Transcript of “304 with Gerald Pollack”

Bulletproof Radio podcast #304

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Female: Bulletproof Radio, a station of high performance.

Dave: You are listening to Bulletproof Radio, and I am Dave Asprey. Thanks for listening, you can find Bulletproof Radio on iTunes bulletproofexec.com, podcast 1, and everywhere else podcasts can be found, but you probably already knew that because you found us. Today's cool facts of the day is that rain can be more than just water. Rain on Venus or on other planets or maybe even moons can be made of sulphuric acid, or even methane. And scientist found the planet 5000 light years away that has rain made out of iron, which is way cool if you ask me. I don't know every man has to say about that, but it's got to be cool. Today's guest is a guy I have wanted to interview for a long time ever since I, I read his book.

And he is a distinguished professor of bioengineering at the University of Washington where he conducts research on water science at the Pollack laboratory. He is the executive director of The Institute for Venture Science, and the founding editor in chief of the Journal of Water. He is also a founding fellow of the American Institute of Medical and Biological Engineering, and a fellow of the American Heart Association and the Biomedical Engineering Association. In other words he is a complete bio-hacking bad ass although I don't think anyone has ever called him that, and his name is Dr. Gerald Pollack. Gerry welcome to the show, it's an honor to have you.

Gerald: Oh thanks Dave, I'm really happy to be here and uh thanks for the introduction.

Dave: You're, you're so welcome. Uh your book that's probably most famous at least in the circles where I hang is called The Fourth Phase of Water: Beyond Solid, Liquid and Vapor, and it's on amazon.com. And that's kind of what you are known for because you're saying why does water do the weird stuff it does that no one has ever explained, and you have that natural sense of curiosity combined with some pretty legitimate scientific research background. But you've also looked at the other book that, that changed my view on uh, on how to hack the human body which was called Cells, Gels and the Engines of Life from 2001.

It just played a pivotal role on me probably like I think I do have control of my own biology, and you've done some other work on muscles and molecules and all this. And, and I want to know how did you get into this stuff, like you've doing this for, for longer than I have like by a long time. What, what brought on this level of curiosity and interest in such small things?

Gerald: Why do you think they are small?

Dave: (laughs) well, we can't see them is why I think they are small, I think they are fun …

Gerald: Oh you mean the molecules; I thought you meant uh the subject.

Dave: No, no the subjects are actually fundamental to everything we are. I mean how our bodies produce energy, uh how we turn that energy into motion I thought is, is fundamental. And almost all of what I do is around tweaking those things. And, but how did you get into those things, when you started this research so little was understood about this stuff. What, what made you go there?

Gerald: Um I was studying muscles and how muscles contract ,and what struck me is really weird uh one day uh is that when we think of muscles at the molecular level we consider the proteins and how the proteins interact to produce force. But you know muscles contain not only proteins, but also water, in fact two thirds, two thirds of uh by volume of our muscles and all other cells too are roughly two thirds of water. Um it's actually, it's, it's even more dominant than that if you consider the, the fraction of molecules that are water molecules. You know the water molecule is so small that in order to fill that two thirds by volume, you need to put in uh, uh a lot of water molecules. And if you do the molecular count, it turns, it turns out that um 99, more than 99 out of every 100 molecules are water molecules.

And it struck me as odd that you could discount 99 out of a 100 molecules when trying to figure out how muscles work. There is a

theory uh that prevails now about muscle contraction and how it works, and it dates back about 60 years or more. Uh it was developed by famous Nobel laureate, a member of the Huxley, famous Huxley family, Sir Andrew Huxley, and almost everybody follows it. Uh but I found some difficulty with, with that theory namely that the evidence didn't fit.

Dave: Oops.

Gerald: And so yeah oops is right, oops. Uh practically every experiment that we did in the laboratory failed to fit the theory, and, and so we began thinking along other lines. And I began to realize that critical to the entire subject of contraction was the water, that 99 out of 100 molecules did play some role.

So then we started to figure out, uh not so much the particular role of water, but, but of water itself because, because water as you said is, is a complicated subject. Or it seems complicated because there are so many anomalies uh that um in other words properties of water that we can't predict from any theory. And so I began to scratch my head, and I had a few interesting contacts who uh I wouldn't say guided me uh along the way, but provided some clues that were really instrumental. And then we turned to water, we stopped dealing with muscle contraction, and we began to figure out the properties of water, and we found some really surprises. And, and those surprises are, are found in … Especially in The Fourth Phase of Water book, but also some in, in the Cells, Gels and the Engines of Life book. And I'm flattered that you read them.

