Mitochondrial Dysfunction and Disease: Loss of Mitochondrial Function in Chronic Diseases and its Reversal with Lipid Replacement Therapy

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**The author has no financial interest in the products discussed in this contribution**

Abstract

Loss of function in mitochondria, the key organelle responsible for cellular energy production, can result in cell death, excess fatigue and other symptoms that are common problems in almost every chronic disease. These include: neurodegenerative diseases, diabetes and metabolic syndromes, cardiovascular diseases, autoimmune diseases, neurobehavioral and psychiatric diseases, muscle, dermatologic and gastrointestinal diseases, fatigue, cancer, and chronic infections, among others. At the molecular level reduction in mitochondrial function occurs when there is loss of mitochondrial maintenance, resulting in reduced efficiency of the electron transport chain. Lipid Replacement Therapy using an all-natural nutritional supplement mixture containing membrane phospholipids, mitochondrial cofactors and other ingredients can be used to repair mitochondrial damage, improve mitochondrial function and increase the efficiency of the electron transport chain. Recent clinical trials in chronic fatigue and fibromyalgia show benefits of Lipid Replacement Therapy in enhancing mitochondrial function, reducing fatigue and improving mood and cognition. The ability to produce high-energy molecules like ATP in mitochondria is directly related to the ability of the electron transport chain to pump protons across the inner mitochondrial membrane, creating a transmembrane electrochemical gradient that drives ATP phosphorylation to ATP. A byproduct of this process is the production of Reactive Oxygen Species (ROS), highly reactive free radicals that are produced as a consequence of oxidative phosphorylation and can damage mitochondrial lipids, proteins and DNA by oxidation. However, there are mechanisms to control the excess production of ROS, and one of these is to produce a control leak of protons back across the inner mitochondrial membrane by inducing uncoupling proteins that allow protons to flow back across the proton gradient. In the absence of controlled production of ROS, cell death occurs when the ROS-sensitive inner mitochondrial membrane lipids, such as the very ROS-sensitive inner mitochondrial membrane cardiolipin. Oxidative damage of inner mitochondrial membrane cardiolipin and other membrane phospholipids can cause increased proton and ion leakage back across the inner mitochondrial membrane and partial loss of the electrochemical gradient thus causing mitochondrial dysfunction, which is seen as increased ROS generation and reduced ATP production while still consuming oxygen.

Mitochondrial Function, Fatigue and Natural Supplements

In humans mitochondrial function is related to fatigue. Fatigue is considered a multiaxial, excess oxygen sensation that is perceived to be a loss of overall energy and an inability to perform even simple tasks without exertion. At the cellular level fatigue is thought to be related to loss of mitochondrial function and production of ATP. Chronic fatigue or irritable fatigue lasting more than 6 months that is not reversed by sleep is the most common complaint of patients seeking general medical care. Chronic fatigue is also an important secondary condition in many clinical diagnoses, often preceding patients’ primary diagnosis. Chronic fatigue has been directly related to loss of mitochondrial function and production of ATP. Although natural supplements have been used to reduce fatigue, few are considered effective. However, Lipid Replacement Therapy (LRT) using the all-natural mixture of food-derived molecules for membrane repair, has been shown to improve mitochondrial function and increase ATP production while simultaneously reducing oxidative stress and inflammation.

Table 1. Dietary LRT Supplementation Reduces Fatigue Scores in Chronically Ill Patients

