I have had a number of questions from listeners about Annetta Freeman.

Annetta was diagnosed with Parkinson's and began launching a new and innovative approach toward finding relief from her symptoms using a number of different supplements. The questions recently have been

What ever happened to Annetta Freeman? We want to know more about her story.

Steven Fowkes is the Executive Director of the Cognitive Enhancement Research Institute in Menlo Park, California. Steven is the individual who interviewed Annetta and captured her story about what she did to feel better from the symptoms of Parkinson's. Steven has kindly agreed to answer questions about Annetta's journey and to talk more generally about what people can do to feel better who have Parkinson's.

Tell us Annetta's story starting from the mid 1990's and especially the things she was doing for herself to get relief and help herself feel better.

When I first talked with Annetta over the phone she had successfully resolved a lot of her problems. She was in a position of being relatively stable. Her functionality was way up. Her tremor was primarily limited to only her weak side, her left side.

When I met her at the end of the decade, I would not have thought she had Parkinson's at all. She moved effectively. Her carriage was upright. I *would not have guessed, and I think a lot of doctors would not have necessarily guessed, that she had had Parkinson's disease.*

In the early 90's it was a very different picture. When I met her in person in Florida and in Los Angeles I got a lot of the back story. She had early onset Parkinson's, which was rapidly progressing, and had been put on Eldepryl (a brand of deprenyl or selegiline) in the early 90's – 1991 and 1992. She had horrendous problems. Her Parkinson's disease accelerated. She was bedridden. She needed help to get to the bathroom.

I can't begin to tell you how compromised she was. She was lucky enough to hear about the Discovery Experimental & Development brand of liquid deprenyl. When she switched from Eldepryl to the liquid deprenyl her condition turned around in weeks.

Later we found out that there was contamination of the Eldepryl supply at that time. Parkinson's people all over the world were dying at a much more accelerated rate with a neurotoxin in the drug supply. When she started taking Eldepryl it was contaminated. It was just making her sicker and sicker.

When she switched from the contaminated Eldepryl to the high purity Discovery liquid deprenyl, she started recovering. The neuroprotective effects of deprenyl manifested. She looked at this as being a gift from God. She went on a search to find other nutrients, dietary things that she could do to augment the gains she was making and found significant benefit.

Is Discovery Liquid Deprenyl currently available to people with Parkinsons?

It is not. The Discovery company was put out of business by the FDA, the justice department prosecuted the guy who developed it. They put him in prison for 13 years. It was a massive bureaucratic snafu. The FDA "lost" his drug applications for his liquid deprenyl, and obstruct him left and right. Then, they prosecuted him when he circumvented the process to make deprenyl available through a company in Mexico. I think it was a travesty of justice of immense proportions.

There are other, non-Discovery liquid deprenyls that are available. There is still one being made in Mexico. Your local compounding pharmacy can take standard deprenyl, dissolve it in water and add citric acid to it.

It is not really the question of whether or not it is liquid that makes the difference. It is really the fact that Discovery had developed a new way of making deprenyl by a process that resulted in highly purified deprenyl. That was why it was so much better.

That is Annetta's story in the 90's. What has happened since then?

The Discovery-brand deprenyl supply disappeared when the government shut down the Discovery company. Rather than taking Eldepryl, which Annetta associated with her horrendous initial progression of the disease, she decided to try an acupuncture-based therapy and got some pretty bad results from it. I believe she has since passed on.

It doesn't necessarily mean that deprenyl is not available to people – it certainly is. But the medical community has been essentially brainwashed by this contamination event. US doctors were told by the New England Journal of Medicine that this contamination problem was *an inherent flaw in deprenyl itself. The company that had contaminated the deprenyl supply which resulted in all of these deaths actually managed to keep their skeleton in the closet and prevent the medical community from learning that there had been a contamination problem.*

- *If you want deprenyl*
- *if your relatives want deprenyl ,*
- *if you want your parent to have deprenyl*

it is much harder to convince your doctor to prescribe it because of this history and cover up that took place. You can get a lot of flack for seeking out deprenyl.

So, there were two confounding factors for Annetta. One was that she went cold turkey off Discovery deprenyl. The other was that she engaged a strategy of acupuncture. Which of these two factors prominent in contributing to her gradual decline?

I have no way of knowing. Part of the mistake I think that Annetta made was that she was told by the acupuncturist that she should stop her supplements, so she did. She had developed all kinds of benefits from things like NADH and Co-Q10, and lipoic acid.

