Tim Guilford, MD: Vitality, Energy, Detox – Your Need for Glutathione

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Bern: All right. Our main speaker is Tim Guilford, MD. Doctor Guilford is both a clinician and a researcher. His education includes John Hopkins University for the undergraduate degree, the University of Texas, medical branch, for medical school, two years of general surgery at general at John Hopkins Hospital and an ENT surgery residency at the University of Michigan and board certification in ENT. Dr. Guilford has been in practice since 1979. He's a researcher and an expert in glutathione.

Tim Guilford: I'm on. Sounds all right. I'm actually ... I kind of wonder about myself when I hear all that basic education that I had. I wonder how I ended up doing what I'm doing. Not long ago, amongst the many things that I've learned along the way, I have been using homeopathics. One day, not too long ago, my wife turned to me and she said "You know, after all the years that we went to medical school and two years extra surgery and all this type of thing," she said "Did we do all that so you could put drops under people's tongue?" I just looked at her and I said "I've never thought about it." I said "It really puts everything in a different perspective," but that's what I've done.

Along the way, I thought I would try and do something that I could show worked. A lot of these subtle mechanisms that we touched on briefly have affected people very profoundly, but it's very difficult to do a study within the model that medicine has required, a double-blind study, for example, because not everybody needs the same thing and the same dose, for example, with homeopathics. It's very difficult to do a study, yet there are many studies showing homeopathics do work. Along the way, I decided I would do something that you could demonstrate actually was real and was there.

I helped formulate a liposome encapsulation of glutathione. Glutathione can come in a powder, and it's been around for 125 years. It's been sold to the health food stores for about 40 years. There have really not been many studies showing that plain glutathione taken orally can have an effect. I decided to put it in a liposome and began doing studies to demonstrate that it had an effect. I'll show you a few of those. I think we're gaining more information all the time. As you gain information in the basic science, first everybody says "Well that was just cells," so you move to animals, and they say "Oh, that's just animals." They forget that humans are animals too. We're now approaching the stage where we've shown benefit in people. We actually have a study done in children that shows that taken the oral ReadiSorb glutathione, which is the product I've worked with, and that's the one that I'm going to draw the information from. I'll not give you a persisting commercial.

I may refer to it as just plain liposomal glutathione in a generic sense, but they're not all the same. As soon as I start into that mode, then everybody says "Well what about this attribute? What about that?" All I can do is talk about the one I've worked with. That's what I plan to do. If you generate any questions, this is my email. The other thing is we have now eight published studies, peer-reviewed, published studies. Oh, yeah.

I took those studies and about 10 other studies that I've now been involved with publishing, some I was just a co-author, and some I was a primary author. I put those at drguilford.com. When you get there, you'll see your little index at the top you can press and see the papers. Many of them are online. If they're not, just write me if you're interested. I'll be happy to forward a copy of the paper for educational purposes.

The other thing, if you want to join the newsletter that we send that keeps people up to date, I'm hoping, I know that two different papers from two different university studies are going to be written up at the end of this month. When they'll be published will depend, of course, on how quickly they're accepted. I've learned that in science, you can't predict anything. I've learned all the hard way. Anyway, you can go to ReadiSorb. In the contact area, you can put your name in and it'll put you on the email list if you're interested.

I also want a bit of housekeeping. Over the years, one of the things I got interested in was what's called chelation with EDTA, a material that binds metals, especially lead, for example, and pulls it out of the body. I've offered that to many people and been gratified to see benefit in a lot of people, particularly people with chest pain, for example, from exercise, but they were not at the point that they needed therapy or mainstream surgery. I always recommend that people get a cardiology consult before I offer them EDTA, for example. This has been around for 50 years and it has generated a lot of controversy over the years. I wanted you to know, have you heard of the TACT trial? This is a ... it's something about chelation therapy. I forget the first portion of the acronym, but you can look up TACT trial, EDTA, chelation. Here's the primary author, [inaudible 00:05:50]. It was just published 2014. It was done last year. They actually broke the code on the trial, because there was concerns about safety. It turned out that EDTA chelation is safe, and infusion of EDTA is safe. There were no major side effects.

They were using people that have had previous [MI 00:06:15], because people that have had one MI have a very high risk pattern of having a second MI. They used that group because they would have a fallout that they could measure statistically. Anyway, it showed that there was definitely a benefit - 28% of people improved, and they were just using endpoints. They weren't looking at metals. Why they didn't look at lead, which is why EDTA was originally cleared through the FDA, I don't know. If you have diabetes, you had a 38% improvement in significant side effect, like second MI or death, or stroke, stuff like that. It was shown that it had benefit.

There's a fellow named Roy Heilbron, who's a cardiologist. He actually was in his training [inaudible 00:07:03] from University of Miami. Heilbron was in the training and was involved in that study, and has gone to use chelation in his practice and has written at least one book, which I'm showing you here, Roy L. Heilbron. H-E-I-L-B-R-O-N. Showing the benefit of chelation in [inaudible

00:07:25] heart disease. Also, here's the title of the latest book. I would urge you to look into that. In a way, it's a vindication of things that I've chosen to get involved with. It finally is a trial showing that it's safe and efficacious. Of course, they need more work. That's the standard response from mainstream cardiology. It only took $30,000,000 to do this study, so it's a pretty big deal to get these kinds of things done.

We're going to talk about glutathione tonight. Just basically, it can work directly as well as this unique antioxidant can work with enzymes. This is what separates it from other antioxidants, in my opinion. It turns out that every nucleated cell on the planet makes and uses glutathione, plant and animal. It's really fascinating in that regard. It works, also, in the detoxification of reactive oxygen and nitrogen species. I'll talk to you about that. That's a little bit of a summary. It shouldn't surprise us that you're going to see glutathione deficiencies or dysfunction associated with many health conditions, starting with cancer, diseases of aging, cystic fibrosis. They're missing the enzyme that carries glutathione into the lung. [inaudible 00:08:58], cardiovascular disease, inflammatory disease, immune diseases, and neurodegenerative diseases.

When I started reading about glutathione in the mid-90s, I became fascinated with it, because I had run an allergy immunology lab prior to that. Although I trained in ear nose and throat surgery, I think understanding the basics of inflammation are really important. Glutathione, when it's low, will skew cells towards chronic inflammation, which includes allergy-type systems, and is even involved with autoimmune diseases. You'll see more and more about that with glutathione over time. At the same time, I was doing chelation for people and wondering what was the problem that caused mercury to be toxic. I went to the library, back then pre-internet, you know, I used to roam around the library at midnight, and found that the first article and the major thing that they showed with mercury is that it depletes glutathione.

All of a sudden, my two worlds collided. It started me on a journey that I'm still on today. I spent a lot of time reading about glutathione. Depletion of glutathione, if you're a speed reader, you can read all this, you can see that it influences inflammatory potential, dysfunction of intracellular signaling, including P-53. Each of these is very important. I just want to show you that it's involved in the blockade of the methionine cycle. We'll talk about that a little bit. In other words, glutathione, and I'll show you these cycles, which is the end product that starts with the methionine cycle, can actually, if it's not available, slow that cycle down.

Since the time I started reading about glutathione back in the 90s, this starts in 1995, I've been working for 10 years with the liposomal glutathione product that I work with, since about 2004. The number of articles under the single word search glutathione in PubMed has gone from 10,000 up to 115,000 articles. I don't know how you're going to catch up if you started reading about glutathione. I used to read all night. Now, I just read day and night. When you

look at it as a detoxifier, it takes care of both xenobiotics, that's from outside, and endogenous compounds. I'll show you that again. It facilitates a plasma membrane transport of toxins by these four different mechanisms. I'm not going to go into all of that, but that's the real key with glutathione. It's both an antioxidant and a detoxifier. Your cells make it. As long as you're making it, everything's fine.

The PubMed article that I mentioned, the last one, it was number 115,000 zero 1-5, was titled Degradation in Urban Air Quality from Construction Activity and Increased Traffic Arising from Widening Roads. That would be, I couldn't figure out, I mentioned that to somebody. They said "Well it came up under glutathione, right?" I said "Yeah." They said "Well look at it." I read the abstract and it says that it puts stress on your glutathione-related antioxidant, our oxidative system. It reminded me of an article I read a few years ago, which showed that the closer you live to a road, this was in England, the higher concentration of carbon particles they can find in your lungs and in your blood. They used people with type two diabetes, because they seemed more susceptible. Type two diabetes and type one have been shown to be deficient in glutathione. One of the articles that is coming out from a university group that I work with will go into the mechanisms of this loss.