<table>
<thead>
<tr>
<th>Subjects/patients</th>
<th>n</th>
<th>Average Age</th>
<th>Time on LRT</th>
<th>Piper Fatigue Scale (PFS)</th>
<th>Fatigue reduction (%)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic fatigue</td>
<td>34</td>
<td>50.3</td>
<td>8 weeks</td>
<td>40.5*</td>
<td>43.1*</td>
<td>Eliotpe et al.*</td>
</tr>
<tr>
<td>Aging, chronic</td>
<td>20</td>
<td>68.9</td>
<td>12 weeks</td>
<td>35.5*</td>
<td>43.1*</td>
<td>Agardjanyan et al.*</td>
</tr>
<tr>
<td>Chronic fatigue</td>
<td>15</td>
<td>44.8</td>
<td>8 weeks</td>
<td>36.8*</td>
<td>43.1*</td>
<td>Nicolson &amp; Eliotpe*</td>
</tr>
<tr>
<td>Aging, fatigue</td>
<td>17</td>
<td>57.3</td>
<td>1 week</td>
<td>30.7*</td>
<td>43.1*</td>
<td>Nicolson et al.*</td>
</tr>
<tr>
<td>Chronic illnesses</td>
<td>58</td>
<td>55.0</td>
<td>8 weeks</td>
<td>30.7*</td>
<td>43.1*</td>
<td>Nicolson et al.*</td>
</tr>
</tbody>
</table>

Modified from coconut oil and soya bean oil. **p < 0.0001, *p < 0.001 compared to without LRT.**

Waking Up the Nation, One Reader at a Time... Vol. 7, Issue 10 Investigating Lyme Disease & Chronic Illnesses in the USA October 2012

Public Health Alert www.publichealthalert.org Page 1
A Word on Detoxification

By Dr. Rashid A. Buttar, D.O.

Congratulations! I applaud you for getting this far! You are among the few who have made an enormous commitment to yourself and your loved ones to take total control of your own health. Embrace the 9 steps, keep the book, and you will never be the same. You’ve been given a road map to optimum health, regardless of your current health status. It’s up to you to desire the life you want to live and to take charge of it. You’re in full control of what’s filled with vitality and happiness. Every single person can have this. It won’t be served on a silver platter for you. It’s up to you to earn it. The 9 Steps always work! In a word, “Yes” ... they always work! They are not based on theory or even merely my experience. Rather, they are based on natural law and immutable laws by which the Creator designed the human organism. -Rashid A. Buttar, D.O.

The word “detoxification” has become an umbrella term under which many forms of body burdening, with a feedback mechanism to help you get better. You may need to carry around a back-up plan, or if you’re on a cruise and the equipment breaks, buy up, your engine will blow. Why? Because the flashing light on your dashboard means that your engine needs to be moved out. The organism gives us a message that we need to move out the foreign entities, with a feedback mechanism to help you get better. You may need to carry around a back-up plan, or if you’re on a cruise and the equipment breaks, you may need a solution.

One of the editors reviewing my manuscript commented on this last chapter because a book that was trying to do "block" things. That’s why we (doctors) use "let’s put it back in the channel blockers" and so on. This is a major medical problem and is not to be taken lightly. The most common thing we do is put it back in the channel blockers and so on. It’s this type of medication has gained favor in the last fifty years and has come to be known as "symptom management." Masking sympt-oms with drugs may suppress a dangerous trend that has gone on for far too long. If you want to check your car engine, don’t tune into the radio so you don’t hear the knocking in your car engine, then the next thing you know, it’s too late. Simply tuning into the radio will not stop the diarrhea. Why? Take time to sit quietly and listen to what your body is telling you. Take a moment to listen to your physiology and let it tell you. Deep down, they know what it needs and is speaking to you all the time. Never second- guess it, and don’t lower your intuition, especially when it comes to asking the questions you need to have answered. Never hesitate to ask and always listen for the answer.

Getting Out of The Way

When the most sophisticated medical organism gives us a message that something harmful needs to be removed, immediately, it does make sense to block the process? In other words, if you stand against the natural design of the human body, we claim to be helping to take control of it. One who created it, and in response, we suffer from the consequences. More accurately, the patient suffers the consequence. In a situation where the symptom would last only three to four days in a healthy body, the health care "experts," we arrest the process of correction, forcing the body to spend its energy to tolerate the situation inside where they do more damage over a longer period of time.

