BIOLOGICAL BASIS OF THE GERSON THERAPY:

Salt and Water Management and Tissue Damage Syndrome

From a lecture by Gar Hildenbrand, 1990.

The Gerson Therapy is a salt and water management. There is a whole chunk of the medical literature on salt and water management: and that salt and water management also means hormone manipulation, and manipulation of the energy production and the integrity of the human cell. What that meant to the average person who's trying to get his or her body to work better is that, when one controls the types of salts that are found in the individual cell – the building blocks of our lives – and when one controls the water content – how much water there is in the cell – one can affect the way that the cell functions: the health of the cell, the energy production capabilities of the cell, the ability of the cell to stay alive and to stay normal.

We yield and lose the barrier between ourselves and the environment when we are poisoned. For example, when the toxic air and the toxic water are too much, or when we come into contact with industrial materials that are toxic, these environmental factors will pollute us.

The same is true with the individual cell. Freeman Cope, M.D., a pioneering physician, physicist and researcher, found that when cells are poisoned, there is a unifying set of occurrences, whether the damage occurs by oxygen starvation, by trauma, by any type of insult such as poisoning or malnutrition. The same responses may occur in cells throughout any part of the body, no matter what the tissue of origin. First the cell will lose potassium, second the cell will accept sodium, and third, the cell will swell with too much water. Such cell swelling is called cellular edema. No matter what tissue in the body, and no matter what the cause of injury, the unifying set of occurrences in the tissue damage syndrome are 1) loss of potassium, 2) acceptance of sodium, 3) swelling with excess water to create cellular edema, and 4) loss of cell energy production.

What happens to a cell that has swollen with too much water? Inside the cell, the environment becomes inappropriate for the manufacture of energy. You will notice, when you study Gerson's book that he talked about increasing free energy; that was one of his goals. Free energy, in a medical dictionary, translates to ATP, a compound – adenosine triphosphate – that is manufactured by most cells in the body. It is the energy storage compound of the body, the energy currency of the body.

ATP is the cellular product of burning sugar through oxidation, and it is made and broken, remade, and re-broken in order to liberate bursts of energy. Essentially, it is an adenosine molecule with three phosphate bonds. It is the immediate source of energy for most energy-requiring functions of the body at the cellular level. Without ATP the cell dies. Without ATP we die. When the cell has swollen with too much water, cellular burning of sugars is inhibited; ATP production is inhibited, along with the protein synthesis and lipid metabolism. Inside every cell are small organelles, tiny factories in the cell. They are microscopic filaments called mitochondria.

In our mitochondria, we have the ability to burn sugar with oxygen. Otto Warburg, who won the Nobel Prize twice in medicine, advanced a theory of cancer that held that cancer was a fermentative disease. The Warburg generalization is probably not correct, although the observations that led Warburg to the generalization are most likely correct. What Warburg contributed was an understanding and a description of both the oxygen and the hydrogen shuttling enzyme systems of mitochondria that burn sugar with oxygen to make our cellular energy in the form of ATP.

Gerson's therapy is aimed at increasing free energy production; making more ATP available in the cell. In order to do that, Gerson attempted to manipulate the tissue damage syndrome that, although Cope did not describe it until 1977, was known clinically to Gerson in the 1920's; and he was active and correct in his management of it. What Gerson did was to eliminate sodium from the diet, to supplement a high potassium diet with an additional potassium, and to find ways to remove toxins from the bloodstream that inhibit normal cellular enzyme functions, metabolism and respiration.

Gerson was a neatly packaged genius, a low-tech genius. What he did was very low tech, but it can be measured with very high tech means to prove that it is, in fact, doing what he said it was doing. Gerson provided a way for a damaged cell to be confronted with less sodium so that it would have an opportunity to bind some potassium, to improve its hydration by lowering its water content, and to improve its mitochondrial function.

In order to ensure that the mitochondria would function, Gerson gave thyroid, and he gave it in pretty high doses. Thyroid is, very simply speaking, an amino acid iodinated and oxygenated by the thyroid gland which, when administered in significant dosages, first signals cellular mitochondria to replicate, which they do independent of the cell because they have their own DNA and RNA, and second tells mitochondria to make more energy in the form of ATP by burning sugars fast.

