From Citrus Fruit to Medical Breakthrough

The Unique History and Extraordinary Future of **Modified Citrus Pectin**

By Isaac Eliaz, M.D., M.S., L.Ac.

"One day, they will find out there is a cure for cancer in the peel of an orange"

I'll never forget those words. They came from Dr. Ruth Cohen, a neighbor of mine during my childhood in Israel 40 years ago. In a country known for its prized citrus fruits, she and her husband Leo were organic chemistry scientists with a particular focus in the field of citrus pectin.

Decades later I began to see how true Ruth's statement really was. What once seemed like mere wishful thinking was becoming a remarkable reality. A large body of scientific research now shows that the nutrient Modified Citrus Pectin (known as MCP) may well be one of the most important natural compounds to use on a daily basis, because it safely and powerfully addresses a wide variety of serious health problems.

Today I am excited to share with you the incredible body of MCP research that demonstrates potent cancer fighting properties and significant health benefits for preventing and reversing numerous chronic conditions. These results are the fruit of my life's mission to research and develop natural solutions that can fight disease and restore health. As I will describe in detail in the following pages, these important discoveries offer exciting new hope for everyone seeking safe and effective natural health solutions.

THE REMARKABLE BENEFITS OF MODIFIED CITRUS PECTIN

MCP EFFECTIVELY FIGHTS CANCER, INFLAMMATION, FIBROSIS AND MORE...

Years of research have demonstrated that a very specific form of MCP is one of the most potent and effective natural cancer-fighting nutrients available. However, as the body of evidence grows, it's clear that MCP's benefits don't end there.

Once known solely for its ability to combat many cancers, a fast-growing body of high- impact, independent peer-reviewed studies are showing this MCP to be extremely valuable for inflammatory and fibrosis (uncontrolled scar tissue formation) conditions like cardiovascular disease, kidney disease, sepsis, liver cirrhosis, diabetes, arthritis and others.

These results are due to a particular mechanism of action: The unique ability to block the devastating effects of "rogue protein" galectin-3. In fact, the form of MCP which I worked to develop, is currently the only available agent shown through extensive research to halt and in many cases, reverse the impacts of harmful galectin-3 throughout the body. This MCP is known in the literature as the "most-researched galectin-3 inhibitor."

Galectin-3 represents one of the fastest growing fields of medical research today. Thousands of published studies show how galectin-3 functions as a driver of deadly inflammation, fibrosis, cancer formation and metastasis, immune suppression and more. Importantly, because of its unique ability to enter the circulation and bind and block galectin-3 molecules throughout the body, this specific form of MCP is earning a reputation as one of the most advanced and effective supplements for the treatment of our most critical health conditions, from cancer to cardiovascular disease, kidney failure and much more.

BROAD-SPECTRUM BENEFITS

Blocking galectin-3 to halt and reverse cancer and deadly fibrosis are not the only critical benefits of this MCP. Several clinical studies have shown that MCP can safely remove harmful heavy metals, radioactive isotopes and environmental toxins from the body. MCP's unique molecular structure, which I will explain in detail later, makes it easily absorbed into the bloodstream where it can work throughout the body to gently remove health-robbing toxins, without affecting essential mineral levels.

As the research continues to expand, so too do the indications for MCP as a powerful therapy across numerous conditions. For example, MCP has been shown to activate the lymphocyte cells known as Natural Killer (NK) cells in human blood samples, increasing their ability to destroy leukemia cells in culture. In another study, MCP was shown to reduce Shiga toxin damage from E. Coli infection, adding another mechanism of action under the immune health benefits of this natural ingredients.

MCP has also been shown to enhance the effects of other treatments, particularly in the area of cancer. MCP is shown to work synergistically with certain chemotherapy drugs, as well as radiation therapy and botanical agents, allowing lower dosages of these therapies to produce more significant clinical outcomes.

RESEARCH & DEVELOPMENT

REGULAR PECTIN VS MODIFIED CITRUS PECTIN: THE LIFE-SAVING DIFFERENCE

You encounter regular (unmodified) pectin on a daily basis as a thickening agent for jams, jellies and other foods—yet the medical benefits of regular pectin are not widely recognized. On a basic chemistry level, pectin is a soluble fiber found in abundance in the rinds and peels of fruits like oranges, lemons, grapefruits and apples. Besides its usefulness in your kitchen, regular pectin actually provides a number of dietary health benefits, especially in the stomach and intestines where it can help to remove toxins.

In the intestinal tract, regular pectin can bind and help remove mutagens — harmful particles such as heavy metals, radioactive isotopes, and environmental toxins which are capable of mutating DNA, disrupting cellular functions, and wreaking havoc in the body. This is why pectin is known to reduce cancerous risks to your colon, and there are over a dozen published studies demonstrating this relationship.

While the benefits of regular pectin to the digestive tract were understood for many years, pectin's molecules were simply too large to provide benefits throughout other parts of the body. This meant that the additional disease-fighting properties in pectin remained untapped — until the discovery of MCP.

EARLY SCIENTIFIC VALIDATION

In the ongoing search for a safe, natural substance useful in cancer therapy, MCP has emerged as one of the most promising. The first research on MCP was published in 1992 by Dr. Avraham Raz, a researcher at Wayne State University. Knowing the benefits of regular pectin, Dr. Raz was able to successfully demonstrate that a smaller pectin molecule could provide benefits in the fight against cancer.