She stopped taking those supplements as part of the protocol of going through this acupuncture therapy. They warned her that things would get worse before they got better; somehow the acupuncture realignment of the nervous system and the meridians would somehow get worse before it would get better. When she started to get worse she didn't necessarily look at that as an immediate indicator that the new treatment was not working. There was a silver lining in the clouds, so she kept at it for a longer period of time. It then made it very difficult for *her to recover and get back onto her previous protocol. I am sure that going off deprenyl had an adverse effect, but I suspect that going off nutrients was more consequential.*

If people are taking a regime of supplements like Co-Q10 and lipoic acid it would not be advisable for them to go cold turkey and say:

> *"Well, this is not doing me any good. I am going to just stop taking this stuff."*

There are things you can take that don't make a difference, things you can go cold turkey off with minimum consequences. There are other situations where it is critical. I have run into situations where doctors have made this kind of recommendation because they do not understand the consequences of how a drug interacts with, say, a surgical procedure, or anesthesia, or even with insurance because of potential legal-liability issues. They will tell you to stop taking the supplements on the basis that it is not dangerous to ***them****. It is going to make their job easier because they will not have some kind of interaction that they don't understand. There are instances where doctors have recommended a withdrawal from nutrients where it has been absolutely catastrophic for people.*

The specific incident I am more familiar with is the Down syndrome children who are scheduled for heart surgery. The doctors tell the parents to take their kids off of their dietary supplements. This causes massive oxidative stress. And with this particular surgical procedure, oxidative stress is known to be severe enough to cause death on the operating table.

This was actually catalogued in a scientific study where the researchers had gone in and looked at pre-surgical oxidation indices and all kinds of measures of oxidative stress during the procedure. They found that it was the most severe kind of thing, comparable to having a heart attack in an adult. Yet, these doctors were telling these parents that they should take their kids off of the supplements that were preventing that oxidative stress. I did not understand it at all.

I now tell parents,

> *"Just don't listen to the doctors about that. Your children are too important. Here are the data. Look at the data. If they give you any flack about it, give them a copy of the study and say – this is nonnegotiable. You do it my way or you don't do it."*

Sometimes that is the kind of attitude it takes. Staying alive is about defending yourself against the medical system as much as it is about self-care options to use technologies the medical system does not know about.

People with Parkinson's tell me that they are always interested in knowing how easy or how hard it is to find sustained relief from their symptoms. You have done a great deal of work with Alzheimer's. Can you compare Alzheimer's as a condition with Parkinson's? Is one or the other easier or harder to address with regard to alleviating symptoms?

I would say there is a mechanism they have in common right down the line. That has to do with the mitochondrial energy systems. There is a "brown out" that happens with Alzheimer's disease and there is a brown *out that happens with Parkinson's. By this analogy, the voltage of the body is failing.*

On this level, there is no difference, so the treatments would be the same: Energy related nutrients, mitochondrial nutrients, exercise, aerobic capacity, coconut oil, thyroid hormones, hormone replacement therapy with testosterone in men or progesterone in women. These are kinds of things that would be universal to both diseases.

The difference is that in Parkinson's Disease, there is another factor at play. There is a focal problem at the cellular level that causes one part of the brain to deteriorate. You don't see that kind of thing in Alzheimer's Disease. Alzheimer's tends to be distributed over many areas. There are different variations of Alzheimer's disease that happen because there can be subtle focal issues involved in particular parts of the brain. Each one of which has its own diagnosis. On the whole, the Alzheimer's disease affects a large part of the brain. It is, essentially, a cascade failure of the energy systems. The brain turns from being fairly high functioning to fairly low functioning in a fairly short period of time.

You don't tend to see that with Parkinson's, which is more of a continual, inexorable, lon- term drift over periods of decades. The symptoms really don't become conspicuous until a fairly late stage in the process. You can have half of your neurons die and you don't necessarily have symptoms. But in Alzheimer's disease, the neurons all shut down at once.

In terms of addressing the two, are there things that people with Alzheimer's can do to get relatively quick relief, whereas people with Parkinsons can do similar things but it takes much longer to see relief?

All of the things that can adversely affect your health can complicate Parkinson's disease. If you have a B12 deficiency and Parkinson's disease, when you take B12 your Parkinson's disease symptoms are likely to partially resolve. It is like having two things going wrong at the same time, one of which is easy to fix and the other of which is not.

The same thing can happen with Alzheimer's Disease. With Alzheimer's, you can say

> *"You have 15 potential systems that can go down, but in any particular person we don't know if it is those five or these three that are the ones that are involved."*

That is the real, daunting challenge to a medical professional who is supposed to know the answers to everything. How do you relate to a client when you really have no way of measuring what is broken in the system and how to go about fixing it?

The good news to the person with Alzheimer's is that this can be a simple, trial-and-error process that you can do at home. You can take different nutrients and just measure changes in cognitive function – either on a preventative basis (if you are worried about getting it and you have a high risk ApoE genotype), or, you can work these things one at a time with a relative that has Alzheimer's disease and just observe from their memory or from their conversations that you are having with them how much they forget – how soon they forget. From these observations you can judge whether or not a particular intervention or particular system is or is not helping that person.

All of those things that affect Alzheimer's disease can also affect Parkinson's disease. There is a special kind of dementia called Parkinson's dementia. I don't look at dementia as being necessarily a part of Parkinson's disease. There are a lot of people with advanced stages of Parkinson's disease that have extremely clear minds.

You may be unlucky and have dementia and Parkinson's disease both. In my opinion, it is fairly easy to treat Alzheimer's disease and exceedingly difficult to treat Parkinson's disease because of that underlying problem. It isn't just about the brown out of the energy system. There is a deeper level of cellular stress in Parkinson's disease.

People get overwhelmed by too many choices.

Absolutely.

"Oh my god," they say. "I am into the fiftieth of sixtieth therapy. I don't know what to do. My mind is dizzying with confusion".

