The Essentials of Enzyme Nutrition Therapy

Part 1 of 3

Food enzymes in raw food are vital for digesting that food, but their destruction during cooking is a key factor in today's rising levels of allergies and chronic degenerative diseases.

In August 1971, the US Department of Agriculture published "An Evaluation of Research in the United States on Human Nutrition; Report No. 2, Benefits from Nutrition Research". The US government spent approximately $30 million analyzing the relationship diet has to disease. According to the study:

- Major health problems are diet related;
- The real potential from improved diet is preventative;
- Benefits would be shared by all… especially by lower economic and non-white population groups;
- Major benefits are long range… Early adjustments of diet could prevent the development of undesirable long-range effects;
- There exist geographical, regional differences in diet-related problems.

It's now known that within a very short time after its release, all copies of the report were seized by the federal government. It was not until the campaign in 1993–94 for the Dietary Health Education and Supplement Act that a copy was mysteriously forwarded to the grassroots organization, Citizens for Health, to help in its fight to prevent the Food and Drug Administration from classifying food supplements as drugs.

Within any group that seeks control and power over a population, even health is a legitimate target. If you can manipulate the population's health or induce disease by modifying what they consume, you can create a pseudo healthcare system that seems to care but is busy making billions off disease that is relatively easy to prevent or cure through diet alone. With the multimillion-dollar backing of an industry, you can also discredit any alternative to current, popularly accepted treatments by labeling them "old wives' tales", "quackery" or "unscientific".

In 1988, "The Surgeon-General's Report on Nutrition and Health" addressed the overwhelming evidence of the connection between diet and chronic disease. In his report, then Surgeon-General C. Everett Koop wrote: "For the two out of three adult Americans who do not smoke and do not drink excessively, one personal choice seems to influence long-term health prospects more than any other: what we eat... The weight of this evidence and the magnitude of the problem at hand indicate that it is now time to take action. In the cause of good health for all citizens, I urge support for this Report's recommendations by every sector of American society." (Italics added.)

As reported in the Journal of the American Medical Association (vol. 280, November 11, 1998), a nationwide survey on the use of alternative medical therapies revealed that "estimated expenditures for alternative medicine professional services increased 45.2% between 1990 and 1997 and were conservatively estimated at $21.2 billion in 1997, with at least $12.2 billion paid out of pocket". The article concluded that "alternative medicine use and expenditures increased substantially between 1990 and 1997, attributable primarily to an increase in the proportion of the population seeking alternative therapies, rather than increased patient visits per patient".

Not only in America but in other countries, the populace is demonstrating a preference to what are referred to as "alternative therapies". People are seeking natural therapies, drawing upon cultural heritages of healing aligned with their own philosophies and beliefs. These therapies include acupuncture, herbal medicines (both Eastern and Western botanicals), homeopathy, Reiki and other so-called energy treatments, and nutrition.
It has become overwhelmingly clear that diet and lifestyle influence health and disease. Yet, within the field of nutrition, there are differing opinions on just what constitutes a healthy diet. This is most evident with popular books on diets which flood the market. Is the low fat/low protein, high complex carbohydrate diet that Pritikin advocated correct? Or is the Atkins diet with high protein/fat, low carbohydrate the one we should favor? Should we eat according to our blood type? What about raw versus cooked foods? Is soy good for you, or is it harmful? Do the media drive our choices through advertising? What about the "friendly" doctor staring from your television set, telling you how dangerous this herb or that vitamin is? Are nutritional supplements effective or not? The debate seems endless.

Over the last decade, sales of nutritional supplements have generated a US$4 billion industry worldwide. Almost every month, new companies claim to have the "magic bullet" for what ails us. Multi-level/network marketing companies are quick to get on the bandwagon, knowing how much profit is available thanks to members of the baby-boomer generation who pride themselves on "looking good" and staying healthy, no matter what the cost. The rush to discover new drugs from medicinal herbs in Third World countries keeps pharmaceutical companies abreast of all that is under the sky.

**Pioneers in Enzyme Nutrition Therapy**

Within the field of nutrition, enzymes have become the buzzword. Every company now has its own "super-concentrated enzyme formula", and boasts how powerful it is and how it contains 10 times the enzyme power as the other company's product.

Yet, understanding enzymes and their role in human nutrition requires more than just knowledge of the chemistry. We also need to be familiar with the history and pioneers behind the development of enzyme nutrition therapy and the rationale behind its clinical use.

Historically, there is recorded evidence of diverse cultural groups developing foods high in concentrated enzymes. Many of these cultures discovered the health benefits of enzyme-rich foods because of trial and error and probably just plain luck, by leaving them out in the open for bacteria to work on them. Among these foods are fermented dairy products, such as yoghurt, kefir and various soured-milk products; fermented vegetables, such as European sauerkraut and Korean kim chi from cabbage; and soy products like miso and tempeh, which were first developed in Asia. In tropical countries, certain fruits such as papaya and mango were found to contain very high concentrations of enzymes, and have been used traditionally for the topical treatment of burns and wounds.

Nonetheless, it was not until the early 1900s that Dr. John Beard, a Scottish embryologist, filtered the pancreatic liquid of freshly slaughtered young animals for the active enzyme content. He reasoned from observation that young animals had to have greater and more powerful concentrations of enzymes because the energy required for growth was greater. Dr. Beard injected this concentration into veins, gluteal muscles and sometimes directly into tumor sites of cancer patients. He observed the rapid shrinkage of tumor masses and cancer cell growth inhibition. Some patients experienced allergic reactions because the unpurified juice contained foreign proteins. In spite of this, more than half of the cancers completely disappeared, while other patients' lives greatly improved and were prolonged far beyond what was expected.

Dr. Beard's enzyme treatment caused turmoil in the allopathic medical community in England. He was called a charlatan and received threats to close down his practice. However, patients of other doctors requested Dr. Beard's enzyme treatment. To satisfy them, doctors ordered pancreatic juice from local pharmacists who, in turn, ordered it from the slaughterhouses. Doctors were sold
pancreatic juice from older animals whose enzyme content was inactive. Unfortunately, the results were not successful and patients were very disappointed.


Not much followed from the early part of the 20th century. Indeed, it was not until the 1930s that clinical use of enzymes began to pique the interest of a few physicians.

In 1930, at the First International Microbiology Conference, held in Paris, Dr. Paul Kautchakoff, a Swiss doctor, presented a paper entitled "The Influence of Food Cooking on the Blood Formula of Man". In it, he explained how digestive leukocytosis occurred every time cooked food was ingested by subjects of differing age and sex. This phenomenon was observed in patients as early as 1843 and was considered a normal occurrence.

Digestive leukocytosis is the dramatic increase in the amount and activity level of white blood cells (leukocytes) in the blood due to a stimulus – that stimulus being undigested cooked food crossing the gut wall. With canned and cooked foods, the increase was moderate. With heavily processed foods such as packaged meats, the increase was identical to food poisoning! The only difference was the absence of the bacterium associated with food poisoning. Cooked foods are missing essential enzymes which prevent adequate digestion. Dr. Kautchakoff made note that there was no increase leukocyte count/activity in subjects who ate only raw food. This is because *all raw food contains food enzymes which completely digest what we eat*.

From 1932 to 1942, Dr. Francis Pottenger, Jr, of Monrovia, California, began one of the most intriguing clinical studies undertaken in the field of nutrition. His study ran for 10 years, covering four generations of over 900 cats. In this groundbreaking study, Dr. Pottenger simply controlled the food cats were fed. The original group was fed raw, unpasteurized milk, cod liver oil and cooked meat scraps. The other two groups were fed uncooked meat/pasteurized milk and cooked meat/pasteurized milk respectively. The fourth group was fed uncooked, raw meat and raw, unpasteurized milk.

Dr. Pottenger's observations should have shaken the foundations of modern medicine. Nonetheless his work, like that of so many others, has largely been ignored. He meticulously recorded his observations with exacting measurements and photographs. Here is a brief summary of his discoveries. In the group of cats fed only raw food, there were no chronic degenerative diseases! The cats lived to grow old and were easily handled. They primarily died of old age, living much longer than cats from the other groups.

In the first generation of the combination cooked-food groups, cats showed symptoms of chronic degenerative disease that we are familiar with: allergies, asthma, arthritis (both rheumatic and osteo), cancers, heart disease, kidney, liver and thyroid disease, dental disease and osteoporosis. The second generation manifested the same diseases, albeit even more severely. Most kittens were stillborn or born with disease, and died within six months in the third generation. By the fourth generation, the study ended because the cats were infertile and could not reproduce.

In drawing his conclusions, Dr. Pottenger reported the underlying nutritional factor had to be a "heat-labile substance". Unfortunately, he had not deduced them to be enzymes, because so little was known about them at the time.

In the early 1930s, a "special substance" was discovered in the blood of healthy individuals which was proficient at attacking and destroying cancer cells. However, this substance was found only very
slightly or was missing altogether in patients suffering from cancer. Working during those years in New York, Dr. Max Wolf became one of the most celebrated doctors of his time. He was fascinated to hear of this substance and began investigating on his own. He convinced Dr. Helen Benitez to join him from her post in the neurosurgical department at Columbia University, and they performed thousands of tests to determine exactly what this substance was. They concluded it had to be enzymes.

