his book *The Cancer Industry*.

We are no longer surprised when institutions fail to live up to their supposed ideals, but institutions are composed of individuals who are making value judgments on the job every day. In this story we see the esteemed, rewarded, and awarded individuals cave in to external pressures and their own personal agendas – except for one. For that, Kanematsu Sugiura deserves his place in the historical record, as does Ralph Moss for preserving this story. ◆



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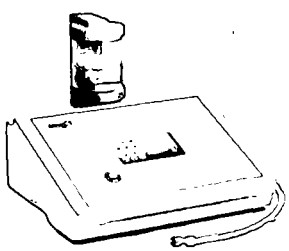

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A Plea for Change in the Approach to Cancer

review by Flora Biancalana, MD, family physician

The Good Fight: A Story of Cancer, Love and Triumph
by Greg Holmes, PhD, and Katherine Roth, MD
Paradox Press
© 2014; $16.99; 380 pp.

Family practice physician Katherine Roth and her psychologist husband Greg Holmes discovered in 2004 that Greg had a rare and fatal carcinoma of the sinuses. Greg began the expected medical path of radiation therapy and chemotherapy. However, Katherine, despite the shock of such a diagnosis, began to devote hours of research into alternative therapies, directly countering continued negative and unbelieving input and comments from her medical colleagues. This book tells of their indomitable courage to value the life in Greg through using acupuncture, herbs, medicinal mushrooms, and specialized diets and by embracing the spiritual realm. They each in their own way explore the field of psychoneuroimmunology, the network of how the mind, emotions, and nervous system influence the immune system.

In an almost journalistic style, the book is divided between portions written by Katherine and portions written by Greg. In this manner, we discover an inordinately convincing drama of one couple's refusal to accept the negative condemnation from traditional oncology and seek out a form of "medicine" that embraces all aspects of healing. The book includes information on critical supplements (MCP, curcumin, grapeseed extract, quercetin, etc.), controversies about antioxidants in conventional cancer treatment, using medicinal mushrooms, the importance of maintaining a healthy GI system, and the potential of proteolytic enzymes. This information is presented in a way that a nonmedical reader can understand, with recipes and daily administration guidelines. Despite the inclusion of technical information and references, their story is carried by a powerful narration of love and commitment written with sincerity and profound emotions.

For years there has been a struggle between Western medicine as we know it and the diversity of other healing arts, including Eastern medicine. The integration of these different modalities as so clearly detailed in this book makes it harder to simply discount "holistic" or "alternative" medicine. This compelling true story of a couple's struggle with the diagnosis of cancer takes us on an emotionally profound journey – one that hopefully will open doors, insights, and appreciation for all the modes of healing and therapy that most assuredly do have merit, as these bright and informed writers make clear.

Katherine and Greg's story is a plea for change in the way our medical system approaches cancer and the delivery of its treatment. This is a powerful book that belongs in the hands of everyone as we prepare for the changes that simply must come in our struggle to improve health care. This book belongs in the curriculum of every medical school and in every library in this country.

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Anti-Aging Medicine

by Ronald Klatz, MD, DO, and Robert Goldman, MD, PhD, DO, FAASP

www.worldhealth.net

An Anti-Aging Approach to Skin Cancer Prevention

Skin cancer is the most common form of cancer in the US. The two most common types of skin cancer – basal cell and squamous cell carcinomas – are highly curable, but can be disfiguring and costly. Melanoma, the third most common skin cancer, is more dangerous and causes the most deaths. The majority of these three types of skin cancer are caused by exposure to ultraviolet (UV) light.

The overall incidence of skin cancer has been on the rise – increasing nearly eightfold during a 39-year period, among middle-aged men and women. Jerry Brewer and colleagues from Mayo Clinic (Minnesota, US) completed a population-based study using records from the Rochester Epidemiology Project, selecting participants aged 40 to 60 years old with a first lifetime diagnosis of melanoma between January 1, 1970, and December 31, 2009. The researchers found that among white, non-Hispanic adults, the incidence of skin cancer increased 4.5-fold among men and 24-fold among women. In particular, women under age 50 showed a marked increase in melanoma. While the overall chances of surviving melanoma increased by 7% each year of the study, the researchers found that the steepest increase in melanoma occurred in the last decade covered by the study, 2000 to 2009. The uptick, researchers speculate, may be connected to the popularization of tanning beds in the 1980s and 1990s. The study authors conclude: "The incidence of cutaneous melanoma among middle-aged adults increased over the past 4 decades, especially in middle-aged women, whereas mortality decreased."

In this column, we share scientific evidence that suggests an interventive role for a variety of nutritional compounds that may offer protection against skin cancer.

Lowe GC, Saavedra A, Reed KB, et al. Increasing incidence of melanoma among middle-aged adults: an epidemiologic study in Olmsted county, Minnesota. *Mayo Clin Proc.* 2014 Jan;89(1):52–59.

What is skin cancer? [Web page]. US Centers for Disease Control & Prevention. www.cdc.gov/cancer/skin/basic_info/what-is-skin-cancer.htm. Accessed 6 May 2014.

Omega-3 Fatty Acids

Following on from animal studies which suggest that omega-3 fatty acids exert a protective effect against photoimmunosuppression and skin cancer, Lesley Rhodes and colleagues from the University of Manchester (UK) enrolled 79 men and women, aged 22 to 60 years, to consume either a supplement containing 5 g of omega-3 fatty acids (70% eicosapentaenoic acid [EPA] and 10% docosahexaenoic acid [DHA]), or a control pill, daily for 3 months. The subjects were then exposed to the equivalent of 8, 15, or 30 minutes of summer midday sun using a light machine that emitted solar-simulated radiation. The team observed that immunosuppression was 50% lower in subjects who took the omega-3 supplement and were exposed to 8 or 15 minutes of simulated sunlight, as compared with people who did not take the supplement. The study authors conclude: "Oral [omega-3 fatty acids] appear to abrogate photoimmunosuppression in human skin, providing additional support for their chemopreventive role."

Pilkington SM, Massey KA, Bennett SP, et al. Randomized controlled trial of oral omega-3 PUFA in solar-simulated radiation-induced suppression of human cutaneous immune responses. *Am J Clin Nutr.* March 2013;97:646–652.

Green Tea

Green tea contains between 30% and 40% of water-extractable polyphenols and is particularly abundant in catechins, most notably epigallocatechin gallate (EGCG), for which some studies suggest a beneficial effect on cardiovascular health and weight management. Lesley E. Rhodes and colleagues from the University of Manchester (UK) enrolled 14 healthy men and women, average age 42.5 years, with fair skin, and gave them low-dose green tea catechin supplements at a daily dose of 540 mg in combination with a vitamin C dose of 50 mg, for 12 weeks. The effects of the supplements were quantified by exposures to UV light before and after supplementation. Results showed that levels of metabolites of green tea catechins increase in skin fluid after supplementation, and erythema (skin redness) levels were reduced after the 12-week supplementation period. The team also observed that whereas UV exposure increased key markers of inflammation, green tea supplementation reduced that effect. The study authors submit that the data suggests that green tea exerts: "protection against sunburn inflammation and potentially longer-term UVR-mediated damage."

Rhodes LE, Darby G, Massey KA, et al. Oral green tea catechin metabolites are incorporated into human skin and protect against UV radiation-induced cutaneous inflammation in association with reduced production of pro-inflammatory eicosanoid 12-hydroxyeicosatetraenoic acid. *Br J Nutr.* 28 January 2013.

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Anti-Aging Medicine

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Resveratrol

Resveratrol, a polyphenol found in red wine, is known to have anticancer properties; however, scientists had thought that it was metabolized so quickly by the body that it would be ineffective in clinical trials. Nevertheless, researchers at the University of Leicester's Department of Cancer Studies and Molecular Medicine in the UK have found that this is not the case. Professor Karen Brown and colleagues found that resveratrol can still be taken into cells after it has been metabolized into resveratrol sulfates. Once in the cell, enzymes then break down the sulfate metabolite, converting it back to resveratrol again. In fact, the results appeared to show that resveratrol may be more effective once it has been generated from resveratrol sulfate because the cellular concentrations achieved are higher. Encouragingly, the study also showed that resveratrol generated from resveratrol sulfate can slow the growth of cancer cells by causing them to digest their own internal constituents and stopping them from dividing. "Our study was the first to show that resveratrol can be regenerated from sulfate metabolites in cells and that this resveratrol can then have biological activity that could be useful in a wide variety of diseases in humans," said Brown. "Importantly, we did all our work with clinically achievable concentrations so we are hopeful that our findings will translate to humans."

KR Patel, C Andreadi, RG Britton, et al. Sulfate metabolites provide an intracellular pool for resveratrol generation and induce autophagy with senescence. *Sci Transl Med.* 2013;5:p. 205ra133.