Is there a way to simplify this for people? Is there a core set of vitamins or nutrients or minerals that they need to pay attention to in the very beginning to engage the type of experimentation you recommend?

No, I don't think so. Some people with Parkinson's disease are going to have a blood coagulation problem that goes along with it. When they take nattokinase, all their symptoms are going to ease significantly. Until you try it, you do not know that.

The "opportunity costs" that people are bearing when looking at Annetta's program, which has 30 or 40 supplements on it, is daunting. She used to spend $30 a day. Luckily she had money. For her, money was never an issue. It was always an issue of the time and trouble it would take to explore something and try something. She would try things all the time and just make some kind of a judgment, a feeling, of whether or not something was benefiting her or not. I take this as the yardstick to use for people with opportunity costs is to say:

> *"Well, all you have to do is one thing at a time. Whether you do the therapy of the week, the therapy of the month, it really doesn't matter as long as you just pick something and try it."*

If you can measure some aspect of your performance – the one that I tell people to measure is the one that most bothers them the most.

- *Tremor.*
- *Handwriting.*
- *Posture.*
- *Walking.*
- *Freezing behaviors.*

Whatever it is, focus on that symptom and rate it. Pick a number - one to five. Every day you judge it. Put it on a calendar. Graph it. Every time you try something, you look at how the symptom changes.

- *Is this number going up? Are you getting worse?*
- *Is this number going down, Are you get better?*
- *Or, can I not tell at all?*

If you employ a draconian rule: If I don't get better, I don't spend my money on it and I don't spend my time on it.It actually comes down to a fairly simple program.

Robert: That does simplify it for people.

The problem is that most people do not have that kind of a yardstick. They will be taking all kinds of things on faith. When it gets to the second handful of pills, they start to go

> *"Oh, no! Do I really want to do this?"*

You mention mitochondrial mechanisms as a factor with Parkinson's. That is a mouthful. Can you explain to people what that is all about?

I have done several articles giving people both verbal and visual pictures of how the mitochondrial system works. Basically, mitochondria are little power plants, little blast furnaces inside our cells. They burn fuel and generate energy for us. ATP is the primary energy that comes out of them.

There is a secondary fuel, that most people don't think of as a fuel, called NADH, which can be described as reducing power – the opposite of oxidation power. NADH powers the antioxidant defense mechanisms, which turns out a critical factor for both Parkinson's disease and Alzheimer's disease, mainly involving regeneration of a substance called glutathione.

Glutathione has sulfur in it. Sulfur is the pivot for all biology. Our entire chemistry is defended by a sulfur defense system. The sulfur intercepts all of these free radicals and oxidizing agents and protects us from oxidative damage.

With Parkinson's disease we get apoptosis of the Substantia Nigra neurons. In Alzheimer's disease, the attack on the sulfur pool causes a depolarization of the brain's materiél distribution system; the highway system of the brain disintegrates. It just falls apart.

If you make the width of the brain's transportation system – called microtubules – analogous to a two-lane highway, it would stretch from San Diego to Maine. That is how long these microtubules are. These brain transportation highways are needed to accommodate the long branches (axons and dendrites) in neurons. The structure of brain cells is highly unusual. (Most cells in the body are round and globular and do not have branches.)

If you can't move material through the highway system – if you don't have a road system and you don't have trucks – how can you move lobsters from Maine to San Diego and lettuce from San Diego to Maine? Putting lobsters and lettuce in back packs and walking it from California to Maine is not going to work very effectively.

That is the problem you have in the Alzheimer's brain. These transportation systems – these long microtubules – have these little motor proteins that attach at one end and drag the sack of material all the way down to the other end of axons and dendrites. They stop working.

As you might expect, the brain has a catastrophic decrease in performance which is exactly what you see in Alzheimer's disease. People are fine then all of the sudden they deteriorate and cannot remember what is going on.

In Parkinson's disease, the sulfur system is different because it is protecting against a lon- term kind of cumulative damage. The *Substantia Nigra* *is named "Nigra" (which means black) because when you do an autopsy on the brain and look at those particular cells, they are colored black. There is a pigment in those particular cells. It turns out that pigment is caused by the polymerization of compounds that relate to dopamine which is a neurotransmitter in those particular neurons. This pigment is called* *melanin*. *It is black. It is produced from that specific neurotransmitter.*

That is why those particular neurons die. The antioxidant defense systemfails to defend that neuro-transmitter. It becomes compromised. It polymerizes into the black pigment. Those particular cells become stressed. Then they shut down and die.

It all comes down to antioxidants. Those antioxidants are defended by the NADH that comes out of the mitochondria and they are defended by the ATP that comes out of the mitochondria. So, the mitochondria are the "power grid," or electrical outlets, for our brain.

When you talk about neurons, people think about neural networks in a conceptual sense. What does a neuron look like physically if you were to spread it out on a table? Would you see something hard and thick, Would it be sticky and mucous like? Would it be watery? What does a neuron really look like?

An earth worm?