Anyway, these people had an elevation of oxidized LDL. What's oxidized LDL? That's the oxidation product from regular LDL cholesterol. It's been shown to deplete glutathione and the reductase that's really important. I'll show you that cycle, so I need to move along. It promotes chronic mitochondrial dysfunction. That should sound familiar. If you increase the glutathione present, and that's what they did in this study by increasing the function of glutathione reductase, which recycles glutathione, they could change the mechanism with oxidized LDL. It's the major lipid found in atherosclerotic lesions. It's the trigger for atherosclerosis, and that's been acknowledged by a number of studies now, a major risk factor for atherosclerosis.

The first study we had done with the liposomal glutathione I worked with showed that if you put the product into the blood, taken from a healthy person to whom they had added a lot of excess copper ions, that can create oxidized LDL. If liposomal glutathione was present, it reduced the lipid peroxides formed by 90%. If it wasn't present, of course, there was no change. It happened between one and two micrograms per ml, which turns out to be achievable with the oral liposomal product that I work with. It doesn't take very much. Anyway, it showed that the macrophages from these mice, this was done in mice, [inaudible 00:14:35] we knock out the lipo protein carrying agent APOE was removed so these mice get atherosclerosis prematurely. It showed that they had an increased HDLD-induced cholesterol e-flux from their cells, significantly higher than in the mice consuming liposomal glutathione. That resulted in a reduction in the cholesterol mass in these macrophages. That's important, because that's what causes the lesions, they call the fatty streak, the beginning of atherosclerosis. It reduced the atherosclerotic plaque in these mice by 30%.

We don't have a human study, so I can't make any recommendations. I do want to say I'm not making any claims for treatment or diagnosis, you know, that standard FDA warning, in any of the things I talk about. Chronic exposure to these various materials in our world is met by an increase in glutathione. In fact, that's what happens when people train for marathons, for example. The total glutathione increased at 20 weeks of training, but by 40 weeks, it went back down to normal. It developed a whole mechanism to manage this. At first they were oxidized and stressed, but your body can respond to this. It's also interesting that glutathione has transference activity. It went up and stayed markedly elevated. I'm not sure why. Maybe they're breathing in, maybe they jogged by roads, for all we know. That wasn't in the study.

It's also interesting that riboflavin content of the [inaudible 00:16:08] blood cells increased by 40 weeks. I'll show you where all these different vitamins plug into the production of glutathione. There's a bunch of diseases associated with low glutathione. I mentioned those, and there may be a few others in this list. I'm going to talk on cancer in a couple of months in regard to oxidation stress. Diseases of aging, we're back to some of the ones we already mentioned before. When you're deficient in glutathione, it's a standalone marker for a number of these conditions. I mention, well we mention the pollutants are removed primarily by glutathione and other mechanisms.

I've also got to publish an article that came out this year that shows that mycotoxins, the toxins from molds, part of their pathophysiology is the depletion of glutathione. I'm really proud of this because it took a lot of work to write the article and it took even more work to get it published, because it wasn't so much contentious, but they wanted me to review a lot more literature. I had already thought the article was much too long. I'm recommending it. It's online and you can find it with my last name and mycotoxin. It'll come up on a search engine, usually the first one. It's a little esoteric as far as the mechanism. It's really fascinating to see how these mycotoxins work if you're into the science. It's a very nice review of the formation of glutathione, so if you miss something in my presentation, then you can go to that resource and read about glutathione there.

As far as detection of mycotoxins, they become important because it's been shown that that occurs in fatigue syndromes, including fibromyalgia and lime disease. People with these problems, lime disease symptoms have persisted in spite of antibiotic therapy. These mycotoxins were shown to be present in the urine of people with criteria. That's an emerging area that you might not have heard about before. Very few physicians are familiar with the effect from these mold toxins. This is the way molds cause problems. I think they play a big role in allergy in general, but that remains to be proven.

Everything's fine with glutathione because you're making it and you're healthy until something happens. What could happen? You can have a modification of the oxidant stat material, a protein that turns on the production of glutathione

that's released when there's too much oxidation. This occurs in chronic asthma. You can have SNPS, single nucleotide polymorphisms in the enzymes that put glutathione together with cysteine and ligate them. You can have SNPS in the GSTs. GSTs are the ones that is commonly tested, single nucleotide polymorphism, SNP. There's three of them and about 40% of us are missing at least one of them, the GSTM. What that net result is that your glutathione system doesn't work as efficiently. Those enyzymes, I'll talk to you about that in a minute. Then transforming growth factor beta is increased with a lot of inflammatory diseases. It's in congress, but for some reason, elevations of TGF beta can shut down the formation of glutathione. We have a published article that talks about that occurring in HIV disease, for example.

They show that if you give the whole molecule of glutathione with a liposomal glutathione, you can get a significantly improved response. Glutathione as transfer [inaudible 00:19:55] works like a matchmaker introducing glutathione to the toxins, both physiologic metabolites and xenobiotics. I mention that because that gets back to attaching glutathione to mercury, arsenic, or lead for removal from the cell. That's how these things get out of our body. Methyl mercury takes one glutathione molecule and attaches it. The body thinks that there's articles that have shown that it looks like the oxidized form of glutathione, which is exported out of the cell into the bloodstream, carried to the liver, and then removed through fecal excretion. When you're doing these detoxification exercises that Susan talked about, be sure you have normal bowel function and you're keeping your bowels moving normally with both the standard recommendations of fibers, but I use vegetables a lot. I just tell people to eat a lot of vegetables. That seems to help. Drink water, and magnesium; magnesium is really critical for bowel function. If you're having to strain at stool, you need a little bit more magnesium. It may be an irritant effect in the gut, but it also suggests the individual was low in magnesium.

Glutathione itself is a straightforward molecule consisting of glutamine, cysteine, and glycine. The cysteine is the active component in the middle of this structure. It's got a unique platform that allows it to remain stable in the cells. The cysteine in this form has an available hydrogen that can be released along with an electron. That's where the antioxidant effect comes from. When it's oxidized, two glutathione prefer to, each glutathione to grab the other, and there's a double bond between the sulfurs that are formed. This is the acronym, you know, the abbreviation, reduced glutathione and oxidized glutathione is GSSG. To think of free radicals, some of the early work in forming free radicals was using ionizing radiation, which splits a hydrogen off of an OH radical. Well, what does that mean?

That OH wants to grab another hydrogen. It wants to be stable. It'll grab hydrogen from wherever it can. These polyunsaturated membranes in our body have the hydrogen less attached at the sites where the double bonds are. They can grab that hydrogen off there and create a free radical. That can in turn create a chain reaction along that membrane until something comes along that

will stop that. Vitamin E can stop that, but glutathione and the peroxide of glutathione play a big role in stopping that changed mechanism in the formation of these lipid peroxides.

Reactive oxygen species will attack membranes, enzymes, proteins, and nucleic acid. That's where these problems come from. It took me a long time to figure out a way to describe what a free radical is. You read about it, but you don't really ever understand it. Most of these free radicals, reactive oxygen species come from the mitochondria themselves. There's a whole mechanism there, but it's also involved with, iron and copper happen to be in the mitochondria. That's through a reaction called the Fenton reaction. There's not going to be a quiz, but that's the answer for the quiz. In the mitochondria of the cell, that's where your energy is produced. That's also where you're producing the most, majority of your free radicals. It happens to also be a focal point for iron metabolism and cadmium, happens to affect the mitochondria also.

It turns out, when they infuse mercury into cells from liver cells, it turned out they used in this study, that they found the mercury seemed to attach preferentially to the mitochondria 48%, 36% of the nuclear membrane, and only 8% was in the cytosol. That's one of the reasons mercury causes so much problem. It attaches to these mitochondria and creates problems. Mitochondria actually import glutathione preferentially. Without glutathione, mitochondria don't work well.