Milk Thistle

Silibinin, the extract of milk thistle, kills skin cells mutated by UVA radiation – which makes up about 95% of the sun's radiation that reaches Earth. Rajesh Agarwal and colleagues from the University of Colorado Cancer Center (US) subjected human skin cells pretreated with silibinin to UVA radiation. The team observed that the rate at which these damaged cells died increased dramatically. Specifically, the study shows that pretreatment with silibinin resulted in higher release of reactive oxygen species (ROS) within the UVA-exposed cells, leading to higher rates of cell death. The study authors conclude: "These results suggest that silibinin may be beneficial in the removal of UVA-damaged cells and the prevention of skin cancer."

Narayanapillai S, Agarwal C, Tilley C, Agarwal R. Silibinin is a potent sensitizer of UVA radiation-induced oxidative stress and apoptosis in human keratinocyte HaCaT cells. *Photochem Photobiol.* September/October 2012;88(5):1135–1140.

Sunscreen

Perhaps the single most basic intervention for skin cancer is to wear sunscreen. It confers two important benefits:

1. Sunscreen not only protects against the damage that can lead to skin cancer, but it shields p53, a gene that works to prevent cancer. While it is generally accepted that sunscreen helps to minimize burning, whether it helps prevent skin cancers has been the subject of some debate. Elke Hacker and colleagues from the Queensland University of Technology (Australia) have elucidated the molecular mechanism of sunscreen. The team confirmed previous findings that sunscreen protects against all three forms of skin cancer.

2. The daily use of a broad-spectrum sunscreen slows, and may even prevent, sags and wrinkles – the hallmarks of aging skin. Maria Celia B. Hughes from the University of Queensland (Australia) and colleagues asked 903 Australian men and women, aged 55 years and younger, to use a broad-spectrum sunscreen daily, and/or to consume a dietary supplement of beta-carotene (30 mg) daily. Subjects were followed for a 4-year period, with dermatological assessments conducted to analyze changes in skin appearance. The researchers found that the daily sunscreen group exhibited no detectable increases the aging at the end of the study term. Further, the subjects who used sunscreen daily showed 24% less skin aging, as compared with those who used sunscreen periodically. No effect was seen for beta-carotene supplementation.

Hacker E, Boyce Z, Kimlin MG, et al. The effect of MC1R variants and sunscreen on the response of human melanocytes in vivo to ultraviolet radiation and implications for melanoma. *Pigment Cell Melanoma Res.* 2013 Aug 21.

Hughes MCB, Williams GM, Baker P, Green AC. Sunscreen and prevention of skin aging: a randomized trial. *Ann Intern Med.* June 4, 2013;58(11).

To stay updated on the latest breakthroughs in natural approaches to protect yourself and your loved ones against skin cancer, visit the World Health Network (www.worldhealth.net), the official educational website of the A4M and your one-stop resource for authoritative anti-aging information. Be sure to sign up for the free Longevity Magazine e-journal, your weekly health newsletter featuring wellness, prevention, and biotech advancements in longevity. ◆

Healing with Homeopathy

by Judyth Reichenberg-Ullman, ND, DHANP, LCSW, and Robert Ullman, ND

www.healthyhomeopathy.com

Homeopathy for Fear of Flying

Some material excerpted from *The Homeopathic Treatment of Depression, Anxiety, Bipolar Disorder and Other Mental and Emotional Problems* (Picnic Point Press; 2012) and *The Savvy Traveler's Guide to Homeopathy and Natural Medicine* (Picnic Point Press; 2014)

You Are Not Alone!

Aviophobia, fear of flying, may be related exclusively to air travel, or may be related to other fears such as claustrophobia (fear of enclosed spaces); agoraphobia (fear of going out in public, especially when one cannot escape); acrophobia (fear of heights); or a fear of vomiting, terrorist attack, impending death, drowning, or simply a loss of control. Nearly 3 million passengers fly every day worldwide. It is estimated that ⅓ to ½ of the population suffers from fear of flying at least once in a lifetime.

Judyth: Being afraid of flying is different from having an actual panic attack, which I experienced firsthand. I was flying to a homeopathic education conference in Minneapolis about 20 years ago. In fact, a homeopathic colleague, Dr. Dean Crothers, was seated farther back in the plane. I had mixed feelings about leaving home in the first place because we had just purchased a new house that was about to close that weekend. It was a sweltering summer day, and my Northwest flight was stuck on the runway for an hour. As with many traumatic events, I remember it as if it happened yesterday. Next to me, spilling over onto my seat, sat an obese woman. For the first time in my life, I began to experience a panic attack: shortness of breath, rapid heartbeat, and anxiety. I was overtaken with only one overwhelming desire: to get out of the plane! When the symptoms became even more intense, I alerted a flight attendant. She asked me to take my seat and assured me that it would hopefully pass soon. Another 15 minutes passed, it got even hotter internally and externally, and I felt sweat running down my brow. Definitely not better! I felt even more desperate to exit the aircraft. I jumped out of my seat; my desperation must have been quite compelling. I mumbled something about being sure to let Dean know what happened (which they failed to do and he was left puzzled as to what became of me).

The next thing I knew, the pilot turned around the plane and dropped me off at the departure gate with my checked bag. My embarrassment was superseded by my fear and discomfort! That part of the drama is a bit of a blur. I do remember calling Bob from a pay phone (remember those days?) and his responding, "You *what*?" Bob and I spent the weekend furniture shopping, which was great fun. Dean kindly wrote me a prescription for Xanax, which I never used. Although I have never again experienced anything to that degree, I did, for a period of time, fear that I might. We routinely take one- or two-day-long international flights, which, fortunately, have never been a problem. When I did travel alone a couple of years ago from Chile to Germany to Egypt, Bob was kind enough to record a 10-minute relaxation exercise for me on iTunes. Fortunately I didn't even have to think about using it. I was tested again on a recent 90-minute flight from Puerto Montt to Punta Arenas, Chile. Patagonia is well known for intense, even violent, weather that can change in a moment, especially very high winds and storms. Fifteen minutes before landing, the captain announced matter-of-factly, "Due to extremely high winds in Punta Arenas, the plane will either land or turn back to Puerto Montt." Thankfully, we landed without incident. I only turned a plane around once, but we recently met someone who persuaded pilots to turn the plane around for her *three* different times! Now that is impressive!

Here is the case of another patient whom we treated for airplane anxiety.

Get Me Out of Here: Anyplace but an Airplane

Sally, a 34-year-old public relations consultant, sought out homeopathy for relief from her panic attacks. British and very accustomed to transcontinental air travel, over the

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past few years she had become more and more nervous about flying.

Fortunate enough to have had a happy childhood on a farm in the English Lake District, Sally had a very stable upbringing. But despite her care-free beginnings, she was forever worrying about one thing or another. If it was not fear that something terrible would happen to her husband, it was concern that she might die in a future childbirth, as did a family friend. "My imagination just goes wild. I tend to take little things and blow them way out of proportion." Sometimes Sally's anxiety caused her to wake every hour on the hour. She frequently awoke in the middle of the night, thought she heard a strange sound, then convinced herself that a robber was breaking in and would kill the family. Then she quickly imagined herself racing to the phone, dialing 911, and running to the door. She admitted to a having a dreadful fear of her own mortality.

Sally's anxiety had increased considerably following a stillbirth a year earlier. The night before the delivery, after she and her husband learned that their baby had died, she shook all night. These shaking fits recurred several times after that but were now associated in her mind with flying to Europe. The panic attacks were characterized by extreme anxiety and violent heart palpitations from which Sally felt as if her heart would jump out of her chest.

Prior to her daughter's death, Sally had experienced occasional panicky thoughts, such as wondering what would happen if her car plunged off a bridge, but she could dismiss them. Now she felt forced to work through in her head the entire scenario, such as a flight, in order to cope. If the thought of her car falling off the bridge entered her mind, she felt compelled to imagine the car sinking into the water, being unable to open the doors, trying to figure out how to open the windows, and having only seconds to save her own or her husband's life. Sally's feeling was sheer terror. What if she couldn't escape? What if she made the wrong decision and one or both of them died as a result?

Sally's greatest fear about flying was the anticipation of the crash – knowing that something was wrong and waiting for it to happen. She became extremely edgy if the plane experienced any turbulence or if a bell was supposed to go off but did not. The only way she could become calm was to remind herself that she had absolutely no control over the situation.

Concerns about her health had also become magnified. What if she suffered a heart attack? Or breast cancer? No one could tell her why her daughter died. Maybe she too had something terribly wrong with her and no one knew. Since the stillbirth, Sally had lost confidence in doctors. She was plagued by a deep sense of failure since the baby's death. Having a child was what she had planned for her life, and it hadn't happened even though she thought she had done everything right. She lived in fear of others' asking her if she had any children. "I'm wondering if the grass is greener. I have a good marriage, I enjoy my life and my job, but I'm great at living for tomorrow. When we travel, I drive my husband crazy. He makes the arrangements with the travel agent. Then I go over the whole list, one by one, to make sure he's made the best connections. I like to check it all out."

Physical problems included periodic rashes and herpes on the face. Also troubling were her menstrual periods, which had become considerably heavy and clotted and lasted longer than previously. She was bothered also by a persistent vaginal discharge. She loved coffee, chocolate, and bread.

