

The Heart of the Matter: CFS & Cardiac Issues (as written by [Carol Sieverling](#)) (Apr 05)

Preface

The following is my interpretation of transcripts and tapes of conversations that took place between Dr. Paul Cheney and two different patients (including myself) during September and November of 2004. Any treatments mentioned are highly individualized and should not be generalized to all CFS patients. Dr. Cheney's treatment approach is rapidly evolving as new information and insights unfold.

Certain broad concepts central to Dr. Cheney's understanding of this illness are generally much more constant (such as decreased cardiac output, HPA axis involvement, the role of glutathione, etc.). It's essential to note that a set "Cheney protocol" applicable to most patients does not exist, given that his treatment protocol is extremely individualized and constantly evolving.

Quotes are from Dr. Cheney or, where noted, from a patient. Statements in brackets were added by me to provide clarification or context. All other comments are statements from Dr. Cheney that have been slightly paraphrased, but, to the best of my knowledge, maintain his original meaning.

The focus of this article and much of Dr. Cheney's current work is based on the following publication: ["Abnormal Impedance Cardiography Predicts Symptom Severity in Chronic Fatigue Syndrome." Peckerman, et al; The American Journal of the Medical Sciences. 2003; 326\(2\):55-60.](#)

A [synopsis of this article](#) and an interview with Dr. Peckerman was published in the Fall 2003 issue of *The CFS Research Review* by the CFIDS Association of America [[cfids.org](#) ==> archives ==> Research Review ==> 2003 ==> Fall ([www.cfids.org/archives/2003rr/2003-rr2-article01.asp](#))]. The article can be found online at: [www.cfids-cab.org/cfs-inform/Coicfs/peckerman.etal.03.pdf](#). You can also [Google](#) "Peckerman" and [find another article on WebMD](#) and [elsewhere](#).

Peckerman's Article

Dr. Cheney stated, "This is the best, most important publication in 20 years." [regarding CFS.] "This was published the year I left practice, 2003. The senior author is Benjamin Natelson, and the principal author is Arnold Peckerman. What this very impressive article says is that, without exception, every disabled CFS patient is in heart failure."

CFS Compensates for Idiopathic Cardiomyopathy

"Let me first of all define heart failure. There are two kinds of heart failure. There's the kind that any cardiologist can diagnose in about a minute. That you do NOT have. Which is why cardiologists missed this. What you have is Compensated Idiopathic

Cardiomyopathy." [Idiopathic: cause unknown; Cardiomyopathy: structural or functional disease of heart muscle] "And your primary means of compensation—now this is the big twist—are you ready? Have you got your seat belt on? The primary methodology for compensation for this disorder is in fact CFS itself."

Patient responds: "I see. So, this is the body's way of saving us from dying of cardiomyopathy."

Dr. Cheney: Yes. From dying of cardiomyopathy. What is ironic about this, is that I had Idiopathic Cardiomyopathy (ICM). "But I never had CFIDS."

In the medical literature, at least 35% of those with a diagnosis of ICM will die within 5 years unless they receive a transplant. [That was Dr. Cheney's experience—a heart transplant.] I've been following CFS patients for 20 years and never seen one case of CFIDS go on to transplant or ever even heard of one going on to transplant.

Now if your diagnosis is ICM, why aren't you dead? Why hasn't one patient in 20 years needed a transplant? It's because you had CFIDS, and I didn't. "I even suspect the mechanism, and that has been published too."

"The disease [CFS] itself is protecting you from a deeper problem that has been totally missed, including by me. I missed it, too. Because it's so well-hidden."

The Research

[Let's take a closer look at the study, beginning with the researchers.] This group is at the New Jersey Medical Center, a major medical school. Dr. Natelson, a neurologist and professor of neurology, is a very good researcher; quite a bright and accomplished scientist. Dr. Peckerman, the lead author, is a cardiac physiologist or cardiopulmonary physiologist. About five years ago, the NJ Medical Center received a multi-million dollar grant from the NIH (National Institutes of Health). To get the grant, Dr. [Natelson](#) wrote a proposal to find a physiological parameter that could be objectively measured and would correlate with disability.

Find an Accurate Measure of Disability

Their job was not to find the etiology, pathophysiology, or treatment for this disorder. "Their job was to find a measurable number that could accurately demarcate those with [CFS] that are disabled vs. those that are not, so that we could resolve some of the disability adjudication problems [that affect so many CFS patients], where people don't believe you have a problem and it's hard for you to get objective proof that will satisfy critics as to your disability."

As clinicians, we know that not everyone with CFIDS is disabled; yet, there are many people with CFIDS that are disabled. "We know these extremes exist. What we know less about is where to draw the line, because that's a harder thing to do. And the government

is just nuts about this, because some circles feel that too many people are getting access to SSDI that shouldn't, and on the other side there are people who feel that there are some who aren't getting it who deserve it. We need to resolve this in a compassionate and fair manner."

"That was [Natelson's] proposal and it was funded, fully. [The NJMC was named a "CFS Cooperative Research Center.] And you can guess why. The government has a vested interest in knowing we're not raiding the treasury unfairly, but they don't want to be accused of knocking people off [SSDI] who later turn out to be disabled."

A "Q" Problem

So the NJ team looked at many things, and they found something: a "Q" problem. "Q" stands for cardiac output in liters per minute. "Q" in CFIDS patients correlated—with great precision—with the level of disability as judged by validated clinical questionnaires that asked about activities of daily living. What can you do (bathe, dress, cook, etc.) and how hard is it (no problem, little bit of a problem, moderate problem, lot of problem)?

"Question after question after question. Then they have a score, and those with the highest score were the most disabled, and those with the lowest score were the least disabled. And then they gave the same questionnaire to normal sedentary controls."

The Test: Impedance Cardiograph

"Then they measured Q, using impedance cardiography. This technology allows one to accurately measure the cardiac output using the idea that the resistance a current has, passed through your chest, is a function of the blood flow through it. It's actually inversely proportional. The greater the blood flow, the lower the impedance. The less the blood flow, the greater the impedance [resistance]. Because blood is water, water passes current better. It's a simple idea. Put an electrode on your front and your back, and pass the current through. If it goes quickly through, there's a lot of blood going through the chest, and if there's resistance, there's less."

They used a thoracic algorithm, developed at the University of Minnesota some 30 years ago. This algorithm allows many factors to be part of determining Q, including chest and body size. Using it, you can compare the "Q" of big people to the "Q" of small people and still be comparing apples to apples.

The University of Minnesota algorithm has been approved by the FDA as a valid measurement of Q. The point is that Medicare pays for this. It's been clinically validated by a government agency and is not considered experimental or research—as long as you use this algorithm. That's important, because whenever this test result filters back to a cardiologist, the first thing many say is, well, but, you know, that's not accurate. And indeed, it may not be accurate, depending on the machine and the algorithm it uses.

"By the way, there's one other important detail. Unlike all other measures of cardiac output, this is the only one that can be done in the upright position. Which, as you'll find out in a second, was a critical step. Absolutely critical. All other cardiac output measurements are done in the supine position—laying down." [To detect the heart problem in CFS patients, it has to be done both lying down and standing up. If you can manage the whole test, it's preferred to take readings in four positions on a tilt table.]

Now, do CFIDS patients prefer to stand up or lie down? Of course, they prefer to lie down. Do you know why? "Do you know what your cardiac output does when you stand up? It drops 30%. In all humans, without exception. So very critical to this technology is that it's the only one that could be done upright [again, four positions on the tilt table are best; standing up and laying down at a minimum]. And what they found is absolutely astonishing, truly astonishing. When [disabled CFIDS patients] stand up, [they're] on the edge of organ failure due to low cardiac output."

The study involved 38 CFIDS patients and 27 matched sedentary controls—a reasonable sample to get convincing statistics. The CFIDS patients were subdivided into 18 severe cases, and 20 that were less severe. When they looked at the test result statistics, disability correlated with Q!