All of these free radicals are made inside the mitochondria. The OH radical and the even more tough one, if you were socked with the hydroxyl, you go "Oh." If you were socked with the peroxynitrite from nitrogen, you go "Oh no." That's an easy way to remember it. All of these are neutralized by glutathione, including hypochlorous acid, which is made when your neutrophils start attacking cells it's released into the environment to kill the invading cells. The normal cells need a way to neutralize that excess free radical. This is happening a lot in the body. You get four million hydroxyl radicals made in each cell every day. You can imagine the number of times this is happening. It's phenomenal. Don't think about it, because you'll tire yourself out. It's just happening so much.

What's happening here is this peroxidase enzyme is facilitating the introduction of glutathione to this OH radical, and that hydrogen and the electron are then handed off to the hydroxyl radical to create harmless water. This is happening repeatedly. You need the enzyme, and a lot of studies don't talk about this. They'll talk about the presence of the enzyme, but you also need the availability of reduced glutathione for that to happen. If your mitochondria can't get enough glutathione, you can lose the loss of the mitochondria completely when glutathione is depleted. That happens in a lot of conditions. Just briefly, I'll respond. Go ahead.

Speaker 3: [inaudible 00:25:52].

Tim Guilford: There are portions of the Krebs cycle that are interfered with oxidation stress. Those enzymes won't work, yeah.

Where do we get our glutathione from? We make it. It's made starting with methionine cycle. Methionine goes to the [inaudible 00:26:11] methionine sam-e and SAH and homocysteine and then folate and B-12. It goes around in that cycle. I guess I could use this and advance it, yeah.

That's where your MTHFR snips occur that you're all familiar with, that prevent the folate from handing off the carbon. The methionine cycle's just a migration of carbon around that cycle. If it doesn't get a methyl group carbon handed off to B-12, it won't function properly. When it goes around properly, then the body will make cysteine from that, which can then work with glycine and glutamine to form glutathione. When this is blocked, you can have problems, but also, it's not well known or talked about, but if you don't have enough glutathione, you can't make the methyl B-12 properly. That occurs because glutathione will sit as an intermediate between B-12 hydroxy cobalamin or, yeah. It becomes glutathionyl cobalamin when its sites are opened up. Then something else could get in there and prevent the formation of methyl cobalamine. When glutathione is present, it will allow that whole cycle to go. That's where they were talking about, blockade of the methionine cycle.

More and more interest is developing on these enzymes, the glutamyl cysteine ligates, glutamine and cysteine are ligated, tied together. Glutathione [synthates 00:27:58]. Glutathione [synthates 00:28:02] can be blocked by mercury. I had a patient who presented his chronic fatigue. It was due to a diagnosed epstein barr infection. The parents brought him to me, finally. He was being homeschooled and not doing well. I put him on the liposomal glutathione and his allergies cleared up right away. We can go in, I don't have this in the talk, but the antigen presenting cells I mentioned, if they don't have enough glutathione, then you get chronic inflammation. I thought he was better, but the mom insisted he wasn't. He still had a large spleen, so we continued. We eventually found that he had an excess of mercury. I also happened to run a neurotransmitter test that ended up looking at his taurine in the urine, and his taurine was four times higher. I was working at that time with a lab that could measure glutathione in the plasma. His plasma glutathione was low.

We detoxed him for mercury, kept him on the liposomal glutathione for another six months, and as that mercury came out, his glutathione level went back up to normal, and his taurine level went back down to normal. I think it's a classic example of this pathway, because cysteine preferentially goes to glutathione. If it has to, it'll go on and form taurine. It's really fascinating. Anyway, he's done great. He went back and did full athletics and full school. I happened to bump into his parents on an airplane three years later, and they told me how fantastic he was doing. I never hear about this until chance intervenes.

The other thing, while glutathione is now available, it's not run routinely through most physician's office. On my website, drguilford.com under presentations, I have a list of labs where you can get glutathione levels. You can now get plasma levels routinely. It wasn't so routine until just, it's just becoming. One thing you can get is your GGT level, that's gamma glutamyl transpeptidase. What that is an enzyme that sits on the outside of cells that actually helps bring more of the components of glutathione into the cell to be manufactured.

I'll go into that. It breaks glutathione down into its individual components, which are then carried into the cell. You need energy and these enzymes working to put it back together. That's what GGT does. When it goes up, your body is saying "Feed me more glutathione, please!" You can measure GGT in the blood. It's relatively inexpensive. It's often on a routine chem panel. If you ask your physician to run it, you can do that. If it's elevated, there's a number of causes. It used to be nobody wanted to check it because they told the patients that if your GGT is elevated, you're drinking too much alcohol, which is very possible. They kept telling a buddy of mine that, and it turned out, I found an article that shows that GGT is elevated in coronary artery stenosis. He ended up having a stint placed. It's an indicator that something's not right. That's one of the problems, it's not specific for anything except for the need for glutathione. It's elevated in many conditions, non-alcoholic fatty liver disease, especially in children it's been found. Alcohol abuse, pancreatitis, heart disease I mentioned, both coronary artery disease and heart failure.

The production of glutathione at the level where these three amino acids are put together is really critical. There's two ways to make glutathione. One is by this de novo production. The other is by recycling of glutathione from the oxidized state back into the reduced state. You can see how that happens over here with NADP. Because of its role in supplying reducing agents, NADPH is often considered an antioxidant, but strictly it's not. If I can figure this out, okay, this is happening four million times a day. This is where your G6PD comes into play. For people that are missing this enzyme, they can't reduce their glutathione again. About 14% of the armed forces now have G6PD deficiencies. That's why if you're going to take very high-dose things like vitamin C, which becomes an oxidizer, if you have any chance of having a Mediterranean ancestry or North African ancestry, these folks don't have G6BD and they don't tolerate these oxidizing stressors very well. Your blood cells can actually [crenate 00:33:00]. It also, in this enzyme system, GCL is controlled by a catalytic unit and a modifier unit. We'll talk about that in a few minutes.

A lot of vitamins play a role. I mentioned magnesium. Magnesium, when it's deficient, your glutathione is often deficient. The strange thing is, when your glutathione's deficient, your magnesium's often deficient. I don't quite understand that, but it's published. You need that, NB6, niacin plays a big role in regeneration. B2, zinc is important for regeneration of glutathione. It's a very complicated apparatus that's designed to help maintain glutathione, is the bottom line.

Pythagoras was Greek. He died in Italy when confronted by an angry mob. He had a field he could escape out the back of the house through, according to the history books, but he chose not to, because of a fava bean field, and fava beans are very oxidizing. He knew from past experience that if he got into fava bean pollen, he had a big problem. It caused his red blood cells to change form, and they wouldn't flow normally. He had a lot of pain. He turned himself over to the angry mob. I'm sure he was expecting some leniency, but they hung him, I think. That's what happened to Pythagoras. That's really kind of a fascinating bit of history.

In people with HIV, I'll go into this a little further. For some reason, and we've looked at several reasons, the enzymes that make glutathione are compromised. They're not being expressed properly. This GCL and GCLM are not being formed. The GS is not formed. The [GGT 00:34:48] is not formed. This comparing HIV to healthy. You can see the purple is HIV. The glutathione reductase is working overtime in that situation. That just points out when you're stressed, that GSR really picks up a lot of work. It's the same in the marathon people.

Nerf2 is considered the oxidant thermostat of the cell. It's a protein that's isolated in the cytoplasm and usually kept there until oxidation stress comes along and releases nerf2, it'll migrate to the nucleus, where it attaches to the antioxidant response elements, which trigger the formation of a bunch of antioxidants, including catalase and others, but also, specifically glutathione and GSTs and glutathione peroxidase. If this isn't working, you don't get the formation of glutathione. Here's where this nerf2 doesn't act directly, but it stimulates the production of these materials, including the modifying unit and the catalytic unit of GCL. When they're not working, when they're modified, you can't make glutathione properly. Let's see, I can go back this way.

This came from a study by Anne Fitzpatrick at Emory University. She looked at children with chronic asthma. This was done in small humans, not animals, small humans. With bronchoscopy, she found that in their macrophage cells and that sort of thing, that they're not able to make glutathione normally. Even in that institution, there's still in some quarters resistance to the acceptance of the fact that asthma is a low glutathione disease and might respond if you could raise glutathione in those cells. One of the problems has been we haven't had a way to get glutathione into people easily besides intravenous infusion. There's some that doesn't always work. We have a paper coming that demonstrates that in the lung, you can raise glutathione with the oral liposomal preparation that I've worked with. It's really kind of an exciting time in this evolution. Again, I mentioned you can read about the pathways that I just showed you in that article on mycotoxins.