Sally's symptoms matched the picture of *Argentum nitricum* (silver nitrate). This is a medicine for people with anticipatory anxiety of all kinds. They often have claustrophobia and a fear of heights and bridges. Those needing this medicine have a perpetual tendency to imagine disasters and catastrophes and therefore are likely candidates for phobias and panic attacks. Sally's 5-week follow-up report was very positive. She felt much less anxious about flying and had flown from Seattle to Chicago without incident. The thoughts about driving off a bridge were gone, as were the palpitations. The insomnia was somewhat alleviated. Sally had a small patch of ringworm for the first time in 20 years. Since she had it all the time as a child, we understood that this symptom was part of her healing response and that it would resolve over time.

Over the following 3 years Sally has continued to feel extremely well. She needed six doses of the *Argentum nitricum* during that time.

Self-Care Homeopathic and Natural Recommendations for Fear of Flying

In addition to the *Argentum nitricum*, which benefited Sally, here are a number of other practical tips to help you fly calmly and coolly. If it is a chronic problem, like Sally's, rather than an acute one that occurs infrequently, we recommend constitutional care with a homeopath.

Homeopathy

- *Aconite* (monkshood): Fear of planes and crowds. Sudden fright and emotional shock about the flight. Terrified of impending death. Great anxiety and restlessness. Rapid heartbeat. Violent palpitations. Profuse sweating.
- *Argentum nitricum* (silver nitrate): Anticipatory anxiety and apprehension before the flight. Fear of heights, being trapped. Worried about making the flight on time. Impulse to jump out of the plane. Fear of elevators and bridges.
- *Arsenicum album* (arsenic): Tremendous preflight anxiety. Fear of dying when the plane crashes. Extreme worry about health. Insomnia after midnight. Cold.
- *Calcarea carbonica* (calcium carbonate): Anxiety about safety and natural disasters in general: fear of flying, heights, earthquakes, storms, security, mice. May be overweight, flabby. Calf cramps. Sweat on scalp. Loves eggs.

Prevention

- Watch YouTube videos and other free online courses to relieve you of your fear.

- Take the indicated homeopathic medicine 4 hours before your flight.
- Allow plenty of time to travel to the airport, check in, proceed through security, and even have a meal or a snack, if that relaxes you.
- Book a seated chair massage for half an hour; they're now available in many airports.
- Pack lightly so that you have less to worry about. If you check baggage, label it well and make it a different color than black so that it will stand out. If you do need to put carry-on luggage overhead, try to board early so that it will be less stressful.
- If you are traveling to a new destination, bring a travel book to keep you busy until you arrive.
- If it makes you feel better, research the safety, on-time arrivals, and seating configuration of the plane alternatives and choose what puts you most at ease.
- Know what to expect, understand why flying is safe, sit on the wing, and breathe fresh air.
- Have your travel documents and money organized and easily accessible so you will not need to worry about them.

More Natural Tips

- Try out airplane yoga; for example, see About.com's Web page (www.yoga.about.com/od/lifestyle/tp/airplaneyoga.htm) or *Airplane Yoga*, by Rachel Lehmann-Haupt (2003).
- Deep breathing exercises, even without the yoga, are very relaxing. Close your eyes and breathe in and out slowly through both nostrils, do alternate nostril breathing, or inhale and exhale only through the left nostril (a calming breath).
- Skip the alcohol and caffeine, drink plenty of water, and eat as healthfully as possible on the plane. Becoming hypoglycemic or dehydrated will only make you more anxious. Take along healthful, delicious snacks.

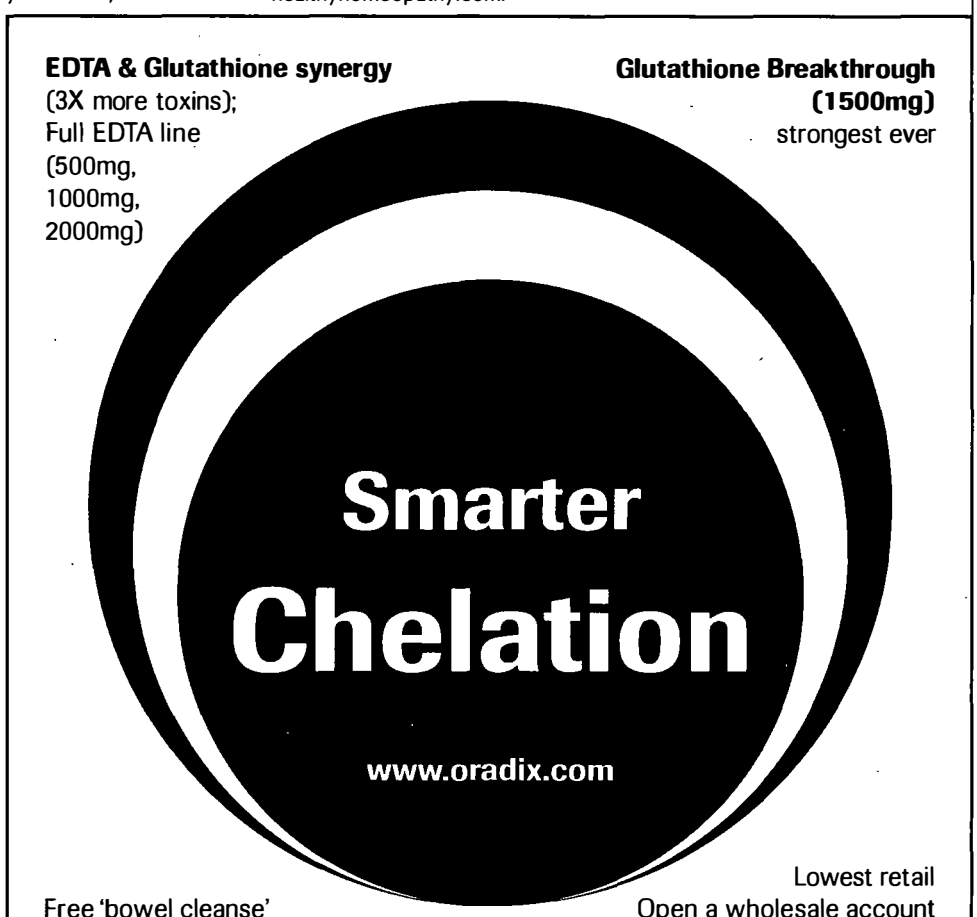
Lifesavers

- Thought not a matter of life and death, plane anxiety may feel that way at the time. Remember, you can always get a prescription for a mild sedative such as Xanax. It may be enough to only keep it in your pocket!

Trip Savers

- Organize your travel toiletries beforehand to satisfy the US Transportation Security Agency and to decrease last-minute stress.
- Take Rescue Remedy as often as needed during the flight.
- Bring engaging reading materials, either in book, magazine, or electronic format.
- Book an aisle or exit row seat in order to have more leg room and ability to get up and walk around during the flight.
- Travel with a buddy. If alone, strike up a conversation with your seatmate(s). You may or may not want to share with them that you are nervous, depending on who they are and what makes you feel best.
- Make a personal connection with the flight attendants so you feel that they are on your team.
- On long flights, watch entertaining, nonsuspenseful movies to pass the time more quickly.
- Bring along a recorded deep-relaxation tape or music tape, either standard or recorded just for you, to relax mind and spirit.
- Meditate, sing to yourself, or sleep – whatever is most calming.

Judyth Reichenberg-Ullman and Robert Ullman are licensed naturopathic physicians, board certified in homeopathy. Much of the material for this article was excerpted from their upcoming book, *The Savvy Traveler's Guide to Homeopathy and Natural Medicine: Tips to Stay Healthy Wherever You Go!* Their previous books include *Homeopathic Self-Care, The Homeopathic Treatment of Depression, Anxiety and Bipolar Disorder, Whole Woman Homeopathy, Ritalin-Free Kids, Rage-Free Kids, A Drug-Free Approach to Asperger Syndrome and Autism, The Patient's Guide to Homeopathic Medicine,* and *Mystics, Masters, Saints and Sages: Stories of Enlightenment.* New editions of *Ritalin-Free, Whole Woman Homeopathy,* and *Homeopathic Self-Care* are available now or very soon, as well as electronic and free mini versions of all of the books. They live on Whidbey Island, Washington, and in Pucón, Chile, and practice at the Northwest Center for Homeopathic Medicine in Edmonds, Washington. They treat patients by phone and videoconference as well as in person. They can be reached at 425-774-5599, drreichenberg@gmail.com, or drbobullman@gmail.com. Their website is www.healthyhomeopathy.com. ◆



Monthly Miracles

by Michael Gerber, MD, HMD
contact@gerbermedical.com

Poison Hemlock to the Rescue

Explaining homeopathy to patients is frequently challenging. The counterintuitive concepts involved with prescribing poisons, snake venoms, toad sweat, poison mushrooms, arsenic, strychnine, and in this case poison hemlock, the famous poison used to kill Socrates, takes a few minutes. Once assured that there is no possibility of there being any of the original substance in the homeopathic preparation after hundreds and thousands of dilutions and succusions, they are prepared to take the leap.