They are gelatinous. The brain is composed of more fat than protein. This makes the brain very greasy and probably more analogous to fat tissue than anything. Brain cells are also fairly soft and squishy. Their *shapes are like starfish, with many more than five arms, and with smaller arms on the bigger arms. This brain microstructure is tangled, with long arms reaching around other cells to touch cells very far away. We are talking about many trillions of neurons, each with thousands of arms reaching out to touch each other. It is the ultimate in complexity. This is why the energy issue with mitochondria is so critical. The brain is only 3% of the body's mass but it consumes 20% of the body's energy. These long spindly cells with all of these branches throughout the brain are connected via an intricate transport system. They are very much dufferent from the round globular cells of the liver or spleen, which are like a glob of Jello, where if you put coloring onto it, it will diffuse and spread passively into and through the Jello.*

You just can't do that with neurons. The typology and the branching are way too complex. It is kind of like if you took five trees that have a lot of branches, uproot them, and jamb the crowns of the trees into each other, so all the trunks are on the outside and all the branches are penetrating into each other. That is what the brain would be like – that kind of complexity – all these branches and leaves touching each other, but connected to different trunks.

One the cognitive Enhancement Research institute web site (www.CERI.com) there is a page that has a number of different resources that are specific to Parkinsons. Could you tell people what information they can find there?

When CERI was operating in its publishing mode and we had a robust organization, we wanted people to look at the web site and get an idea of both the breath, focus and depth of the quality of the information. We picked Down's Syndrome, Parkinson's Disease and GHB as examples of *the depth. Nearly everything we published on those subjects was put on the web site to show how detailed it got. We dealt with drug-drug interactions, nutrient effects on symptoms, how you distinguish between people who have Parkinson's Disease, who tolerate alcohol and people who don't – some of it was very esoteric information.*

In other parts of the website, we have articles that show the breadth of our publishing…

- *How could you survive holiday stress?*
- *How do you survive the cross linking effects of alcohol?*
- *How do you use carbon dioxide as a smart drug.*

What is that about? How can carbon dioxide help your brain function?

It is really true. It is a critical asset to how your brain works. If you have Parkinson's disease or Alzheimer's disease ***and*** *a CO2 deficiency, you are going to have more symptoms than if you did not have a CO2 deficiency. We discuss:*

- *How do you figure that out?*
- *How can you know?*
- *If you push your CO2 up, what happens to your symptoms?*
- *If you push CO2 down, what happens to your symptoms?*

In a sense, this is all about giving people tools that they can use in their lives to figure it out for themselves. The medical profession does not give people this kind of information.

So, are you pushing your CO2 levels up and down by breathing into a plastic bag?

That is one way, yes. That is the typical way most people do it. But when you do that, you become depleted of oxygen. A better way to do it is to use "power breathing." You do the following:

1. *Inhale slowly for four seconds*
2. *Hold your breath for four seconds*
3. *Exhale through pursed lips (blowing pressurized air through your lips)*

Or, you can accomplish the same thing through vocalization, by chanting, humming or singing during the 16-second exhale. The increased pressure during the exhale drives CO2 back into your system.

Since Parkinson's disease and Alzheimer's disease are both associated with decreased metabolism, your voltage is low. You are not producing as much energy as other people.

Your CO2 is also going to be low. Your CO2comes from your energy. Carbon from carbohydrate or fat burns with oxygen to make CO2.

Power breathing increases your CO2. Do that for five minutes and your CO2 could be 50% higher in that short a period of time.

People who have a tendency toward hiccups or panic attacks are often triggered by a CO2 deficiency. What is the folk cure for hiccups? You hold your breath and somebody feeds you a glass of water. Holding your breath drives your CO2 up and cures the hiccups.

Whether a CO2 deficiency is an issue for you can be useful to find out. Is this a complicating factor in your Alzheimer's or Parkinson's disease? The energy system of the body has all of the support elements that are involved in this.

For example, blood flow. Your cells cannot generate energy if they cannot get fuel, like glucose or fat, through your blood stream and oxygen delivered to your blood stream through your lungs. If you can't carry CO2 from the cells back to your lungs, you are going to build up too much CO2. That will inhibit your metabolism.

Estrogen counteracts thyroid, testosterone and progesterone hormones which are the "on" switch for your metabolism. Estrogen is the "off" switch. These are in a balance with each other. Doctors would be great if you could get them to access these kinds of things for you. There are some alternative doctors that do exactly that for people. The average person out there who has Parkinson's disease probably does not even hear about these options.

When you talk about oxidative issues with regard to Parkinsons, is there any specific recommendations that you would put at the top of the list that people ought to do? For example, drink a glass of blackberry juice every day? That is, is there anything in particular you would recommend in light of all the research you have done?

A couple of things are statistically anomalous. One is NADH. One out of a hundred "normal" persons will notice something from taking NADH, maybe not even that many. NADH with somebody with normal metabolism is already sufficient. Adding any more is like filling up your gas tank after you have gone 10 miles. It doesn't make any difference in how your car works.

With Parkinson's disease the positive response to NADH is probably 40%. This is something that I would put at the top of the list just because there are several aspects of mitochondrial metabolic function that are known to be associated with NADH. We know from the *scientific literature that Parkinson's people respond more strongly to NADH.*

Can NADH be purchased at a health food store?

Yes. It is not available by prescription. You have to get it from your health food store.

Does NADH come in pill form?