Understanding the vital importance of these findings, I worked together with a handful of doctors and researchers to develop a standardized MCP — a natural pectin powder that is molecularly much smaller than regular pectin.

With a much smaller size and different molecular structure, this MCP's molecules can be easily absorbed into the bloodstream for maximum bioavailability and bioactivity throughout the body. Through this novel and safe modification, a flood of previously unknown health applications emerged, heralding a new chapter in the field of integrative cancer research.

A POWERFUL SUBSTANCE

THE RIGHT MODIFICATIONS CREATE A POWERFUL AND EFFECTIVE COMPOUND

Discussing the molecular composition of any nutrient is not a simple topic. But since it is the most crucial aspect of MCP's cancer-fighting abilities, I'd like to explore in depth the differences between regular pectin and MCP.

MOLECULAR WEIGHT AND ESTERIFICATION

In the body, the size of the pectin molecules ultimately determines where they can go and what they can do, and this value is expressed in terms of molecular weight, or kilodaltons (kDa). Regular pectin, such as what you would find in your kitchen, has molecules that are between 50 and 300 kilodaltons (kDa) -- far too large to enter the bloodstream and offer the whole-body health benefits we have been discussing.

To create an effective MCP, the proper method employs an enzymatic and pH process to yield an average molecular weight range between 3 and 15 kDa. This is the most scientifically proven and biologically active weight and the only MCP size that is effective in human clinical trials.

Along with the correct molecular weight, another key factor to consider is the pectin's degree of esterification — and the rule of thumb is the smaller, the better. Regular pectin has a degree of esterification of about 70 percent — but even some modified forms have as much as 50 percent, rendering it largely ineffective. The most powerful preparations of MCP have a degree of esterification of less than 10 percent. If the degree of esterification is too high, then the pectin chains link together and cross-bridge to each other, instead of binding and blocking galectin-3.

When looking for the most effective MCP, the molecular weight needs to be between 3 and 15 kDa and the esterification should be below 10 percent. These precise specifications are what guarantees the full benefits MCP as shown in the published literature.

THE ONLY AVAILABLE GALECTIN-3 BLOCKER

CANCER, GALECTIN-3 AND MCP

In the last few decades, hundreds of studies have shown that galectin-3 plays a primary role in cancer formation, proliferation, metastasis and evasion of the immune system. In small amounts, galectin-3 aids cellular communication, and healthy growth and development. However, large scale studies show that unhealthy galectin-3 expression indirectly promotes abnormal cell behaviors involving inflammation and fibrosis, uncontrolled abnormal cell growth, colony formation (tumors), and metastasis, among others. For this reason, galectin-3 has been termed the "guardian of the tumor microenvironment."

Because MCP is small enough to enter the bloodstream and is naturally attracted to galectin-3, it will bind and block rogue galectin-3 molecules. This is the main mechanism by which MCP can prevent the growth and spread of cancer, and other chronic degenerative conditions.

HOW MCP BLOCKS GALECTIN-3

In the last few decades, hundreds of studies have shown that galectin-3 plays a primary role in cancer formation and proliferation. It's important to understand how cancerous cell behavior differs from normal, healthy cell behavior, so let's take a moment to explore some of the biological misfires involved in cancer's formation.

Healthy cells die and regenerate as part of an orderly process -- as one becomes sick, another is produced to replace it. When this cell formation accelerates, however, it causes cells to "pile-up" and form a tumor. But as long as these cells appear normal and static, the tumor is considered harmless, or "benign."

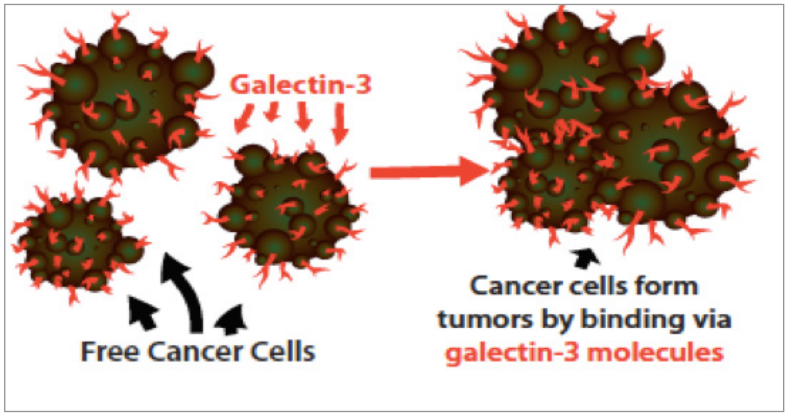
Unlike benign tumors, cancerous tumors are malignant. They're marked by uncontrolled growth and the ability to spread aggressively -- a process known as metastasis. If given the opportunity, they will spread through your entire body, invading healthy tissues and causing new tumors. And this dangerous ability hinges on the presence of excess galectin-3.

Galectin-3 promotes cancer progression in 3 interconnected ways:

- It allows cancer cells to attach to one another, forming groups that can survive in your bloodstream and migrate to other parts of your body.