Dr. Wolf then had to isolate which of the many dozens of known enzymes were responsible for several activities, i.e., controlling inflammation, correcting degenerative disorders and breaking down cancer cells. After years of testing various enzyme mixtures on animals, with no harmful reactions, he was able to offer his enzyme therapy. It soon earned him a reputation with many famous clients in politics and the arts. Even a few Presidents and European leaders sought him out. He developed one of the most widely used enzyme products available – Wobenzymé™. [Editorial comment: The enzyme Wobenzymé™ used to be the foremost European systemic enzyme. The active ingredients are derived from animal sources. Currently, the most powerful and effective systemic enzymes available are formulated and marketed through World Nutrition of Phoenix, Arizona and are all vegetable-based.]

At the same time that Dr. Pottenger was overseeing the clinical study in California and Dr. Wolf was researching in New York, Dr. Edward Howell of Chicago was questioning the use of cooked, processed food for human consumption. He found that heating food to 118°F (47.78°C) for more than 15 minutes destroyed all the enzymes. Obviously then, heating foods at higher temperatures for shorter periods also destroys enzymes. The current technology of "flash pasteurization" of milk and juice is an example.

Enzymes are the only substances capable of digesting food. They exist in raw food in order to digest (break down) that food.

**Enzyme Deficiency and Degenerative Disease**

In 1940, Dr. Howell posed the question, "Is chronic degenerative disease a matter of severe enzyme deficiency?" To this end, he spent the rest of his life researching and documenting clinical work throughout the world, and he answered his query with a resounding "Yes!"

In the early 1940s, Dr. Howell created the first manufacturing facility for the production of plant-based enzymes. While Drs Beard and Wolf used animal-based enzymes produced from the pancreas of animals, Dr. Howell used certain species of fungus to "grow" highly concentrated plant-based enzymes. This is where animal- and plant-based enzymes become markedly different in their clinical use. And this is where Dr. Howell's observations and research have made all the difference in the world of enzyme nutrition.

Dr. Howell wrote two books reporting his life's work: *Food Enzymes for Health and Longevity* and *Enzyme Nutrition*. Some of the most important revelations about enzymes, nutrition and physiology are contained in these pages. He noted that all mammals have a pre-digestive stomach; he called it a "food enzyme stomach". In humans, it is the uppermost portion of the stomach – the fundus or cardiac portion. It is here that enzymes found in raw food pre-digest what has been ingested. Enzymes secreted from saliva and other glands will likewise pre-digest some of the cooked food consumed. However, when cooked food is eaten, enzymes will be supplied from other organs to digest the cooked food. This produces a constant drain of enzymes from the immune system and other important organs. When this happens over a lifetime, organs fail and are overcome with "disease".
Howell discussed organ hypertrophy, noting that any organ or gland will grow more cells, becoming larger because the demand placed on it exceeds its ability to function. He found that, in particular, the pancreas in humans was 2–3 times heavier and larger in proportion to body weight as compared to the pancreas of other mammals. He attributed this to consumption of an excessive amount of cooked foods.

When enzymes are not present in the stomach for digestion, food passes into the duodenum, the upper portion of the small intestine, where enzymes secreted from the pancreas digest the food. This is the common teaching in medical schools. But what if the pancreas was not meant to be the major digestive enzyme organ? What if digestion was meant to take place in the stomach, with enzyme-rich food?

Dr. Howell cited studies suggesting this to be the case. Because food is not digested in the stomach as Nature intended, the burden then falls to the pancreas, causing it to hypertrophy. If the burden continues for long enough periods, it may lead to pancreatitis or other more serious ailments.

Howell referred to what he called "the law of adaptive secretion of digestive enzymes" – that the body will secrete exactly the right amounts and types of digestive enzymes depending upon what type of food is ingested. Eating a piece of cheese will produce more fat-digesting enzymes than would be produced if eating a piece of bread, which is primarily a starch and requires a starch-digesting enzyme.

Dr. Howell remarked that during the early part of the 20th century when zoos were being developed to house captured wild animals, the death rate was very high. It was found that animals in their natural habitat ate everything raw. They were now being fed cooked foods and experiencing many new diseases unknown to their counterparts in the wild. It was found that the enzyme content of saliva from animals in the wild was either hardly there or missing altogether. On the contrary, captured animals fed cooked foods had very high enzyme content in their saliva. The animals were being forced to secrete enzymes from other organs to digest the cooked food. When their diets were changed back to mostly raw foods, the enzyme content in their saliva was reduced and the death rate dropped significantly.

Before Dr. Howell passed away in the late 1980s, Dr. Howard Loomis journeyed to Florida to spend time with him. He had been asked by Dr Howell's original manufacturing facility to formulate a professional line of enzymes. Dr. Loomis had become frustrated with the use of nutrition in clinical practice. There seemed to be no rhyme nor reason in administering minerals, vitamins or herbs to those in his care. As he said: "A patient comes in with a cold and you give him vitamin C, and within a week he's feeling better. Another person comes in with a cold and takes nothing. Seven days later, she's fine." Everywhere one looks, the common discussion centers around deficiencies. "Oh, you have this or that mineral or vitamin deficiency: take some of these."

Nutrition today is practiced much like pharmacology is. For every symptom, there is a corresponding deficiency. The solution, then, is to take more of a particular mineral or vitamin. It is a matching game, much like with pharmaceutical drugs. And while it is true that in certain cases a deficiency can relate to a symptom, it is not rock-solid evidence of a deficiency. "I have a deficiency in relation to what – another mineral or vitamin? Isn't it possible I have an excessive amount of something?"

Making Sense of Decades of Misdiagnoses

The progression of differing diagnoses over the last few decades is an example of how symptoms alone can be misleading when it comes to finding root causative factors in disease.
In the 1960s, one of the common diagnoses in Western societies was hypoglycemia or low blood-sugar levels. Blood sugar is composed of glucose which is metabolized from protein by the liver. Doctors told their patients simply to eat more protein. And while it is true that low blood sugar can be the result of inadequate protein intake, no one ever suspected it could be the result of an inability to digest protein completely, i.e., a protein digestive enzyme deficiency. So even if you increase the patient's protein intake, what good is it doing if they cannot digest it adequately? Was it a protein deficiency or a protease deficiency, which caused the low levels of protein leading to hypoglycemia?

In the 1970s, vitamin B12 deficiency was a popular diagnosis. Many of the symptoms of B12 deficiency match those of hypoglycemia. These include fatigue, inability to concentrate, irritability, headaches, confusion, tremors and even cold sweats. Patients were given vitamin B12 shots to alleviate the symptoms. A major concern with vegetarianism is the high incidence of vitamin B12 deficiency that's been documented.

One of the functions of protein in the blood is that of a "universal carrier". Protein transports vitamins, minerals, enzymes and hormones throughout the body. Not having enough blood protein to transport these substances would lead a doctor to diagnose a patient with a particular imbalance or illness. The underlying assumption in the medical world is that patients' digestions are working fine – unless, of course, they complain to the contrary. Nevertheless, if patients have inadequate protein levels, even though blood tests are within reference range, they still may not be transporting or utilizing vitamin B12.

Moving into the 1980s, most everyone had become infested with yeast/fungal organisms and/or parasites. Normally, various micro-organisms inhabit the digestive tract and are kept in balance by "friendly" micro-organisms like Lactobacillus and Bifidobacterium. Many of the symptoms of this new diagnosis were, again, very similar to hypoglycemia and vitamin B12 deficiency.

When it comes to immune system function, protein is the most essential nutrient. White blood cells, cellular complements and many other aspects of this system are dependent upon protein. Enzymes themselves are composed of protein and minerals. Additionally, Dr. Howell reminds us of this "vital force" inherent in enzymes. These microscopic entities we are dependent upon have something of an almost mysterious nature. Various white blood cells use enzymes literally to digest what they come up against in our bodies. These processes are known as pinocytosis and phagocytosis. After engulfing an offending pathogen or allergen, white blood cells secrete enzymes that destroy and digest it. If the majority of enzymes from the immune system are being redirected to digest food, how is it possible to maintain healthy immune system functions?

As the 1990s progressed, patients were told they must have an environmentally induced illness, which could include allergies and hypersensitivities. Patients were told to avoid everything they were allergic to and take enormous amounts of supplements. Usually this resulted in extremely limited diets and very expensive bills. New "energy" techniques were developed supposedly to remove blocked energy and rewire the nervous system to allow for accepting the allergen into the body without the overt reaction.

If we look at allergies from an enzyme point of view, it becomes apparent why so many of these techniques work only temporarily. Allergies are the body's reaction to something entering via the blood, skin, nasal cavity or other source. When something enters the body in a healthy person, the immune system is called upon to investigate and clear the allergen (substance) from the body. This happens without any notice. Because there are enough enzymes available in a healthy person, the allergen can be cleared unobtrusively. In someone with an allergic response to the same substance, the immune system is called to do the same work but finds it cannot handle the request. In a person
who exhibits an allergic response, there are not enough enzymes available for the white blood cells to
break down the allergen and rid the body of it. They then experience the typical histamine response,
including reddening of the eyes or local tissue, heat, runny nose and pain.

People with allergies of an airborne source are typically those with a history of excessive sugar and
simple carbohydrate intake. Someone with this problem has depleted their reserves of the enzyme
amylase. Amylase is an IgG histamine blocker. Like bioflavonoids, amylase stabilizes the mast cells
and basophiles that release histamine as a reaction to the damaged area. Antihistamines are what
these types of patients get from their doctors.

Finally, in the last five years or so, patients were tested for something called "Syndrome X", which
happens to bear a striking resemblance to type II diabetes. Syndrome X patients exhibit excess
weight, cardiovascular issues, lightheadedness and elevated glucose levels, among other symptoms.
If this is actually another name for diabetes II, it should be apparent how symptoms are only one
aspect of proper diagnostics.