Yes. It comes in sublingual pills and it comes in enteric-coated pills. It is a relatively pricey thing, considering the fact it is just an activated form of vitamin B3. One gram of NADH sells for the price of a kilogram of niacin or niacinamide. It is very expensive and tends to be one of the higher-expense items on your supplement list.

That is the nice thing about testing something like this out. If you take NADH and you have no improvement in

- *your memory*
- *your cognitive function*
- *your tremor*
- *your freezing behavior*
- *and your body temperature doesn't change*

then it is like – OK. That is it. You tried one bottle. You tried it out. It doesn't work. Give it up. Don't waste your money. Don't waste your time.

To test it:

1. *Take one pill the first day,*
2. *Then two pills the second,*

3. *Four the third,*
4. *Then eight the next,*
5. *Then 16,*
6. *Then take rest of the entire bottle.*

This stuff is so non toxic that the only way you can kill yourself would be to be a millionaire and spend all of your money taking NADH.

NADH is at the top of the list. Is there something next on the list?

I would say one of the things that potentially could be a critical factor for Parkinson's disease is iron storage. I would tell anybody who has Parkinson's disease to talk with

- *their children*
- *their grandchildren*
- *their nieces*
- *their nephews*

about having men get their iron storage assessed clinically early in life. If they are accumulating too much iron they can off load that iron by donating their blood to the Red Cross. This is one of the things that is sadly underappreciated. Iron toxicity can be a cause of heart disease in men particularly, and in post menopausal women. When women stop menstruating, they start accumulating iron like men do in their twenties, so twenty to thirty years of iron accumulation can actually get to the point where you actually start to "spill" the iron. At that point your entire health starts to deteriorate very rapidly, including your cognitive function.

So, donating blood to the Red Cross can be a huge benefit to a person?

Oh yes. When I was doing volunteer work for the AIDS community, they did a study where they were transferring antibodies from people with high antibody counts to people with low antibody counts. The people receiving the antibodies actually did not get any benefit at all. But the surprise was that the people donating the antibodies got benefit.

I regularly give blood three to four times a year and have for a long period of time. I know that this is the best way to get rid of iron. If you are male and in your thirties, ask your doctor to give you a serum ferritin test. If you want, also ask for a transferrin saturation test and a TIBC which is a Total Iron Binding Capacity test. They are all relatively cheap. They tend not to be included in a regular annual physical because your iron status changes so slowly over time.

Normal blood tests that you get done by your doctor during an annual physical will measure the iron in hemoglobin, but it does not measure the stored iron. Hemoglobin iron and stored iron do not track with each other. Oftentimes they have nothing to do with each other.

When you are anemic, you can actually have dangerously high levels of iron, but it is not getting from your storage form into the hemoglobin. When your doctor puts you on iron supplements this can actually threaten your life.

You need to measure your storage form of iron to know whether or not you need to take B12 and folic acid to solve your anemia or whether you need to take iron to solve your anemia. In men this is critical because they do not menstruate. The only way we lose iron is to go out and fight wars, get injured, fall from trees, and get bitten by wild animals. In our modern society that happens so frequently … (all kidding aside).

Get this ferritin test. If you come from a family with a history of heart attack rates in males, in their fifties or sixties, you will probably see that your ferritin will be high. Just start giving blood.

If you have an HIV infection or a hepatitis infection and they will not take your blood, just insist that every time you see your doctor, the doctor take a pint and they just throw it away. Offload that blood. Every time you do that it drops your iron down a notch, so, hopefully, your iron does not build up to a point where it causes a heart attack.

There are high-iron accumulators that run in families. It is genetic. It correlates with heart disease. Something called haemochromatosis is the clinical form. But I am of the opinion that a lot of people die from a subclinical form of haemochromatosis.

Since iron toxicity is involved in Parkinson's disease, men need to get this assessed. Post menopausal women need to get this assessed to see if maybe part of their long term program should be offloading iron.

You mention this as a matter of routine, you give blood three times a year – is this preventative or have you determined that you determined that you have high levels of blood in your own system?

It does not run in my family. I do it for preventative reasons.

I also look at biology in terms of rhythm. This is one of the philosophical things that you can see that go back through Ayurvedic and traditional Chinese medical practice. A lot of religious orders emphasize the issue of rhythm in life and rhythm in routine as a very important part of their spirituality, the cultivation of spiritual connection to God, or their body, or whatever their goal is.

There is an advantage to oscillation in biology. For example, in humans we see aerobic-anaerobic oscillation. It happens every day. During the day we are aerobically dominant. During the night we are anaerobicly dominant. During the day our urine pH will be about 5.5 and at night it will be about 7.5. When this pH rhythm stops, you tend to get cancer.

Biology is all about rhythm. You sleep every night. If you don't sleep you personality and your mind disintegrates. Sleep deprivation is so nasty that they use it to torture people.

What happens with Parkinson's disease and Alzheimer's disease is that you get inflammation. You stop sleeping deeply or soundly. The mind is the most sensitive organ of the body to biological dysfunction and destabilization. If you pay attention to how good your mind is, how well it is working, you are going to learn something is wrong through a decrease in your cognitive function years before you will likely see it in any other physical measure. That is common.