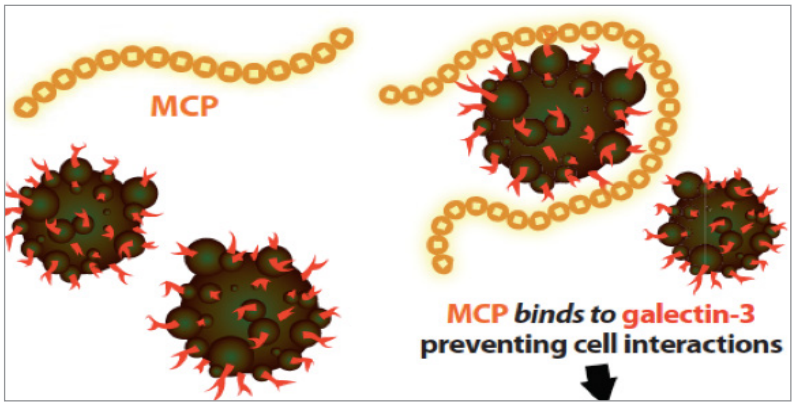
- Once cancer cells have formed a main tumor, galectin-3 allows the cells to aggregate and grow, and attach themselves to new sites as well, forming secondary tumors.

- Lastly, galectin-3 nourishes malignant tumors by stimulating new blood vessel growth (even where there was no blood supply before) to feed the tumor. This process is called angiogenesis.



It's no surprise, then, that these deadly galectin-3 molecules have become a primary target in modern cancer prevention and treatment. If you disarm a cancer cell's ability to communicate, you essentially pull the plug on its power supply. If it cannot spread or nourish itself, ultimately it will die.

MCP's affinity to bind to galectin-3 makes it a vital weapon in blocking the spread of cancer. By tying up galectin-3 on cancer cells' surface, it can disable their ability to communicate, nourish themselves and grow.



PROSTATE CANCER

DOUBLE-BLIND CLINICAL TRIAL IN PROSTATE CANCER

Research on this MCP in prostate cancer continues to expand and gain momentum. The most recent groundbreaking study is a double blind clinical trial on men with biochemically relapsed prostate cancer. Interim six months results on 45 patients were initially presented at the ASCO-GU (American Society of Clinical Oncology- Genitourinary) Annual Cancer Symposium in San Francisco, CA, in February 2018.

These results demonstrated the ability of MCP to slow PSA doubling time (PSADT). PSADT is an accurate measurement for recurrent prostate cancer growth in patients whose prostate has been treated with surgery and/or radiation. Of the 45 patients enrolled at the six-month evaluation, 68% (31 patients) showed reduction in disease progression.

Updated results from this study following an additional 12 months of treatment with MCP were published in European Urology Supplements and presented at the 11th European Multidisciplinary Congress on Urological Cancers—EMUC19, in Vienna, Austria, November 2019. This extended arm of the study followed the 31 patients who successfully completed the first six months of the trial, to further evaluate the long-term effects of MCP treatment at 5 grams/three times daily. These results showed that 65% of subjects had no disease progression. There was no treatment interruption due to adverse effects. 50% of subjects had a lower PSA, or PSADT lengthening at 18 months, compared to their baseline 18 months prior. Currently, the 60 patients planned for the study have completed the initial 6 months with promising results, and all the patients who showed benefit are continuing for an additional 12 months. These trial results mirror what my colleagues and I see in practice all the time: Cancer patients who use this MCP regularly experience significant, clinically relevant benefits.

HISTORY OF MCP RESEARCH IN PROSTATE CANCER

In 1995 while I was developing Modified Citrus Pectin, the first in vivo research on prostate cancer metastases was conducted by Dr. Kenneth J. Pienta. The results were excellent showing a 56% decrease in lung metastases—a significant difference. This was quite a dramatic study published in the prestigious Journal of National Cancer Institute (JNCI).

These results paved the way for future research, and the first human trial—a small pilot study conducted by myself along with Dr. Stephen Strum in 1995 and 1996—was presented at the International Conference on Diet and Prevention of Cancer in Finland in 1999. Seven patients with local recurrence of prostate cancer after local therapy were administered 15 grams of MCP per day for 12 full months. During the study, PSA doubling time, which is a measurement that reflects the rate at which the cancer is growing, was evaluated at the 3, 6, and 12 month mark and the results were extremely promising: four out of the seven patients responded with a lengthened prostate specific antigen doubling time (PSADT) of more than 30%. PSA doubling time reflects the speed at which prostate cancer is growing. Lengthening of the PSADT reflects a slowing down in the progression of the disease.

Additional analysis using prostate cancer cells was presented at the conference in Finland. It revealed that MCP does indeed interfere with cancer cell growth and metastasis, resulting in cytotoxicity (cancer cell death) between 76.9 and 80.7%, compared with only 3.8% in the control.

Both results warranted a longer and more controlled phase-II study, which was finally completed in December 2003. This time, 10 patients with biochemical relapse of prostate cancer after local therapy were given 15 grams of MCP each day for a year. 80% of the participants showed positive response to MCP treatment, with a significant slowing in the rise of their PSA, which represents a slowing of disease. Seven out of ten patients more than doubled their PSA doubling time—ultimately leading to a significant reduction in the chance of premature cancer death. This is of great clinical importance as MCP does not exert its benefit through hormonal mechanisms. Since MCP serves as a binder that slows the growth and spread of cancer without any detrimental long-term side effects or damage, its ability to slow down the progression of the cancer translates into increased longevity.