Mycotoxins were shown, I mentioned, in chronic fatigue syndrome. If you just put up this fellow's name, Brewer, if you want to read about chronic fatigue and fibromyalgia and [lime 00:37:16], it doesn't respond. They found that if you had a

history of fungal exposure, especially water damage building, if you just put Brewer and mycotoxin into the search engine, Brewer like it sounds, B-R-E-W-E-R, you can read about that relationship. That's all new. That was just published, I think, last year. Yeah. That's an emerging new awareness of health related problems.

In people with HIV, this study shows that when you're healthy, you have an excess of free glutathione, and here, a less amount of oxidized glutathione in their macrophages. In HIV, you have an excess of oxidized glutathione. That's essentially the same thing that's shown in these, here you can't read the legend as well, but this is healthy, and then down here at this level is the HIV level of reduced glutathione. I showed you this slide before how they're working overtime with the reductase. This is really fascinating because when you take an intracellular infective material, [mycobacteria 00:38:20] tuberculosis, and you inoculate those cells, in healthy people, you don't get too much replication. This is healthy here. In people with low glutathione in their macrophages, you get a very significantly increased replication of bacteria. This points out how important glutathione is in both killing cells and supporting your macrophage function.

NAC was helpful. That's a precursor. It's a material that gets into the cells, ANS [inaudible 00:38:51] cysteine, to ten millimolar to get a reduction in the macrophage, the mycoplasma replication. Its colony-forming units per ml. It took a thousand times less with the liposomal glutathione, only five micromolar, to achieve the same or greater reduction and replication of those bacteria. It really points out how important glutathione is in maintaining your defense against bacteria. In cell culture, plain glutathione had been shown to replete cells. They used astrocytes in the cell culture that were depleted of glutathione. It took 500 micromolar to replete, to bring them back up to a normal level. It took only five micromolar of the [inaudible 00:39:42] glutathione to achieve the same. The theory here is that the liposomal glutathione, the liposome's carrying the glutathione right into the cell, does not have to be reconstructed. Where plain glutathione helps, but it has to be broken down by GGT and then reconstructed inside the cell. As these cells get compromised, you have less and less ability to do that.

This was done by Gail [Zebok 00:40:08] at the ... I don't know what I pressed, but it'll go away maybe? No.

Speaker 4: Press escape.

Tim Guilford: Thank you. [inaudible 00:40:17] thank you.

Speaker 4: You're welcome.

Tim Guilford: Gail Zebok at the University of New Jersey medical dental. She has published many papers on glutathione, including one that talks about glutathione in Parkinson's disease. She has a colon in the title. She says "Is glutathione the

elephant in the room when talking about Parkinson's disease?" We tried to get a study going there, but the professor wanted to see more animal work first. Unfortunately, Dr. Zebok decided she didn't need to put up with the NIH grant system anymore so she could retire, and she did. She's been very helpful in talking to the other researchers that have continued with this work. Finally, we had a study, this was done, I didn't know it was being done until it was published, actually, because I had sent the glutathione up to this lab for another purpose.

They showed that it helped reduce the damage in the skin from radiation, cobalt 60 radiation exposure. They had the glutathione, they put it into this study. They were mandated to look for ways to get rid of cobalt out of the body, as if it were blown up by someone who intended to inoculate a large group with cobalt 60 dust, for example. They put this into the rat, and then this is the data coming from the liver of the rat. They knew that IV glutathione would bind cobalt and help remove it. It removed 65%. Liposomal glutathione, that I work with, was able to remove 75% of that same amount. The plain glutathione, given orally, did nothing. This was done over five days. It's a relatively short period of time, but it shows you that IV glutathione would be very helpful, but it's really much more practical to take an oral form that you could take on a regular basis. There was a control. It's really fascinating. That's, well we got plenty of time. I'll keep going. I plan to cut off at ... I can never tell how things are going to go, how fast. I always tend to put in too many slides.

SNPs and that GCLM are starting to become more and more recognized. This-

Speaker 5: [inaudible 00:42:30] clear if people know what SNPs are.

Tim Guilford: Single nucleotide polymorphisms.

Speaker 5: Thanks.

Tim Guilford: In a DNA molecule, you get one from your one parent and the other from the other parent. You usually have two genes being represented. If one of them is missing, if there's a little alteration in the different amino acids that form the gene, it won't be represented on one side, or possibly both sides. If one of them is out, they call it heterozygous. If it's on both sides, it's homozygous, meaning both representations of that gene are not present. In some cases, you won't make the product, but in most cases, it means that it's inefficiently being made. A lot of people run these detoxification profiles for GST. That's been available. The ones that I showed you for the GCLM and the enzymes that make glutathione, they're not available as yet. I suspect they will be, because there are research articles that show they're deficient in a number of serious conditions, including some brain function, chronic metal accumulation, diabetes type I. This is the modifier unit.

Similar findings were found in portions of the brain in autism. This is just a couple years ago. I was going to point out these long strings of numbers go roughly,

we're now in the 2500s, so 2014, almost 2015, where it starts with 25 now. This was just a couple of years ago. They found that in portions of the brain, they were not making glutathione because these GCLM was not being expressed. They felt in those brains that it was due to nerf2 modification, similar to what we saw in the lung with asthma and children with chronic asthma.

Both glutathione and GST levels have been shown to decrease with aging. This is likely to be one of the causes of the problems that we run into after we've been on the planet and exposed to these different materials for a length of time. There's some evidence in some of these studies that show that you actually don't ... the enzyme itself is not as tightly bound to cysteine as it was when you're younger. You don't make the glutathione as efficiently. It's really fascinating. The capacity for de novo glutathione biosynthesis may be compromised during the aging process due to the lack of the catalytic activity for this GCL, the glutamyl cysteine ligates.

A variety of materials lower glutathione. Acetaminophen is one that's enjoyed a lot of publication, but you never hear about it. Were you aware that acetaminophen, you know what acetaminophen is?

Speaker 5: Ibuprofen.

Tim Guilford: Right. I don't like to use those brand names, because I don't want to [know 00:45:38] who do you want us to mess with that's a big company. They've shown that it depletes glutathione. It's just one of the things that requires glutathione. Nitrates lower glutathione such as digoxin. I notice that an article came out that Stanford showed that digoxin may not be the best choice for a long-term. They didn't say why. I don't believe they got into the glutathione part, but that's been shown. I try and show references for all the statements that I make, because these are not my ideas. I'm just passing on what's published.

Systemic lupus erythematosus, SLE. It's not a really common disease, but occasionally you'll see that it's supposedly an autoimmune disease. That's been shown that glutathione levels are actually low in that disease. I found that really fascinating. I also mentioned other autoimmune diseases, such as thyroiditis and some muscle dysfunction. A number of conditions are showing up, and you're going to see more and more about that. I mentioned the plasma levels are low in aging as well as [macular 00:46:59] degeneration in diabetes.

My last slide, when I found out that we were going to have a second speaker, I went back and I found an article that I had presented before at a hormone meeting that shows that the cells that make testosterone in both young goats and old goats won't make testosterone as efficiently if they don't have glutathione. It shows the importance of having glutathione around, especially if you're an old goat. There are some comments that when you just replace testosterone, you may be increasing your oxidation stress. I don't know about that.

Just as a reminder, if you want to be kept up to date on the latest research, you can just put your name into the, there's a little form you fill out with your name and your email. We'll be happy to keep you informed. That's what I had planned to talk about. I appreciate, it's been a real honor to address this audience, because I know you folks are very well-informed. I've known Bern for years and Bern [inaudible 00:48:11] is an expert in many areas. It's a real pleasure for me to present the research that I've been involved with. I hope it's understandable, and I'm glad I got to do it with slides, because trying to do this without is not possible.

Bern: Do we have questions?

Speaker 6: [inaudible 00:48:32] were you saying [inaudible 00:48:34] oh I'm sorry.

Bern: Never talk without this mic.

Speaker 6: Sorry. Relative to vitamin C, your comments, is vitamin C a, causes oxidation, are you saying? I always thought it was healthy to take a lot of vitamin C.

Tim Guilford: Bern, you want to answer that?

Bern: Vitamin C does convert to an oxidized form.

Speaker 7: [inaudible 00:48:55].