- *Playing video games and recording your scores*
- *Timing yourself with crossword puzzles.*
- *Playing duplicate bridge.*
- *Using brain-training software programs.*

There are all kinds of ways you can gather information about how well your mind is working. Concentration – the game you played as a kid – where two kids will sit at a table with cards on the table and take turns turning two of the cards over at a time. If they pair off they get to keep them. If they don't pair up they put them back face down. The next kid takes a turn. If you remember where those cards are, you end up with more cards and you win the game.

You can play Concentration against yourself with a stop watch. How long does it take you to clear 52 cards off the table, pairing them up two at a time? This measures your short-term and medium-term memory. If you do that every day, you are going to now have a real-time way of tracking how your brain is working. That is going to tell you when something is not right.

Let' say, I have been doing the card game and all of the sudden, after 8 weeks, 8 months or 8 years, my scores go down. I now have an indicator that something is going wrong with my body. What do I do then?

I take NADH. I see if the trend reverses. If that doesn't work then next week I take B1. The next week I take lipoic acid. If you don't know what to take, flip a coin. There are so many things to try.

- *Take one of the mitochondrial nutrients.*
- *Try hormone replacement therapy.*
- *Try exercise.*
- *Try a negative ion generator.*
- *Try hypnosis.*
- *Try acupuncture.*
- *Try a wheat-free diet.*

Something is going to work. Just keep experimenting.

In a real sense, you are creating a biofeedback loop where your brain is telling you through your body what is right and what is wrong in terms of your choices. It is an incredibly simple system.

To what extent does helplessness have anything to do with a person's ability to get well?

I think it is very important, not only from the perspective of hopefulness and belief in the efficacy of what one is doing, and that one can make a difference, it is also important for both treatment and prevention. In my opinion it is a key factor.

Nothing is worse for education than undermining a child's learning ability by planting the seed in their mind that they cannot learn, to go through a public school system where the only goal is that you attend and that you do not make trouble. Your curiosity is not a factor. Learning is not a factor.

Hopelessness is really quite deleterious because it interferes with what is called the neuroendocrine system. This is a way that your brain and mind are integrated—and how your mind and brain are integrated. Your mind is connected to your brain. Your brain is connected to your body. Your mind has the potential to influence how your body works, how it heals and how it doesn't get disease, and how it ages gracefully.

All of these kind of things can be cultivated. If you are in an abusive relationship or you are being negatively reinforced, or you believe that an Alzheimer's diagnosis or a Parkinson's diagnosis is a death sentence, you are going to deteriorate more rapidly than somebody who says,

> *"Well, tough luck doctor, I am not taking Sinemet. I am going to try all these other things. I am going to do Tai chi in my local park. I am going to take a vacation to Paris. I am just going to do these things that I have been putting off my entire life. I am going to paint pictures."*

Whatever it is that turns you on, whatever it is that connects you to yourself, --or to God, or to your community, or to your family—that you *nurture that stuff so that your neuroendocrine system doesn't age prematurely and that you are able to draw on the natural healing properties of the body.*

Is it then primarily important what choices are made specifically in this experimentation program that you recommend or is it just the trying of it all that makes the difference?

Physically, it is about the hardware, the specific nutrients that you need. But spiritually or psychically, which is the realm of the neuroendocrine system, I would say the latter. It really doesn't matter what you do. If you are actively involved in bettering yourself in accordance with your beliefs, then your neuroendocrine systems will help you get better.

This is the whole placebo response. Thirty percent of the benefit of a drug is the placebo. If they are talking about the difference between a 30% cure from a placebo and a 40% cure from a drug, they are lucky. It may be 30-35% or 30-50%, but the effect of a placebo is awesome. That benefit comes from the belief, the attachment, the reinforcement of purpose, the hopefulness that is engendered.

I think a lot of spiritual healing is focused on this. A lot of people can enter a spiritual discipline involving things like transcendental meditation or even fasting. Although, in my opinion, fasting is a good short-term therapy for spirituality and for health, but not a good long-term one. In other words, there is a big downside to starvation. If you fast for too long, the anti- starvation defense mechanism will kick in and drop your energy systems.

With Alzheimer's and Parkinson's disease, the energy systems are already too low, so you are just going to aggravate the brown-out effect.

One of the benefits that happens from fasting is that you go into fat-burning mode. Fat-burning mode generates more ATP than carbohydrate-burning mode. It generates more NADH than carbohydrate-burning mode.

In that interim period when you switch to fat-burning mode and your body energy systems do not yet turn themselves off because you have been in starvation mode for too long a period of time, you have all kinds of healing.

This is another theme that I talk with people about with regard to cancer and heart disease. Cultivate fat-burning metabolism. Get better and better and more and more efficient about ketosis (fat burning) so that one does not turn the test papers brown, ever—one only gets the pink color because one is so efficient at burning fat. That energy enhancement that you are getting will oppose the trends that are involved in Alzheimer's and Parkinson's Disease.

You do not want to go on a fast for too long a period because all systems go downhill?