P Value: "Q" Correlates with Degree of Disability

"And this is the relevant number. The correlation coefficient of .46 with P value of 0.0002 suggests that the disability level of those that were disabled was exactly proportional to the severity of their "Q" defect—without exception, and with scientific precision by virtue of their most disabling symptom, post-exertional fatigue. **WOW. WOW!**"

[Dr. Cheney circles the P value on the copy of the article with great excitement. A little research on Google revealed that a P value less than 0.05 means there's a 5% likelihood that the association between the factor and the outcome is due to chance. A P value of 0.01 means there's a 1% likelihood that the association is due to coincidence. A P value of 0.03 means there's a 3% likelihood that the association is due to chance. So, the P value of 0.0002 in this study means there are only 2 chances in 10,000 that the factor and outcome are due to coincidence! The factor being severity of CFS (disability) and the outcome being lower cardiac output ("Q" problem).]

Statin drugs are given to people with high cholesterol due to only a $P < 0.05$. [They're given—based on a much weaker P value.]

Dr. Cheney continued, "And I'll tell you, it's profound because no other paper that I know of has been published in 20 years that can give a number which so precisely correlates with the level of disability. There's nothing out there. Believe me—nothing exists. Not RNase L, not immune-activation levels, not SED rates. NOTHING has this sort of correlation with disability that I know of."

Post-Exertional Fatigue Indicates a "Q" Problem

Next, the NJ team looked to see if there were any symptoms that were 100% observable in the group of disabled cases, but not in the others. They found that there was only one symptom (among the loooong list of CFIDS symptoms) that was seen in 100% of the patients with the Q problem. Only one. Post-exertional fatigue. That is, when you push yourself physically, you get worse.

What distinguishes CFIDS from FM? Post-exertional fatigue. Patients who have FM, but not CFIDS, can exercise—it helps them. FM patients do not have a Q problem. MCS patients do not have a Q problem. [Unless they also have CFIDS.] They do have other issues that overlap with CFIDS. Martin Pall's conceptual framework allows us to lump these people all together (FM, MCS, GWS, CFIDS). However, Q is what separates them. CFIDS patients have a big Q problem, and post-exertional fatigue is the one symptom that correlates with Q.

Post-exertional fatigue is the number one symptom reported by people with ICM. Among the disabled CFS patients [the severe group], 80% had muscle pain, 75% had joint pain, 72% memory & concentration problems, 70% unrefreshing sleep, 62% generalized weakness, 60% headaches, 60% lymph node swelling, 68% fever and chills, and, 50% had sore throat. Though some symptoms were certainly more common among the disabled patients, the symptoms varied—with the exception of post-exertional fatigue. They all had that.

This suggests that it is not so much the symptoms that are disabling. Rather, "the symptoms are reflecting an interaction (or a nexus) between Q, and how you compensate for Q. Depending on the nature of the compensation, which is individually distinct, you will get an array of symptoms that is individually determined. Just like this: ten patients with MS will not have identical symptoms. Any more than ten AIDS patients, or ten cancer patients, or ten of anything." Why? Because the disease process—which they all have—will manifest differently in each person. The specific symptoms will arise out of factors unique to each person; those factors will determine how the disease plays out in each.

"Within the non-disabled [CFS] group they saw pretty much the same thing—it's just that the percentages were a lot lower. For example, fever and chills were found in only 5% of the non-disabled. The highest percent was post-exertional fatigue seen in 60%. But 40% of the CFIDS patients who were not disabled did not have post-exertional fatigue, but did have CFIDS."

"The reason for that is, of course, if you look at the original case definition, post-exertional fatigue—that is exercise worsens the syndrome, effort-related exacerbation, push-crash phenomenon—is not a major criteria, it's one of the eight minor criteria. It's possible not to have that and still meet the case definition. But all disabled patients have that, and 60% of non-disabled have that." [It's possible to not even have post-exertional

fatigue and still have CFS. However, all disabled CFS patients have post-exertional fatigue, as do 60% of the non-disabled.]

"More importantly, all disabled CFIDS patients, all of whom have post-exertional fatigue, have low "Q" and are in heart failure."

Top Priority: Blood Pressure

"Now there is one factor that I want to mention before I get into the data display. Natelson requires, as a rule, before you're allowed into his medical school for study (whether it's this particular study or any other study) that you consider coming off of all medications and all nutraceuticals or he may not see you. Furthermore, his team is not treatment oriented."

Patient responds: "Well, I certainly wouldn't agree to do that. I'd be a wreck."

Dr. Cheney continues: "Of course you wouldn't agree. Therefore, the data I'm about to present is not anywhere near as bad as you are." You are more severely affected than anyone in this study. I'm not sure he has patients from the truly severe end of the spectrum of CFS. Those patients don't participate in studies. Just reflect on that as I go through this.

In this study, the normal person and the non-disabled CFIDS patient pump 7 liters a minute through their heart with very little variance: 7 liters plus or minus .5. When they stand up, they drop all the way down to 5 liters per minute, a full 30% drop in output. That's normal.

"First of all, why does it go down when you stand up? Because the heart can only pump as much blood as returns to it. If you drop the return by 2 liters per minute, you will always drop the output by 2 liters per minute. The blood has to go uphill against gravity, so there's an automatic 2 liter per minute drop in return, and therefore an automatic 2 liter drop in output even though the heart is completely normal. Where does that extra 2 liters go? It's pooled in your lower extremities and capacitance vessels. Rapidly, by the way." [Capitance vessels are the larger veins of the body where most of the blood volume is found and where regional blood volume is regulated. For a great explanation of the circulatory system, including the different types of veins and arteries and their respective functions, go to www.cvphysiology.com/Blood%20Pressure/BP019.htm.]

Why don't normal people sense that 30% drop in output? You might assume that their blood pressure would fall 30% and they'd sense it. Nevertheless, their blood pressure either stays normal or goes up when they stand. Blood pressure is so vitally important that the body compensates to prevent blood pressure from dropping.

Think about how significant blood pressure is. Physicians are allowed by law to pronounce people dead. That's a lot of power. And how do we do that? Think about the movies. They always check for a pulse—blood pressure. No pulse—you're dead. And, of

course, they check to see if you're breathing. However, if you don't have a pulse and aren't breathing, you'll be pronounced dead. Doctors don't even have to check for brain activity.

Why does the law give doctors such power? Because there's never been an exception to this rule. No breath, no pulse, you're dead. No exceptions—unless you're ice cold. "It points to how important blood pressure is to the body, because blood pressure is, in fact, life. And so, your body will defend your blood pressure beyond anything else. Or, to put it another way, it will sacrifice everything—even your brain—to keep the pulse going."

Nozzles

"Now, when your Q drops 30%, your pressure will not drop, because your body will defend that pressure, even to the loss of your brain. This is critical to understanding what happens in CFIDS patients." [Let's use an analogy from gardening.] "Here's the hose attached to a spigot at the side of the house. I have the spigot turned fully counterclockwise [on] and it has maximum Q at 7 liters per minute coming out of that hose. Because it's coming out fast enough, there's enough pressure for this water to shoot out of the hose and I can water all the plants out there, all the way out to the 4th row tomato plants, 6 feet beyond this hose. So, I can sit there and water all day long providing sufficient nutrients and stuff to the plants, because I have adequate Q.

"Now let's take the knob and crank it down so that we drop it down from 7 liters to 5. That would be a normal drop on standing up. The pressure should drop at least 30% or more, but doesn't. Why?" Because, if you turn the flow down, the water can't get out to the tomato plants anymore. There's not enough pressure and it's just dribbling out, so what do I do? I take my thumb and I press it on the end to partially block it and create backpressure. That builds the pressure back up sufficiently to allow that stream of water to shoot out at sufficient velocity to water the tomato plants in the 4th row—even though I had a 30% drop in (cardiac) output. Because my thumb gets tired, I put a nozzle on the end of the hose and tighten it down so I can spray all the way out there at a low Q [pressure]. That's what a nozzle is for.

And you have a nozzle in you. It's called the end arteriole or resistance vessel. It regulates the resistance against which flow occurs to keep your pressure within normal range—despite a large fluctuation in Q produced by standing up or laying down. Because I can maintain the pressure, I can water the plants all the way out to the tomato plants in the fourth row regardless of the Q, because the pressure is maintained.