Tim Guilford: I want permission to-

Speaker 8: You've got to go back to the "why" man, you're slow.

Tim Guilford: I want permission to follow up.

Speaker 8: It does oxidize. There is an oxidation factor to vitamin C. Glutathione and alphyl [inaudible 00:49:09] and vitamin E recycles it back. That's why you need both. Another thing, a very interesting thing he said about mycoplasma, which is true. If you're going to do any form of treatment like vitamin C or anything like that or ozone, do the glutathione prior. Otherwise, it won't work as well. Something about glutathione prior to having an ozone IV, and I spoke with Robert Rowan about it and Frank. It actually enhances the effects of the combination and does reduce mycoplasma and mold, which he's actually right. Always do the glutathione first.

Tim Guilford: I appreciate that comment in several areas. If I said mycoplasma, I was referencing our studies in mycobacteria tuberculosis. You're right in mycoplasma. Glutathione helps break down especially the elemental body. I'm thinking of chlamydia, that it works in chalmydia also.

Speaker 8: [inaudible 00:50:07] bacteria [inaudible 00:50:08] viruses, it has a better effect prior to any form of treatment.

Tim Guilford: Thank you. I'm glad you said that. We're going to have some data on-

Bern: Did you define liposomal?

Tim Guilford: Liposomes are, thank you, a lipid shell that has been enclosed around a fluid. I guess I didn't put a slide in there to show that. I don't know why. It's made with the same type of materials like [inaudible 00:50:37] choline that makes up the cell membrane. It looks for all the world like a cell when you take it in the oral form. The advantage with liposomal glutathione is it stabilizes the glutathione and keeps it in a reduced state and allows its absorption. These lipids are actually the liposomes actually taken up. There are studies that show it will pass through the mucosa in the top part of the stomach, for example. It goes in long before the digestive system ever sees it. Then it goes into the lymphatics and the lymphatics dump through what's called the thoracic duct, those of you who took anatomy, into the superior vena cava, the big vein going into the top part of the heart. The liposomes get distributed very quickly into the blood system, then they're taken up by macrophages, and we've also shown that goes directly into cells.

That's why the liposomal glutathione that I work with, the ReadiSorb, has had a chance to get into the system before it's digested or gets involved in the digestive pathways. That's why I like it in a liquid. We recommend taking it on an empty stomach, because it seems to stick to foods.

Speaker 9: [inaudible 00:51:56]

Tim Guilford: Liquid.

Speaker 9: [inaudible 00:51:58]

Tim Guilford: No, I didn't bring one, but it's a liquid and you can mix it with juice or water. It's stable. It's in water already, so it's stable in juice or water and absorbs well, but you don't want to take it with solid food.

Speaker 9: [inaudible 00:52:15]

Bern: Hello.

Tim Guilford: The question, let me repeat the question. The question was "You can start with a few drops and work your way up to one teaspoon twice a day," is what I use for a target when I'm seeing people that have problems that I think need to have support of their glutathione. This lady has a microphone. She's in charge.

Keke: Hi Dr. Guilford, thank you. This has been fascinating to watch your presentation. My name's Keke Corbin and I'm a certified traditional naturopath. I've been studying this and the effects of the pesticide residues on foods now for about two years. It's like I've been back in college again.

Tim Guilford: Right.

Keke: I've gotten to know all the researchers, not just in this country, but everywhere, asking a million questions. What I'm noticing in my practice over the last 20 years is that we really need to give the body the forms, the end forms of supplements rather than try to interrupt all the things that are being interrupted by environmental toxins. Your product, I've been reading about it now for about over a year, I think, all the science on your site.

Tim Guilford: Oh, thanks.

Keke: Yeah. It is good. Yeah, it's so helpful, because we've got to find a way to increase glutathione. Everyone, everyone I think is getting, it's interrupted, just because we're all polluted, basically, for lack of a better word. What I've been noticing, I've been talking to the researchers that are working on glyphosate toxicity, which is RoundUp.

Tim Guilford: [inaudible 00:53:59] phosphate. Yeah, go ahead.

Keke: Yeah. So many of the parts of that whole cycle you were showing, like for example, it binds to minerals. It also interferes with mineral transport, you know, making sulfur into sulfate. Just that alone, I've been wondering, how in the world are we all walking around still being able to function with what's in all of our bodies?

Tim Guilford: I bet we've all got that glutathione reductase revved up and that whole system working better. You're running a marathon. I'm going to make that point at an upcoming conference I'm going to present at, make the point that these toxic materials are piling up, and I think we're all running marathons. Everything's fine until something in that system doesn't work. That's why I showed you what can happen, including the mycotoxins which have been really overlooked.

Keke: Well, and the tipping point, you know. We get sick when we hit that tipping point. Before the tipping point, our whole body's suffering. You're showing the statistics.

Tim Guilford: I'm glad you said that. I wish you could say that on the microphone. I'll let you say it again. Next question.

Speaker 11: Hello, yes. Former patient of yours. I had EDTA chelation years ago. I was wanting to find out the thing about uranium radioactivity. Would the glutathione be something that's very necessary to help your body clear that?

Tim Guilford: The normal way the body responds to radiation is to up regulation of glutathione. As long as the amount that you receive is in such a dose, amount that you can respond to it, you're fine. Where it runs into problems, you're back in the marathon race, and you're also then overwhelmed with a big, heavy dose. That's why people feel bad when they take radiation therapy in the past. They're getting a big dose of radiation. Look at the symptoms people have had. They get redness on their skin, but they get fatigued and tired and susceptible to infections and things like that. Glutathione's being depleted.

Speaker 11: Mine was environmental. I should say on the job exposure. The other thing I wanted to ask real quick is, as far as a copper, heavy body burden of copper-

Tim Guilford: Right.

Speaker 11: And [detoxication 00:56:24] for that. Is there anything that would relate to glutathione?

Tim Guilford: Definitely you should support your glutathione system if you suspect an elevation of copper. There are copper chelating and reducing agents. EDTA doesn't generally pull copper. I think a material, yeah, penicillin does and another material called DMPS that I've worked with will pull copper.

Speaker 12: Zinc. Zinc is the best chelater for copper.

Tim Guilford: Thank you. The comment was to displace it with zinc.

Bern: One of the questions I've always had, if on a Sunday afternoon and you're driving down, you never stop by the hospital to get a shot of chemo or radiation. When you're sick, you can't wait to get some of this good stuff.

Tim Guilford: I'm going to talk about that at an upcoming conference. It's another, I've got another too many slides, but I'm happy to see I got through what I got through, because it gives me courage to present all the slides. It does address the accumulation of toxins that have been documented to occur and create yet another oxidized agent in fatty tissue. It's called 4HNE, if you run across that. I don't want to go in to try and explain. I can't remember the full acronym. It's another product of past oxidation past oxidized LDL that has been documented to occur in tissue taken from healthy people, young people. They intimate in this article, I don't want to go into it because I don't have the reference, I want to give you the reference. It was done in the University of Pennsylvania in Hershey, Pennsylvania. They've worked on it for quite a few years, and they show that this leads to changes that are associated with a caner phenotype. I'm going to talk about how that leads to the metabolic process we know as cancer. It begins to demystify a lot. Most of the time when you're given a diagnosis, just like you were alluding, Tom, to taking a heavy oxidation, it really questions why that has been in use. It's just become a habit. Yes.

Speaker 13: Dr. Guilford, I've run across some literature that makes a distinction between glutathione that's used at an extracellular outside the cell, and another type that goes inside the cell. There's products out there like [inaudible 00:58:56] glutathione that, presumably, go inside the membrane.

Tim Guilford: They presume it goes inside. The evidence is that it may be absorbed into the bloodstream. There's no evidence it gets inside the cell. That's why I mentioned the studies. I don't like to talk, I haven't studied other products. All I can tell you is what the product that I've worked with, the ReadiSorb, can do. We've documented it gets into cells. They've done this in cell culture very clearly. I don't doubt that people have felt better with these other products. I just have had a good experience with the one I use.

Speaker 14: So, it seems like you presented some research that shows that, in the case of certain diseases, that glutathione known is reduced. I wasn't clear, did you also show clinical trials that show that if people take this liposomal glutathione that it reduces the incidence of these diseases in real clinical trials, or is there no such research?