What the examples above point to are signs and symptoms of distress in the body. Looking more
deeply, one finds the same phenomenon exhibited in Pottenger's cat study and Howell's life research:
namely, that signs and symptoms of disease are proof of chronic enzyme deficiencies! It is like
coming upon a car accident and seeing the wreckage, but not knowing exactly how it happened. The
medical profession is seeing evidence of enzyme deficiencies but is unable to correlate them to the
actual disease. Governed by their training in schools biased towards pharmaceutical drugs, surgery,
radiation and the latest in genome biotechnology and nanotechnology, doctors today are further away
from realizing the truth of how the body can go out of balance and end up in a diseased state.

When Dr. Loomis asked Dr. Howell what the symptoms were for a particular enzyme deficiency,
Howell did not have an answer. He had not linked up the signs and symptoms of enzyme
deficiencies. Dr. Loomis left with many unanswered questions and began the work that has
developed into Enzyme Nutrition Therapy. After 20 years of clinical work in the field of enzymes, Dr.
Loomis is considered the foremost living authority. His trained associates continue adding to the
body of work he pioneered. Enzyme Nutrition Therapy is a scientifically sound system of assessing
enzyme deficiencies in patients. Loomis has taken Howell's baton, carried it to the next stage and
continues to push it to a higher level.

Over time, as Dr. Pottenger observed in his study of cats, the continued use of cooked, enzyme-
deficient food not only leads to enzyme deficiencies but also to subsequent generations of subjects
with disease that's more intense with each generation. Could this explain why 40 to 50 years ago
childhood asthma and allergies were rare, but today they affect the majority of children? What about
obesity? Or infertility? The percentage of infertile couples has risen sharply in the last several
decades. And while environmental toxins may play a part in this, are we now not seeing the results of
generations fed excessive amounts of cooked food – as Drs Howell and Pottenger foresaw?

Without ever knowing it, Drs Howell, Pottenger and Wolf confirmed each other's work and left a
legacy upon which Dr. Loomis has demonstrated the solution to humanity's many ills – that enzymes
are the key factors in health and healing, but their destruction by heat leads to chronic degenerative
disease.

Enzymes – the Vital Labor Force

*Dorland's Illustrated Medical Dictionary* (28th edition) defines an enzyme as "a protein molecule that
catalyses [increases the velocity of a chemical reaction...] chemical reactions of other substances
without itself being destroyed or altered upon completion of the reactions". While this may seem to
be definitive, it does not clarify why an enzyme can do what it does, nor how a protein can become an active enzyme. In other words, if an enzyme is simply a protein molecule, why not manufacture enzymes synthetically?

The trouble begins here because, to date, no one has successfully created an enzyme from synthetic material. Enzymes can only be created from living, organic material. It is evident that there is something more to enzymes than can yet be accounted for scientifically.

Dr. Howell observed enzymes giving off a "luminescent glow" when actively working. He is famous for his statement, "Life itself could not exist without enzymes". He surmised that there is a "vital force" inherent in all living beings, as demonstrated by enzymes. For ages, humans have observed and deduced a "divine innate force" common to all living things. Animation of animals and plants separates us from the soil, dust and rocks on which we move around.

Enzymes are considered the "labor force" in living things. They are the only substances capable of doing work. They are busy putting things together or splitting them apart. They initiate, speed up, slow down or stop all biochemical processes in living beings. Enzymes are very specific in how they work on a substrate (the component upon which they work). This has often been referred to as a "lock-and-key system". The substrate is the lock, while enzymes are the keys that fit precisely into the lock. They can only work on the exact substrate.

Enzymes are classified into several groups. Hydrolytic enzymes are the most relevant in clinical nutrition, and they are of three major groups:

1) **Digestive enzymes** – manufactured by digestive organs to assist in digesting food;
2) **Food enzymes** – found in all raw, uncooked food;
3) **Metabolic enzymes** – manufactured by all cells to carry out their respective functions.

Although there are many classes and sub-classes of **digestive enzymes**, there are four general enzymes considered here:

- **Amylase** – digests starches, including grains and starchy vegetables;
- **Cellulase** – breaks down plant fiber;
- **Lipase** – splits apart fats and oils into fatty acids;
- **Protease** – breaks down protein into amino acids and small-chain peptides.

Probably the most familiar of the amylases is lactase. People who are lactose intolerant are both deficient in and lack the ability to manufacture this enzyme.

All the above, except cellulase, are manufactured in the human body. Cellulase must come from the plants themselves, which is why it is so important to chew one's food thoroughly. Cellulase is trapped inside the fiber itself and must be liberated in the chewing process —otherwise, one experiences the gas and bloating common to those, especially the elderly, who cannot digest raw foods. Juicing fruits and vegetables also extracts cellulase from the fiber. But the need for plant fiber in a world where many are dependent on laxatives cannot be overstated and may outweigh unnecessary juicing.

All raw, uncooked foods contain the exact types and amounts of enzymes necessary for their breakdown (digestion). Fruit ripening is the consequence of enzymes slowly breaking down the fruit's contents. If it has gone too far before we consume it, we say it is "rotten". There are optimal times when fruit should be harvested and consumed. But due to "shelf life", fruit is picked unripe and left to ripen in the warehouse or grocery store. In this case, the vitamin, mineral and enzyme content is inadequate and not desirable from a nutritional point of view. One study found that plants gave up
their enzyme structures to return the mineral portion of them back to the soil since it was lacking in minerals.

Enzymes are the most heat-sensitive nutrients. As mentioned earlier, food enzymes are generally destroyed when heated at 118°F (47.78°C) for longer than 15 minutes, and this happens whether the food is baked, boiled, broiled, canned, fried, pasteurized, roasted, steamed or especially microwaved. Dr. Howell observed this and reasoned that enzyme-deficient food must force the body to use up metabolic enzymes to digest food. He compared it to a bank account. If you continually drain your resources and never replenish your holdings, at some point you are bankrupt. In the case of enzymes, degenerative disease occurs, with old age following soon afterwards. We are told all the time, "Oh, your symptoms are related to old age; better get used to it". Culturally, this seems true because we have observed it since childhood. We even expect to grow old with the accompanying health issues associated with old age because we have been told so.

Granted, our progression from infancy through adolescence and adulthood involves changes and the appearance of "aging". But what if there were substances naturally occurring in the food and within our bodies that were responsible for the rate at which we grew older? Dr. Howell equated that the length of life was proportional to the amount of enzymes exhausted in digestion. In other words, one's length of life is influenced by how much our metabolic enzymes are used to digest cooked food. Since enzymes are shifted from their metabolic uses, especially from the immune system, to digest cooked food, we will age faster. Could this be what Ponce de León was looking for in his legendary "fountain of youth"? Some researchers may have given us a clue.

In the 1980s, Dr. Roy Walford of UCLA conducted numerous laboratory experiments on animals. He reduced their food intake and found that their length of life extended beyond what was considered normal. He suggested that all one had to do was not eat so much in order to have a healthier and longer life. Walford stated the obvious, but he may have missed the real point.

Dr. Howell found that in fasting there is an increase in available enzymes in the body due to the lack of food, especially cooked food. In the absence of food, the body has more enzymes for repair and healing. As an example, there are approximately 64 different types of enzymes circulating in the blood to clear waste and prevent the build-up of plaque. When the body is short-changed of these enzymes, there will be an unnatural build-up of plaque. Why would there be a lack of these enzymes in the blood? When cooked food is eaten, enzymes for digesting it must be found somewhere in the body. It is here that metabolic enzymes are shifted from their normal functions to the role of digestion, leaving the body primed for future disease.

**Signs of Enzyme Deficiencies**

Symptoms of mineral and vitamin deficiencies occur relatively quickly. They are recognized to cause specific illness. Enzyme deficiencies, outside of genetic or birth defects, take longer periods to be noticed and have only begun to be recognized in some circles of the medical community. What, then, are typical signs and symptoms of the more common enzyme deficiencies?

- **If you have problems digesting carbohydrates**, you may experience airborne-sourced allergies, diarrhea, fibromyalgia or attention deficit disorder (ADD or ADHD).
- **If you cannot digest fats**, you may experience constipation, gallbladder problems, heart disease or hormone imbalances.
- **If you cannot adequately digest protein**, you may experience constipation, arthritis or other inflammatory conditions, anxiety or panic attacks, premenstrual syndrome or immune system disorders.
If you are unable to break down plant fiber, you may experience constipation, eczema or other skin-related problems, recurrent yeast/fungal infestations or excessive weight gain.

The above conditions are also the result of diets high in those foods associated with the enzyme deficiency. In fact, the foods one craves are those that create dietary stress due to one's inability to digest them completely. They are also the foods one has either allergies or hypersensitivities towards because of the failure to be able to digest them, i.e., because of the deficiency of that particular enzyme.

People may crave certain foods because of the enzymes found within the food, which the body needs. But being cooked and destroyed, those enzymes do nothing for the craving – so we eat more of the same thing, telling ourselves we should not.

References:
- Pottenger, Francis, Jr, Pottenger's Cats: A Study in Nutrition, Price-Pottenger Foundation, Inc., La Mesa, CA, 1995

From: www.nexusmagazine.com/articles/Enzymes1.html

Enzyme Nutrition Therapy – Beyond a Raw Food Diet

Part 2 of 3

Although enzymes are generally associated with raw food and digestion, they have been shown to have clinical uses in treating disease and restoring health.