Now, let's crank it to down to 50%, taking it from 7 liters per minute, all the way down to 3.5 liters per minute. I still have the same nozzle attached but when I drop the flow to 3.5 liters, I can't reach the tomato plants, unless I really tighten down on the nozzle. Moreover, if I tighten it all the way down just a little tiny spray spits out. Maybe only a drop or two will reach all the way out to the tomato plants. Now I'm sacrificing water perfusion of the plants in order to maintain pressure, because without blood pressure

you're dead. [Perfusion: the injection of fluid into a blood vessel in order to reach an organ or tissues, usually to supply nutrients and oxygen.]

When faced with a low Q, the body sacrifices tissue perfusion in order to maintain blood pressure, and that's all you need to know to understand this concept. Microcirculation to the tissues of the body is sacrificed to maintain blood pressure so you will not die in the face of a low Q, and that is what is going on in the disabled CFIDS patient.

In Peckerman's study, the data of the disabled CFIDS patients reveals that when they are supine (laying down), their Q is 5 liters per minute. So laying down they can perfuse out to the extremities, but admittedly not as much volume gets out there as would occur at 7 [the Q of the controls and mild CFIDS patients when laying down], but there's enough volume that you are really not that badly affected.

Let's look at what happens when the disabled CFS patients stand up. They drop to 3.7 liters per minute, a 50% drop from the normal of 7, and that means they can't water the tomato plants! The tomato plants start to shrivel up and experience trouble. Big trouble! At 3.7 liters per minute, they do not have adequate Q to function. There will be a functional contraction [lowering of what you are able to do] determined by the drop in Q. The lower the "Q" goes from there, the more in bed you will be, because lying down is the only time you come close to sufficient Q.

Patient asks: "So basically, the tomato plants are all the organs and tissues in the body?"

Dr. Cheney replies: "Yes!"

And those "severe" patients in the study who dropped to 3.7 liters per minute would be mild or moderately ill patients in my practice. How do I know that? I know it by virtue of their pressure changes and their heart rate changes. Look particularly at the MAP (mean arterial pressure)—MAP is the average of your systolic and diastolic pressure. If your blood pressure is 120 over 80, your MAP is 100. All groups in the study had virtually the same MAP when they stood. There is no real difference in the MAP of the controls and the patients in this paper. That's not true in my practice. My patients are virtually always lower than normal. Same for their heart rates.

Sacrificial Prioritization

Now here's an important, critical idea. The body does not sacrifice tissue perfusion equally across all organ systems. It prioritizes the order of sacrifice, and you can see the progression of your disease in this prioritization.

The heart pumps out blood to the artery and the artery produces blood pressure. It pumps down to the smallest arteriole called the resistance vessel, which we will call the nozzle. The nozzle then breaks out into a capillary bed that delivers a certain capillary pressure to the tissues. In the human body, every cell in your body is within 1 millimeter of a

capillary, (except in cartilage, periosteal bone and the cornea). Then, the blood returns to the heart via the veins, the venous return.

"There are two organ systems that have a super nozzle in addition to the main nozzle. They have a super built-in nozzle—it's called the Renin Angiotension System, or RAS. It's built into two organs: the lung and the kidneys. They have the greatest nozzle in the body. They can spit water out all the way to the tomato plants with practically no Q at all; they just need a little bit. They can sustain the greatest degree of Q problems, because they have this extra fancy nozzle, the Renin Angiotension System."

Additionally, the heart and the brain also have secondary nozzles. Although not as powerful as the RAS, these secondary nozzles protect that tissue even in the face of extremely low Q. Therefore, the lung, the brain, the kidneys, and the heart are a little bit more protected than the liver, gut, muscles and skin from a drop in Q.

First Compromised: Skin and Compensatory Hypothyroidism

Having said this, in what order are things sacrificed and what are the consequences? The first is the skin. If you sacrifice the microcirculation of the skin, several problems can arise. One is that without adequate microcirculation to the skin, the body cannot thermoregulate anymore. [Thermoregulate: regulate body temperature]

You cannot stand heat or cold, although heat will be more difficult at first than cold—in part because if you're too cold you just put on more clothes, but how do you rip your skin off when you get too hot? If your core temperature rises high enough, you will not sleep and your body will activate your immune system. In order to regulate that problem, your body will kick in thyroid regulation and you will downregulate [reduce or suppress a response to a stimulus] your thyroid to keep your temperature from going too high, and you will develop "compensatory hypothyroidism"! Now you will have trouble with cold.

The second thing your body will not be able to do is get rid of VOCs (Volatile Organic Compounds), which are shed in the skin's oil ducts. VOCs build up in the fat stores of your body and you become progressively chemically poisoned by whatever is present in your environment, and whatever you are genetically susceptible to—different things in different people. If that's pretty significant, we call that Multiple Chemical Sensitivities (MCS). If all you've got is microcirculatory deficiency of the skin, we'll call that MCS and the treatment is to put you in a sauna to outgas you—to detoxify you—which is in fact the primary treatment of MCS patients. We'll also exercise you, which is another MCS treatment.

Next Up: Muscles

If it gets worse than that, the next thing you'll sacrifice are your muscles. You'll have exercise intolerance—you can't go up stairs or climb mountains as easily. When you move your muscles, you feel like you got hit by a ten-ton truck. Very minor activity on

day one produces a day two on which you say, "What did I do, it's almost like I ran a marathon."

If it gets still worse, you begin to get fibromyalgic pain. If it affects the joints, it may precipitate pyrophosphoric acid and uric acid crystals and you start to have arthralgias and myalgias linked to this microcirculatory defect. Microcirculation problems have been suggested by Fibromyalgia research in Toronto. Moldofsky tried to induce FM symptoms by interrupting the sleep of study participants and was successful with a significant number of the women. It was harder to induce clinical FM in men, and almost impossible in male athletes. It came down to microcirculation. Men had a higher capillary cross-sectional area (more capillaries) than women. Athletes have more than non-athletes. Male athletes are therefore more resistant to microcirculatory problems within the muscles, whereas sedentary women are the most vulnerable. Microcirculatory problems will be much worse for sedentary women because such problems are modified by the capillary cross-sectional area. Low cardiac output further exacerbates microcirculatory problems.

Third System Down: Liver/Gut

The next thing affected is your liver/gut. Probably the very first thing you'll notice is that there are fewer and fewer foods you can tolerate. If it gets really bad, there will be only a handful of foods you'll be able to eat—for a lot of odd reasons. In part because microcirculation is necessary for proper digestion. Also, your body won't secrete digestive juices so you won't digest your food. If you can't digest your food you'll get peptides that are only partially digested and highly immune-reactive. They'll leak out of your gut [into your bloodstream] and you'll get food allergies and/or sensitivities.

Your body will also fail to detoxify your gut ecology, so your gut will begin to poison you. That's manifested as feeling yucky and a sense of toxic malaise. You get diarrhea, constipation, flatulence, and all kinds of GI problems, including bacterial overgrowth, yeast overgrowth, parasitic overgrowth.

It's a problem because you have poor microcirculation. If it gets worse, you'll get malabsorption syndromes because the nutrients that are—by some miracle—digested, are not absorbed well because there's no microcirculation. At which point, you will begin to become increasingly toxic, which can manifest as a variety of skin disturbances, and you don't feel good, and other interesting things—particularly in the brain.

Fourth Affected: The Brain

In the brain, there's a devastating effect with respect to liver/gut dysfunction—it can quickly toxify the brain. That's perceived initially as, "I only have problems when I have to use my brain." Then it becomes a problem even when you don't use your brain that much. You have all kinds of cognitive complaints like memory disturbance and processing speed. Then you begin to get central brain structures that can destabilize you psychiatrically. You can get hypothalamic structures that begin to destabilize you from an autonomic nervous system perspective and/or neuroendocrine response defects.