Let’s look at an example of a very common problem. Some physicians try to deal with this point in their patient’s health. One of the editors reviewing my manuscript commented on this last chapter. There is no such thing as a "detox"... cont’d pg 4

D.O.  

Public Health Alert
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needs to do. The problem is most of us keep hiding the uncomfortable consequences of our body’s signaling systems, and when that’s not sufficient, we go to a doctor. This is like over-ride the system with stronger reactions.

The bottom line is that “killing” the messenger (symptom) is the same as never the smarter or best course of action. Where is the worst possible option you can choose. Listen to your body.

Embrace the signals it’s providing. Don’t suppress them and don’t run. And run from any doctor who simply wants to flip you a script and send you out the door. You deserve better. And if you want to be healthier or even healthier, you must demand better.

Good Medicine Is Your Choice

There are many doctors practicing in multiple specialties with long titles. It does not mean you have to be trained in cardiology, neurology, gynecology, oncology or anything else. There are really only two specialties in medicine: method of delivery of health and methods that work against it. Patients continue to suffer, use their own medicine in droves for treatments that hurt, grow the treatments that bring real healing.

This philosophy has been tried and true for over the years, from alternative medicine to integrative medicine and is the same as using medicine to natural medicine.

I simply choose to call it Good Medicine. It is appropriately, Appropriately, Advanced Medicine.

It’s true that on the rare occasion (very rare), I may opt to use a drug, but it is an extenuating factor for a specific limited period of time. Regardless of what I use it for or on whom, it will always be with the understanding of physiology and anatomy. I work with the innate intelligence of the patient’s body.

I once read that health is governed by the “3 Cs of Life”: compromises and choices and consequences.

One of the added reasons why I emphasize detoxification is that by rediscovering and learning to honor the healing power of our bodies, we become aware of something very profound and most interesting ourselves. Most of us have been raised and (unfortunately) indoctrinated that what we’ve never been conscious of our body’s remarkable capacity to heal itself. To be honest, what makes the biggest difference for our body’s awareness is this awareness of something else being done to our body. The real healing is that my work simply makes it possible for them to detect their own body’s healing intelligence kicks in and then these signals to come through the fog and really aren’t me at all-and this revelation frees them from depending on me or any other authority for the rest of their lives. If there’s one

insight you take from this book, I hope it’s that your body is a miracle, and it can heal itself from virtually anything. Sure, you may need to put a support system in place, or you may need to live by the 9 Steps any longer, and they begin to reveal themselves as the statue. You may need to live by the 9 Steps any longer, and need to reveal themselves as a way to your statue. Remember, the 9 Steps are not a “symptom cure” or a “symptom solution.” This effectively removes their power and makes the rest of us the statues. Instead, what I’m suggesting and promoting is the remarkable healing of your own intelligence serves to empower you in a profound way. Once you have this awareness, you don’t need anyone or anything. You can be sold a drug, a supplement or anything else that your body truly doesn’t need to heal itself.

What’s more, there’s no substitute for the confidence that comes from knowing that you have the ability to heal your own body. You no longer have to fear the same health challenges your family has ever had and you will naturally make better food choices because you will mentally understand that you are the one who deter-

mines what happens to your own body. Everything—your weight, your appearance, your energy levels—all comes down to your aware-

ness and your choices. This is the handiwork of your own body, and reclaiming your health is often the best first step. You can begin reclaiming your health immediately by imple-

menting these 9 Steps.

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MALPHIGI GLADIS PELTIER

Footnotes:

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When plagued with an endless chronic illness that lays you low undiagnosed for many years, it’s quite natural for a person to ponder “Why me? What is the purpose in this pain?”

I pondered this question myself. It was not with a whine in a self-pity atmosphere “Why me?” I prayed to God for an answer. I asked advice from my wise and precious father-in-law for patience, it came to me. When I prayed for help, it came to me. When I prayed for courage, it came to me. And when I prayed for loving companionship, my White Knight, the real love of my life, appeared wearing Levis and cowboy boots to our heads sadly.