THE CHALLENGES OF OUR MODERN WORLD

Dr. Edward Howell, the pioneer in the clinical use of plant enzymes, began working at Dr. Henry Lindlahr's nature cure sanitarium in the 1920s near Chicago, Illinois. Dr. Lindlahr is considered by many to be the "Father of Naturopathy", introducing the modality to the public after his own diabetes
was cured by Father Sebastian Kneipp, a nature cure doctor in Bavaria. Father Kneipp used his "cold water cure" and herbs to restore the health of his patients.

Dr. Howell's research and observations led him to believe that if he could replace the enzymes lost in cooked and processed food, the nutrients could be better utilized. In 1932 he founded the National Enzyme Company to produce food enzymes to help in digestion. During his clinical practice, he witnessed hundreds of patients' cures from chronic degenerative disease.

Dr. Howell advocated at least a 75% raw food diet and taking digestive plant enzymes with the remaining cooked food. In an interview conducted towards the end of his life, he remarked that even if someone ate a mostly raw food diet, it still would be important to use concentrated plant enzymes. Replenishing what he referred to as the "enzyme bank" was a sure way to maintain one's health into old age and prevent disease.

While eating an entirely raw food diet would seem ideal, in most cases it would not be realistic for the majority of people at this time. Even the vegetables of the cruciferous family (broccoli, Brussels sprouts, cabbage, cauliflower and kale) should not be eaten raw. They contain thyroid-inhibiting factors that should be destroyed by cooking.

Though there is a growing awareness of diet, nutrition and alternative medicine, the average person leaves it to someone else to "fix" them. Thanks to the media's flood of advertisements, they usually rely on over-the-counter drugs. The combination of propaganda and naïveté allows the average person not to take full responsibility for their own health.

Changing the system so that raw food was the main staple of society would demand a complete alteration of the food and medical industry and require re-education on food preparations. It might even challenge belief systems in many cultures. It would confront the largest and most powerful industry in the world: the pharmaceutical/petroleum cartel. Monsanto would be the first to sue anyone having anything to do with it because it would invalidate the corporation's push for global market control of worthless genetically engineered seeds. Only organically cultivated seeds could be used because of the greater enzyme content inherent in the plants once they were grown. All food would be organically grown, not only to prevent the pesticide/herbicide interference with normal bodily enzyme functions but because mineral content in organic food is far more abundant, minerals being necessary co-enzymes. Appliance companies selling microwave ovens would be driven out of business unless they developed new products. All those cooking shows on cable television would have to reinvent themselves by coming up with novel ways to prepare raw food.

There would be an ongoing debate, as there is now, on whether to be vegetarian, since eating raw meat would probably be seen as abhorrently barbaric. Nonetheless, Dr. Howell specifically discussed how the Eskimo culture ate raw autolyzed meat. Howell points out the original meaning of the American Indian word "Eskimo": "he who eats it raw". The technique of autolysis involves keeping meat in the proper conditions of temperature and moisture for the enzyme cathepsin, found in meat tissue, to break it down slowly. It has been practiced for centuries. Traditionally, Eskimos survived brutal winters in the northern tundra living on raw, pre-digested meats and blubber, without any fruit or vegetables or degenerative disease! When they began eating a "regular" diet of cooked foods high in carbohydrates, they experienced an increase in degenerative disease.

Howell explains there is no evidence that humans can live on an exclusively raw meat diet, but he does make the point for autolysis. The hygienic conditions of those animals raised as food supply would have to be updated so that they lived in extremely clean environments without cages and were free to roam. They in turn would not eat grains but would be pasture fed. Antibiotics and other drugs would be used only in rare instances. This would cost several billion dollars or more to change
worldwide. It is doubtful the food and pharmaceutical industry would go along with it. Since the bottom line in any industry is profits, there would be far less profit if farmers and the populace suddenly did not need the majority of pharmaceuticals.

Traditions and cultural implications aside, the socio-economic structures of today's world make it difficult to achieve this change towards eating raw food on a grand scale. Nonetheless, there are small groups around the world who are practicing this way of eating. They mostly advocate vegetarianism. Whether being a vegetarian is the most appropriate approach to health is still debatable; it is not to be addressed here. Even vegetarians have major health issues, sometimes far worse than non-vegetarians. What the author is addressing is the clinical use of enzymes as therapeutic tools for preventing and reversing disease and maintaining optimal health.

The therapeutic use of enzymes reveals significant differences between enzymes resulting from animal sources and those of plant origin. Today, animal-based enzymes are primarily derived from the pancreas of freshly slaughtered pigs. They contain the highest enzyme concentrations from animal sources that we know of to date. They have been used since the early 1900s and have been very effective under certain conditions. Some enzymes are obtained from plants, including bromelain from pineapple, papain from papaya and natokinase from soy fermentation. Other plant-based enzymes are produced from different fungus/mould species by "growing" them. Various enzymes can be cultured from these fungi/moulds in very high concentrations. Contrary to popular belief, these enzymes do not contain any of the substances they were grown from; laboratories manufacturing plant enzymes have independent laboratory assays available to verify this.

ENZYME ACTIVATION DEPENDENT FACTORS

Vitamins and minerals are considered essential nutrients and the symptoms of their deficiencies are well documented, often occurring soon after depletion. Signs and symptoms of enzyme deficiencies take much longer to manifest and are very often missed in clinical evaluations.

Enzymes are usually bound to either a mineral or a vitamin, which are co-enzymes. Unlike most vitamins and minerals, enzymes are unique, requiring four specific conditions for activation in order to function:

• moisture (water);
• ideal temperature range;
• the exact pH (alkalinity or acidity);
• a specific substance (substrate) to work on.

Water: The Gift of Life

*In order for enzymes to be active, moisture must be present.* Enzymes will not work in a dry environment. They must have moisture.

All legumes, nuts and seeds contain enzyme inhibitors. The inhibitors prevent those foods from spontaneously growing, and also nullify the body's own digestive enzymes from working on them. This is why they are so difficult to digest and why we feel tired after eating them. It costs the body great amounts of energy to digest them. Heating will destroy enzyme inhibitors but will also destroy the enzymes themselves. Soaking these foods for at least 12 hours not only destroys the inhibitors but activates the enzymes. Once activated, enzymes will begin breaking down proteins, fats and carbohydrates within the legume, nut or seed, giving the body pre-digested food.
In his book, *Your Body's Many Cries For Water*[^1], Dr. Fereydoon Batmanghelidj documents chronic dehydration as a causative factor for many health problems such as asthma, arthritis, allergies, back pain, hypertension, migraine headaches and other degenerative diseases. Coffee, alcohol, manufactured beverages and many of the pharmaceutical drugs dehydrate the body. He believes dehydration to be the root cause of many degenerative diseases.

Enzymes are the only substances capable of doing work in the body, but they need adequate moisture in order to accomplish this.

Is it possible that dehydration for extended periods inhibits or slows normal enzyme functions which could lead to disease? It may be an academic point of argument. When the body is dehydrated, the blood becomes thick, making normal bodily functioning difficult. Taking aspirin will thin the blood, but not without side effects. Drinking more water will also thin the blood. Supplemental enzymes will thin the blood, but large amounts are required to accomplish this.

There are several ways to view any health crisis and there may be more than one way to remedy it. Finding the safest, most natural and medically sound way of supporting the body to achieve resolution of any health crisis can be challenging for the average person. Having the media thrusting advertisements at them and at the same time spewing propaganda about questionable safety issues of natural remedies, it is no wonder most people are confused and leery.

Some will say: "What about vitamin and mineral depletion in the soil and our food as causative factors in disease? What about our polluted environment – the pesticides, herbicides and industrial waste?" Frankly, it should not take a rocket scientist to conclude how health-damaging our waste and chemical toxicity have become. It is essential to eat organically grown food, while avoiding junk food and food that has been genetically modified, microwaved and/or irradiated. Yet if you eat cooked food, the body will still suffer from enzyme deficiencies. When there is enough of nature's "labor force" – namely, metabolic enzymes and fluid circulating throughout the body – digestion, tissue repair, growth, immune function and detoxification will proceed normally.

Dr. Loomis includes a 24-hour urinalysis in his system of evaluation. "Volume" represents how much fluid intake there is and how well the body eliminates it. In relation to chlorides and specific gravity, volume reveals sodium chloride (salt) intake and kidney function respectively. Does one ingest too much salt or not enough? Does the patient drink enough water or too much?

Many people drink too many liquids (not necessarily water) in the belief that they are doing their bodies good by flushing out toxins. While elimination of toxins is beneficial and to be encouraged, excessive fluid intake can deplete and change the electrolyte balance, resulting in numerous other health issues. Rather than guess how much water your body needs, you are advised to follow the recommendations in Dr. Batmanghelidj's book.

In addition, utilizing Dr. Loomis's 24-hour urinalysis will prove to the patient if they are drinking excessive amounts of water, too little water or just the right amounts daily. Adjusting water intake based on a 24-hour urinalysis is a clinically sound method of correcting electrolyte levels and balancing acidic/alkaline conditions.

**Temperature**

Temperature plays a crucial role in how active enzymes are within the environment in which they are working. Bromelain and papain are two protein-digesting enzymes common in commercial and industrial use. Bromelain is utilized in the meat industry as a meat tenderizer because its ideal temperature range is 120–160°F (48.89–71.11°C). Papain is used in the tanning industry to soften
leather. Its optimal temperature is around 105°F (40.56°C). Bromelain and papain have had some success in clinical use as anti-inflammatory agents. However, their limited results might be due to the body's temperature of 98.6°F (37.0°C), which is not ideal for them. Enzymes produced from mould/fungus organisms, however, have an ideal temperature range of 95–105°F (35.0–40.56°C). At the normal body temperature of 98.6°F, plant enzymes from mould/fungus origins are perfect. This will be seen when we discuss fever in part three of this article series.