[neuroendocrine: the interaction between the nervous system and the hormones of the endocrine glands] Whatever the brain does, it doesn't do it as well.

The brain and the heart probably get hit about the same time, but patients usually notice their brain being affected much earlier than their heart. That's because heart muscle cells have the greatest mitochondrial content of any tissue in the body. Thus, when mitochondria are impaired, the heart muscle has the greatest reserve and is the least vulnerable. Neurons have far less mitochondria and they run out long before the heart, especially if you're sedentary. If you're sedentary there's not too much demand on your heart, but you can still think and make great demands on your brain. Energy is energy, whether it's being used physically or cognitively. The effect on the brain is noticed first because it has less reserve, especially if you're thinking—unless you do meditation. Patients who are both sedentary and meditating regularly may actually preserve their brain longer than those who are just sedentary and use their brain a lot.

Fifth: Heart—A Two-Parter

Part A: Manifestation of Microcirculatory Impairment

The effect on the heart has an "a" part and a "b" part. "The initial manifestation of microcirculatory impairment of the heart is arrhythmia. What kind? You name it, you've got it."

"You'll also notice, again, exercise intolerance, because the heart is indeed a muscle just like your leg muscle. When you go up flights of stairs or up mountainsides, you need more cardiac output and you can't sustain it. Therefore, you're going to have trouble. As it gets worse, you'll begin to see mitral valve prolapse (MVP) because that inadequate capillary function affects the papillary muscle and results in prolapse of the mitral valve. Finally, when you get even more severe microcirculation problems, you start to get chest pain as you begin to knock off myocardial cells [heart muscle cells] because they can't get adequate oxygen."

Part B: "The Event Horizon"

"And finally you get to the 'B' part of the heart, and I'll put a line here [on one of many drawings] which I'll call the Event Horizon, after a movie I saw by that name. 'Event Horizon' is a movie in which a group of space explorers discovers a black hole. They park their space vessel outside the event horizon because if they pass that line they can't get back, and if they pass it they're drawn down into a vortex into the black hole and vanish from this universe."

"The Event Horizon with respect to the heart is this: when the microcirculation defect within the heart itself (produced by a low Q), begins to impact Q itself, you enter a vicious cycle. Microcirculation impairment reduces the Q, which produces more microcirculation impairment which produces even more Q problems, and back and forth,

zigzagging into a vortex, and down you go "through the Event Horizon" to the next phase of cardiac failure, which is the lung."

Sixth System: Lung & Kidney

"Cardiac failure in the lung produces Congestive Heart Failure (CHF) and Pulmonary Edema. Then comes the kidney—because remember the kidney and lung have the super-duper RAS system. So the last to go turns out to be the kidney which has the biggest RAS system of all buried in its cells, the Renin Angiotension System. When the kidneys go, you go into renal failure, which combined with the liver, is often dubbed hepatorenal failure, and that is the requisite cause of death due to Idiopathic Cardiomyopathy." [After crossing the Event Horizon and spiraling down into Congestive Heart Failure]. I've been there and done that. I'm an expert on that particular journey. And this is the exact sequence I went through over a two—to three-year time period."

The Good News: CFIDS Prevents Us from Crossing the Event Horizon

"You'll notice that the last things afflicted are the lung and the kidney because they have the RAS, and therefore you really have to cross the Event Horizon to involve those. I crossed it. One third of all cases of ICM cross it, and once you cross it, there's no turning back. You either die or get a transplant. There is no turning back."

"Now, for some interesting reason, CFIDS patients do not cross the Event Horizon, at least in any significant way. We don't see them in Pulmonary Edema; we don't see them in renal failure; and, we certainly don't see them needing a transplant. Therefore there is something about this disease that keeps you from progressing across the Event Horizon, though you can get cardiac involvement in the milder sense."

Since no CFIDS patient that I've ever known or heard about has crossed the Event Horizon, I maintain that this means that CFIDS must prevent it from happening in the first place. I crossed the Event Horizon and spiraled down because I did not have CFIDS. You have CFIDS; therefore, you're very unlikely to cross the Event Horizon, which doesn't mean that you won't over time. Peckerman believes that a certain percentage of CFIDS patients are headed right for that. However, they may take a long, long time, or die of something else before that happens.

Almost everyone with CFIDS has Compensated Idiopathic Cardiomyopathy [based on the test results he's getting]. It's the degree of compensation that varies. Some compensate very well, others less so. How will you know if you eventually lose your ability to compensate and cross the event horizon? You'll know it because you'll lie down and you'll be short of breath. When you lie down you'll no longer be able to breathe. Rather than lying down and feeling better, you'll lie flat and get short of breath. Then you know you've crossed over.

Recovery Takes Time

When I had my heart replaced, one of the first things that came back was my kidneys. My brain came back, but slowly. Even though my cardiac output was a whopping 10 liters per minute with the transplant, my brain did not come back fully for 6 to 7 months. Even then, there was continued progression for about four more months before I reached near 100% or greater. In fact, what's interesting is that I now think my brain is functioning at a much higher level than has been present since I was 20. That's interesting because age 20 is when you see 10 liters per minute output. The point is that, at some interesting level, brain functionality depends on microcirculation and when you have sufficient amounts of it, you have excellent brain function.

The next thing that came back was my liver/gut; I couldn't stop eating, and my gut functioned perfectly. Then, my muscles started to come back and that took 8 months. Interestingly, my skin took a long time. So, my body resuscitated in reverse order. "It's taken me over a year to fully come back despite an almost instantaneous restoration of Q, which was my only problem in the first place."

"Which speaks to something very important, and that is, fundamental therapy does not instantaneously result in improvement. As a matter of fact, anything that would improve you within a matter of minutes, hours, or days is, in fact, not therapy at all. It is palliation—symptom suppression—which in fact may not be helping you at all."

Marshall Protocol & "Q"

My hat is off to Trevor Marshall for identifying that the Renin Angiotensin System (RAS) is a key element in the pathology of this disease and pointing out that it acts locally as well as systemically. I didn't know that before. But I'm concerned that an ARB (Angiotensin Receptor Blocker) is being used in CFIDS patients without an awareness of its effect on "Q."

Angiotensin II has two receptors that we know of, and we only understand the first, AT1. When Angiotensin II binds to AT1, it increases the hormone Aldosterone, which in turn increases blood volume. Big issue! If you block AT1 with an ARB [like Benicar], down will go your Aldosterone, and down will go your blood volume, and you could be in a heap of trouble. ARBs that bind to AT1 will constrict blood volume.

I'm also concerned that the other receptor [AT2] is being ignored. No one knows what it does. Not even Merck! I suspect that it has an immune effect. An ARB like Benicar selectively binds very tightly to AT1, resulting in a two—to three-fold increase of Angiotensin II, which then binds to the wide-open AT2 receptor. And who knows what kind of immune responses that is setting off. This is just speculation, but I am concerned.

"I don't believe that you can block a regulatory pathway, especially tightly, with a rebound upregulation of Angiotensin II, two or three fold, when you leave unblocked an unexplained receptor that you have no idea what that thing is doing and then hope that down the road everything will be rosy."

Etiology (Cause)

What is the etiology, the cause, of this cardiac output problem? The short version is that cardiac muscles have lost power because their mitochondria are dysfunctional. They're not functioning well because of a redox-state problem. [Redox: a reversible chemical reaction in which one reaction is an oxidation and the reverse is a reduction. Look for a future article explaining redox states.] But, what causes the redox-state problem? I don't know. I just know that, like MCS and GWS and many other illnesses, we're looking at a redox-state problem. But, there's something unique about CFIDS, because this redox problem seems centered on the heart. It's not focused on the heart, at least to the extent that we can tell, in these other disorders. But there is one big, big clue. It ties in to what we know about Idiopathic Cardiomyopathy (ICM), so we need to look at that first. It may shed some light on CFIDS-linked cardiomyopathy.

Viruses

According to the textbook of medicine, the list of things associated with cardiomyopathy is as long as your arm and covers three pages. But most of the things listed are infectious diseases, and viruses are at the top of the list. ICM appears to be caused, in the minds of most physicians, by a post-viral infectious disorder that evolves following a viral infection, sometimes at a relatively young age. Doesn't that sound a little bit like CFIDS?