COLUMBIA UNIVERSITY PROVES MCP EFFECTIVE FOR AGGRESSIVE PROSTATE CANCER

In 2010, research from Columbia University was published in the journal Integrative Cancer Therapies offering some additional answers as to how MCP is able to achieve such remarkable anti-cancer effects. Laboratory results indicate
that MCP can inhibit cell proliferation and promote apoptosis (programmed cell death) in prostate cancer cell lines (including androgen-dependent and androgen-independent cells) and inhibit cell proliferation by reducing MAP kinase signaling—a cellular signaling process used by cancer cells to allow their spread and proliferation throughout the body.

The ability to induce apoptosis in androgen-independent prostate cancer cell lines is especially significant, as this is the more aggressive form of prostate cancer that can become resistant to treatment, metastasize and lead to premature death. Any help in slowing down the progression of this cancer obviously has a direct effect on prolonging a patient's life.

Even with these astounding results, MCP by itself isn't necessarily a cure for prostate cancer. But it is an extreme ly valuable nutrient for any man in "watchful waiting" and a very important adjunct to standard treatment — not least of all because of the many outstanding benefits that continue to emerge with ongoing research into MCP use. While it's true that the promise of MCP has perhaps been the most profound in cases of treatment-resistant prostate cancer, several in vitro and animal studies have revealed its advantage against other diseases as well.

MODIFIED CITRUS PECTIN FOR BREAST CANCER & MORE

COLUMBIA UNIVERSITY PROVES MCP EFFECTIVE FOR AGGRESSIVE BREAST CANCER

With the diagnosis of breast cancer at an all-time high, the necessity for natural solutions is paramount. Fortunately, MCP also has very important benefits in the treatment of aggressive breast cancer.

In a 2002 in vivo breast cancer study, published in the Journal of the National Cancer Institute, varying doses of MCP were studied on breast tumors. Results showed that MCP treatment inhibited tumor growth, with larger doses yielding stronger results. Earlier in vitro research supported these results, revealing the same reduced angiogenesis and cancer cell adhesion, also in a dose-dependent manner.

In addition to MCP's role in preventing and treating breast and prostate cancer, other MCP studies suggest that this versatile nutrient plays a crucial role in protecting against skin cancer. One study (also published in the Journal of the National Cancer Institute years earlier) showed that, while regular pectin demonstrated no positive effects on melanoma cells, the administration of MCP reduced tumor metastasis by a remarkable >90%. These incredible results were supported two years later in a followup study that demonstrated a similar decrease in melanoma progression. The study authors attributed this remarkable effect to MCP's superior galectin-3 binding capabilities.

In addition, a recent study showed incredible inhibitory effects of MCP on urinary bladder cancer cell proliferation and survival in vitro and in vivo, mainly through antagonism of galectin-3.

Finally, MCP inhibition of extracellular galectin-3 was shown to decrease colon cancer cell migration.

HOPE FOR TREATMENT RESISTANT CANCER PATIENTS

In 2008, a German study tracked a group of 49 patients with multiple types of cancer: colon cancer, breast cancer, lung cancer, pancreatic cancer, ovarian cancer, throat cancer and others. These were not early-stage diagnoses either. This was a group of patients with advanced cancers, most of which had metastasized, who had already unsuccessfully gone through surgery, radiation therapy and chemotherapy.

And yet, 5 grams of MCP 3 times per day improved the quality of life and reduced pain in the majority of these patients. In fact, one patient with advanced prostate cancer had a 50 percent decrease in his PSA level over the period of 16 weeks, with an equally significant decrease in his clinical symptoms and his pains. This is incredibly promising, especially for anyone who has been failed by available treatments.

Furthermore, the results of this study are equivalent to and in some cases better than the chemotherapy results achieved in the same group of patients -- and without the toxicity and side effects. Once again, it's not that MCP is a replacement for conventional therapy, but it is an integral part of a comprehensive program for cancer patients. It also quite possibly offers a new lease on life for anyone with advanced stage, treatment-resistant tumors.

COMBINED SYNERGY: MCP BENEFITS CONVENTIONAL CHEMOTHERAPY AND OTHER TREATMENTS

Integrative medicine demonstrates that the battle against cancer is best won by attacking it from multiple angles using synergistic anti-cancer therapies and treatments. Synergistic action means that different therapies work together and enhance each other's beneficial effects. Here's a simple metaphor to explain synergistic action: with synergy, 1 + 1 equals not just 2, but 3, or 5, or even 100, depending on which treatments are being used together. The strategic synergistic combination of various therapies is one of the keys to successful integrative health treatment.

As a preclinical example, MCP was shown to enhance the anti-cancer effect of paclitaxel on ovarian cancer cells by inhibiting signal transducer and activator of transcription 3 activity.

Clinical observations show that MCP has the power to enhance chemotherapy. It can also help the body to deal with some of chemotherapy's harmful side effects, which often further destroy a person's health. By using MCP in conjunc-tion with traditional chemotherapy, a patient may receive the benefits of a synergistic action against the cancer. This synergy may allow for a lower dose of chemotherapy, less side effects, and a greater clinical outcome.

MCP can also enhance radiation treatment. One study found that MCP reduced prostate cancer cell viability and synergistically enhanced cell sensitivity to ionizing radiation.

A synergistic anti-cancer effect has also been seen when MCP is used in conjunction with specialized poly-botanical formulas, to fight cancer and prevent metastasis via multiple mechanisms of action.