Right. For example, one of the things that doctors ignore is the conversion of thyroid hormones. When you go to a doctor and say

> *"My body temperature is down. I am depressed. I am not sleeping well. My body temperature is low. I am fatigued all the time. I'm constipated most of the time."*

All of these are classic symptoms of hypothyroidism, or as I prefer to call it, hypometabolism, or low, sluggish metabolism. The doctor will measure something called TSH which is the neuroendocrine signal for *the thyroid system. It is what your brain thinks is the right amount of thyroid hormone. The TSH test for hypometabolism is like…*

> *Your house is freezing so you call the furnace repairman.*
>
> *They come in to check your thermostat and say*
>
> *"Nope. Nothing is wrong with your furnace. Live with it."*

It just doesn't make any sense. If you are lucky, your doctor will measure your T4 which is one of the two hormones (T3 and T4) that are produced that have the most thyroid activity. T4 is the one that is produced to the largest degree. Eighty-five percent of your thyroid hormone production is T4, so the extra-service doctor measures that one.

Well, the problem with the T4 test is that it really doesn't tell you what is going on with your metabolism. T4 can either convert to T3, which is four times more potent than T4, or it can be converted into reverse T3 (rT3), which has no thyroid activity at all. So, the difference between T3 and T4 is like supercharging your motor or punching a hole in your gas tank. The doctors TSH and T4 tests don't measure that.

How can you know whether you have hypometabolism from inadequate thyroid hormones if you don't asses your T3:reverse T3 ratio? I have run across only two clients in decades of consulting that have ever had their T3 and reverse T3 assessed before they came to me.

Then there is a secondary problem beyond that. The response of the tissues to your T3 or T4 is not assessed by testing. There is no good test for measuring that.

How can you tell whether your grandfather is able to hear you if all you do is measure how loud you are talking? You do not know whether your *grandfather is deaf and is actually able to hear you unless you measure your grandfather's response to what you say to him. The same is true of thyroid hormones. If you do not get energy from your thyroid hormone, your thyroid hormone isn't doing its job.*

There is something called a thyroid trial you can do where you just take thyroid hormones, even though your tests may be all perfectly text-book normal, or maybe they are low normal, you just start taking thyroid hormone. You look to see,

- *Does your body temperature go up?*
- *Does your cognitive performance improve?*
- *Does your strength go up?*
- *Does your stamina go up?*
- *Do you feelings of well being improve?*

All of these things are indications that you are deficient in thyroid and the added thyroid is now making you healthier and making things work better. Positive responses are clear evidence that all of this testing that could have been done but wasn't done really isn't telling you what you need to know.

Much of what you say recommends an experimental approach using yourself as the subject.

Right. Empirical self-care.

You try something. See how it works. You can either drop it or keep it. If we have two individuals and the first individual says
"I have to spend another three months evaluating options A, B and C because I am not sure which one is best for me "

versus the second person who says
"Well, I have option A, B and C, and D, I do not know which one is going to be best and I don't care. I am going to randomly choose one and start with it".
Are you saying the second person actually has the better strategy?

I would say not. On one level you are right. That level is the opportunity cost. But there is another issue called cognitive dissonance. You have to do things in ways that are comfortable with whatever your process is.

This can be really awkward with Parkinson's and Alzheimer's diseases because, oftentimes, with Alzheimer's Disease, your mind is so compromised as the patient that somebody ***else*** *is making the decision for you. That is oftentimes a family member. Different people in the family will have different criteria for what is the proper decision-making process to go through to become comfortable with whatever it is you are about to do.*

I, for example, am perfectly comfortable trying all kinds of things. I have been experimenting on myself, taking nutrients, trying herbs - you name it. More than half of the stuff I have written about in newsletters and books, I have actually taken myself, personally. For me, that is comfortable.

Somebody else can look at me and "You're nuts! Just plain nuts." So...

- *You have to be true to yourself.*
- *You have to be true to your spirituality.*
- *You have to be true to your knowledge.*
- *You have to be true to your emotions.*
- *You have to operate in concert with yourself.*

In a social context, when there is more than one person involved, you have to be tolerant that somebody's else's decision making process may not be the same as yours.

You clearly are a pioneer, an experimenter, an inventor and you have a number of interesting projects going. Could you talk a little about those?

When I went to school (Reed College, a west-coast Ivy League college, a really challenging environment, a top-notch educational opportunity, a place to learn how to think, how to investigate things, a wonderful experience), I went through a program of organic chemistry. But I didn't become a practicing organic chemist. I went sideways into nutrition. My grandfather died of Alzheimer's disease while I was in college. So, I was interested in gerontology. But at that point in time, gerontology was all about more efficient ways of "warehousing" old people. That wasn't my interest.

That was the "evil side" of gerontology. I decided to look at the mechanisms of Alzheimer's disease, and spent 30 years at this. It was not until 2001 that I ran across the definitive work that gave me the insight to know what Alzheimer's disease was all about and how you can prevent it and reverse it.