Animal-based enzymes (pancreatin) are heat labile, as are plant enzymes. Dr Howell noted that heating food at 118°F (47.78°C) or greater, for any length of time, destroys all the enzymes. Pancreatin, which has been used most extensively over the last 80 years, is subject to the same problems faced when manufacturing enzymes in the form of tablets or capsules. Whether the enzymes are from animal or plant origins, when they are produced as a tablet the heat involved in the processing causes a loss of at least 50% of the enzyme activity in those products. Encapsulating enzymes is more advantageous because there is no heat involved and consequently no loss of enzyme activity. There are also no binders, fillers or excipients as in tablets; these have the potential to cause allergic reaction in some people.

**Acidity and Alkalinity**

One of the other major differences in using animal and plant enzymes is what is known as the pH factor. In chemistry, pH is a measurement of the acidity or alkalinity of a substance. Vinegar is somewhat acidic, while hydrochloric and sulphuric acids are highly acidic. Sulphuric acid is contained in car batteries. Hydrochloric acid is used commercially and is produced in the stomach. Lye, on the other hand, is extremely alkaline; it is an ingredient in most commercial products used to unclog plumbing drains. Interestingly, many of the newer plumbing and septic tank cleaners use concentrated plant enzymes.

Animal-based enzymes like pancreatin are limited, as they can only work in a pH range of 7.2–9.0, which is alkaline. Stomach acid concentrates down to about 2.0–3.0 during digestion. This is why animal-based enzymes can never digest food, since they are limited to the alkaline end of the pH spectrum.

One of the body's most important functions, monitored by the hypothalamus, is that of keeping the blood pH between 7.35 and 7.45 – which, as indicated above, is alkaline. The slightest deviation from this narrow range will throw the body into crisis. Since animal-based enzymes work only in an alkaline environment, they have been shown to work best when taken in between meals to break down unwanted protein such as undigested food remnants, viruses, bacteria and other pathogenic micro-organisms. They are also clinically proven in reducing inflammation.

Most of the original clinical studies using enzymes were done in Europe, particularly Germany. These were primarily performed using animal pancreatic enzymes. A library search of literature dating back to the early 1900s shows that most studies were written in French, Italian and German. Very few studies were presented in English until the late 1930s, as found in the Index Medicus. Even today, most clinical studies recorded in the medical literature still employ animal-based enzymes (pancreatin) and are from Europe.

Common usage for pancreatic enzymes is in the treatment of pancreatic insufficiency diseases such as steatorrhoea (excessive amounts of undigested fat in stools), cystic fibrosis and pancreatitis. Results are mixed, but generally some help is obtained from pancreatin. While some of the inflammation is reduced to a degree, digestion is very little affected due to the fact that pancreatin does not work in the acidic pH of the stomach.
Plant enzymes, on the other hand, are known to have a much greater effect in these conditions due to the advantage of their broad pH range. A study out of England observed that a small amount of an acid-stable lipase from plant sources was as effectual as a 25-times larger dose of animal pancreatin.[2]

One experience of the author involved a gentleman diagnosed with pancreatic cancer, due in part to his alcoholism. His doctors prescribed pancreatin to aid with digestion and relieve inflammation. He was given six weeks to live. He had not found any relief with the pancreatin. Four weeks after he started a plant-based enzyme program, he lost touch with the author. The author succumbed to thinking he would never see this client again, due to his death. One year later, he ventured into a restaurant and there was the former client with his wife and son, enjoying a meal. The author asked in disbelief how he had survived. He explained he had continued taking plant enzymes, having purchased some from a health food store. He was still alive after several years, to the amazement of his doctors.

Plant-based enzymes work in a very broad pH range of about 2.0–12.0. This covers both the acidic and alkaline ranges and makes them ideal for digesting food. Remember, Dr. Howell found a pre-digestion stomach in mammals, including humans. Based on the observations of Beazell et al. as well as other researchers, Howell reasoned that most digestion takes place in the stomach. Since plant enzymes survive extreme pH conditions, this makes them perfect for digesting protein, starches and fats in the stomach. This digestion in the stomach also relieves the pancreas of its enzyme-producing burden. Plant enzymes are active in both acidic and alkaline environments, giving them greater access to digesting substances in blood, lymph and tissue that do not belong there.

Substrates: The Lock and Key

Lastly, enzymes need a specific substrate (substance) on which to work. The analogy most commonly used is that of a lock-and-key system. Enzymes are very exacting in what they can work on: if the key does not fit the lock, nothing can occur. Protease works only on splitting protein down into smaller protein peptides and amino acids. Lipase cleaves fats and oils into fatty acids. Cellulase breaks down cellulose, which is plant fibre. Pectinase works on pectin (fibre) from fruit. Fructase breaks down fructose, the sugar found in fruit. Sucrase breaks down sucrose, the sugar obtained from beets or sugar cane.

One of the most commonly discussed enzyme deficiencies is lactose intolerance – the inability to digest the sugar component of milk. It has been observed through associates of Dr. Loomis that when someone is lactose intolerant, they are also usually intolerant of other sugars including maltose from grains and sucrose.

The enzymes necessary for digesting these sugars are produced by the villi of the small intestine. When someone overconsumes sugar in its many forms over time, they exhaust their body’s ability to produce the specific enzymes necessary to digest those sugars. This is also the case with fructose when it is used as an additive derived from synthetic or even natural means, if enzymes are not present to digest it.

People who consume too much sugar also end up not being able to digest fats properly. This is especially true for women. The complex endocrine system of women warrants the ability to digest fats and proteins to ensure necessary hormone production throughout life, especially during menopause. Hormones are primarily produced from fats, proteins and minerals. In fact, the major steroid hormones (aldosterone, cortisol, estradiol and testosterone) are derived from cholesterol.
Due to excessive sugar consumption during their lifetime and the inability to digest the sugar, so many women experience difficult menopause because of mineral deficiencies brought about by the sugar. Difficult menopause also stems from long-term problems of protein and fat digestion. The body uses food not only for energy but for tissue repair (which requires protein) and production of essential hormones.

The above example is true of any food that is consumed exclusively for long periods. Excessive consumption and the concurrent inability to digest those foods are known as dietary stress factors. Everyone is subject to dietary stress factors due to the repeated overconsumption of particular foods. The base of the food pyramid advocated by the medical community is built upon carbohydrates. It has become clear to many that this is a faulty representation of the ideal diet. The rapid rise in the incidence of diabetes, obesity and cardiovascular disease, especially in children, is the result of excessive carbohydrate and sugar intake and lack of exercise. The new kid on the block, insulin resistance syndrome (IRS), is just another example of the body's inability to digest and utilize sugar and simple carbohydrates properly. It is believed by many to be the precursor of type II diabetes. It is further evidence of enzyme deficiencies, specifically of the sugar and carbohydrate digesting enzymes.

Another group of enzymes, anti-oxidant enzymes, works on what are termed free radicals. Free radicals are the result of living in an industrial society. Externally they are caused by radiation, pollution and toxins, while internally they are the result of normal metabolism. They are molecules without a paired electron in their outer ring. Electrons hold molecules together. Normally, a stable molecule has a pair of electrons. It will become unstable and reactive if there is an unpaired electron in the outer ring. Very often, free radicals are composed of an unstable oxygen molecule which will cause damage to the lipid portion of the cell membrane. It can also affect the protein and DNA of the cell. Antioxidants, including enzymes, can prevent or stop the damage caused by free radicals. Glutathione peroxidase splits hydrogen peroxide into water and a single stable oxygen atom. The main symptoms of excessive peroxide free radicals include heart and liver disease, premature aging, and skin disease such as age spots, cancer, dermatitis, eczema, psoriasis and wrinkling. Glutathione peroxidase is dependent on the mineral selenium. If there is a deficiency of selenium in the soil and thus in the food consumed, there may be a hindrance in the body’s ability to produce adequate amounts of glutathione peroxidase. Interestingly, epidemiological research in the United States and China shows areas with the lowest concentrations of soil selenium have the highest cancer rates, with the converse being true. This was first known in 1983 and later confirmed in the latter 1990s.

Superoxide dismutase (SOD) is an anti-oxidant enzyme responsible for cleaving the highly reactive superoxide radical O2 into hydrogen peroxide and protecting cells from dangerous levels of superoxide. Working in tandem with SOD is the enzyme catalase. It breaks down the hydrogen peroxide that is created by SOD’s action on superoxide radicals. SOD/catalase deficiencies have been observed in inflammatory conditions, especially arthritis, bursitis and gout. In the field of anti-aging medicine, it is believed that supplemental anti-oxidant enzymes can slow the aging process. By curbing free radical processes, one may stop the damage done to cell membranes, strengthening the permeability of the cell and making it less prone to invasion by pathogens or environmental pollutants.