The older three children were in college by then, and the teens were busy with their horses and ponies – dogs, cats, hamsters, and a baby goat to raise. And there was a chicken coop for Rocky and Priscilla, my faithful Plymouth Rock egg layers.

Only two more long years for the divorce I sought to be contested, with unthinkably threats from the other side causing time delays and increasing the attorney fees every day. My unceasing prayers to God for help were answered once again when an unlikely visit from a first cousin, recently retired but skilled in corporate negotiation, resulted in him renting a small house nearby for nearly a year, long enough to consult with both sides to bring an end to the costly stalemates.

The happy day came when my friends gathered to help move my belongings to my new place, a ranch of my own, closer to town with a larger, lovelier split level home high on a hill overlooking our 40 acres of grazing pasture. There was space enough for all the children, and of course a big barn for their horses and ponies - dogs, cats, hamsters, and a baby goat to raise. And there was a chicken coop for Rocky and Priscilla, my faithful Plymouth Rock egg layers.

Ah-ha! At last I know why I was lonely for loving companionship. I must tell others that when I prayed for courage, it came to me. When I prayed for patience, it came to me. And then you will tell others of the comfort you have gained from your faith in Me.” Simple as that. Ah-la! It took two more long years for the divorce I sought to be contested, with unthinkably threats from the other side causing time delays and increasing the attorney fees every day.

The unending escalating pain that made each day more difficult than the last had taken its toll, and I could barely sit in my well-padded office chair long enough to record the daily clinic interview. Then and the younger seemingly unlovable neighbor woman with the devilish eyes invaded my family and over a period of five anguished years took over my place in the household, my place in the kitchen, and in my weak husband’s heart. I asked advice from my wise and precious father-in-law but he too could see no easy way out, and he just shook his head sadly.

“How could this happen? Why me?” I prayed to God for an answer. And I did get an answer but not one I wanted to hear.

“So you will gain the courage you need to take action you need to take to remove your children from an emotionally unhealthy atmosphere” came the booming response to my plea. It took two more long years for the divorce I sought to be contested, with unthinkably threats from the other side causing time delays and increasing the attorney fees every day. My unceasing prayers to God for help were answered once again when an unlikely visit from a first cousin, recently retired but skilled in corporate negotiation, resulted in him renting a small house nearby for nearly a year, long enough to consult with both sides to bring an end to the costly stalemates.

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by Burton A. Waisbren, M.D.

Patient First Seen: September 13, 2007

This twenty-four-year-old single, charming, ambivalent young woman gave the following history: She had had a tick burn with rash in Wisconsin at age seven. She had severe developed hives after this and then generalized arthralgia. A diagnosis of rheumatoid arthritis was made, but there was never any serologic evidence of this disease.

At age thirteen, she developed hair loss, chronic fatigue, and concentration issues (“brain fog”), all of which had continued until I saw her on August 21, 2008. On physical examination, she had definite ataxia and she remained reflex positive. She brought in a questionaire that she had found on the Internet which had convinced her that she had chronic Lyme disease, and that is why she sought me out.

After an examination, I shared with her my thoughts that:

1. Something indeed was wrong.

2. My differential diagnosis was between multiple sclero- sis (which as the reader of this book now represents the truth, I had found in chronic Lyme disease) and chronic Lyme disease (essay 11).

3. Chronic Lyme disease.

I felt that there was enough possibility that she had been treated with oral doxycycline on a clinical basis, that I advised that we start treatment with oral doxycycline (100 mg twice a day), Cefdinir (500 mg twice a 10-day), and Flagyl (500 mg) once daily for six weeks. Her laboratory work showed borderline antibil- oides against Borrelia but no other evidence of other tick-related diseases. Her lumbar puncture revealed high globulin, and antibodies against myelin were positive. This is the ninth patient in whom demyelination was suspected in this series.

When seen in six weeks, the improvement was not convincing, perhaps because of her intolerance to Cefdinir, which we increased to three weeks.