Tim Guilford: No, I'm not. I tried to be clear and say there have not been trials that demonstrate that. I can't make any statement about disease states. That's why I spend so much time talking about the function. We do have a clinical study in children with autism that shows you can raise glutathione from a low level, which they have, and it's documented, up to a normal level. It was a low normal, but it was a significant increase in glutathione using the ReadiSorb. Aside from that, there have not been any clinical studies. There may be in the future. That's what I was trying to say, we are working toward that, but we're not at that point.

Speaker 14: There's [crosstalk 01:00:30] doctors-

Tim Guilford: If you want to wait for the study, that's okay with me. I mean, I can't promise anybody anything. I can just tell you, I've had a great experience supporting glutathione over the past ten years.

Bern: The other question I remember in my tidbits of information in my life is that when you have cancer, you should feed yourself so you can fight the cancer, but if you take chemo, it makes you sick, you throw up, you get hernias, and you can't eat very well, so you starve yourself and the cancer wins.

Tim Guilford: I debated about talking about glutathione and cancer at all at these upcoming conferences. The reason is that a lot of oncologists have been taught that cancer cells make glutathione in higher amounts. If you add glutathione, it's not good. They'll be more resistant, the cells will be more resistant to the oxidative therapy they've been given, radiation or chemotherapy. They used to call chemotherapy radiation mimics, by the way, so that's really what's happening. They're trying to

create oxidation stress. The focus has been on the cancer, and there's been very little work on the patient.

I found an article that gave me a lot of courage to go forward that was published, Mahajan, M-A-H-A-J-A-N, wrote a beautiful article. I think it's online, that shows, she was looking at inflammation, which is calmed by adenosine. There's an adenosine enzyme that breaks down adenosine. She showed that adenosine is this ADA is increased in breaking down adenosine, allowing more inflammation. She also looked at glutathione. In breast cancer of any type, glutathione was significantly lowered compared to normal. There's something happening in the whole body that people are being depleted of glutathione. I can go into the mechanics of that. There's a fellow named Lisanti, L-I-S-A-N-T-I, who's written over 100 articles on this in the basic science, and shows the mechanism of oxidation stress causing these changes that [Warberg 01:02:46] initially described back 80 years ago. Lisanti took it one step further to demonstrate that the [glycholitic 01:02:54] pathway and lactic acid actually feed a mitochondrial persisting cell line that is present in the majority of cancers.

More and more is coming out on this. It's really fascinating stuff. I never imagined that I would understand any of these. It's been the beauty of glutathione. I've done a lot of various medicine in my past experience, but glutathione has been a vehicle that's taken me and allows me to understand articles in many, many areas. Next person.

Speaker 15: Hi. My understanding is that the glutathione helps move toxins through the cell membrane. Is that correct?

Tim Guilford: Yeah, that one article suggested yeah. It facilitates the removal of toxins by helping carry them through a number of mechanisms out of the cell.

Speaker 15: If you're taking glutathione and you have a biotoxin illness or heavy metals, do you need to take a binder so that you're moving it out of your body, such as like bentonite clay or activated charcoal?

Tim Guilford: I think you're answering your question, and yes, I encourage that. That's why I mentioned earlier, any time you're doing a detoxification, you want to have good bowel function. You don't want to be holding onto the stool. You don't want things be staying inside of you. You want to have good, regular, you should have bowel movements twice a day. I don't know. Should we do a show of hands? If you're not, you're not moving stuff out quickly enough. The other thing that somebody pointed out in a conference was ask your patients, you know, when you eat corn on the cob, we don't always digest all the corn. Some may come out in your stool. You want to ask how long does it take to come out? Sometimes people are having bowel movements, but their corn will stay in their system for four or five days. You want to be moving stuff through your system. Yes, various binders are a good idea when you're doing any detox, because that's the way you get rid of toxins. You put them out through the bowel and/or the urine.

Speaker 15: I have one more question. I was reading Richie Shoemaker's book on mold illness.

Tim Guilford: Yeah.

Speaker 15: He estimates that 25% of houses and structures have water damage. I'm wondering how. He also thinks that chronic fatigue syndrome has a mold exposure, that it's really a mold exposure.

Tim Guilford: I would refer you to Brewer's article. Put "Brewer" and "mycotoxin." I think he gave the first study that I've seen. There've been some anecdotal studies reporting anecdotal benefit in treating people with mycotoxin illness. They use liposomal glutathione in that treatment. That spurred me to write this article that was published this year on the effect of mycotoxins depleting glutathione. In Brewer's article, he showed that these toxins are present in people. I don't think we have studies in large numbers yet showing that as people get better, these toxins go down, but they use a variety of treatments, including binding agents for some people, liposomal glutathione, antifungal nasal spray for others. I've been treating mold related problems for 30 years. It's kind of, there's some value to hanging around, I guess, because I'm finding all the answers to these things that you can see empirically.

I wrote an article, I tried to get an article published on Canada yeast in 1985, and I couldn't get it published in a mainstream journal. I published it in the ACAM journal, and I have a copy, if you want to read it, but the point is that the higher the antibody response to the Canada yeast, the person either felt better right away, or the people in that group felt terrible, because you're killing yeast, you're getting a herxheimer, a die off reaction. People with low levels didn't notice anything at all. It was really fascinating. We weren't ready to hear about that yet. To see this kind of work, but it's coming out the mycotoxins, that irrespective of your antibody response. It's creating cell responses and membrane responses. I'm trying to correspond with some people about that now. My experience has been really positive.

Bern: How many people with social functions have bowel conversations, out of curiosity?

Speaker 16: [inaudible 01:07:18] mycotoxins.

Tim Guilford: You were all exposed to some mycotoxin. You're all exposed to some.

Speaker 16: Yes, of course.

Tim Guilford: This particular article specifically addressed people that have been living in houses with known water damage. Water damaged houses often will develop toxins in the walls. Some of these toxins will be associated with mold release.

Some of the toxins are released, like from [inaudible 01:07:45] is from the Greek word "sticky," so it doesn't release a lot of spores in the air so you may not find it, but the toxin has been identified being released. We're all exposed to some mold and mold toxins.

Speaker 16: What about eating mushrooms, though?

Tim Guilford: Of course. As long as you get along with them. That may explain why some people don't get along with certain things.

Speaker 16: Intense anaerobic exercise, like weight lifting, generates free radicals. There seem to be two schools of thought about addressing that. One school says that one should take vitamin C, [inaudible 01:08:25], etc. before that exercise. The other school says "No, you should not take antioxidants before exercise, because otherwise, the glutathione, the stress of the exercise causes glutathione to be released." Which school of thought is right?

Tim Guilford: I think people, for example, who have had a heart attack, they put people on exercise right away. I think you ought to know their glutathione levels. Glutathione's a standalone predictor of progression of heart disease atherosclerosis and heart attack. In fact, they tried to put people who had had a heart attack on arginine. They had more problems. You need glutathione to prevent the formation of the free radical from arginine, the nitric oxide and the nitrotyrosine. [inaudible 01:09:16] agent. There are certain situations where you should take the antioxidant first, then there are other situations, as you get stronger, you want to develop your own, and you can take it later. If you have a lot of aches and pains after exercise-

Speaker 16: [crosstalk 01:09:29]

Tim Guilford: Yeah, yeah. I used to take it, for example, I used to do a hike. I'd go up a really steep hill. About halfway up that, I'd try and jog up that hill, which I couldn't do. About halfway up, I'd be really winded, and I'd take some of the liposomal glutathione, and I would feel more energetic fairly promptly. It could be psychological, I will admit. I did reference that article on marathon, is developing these mechanisms to regenerate your glutathione.

Speaker 17: Hi. My question is how does liposomal glutathione compare to the two other delivery mechanisms, IV intravenous, and IM injection?

Tim Guilford: I don't know about IM, but I addressed that with the animal study that shows that we get about 75% of the function of removing the toxin from the liver of the animals with cobalt 60. The advantage with the oral liposomal is you can take it every day, a couple times a day if you want to. We're not going to have that luxury with an IV. I don't know about injection. I've not done that. Yeah, it gets into a lot of complicating factors. There's clearly, Gail Zevok's study showed that the liposomal glutathione goes into cells much more efficiently, 100 times more

efficiently. You get this tradeoff. You get a high burst of IV, but you get the continuous exposure with the oral. Okay.