**ABSORPTION OF EXOGENOUS ENZYMES**

One of the arguments against using supplemental enzymes is that they are protein macromolecules and therefore are denatured or destroyed by the action of hydrochloric acid produced inside the stomach and, as such, they cannot cross the brush-border of the intestine intact. Another argument
is that even if they did cross over, they are nothing more than a trigger for the production of endogenous enzymes. As described below, these and other arguments have been proven incorrect. A macromolecule is a compound of 1,000 or more atoms bound together. There is overwhelming evidence that macromolecules do, in fact, cross the gut lumen intact. In 1904, Drs Ganghofer and Langer demonstrated that large protein molecules were absorbed across the intestinal gut without being degraded and were still capable of functioning.[4]

Morris documented the intact absorption of gamma globulin in newborns. He recounted how infants' first milk is colostrum, which sets up the infants' digestive immune function.[5] Both gamma globulin and colostrum are proteins. Professor Seifert of the University of Kiel not only demonstrated the absorption of gamma globulin but proved by means of immunological testing that the proteins were intact, entering the bloodstream unaffected and in full molecular size.[6-8]

Walker and others documented extensive work on the intestinal uptake of macromolecules in relation to immunisation.[9-11] Gardner specifically wrote about the gastrointestinal assimilation of intact proteins.[12, 13] Other animal and human studies have described numerous intact proteins including animal-based and plant-based enzymes being absorbed into the bloodstream following oral administration.[14-17]

In one study, cancer patients with known inflammatory conditions (deep and superficial thrombophlebitis of the extremities) were given doses of proteolytic enzymes either orally or intramuscularly of trypsin and chymotrypsin. Measurements of blood levels of both enzymes showed marked increases within 30 minutes, with a decline to base levels at the end of 24 hours. These results occurred with both orally administered and intramuscularly injected enzymes. Since the orally administered enzymes did increase the blood esterase substantially, it was concluded that "orally administered chymotrypsin and trypsin resulted in specific esterase activity changes in blood, indicating absorption of the enzymes given, rather than release of other enzymes from the intestinal tract".[18] Unfortunately, this study was only interested in whether or not proteolytic enzymes could be absorbed across the gut wall. There was seemingly no interest in what the effects might be from the enzymes themselves on the inflammation or cancer.

In another study, lipase was found to be circulating from across the intestinal lumen into the lymph system and back to pancreatic acinar cells, where the cycle repeated itself.[19] This circulation of enzymes via the lymph and blood systems is similar to the recycling of bile salts by the liver.

YOU ARE WHAT YOU CAN DIGEST!

Over the last century, doctors have sought to treat human ailments with a variety of natural and not-so-natural methods. Driven by the financial gains of pharmaceutical companies, research scientists have tried to unlock the secrets of nature to synthesize active ingredients of plants and animals. The amount of money spent on health care in the United States per person based on per capita income far exceeds any other country – yet there is rampant illness, with always the promise from pharmaceutical companies of yet another discovery just around the corner. Most people have come to expect the "magic bullet" pill that will do everything for them. Even in the natural health food industry, the latest vitamin/mineral supplements have everything except the kitchen sink thrown in for good measure.

In the early 1900s, radiation and surgery became the mainstays of treatments. By the 1940s, pharmaceutical drugs had turned into the miracle cures. We've moved into an entirely new and uncharted territory, becoming cocky with the analysis of genomes and the ability to tamper with life. Cloning of animals and production of genetically modified drugs are the next promise for the future.
We are told that irradiated and genetically modified foods will feed the world, but at what cost? All of the above factors will provide continuing evidence of enzyme deficiencies leading to more obscure and unrecognizable diseases. Biological and chemical terrorism now threatens our existence, but so does the manipulation of our food.

Throughout history, many scientific discoveries have been blighted by a blind spot. That spot is the gaping hole of the future of this planet, including everyone and everything on it. In the Hindu and Buddhist religions, karma is the principle of cause and effect. It has been described in many ways and in many languages by prominent religious leaders as well as physicists. Christians understand it as "What ye sow, so shall ye reap". What we do now will forever affect the world we live on and in. Clean food, water and air are essential for survival. We can control what we eat, drink and breathe, so long as we are informed and educated.

The ongoing work of Dr. Loomis and his associates attests to the best-kept secret in the field of nutrition. You are not necessarily what you eat, but what you can digest. Improved digestion through plant enzymes should be the starting point in any health program. When the body can get what it needs, when it needs it, it will perform wonders and even miracles.

As Dr. Howell said, "Without enzymes, life itself would not be possible".

References:


Endnotes:


From: www.nexusmagazine.com/articles/Enzymes2.html

**Enzyme Nutrition Therapy**

Eating enzyme-rich raw foods and supplementing the diet with plant enzymes is our best insurance in preventing and treating disease and promoting health and longevity.

**Part 3 of 3**

**ENZYMES AS THERAPEUTIC TOOLS IN HEALING**

Since ancient times, enzymes have unknowingly been involved in treating human ailments. Food consists of protein, carbohydrates, enzymes, fat and fiber, minerals and vitamins. While the properties of enzymes have largely been unknown until recently, results were witnessed and associations of health or disease were made between various plant and animal substances. The healing properties of herbs are primarily attributed to alkaloid or other chemical properties that trigger a response in the body. Invariably, the chemistry of herbs affects metabolic enzyme pathways. The unique substance either inhibits an enzyme or stimulates another to change body chemistry. Some plants have unique essential oils capable of inhibiting or destroying pathogenic micro-organisms due to the disruption of some enzymatic pathway of the organism.

Observations of the few (medicine men, shamans and later monks) gave them a certain power over the rest of the population who could not identify which plants caused the healing. This was reserved only for the tribal healer and passed on to the favorites within the tribe. The use of hallucinogenic plants was often employed by shamans to elicit the wisdom from the spirit world to aid in the cure of the person. In today's world of organized medicine, control over one's health is still largely in the hands of the elite few and knowledge is kept from the populace. Contrary to the enlightening herbs of the shaman, a moderate number of health care workers become addicted to or self-medicate with pharmaceutical drugs or turn to alcohol to help relieve stress involved in their profession.[1, 2, 3]

Within the realm of natural medicine, old and new alike, therapies abound. Everything from
acupuncture, botanicals and nutrition to homeopathy and, more recently, "energy medicine" is available to the average patient. Regardless of the modality chosen, what remains to be understood is that in every case the healing can only occur if the body has enough metabolic enzymes to do the work. Enzymes do work. Work in this case denotes the ability to initiate, alter, speed up or slow down biochemical processes. It indicates having the capacity to break apart or join components together synergistically to change their original structure and function. Food is broken down during digestion and made into smaller components which are then utilized in the body for structure and function. Protein is rendered into amino acids and smaller peptides. These can be used as neurotransmitters for proper brain function. Certain amino acids are used for energy, mineral transport and repair of tissue.

Nutrition, as defined by Webster’s Third International Dictionary of the English Language, is "The science of food and the processes by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances". All too often, this definition is forgotten in the field of nutrition. Nutrition today is practiced in much the same way as the pharmaceutical drug approach: for every symptom, there must be a deficiency; simply give the mineral or vitamin and the signs will go away. One of the most common assumptions in both allopathic and complementary medicine is that the patient's digestive system is working fine. Unless the patient complains of heartburn, gas, bloating, belching or pain in the abdomen, doctors assume no problems. Divergent to this is the approach Dr. Loomis took in his research into enzymes.

**Diet, Digestion and Detoxification**

When Dr. Loomis began his exploration into the benefits of enzymes in restoring health, he knew the starting point had to be with diet and digestion. The dramatic increase in obesity, cardiovascular disease and diabetes in Western societies is evidence of the simple fact that people eat too much. It also reveals signs of chronic enzyme deficiencies. The combination of simple carbohydrates, fats and sugars found in "fast food" are the major contributing factors to the above disease conditions. Food is much more than just a quick fix for energy. Food is responsible for tissue repair and growth, hormone production, eyesight and immune function. Through protein neurotransmitters, food, or the lack of it, affects our feelings, thoughts and behavior. In her groundbreaking book, *Molecules of Emotion*, Dr. Candace Pert recounts her discoveries of several biochemicals involved with emotions.[4] The body requires "raw material" from which to produce these biochemicals. Food is the raw material in the form of protein, fats and carbohydrates.

We must appreciate the dynamics of our body's internal environment – the intracellular and extracellular fluid – in order to understand other complications as the result of poor digestion. Intracellular fluid is found inside the cell and is not constant; it changes due to the extracellular fluid – the fluid outside the cell. Intracellular fluid represents about 66% of the water found in the body. Extracellular fluid roughly makes up the other 33% of the body's water. It serves as a means of transport for nutrients and waste products from normal metabolism. The extracellular fluid needs to remain reasonably stable regarding volume (amount of water), temperature, acid-alkali balance (pH) and levels of nutrients (protein, cholesterol, minerals, glucose) to nourish the cells.

The body continually identifies deficiencies and excesses of specific nutrients or metabolic waste products. All attempts are made to rectify any imbalance by changing the chemistry. The hypothalamus is the only part of the brain not isolated by the blood-brain barrier. This barrier shields fragile tissues of the brain from changes in the body's extracellular fluid. It monitors the body's chemistry 24 hours a day, seven days a week. It reads the slightest alteration in the blood, then quickly sets about to make the necessary changes to maintain homeostasis (balance). The chemistry of the blood is largely determined by what we consume. Food and drink comprise varying
combinations of proteins, fats, carbohydrates and fibers, enzymes, vitamins and minerals. It is all about chemistry. The hypothalamus must ascertain how to keep the body in balance despite the type of food consumed. The sort of balance necessary for optimal health for one person may not be the same for another. Indeed, most often they can be radically different. As Shakespeare wrote, "One man's meat is another's poison".

If you cannot completely digest what you eat, several things may happen.

• Firstly, the undigested food remnants pass through the brush-border of the intestinal tract into the blood and lymphatic systems. White blood cells are stimulated to find the offending material and finish breaking it down. This is known as digestive leukocytosis. It is an automatic response every time you eat cooked/processed food. It was thought to be a "normal" reaction to eating, ever since the early 1800s. However, it was shown to be an unnatural response in the 1930s by Dr. Paul Kautchakoff.[5] He proved by careful monitoring of patients' blood that only cooked – not raw – foods caused the reaction.