Heavy Metals

The second thing that is mentioned, for which a great deal of evidence now exists in cardiology literature, including recent publications in the Journal of American Cardiology, is heavy metals. This is the big, big clue I referred to earlier. There's an Italian article published in one of the cardiology journals about a link between ICM and mercury. The authors looked at about 13 cases of ICM, 24 cases of other types of heart disease, and 4 controls. They biopsied the heart muscle of all the participants and radiated it with neutron flux to make any heavy metals radioactive. Then they put the tissue in a chromatograph to determine with great precision exactly how many molecules of mercury were in each of the tissues.

What they found was astounding. [All 13 cases of ICM had 23,000 times more mercury than the controls, and 18,000 times more than the other types of heart disease.](#) One hundred percent of the people with ICM were mercury toxic at the tissue level. Does that necessarily mean that the cause of ICM is mercury? Or, is mercury linked to some other phenomena?

A professor at the University of Kentucky whom I greatly admire analyzed that data. He determined that in normal heart muscle there are not enough mercury-binding sites to have that much mercury. He said the only way you could load that much mercury into the heart muscle was if something else carried it in. There may be a cardiotropic pathogen and/or an immune-system dysregulation associated with a cardiotropic pathogen that is

required to load that much mercury into the heart. [Cardio: heart; tropic: affinity for, or influencing]

I doubt the cardiotropic pathogen by itself can produce ICM. I think takes a combination of a pathogen and the presence of a heavy metal like mercury.

The Nexus: Virus/Bacteria/Toxins/Allergies and Heavy Metals

I believe that the proximate etiology of cardiomyopathy is a nexus between an infectious, allergic, or toxic experience, as well as heavy metals. I'll go through why I think that, but I'm not claiming I know the exact cause. I'm just claiming that, based on the medical literature on cardiomyopathy as well as what we know about CFIDS, I would lay my wagers on those two entities, and I think they both may be required, not just one. That's why I call it a nexus between the two, and you'll see why. Because the underlying issues for the etiology of a Q loss need those two entities to really get going."

Pall: Nitric Oxide + Superoxide = Peroxynitrite

The pathophysiology [functional changes that accompany a disease] at the cellular level that underpins this pathophysiologic state is well elucidated by Martin Pall. [A search for "Martin Pall" on immunesupport.com will produce several articles.]

One nitric oxide molecule plus one superoxide molecule equals one peroxynitrite molecule. Peroxynitrite is a reactive oxygen species, is deadly, and highly damaging. At the cellular level, it is the proximate cause of human mortality. Even if you are healthy and your body handles peroxynitrite as well as possible, you will still die of old age.

"These molecules [nitric oxide and superoxide] have to be generated because they are essential for life. They are the end products of a complex scheme of oxidation reactions in the human body; necessary for, among other things, energy generation, and their production is inevitable. Indeed, if they weren't produced you would not be alive. But because they are produced, you will die of oxidation. If you live by the sword, you die by the sword. If you live by oxidation then, like any piece of iron set in an oxygen environment, you will eventually rust away, and we call that death by old age. This is called 'The Free Radical Theory of Aging.' "

What do humans die of, usually? The top killer is Coronary Artery Disease [CAD], and the next is cancer. It turns out that CAD and cancer are also driven in part by peroxynitrite formation. Neurodegenerative diseases like Parkinson's and Alzheimer's are also suspected of being driven by free radical formation. Even suicide is increasingly thought to be generated by oxidative stress in the central nervous system. And, of course, MS and autoimmune diseases. And finally ICM, the path down which you seem to be going, though halted by CFS itself.

But your path deviated right here, just above the Event Horizon to CFS, and you went down the CFS path for a very interesting reason. Why didn't you go down the cancer or

MS or Parkinson's pathway? For some reason you started down the CFS pathway over those, and I think that's a result of preordained genetics and environmental influences that combined in a unique fashion to produce that particular road I went down—the ICM pathway. But I could not deviate [from the ICM path] because I never developed CFIDS and I went straight to a near-death experience and came back.

I want to talk a little bit about these two guys [nitric oxide and superoxide], show you why they're necessary and that you have to make them, and how they can modulate your disease process. Especially how they're related to etiology. [They cause many, if not most, of our symptoms—directly or indirectly.]

Nitric Oxide is made by iNOS, eNOS, and nNOS, so far identified. [The small letter in front indicates the source.] The **iNOS** is of particular interest because it comes from the immune system. When any kind of virus, bacteria, mold, toxin, microbe, or allergy activates your immune system, it induces iNOS, which makes copious amounts of Nitric Oxide. iNOS can make far more Nitric Oxide than eNOS and nNOS can ever make.

eNOS is made by the endothelial cells in the blood vessels and is responsible for regulating microcirculation, basically.

nNOS is made in neurons and is responsible for memory and learning. It is also, when highly activated, very much responsible for MCS, EMR sensitivity [electromagnetic radiation], light and noise sensitivity, and can make sleep difficult. Over-activation also amplifies pain.

Your body has to make nitric oxide. If you don't make it, you have no immune system, no circulation, no brain. The question isn't do you make it; the question is do you make a lot of it. If you make a lot of it there can be repercussions downstream. What those repercussions are depends on what you're [your body is] doing with superoxide.

Now superoxide is produced by the act of making energy [ATP]. It's made in the mitochondria, and for every molecule of ATP generated, you generate one molecule of superoxide—one for one. The more energy you make, the more superoxide you make. However, superoxide is generally found inside the mitochondria. Generally. Nitric oxide is found outside the mitochondria. As long as superoxide stays in the mitochondria and never leaks out, there's no way you will make peroxynitrite, because it takes one nitric oxide plus one superoxide to make one molecule of peroxynitrite.

A Little Math

Now, let's stop here for a moment to talk about the coupling effect. If I have 50 molecules of nitric oxide, and five molecules of superoxide have leaked out of the mitochondria, how many peroxynitrite molecules do I generate? Five. If I make 10,000 nitric oxide molecules, and only 5 superoxide, how many peroxynitrite molecules do I generate? Again, five! Do you see what is happening? What dictates peroxynitrite is not the one with the highest amount, but rather the one with the lowest.

Super Oxide—Out of Control

Therefore, the primary driving force behind peroxynitrite is in fact the production of superoxide. However, if superoxide is well controlled, peroxynitrite formation is limited. However, if superoxide is out of control, there are few limits to the formation of peroxynitrite. It's purely a function of energy production. The more energy you produce, the higher the peroxynitrite may go, especially if nitric oxide is also out of control.

If everything worked as intended, the mitochondria would take in oxygen and nutrition, and output carbon dioxide, water, and ATP (energy). You have enzyme systems embedded in the mitochondria that can break superoxide down to water to prevent superoxide from leaking out of the mitochondria. One enzyme system is called Superoxide Dismutase (SOD). Actually, the enzyme breaks it down to hydrogen peroxide and then down to water, via Glutathione Peroxidase, which depends on selenium and glutathione. [Without proper amounts of selenium and glutathione, the enzyme cannot do its job.]

For the enzyme [SOD] to break superoxide down properly, selenium is supposed to bind to Glutathione Peroxidase. However, if mercury is present in any amount and you have no defense against it [and there are defenses], it competes for that binding site and blocks the selenium. When mercury displaces selenium at the binding site, the function of that enzyme is knocked out. At that point, you have no way to oxidize superoxide down to water, and superoxide starts to leak out contributing to the formation of deadly peroxynitrite. How much superoxide leaks out depends on how much energy you're generating [and thus how much superoxide], as well as the presence of other defense mechanisms. CoEnzyme Q10 is one and Lipoic Acid is another.