Just as a note, if you think of the cell as a planet, the mitochondria are the industrial cities. They are the cities of industry. And when a cell has lost potassium and gained sodium and swollen with water, the sewers back up, the industrial cities are shut down in their function, and energy cannot be made to clean out the sewers. That is the problem with tissue damage syndrome.

Around every tumor and around every arthritic joint and in most chronic viral conditions, our tissues that have lost potassium have gained sodium and have swollen with too much water. As early as 1957, Christine Waterhouse and Albert Craig, working on a National Cancer Institute grant, were able to measure water retention in cancer patients, which was a general systemic edema, not visible, not discernible clinically, but measurable. Let me quote them from the article "Body-composition and changes in patients with advanced cancer" which was published in the American Cancer Society's journal Cancer 11 (6), November-December 1957.

"Recent communications from this laboratory have emphasized that gross-weight changes in patients with advanced cancer may be minimal even when large amounts of body fat are being lost. Under these conditions it has been shown that there may be a great gain of total body water even though there may be no detectable edema."

In an earlier article, Waterhouse admitted to inadvertently killing a third of her advanced cancer patients in an experimental high fat – double the normal calorie intake – force-feeding trial. I'm quoting her from an article she co-authored with Raymond Terepka called, "Metabolic observations during the forced feeding of patients with cancer," which was published in the American Journal of Medicine, February, 1956.

"Our data do not warrant any direct analysis of these changes, but if one assumes that the calculated caloric discrepancy is approximately correct and that this is all made up by body fat stores, *in every instance a gain in weight as a result of forced (fat) feeding was due almost entirely to a gain in intracellular fluids*." These are the changes of tissue damage syndrome stemming from advanced disease, a great gain of total body water, a gain in intercellular fluid, cellular edema; and what Gerson did was to work against this.

Gerson started out as a tuberculosis physician, and around every tuberculosis infection, around every cavern and cavity and lesion, he saw a puffy malfunctioning sphere of adjacent tissue that had been damaged by toxins from the infection. Partial metabolites

from the diseased tissue materials that are not entirely metabolized can cause problems because they are junk to the tissue around them and they damage and upset otherwise normal tissue.

Gerson saw that by restricting protein and by giving a high-potassium, low-sodium, basically all fruit and vegetable diet, with fresh raw juices and much freshly prepared raw food, edemas could be absorbed. He saw that this could be encouraged, the course of tuberculosis could be affected, and patients could be saved.

Gerson's answers to tissue damage syndrome were the most logical answers that have been contributed to medicine to date. There is nothing better in medicine for salt and water problems, for the edemas that surround tumors; there is no better answer.

Essentially, salt and water therapy means creating a situation in which the cell will tend to return to normal. Many medical doctors do not understand why potassium will function in this way, and why a low sodium, high potassium diet is therapeutic. That is because our medical schools are in, but hopefully coming out of, a period of ossification in cellular biology. Not much progress has been made for a long period of time. We have accepted theories of the pumping enzymes, called sodium pumps, magnesium pumps, many, many postulated pumping systems, that are supposed to exist in human cells, that have never been observed or proven in most human cells. Chapter three of Guyton's Medical Physiology, and first part of every textbook on cellular biology and medical physiology describes sodium pumps which have never, ever been observed in most human cells.

It is on that basis that a theory of cell metabolism is taught in medical school that does not, and cannot, predict that a low sodium, high potassium diet is good for you or will have and beneficial effect. However, slowly gaining acceptance throughout the world is the work of Dr. Gilbert Ning Ling, who will be one day recognized as the father of the new cellular biology, which is based in physics rather than wet chemistry.

Dr. Ling's work led Dr. Cope to Gerson because, essentially, Cope went looking for something that would prove Ling's theory, which correctly predicted the value of high potassium, low sodium diets. Cope found evidence in the treatment developed by Gerson, and he found more evidence in the related treatment developed by Mexican cardiologist Dr. Sodi-Pallares.