Speaker 18: Thank you, Dr. Guilford, for mentioning glutathione and autism. I also forgot to mention that Dr. Susan Downs has just published a new paper in bio markers in autism.

Tim Guilford: Great.

Speaker 18: Susan also mentioned the importance glutathione for protection against oxidative stress. Do you have any more-

Tim Guilford: Thank you very much. I appreciate it.

Speaker 18: Information on that with the autism and glutathione? [crosstalk 01:11:21]

Tim Guilford: A lot of doctors who treat children with autism use glutathione. I think there's a growing awareness that glutathione is deficient in that condition. When you look at this paper by a lady named Gu, G-U, that came out I think in 2012 or 2013. If you put in "G-U" and "autism." She shows clearly that these children are missing the enzyme that manufactures glutathione in certain portions of their brain. I think the hippocampus ... Bern, what's the back of the brain? Anyway, certain portions of the brain-

Bern: Cerebellum.

Tim Guilford: Yes, cerebellum, thank you. It begs the question, are these kids born with an inefficient system to begin with and then they develop all these secondary problems that you see? Is that related to low glutathione in the beginning, and then when you just try and raise their glutathione, it doesn't necessarily solve the problem. You've got all these secondary things, not to mention misformed pathways and things like that.

Speaker 18: I have a testimonial about glutathione. About 15 years ago, I was in a car, and we were rear-ended at a stoplight in Los Angeles. The airbag mechanism detonated and exploded and filled the car with sodium azide, which scorched my lungs.

Tim Guilford: Wow.

Speaker 18: Fortunately, who was it, Dr. [inaudible 01:12:51], who is a holistic MD at L.A., Thousand Oaks. He knew to use glutathione in a nebulizer. Other doctors I had seen all said "Your lungs are never going to heal. You're going to be coughing for the rest of your life." It takes forever to sit there and breathe a nebulizer, you know, every single day two or three times a day. You know what? Within about a year, my lungs healed.

Tim Guilford: That's fabulous.

Speaker 18: Your product didn't exist, or I would've taken that too.

Tim Guilford: It didn't exist. No, I appreciate that endorsement of glutathione. I don't think medicine has any awareness of what glutathione can do with people. There's just not been an efficient way that people can get it on a routine basis. I'm really happy for you and to hear that story. Thank you.

Speaker 19: What would be the summary for people that came late as to what to do when you go home? Second question is about, were you the one who talked about vitamin C infusion with Dr. [Leavey 01:13:49] several-

Tim Guilford: Several years ago?

Speaker 19: Yeah.

Tim Guilford: Yeah, I think we both gave a talk the same day years ago, yeah.

You can go to my website, drguilford.com, and under publications. I can't remember, I think it's right before those labs that I mentioned. I have a glutathione for physicians who are new to glutathione, kind of a review. Then the article online on mycotoxins gets into the nuance of the mechanism of preventing these enzymes from working. I also have a section on glutathione in that article that goes through all these pathways that I showed. They're non-commercial.

Speaker 19: The vitamin C, does that help with shingles? Would it kill the chicken pox virus inside this system, or...?

Tim Guilford: You know, it's fascinating. Over the years, particularly from this group, there've been individuals who promoted very high-dose vitamin C. There's actually, when you go to the literature and you read about vitamin C and glutathione, there's an article that shows the various forms of vitamin C actually stimulate the formation of glutathione because of its oxidating-like effect. I've seen great things. I've given vitamin C in various doses, higher than the low dose, which is somewhat antioxidant. Somebody asked that earlier. I saw a lady just a couple weeks ago who had a sever shingles eruption over her hip and she was in a lot of discomfort. I put her on the liposomal glutathione to support her glutathione and gave her a fairly low dose by the standards that have been promoted for vitamin C in that condition. Two weeks later, she's much better. She has probably taken two or three IVs, but also the liposomal glutathione on a regular basis.

We have an unpublished study, we tried to get a grant to do more work, but it was done at SRI of all things. It was a great write-up. The write-up was brilliant, I don't know. This young lady didn't get funded because she was a new researcher and they said she should've applied to the new researcher, and they didn't even grade the write-up. Getting grants is really difficult. The point I wanted to get to

is that in the study in this type of cell that they used, higher dose of liposomal glutathione they put in the cell culture, the better the cells did, where plain glutathione just had a flat, straight line. It had some benefit, but didn't change. There was an effect that seemed to increase with dose. I don't have clinical studies that regard, no.

Speaker 20: The vitamin C would help with lime disease also? No.

Tim Guilford: Yeah, I'm not going to get into treatment of diseases heavily. Each case is [inaudible 01:16:52].

Phillip: Tim, you told me a story once, which is relevant to his question about shingles. You treat so many patients you probably forgot this, but I've always used it as a way to explain the power of large doses of vitamin C. I sent you a patient and you treated her successfully with 25 grams, I think three or four different days. At the same time, you told me about another patient you had, who was reluctant to try biomolecular medicine. He thought if it was going to work, his doctor would tell him, this kind of thing. His shingles was so terrible his wife finally got him to come in. You were treating his wife for mercury poisoning. He came in and his eye was swollen shut. Do you remember this story?

Tim Guilford: Yes.

Phillip: Yeah. I think it's very dramatic. You started giving him the vitamin C, and in the process of the first treatment, by the end of the first treatment, which took an hour or two, his eye had opened, and most of the swelling in his face had disappeared.

Tim Guilford: Thank you for reminding me of the story, Phillip.

Phillip: It's a great story. I think it's very important, because-

Tim Guilford: Well I think it's really important that you support these people's glutathione. You may not need to have as high a dose C. That's the point I'm making today. That's the story I'm telling you today. I know that you've been a big proponent of high dose C. I'm not against it. I'm all for it, but you need to be careful. You just can't start people out with big doses of C, unless you're giving the IV, you may do what you like.

Speaker 22: [inaudible 01:18:26]

Tim Guilford: Thank you. I heard a great story about that earlier.

Speaker 23: Is [inaudible 01:18:35] effective in increasing glutathione, and if so, what's your recommendation?

Tim Guilford: Well NAC has been documented to raise glutathione. That's [anisyl 01:18:44] cysteine. In one of the studies that we have, it was shown in cell culture that the liposomal glutathione goes into cells a thousand times more efficiently than NAC.

Speaker 23: [inaudible 01:18:59]

Tim Guilford: The liposomal glutathione that I work with.

Speaker 23: Oh, I see.

Tim Guilford: That study is not online, unfortunately.

Speaker 23: It's online?

Tim Guilford: It's not online, but I can send it to you, if you write me, for education purposes.

Speaker 23: Thank you.

Tim Guilford: There may be human work in that regard coming up. NAC's fine as long as you're healthy, but you need to look at this whole series of articles by [Binken 01:19:21] and [Ramen 01:19:22]. The third one talks about NAC in neutrophils. It's fascinating that it may not be the ideal thing. I'm sorry, go ahead, Dr. Han.

Dr. Han: Yes. Since the glutathione is produced in our liver, what type of diet would you recommend, and also, have you noticed any glutathione level difference between the vegetarians versus meat eaters?

Tim Guilford: Well, I haven't really seen many vegetarians recently. The few that I have are deficient in B12, so they don't make glutathione. Back at that time, I didn't have a good glutathione test to run. They are at risk for having low glutathione. This came up from somebody else who's an expert in glutathione when talking to someone who was going into an endemic area of a current virus problem. He was HIV positive and these people are low glutathione and vegetarian. The comment to him, not from me, but from this other researcher, was you are really at risk. I don't know, avocados contain a little more glutathione. It's really the production in the body that's critical. I'm not aware of a diet specifically that'll raise glutathione. Of course, eating Brussels sprouts and things like that will stimulate the formation of glutathione. I think those are important. Yes sir.

Speaker 25: Is this something available over the counter that you can experiment with as a supplement, or do you try to [crosstalk 01:21:04].

Tim Guilford: It's sold primarily through physicians. If you could get it through your physician, that would be the best way to-

Speaker 25: Do you know who might carry that by any chance?

Tim Guilford: I happen to carry it, but I was thinking this lady who's a naturopath could order it for you.

Speaker 25: Just asking.