Conium Maculatum

Conium maculatum, poison hemlock, is a great remedy for the elderly. It causes an ascending paralysis. *Conium mac* has difficult, uncertain gait, trembling, sudden loss of strength while walking, affects the nerves and muscles, difficult speech, incoordination, and paralysis. The patient becomes progressively weak, with arteriosclerosis, senility, symptoms similar to Alzheimer's disease, depression, timidity, and indifferent mood. Vertigo when lying down and when turning over in bed, turning head sidewise, or turning eyes is also a property of *Conium mac*. There are of course hundreds of other indications for *Conium mac* found in the various materia medica. I am greatly enamored of the new Homeopathic Remedy Guide, *Nature's Materia Medica,* by Robin Murphy, ND.[1]

A Sad Case

C. H., a 74-year-old male retired from a very responsible job, presented with a 4-year history of severe "dizziness until I can no longer see." The symptoms were more severe in the last 2 years and "horrible in the last month." Accompanying the dizziness was persistent "nausea until I vomit." He couldn't move his head without bringing on the vertigo, nausea, and vomiting. Additionally he had difficulty breathing, blurred vision with photophobia, very unsteady on his feet, and chronic fatigue with muscle cramps in his legs and feet at night. Barely able to walk with one hand on the walls and one hand on his wife's shoulder, he trembled into my office.

He had been worked up by ENT, neurologist, and cardiologist with negative findings. He was on three blood pressure medications and meclizine. His lab showed a high MCV and MCH with very low sodium and chloride, low testosterone, and low thyroid. His hair analysis showed double high mercury and very low levels of all the beneficial minerals.

C. H. also tested positively for viruses, and we administered the multiple dilutions of viruses after John Diamond, MD, 0.1 cc to Spleen 6 alternating ankles for 12 days. He didn't test strongly for many interventions; however, we did start with weekly IM injections of methylcobalamin and folic acid and one injection of Vertigoheel from Heel Company. It contains Cocculus 3X, Conium 2X, Ambria 5X, and Petroleum 7X. He had already been on a fair range of nutrient supplementation.

After I checked several other dizziness remedies on my BioMeridian, MSAS, EAV device, *Conium mac* tested for him. Reviewing several dilutions, he balanced on 1M *Conium maculatum* from Hahnemann Laboratories Inc. and began it on his first visit.

Happy Beginnings

We instructed C. H. to call in a couple of days to report progress or lack thereof. After 2 days, 80% of his symptoms had resolved and in 2 weeks they had all resolved. At his first return office visit, he gave me a big hug, always a good way to begin a visit. He walked confidently but a little weakly down the halls, and we referred him to physical therapy to rebuild and reeducate his weakened muscles. Now we are starting to work on his hypothyroidism, hypertension, hypogonadism, poor mineral absorption, and mercury toxicity. The *Conium mac* 1M no longer tests for him, so I discontinued it. His system got the homeopathic message and it was no longer needed.

Notes

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Environmental Medicine Update

by Marianne Marchese, ND
www.drmarchese.com

Can Taking a Shower Make You Sick? Chemicals in Your Water

Introduction

Everyone knows that water is essential to life and to living. Water covers 70% of the earth and is the only substance that can exist as a liquid (vapor), gas, and solid (ice). Water is necessary for the human body to live. We drink it, it's in our food, and we wash in it, play in it for sport, and use it for energy production and manufacturing. 97% of the earth's water is undrinkable because it's saltwater. 3% of the world's water supply is freshwater, and 77% of that is frozen. That leaves very little freshwater for humans to survive. In some parts of the world, freshwater is so contaminated that it is unusable. In developed countries, the water is treated with chemicals and regulated, making it safe for consumption. But how safe are those chemicals?

Concern over the drinking water in this country is nothing new. In the 1970s the Environmental Protection Agency (EPA) and Congress passed two pieces of legislation to protect waterways and drinking water. The Clean Water Act of 1972 maintains the physical, chemical, and biological integrity of the waterways, and the Safe Drinking Water Act of 1974 controls drinking-water contamination through multiple barriers. The source of most drinking water varies greatly depending on location. Freshwater sources include rivers, lakes, and streams that accumulate through rainfall and snowmelt. This accounts for what is known as surface water. Groundwater is another source of drinking water which accumulates through rainfall that seeps into the soil until it reaches a layer of rock. This water, once it saturates the soil and collects in the rock, can flow into a river or lake or an aquifer. Some cities have underground aquifers that hold groundwater in a spring or well.[1]

Chemicals in the Water

There are several types of contaminants that can be found in drinking water. There can be bacteria and viruses that are typically removed through cities' disinfection and filtration processes. There can be agricultural and industrial runoff leading to high levels of pesticides and heavy metals in the water. Volatile organic compounds (VOCs), chlorine disinfection byproducts, and medications can all be found in the water supply as well.

In March 2008 the Associated Press released results of an investigation into pharmaceutical drugs in the tap water in the US. In Philadelphia investigators found 56 drugs in the tap water, including antibiotics and pain medication for cholesterol, asthma, epilepsy, and heart problems. In Southern California, 18.5 million people's water had antiepileptic and antianxiety medications, and a sex hormone was found in San Francisco's water. The water of Washington, DC, was found to have six different prescription drugs. All of the water tested had already gone through the city's water treatment facility.[2] The report outlines pharmaceutical medications found in all the major cities' drinking water in the US.

Many cities have excessive levels of trihalomethanes (THMs) in their water.[3] THMs are a byproduct of the disinfection process. Most cities use chlorine to disinfect the water. The THMs include chloroform, bromoform, bromodichloromethane, and dibromochloromethane. Exposure to these is through drinking water, showering, and bathing. These chemicals off-gas as chlorinated water heats up, thus making showering a common source of exposure. The THMs are associated with adverse birth outcomes, and they are known to cause cancer.[4]

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Agriculture and industry are two means by which VOCs, heavy metals, and pesticides end up in your drinking water. For many years, industry dumped chemicals into lakes, rivers, and streams, polluting surface water. Both agricultural runoff and industrial contamination have also affected groundwater. In Arizona, the Motorola company contaminated the groundwater with trichloroethylene (TCE). Motorola leaked TCE into the drinking water that serves Scottsdale and Paradise Valley. The cities instructed people to drink bottled water until the problem was corrected. Residents were not warned against bathing and showering in the contaminated water. Motorola ended up having to pay a $500,000 fine for dumping the cancer-causing toxin into the city's water supply.[5,6] The EPA declared the area a Superfund site. According to the Agency for Toxic Substances and Disease Registry, TCE is a VOC that causes cancer and has adverse effects during periods when organs are developing, and neurological effects.

According to the Environmental Working Group's National Drinking Water Database, the most common pollutants in the water are disinfection byproducts (trihalomethanes), nitrate, and arsenic. Nitrate enters drinking water sources from fertilizer runoff, leaching septic tanks, and erosion of natural deposits; it is also emitted by chemical, petrochemical, and metal-finishing industries. Arsenic contaminates drinking water due to mining runoff, erosion of natural deposits, emissions from glass and electronics processing, and the use of arsenical compounds as wood preservatives and pesticides. Other chemicals of concern in the water include fluoride, mercury, lead, polychlorinated biphenols (PCBs), pesticides, and dioxin.

The EPA sets the limits for amounts of chemicals allowed to be present in drinking water. Health officials and environmental groups argue that the limits are too high, allowing too many chemicals to be present in our water. These chemicals can build up in the body over time and cause adverse health effects immediately or later in life. The effects of arsenic, nitrates, trihalomethanes, and trichloroethylene are well researched and documented by the Agency for Toxic Substances and Disease Registry. The effects of pharmaceutical medications in the drinking water are unclear.

Home Water Filtration

Water filtration can remove most chemicals and impurities. It is important to first have the water at home tested for chemical contaminants to determine what exactly needs to be filtered out. City water departments offer testing, as do some specialty labs and companies. Each laboratory will have reference ranges for an acceptable amount of a chemical that should be in the water. Also available are the guidelines set forth by EPA and the Centers for Disease Control (CDC).

Once the water has been tested, purchase a filtration system designed to remove the chemicals of concern. Home water treatment systems are of two basic types, either point-of-use or point-of-entry.

Point-of-use devices treat water within the home, such as at the kitchen sink or at the shower head. If the chemical is only a concern for when you are cooking, bathing, or drinking the water in the kitchen, then a point-of-use system is fine.

A **point-of-entry** or **whole-house** system treats all the water coming into the house from the city line. This is recommended for chemicals such as radon and VOCs.

There are several different types of filtration devices on the market, and it can be confusing as to which one is the best. Again, it depends on what needs to be filtered out. A nonprofit organization called NSF International rates the various types of filtration systems available. They also certify units according to strict standards and guidelines. Go to www.nsf.org for a list of certified filtration systems. Here are a few examples of different filtration systems available for the home:

- activated charcoal/carbon
- reverse osmosis
- aeration
- distillation
- ion exchange
- ultraviolet light

Activated charcoal/carbon is the most common type of filter that people buy. This is the pour-through container wherein water is passed over the filter and collects into a plastic pitcher. It is effective for removing radon, organic chemicals, chlorine, odors, some VOCs and pesticides, lead, and trihalomethanes. These units can be connected to the kitchen sink, showerhead, point-of-entry, and manual fill pitcher. The filter must be changed every 2 to 3 months or bacteria will grow. Point-of-entry use is the most effective location for charcoal/carbon filters.