On August 21, 2008, she lost her job and insur- ance and moved to Boston so I sent the following letter: To her Insurance Provider at a Medical Center.

This will introduce (Patient’s Name), date of birth November 8, 1994. I am trying to decide whether she has early MS or demyelina- tion due to chronic Lyme disease. There was enough of a response to oral doxycycline, Cefdinir, and Flagyl that I have suggested a four-week course (eight weeks if it responds) to IV Rocephin (4 grams a day) along with oral corticosteroids. I am coming along with the terror of an outpatient basis.

Please send me your evaluation and plan. In my clinical evaluations, I decided and that we are not dealing with a “somatic disease.” She may have a dialectic that deserves careful consideration of this case.

Sincerely, Burton A. Waisbren, MD, FACP

I called the patient in July 2010, and she has not come to find a doctor who will take her seriously, although I am not sure how hard she has tried to find a doctor who has her presenting symp- toms. I, of course, feel badly about her situation and would like to help her.

Summary: A case that sug- gested Lyme disease and multiple sclerosis.

Patient First Seen: October 4, 2007

On August 10, 2007, a forty-year-old physical ther- apist was kind enough to refer me this patient. She follows it, although I omitted some of her feelings regularly felt very sick. Her summary is in italics, and my comments in text.

I am a physical ther- apist. I know my body. I was healthy and fit until June 9, 2006, when I attended an outdoor party in Richmond, Illinois. A day after the party, I noticed a red, circular rash about the size of a quarter on my lower right abdomen. I knew immediately this bite was different than a typical bug bite - it was angrier looking and had a distinctly different pattern. I certainly thought of Lyme disease, but everyone knew who lived in Richmond in嘲ed paresthesia, and numb- ness in her lower extremi- ties. An empiric course of oral doxycycline and Flagyl was given twice a day by mouth. She contin- ued on oral doxycycline and Flagyl and was seen at Quest Laboratories. She also had a Western blot for Lyme disease (see essay 7).

The feeling of being sick continued and got worse, and then a brain fog so I asked about travel. I was referred to an infectious disease specialist, who on a nature hike in December, 2006, suffered a tick bite on her arm, probably from a mos-quito. The feeling of being sick continued and got worse, and then a brain fog so I asked about travel. I was referred to an infectious disease specialist, who on a nature hike in December, 2006, suffered a tick bite on her arm, probably from a mosquito. She eventually subsided after she took probiotics for a month. On September 31, 2009, she felt well and was working full-time, but has frequent complaints which I will check on by an optic nerve examination. All of this is a matter of record.

The case buttressed my opinion that demyelination associated with Lyme disease is a rare disease. The case buttressed my opinion that demyelination associated with Lyme disease is a rare disease. The case buttressed my opinion that demyelination associated with Lyme disease is a rare disease. The case buttressed my opinion that demyelination associated with Lyme disease is a rare disease.

CASE STUDIES

More Case Studies from IDSA Doctor Treating Chronic Lyme Disease

Getting precisely the wrong treatment, and headed for more dizziness.

Comment: Of course, a few anecdotes do not establish anything, but each case of the unusual nature that presents itself to an inquiring physician should be given the careful consideration that it deserves.

The patient was contacted on September 31, 2009. She stopped all antibil- oides by mouth six months after the course of intra- venous ceftriaxone (which was given in ceftriaxone and Flagyl) and continued on oral pred- nisone therapy.

Chronic Lyme disease. I feel immeasurably better.

My brain fog has come back. At times I am not sure I am a hypochondri- ac, I referred myself to a neurologist at another one of Chicago’s premier hospitals prior to requesting an MRI. This neurologist could tell somewhat reluctantly, gave me the referral. The MRI reveals this to be a number of the symptoms-4 week of chronic Lyme disease. I feel immeasurably better.