What happens in the human cell is mostly not what we are able to read in our medical textbooks. Essentially, we are still reading medical textbooks, and students are still being taught that the cell is a bag of water with solutes. According to Dr. Ling's theory, without getting too complex, our human cells are more like solid-state electronic devices. Raymond Damadian, M.D., the developer of magnetic resonance imaging, used Ling's model to develop the theory behind MRI. Damadian says that human cells are more like ion exchange granules in a water softener. They are not bags of water.

There is, throughout the cytoplasm of our cells, water that is structured. You can see this through magnetic resonance measurements. The water in our cells is not free liquid. We are more than 55% water, most of us, and the water in our cells is structured. It's not like ice, it's not that structured, but it's much more stacked than free liquid water. The reason that it is structured is that there are dynamic energies in cells that hold water in an organized pattern. It is the work of Ling that describes this.

Imagine, if you will, inside the membrane – or the outer skin – of the cell, a ball of steel wool. The ball of steel wool is, more or less, one long molecule; a big, long strand that forks and wraps around and around. It is like a skeleton inside the cell. It is a protein and lipid, or fat, macromolecule, and there is an electron current that flows through it. As the electron current flows through it, a force is created that attracts paramagnetic ions. In the

water molecule, that's the hydrogen – anything with an uneven atomic number is paramagnetic – so this force attracts hydrogen. You've got an H2O molecule: say the "O" is my fist, and the "H's" are my extended fingers (shows a victory sign). The hydrogen atoms turn towards the macromolecule.

They all point toward it, one after the other, all lined up. You've got a layer of polarized water around that filament, and a second layer on top of the first layer, and a third layer, and so on. There are layers on top of layers. There is virtually no free water in the cell; it's all multiple polarized sectored layers of water inside the cell. It is the water securing itself that controls the water content in the cell. How does structured water prevent excess hydration? It's simple: you can't pour water into ice.

If potassium fills the sites to which it may bind on this macromolecule, the cell will organize water. If potassium is lost from those association sites, and sodium is bound, the cell will lose much of its ability to structure water, and it will swell with much more water.

As Dr. Ling describes it in his Association-Induction Hypothesis, for every molecule of ATP that is complexed with the macromolecule, twenty association sites for potassium for every one molecule of ATP that complexes to the macromolecule, which is this big ball of steel wool inside the cell.

The mitochondria are nestled inside the ball of steel wool. The little mitochondria are taking sugars that have been funneled to them by activities within the cell. They burn the sugar, they make ATP, and the ATP complexes with the macromolecule, which contributes to the binding of potassium at association sites, which contributes to the structuring of water content normally for hours, meaning it is not energy from ATP that actually controls ion content in the cell.

What this means, from Gerson's point of view, is that when you are sick, when your tissues are damaged, when your cells have lost potassium and taken on sodium and extra water, we must reduce the challenge of sodium and load potassium into the system. Taking supplemental potassium in addition to a low sodium diet helps potassium to compete for association sites in the cell. When you do this, you create a situation in which potassium may again be bound.

This big ball of steel wool, this macromolecule, can exist in one of two configuration states: normal or damaged. If you insult the cell, if you poison it, if you starve it, if you take away its oxygen, the macromolecule will flip over to a damaged configuration. The macromolecule jumbles some or all of its proteins and lipids, and it can no longer complex ATP well, and it cannot control potassium binding. Anybody who has taken chemistry will ask, "What is the difference between potassium and sodium? They have the same valence. Why aren't they interchangeable?" They are not interchangeable in the bio system. The cell actually has a preference for potassium, as Ling demonstrated.

A little bit about Ling: He is a genius from China who won the Boxer Award in Biology during the 1940's. While he was still a graduate student, he invented the intercellular microelectrode, on which the whole field of micro electrophysiology is based. He was the head of the molecular biology laboratory for Pennsylvania Hospital in Philadelphia and Chief Editor of the journal Physiological Chemistry and Physics and Medical NMR , and is now (2002), Director of Research of the Damadian Cancer Foundation.