CoQ10 within the mitochondria and Lipoic Acid in the cytoplasm bind excess superoxide so it's unavailable to couple with nitric oxide to produce peroxynitrite. Taking sufficient CoQ10 under certain redox state conditions, would allow you to make more energy and not get creamed with peroxynitrite. [Redox will be discussed in another article.] But, if you keep raising CoQ10 in an inappropriate redox state you may actually generate more superoxide, and that's when the CoQ10 bites you. [Some patients who cannot tolerate CoQ10 find that its analogue, Idebenone, works better.]

Glutathione production is linked to ATP production, because the more ATP (energy) you make, the more Glutathione you need to keep the enzyme breaking the resulting superoxide down to water. If you don't, then the lack of Glutathione will actually result in injury to the mitochondrial membrane and a drop in ATP. That's the Gibbs Free Energy Equation, which says that Glutathione concentration and ATP generation are intimately linked.

Which brings me to the most important statement I'll make about this peroxynitrite diagram. If you are immune-activated from virus, bacteria, mold, and/or toxin exposures, then you're generating an excess amount of nitric oxide. And if you also make a significant amount of ATP, it can result in superoxide, which then binds with the nitric

oxide to produce large amounts of peroxynitrite. Then you're set up for major problems. [Oxygen transport, microcirculatory impairment, lack of tissue perfusion, etc.]

Protection from the Death Spiral

So to protect yourself from going down the death spiral, your body stops making energy—at least to a point. That results in significant reduction of superoxide, and knocks out peroxynitrite. Thus, you cannot and will not advance [toward the event horizon], or, if you do, you will advance very, very slowly. I couldn't do that, and therefore I crossed the event horizon and almost died.

By the way, all this is Dr. Pall's model. The only added dimension here is the NMDA receptor, which sits on a neuron and when activated, triggers nitric oxide production. So blocking NMDA reduces nitric oxide.

Klonopin/Neurontin

Patient asks: "Klonopin only upregulates the GABA receptor, is that right?"

Dr. Cheney responds: "Yes. But that has an indirect effect on the NMDA receptor, through the GABA receptor. By upregulating [increase a response to a stimulus] GABA, you downregulate NMDA and reduce nitric oxide." [Thus, Klonopin and Neurontin can help reduce nitric oxide.]

Avoid Provigil: It Stimulates Nitric Oxide

"Provigil does the opposite. Provigil does several things, but is mostly an NMDA-activator—it's a stimulant similar to cocaine—it will actually stimulate nitric oxide production. It may also stimulate ATP generation, which is the benefit perhaps that one sees. With more nitric oxide, you can think better, your memory improves, you can focus better, and you have more energy. But what you're doing is generating more peroxynitrite and this may not be felt for a while, but ultimately it's probably felt—in the brain at least—as Alzheimer's or Parkinson's Disease or worse, ten years from now."

How to Block Peroxynitrite

1) Increase CO₂

Let's turn to peroxynitrite. According to the Textbook of Medicine, and Dr. Pall himself, what is your primary scavenger of peroxynitrite? The answer is CO₂. Carbon dioxide. When ATP is generated in the mitochondria, CO₂ is produced as a by-product. So, when you make energy [ATP], you produce the very thing needed to scavenge peroxynitrite. It's a beautiful system! When everything works perfectly, you can make a lot of ATP because superoxide is being broken down into water. And CO₂ is produced which will get rid of any peroxynitrite that accidentally happens to be produced.

What a great system! If that system could be maintained in the state it was in when you were born, you should live to 120 to 140 years of age. It's just that things creep in that degrade that operation, that system, and we just exit out earlier than we should.

Now, if you keep lowering ATP production, which then reduces the amount superoxide produced, you also reduce the production of CO₂. "The result is you have less and less primary defense against peroxynitrite. It's a vicious cycle. And especially in the lowest energy states of all you really have that problem."

How do you increase CO₂? Well, first let me ask how you decrease CO₂, which we definitely don't want! Hyperventilation. If you hyperventilate, you dramatically decrease CO₂, which would be highly damaging. It can produce carpal-pedal spasms in some patients (carpal: wrist; pedal: foot). Its most damaging effect is to your brain, however.

Rebreathing: You can increase CO₂—and stop hyperventilation—by rebreathing. By inhaling your expired CO₂, you actually scavenge peroxynitrite. [Rebreathing involves cupping your hands over your nose and mouth so that when you exhale, your CO₂ is trapped there and then you inhale it. Do this for a minute at a time, about once every four or five minutes during a thirty-minute period once or twice a day. You can also do this while breathing oxygen through a nasal cannula. Rebreathing can also help address respiratory alkalosis, *extremely common in CFIDS*, thereby improving microcirculation by shifting blood pH—thus allowing more oxygen to be transported off the hemoglobin.]

Klonopin: Taking Klonopin knocks out Nitric Oxide Synthetase (NOS) and that defends against peroxynitrite. Klonopin can also slow the breathing and that will raise CO₂.

Barometric Pressure: Another way to do it is to walk in Death Valley. Below sea level, with all the extra oxygen, you hypoventilate and that will increase CO₂. [hypoventilate: breathe abnormally slow and shallow] The opposite is flying in aircraft at 10K feet, causing you to hyperventilate, so flying in airplanes is not good. CFIDS patients often feel bad when low pressure comes through their area and they ache, among other things. Low pressures are like climbing to high altitude, and you don't do as well, because you tend to hyperventilate more.

2) Uric Acid

Uric acid is a powerful scavenger of peroxynitrite. Uric acid levels in CFIDS patients are among the lowest I've ever measured, in all of medicine. [Keep in mind that before specializing in CFIDS, Dr. Cheney served as a Major in the Air Force Medical Corps and was Chief of Medicine at Mt. Home Air Force Base hospital in Idaho for several years before moving on to a private practice in Internal Medicine at Incline Village, Nevada. He was also the Chief of Medicine at the Lakeside Community Hospital in Incline Village, Nevada. In Charlotte, before opening his own CFS clinic, he was the Senior Staff Physician in the Department of Internal Medicine at The Nalle Clinic.] CFIDS patients are the only ones you see at 1 or 2. Everybody else is up at 4, 5, and 6. Most CFIDS

patients are quite low. The lowest I've ever seen as a group. [Dr. Cheney currently checks blood levels and 24-hour urine levels of uric acid.]

What do you make uric acid from? You make it from RNA and DNA metabolism and that is produced endogenously [within the body] and exogenously [outside the body]. Endogenous production is by apoptosis [normal, programmed cell death.] "Or by fasting in which you lose muscle mass or even by exercise which can produce muscle mass loss. In any event, you can produce your own endogenous RNA and DNA for uric acid production, which then scavenges peroxynitrite."

Sushi: Exogenously there are certain foods you can eat that do it. [When considering the following foods, take your own food sensitivities and allergies into account!] The best foods that produce RNA and DNA are on the meat and the vegetable side. On the meat side, the best RNA and DNA production is in sushi. Sushi is very high in digestible RNA and DNA.

Patient asks: "Now what do you mean by sushi? Is that raw meat?"

Dr. Cheney replies: "Yes, raw meat. Raw meat of any kind is better than cooked meat." [Assuming it's safe and not contaminated.] Cooking destroys the RNA and DNA, depending on how much you cook it. If you overcook it, you definitely destroy it. But the most efficient way to destroy RNA and DNA is by microwaving.

Eggs & Raw Milk (Cheese): Secondly, young food is better than old because it has a higher RNA and DNA content. How young can you go on the meat side before you can't go any younger? The egg. Eggs are very rich in RNA and DNA. And milk, if it's not pasteurized. It has to be raw milk. Raw milk has a high content of RNA and DNA. It also, interestingly, has a very high proportion of whey protein.

Moreover, if it's undenatured there's likely to be RNA and DNA embedded in that. So I have a sneaky feeling that part of the power of undenatured whey protein may in fact be its RNA and DNA. And if you could raise your uric acid level, you would allow yourself to make more energy, which will allow you to raise your Glutathione. That could well be the mechanism [of the effectiveness of undenatured whey protein].