MCP IS CRITICAL BEFORE AND AFTER SURGERY/BIOPSY

Cancer surgery or diagnostic biopsy is sometimes a necessary choice. If this is the case, MCP is a critical ally which can help protect against further damage potentially caused by these procedures, such as inflammation and damage to the surrounding tissue that can increase the potential for growth and spread of the cancer. The injury to the tissue can cause increases in various growth factors such as VEGF and EGF, promoters of cancer growth. Surgery and biopsy can also increase the aggressive behavior of cancer cells, release them to migrate from the primary tumor site and invade other tissues, promoting metastasis.

That's where MCP can play a critical role in protecting against cancer proliferation, invasiveness and metastasis after surgery or biopsy. By taking 5 grams three times a day for two weeks prior, and two to four weeks after the procedure, patients can also reduce inflammation and abnormal scar tissue — by relying on MCP's ability to bind and block galectin-3. Some patients increase the dosage in the 24 hours before the procedure to 20-25 grams. Supplying an active dose of MCP before and after will help to protect against aggressive cancer cell behavior and potential metastasis following the procedure.

REMOVING TOXIC METALS AND RADIOACTIVE IONS

SAFELY CHELATE TOXIC METALS AND RADIOACTIVE ISOTOPES

Another essential benefit of MCP was revealed when science discovered this nutrient's ability to safely and gently chelate (tightly bind & remove) heavy metals and toxins from the body.

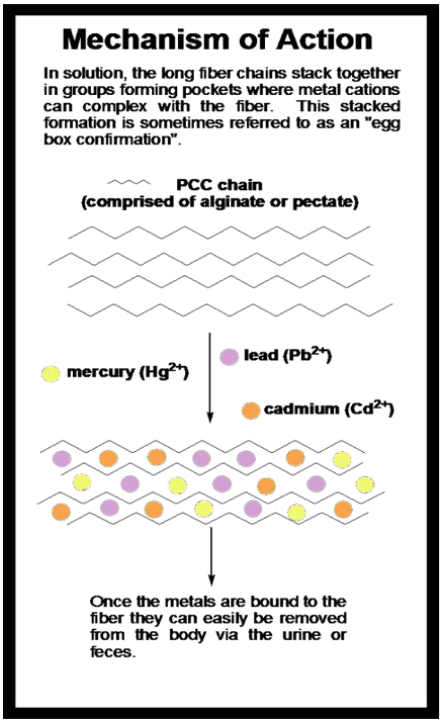
Heavy metal toxicity can be seen in everything from chronic pain and high blood pressure to a variety of neuro-degenerative conditions -- and most notably, cancer. Heavy metals distort cellular communication signals, mutate DNA, impair the immune system and disrupt numerous critical biological functions. Even if your heavy metal intake is limited to minuscule amounts at a time, these metals can build up gradually in bone and soft tissue, leading to very serious condi-tions down the road.

Given these numerous harmful effects, the removal of toxic heavy metals is essential in reducing health risks -- which is why the discovery of MCP's chelating powers presented such an exciting advancement in the focus of my research. Once again, it's the unique molecular structure of MCP that provides the ability to remove these toxins -- and importantly -- without removing essential minerals, as many other chelation therapies unfortunately do.

MCP, ALGINATES & THE "EGG BOX"

MCP belongs to a specific class of polysaccharides known as polyuronides. In solution, MCP's negatively-charged fiber chains stack together to create pockets, forming what we call an "egg box." Heavy metals have a strong positive charge and are attracted to these chains, which cause the metal ions to bind to the pockets. Over time this process can stimulate a more thorough release of heavy metals and toxins from deep within your soft tissues where they're accumulating.

Once they come in contact with the "egg box," heavy metals become trapped and bound in the pockets, allowing them to be safely excreted from your body. And when MCP is paired with another class of polyuronides called alginates -- derived from kelp -- then heavy metal removal becomes even more effective. That's be-cause MCP and alginates work synergistically to reduce circulating heavy metals, prevent toxin absorption from the diet and prevent the re-absorption of circulat-ing toxins in your digestive tract (a common shortcoming of other conventional methods of chelation).



PECTIN FIRST USED IN CHERNOBYL

Reports of pectin's remarkable effectiveness in this field first surfaced during the efforts to minimize the devastating consequenc-es of the Chernobyl disaster and radiation poisoning among residents. In a multitude of cases, pectin as well as alginates prevailed as powerful antidotes to the toxic radiation, by binding to the radioactive particles in the digestive tract and safely removing them. As the radiation fallout entered the food chains, those children who received a diet which included pectin had significantly fewer cases of thyroid cancers than were occurring in the regions not receiving a pectin-rich diet.

Genuinely intrigued by this powerful natural approach to the effects of this overwhelming disaster, I headed a pilot study in col-laboration with USDA scientists to study MCP's ability to bind and remove toxic heavy metals. Not only were the results impres-sive, but they showed that MCP chelation does not disturb the body's essential mineral balance or cause any adverse side effects.

CLINICAL STUDIES ON MCP AND HEAVY METAL TOXICITY

Soon after this research became public, I published a multiple case study report involving patients from my clinic, Amitabha Medical Clinic and Healing Center. Using both MCP and MCP combined with alginates from kelp, it was the first study of its kind to show the relationship between heavy metal removal and the subsequent reduction of a wide range of clinical symptoms. In the study, not only did all five patients decrease their heavy metals by an impressive average of 74 percent, but participants' clinical symptoms ranging from elevating PSA levels to asthma, IBS, adrenal fatigue, and depression, were significantly improved as heavy metal body burden was reduced over time. No adverse effects were reported. This groundbreaking clinical evidence pointed to what I emphasized in my practice for years -- namely, that heavy metals are a very prominent and deadly contributing factor in a wide range of serious health conditions.