Tim Guilford: Yeah, I appreciate the question very much. Yeah, I carry it. I've used it a lot. I use it in almost every patient I see, because they're coming into me sick. Nowadays, I don't see anything that's ... I've had a great experience treating routine nasal allergies, you know, inhalant allergies and things. I don't see many patients, I saw a young man, he had inhalant allergies really bad this spring. He's much better. He's presumed lime and has been on antibiotic treatment for a year and a half. We're just getting started in his workup, but the first thing comes back on a spectracell test, intracellular nutrient analysis. His glutathione level's rock bottom. His cysteine is adequate. What's that telling me? It sounds to me like he's not making glutathione. He's clearly not making glutathione. He's low.

Intriguingly, in his history, he was sent for me to evaluate metals, and was going to get there, but he also lived in a house that had mold under the flooring for years. He also could be a mold candidate. It's very interesting to see the similarity between these mechanisms and the outcome, you know, with chronic fatigue, is fascinating.

Speaker 26: What's the story on this acetyl form?

Tim Guilford: I thought I addressed that, but obviously not adequately. The point here is that it's an older form that was documented, it was some absorption early on, but it's not been documented to get into cells. I don't have studies with it, because I only study the product that I work with. There may be great results with it. I just can't attest to that. I can tell you that the liposomal form has been working great for me.

Speaker 27: [inaudible 01:23:15]

Tim Guilford: I'm glad Bern [Freidlander 01:23:25] is here. He helped me with a number of questions. I appreciated that, so you don't think I'm telling you everything just from a biased perspective.

Speaker 28: I have a friend at church who has just come down with shingles just about a week ago. I don't think she'll get into your office for the vitamin C. It's a little remote that it would happen, but if I got some glutathione to her, liposomal, is that going to help without the vitamin C, or do you have to have them together? Would it help a lot if she took that, like the, what did you say, the teaspoon twice a day?

Tim Guilford: I'd be interested to know what her glutathione level is. It's interesting that glutathione goes down with age. It's one of the few things that you can measure clocks with age. The longer you're on the planet, the lower your glutathione

becomes. I don't know this person's age, but if she's elderly, it's likely she's low glutathione, so that may explain why she was susceptible to the virus in the first place.

Speaker 28: She's in her 60s.

Tim Guilford: Well that's not so old anymore, is it?

Speaker 28: Yeah.

Tim Guilford: It may help. It may be very helpful. It may not be quite as quick as the high dose C stories that you heard earlier.

Speaker 28: If she took a lot of, see I don't think she can come in and-

Tim Guilford: I would suggest, my experience is, and I tell everybody to start low and progress up. If you're low on glutathione, when you start the ReadiSorb glutathione, if things start moving, you could also have a herxheimer type experience. We've documented that it helps your cells kill tuberculosis and we have more information coming out. That's a pretty tough bug. We have more information coming out. I'd start everybody low. I start them at a quarter teaspoon, work up to a half, three quarters, and one teaspoon twice a day.

Speaker 28: Okay. I don't think she can afford the IVs of C. Could she take a pill form of C, or is that a waste?

Tim Guilford: No, I don't think it's a waste.

Speaker 28: Okay.

Tim Guilford: I don't think it's a waste.

Speaker 28: [inaudible 01:25:44]

Tim Guilford: I'm awkward recommending therapies, especially through other people, but-

Speaker 29: Yeah, I know, but that's [inaudible 01:25:53].

Tim Guilford: I understand your concern and compassion, and I praise your concern and compassion. Just don't ask me to recommend treatments for anybody, because I'm not going to do it. I'm not going to do it. That's a trap. I'm not going there.

Bern: I think it's time to end and give Dr. Guilford a hand.

Tim Guilford: Thanks for coming out. I appreciate it.

Bern: Thanks, Tim. I've known Tim for a long time. I think, when I first came up here, you were a patient. You were sitting there, and I was using some kind of therapy on you.

Tim Guilford: [inaudible 01:26:28] I forget.

Bern: [inaudible 01:26:31]

Tim Guilford: Yeah, I forget why you were right around the corner for me.

Bern: I used to, in the 80s, I developed a company called Real Life Research, which was the first liposomal delivery system ever developed for amino acids and B12. Then I worked a little bit with the company that you're working with, Dan, and Biozone and developing liposomals. It's one of the best ways to deliver anything, is liposomal. There's no doubt. In the 80s we were ahead of the game, but the public wasn't.

Speaker 30: Listen, I want to make an announcement, because a lot of you are interested in ozone, especially in water treatment and rectal treatment. As you know, Robert Rowan and Frank [Shallemberger 01:27:10] and Silvia Menendez is coming back in October, November to give a conference here. She's a world leading expert in ozone and predominantly in Cuba, they only do rectal ozone. Nothing else, because most people [can 01:27:24] afford it. I think he needs it badly. I really, I recommend Dr. [inaudible 01:27:32] to get him in your chamber and do some ozone therapy. Because he's going to burst. What we are making it available, I told you I've been working on getting a unit that is very reasonable, that has certain features. One of the features I've been working with ozone since the 80s with the Olympics. I've learned a lot about ozone therapy. I know how it works, how it helps to heal, wound healing. As you know how functional and how benefit it is. Silvia Menendez always emails me her updates and tells me more and more about her work and recommendation.

If you want an ozone device really inexpensively, here's the machine. As you can see, we have the unit there with the whole setup, everything. You go into wwozoneoils.com. I have cards here. We're making it available for $800, between $800 and $900 for the whole system. It has the bags, everything. It's easily operated. It can be also used for ozonated water. That's another feature.

Another thing, also, on September, I'm going to be giving a lecture at the Holistic Arts Fair in San José, 27th. One thing I'll mention to you. There's something very exciting happening today. If you don't know who Gilbert Ling is, L-I-N-G. Who knows Gilbert Ling? You know him. You know how, he's probably the most brilliant scientist of our time. I've had a two-hour discussion with him and Raymond the [inaudible 01:29:15]. The [inaudible 01:29:16] is the inventor of the MRI, the [phonar 01:29:20], the nuclear MRI, and there's another component. It's about the cells. We don't understand the function of the cells. The key is what Gilbert and Raymond and a guy by the name of Gerald Pollock, Cells and

Gels, the Engine of Life. Once you understand how cells work, you will understand the basis of life. His new book is called The Basis of Life. That's why you never want to have a CAT scan done. You never want to have a PET scan done. It will never pick up cancer. There's another factor that cancer, it's a swelling, a mechanism of retention of water. This relaxation T2, any radiologists here?

We just had a, if you can go on [inaudible 01:30:08] website, we just did an oncology one-and-a-half hour program. It explains a little bit about what we're doing with cancer and the new approaches. We did have two oncologists, radiologists there. One of the things I asked them about, and the radiologist knew about it, it's T2 relaxation time. That is the number one factor that you want to measure in every cell, is the relaxation of T2. Cancer cells have a prolonged relaxation time. They don't stop. The only basis for determining that if you have a successful treatment is by reducing T2. This is the new science. This is the absolute new science. You will know if your therapies are working by measuring through a magnetic resonance, or phonar, if T2 relaxation prolonged time is reduced. The radiologist knows how to look for that. That's why the only thing that you should always advise is an MRI. Not a CAT scan or PET scan. They actually cause DNA. They actually damage the hydrogen bond, the DNA, the nucleus of the cells and all of that. Also, they damage the [inaudible 01:31:22] of the cell.

The cell is predominantly two things: water and protein. It looks like a gelatin molecule. That's why it's called Cells and Gels: The Engine of Life. I'm going to talk more about that. We're finishing up a study with Dr. Elizabeth [Mazio 01:31:40] and three Nobel laureates in her staff that won Nobel scientists. We're measuring every compound that has anti-tumor, [anti-pelipherating 01:31:50] mechanism, anti-mitotic, without causing any toxicity levels in the body. We're also measuring epigenetic factors, which is the factor in genetic mechanism of aging and all that. We're looking at [HDOC 01:32:05] inhibitors, everything. We're looking at neurogenesis. Here's the card. If you want to get ahold, call them for the ozone therapy.

Ozone and glutathione together have tremendous benefit, much better benefits, we have shown it, than vitamin C by itself. Now if you use glutathione, you use ozone, and then vitamin C, you even have better results, for anything. That's what we're doing in San Francisco. We're seeing the evidence there right now.

Bern: We have two cards on the table: one for Tim Gallagher and one for Susan, if you'd like to sign those for them. Let's take 10 minutes and we'll come back for a short presentation.