Reverse osmosis (RO) is effective for removing heavy metals, asbestos, some pesticides, VOCs, and trihalomethanes. Most RO systems are point-of-use and placed under the kitchen sink but can be installed as a whole-house filter. They typically come with the filter membrane plus a pre- and postfilter. These need to be changed every 6 months to avoid the growth of bacteria. The downside of RO systems is the amount of wastewater created during the filtration process. As the water is being treated, it is collected in a storage container and the impurities and chemicals are washed away in a stream of wastewater. A RO unit may take almost 3 hours to produce 1 gallon of treated water from several gallons of contaminated water. So, yes, a lot of water is wasted in this process.

Aeration is a point-of-entry system that can remove very high levels of radon and VOCs. Air is introduced into the water to volatize these chemicals which are then vented and released into the air. This of course creates a source

of air pollution. There are 3 types of aeration devices: a packed tower, bubble aerator, and spray aerator.

Distillation is one of the oldest methods of water treatments. These are point-of-use systems effective for removing arsenic, some pesticides, and organic chemicals, including heavy metals. The process is energy intensive, as the water is heated into steam and then cooled back to water, leaving any chemicals behind. There are two types: air cooled and water cooled. Air cooled makes 1 gallon of distilled water from 1 gallon of tap water. Water cooled makes 1 gallon of distilled water from 5 to 15 gallons of tap water. This method is not good for VOCs, trihalomethanes, and some pesticides.

Ion exchange replaces chemicals with ions such as sodium or chloride. The most common type of ion exchange is a water softener system. The other type is called an anion exchange device. These can remove some heavy metals but mostly remove hard minerals and salts. They can leave behind high levels of sodium in the water, which causes a problem for people with high blood pressure.

Ultraviolet light systems radiate the water to remove chemicals, microorganisms, spores, and viruses. They don't remove heavy metals, VOCs, and pesticides. They are energy intensive and the bulbs can be expensive.

Summary

There are many toxins, some known to present health risks, in the drinking water. Some are present naturally and others are regulated into the water by government agencies. Some are present due to other people's flushing items into the water system, such as prescription medications. People are exposed to these chemicals when eating, drinking, bathing, cleaning, and washing clothes. It's important to test the home water supply for chemicals present in the water and use appropriate filtration methods to decrease exposure to chemicals.

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Women's Health Update

by Tori Hudson, ND
womanstime@aol.com

Screening Mammography Confusions and Yoga: Back to Basics

Yoga's Effect on Mood, Fatigue, and Inflammation in Breast Cancer Survivors

This randomized controlled trial was conducted in breast cancer survivors post treatment to evaluate the impact of yoga on inflammation, mood, and fatigue. This trial compared a 12-week hatha yoga practice with a wait-list control condition. Two hundred breast cancer survivors with stage 0 (ductal carcinoma in situ; DCIS) to stage IIIa ranged from ages 27 to 76. All had completed their cancer treatment within the past 3 years except for hormonal therapies, such as tamoxifen or aromatase inhibitors, and all were at least 2 months after the last of their surgery or chemotherapy or radiation.

Women who were randomly assigned to the yoga participated in two 90-minute sessions per week. Women in the second group continued their usual activities and were told not to initiate any yoga. At the end of the study, the control group was offered the yoga classes. Study personnel who evaluated the data did not know which group the patients were in.

The main outcome measures were the production of proinflammatory cytokines interleukin-6 (IL-6), tumor necrosis factor alpha (TNF-alpha), and interleukin-1B (IL-1B, and scores on the Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF), the vitality scale from the 36-item short form of the Medical Outcomes Study (SF-36), and the Center for Epidemiological Studies-Depression (CES-D) scale.

A total of 186 women received the 12-week yoga classes and completed the immediate posttreatment assessment, and 181 completed the 3-month post–yoga treatment evaluation. Immediately post 12-week yoga, fatigue was not lower but vitality was higher in the yoga group compared with the control group. At 3 months post yoga classes, fatigue was lower in the yoga group; vitality was higher; and IL-6, TNF-alpha, and IL-1B were lower for yoga subjects compared with the control group. There was no difference in depressive symptoms post yoga when compared with the control group. More frequency of yoga practice produced even greater results in fatigue, vitality, and inflammation.

Comment: This trial is significant in that physical activity in breast cancer survivors showed significant changes in inflammation. Observational studies seem to show that more frequent and more intense physical activity lowers inflammation more than sedentariness. However, randomized controlled trials are few and inconsistent.

Another feature of this study was the improvement in sleep in the yoga-group participants. As many as 60% of cancer survivors have sleep problems, 2 to 3 times more than the noncancer adult population. Not only does disturbed sleep cause fatigue, it can also elevate inflammation. Guiding our postcancer patients to a yoga class is perhaps one of the simplest productive things that we can advise.

Kiecolt-Glaser J, Bennett J, Andridge R, et al. Yoga's impact on inflammation, mood, and fatigue in breast cancer survivors: a randomized controlled trial. *J Clin Oncol*. 2014;32(10):1040–1049.

Screening Mammography: Are You Confused?

A Confusing and Difficult Call: A Clinical Perspective

In women's health, nothing is quite as confusing and bustling with controversy as the role of screening mammography in low-risk women and its presumed reduction of mortality from breast cancer. Regular screening mammography is conducted in an attempt to reduce mortality from breast cancer. The practice is based on the presumption that mammograms detect breast cancers smaller than those detected by physical breast exams, meaning that they can be detected sooner on average than clinically palpable breast cancers. This "early detection" confers better prognosis than later detection of larger tumors. However, avoiding breast cancer-related deaths is not the only outcome to consider. Two other outcomes need attention as well: false alarms and overdiagnosis. According to a recent review in *JAMA Internal Medicine* by Welch and Passow, "Among 1,000 US women aged 50 years who are screened annually for a decade, 0.3 to 3.2 will avoid a breast cancer death, 490 to 670 will have at least 1 false alarm, and 3 to 14 will be overdiagnosed and be treated needlessly."[1]

According to randomized trials conducted from the 1960s to the 1980s, screening mammography reduced breast cancer mortality.[2] A significant insight into these studies is the plausibility that screening mammography was more effective in the past when breast cancer treatments were less effective. Researchers with this perspective point out, "If women with new breast lumps now present earlier for evaluation, the benefit of screening will be less. If clinically detected breast cancer has now improved, the benefit of screening will be less."[3] They also point out that these randomized trials occurred before 1990, and since then we no longer have randomized trials but observational studies in the US.

There has been much debate about the benefit versus harm of mammography in the last few years, especially since the United States Preventive Services Task Force (USPSTF) guidelines were published in 2009.[4] These guidelines differed from those of the major advisory groups on this subject (i.e., the American College of Obstetrics and Gynecology [ACOG], the American College of Radiology [ACR], the American Cancer Society [ACS], and the Susan G. Komen Foundation). I'll discuss those differences in a moment.

The most recent controversy and opportunity to rethink the situation comes with the just-published Canadian National Breast Screening Study and its findings from 25 years of follow-up in a screening mammography trial.[5] It was initiated in 1980 and included almost 90,000 women aged 40 to 59. All the women received baseline mammograms. Women aged 40 to 49 were randomized to 5 annual mammograms plus annual breast exams or to usual care. Women in the 50–59 age group were randomized to 5 annual mammograms plus breast exams or to only annual breast exams. Over the next 25 years, approximately the same number of incidences of and deaths from breast cancer occurred in each group. In short, annual screening mammography in women aged 40 to 59 did not reduce mortality from breast cancer any better than physical exam or usual care (when access to adjuvant therapy for breast cancer is free and available via the Canadian health-care system). In addition, 22% of screening detected cancers (106/484) represented overdiagnosed breast tumors.

This Canadian study is not the only study that has cast doubt on the value of screening mammography. Other findings in the last few years have revealed similar findings. These include the Kalager et al. study in Norway, the Mandelblatt et al. study, and the Atelier et al. study.[6–8] In 2012, Bleyer and Welch published a large analysis of 3 decades of screening mammography and breast cancer incidence using Surveillance, Epidemiology and End Results (SEER) data to examine data from 1976 through 2008. They concluded that yes, there were substantial increases in the number or cases of early-stage breast cancers detected through screening mammography, but it only slightly reduced the rate at which women presented with advanced breast cancer – suggesting that there is substantial overdiagnosis of approximately one-third of the cases. They also concluded that, at best, screening had only a small effect on the rate of death from breast cancer.[9] In a 2011 publication of Swedish data based on 3 decades of follow-up, major benefits of screening were observed, with a 31% lowered risk of breast cancer mortality in the screening group; however, the number of women needed to screen for 7 years to prevent 1 breast cancer death was 414.[10] In his stunning *New England Journal of Medicine* editorial after the Kalager et al. study, Gilbert Welch concluded with an even more alarming mathematical calculation: it would take screening 2500 women every year over a 10-year period to avoid 1 death from breast cancer.[6] These studies collectively have contributed greatly to the ongoing debate over the risk and benefit of screening mammography.