During that time I was doing nutrition, consultations, formulations for dietary supplements, advising people and companies about their programs. In 1990, two of my colleagues wrote a book called Smart Drugs and Nutrients. It was very successful. One of the authors went on Larry King Live. It was like,

> *"People are really interested in this stuff, my bread and butter and they are going for it."*

In 1992, I started the Cognitive Enhancement Research Institute (CERI), with their considerable assistance, and began codifying all of these insights into

- *how the brain works*
- *how the body system works with the brain,*
- *how health mechanisms of nutrition help*
- *how the body works*
- *how you can give the body what it wants*
- *how you keep it away from things that poison it*

That was a left turn from my academic organic-chemistry background. Then I made another left turn, into nanotechnology. Although I was interested in nanotechnology, I was not going in that direction. But then an Oakland company that was doing biotech research hired me, and gave me a problem that took me back to my original chemistry days. In solving this problem, I invented a polymer. I did not know that I had invented a polymer at the time. I gave the company a solution. This is going to work for you guys. As I later found, the polymer was new. There were no patents on it. It was not in the literature. It was a new invention. The company patented it, but decided not to develop it.

So I bought the patent and started another company to develop it. So, that is what I have been doing for the last 5 years. I am now back on my original course, organic chemistry, which I did back in the seventies. I am doing nanotechnology development with these nanostructured polymers that are an inspiration from biology. I took my knowledge of how biology does nanostructure, I took some of those biochemical features of biology and added them to industrial polymer backbones to *make an industrial polymer that has the self-assembly capabilities of biological polymers.*

It was so simple. The core invention was a one-atom analog of Kevlar which is Dupont's super fiber for making bullet-proof vests. It was amazing to me that a one-atom change from Kevlar had not been seen or patented by Dupont. It took me many months to come to understand how other scientists could not see something so simple.

Dr. Kreimer gave me this problem. Three weeks later I have this invention. It took me three weeks, one day a week, three days to invent this thing. It was sitting there. Anybody could see that this was going to work and nobody had seen it. So, that is what I have been doing.

We now have a core new-materials company. We are using these industrial polymers to build nanostructured parts. We have a second company working on applying these nanostructured materials to batteries to make more efficient and lower-heat batteries.

This technology might apply to electric cars?

Yes, and personal electronics. The application that everybody is focused on now is transportation—cars and vehicles—where the weight of the battery is not going to limit the car to only 20 or 40 miles.

A third company is about using nanotechnology to mine gold in a way that is ecologically friendly so it does not pollute or destroy the value of land when you mine the gold. Currently, this can be done with cyanide. But we think we can do it using compounds that are biodegradable, so it won't poison the land. That is important because California is in deep financial doodoo. It is sitting on 90% of the gold that started the gold *rush. It is still sitting in the ground. California badly needs to get that gold out of the ground.*

You are sitting on the financial solution to the problems that California and the rest of the country face?

Yeah, better mouse traps all around.

How would someone get in touch with you?

The www.CERI.com website is a really good way to immerse yourself in the kind of ideas and concepts we have been talking about. It is a good thing to get familiar with it. People can also get directly in touch with me at CERI at 650-321-CERI. I have my nanopolymer phone number 650-321-6670. And I can also give out my CERI e-mail address: fowkes@ceri.com

You may get calls from people who want to know more about getting gold out of the ground in California. You may get a call from people who want a consultation from you. Do you still do consultations?

I do them as I have time to do them. At any given time I may have a dozen clients or so who are consulting with me on different issues. I am pretty picky who I take on. But, mainly I am looking for self-motivated people who like the self-care option.

- *They like being in charge of their lives.*
- *They like knowing the context of the decision being made and the advice they are being given by their doctor.*
- *They like knowing what it all really means.*

I like self-determinant people, who have high self-esteem and a belief that they can make a difference in whatever their issue is and a willingness to do things on their own, to take supplements and to measure themselves, and to read stuff, to ask questions, and those kinds of traits.

You mentioned to me earlier a quite fascinating study of animals to see what extent constraints would have an effect on their health. Could you explain that little study for people as a way of concluding our discussion?

It illustrates the issue of helplessness. If you grab an animal, like a rat or mouse, the animal freaks out and wants to get away. It struggles. If you release the animal when it is still struggling, it is left with the message that struggle leads to a solution. That is hopefulness.

If you hold on to the animal until it stops struggling and then let it go, the message is: Struggle is useless. There is nothing they can do to escape the capture, the torment, whatever it is the grabbing constitutes.

So, if you look at those two animals, the animal that you let go before it stopped struggling, that animal lives an almost normal lifespan. The animal that you grab and hold onto until it is helpless and stops struggling dies very young.

That message is about the belief that your action is actually going to make a difference. Doing something is better than doing nothing. Being proactive is better than being passive. You can look at it:

> *Exercise is better than being a couch potato*
>
> *Reading is better than just randomly deciding things on your own.*

There is a far different set of behaviors that are associated with that.

I also have seen this in clients during my HIV-positive volunteer days. Those people who were developing AIDS (advancing from HIV positive to full-blown AIDS) who went off to seek the cure of the month, such as…

- *cucumber extracts or*
- *BHT or*
- *acupuncture or*
- *selenium supplement or*
- *antifungal drugs*

They would go off, look at the literature and then go after it. Those people lived for years.

The people who just accepted the doctor's advice, took the nucleoside drugs and passively cooperated with the system died young.

That told me that attitude was a key issue. It wasn't the specific therapy that was chosen. It could be anything. It could be at the top of my "flaky" meter and still seem to significantly extend their survival, even double it or triple it. That taught me

You need to believe in what you are doing.

You have certainly motivated me to take action. This will be a genuine inspiration to many people who listen and read this discussion.