Of course, raw milk is hard to deal in. There are laws against it. So how can you fix raw milk and make it legal? Make cheese out of it. Cheese made from raw milk and stored in caves—which is the traditional European methodology—actually saves raw milk in a form that can be stored for long periods of time, and has rich RNA and DNA content. You can go to most health food stores and ask for cheeses that are made from raw milk—that's what you want—and ask for the butter that is imported from France or Europe, which is also made from raw milk and is far better for you and is less processed.

Isoprinosine/Imunovir: There's a drug that raises uric acid called Isoprinosine or Imunovir. It's a very good immune-modulator; whose only potential side effect is an increase in uric acid levels. But that's not a problem for CFIDS patients! That "side

effect" would have a profound ability to arbitrate this disease at its most fundamental level.

Soy: One of the highest RNA and DNA content foods on the vegetable side is soy. So, soy could very helpful here. Be aware though that soy binds thyroxin [T4] in the gut and is problematic at best if you have hypothyroidism. [I buy frozen, shelled soybeans, let them thaw in the refrigerator, and eat them raw. Quick, easy, and, with or without salt, very good.]

Nuts & Seeds: How young can vegetables be before they can't get any younger? Nuts and seeds!

Patient asks: "So baby lettuce and things like that?"

Dr. Cheney replies: "Yes, exactly like that." Young foods are better than old. Unprocessed foods are better than processed. Uncooked raw vegetables better than cooked. What is the best way to prepare raw vegetables? Juice them, especially if you have problems with digestion. Juiced raw vegetables, especially organic raw vegetables, would be very high in RNA and DNA content and would be quite easy to digest. Definitely, do not microwave them. Steam them or juice them.

3) Consume Reduced Cholesterol

HDL cholesterol binds peroxynitrite. When it binds peroxynitrite, it produces oxidized LDL. So LDL is what's left after having bound peroxynitrite, and HDL is what's ready to bind it. "So what you're looking at with cholesterol to HDL ratio, is actually how well you are in fact scavenging, or capable of scavenging, peroxynitrite."

It could be that you generate higher levels to protect yourself. When Anthony Komaroff looked at cholesterol in CFIDS patients, it was typically elevated. Which means, I think, that CFIDS patients may have an enhanced ability to scavenge peroxynitrite via the cholesterol pathway than a normal person does.

[Reviewing patient's lipid panel lab] Good, your HDL is high—77.6. Total cholesterol is not very high at 141. But your HDL is high, so this is a mixed picture.

Patient asks: "Which means? So what do I need to do?"

Dr. Cheney replies: "Well, you need to eat reduced cholesterol. What is reduced cholesterol? It's found in unprocessed cheeses, butter, and raw milk. When you process these things, you oxidize the cholesterol. [It's no longer "reduced".] If you don't have a source of exogenous cholesterol [i.e. the unprocessed cheese and butter made from raw milk, mentioned earlier], you excessively oxidize your own endogenous cholesterol. Both are bad —consuming processed forms of cholesterol and excessively oxidizing your own cholesterol.

The cholesterol elevation associated with Coronary Artery Disease (CAD) is not the cause of CAD; it's reflective of it. That's why treating cholesterol is a misapplication of therapy [statins] to the wrong thing [cholesterol]. You're treating your defense mechanism [cholesterol], as well as being in big trouble later down the road. Why? Because statin drugs lower CoQ10 levels. This generates yet even more peroxynitrite; at the very time, you're reducing your defense [cholesterol] against it [peroxynitrite].

That's a prescription for disaster. And you know what that disaster is in the published medical literature? People on statin drugs actually die of many cancers faster than people on placebo. The Harvard study said that in the *New England Journal of Medicine* in 1996. This was also reported in animals on statin drugs. That's why, although there was a 3% improvement of death rate from CAD in the treated group, the net mortality was identical to the placebo group because those on statin drugs died of cancer more often than the placebo group. So there was no net gain. You just traded out what you died of. And if they'd followed the study out 10 years, they would have seen more Parkinson's disease. However, they ended the study at five years.

They have also seen rhabdomyolysis [destruction or degeneration of skeletal muscle tissue accompanied by the release of muscle cell contents into the bloodstream resulting in hypovolemia (decrease in the volume of the circulating blood); hyperkalemia (the presence of an abnormally high concentration of potassium in the blood); and sometimes acute renal failure] in all the developing statin drugs, resulting in one being recalled. I suspect rhabdomyolysis is involved by CoQ10 deficiency produced by the statin drugs.

Three Ways to Block Nitric Oxide

1) Hemoglobin

The best endogenous scavenger of nitric oxide is hemoglobin. [Hemoglobin: the "red" in red blood cells—a protein that transports oxygen from the lungs to the tissues.] "When hemoglobin scavenges nitric oxide, the nitric oxide bends the hemoglobin, causing the red blood cells to deform. Dr. Les Simpson in New Zealand found that the red blood cells of CFIDS patients were deformed, and when they're deformed they can't get through the capillary bed very well and can cause pain."

"An indication of this [RBC deformation] is it also drops the SED rate. CFIDS patients have the lowest SED rates I've ever recorded, and the ones with the lowest SED rate may have the greatest degree of pain." [SED rate refers to sedimentation rate, and is listed as ESR on many lab tests.]

"Do you know what your SED rate is by chance? Normal for you would be 15 plus or minus five. That's according to the British literature. A female your age has a higher SED rate than children and males. And you're probably down around 0 to 3. Which means you have Nitric Oxide binding hemoglobin, and therefore you have an induced hemoglobinopathy [a problem with the hemoglobin—nitric oxide bends it], and red cell deformation, and a low SED rate on that basis."

In the Laboratory Textbook of Medicine, there are only three diseases that lower the SED rate to that level. One is Sickle Cell Anemia—a genetic hemoglobinopathy. The second is CFS—an acquired hemoglobinopathy (acquired by Nitric Oxide binding). And guess what the third disease with a low SED rate is? *Idiopathic Cardiomyopathy!*

The more deformed red blood cells you have, the more pain you may experience. It's bad enough when you don't perfuse your muscles and your joints [because of poor microcirculation], but it's even worse when your red blood cells are so deformed that they can barely get through the capillaries, or are blocked entirely. Some CFIDS patients have a problem similar to that of Sickle Cell patients in this regard, and Sickle Cell patients have unbelievable pain—you have to give them IV morphine and fluids. That's how they're treated.

2) Hydroxycobalamin Injections (B12)

Another important scavenger of Nitric Oxide is B12—it binds Nitric Oxide quite vigorously. [This form of B12 is available from compounding pharmacies with a script from a doctor. One cc a day is recommended, at a concentration of 10,000 mcg/ml. The injection can be intramuscularly or subcutaneous. Some patients need to work up to this dose slowly since it also detoxifies you. Patients report more energy, less brain fog, better sleep. Some patients report a significant benefit at a higher dose, perhaps 2 cc's. I usually take one cc a day, but if I've done too much and am crashing, I take two cc's. It helps!]

3) Magnesium Sulfate Injections

Magnesium blocks the production of nitric oxide by calcium channel blockade. [Many patients benefit from magnesium injections, which are virtually painless with the addition of taurine. The Magnesium used by most is Magnesium Sulfate—standard 50% solution—1/2 cc drawn into the syringe first, followed by 1 1/2 cc's of Taurine. The Taurine is compounded at 50 mg/cc. The taurine makes the injection virtually painless and the ratio eliminates the hard knots many are familiar with. The injection is intramuscular, given in upper, outer quadrant of either buttock. Both require scripts from a doctor.]

Other Treatments

Numerous other treatments are used by Dr. Cheney as appropriate with certain patients. Some of the more common ones are zinc and selenium supplements that help block mercury. [**Zinc Picolinate**: 50 mg, once a day; **Liquid Selenium** by Allergy Research Group: 1 tsp a day.]