In 2008, another study I was involved in was published in the journal, Alternative Therapies in Health and Medicine, demonstrating the effectiveness of using MCP as an antidote to acute lead poisoning in hospitalized children in China. These children all came from the same village where a battery producing plant was based. Their poisoning resulted in detectable levels of lead in their blood and was enough to hospitalize them with symptoms. The study followed their treatment with 5 grams of MCP 3 times a day for several weeks, and monitored their blood decreases and the increase in lead being expelled in their urine. All the children in the study saw a dramatic effect and were able to be released from the hospital within three weeks, without side effects. Thankfully, the hospital involved in this study has informed us that the battery plant in this village has now been shut down.

With increasing exposure to radioactive elements in our environment, safe chelation methods to remove these dangerous ions from the body are of utmost importance. A 2019 clinical case study published in Alternative Therapies in Health and Medicine, showed that the formula combination of MCP and alginates reduced body burden of radioactive uranium in a family exposed through drinking water from their Southwest community.

ADDRESSING HEART FAILURE, FIBROSIS, IMMUNE HEALTH & MORE

LIFE-SAVING INDICATIONS FOR MCP CONTINUE TO EXPAND

The therapeutic value of MCP has now expanded beyond cancer and heavy metal toxicity. As I discussed earlier, our understanding of MCP's uses has grown significantly due to a number of groundbreaking studies demonstrating the role of galectin-3 in the progression of other chronic diseases related to inflammation and fibrosis, including heart disease.

Extensive data, including large scale clinical studies, now clearly demonstrate how galectin-3 drives inflammation and subsequent fibrosis in multiple organ systems including the kidneys, liver and heart. Fibrosis is responsible for many chronic and deadly disease states, including heart failure and cardiovascular disease, kidney failure, and more — because of the uncontrolled inflammation and subsequent overproduction of scar tissue which hardens tissues and organs.

In one kidney injury study, scientists found that MCP interrupts deadly kidney fibrosis by binding to galectin-3, decreasing the inflammation and fibrosis in a kidney injury model. Another study found that inflammatory mediators (monocyte chemoattractant protein-1, oesteopontin, cd68, cd80, cd44, and cd45) were elevated in spontaneously hypertensive rats, but were reduced by MCP. In one more experimental model of mild kidney damage, the increase in renal galectin-3 expression paralleled with renal fibrosis and inflammation, while these alterations were prevented with MCP. These results demonstrated MCP to be an effective agent in protection against kidney damage.

Galectin-3 inhibition with MCP also attenuated the consequences of cardiac toxicity caused by a high-fat diet, by reducing levels of total triglyceride and lysophosphatidylcholine (a bioactive proinflammatory lipid generated by pathological activities). Another study published July 2019 in Scientific Reports, demonstrates that MCP reduces cardiac injury after ischemic reperfusion— the process where blood returns to tissue following a heart attack, causing damage to the tissue. By blocking galectin-3, MCP was able to protect cardiac tissue. An additional study reported that MCP decreased galectin-3-mediated abdominal aortic aneurysm development.

One landmark study illustrates the groundbreaking results being achieved with MCP in the treatment of cardiovascular disease. Using MCP to block galectin-3, researchers prevented myocardial hypertrophy (thickening of heart tissue) and decreased the pro-fibrotic response. MCP has also been found to reduce the size of atherosclerotic plaques by limiting the adhesion of white blood cells to the cells that line the interior surface of blood vessels.

The cytokine cardiotrophin-1 is associated with the pathophysiology of heart diseases. MCP lowers levels of galectin-3 to prevent the fibrotic and inflammatory effects of cardiotrophin-1.

An amazing study demonstrated that acute kidney injury induces remote cardiac dysfunction, damage, injury, and fibrosis via a galectin-3-dependent pathway. Galectin-3 originated from bone-marrow-derived immune cells in this model. The cardiac damage was able to be prevented by blocking this pathway with MCP.

Another significant study investigated the role of galectin-3 as a driver of oxidative stress in human cardiac fibroblasts, spontaneously hypertensive animal models, and human aortic stenosis tissue. Results showed galectin-3 downregulates the antioxidant peroxiredoxin-4 (Prx-4) in cardiac fibroblasts, uncovering a new pathway whereby galectin-3 fuels cardiac damage. Importantly, MCP treatment restored cardiac Prx-4, and improved oxidative status.

IMMUNITY

Another remarkable function of MCP was demonstrated in a 2010 study: Immune activation properties. Studies using human blood samples showed that MCP activated T- cytotoxic, B and Natural Killer (NK) immune cells in a leukemia model.

NK cells play a major role in the rejection of tumors and cells infected by viruses. NK- cells that were activated by MCP demonstrated increased functional ability in inducing cancer cell death among chronic myeloma leukemia cells. This research has paved the way for further investigation into these immune-enhancement properties, and has also given us a more comprehensive understanding of MCP's potent cancer fighting properties. MCP can support appropriate immune response including dramatic NK cell activation and increased functionality, essentially "tagging" the cancer cells for immune cell attack.