When you create a high potassium environment for a damaged cell, you can get potassium to hook on to one or more association sites, because those sites will take whatever's there, sodium or potassium – when the cell is damaged. When the protein-lipid macromolecule is in a damaged state, if you can get potassium to bind at one site, a marvelous phenomenon occurs that Ling calls interactive cooperativity – something we could use more of in the world of humans – in which potassium binding at one site will

trigger potassium binding at adjoining sites. If potassium can be bound at one site, other sites will begin to prefer potassium over sodium, too. So if you can just start the process, the cell will flip back, like dominoes, to a high potassium load; interactive cooperativity. At the same time, the cell's water organizes, the water content of the cell shrinks, and ATP production increases. That is the result of successful salt and water management of tissue damage syndrome.

Protein Restriction

Toward the goal of getting more sodium out of the body, out of damaged cells, Gerson eliminated not only sodium from the diet; he also eliminated protein from the diet for a period of time. In his experiments, as Dr. Ward noted, Gerson had extraordinary laboratory support in the best equipped medical and scientific community in the world at that time. He was able to observe that once you put somebody on a high-potassium, low-sodium diet, the first thing that happens is that tremendous quantities of sodium are excreted in the urine.

Where does it come from? It's coming from inside individual damaged cells. In a really sick person, with extensive tissue damage syndrome, tissues all over the body are dumping sodium. Because sick people got better when they dumped sodium in the urine, Gerson wanted to increase that effect and prolong it. He found that by eliminating dietary protein, he could cause even more of what he called "Natrium Ausschuss", sodium outpouring, or sodium flooding out in the urine – more, and more, and more.

The problem with extreme protein restriction is that you can't do it for too long, because then you being to compromise immunity. This has been observed for a long time. Science has long known that protein is necessary for good immunity, but has never known how much. It has been assumed, wrongly, that we should have lots of it, and that we should always have it.

Gerson, however, said the opposite. He said you must stop dietary proteins for a period of six to eight weeks in order to cause sodium to leave damaged cells and in order to cause edema to be absorbed. In his mind, it was clear that sodium was trapped in the body with protein; it was trapped in deposits of protein and sodium that were somehow complexed together. This is accurate. It is accurate within the context of Ling's work, and Ling's work is modern-day biophysics.

We know now, from the work of Robert Good, that protein restriction, something that you're doing on the Gerson Therapy, can actually stimulate cell-mediated immunity. T-lymphocyte activity can be stimulated by protein restriction.

Robert Good was the Director of the Sloan-Kettering Institute for Cancer Research. Prior to his position with Sloan-Kettering, Good spent time in Egypt visiting a friend in Alexandria who had been working with malnourished children. Good took a deep interest in the immune profiles of these long-malnourished children. He asked his friend why certain panels of the immune profile were disturbed, why they were off, and his friend said, "We don't know. We just know that they are, but we don't know which dietary deficiency is causing which immune abnormality". Good decided it was high time to do some basic research to answer some of these questions.

When he arrived at Sloan-Kettering, he set up a guinea pig experiment, a very simple experiment. He had laboratory chow that contained no protein. He took this no-protein lab chow and fed it to group A, and group B was given normal chow. Group A received no protein. Group B was the control group, the putatively well-fed guinea pig. Good had expected to see deterioration of serum and cell-mediated immunity. Serum immunity is

antibody production, key to some of our bacterial and viral immunity, the ability to fight some bacteria and viruses. Cell-mediated immunity is conducted by T-cells – lymphocytes – and these are the ones that fight bacteria, fungi, and also fight tumors. Good predicted failure of, at least, serum immunity. He was unprepared for what he saw. Not only did serum immunity remain stable, but lymphocytes, especially T-lymphocytes – the thymus lymphocytes – became tremendously increased nonspecifically active, and remained aggressively and nonspecifically active for a long period of time.

And at that point, Good realized and wrote that he had stimulated immunity by dietary restriction of protein. This led to a long series of experiments in many laboratories, all related to Robert Good, who is known as the most published pathologist in the western medical literature. His experiments have shown, in one animal model after another, diseases which are called long term or degenerative diseases – often genetically predetermined – in mice, guinea pigs, and other animals, can be affected by protein and calorie restriction. Some of these diseases have been direct analogues of human diseases, and the weight of the evidence strongly suggests similar effects in man.