Analyzing the Pros and Cons

I have found it extremely useful to read the critiques of the recent Canadian study. The first point of contention is that the Canadian study dates back to a time when women had more primitive mammograms. Between 1980 and 1984, the technology and equipment were limited and mammograms could only detect 30% of breast cancers. Mammography today is in the range of being able to detect 70% to 80% of breast cancers. You can see the problem. Yes, the Canadian study is a randomized, controlled study, and over 25 years, but it's generated by technology from 34 years ago. Another critique is that the study was not truly randomized in that nurses and doctors preferentially put the patient into the mammography arm when a breast lump/mass was detected.

Critics of any conclusion other than an endorsement of screening mammography starting at age 40 also point out that many of the editorials and analyses of benefits and risks are based on calculations and numerical predictions rather than actual studies. They (ACOG, ACS, ACR, Komen Foundation, and many clinicians and surgeons amidst those groups) insist that we look at the actual studies, randomized and observational, that conclude that screening mammograms saves lives (i.e., early detection – and thus earlier treatment – leads to fewer deaths from breast cancer). Others point out that in fact there has not been a randomized trial in the US on this subject for about 50 years, and again, the earlier randomized trials showing benefit also occurred when there were less-effective treatments and less awareness of breast cancer and exams.

I won't be surprised if you are confused, even with this attempt at reducing a vast amount of complicated and contradictory data into a simplified discussion.

The most important thing for clinicians is to determine how to advise our patients amidst all of this confusion. The key 2009 USPSTF recommendations are as follows:

- no universal screening mammography for women ages 40–49 and urging an individualized, informed decision-making process based on specific benefits and harms;
- biennial screening mammography for women aged 50–69;
- screening extended to women between 70 and 74 ;
- insufficient evidence to assess the benefits and harms of screening mammography in women 75 and older;

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- insufficient evidence to assess the benefits and risks of clinical breast exams in women aged 40 years and older who undergo mammography, digital mammography, and MRI versus film mammography;
- teaching self-examination is harmful and not recommended;
- these recommendations do not apply to women who are at excess risk for breast cancer due to known genetic mutations or histories of chest radiation.

The key ACOG, ACS, ACR, and Komen Foundation guidelines for screening mammography in low-risk women are as follows:

- screening mammograms starting at age 40 and annually thereafter;
- clinical breast exams yearly for ages 40 and older;
- clinical breast exams every 1–3 years for women 20–39 years of age.

What Do We Tell Our Patients?

When speaking with patients, I let them know that there are 4 camps that differ greatly regarding screening mammography:

Camp 1 is the dominant school of thought, held by organizations including ACOG, ACR, ACS, and Komen Foundation. They all recommend screening mammography yearly starting at age 40 and ending approximately mid-70s, although this is based on individual health and ability to withstand treatment regimens.

Camp 2 is held by the USPSTF, which is quite a bit different with screening mammography. This recommendation is not to start mammography screening in low-risk women until age 50, and then to do it every other year.

Camp 3 is a model common in many European countries: screening mammography every 3 years, some starting at age 40 and others at 50. There is no evidence that countries using this model have any higher rates of breast cancer mortality than countries that employ more frequent screening.

Camp 4: no screening at all in low-risk women, based on calculations from one of the leading US researchers on analyzing screening mammography data. As mentioned earlier, his conclusions are that it would be necessary to screen 2500 women every year for 10 years to avoid 1 death from breast cancer.

I also point out a few caveats to my patients. The first is that the data do not explain whether avoiding screening mammograms (and their potential for earlier detection) will result in exposing women to more aggressive treatments and the ensuing impacts on quality of life and adverse effects. The second is that breast cancer diagnosed in younger women, ages 40 to 49, tends to be more aggressive. So screening mammography in this age group might in fact be more important than screening mammography after age 50 or so.

After sharing all the above information, I believe that my patients are reasonably well informed and can make their own decisions, with my support.

Final Comments

Some readers might conclude that they won't recommend screening mammography at all or may instead choose to recommend breast thermography. Before doing so, I recommend the excellent article by Walker and Kaczor: "Breast Thermography: History, Theory, and Use."[11] The recent research pointing to more serious questions about the benefits vs. harm of screening mammography in low-risk women has not caused me to stop recommending screening mammography or to suggest thermography. Instead it has caused me to have an increased awareness that the mortality benefit is possibly modest and that my recommendations and my patients' decisions may in fact be a close call with trade-offs of modest benefit and modest harm. This highlights the need for us to make individual recommendations based on known risk factors including obesity, more than 7 alcohol drinks per week, a first-degree relative with breast cancer history, BRCA mutations, and the slight increased risk incurred after estrogen with progestin (and not necessarily progesterone and not estrogen only) use for 3 to 4 years in postmenopausal women. As a point of clarification, though, I would typically recommend annual screening for these higher-risk women 40 and older.

I always try to present information and recommendations in a manner that provides my patients with quality and up-to-date information and encouragement to decide what they are comfortable with and what choice they want to make for themselves.

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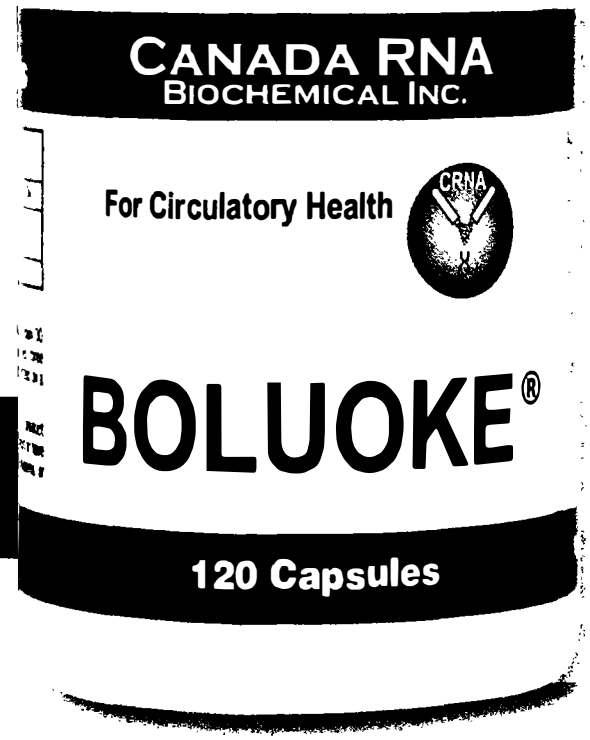

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Please submit an announcement of your event 90 days in advance. Event publication must be limited to 25 words or less. Multiple event listings require paid advertising. Contact calendar@townsendletter.com for details.

AUGUST 9: GASTROINTESTINAL FUNCTIONALITY & HEALTH WORKSHOP II in Fort Lauderdale, Florida. Also, **AUGUST 10** in Washington DC; **AUGUST 16** in Phoenix, Arizona; **AUGUST 17** in San Francisco, California. CONTACT: www.clin-ed.org

AUGUST 22-24: 9TH INTERNATIONAL SYMPOSIUM FOR HYPERBARICS in Albuquerque, New Mexico. CONTACT: 954-575-4973; Sharon@hbot2014.com; www.hbot.2014.com

AUGUST 29-31: WORLDLINK MEDICAL presents MASTERING THE PROTOCOLS FOR OPTIMIZATION OF HORMONE REPLACEMENT THERAPY featuring Neal Rouzier, M.D. in Salt Lake City, Utah. 18.5 CME Credits. CONTACT: 888-222-2966; www.worldlinkmedical.com/courses/bhrt-series/part-i/may-2014

AUGUST 30-SEPTEMBER 1: CANCER CONTROL SOCIETY presents its 42nd ANNUAL ALTERNATIVE THERAPIES CANCER CONVENTION @ Sheraton Universal in Universal City, California. **SEPTEMBER 2:** Doctors' Symposium. CONTACT: 323-663-7801; www.cancercontrolsociety.com

SEPTEMBER 3: BUS TOUR OF MEXICAN CANCER CLINICS starts in Universal City, California. Also, **SEPTEMBER 13.**CONTACT: 209-529-4697; frankcousineau@yahoo.com

SEPTEMBER 10-13: AMERICAN ACADEMY OF ANTI-AGING MEDICINE FELLOWSHIP MODULES, BHRT SYMPOSIUM & BOARD CERTIFICATION EXAMS in Phoenix, Arizona. CONTACT: 888-997-0112; www.A4M.com

SEPTEMBER 12-13: INTERNATIONAL ACADEMY OF ORAL MEDICINE & TOXICOLOGY (IAOMT) ANNUAL GENERAL MEETING in Austin, Texas. CONTACT: 863-420-6373; www.iaomt.org

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SEPTEMBER 13: NUTRITIONAL PERSPECTIVES ON NEUROLOGICAL DISORDERS with Court Vreeland, DC, DACNB in Charlotte, North Carolina. Also, **NOVEMBER 8** in Daytona Beach, Florida. CONTACT: Biotics Research, 800-231-5777; www.bioticsresearch.com