• Secondly, the body may begin to consume more than is necessary. Overeating is one way of compensating for deficiencies of nutrients. The deficiencies are not due to the conscious restriction of a particular food. As stated previously by Dr. Howell, cooking food destroys all enzymes, thus food will not be entirely broken down into the micronutrients necessary for cellular utilization. It is like taking something the size of your house down to the size of a grain of sand in order to get inside the cell to nourish it. Enzymes are the only material capable of splitting food into usable nutrients. Given that undigested food cannot adequately nourish cells, the brain will direct the person to eat more of something to make up for what the body did not get from partial digestion. When this happens over long periods, weight gain occurs with continued loss of metabolic enzymes.

Food cravings are another sign of incomplete digestion. What we crave tends to be the food we do not digest very well. The hypothalamus dictates what we eat based on the chemistry of the blood. So when we eat a particular food and have cravings for it later, it is a sign we did not digest it very well. We will continue to eat more of it because there is something in that food we need but did not get. It has been suggested we are craving the enzymes inherent in that food before it was heated. Those enzymes we are chronically missing normally would be found in the food we crave. Dr. Howell noted that animals fed cooked/processed food often resorted to eating their own feces. He found it was to replace the food enzymes lost in the cooking process.

The enzyme amylase is a good example of the above. Amylase is one of the major carbohydrate-digesting enzymes. It is found in the kernels of grains and in starchy vegetables. By cooking those foods, amylase is destroyed and our body must secrete amylase from other organs, such as the salivary glands. Amylase is known as an IgG histamine blocker. It stabilizes the mast cells and basophils that release histamine at the start of inflammatory conditions. One could say amylase is the body's own natural antihistamine. Antihistamines are prescribed for allergies, dermatitis and other histamine-type reactions. It has been observed clinically that people who eat excessive amounts of simple carbohydrates most often are those with histamine-related health problems – airborne allergen reactions, allergic reactions to insect bites and bee stings, sinusitis and other eye-, ear- and nose-related health issues. Sinus or frontal headaches are frequently associated with chronic amylase deficiency.

In Western society, patients with fibromyalgia tend to have a history of excessive intake of refined carbohydrates. Aside from the occasional discussion, there is little distinction made in the general media between simple and complex carbohydrates. People choose what is convenient. The fast food industry is based on this notion of convenience. However, when closely examined, most of what
is considered convenient has detrimental effects on our health. The excessive consumption of carbohydrates will cause chronic depletion of amylase. This may result in the typical histamine conditions and pain found in fibromyalgia.

It is also thought fibromyalgia is related to excessive waste in the body. Undigested remains of disproportionate carbohydrate consumption can accumulate in tissue, since the body cannot eliminate it properly. This might partially explain the patient response to palpation at several lymphatic trigger points when being diagnosed. The lymph system removes waste from the body. Yet, this will not occur very well when too much food is eaten, causing a virtual backing up of the "plumbing". Using highly concentrated enzymes with patients who have histamine reactions alleviates the response within a very short time and without the side effects associated with conventional antihistamines.

- Thirdly, undigested food allows parasites and other pathogenic micro-organisms to live off the waste inside the body. Incomplete digestion allows bacteria to ferment carbohydrates and putrefy protein, giving off gas. The bloating that occurs after meals is the result of this. It is trapped gas, unable to move through the colon. The accumulation of undigested food in the intestinal tract leads to intestinal toxemia. It is also known as indicanuria and is responsible for a number of health-related problems.

### Eliminating Nutritional Stress

In the field of enzyme nutrition therapy, it is not just a matter of supplementing with concentrated enzymes. It is equally important to make the necessary dietary modifications limiting the intake of those foods known to be dietary stress factors for each individual patient. This is determined through a 24-hour urinalysis and Digestive Challenge Test© as developed by Dr. Loomis. It is believed that the only real disease is stress. It is how the body reacts to stress that determines what signs and symptoms of disease manifest in the body. Within Dr. Loomis’s system, we work with the following:

- Modifying diet to reduce dietary stress factors;
- Greatly improving digestion through intake of plant-based enzymes;
- Improving bowel elimination by nutritionally supporting those organs involved;
- Stopping or reducing inflammation;
- Improving immune function with concentrated enzymes;
- Supporting the autonomic nervous system with acidic/alkaline minerals;
- Nutritionally supporting the endocrine system for proper hormonal production.

There is a type of domino effect involved here. By improving dietary intake, you eliminate nutritional stress. Using plant-based enzymes with meals, the nutrients from food will be better digested, transported and utilized and waste will be more easily eliminated. When food is more completely digested, the body gets the nutrients rather than the pathogenic organisms.

Improving bowel elimination ensures a reduction in toxins being re-absorbed through the bowels back into the blood and lymph systems. This also prevents unwanted growth of pathogenic organisms. Inflammation can be caused by irritation from undigested food both within the gut and in its passage into the surrounding tissue. *Leaky gut syndrome* is the current name given to this phenomenon. The one area where enzymes show consistent results is in reducing inflammation. Well-documented studies indicate enzymes resolve inflammation and pain in half the normal time.[7, 8, 9] If chronic inflammation exists anywhere, the body develops stress in its attempts to resolve it. Over time, this exhausts the adrenals and our immune system, making it easier for detrimental outside influences to affect the body adversely.
Enzymes in Cardiovascular Disease

Cardiovascular disease is the leading cause of death in the Western world. It is amazing that the dietary link still eludes the medical community. Doctors pay lip service to a "healthy diet" and exercise as preventive measures. Dietitians have even worked out a "food pyramid" to help us make wise eating choices. Yet, in spite of the best intentions, the death rate continues to rise and there is no chance of its diminishing in the near future based on the models we have. The food industry "fortifies" food with some 11 "essential" nutrients including B vitamins, calcium, magnesium, potassium, iron and sodium. Yet, the very substances that would digest the food are deliberately left out, destroyed for the sake of extended shelf life.

At the beginning of the 20th century, the transportation of food across a continent posed serious problems. How could a company ship raw, uncooked food without spoilage? The answer was to find a way to process the food and ship it without rotting. In the early 1900s, salicylic acid (aspirin) was used because it "prevented the action of enzymes (unorganized ferments), like diastase, emulsion, and that of mustard, also gastric digestion, fermentation by yeast, ammoniacal fermentation of urine and the germination of seeds".[10] In other words, salicylic acid was "distinctly antagonistic to most enzymes".[11]

So as early as 1903, aspirin was known to affect enzymes. It was used in this way to preserve food for extended shelf-life. As newer techniques for extending the shelf-life were discovered, aspirin was discontinued. Is it not puzzling, then, knowing how aspirin destroys most enzymes, that many patients are told to take aspirin in the prevention of heart disease? From the same reference, it is stated that salicylic acid "has a disintegrating action on the blood corpuscles". The blood-thinning properties of aspirin result from the fact that it destroys red blood cells, causing fewer of them to be found in the bloodstream!

The medical explanation of cardiovascular disease fails to explain the picture fully because it is missing the major piece of the puzzle. Medical research is funded with billions of dollars to find the "cure". In spite of this, triple-bypass surgery is covered by insurance while the advice and wisdom of nutritionists is not. Prevention is not practiced because it does not bring in the revenue that surgery, radiation and drugs do.

Much attention is paid to markers of potential heart disease. The category of lipoproteins is a good example. Lipo means "fat", and protein is self-explanatory. The four principal classes are: high density (HDL), low density (LDL), very low density (VLDL) and chylomicrons. Chylomicrons are dietary triglycerides. VLDLs are endogenous (from within the body) triglycerides, while LDL and HDL are both endogenous cholesteryl esters. Lipoproteins are necessary for the transport of lipids (fats). We are told it is healthy to have relatively high HDL levels, but should have low cholesterol (LDL), VLDL and triglyceride levels.

The endogenous group of lipoproteins is manufactured within the body, but the raw material is still derived from the fats and proteins we consume. Food must be digested in order for the body to utilize it. The abnormal accumulation of lipoproteins in the blood in a small percentage of the population represents an autosomal dominant genetic trait. But in the majority of people with cardiovascular issues, it is evidence of incomplete digestion of fats and protein – accompanied by the fact that people simply overeat. How can the body properly eliminate unused fats and protein when there simply is too much being taken in? The body must hide or store this unusable waste. Some of it is stored in tissue and some of it circulates. When the kidneys and colon cannot eliminate enough waste, the skin compensates. The skin is the largest eliminative organ. Skin eruptions are the attempts to rid the body of waste.
Unfortunately, what circulates begins to adhere to the walls of the blood vessels, clogging them up. Macrophages are summoned to remove this accumulation, but cannot do so without an adequate supply of enzymes. Enzymes produced by the macrophages for their immune function are believed to be shifted to digesting the cooked food. Obviously, this prevents the breakdown of lipoproteins which continue to build up. Foam cells associated with atherosclerosis are formed when over-accumulation of fats occurs in macrophages.[12, 13, 14, 15]

Why has no one asked how this accumulation occurs? What is the bigger picture? It is this author's opinion that the accumulation transpires because cooked foods are not completely digested in the stomach. These undigested remnants cross the intestinal border into the blood and lymph, circulating throughout. Over time, their accumulation leads to damaged arterial tissue. Macrophages cannot break down the lipoproteins due to the exhaustion of their own enzymes. Eating cooked fats demands enzymes digesting them. Cooked foods must be broken down, even at the expense of the cardiovascular system. This daily assault of cooked foods drains lipase from many sources, especially the immune and lymph systems.