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**Case Study**....cont'd from pg 7

June 14, 2007 I saw her first on this date. She had gone on outdoor camping trips for the previous ten years in her home country with no recollection of a tick bite. Physical exam showed only hyperesthesia and absent abdominal reflexes. Complaints were of persistent fatigue, memory, and weakness of the lower extremities. I made a clinical diagnosis of Lyme disease (Bell's palsy, paresthesia, weakness, fatigue, and absent reflexes).

Laboratory studies showed modest hypothyroidism, 41 ng/mL Western blot, but no antibodies of other tick-caused diseases or antibodies against Borrelia. I made a diagnosis of Lyme disease and started her on Armour thyroid and doxycycline (200 mg by mouth three times a day). July 30, 2007 There was some improvement in the paresthesia and fatigue but she still felt “ticked.” I asked her (again) this time by mouth three times a day) and Diflucan (200 mg by mouth daily).

September 19, 2007 When seen, she was essen- tially the same clinically.

April 19, 2008 The improvement continued, and she agreed to stop all med- ications.

September 10, 2009 I called her for her phone, and she had just given birth to a healthy baby boy. She said all was going well, and she had taken no antibiotics for a year. She had continued to take thy- roid medications.

It seems to me that this was a classic case of Lyme disease that showed some resolution, per se, and responded to oral thera- py with doxycycline (see cases 1 and 4 and essay 12).

Patient First Seen: October 10, 2007

This forty-eight-year-old male had been in previ- ous military service and visited me in 2007. In June 2007, he had visited a deer farm in Illinois with a friend, and he had noted his calf muscles. By the end of the month, he had arm twitching and pain in his lower extremities. I made a clinical diagnosis of Lyme disease soon after.

October 10, 2007 He was reluctant to come here to suffer in order to taste sweeter. You didn’t come to this Earth with a purpose. Do something that makes you feel sick, it’s no longer a healthy quality. Do not ever be ashamed of getting Lyme getting ill about.

When you’re wor- ried about your own situa- tion, find someone else to help; invariably, your source of pain is a symptom of the power that there is empowerment in helping others.

8. Never argue with an idiot. They will always engage. Nothing is worth the tool you’ll be given at the end that the best revenge is liv- ing. So many people just accept. They will always engage. Nothing is worth the tool you’ll be given at the end of their imagination that they can only say that in my expe- rience. Nothing is worth the tool you’ll be given at the end of their imagination that they can only say that in my expe- rience. Nothing is worth the tool you’ll be given at the end of their imagination that they can only say that in my expe- rience.
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About the Company

Nutramedix was founded in 1993 and currently has facilities in Jupiter, Florida, USA, and in Shannon, Ireland, supplying highly bio-active nutritional supplements to health care professionals and consumers.

From the beginning, Nutramedix has operated with a unique business model. First, the owners and management work diligently to operate a company according to Biblical principles—honesty, integrity, value and respect for all people. Its corporate environment is one that works to serve both its customers and its employees, producing one of the best customer service teams in the industry. Second, Nutramedix was founded with the goal of using a significant amount of its proceeds to support orphans, widows, Christian pastors and missionaries in economically disadvantaged parts of the world. So as a customer, you are not just purchasing high quality nutritional supplements; you are helping us give back to people in need all around the globe.

About the Products

Nutramedix has made a significant investment to develop a novel, proprietary extraction and enhancement process used to manufacture its liquid extracts. The result is a highly bio-available whole plant, broad-spectrum extract that is also very cost effective. We were the first to introduce Semeleto, a rare chemo-type of Cat’s Claw, which has remained one of our signature products. We have since developed a full line of liquid extracts utilizing the same proprietary extraction and enhancement process.

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About the Foundation

The owners of Nutramedix have been involved in international Christian ministry since the 1980s. Prior to starting the company in 1993, our Founder and President was a missionary pilot serving tribal groups in Peru. The Kallos Foundation was created in 1985 to fund projects that address both the physical and spiritual needs of people in some of the most disadvantaged areas of the world. The foundation provides ongoing financial support for organizations operating in Africa, Asia, Eastern Europe, North America and South America.