SEPTEMBER 15-17: PREVENTING OVERDIAGNOSIS @ Oxford University in Oxford, United Kingdom. CONTACT: www.preventingoverdiagnosis.net

SEPTEMBER 17-20: INTERNATIONAL PLANT-BASED NUTRITION HEALTHCARE CONFERENCE in San Diego, California. CONTACT: pbnhc.com/

SEPTEMBER 19-21: INTEGRATIVE MEDICINE FOR MENTAL HEALTH 5th ANNUAL CONFERENCE in San Antonio, Texas. Presented by Integrative Medicine for Mental Health. CONTACT: www.mentalhealthconference2014.com/

SEPTEMBER 20: MASTERING THE SCIENCE OF INTEGRATIVE BLOOD CHEMISTRY with Abbas Qutab in Windsor Locks, Connecticut. Also, **NOVEMBER 15** in Charlotte, North Carolina. CONTACT: Biotics Research, 800-231-5777; www.bioticsresearch.com

SEPTEMBER 20: A DIFFERENT LOOK AT THYROID, CHOLESTEROL & DIABETES USING BLOOD CHEMISTRY with William Kleber, DC, DABCI in Naples, Florida. CONTACT: Biotics Research, 800-231-5777; www.bioticsresearch.com

SEPTEMBER 20-21: NOVA SCOTIA NATUROPATHIC CONFERENCE 2014 in Halifax, Nova Scotia, Canada. Presenters: Lawrence Freedman, DDS, NMD, IBDM; Jeff Harris, ND; Kumar Biswas, ND. CONTACT: nsnc.info

SEPTEMBER 20-21: HEALTHY AGING THERAPEUTICS SYMPOSIUM @ Harvard Medical School in Boston, Massachusetts. CONTACT: 888-997-0112; www.A4M.com

SEPTEMBER 22-24: NEURAL THERAPY WORKSHOP in Halifax, Nova Scotia. CONTACT: Jeff Harris ND, 206-517-4748; www.jeffharrisnd.com

SEPTEMBER 26-28: INTERNATIONAL COLLEGE OF INTEGRATIVE MEDICINE CONFERENCE on PAIN in Dearborn Inn, Michigan. CONTACT: www.IntegrativeMedicineConference.com

SEPTEMBER 26-28: METAGENICS' 3RD ANNUAL LIFESTYLE MEDICINE SUMMIT – Transformational Patient Care: Powering the Paradigm Shift in Nashville, Tennessee. CONTACT: 800-692-9400 (US); 800-268-6200 (Canada); www.metagenics.com/2014summit

OCTOBER 3-4: 2014 RIORDAN IVC AND CANCER SYMPOSIUM-Addressing the Metabolic Roots of Cancer in Wichita, Kansas. 16.5 CMEs. CONTACT: 316-682-3100; www.ivcandcancer.org

OCTOBER 4: ORGANIC ACIDS TESTING: AN INVALUABLE TOOL FOR DISCOVERING THE UNDERLYING CAUSES OF CHRONIC ILLNESS WORKSHOP in Seattle, Washington. Also, **DECEMBER 6** in Houston, Texas and **FEBRUARY 21** in San Diego, California. Presented by The Great Plains Laboratory, Inc. CONTACT: www.GPL4U.com/workshops

OCTOBER 4: PERSPECTIVES ON NEUROLOGICAL DISORDERS with Court Vreeland, DC, DACNB in Bethesda, Maryland. Also, **DECEMBER 6** in Windsor Locks, Connecticut. CONTACT: Biotics Research, 800-231-5777; www.bioticsresearch.com

OCTOBER 8-12: AARM RESTORATIVE MEDICINE CONFERENCE-Integrating Hormones, Nutrition and Herbal Medicine for Treating GI Disorders and the Origins of Chronic Disease in Santa Fe, New Mexico. Earn up to 30 CME hrs. CONTACT: www.RestorativeMedicine.org

OCTOBER 9-12: ILADS ANNUAL CONFERENCE & FUNDAMENTALS COURSE in Washington, D.C. CONTACT: www.ilads.org

OCTOBER 10-11: 30TH ANNUAL SYMPOSIUM ON ACUPUNCTURE, ELECTRO-THERAPEUTICS AND RELATED LATEST DEVELOPMENTS IN INTEGRATED MEDICINE in Belgrade, Serbia. CONTACT: Yoshiaki Omura, M.D., Sc.D, 1-212-781-6262; icaet@yahoo.com; www.icaet.org/seminars.html

OCTOBER 23-26: INTEGRATIVE SOLUTIONS FOR 21ST CENTURY MEDICINE in Albuquerque, New Mexico. Pre-conference workshops on electromagnetic hypersensitivity, mold, mycotoxins, and low-dose allergens. CONTACT: De Fox, 316-864-5500; defox@aaemonline.org; aaemconference.com

OCTOBER 26-30: ACADEMY OF INTEGRATIVE HEALTH & MEDICINE CONFERENCE-Science and Connection in San Diego, California. CONTACT: Scripps Conference Services, 858-652-5400; med.edu@scrippshealth.org; scripps.org/conferenceservices

OCTOBER 28-NOVEMBER 3: 41ST BIOLOGICAL MEDICINE TOUR TO GERMANY & BADEN-BADEN MEDICINE WEEK: Clinical Applications in Biological Medicine. Exclusive OIRF English language lectures from renowned German clinicians and researchers CONTACT: Occidental Institute, 800-663-8342 or 250-490-3318; fax 250-490-3348; support@oirf.com; www.oirf.com

OCTOBER 29-31: AICR 2014 ANNUAL RESEARCH CONFERENCE ON FOOD, NUTRITION, PHYSICAL ACTIVITY AND CANCER in Washington, DC. CONTACT: 202-328-7744; research@aicr.org; www.aicr.org/cancer-research/conference/

NOVEMBER 7-10: HEALTHY MEDICINE ACADEMY'S FOURTH ANNUAL INTEGRATIVE CANCER MEDICINE SYMPOSIUM in Phoenix, Arizona. Focus on clinical applications. Keynote Speaker: Keith Block, MD, the father of integrative oncology. 32.25 AMA; 36 ND CMEs; & more. CONTACT: (303) 499-1223; www.healthymedicineacademy.com; info@healthymedicineacademy.com. ◆

Is It Really 'Adrenal Fatigue'?

"Adrenal fatigue" is a frequent diagnosis among holistic and nutritionally oriented practitioners, some of whom believe that it is among the most common causes of fatigue. However, practitioners who diagnose "adrenal fatigue" typically do not define clearly what the term means, so it is not certain what this diagnosis refers to. In endocrinology, "adrenal insufficiency" and "hypoadrenalism" refer to the inability of the adrenal glands to secrete sufficient amounts of hormones to meet the body's needs. While severe adrenal insufficiency (Addison's disease) is a relatively rare condition (estimated prevalence, 4 to 11 cases per 100,000 population), milder forms of the disease are likely more common. Nevertheless, in my experience, true adrenal insufficiency (either overt or mild) is not a highly prevalent condition, and it certainly is not among the most common causes of fatigue. During my 19 years of clinical practice, for every patient I saw whose fatigue was due primarily to hypoadrenalism, at least 20 had fatigue due primarily to hypothyroidism. Fatigue caused by reactive hypoglycemia or food allergy and fatigue that responded to basic nutritional supplements (such as B vitamins and magnesium) were also far more common than fatigue due to adrenal insufficiency.

Hans Selye described the 3-stage biological response to stress, which he called the *general adaptation syndrome*. Stage 1, also called the "alarm" stage, is the acute response to stress, in which epinephrine and cortisol are released into the bloodstream to mount the fight-or-flight response. Stage 2 is the "adaptation" stage, in which various systems and organs in the body adapt in order to mitigate the adverse effects of continued stress. The third stage is the "exhaustion" stage, in which the body is no longer able to adapt to or resist the effects of stress. Continued stress can lead to conditions such as hypertension, heart disease, impaired immune function, and increased risk of infection. However, there is no clear evidence that ongoing stress causes the adrenal glands to "burn out," at least not any more than the body's many other vital organs and systems might "burn out." Fatigue and other symptoms often attributed to "adrenal fatigue" might be due more to the deleterious effects of chronic overproduction of cortisol and epinephrine than to a loss of adrenal function.

For example, both epinephrine and cortisol increase urinary magnesium loss, and chronic overproduction of these hormones can result in magnesium depletion. Magnesium deficiency exacerbates the effects of stress, potentially leading to a vicious cycle of poorer tolerance to stress and further magnesium depletion. The manifestations of magnesium deficiency are similar to those of adrenal insufficiency, and include fatigue, anxiety, depression, poor stress tolerance, lightheadedness, and insomnia.