Plant enzymes taken before meals completely digest food. Therefore, no remnants can cross over into the blood. Having prevented further accumulation of undigested food, one can focus on removing the accumulated material. Enzymes taken in between meals are taken up by the body and sent to work in areas that need them the most. Enzymes will digest the undesirable lipoproteins in the blood vessels without affecting the vessels themselves. Reversal of cardiovascular disease is a matter of improving digestion and modifying dietary stress factors – in this case, fats and proteins.[16, 17, 18, 19]

Enzymes and Immune Function

When metabolic enzymes have been constantly drained from other organs and systems (particularly the immune system) to digest cooked food, there will be little left during an immune crisis, as in fever. Regrettably, sometimes the temperature from a fever rises too rapidly, causing great distress, such as seizures in children. If there is the risk of febrile seizure in a child, suppressing the fever with drugs such as ibuprofen or acetaminophen initially may be the wise thing to do; but these drugs are known to suppress immune function. Thus, preventing a febrile seizure first and then enhancing immune function through natural means would ensure a speedier recovery. Consulting a physician is advisable in this case. Someone not prone to febrile seizure may be carefully monitored to allow a fever to take its course but should be given plenty of fluids. Supplemental proteolytic (protein-digesting) enzymes enhance immune function, helping to destroy pathogens. These may help put an end to a fever more rapidly, significantly boosting immune function by destroying the offending pathogen.

Drinking sufficient water helps keep in check the "fire" induced by a fever. It also provides necessary moisture for enzymes produced by immune cells to defend the body. During a fever, extreme hot or cold weather conditions and strenuous exercise, enzymes are used up at a much faster rate. Becoming dehydrated due to decreased water consumption over time and the use of dehydrating agents such as caffeine and alcohol may make it more difficult for the body to resolve many of the health crises. It is believed that using supplemental enzymes during a fever augments available enzymes from white blood cells to destroy foreign micro-organisms rapidly. Taking exogenous enzymes during a fever can dramatically improve immune function, resolving a fever more quickly. A fever's typical temperature range of 99–105°F [37.22–40.56°C] is at the high end of plant enzymes' optimal temperature range. Throughout a fever, enzymes in blood and tissue increase as defense mechanisms and for the removal of waste. Moreover, they are used up at a much faster rate. A
fever is the body's way of destroying pathogenic micro-organisms through heat and increased enzyme activity.

Phagocytosis is a process where macrophages surround and engulf pathogens. They secrete enzymes which digest the invading pathogen. Referring to digestive leukocytosis, when cooked food remnants cross the brush border of the intestine into the blood, leukocytes are activated to find and finish digesting those food components in the blood. When this occurs repeatedly over time and from one generation to the next, the results are compromised immune systems. This is due to the loss of enzymes from white blood cells, which sacrifice them for digesting the food we eat. Note that Dr. Pottenger's cats study showed an increase in disease from one generation to the next, and that cancer rates have continued to soar despite the "War on Cancer".

After researching library archives on the clinical use of enzymes as far back as the early 1900s, specifically the work of Dr. John Beard and later that of Dr. Howell, this author cannot help but ask the following questions: What if one of the pancreas's chief roles is that of an "immune" gland as well as a digestive one? What if Dr. Beard's observations of the pancreas-producing enzymes destroying pre-cancerous cells (trophoplasts) are correct? One study investigated the stimulation of "digestive enzymes" of the pancreas of rabbits after exposure to histamine.[20] Histamine is one of the major components of the inflammatory response in mammals.

Is it possible that the term "digestive enzymes" in this case is incorrect? Are enzymes produced by such a reaction necessarily digestive, or are they responding to resolve the inflammation? Enzymes are known to speed the process of inflammation, thereby resolving it more rapidly.[21, 22, 23, 24, 25] If the pancreas responds to histamine by producing enzymes, could they be for healing the damaged tissue and stabilizing the mast cells and basophils that released the histamine in the first place? Proteases (proteolytic enzymes) are known to mediate the defense mechanisms of the body and maintain homeostasis. It is theorized that proteolytic and other enzymes work in two ways as part of the body's immune system. Firstly, orally ingested enzymes are believed to be marked by the body as "self" and, like the character in the video game "Packman™", are capable of digesting foreign proteins in the body that are "not-self". This would include foreign protein in the form of undigested food remnants, bacteria, viruses and other micro-organisms. Secondly, exogenous enzymes taken away from food are thought to be absorbed across the intestinal lumen and transferred into the blood, where white blood cells uptake them to be used in a variety of activities.

Numerous studies have been conducted in enzyme research that point to the benefits of exogenous enzyme therapy in many immune system-related diseases. Allergies, cancers, so-called auto-immune diseases, HIV and other viral diseases, bacterial infections and fungus/yeast infestations have all been shown to be helped by enzyme therapy.[26, 27, 28, 29]

In the event of allergies, enzymes break down the allergen/antibody complex, splitting it away from surrounding tissue when involved. Enzymes then break down the allergen into smaller components capable of being eliminated without stressing the body. Airborne allergens typically contain both protein and polysaccharide (complex sugar) structures. After entering the bloodstream, they normally are cleaved by enzymes secreted from white blood cells. In an allergic reaction, however, there may not be enough enzymes available from white blood cells to do the work, leaving the mast cells and basophils to release histamine. There occurs the typical allergic reaction of runny nose, swollen itchy eyes, pain, heat and redness in the area of reaction. In a study from Germany, enzymes were shown to split circulating immune complexes as measured in decreased values in blood and improvement of clinical symptoms.[30]
Several attempts have been made in using protease enzymes for patients with celiac disease, but with little success. It had been thought that the gliadin protein structure of many grains such as wheat, rye, barley and oats was to blame for the violent reactions suffered by patients. In a study on celiac disease, the carbohydrate portion was removed with carbohydrases, resulting in total success. There was no damage to the intestinal mucosa as there usually is in this disease.[31] Furthermore, the protein portion was not altered. This shows once again the specificity of substrate which enzymes display.

One of the exciting factors resulting from enzyme therapy comes from a study out of Austria.[32] It was shown that pancreatic enzymes as well as the constituents bromelain and papain stimulated the production of tumor necrosis factor. Tumor necrosis factor is a cytokine (a non-antibody protein which act as an intercellular mediator in an immune response) capable of hemorrhagic necrosis (destruction) of tumors and can exert cytostatic and cytotoxic activity on transformed cell lines. In other words, enzymes not only digest foreign objects but they can activate other protein products of the immune system to destroy undesirable growths in the body.

Although the above references represent only a small number of studies, it can be seen that enzymes have a therapeutic role for many disorders. Other studies include treating autism, sports injury, herpes infection, cancer and auto-immune disease.[33, 34, 35, 36, 37]

**Supplemental Enzymes for Health and Longevity**

While changing over to a raw food diet (or nearly all raw food diet) is desirable, this requires discipline.

Each one of us should take the leap into the world of raw food and experiment to find out what works for us. One can find safe, natural animal products to be used for protein intake. The best proponent of this is Aajonus Vanderplanitz. His website, http://www.primaldiet.com, details his experiences over a lifetime of experimenting with raw foods, especially raw animal products. There are numerous other raw food advocates located on the Internet and they have written several books, primarily dealing with a vegetarian raw food diet. Each has their arguments and points of view. In the end, it is the reader who must decide after experiencing what they believe to be in their own best interest. Whether to be a vegetarian or not is finally decided through trial and error and education. How you feel physically, spiritually and emotionally should be noted during any transition. The impact on one's health using enzymes can only be experienced to be appreciated. We are born with enzyme deficiencies, and we have a limited potential for producing enzymes.

Dr. Howell believed supplemental enzymes are important not only for health and longevity but as a type of insurance. As we grow older, our bodies do not produce as many enzymes as when we were children or young adults. What better way to ensure our health into old age than to eat enzyme-rich foods and supplement with enzymes where needed?

Clinical studies are generally funded by the pharmaceutical companies for the profits of shareholders, and tend not to be conducted for purely altruistic reasons. Furthermore, there is little interest in natural products because they cannot be synthesized and patented – at least not in the USA. We are living in quite a crazy world where anyone can buy and implement various biological and chemical threats. Anthrax and smallpox are only the tip of the iceberg of the dangers we face. As has been written in previous issues of this magazine, there are forces interested in creating chaos – only to hand us a solution, but at a very great trade-off. I believe that enzymes offer mankind the greatest hope of preventing and treating the threats we may face in the coming years. I also
encourage you to take up this call to educate yourself in all available material from reliable sources to keep your family and loved ones safe and healthy. ∞

References:

Endnotes:
10. Loomis, ibid.
11. Loomis, ibid.


*From: www.nexusmagazine.com/articles/Enzymes3.html*

**About the Author:**

Mark Rojek began researching alternative therapies in 1970. His studies included botanicals, mineral and vitamin requirements and diet. He interned in acupuncture with Dr. Bell in Windsor, Ontario, Canada, in 1973, and graduated in 1978 with a Bachelor of Science. He studied aromatherapy, kinesiology, massage therapy and classical homeopathy in England. In 1986, Mark began formal studies in traditional Chinese medicine, especially acupuncture. In Chicago, he worked with several holistic physicians as a medical technician and maintained a private nutritional practice. Also in 1986, he met Dr. Howard Loomis, the foremost living expert in enzyme nutrition, and continues to work with him. He works with several doctors in Michigan who refer to him and seek his counsel while researching, lecturing and counseling clients in nutrition and diet.

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