In addition, MCP was found to have an immune-altering effect on the levels of cytokine secretion in the spleen of mice with a

pro-inflammatory potential galectin-3 is present in the inflamed joints in patients with rheumatoid arthritis strongly suggests that this protein is associated with the development and progression of this degenerative disease. Further research proves that galectin-3 plays a large role in the development and progression of rheumatoid arthritis and that the disease severity is accompanied by harmful immune responses which are influenced by galectin-3. This is the first in-vivo evidence that galectin-3 plays a crucial role in the development of arthritis by directly influencing immune and inflammatory responses.

Another animal model of arthritis has been used to show that inflammation and bone erosion were significantly reduced in mice that had lower galectin-3 levels.

Administering low molecular weight MCP provides an effective in vivo method of reducing inflammation and treating arthritis, including autoimmune arthritis such as rheumatoid arthritis.

DIABETES

Diabetes resistance has also been linked to reduced galectin-3. Mice with reduced galectin-3 levels were shown through various measurements of diabetes progression to be resistant to the development of diabetes, as compared with mice that had normal levels of galectin-3. The same mice with reduced galectin-3 levels also showed a reduction in inflammation. Related research has demonstrated that reduction in galectin-3 levels slows the breakdown of the inner blood-retinal barrier that typically occurs early in diabetes.

LIVER FIBROSIS

Inflammation and fibrosis of the liver has also been linked to excess galectin-3. Mice with low levels of galectin-3 exhibited signifi-cantly reduced liver inflammation and reduced fibrosis together with reduced liver cell injury. One study showed that MCP reduced liver fibrosis through an antioxidant effect, the inhibition of galectin-3, and by inducing apoptosis.

THE FUTURE OF MCP

ONE OF THE MOST IMPORTANT NUTRIENTS OF OUR TIME

Ongoing validation of MCP's multiple health benefits is revolutionizing integrative health care treatments world-wide. Thanks to the work of dedicated scientists, researchers, and integrative doctors, the medical community and those interested in achieving and maintaining health naturally will benefit from MCP in the treatment of a wide range of conditions. As groundbreaking research on this important nutrient continues, and as more and more health professionals and patients seek out effective natural solutions, MCP is becoming known as one of the most valuable nutrients involved in the maintenance of long-term health and overall longevity.

As the only scientifically proven natural galectin-3 blocker, MCP is vital in the prevention and treatment of cancer, inflammation, cardiovascular disease and fibrosis, as well as being a valuable nutrient in the treatment of heavy metal toxicity, immune function and more. Thus, I encourage anyone concerned about the prevention, development and management of these conditions to ask your doctor to test your levels of galectin-3, along with heavy metal body burden, and to add daily MCP supplementation to your diet as an effective tool in preventing disease and maintaining long term health.

My ongoing research -- and that of dozens of other dedicated integrative doctors -- will ensure that the many branches of this revolutionary supplement continue to bear fruit for the years and decades to come. In the meantime, I urge you to share the extensive research in this guide with your doctor, friends and family. It is truly my greatest hope that integrating MCP into your health program will help to light your way to a longer, healthier and more vibrant life.

As promising new research on MCP's role in health and disease continues to emerge from the scientific community, future editions of this important body of knowledge will be updated to share with anyone seeking safe and effective natural health solutions. Stay tuned.

effective natural solutions, Modified Citrus Pectin will surely be known as one of the most valuable nutrients involved in the maintenance of long-term health and overall longevity.

APPENDIX I

HOW TO USE MCP

MODIFIED CITRUS PECTIN DOSAGES PER CONDITION

ONCOLOGICAL SUPPORT	ASPECTS SUPPORTED	DOSAGE CAPS/POWDER	SPECIAL INSTRUCTIONS Empty Stomach = 15 min before or 1 hour after food
ACTIVE	Antifibrotic, antimetastasis, antiproliferative, antiangiogenic, inhibits excessive Gal-3 activity, enhances conventional therapies / chemo / radiotherapy, immunomodulatory, binds to heavy metals and other toxins, spares essential minerals, prebiotic.	1 Scoop or 6 Capsules TID or 1.5 scoops or 9 caps BID	20 grams/day if Gal-3 >18 25grams/day if Gal-3 >25
CHEMOTHERAPY		1 Scoop or 6 Capsules TID or 1.5 scoops or 9 Capsules BID	
RADIATION		1 Scoop or 6 Capsules TID or 1.5 Scoops or 9 Capsules BID	
HORMONAL THERAPY		1 Scoop or 6 Capsules TID or 1.5 Scoops or 9 Capsules BID	
POST THERAPY		Full dose to 5 years / period of increase risk recurrence	
SURGERY		2 Scoops or 12 capsules BID or / 1 Scoop or 6 Capsules QID	Take up to surgery / resume right after surgery. 2 scoops BID week before and 2 weeks after. Can increase to 1.5 scoops TID before biopsy surgery until 1 week post surgery.
ONGOING			Continue dose based on your condition and adjust based on galectin-3 level
CARDIOVASCULAR SUPPORT			
Active Condition	Blocks Gal-3 activity to inhibit fibrosis, vessel support, supports healthy inflammatory response, supports healthy cholesterol levels, microbiome support, antioxidant.	1.5 scoops or 9 capsules BID	
Stable Condition		1 scoop or 6 capsules BID	
Health Maintance		1 scoop or 6 capsules QD	
JOINT SUPPORT			
Active Condition	Blocks galectin-3 activity to inhibit fibrosis, support healthy inflammatory response,	1 scoop or 6 caps BID	
Stable Condition		1 scoop or 6 caps QD	
TOXIN REMOVAL			
Active Condition	Address galectin-3, biofilms, organ protective	1 Scoop or 6 Capsules BID	
Stable Condition		1 Scoopor 6 Capsules QD	
NEUROLOGICAL SUPPORT			
Active Condition	Blocks galectin-3 activity, supports cellular health, immunity, antioxidant support.	1.5 Scoop or 9 Capsules BID	
Health Maintence		1 Scoop or 6 Capsules QD	
DIGESTION & INTESTINAL SUPPORT			
Active Condition	Inhibits galectin-3 activity to support GI mucosal integrity, microbiome, immune support, cellular health, inhibits biofilm establishment.	1 Scoop or 6 Capsules BID	
Health Maintence		1 Scoop or 6 Capsules QD	
IMMUNE SUPPORT			
Active Condition	Blocks Gal-3 activity (Gal-3 suppresses immunity)	1 Scoop or 6 Capsules TID	If Gal-3 levels are elevated continue active dosing
Stable Condition		1 Scoop or 6 Capsules BID	
Health Maintance		1 Scoop or 6 CapsulesQD	
1 Scoop = 5 grams unflavored Pectasol-C or 6.125 grams Lime Infusion powder			