Calorie restriction is another aspect of your treatment here. How can that be when you're eating all the time? Because the fats are gone from the diet. A tablespoon of carbohydrate and a tablespoon of protein yield approximately the same number of calories. A tablespoon of fat provides more than double that number of calories. Fats are everywhere in the Western diet, in our civilized diet; bakery goods, cakes, candies, rolls, meats, cheeses, fried foods, nuts, and seeds. But not in this diet. In this diet the only fats are those in oatmeal, which is 1.5% its total calories in fat – that's why it congeals when it gets cool – and individual fatty acids through some of the vegetables and fruits – individual and small number of them, I might add – and, of course, the flax oil. The patient receives about ninety calories a day in fats.

What we mean, when we say we have a protein-calorie restricted diet here is that we have a better diet. We don't keep people off of supplemental protein for too long. Six to eight weeks is all we can do without compromising immunity to some extent. However, it is entirely safe as we use it, because we give nonfat dairy proteins after six to eight weeks. This provides plenty of protein for the patient.

In this dietary program, even as patients receive it in the early weeks, there is enough protein input from the highly bio-available protein content of potatoes, oatmeal, vegetables and vegetable juices to offset daily obligatory protein loss. A typical patient loses about 40 grams of protein a day through entrails – obligatory protein loss – but that is mostly replaced through the basic vegan diet already before adding the dairy protein. When you add the dairy protein, you will have 30-40 grams more than you require. You're kept in what's called positive nitrogen balance.

Good and his coworkers established that protein and calorie restriction can do some really quite remarkable things with animal models. The first mouse that was studied extensively was the (NZB X NZW) F1 (B/W) mouse, called NZB for short. This mouse is a very rare direct analog mouse. The disease it develops, systemic lupus erythematous, is a direct human analog. That means that it is the same disease in the mouse and the human, and if you can affect it in the mouse, you can affect it in the human.

The NZB mouse, when protein-calorie restriction is implemented, will not develop lupus. This is a mouse genetically preprogrammed to develop lupus. Protein-calorie restriction initiated at weaning will prevent the development of an otherwise inevitable disease. Even if the disease is allowed to develop, it can be caused to regress by initiating protein-calorie restriction after the disease has presented.

Another mouse, the *kdkd* mouse, gets vascular lesions and has a tendency toward nephropyosis. These mice, if protein-calorie restriction is initiated at weaning will not develop blood vessel lesions, and plaque, and kidney problems. Kidney problems can develop when blood vessel supplies are pinched off. The same is true with the heart. You cut off the blood supply and organs get into trouble, and muscles get into trouble. *Kdkd* mice, even if they are allowed to develop the disease, can be regressed if protein-calorie restriction is initiated after the disease presents.

Another mouse, the C3H mouse (these last two mice are not direct analogs), gets mammary tumors, always mammary tumors. At weaning, protein-calorie restriction will prevent, in a large percentage of those mice, the development of tumors. Even if the diet is initiated after they develop tumors, outcroppings of tumors can be kept to a minimum and extension of survival of the mice is established as being marked over the controls.

Let me read you a paragraph written by Dr. Good and David Jose. This is from "Quantitative effects of nutritional essential amino acid deficiency upon immune responses to tumors in mice" which was published in The Journal of Experimental Medicine 137, in 1973:

"Protein-calorie malnutrition may produce profound and sometimes paradoxical changes in the immune defense mechanisms against infection and malignancy. Depression of host resistance to some viral infections and malignant tumors has been reported in nutritionally deprived animals. Our previous studies have demonstrated that animals fed limited amounts of a casein (milk protein – ed.) diet showed intact mycotoxic cell-mediated immune responses to tumor antigens at a protein intake that resulted in profound depression of specific humoral antibody responses, including serum "blocking antibody".

These findings suggested that specific cell-mediated mycotoxic immunity may operate more effectively against tumor cells in the moderately protein-deficient animal, because of the absence of serum inhibiting factors. Further reduction in the level of protein in the diets of tumor-bearing animals resulted in depression of both humoral and cellular responses. In addition, a persistent defect in mycotoxic cell-mediated function was found in animals after nutritional protein deprivation at a young age. Thus the animal's immune resistance could be either increased or depressed depending on the timing and the severity of the nutritional deprivation. Similar inhibitory effects upon the incidence and growth of malignant tumors have been reported in animals fed diets imbalanced or deficient in the essential amino acids.