Practitioners often rely on an "adrenal stress index" test to diagnose adrenal fatigue. This test measures salivary concentrations of cortisol and other compounds at 4 time points – 8 a.m., noon, 4 p.m., and midnight. According to some practitioners, adrenal fatigue may be diagnosed when at least one of the four cortisol levels is low. However, having an isolated low cortisol level does not necessarily indicate impaired adrenal function. For example, a low cortisol level in the morning could be a normal adrenal response to a circadian rhythm that is out of balance. Furthermore, patients might not have true hypoadrenalism even when all four of their salivary cortisol measurements are low. As suggested by William McK. Jefferies in his book *Safe Uses of Cortisol*, a true "adrenal stress test" should measure cortisol levels both before and after an ACTH injection. Jeffries considered patients to have "low adrenal reserve" if their morning cortisol level did not double after they received ACTH. The ACTH stimulation test is more reliable than an unstimulated test for assessing the capacity of the adrenal glands to respond to a stressor.

Other patterns on the salivary test are also claimed to have diagnostic value, but those claims are open to

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question. For example, low cortisol levels in the morning combined with high levels in the afternoon or at night have been correlated with morning exhaustion, followed by hyperstimulation and insomnia at night. While those clinical correlations may indeed exist, the observed cortisol pattern might simply be a normal adrenal response to abnormal body chemistry (such as an increase in cortisol levels in response to afternoon hypoglycemia).

Many of the treatment recommendations for "adrenal fatigue" are nonspecific, such as reducing stress levels, avoiding refined sugar and processed foods, identifying and avoiding allergenic foods, and getting adequate sleep and hydration. These are all sensible interventions, but they would be expected to improve health in most tired people, regardless of whether or not their adrenals are exhausted. Herbs such as *Panax ginseng* and rhodiola, which are also used to treat "adrenal fatigue," have diverse actions in the body, so a positive response to these herbs should not be considered to prove the presence of adrenal fatigue.

My opinion that "adrenal fatigue" is an uncommon cause of fatigue stems in part from observing more than 1000 patients who had clinical evidence of hypothyroidism, but normal laboratory tests for thyroid function. A large proportion of those patients suffered from fatigue and other symptoms that overlap with those of hypoadrenalism, and those symptoms usually improved after treatment with thyroid hormone. It is well known that people with hypoadrenalism typically have an adverse reaction even to low doses of thyroid hormone. However, only a small minority of my patients (perhaps about 5%) had an adverse reaction, which suggests that unrecognized hypoadrenalism was not a common problem in this patient population.

I tend to consider a diagnosis of hypoadrenalism in patients with fatigue who are underweight; who have low blood pressure, allergies, and poor tolerance to stress, exercise, and sexual activity; and who suffer from reactive hypoglycemia. An adverse reaction to low doses of thyroid hormone also increases my index of suspicion for hypoadrenalism. A positive response to licorice root (*Glycyrrhiza glabra*) extract is considered to confirm the diagnosis; licorice root is a specific treatment for hypoadrenalism, because it delays the breakdown of adrenal hormones.

While it is reasonable to question the laboratory criteria that some practitioners use to diagnose adrenal fatigue, making such a diagnosis is, for the most part, not harmful. Indeed, offering a biochemical explanation for vague or psychosomatic symptoms might be validating for patients who have previously been told that their symptoms are all in their head; and it could help persuade some people to engage in beneficial lifestyle changes. However, concentrating on a specific organ might cause the practitioner to focus less on the "whole picture." More important, licorice root in therapeutic doses is more likely to cause adverse effects (including hypertension, congestive heart failure, and rhabdomyolysis) in patients with normal adrenal function than in those with true hypoadrenalism.

Alan R. Gaby, MD

Emerson Ecologics Quality Program Turns Over a New Leaf

Emerson Ecologics LLC, the leading distributor of over 275 professional brands of vitamins, supplements, and natural health products to health-care practitioners, announced today that it is raising the bar for its Emerson Quality Program (EQP). The key change to the program includes a revised assessment of every brand distributed by Emerson in order to demonstrate present compliance with current Good Manufacturing Practices (cGMP). This assessment of all distributed brands assures that all dietary supplement products that practitioners select for their patients come from brands that adhere to the standards set forth by Emerson Ecologics, based on federal regulations regarding the manufacture of dietary supplements.

"By requiring all of the brands we carry to verify their compliance to current Good Manufacturing Practices," said Andy Greenawalt, CEO, "we reinforce our commitment to our customers as their preferred source of safe, trustworthy, and clinically effective products, while allowing the increasing number of brands that go beyond required quality processes to share their practices with our professional customers. The industry has come a long way in the last four years and it was time to update our program to reflect this progress." As a result of this new requirement, some brands have been discontinued for failure to verify their compliance.

Additional changes to the Emerson Quality Program include elimination of the base EQP Partner level, further distinguishing the EQP Silver and EQP Gold Partners for going above and beyond the quality practices required by law. EQP Silver and EQP Gold Partners have all exceeded cGMP requirements, including the use of the most sensitive analytical testing methods for required ingredient and product testing and testing all at-risk materials for a full profile of contaminants and impurities. Emerson has also increased its own verification testing of finished products and will now include annual testing of multiple products for all EQP Silver and EQP Gold Partners. The verification activities of the EQP include an Emerson on-site audit for all EQP Silver and EQP Gold Partners.

For more than 30 years, Emerson Ecologics LLC has been providing professional-quality nutritional supplements, vitamins, and natural health products to health-care practitioners, representing over 275 brands. Customers include naturopathic, chiropractic and medical doctors, licensed acupuncturists, nutritionists, and integrative practitioners, as well as their patients. Since 2009, Emerson Ecologics has also been widely recognized for its innovative Emerson Quality Program (EQP). EQP Silver and EQP Gold Partners are verified to exceed FDA Dietary Supplement current Good Manufacturing Practices (cGMP) standards and represent the best quality in the industry. Headquartered in Manchester, NH, with distribution centers in Virginia and California, Emerson Ecologics is GMP registered by NSF International. For more information, visit emersonecologics.com

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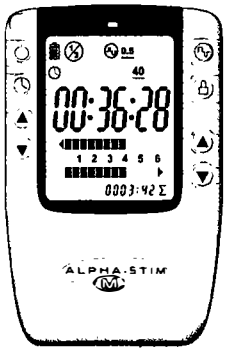

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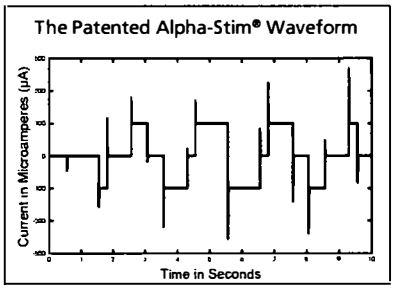

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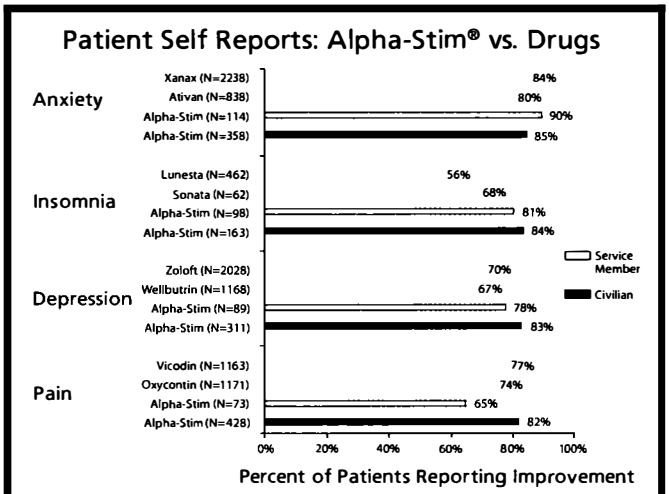

Patients who reported a positive response according to: WebMD Drug Surveys, and Alpha-Stim Service Member and civilian surveys. Alpha-Stim Data from 2011 Military Service Member Survey (N=152) and Alpha-Stim Patient Survey (N=1,745). Conducted by Larry Price, PhD, Associate Dean of Research and Professor of Psychometrics and Statistics, Texas State University. Pharmaceutical Survey Data from: www.WebMD.com/drugs. Accessed on October 28,2011.

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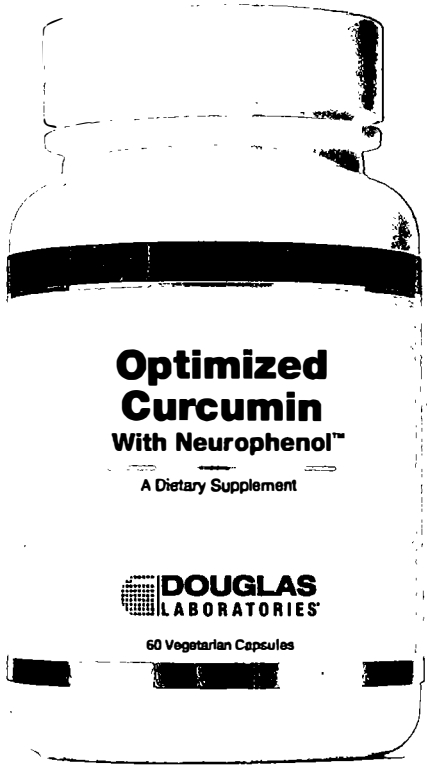

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