FAQS

WHAT IS THE MOST EFFECTIVE WAY TO DISSOLVE MODIFIED CITRUS PECTIN POWDER INTO LIQUID?

1. Put one 5-gram scoop of Modified Citrus Pectin into a glass.
2. Add your liquid (water, juice or tea).
3. Stir contents until powder is dissolved.

WHAT IS THE BEST LIQUID TO MIX MODIFIED CITRUS PECTIN POWDER WITH?

Water is best, but some people do use other liquids, such as juice. It's best to stir immediately upon adding the liquid and even better solubility results may be seen if using warm liquid. Modified Citrus Pectin has a very mild, bland taste.

WHAT CITRUS FRUITS ARE USED TO MAKE MODIFIED CITRUS PECTIN?

The pectin contained in Modified Citrus Pectin is derived from lemons, limes, oranges and grapefruit. It is made from the pith of the fruit, no juice, pulp or any part of the "fruit" is used. Modified Citrus Pectin does not cause a "grapefruit" effect on absorption of medications.

WHAT IS THE BEST WAY TO STORE MODIFIED CITRUS PECTIN?

Modified Citrus Pectin can be stored at room temperature; it is not necessary to store it in the refrigerator. Modified Citrus Pectin is a very stable material and can withstand extreme temperatures.

DOES MODIFIED CITRUS PECTIN CONTAIN VITAMIN C?

No, Modified Citrus Pectin does not contain any Vitamin C.

IS IT OKAY TO GIVE MODIFIED CITRUS PECTIN TO MY DOG OR CAT?

Yes. Average, mid-sized dogs may take 1 scoop daily. Cats should take only ½ scoop, as they are smaller. It is usually best to mix it with your pets' fresh daily water.

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ISAAC ELIAZ, MD, MS, LAc

Dr. Isaac Eliaz, a pioneer in the field of integrative medicine since the early 1980's, is a respected author, lecturer, researcher, product formulator and clinical practitioner.

Dr. Eliaz is a frequent guest lecturer on integrative medical approaches to health, immune enhancement, and cancer prevention and treatment. He has also taught several courses on Traditional Chinese Medicine for medical doctors and licensed acupuncturists. As an innovative formulator of dietary supplements, Dr. Eliaz developed and currently holds the patents for several of his unique herbal formulations. Many of these products are available through ecoNugenics, Inc. as well as from leading integrative medical professionals.

In order to substantiate nutritional approaches to health, Dr. Eliaz regularly participates in clinical studies and has been published in well-recognized, peer-reviewed journals. In addition, many of Dr. Eliaz' formulations have been submitted for validation in independent human clinical studies whose results have been published in peer-reviewed journals.

Dr. Eliaz continually studies, integrates and applies the best of health practices of both western medicine and complementary and alternative approaches. A native of Israel, Dr. Eliaz lived in the Far East and in Latin America before returning to study medicine at Tel Aviv University. While studying for his degree, Dr. Eliaz' interest turned towards the role of alternative therapies in daily health. This led to his eventual research and personal experience with yoga, shiatsu, and acupuncture as therapeutic modalities.

After graduating medical school in 1986, Dr. Eliaz established a highly successful clinical practice in Tel Aviv, utilizing his training in both western and eastern medicine. While maintaining a clinical practice, Dr. Eliaz pursued graduate studies in clinical herbology at Hebrew University of Jerusalem and classical Chinese medicine with teachers in Israel and Europe.

In 1989 Dr. Eliaz moved to the San Francisco Bay area in order to continue his studies at the American College of Traditional Chinese Medicine, earning a Master of Science degree in 1991. During this time he also energetically sought-out leading practitioners of alternative medicine to broaden his knowledge and experience. Since 1991 Dr. Eliaz has maintained a busy private practice in northern California that focuses primarily on integrative, holistic protocols for cancer patients.

The guiding mission of Dr. Eliaz' professional life is achieving the integration and synergy of multiple healing modalities from both ancient and modern paradigms into a holistic practice of medicine. It is the heart of his clinical practice, of his research, and a mission that he communicates with great passion and clarity.

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