CoQ10 and/or Idebenone. Idebenone comes in 40 or 45 mg capsules, and one such capsule is roughly equivalent to 200 mg of CoQ10. [600 mg of CoQ10, or an equivalent combination of the two, is highly recommended. There is a lot of poor quality CoQ10 on the market—the cheaper products may not be worth your money. Douglas Lab's "CoQMelt" is a good product and is available from needs.com. Kirkman Labs

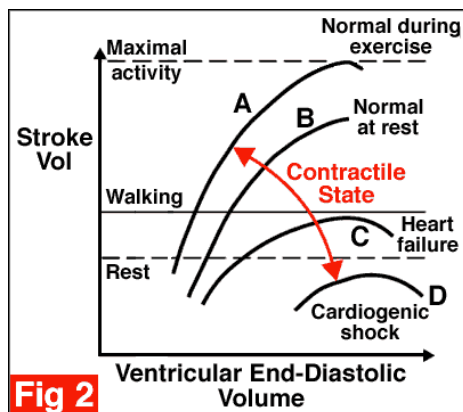
sells Idebenone, kirkmanlabs.com. It's also available at some local health food stores—20% off on the first Tuesday of each month at Sunflower Shoppe in Fort Worth and Healthy Approach in Colleyville.]

Proanthocyanidins or bioflavonoids. The most powerful of these antioxidants are in Grape Skins or Pycnogenol. It just makes good sense to supplement with these.

Essential Fatty Acids, such as Fish Oil, Evening Primrose Oil, and Borage Oil. "I tend to recommend Fish Oil only. It has certain advantages over the others." [Tyler's Eskimo-3 liquid, one teaspoon a day, manufactured by Cardinova in Sweden.]

Physiology: Preload and Afterload

Turning to physiology, how does a cardiologist treat the heart problem? He uses the Frank-Starling Curve. [Dr. Cheney drew a curve for his other patient that I don't have. See www.nda.ox.ac.uk/wfsa/html/u10/u1002_02.htm for sample curves.]



[To understand this diagram and the rest of this section, the following somewhat simplified definitions may be helpful. Stroke Volume (SV): the amount of blood pumped by one contraction of the heart. Cardiac Output: the volume pumped out in one minute (SV x heart rate). The ventricle is a lower chamber of the heart. Oxygenated blood is ejected from the left ventricle to the body; unoxygenated blood travels from the right ventricle to the lungs.

Preload is the amount of blood in the left ventricle waiting to be pumped out to the body, or—as on the diagram—the volume in the ventricle at the end of diastole. It's mainly dependent on the venous return of blood from the body. Diastole is when the muscles relax and a chamber of the heart expands and fills with blood; compared with Systole, when the muscles contract and expel blood from the chamber. Afterload is the resistance the blood encounters when ejected from the heart—remember how arteries constrict like nozzles?]

[The diagram could be seen as plotting the amount of blood waiting in the ventricle to go to the body (horizontal axis) against the amount of blood that is actually ejected from the ventricle (vertical axis). Four curves are shown, the highest two (A and B) being healthy hearts with good cardiac output during exercise and at rest. The lower two curves (C and D) indicate diseased hearts that cannot produce sufficient cardiac output. While they have lower cardiac output, they also have greater ventricular volume—there is more blood in the heart, but the heart muscle isn't strong enough to pump as much out. There are also three dotted horizontal lines at increasing heights indicating the necessary cardiac output for rest, walking and maximal activity.]

Dr. Cheney states, "This is the normal Starling Curve." [Presumably something like Curve B.] This curve is where most CFIDS patients are. [I suspect CFIDS curves are between B and C; i.e.—a curve not shown on this diagram.] The point at the top of that curve is the sweet spot. That would give you the most cardiac output and thus the greatest tissue perfusion, and that would be the best. On either side of that peak, the cardiac output goes down. Most CFIDS patients sit right here. [Probably somewhere on the left side of the curve.]

Now, here is a Congestive Heart Failure curve. [Curve C] Those patients are treated with Lasix to make them eliminate the extra volume, and then they are able to move up the curve and improve their cardiac output. "Most of you, on the other hand, need volume, and as we give you more volume you will come up onto the peak and will maximize your cardiac output. But, if we overshoot, you're going to go down the other side and you actually lose volume. And if you keep going down you'll actually go into heart failure." It's critical to understand the Frank-Starling Curve of Cardiac Output, where you [the PWC] are and how to manipulate it. [Notice that the healthy hearts in the diagram (curves A & B) have little to no drop after their peak!]

Preload: Lying Down

How do you augment preload—which is blood volume—to improve cardiac output? You lie down. When you lie down, you increase the cardiac output a whopping 2 liters per minute. Don't sit, don't recline—lie down. Some patients need to lie down and augment volume anytime, all the time.

But, what if you're one of the ones right near the top of the curve and you increase your volume (preload) 2 liters by lying down? You could actually go over the peak and down the other side. Do you know what that means clinically? Some patients can't lie down! Some tell me, "When I lay down I cannot rest well or sleep." They went right over the top and dropped their cardiac output by lying down!

Preload Chronobiology: Daytime vs. Bedtime

There is a chronobiology to this curve: the time of day affects it. In the daytime, patients need to increase blood volume by taking in fluids. That allows them to be up more. But some can over treat by drinking fluids and lying down in the daytime. [Some with this

problem who can't be up find a semi-recumbent position helpful. Use pillows to raise your torso.]

However, at nighttime, the opposite happens. The chronobiology drops your cortisol and aldosterone so you don't hold fluids as well, and all that combines to allow this type of patient to lay down without this problem. Patients with this problem (lying down makes them feel worse) should only expand volume in the first six or seven hours of their day with the Hydralate (Gookinaid) or Home Brew mentioned below, then switch to water. And if they lie down while over-expanding volume with Home Brew or other supplements or drugs, they'll get creamed. These patients should not use the Home Brew during the six or seven hours before bedtime. If they do, they may not be able to sleep.

Preload: [Hydralate \(Gookinaid\)](#)/HomeBrew

"Volume loading using appropriate volume expanders can be quite helpful. This can be done in a variety of ways, but falls best under the term of isotonic [same salt concentration as normal cells and blood] volume expansion. [Hydralyte \(Gookinaid\)](#) is a well-documented isotonic volume expander and is used in athletic events such as marathon running." [Gookinaid.com] "It has an advantage of rapid absorption and is maintained in the intravascular volume far longer than hypotonic [less salt concentration] drinks such as water itself. The disadvantage to Hydralyte (Gookinaid) is that it has sugar in it in the form of glucose."

"Another option would be a HomeBrew mixture of sea salt and "No Salt". [HomeBrew: one cup of filtered or spring water, 1/8 teaspoon of Sea Salt, and 1/8 teaspoon of "No Salt" salt substitute (potassium). Add lime juice or an herbal teabag as well as stevia for taste.] Four to eight glasses of Hydralyte (Gookinaid) or HomeBrew are recommended.

Why is potassium in these drinks? Potassium induces Aldosterone , a hormone that significantly increases blood volume.

Preload: Cortisol as Licorice Root

For those with low blood pressure—most CFIDS patients have low blood pressure—cortisol could also be useful and can be improved adaptogenically using Licorice Root Extract at 1 to 2 tsp every other day. [Adaptogenic substances respond to what your body needs. I take licorice root capsules. Only the type with glycyrrhizin works for this purpose.]

Afterload Reduction: Magnesium

The second thing you need to do after increasing your Preload, is reduce your Afterload. This means reducing the resistance the blood encounters. The best Afterload-reducing agent I know of is Magnesium, an adaptogenic vasodilator [opens up/relaxes the blood vessels as needed]. Magnesium and taurine injections have been very effective for many patients [see details on these injections in the earlier section]. You could also use oral

Magnesium Glycinate capsules in the form of Magnesium Glycinate Forte 300 to 500 mg at bedtime. [I use both the oral and the injectible forms.]

Will implementing these treatment measures cure you? Absolutely not, because none of this is getting at the primary issue. It is directed at what is most dysfunctional about this disease. If we're trying to get you functional, this is where we start.

[This concludes the information on CFS and Cardiac Issues. Look for future articles on other topics. [Dr. Cheney spoke on this topic on June 18 in Irving, TX.](#) His presentation also included new information on CFS and Diastolic Cardiomyopathy. See www.dfwcfdids.org/menu.html for [details about the seminar](#) and [information on ordering a videotape.](#)]