Normal mice with protein-calorie restriction initiated at weaning live double the normal life span. They will not grow to full size. But, although they are somewhat smaller that full size, they remain tremendously active, with sleek coats, and live twice as long. Most of you have noticed how large people become eating the western diet, regardless of their racial background. Maybe we'd all be better off small.

Maybe we have been killing ourselves with this high protein based diet on an attitude that holds that we should, "eat lots of protein, it's good for you." When Good first published on this subject in the 1970's, he speculated that high protein diets may cause cancer and heart disease. Because he had rattled some cages and rocked some boats at Sloan-Kettering, when he left to go to the University of South Florida at Tampa, Good was out of favor with the same cancer industry that had earlier promoted him. But he had tremendously advanced the study of the effects of isolated dietary influences on the immune system, and his contributions have helped us to understand more about how Gerson's therapy works.

Gerson saw the immune-stimulating effect of protein restriction in people in his clinics in the 1930's. He published, through well-known medical publisher Franz Deuticke, a book called Diattherapie der Lungentuberkulose, which translates "dietary treatment for lung tuberculosis". In that book, Gerson described the same kind of changes Good saw. He noted that his protein-restricted patients showed increased white cell counts with a shift to the left in the differential. That doesn't mean they had car trouble. It's the old German notation for increased lymphocyte activity, nonspecific immune activity. Gerson repeated this observation in a number of later publications, including the monograph you are all familiar with, A Cancer Therapy: Results of Fifty Cases.

To refresh our memories, let's review what we have discussed: potassium supplementation, sodium restriction, calorie restriction, protein restriction, and thyroid supplementation. When you provide high potassium, low sodium environment, even badly damaged cells may be able to structure their water somewhat. When water is structured, the cell is able to control its water content, because its water is approaching the kind of molecular organization seen in crystals. This molecular organization limits the amount of water in the cell.

When you have the basics in place, you have something to work with. Tissue that's functioning can be pushed to greater function. Gerson saw a depressed cellular metabolism, depressed tissue function, in cancer and other diseases. Gerson's attitude toward metabolism was a bit like that of the makers of the old Volkswagen "bug" toward the towards the car's cabin heater. Those heaters had two positions, "on" and "off". If you wanted to regulate the cabin heat, you had to do it yourself, manually. The carmakers probably thought, "if you vant heat, you got heat. If you vant it off, shut it off". Gerson wanted metabolism, so he turned it on with large loading dosages of iodides and iodine, and up to five grains of thyroid.

Thyroid hormone signals mitochondria to multiply and increase production of ATP. This gives your cells, like little planets, more industrial cities producing more energy. Iodides and iodine affect some tissues directly in the same way.

Protein restriction turns on T-lymphocytes, which are important because they are a big part of tumor immunity, capable of infiltrating tumors and killing tumor cells. They also help orchestrate larger and more general systemic responses from the greater immune system.

Protein restriction also avoids feeding the process of toxic waste manufactured by damaged tissues and neoplastic tissues. Cancers tend to deal with proteins poorly and to create metabolites that are toxic to nearby normal cells. Take, for example, a melanoma tumor. It's easy to talk about this because there are magnetic imaging studies of these things. A melanoma will spread damage outward in a sphere maybe several times the volume of the tumor.

In this sphere, tissue doesn't work well because it is waterlogged, insulted, and damaged by tumor toxins, metabolic waste from the tumor. That tissue will just sit there, stewing in its own juices, without good drainage. When you take out that tumor and look at the battleground, the damaged normal tissue, with an imager that gives good T1 and T2 measurements, you can still see the sphere of waterlogged tissue for months after the tumor is gone; months, if the patient is not otherwise provided a way to correct that tissue damage. With Gerson's therapy, that sodium ring around tumors will disappear within weeks, because that's how effective Gerson's management is against the kind of tissue damage syndrome that is seen around tumors.