Dave: Well, Cell, Cells and Gels is one of the reasons that I, I've became a huge fan of collagen protein, because if you want to make a gel you got to have collagen, and I prepared collagen protein in, in my coffee, and I think having properly phone calls and it's probably really important. And of course your book made me pay attention to that and that … So the taking the right amino acids to form collagen or eating bone broth is the ways we get it properly. Even though I probably had no collagen in my diet for a very long period of time, so I didn't know that that would be important.

So, so thanks for that first part there, but the new book blew me away, because, let me just ask you a few questions, I know you know the answers but just because I think our listeners don't. Is water actually liquid, what's your take now that you've studied it?

Gerald: Well, yes and no, uh so water is obviously a liquid because you have a glass of water and it behaves like a liquid. But there is another phase of water that we discovered, and that's really in between a liquid and a solid. So most of us have learned that water has 3 phases, we know there is the solid phase or ice, there is the liquid phase, the one that we put in the glass, and the vapor phase. Um and um so that's what we learned, but what we found out is that yeah there is a fourth phase that's distinct from all of us. And so it's not, it's not a liquid and it's not a solid, but somewhere in between those two, and if you have a little bit of it in your glass of water which you probably, probably do, you won't really detect the difference, but you have a lot of it in certain experimental set ups.

And you can actually measure and find out that this is highly viscous, it's kind of like honey. Uh it's in between honey is not exactly liquid, but not exactly a solid, and this is the consistency of this fourth phase of water.

Dave: Wow.

Gerald: Well, yeah uh it has uh, it has a lot of implications because yeah there is a lot of it around. And it's not a complete surprise because uh there was a physical chemist more than a 100 years ago. Um there was Hardy, and he projected this, he was, he was a colloid chemist, and he said you know something even 100 years ago, something doesn't make sense, because there are properties of water that are basically not, not understood. And if you try to understand them in terms of the 3 common phases, you've failed. And he projected that there is a forth phase of water. And a number of people actually picked that up uh over the years um, and the fourth phase was kind of called structured water.

Structured yeah meaning, meaning the molecules were not randomly disposed, but they were actually lined up in some way. And uh there

were actually quite a few such people, the most prominent being Gilbert Linn.

Dave: Yes, I've just booked him.

Gerald: Yeah Gilbert Linn is now … Yeah he is now I think 97 years old, and still active. Uh and then there was also Albert Saint George, and Saint George was, you might call him the, the nobelist among nobelists because he was uh respected and revered. He got his Nobel Prize for discovering vitamin C, and then he worked on muscles and he worked on water. And he's famous for, for a few quotes and one of them is that, "Life is water dancing to the tune of solids."

So he knew that the water was intimately involved in everything that the cell does. And what happened is that uh people um in the early part of the last century up to the middle part were deeply interested in water, they got ... You might say deeply immersed in, in the subject. And um and then there were 2 debacles that uh set the science of water backward. There were 2 incidents that happened, one of them is called the polywater incident, and the other was called water memory incident, and um I can tell you about this because uh, uh, they're, they are kind of interesting. Uh what the, the summary of, of the story is that, is that the people who were studying these 2 phenomena were roundly criticized by uh by scientists. And, and so it became water, the study of water became a kind of scientific joke, and people then became reluctant to pursue it.

So, so the first one, uh the so called polywater incident took place. And it became from the laboratory of a guy named Boris Derjaguin. Derjaguin was a Russian. He was the most prominent physical chemist in all of Russia. Someone came to his lab and, and showed him something that he, that got him really excited, and then he pursued it. Um what happened was that if you evaporate water, so the water is, is pure and then condense it again, uh and condense it into small capillary tubes, little glass tubes or quartz tubes, um the water took on very strange characteristics. Uh the, the, uh, it was really difficult to freeze it. You couldn't boil it until you reached very high temperatures. It was denser

than ordinary water.

And the people who, who the physical chemists who measured the spectroscopic property that is the absorption property's different wavelengths found it was really strange. It didn't behave at all as though it were regular water. And so this was the time of the cold war, and, and, and the Russians and, and the west didn't communicate a whole lot. So the papers were written in Russian language. When they started to be translated in, into English, the uh the people, the scientists in the west became really excited about this. And at first they took up the result, and uh they, they really had 2 choices, you know because, because of the uh political background. Uh one, one choice was uh to dismiss it as nonsense, because after all you know the Russians are enemies, and how could they do anything meaningful in science.

The other one was try to pursue it, and find something that uh use the Russian findings as leverage to find something even, even more important or exciting. It looked as though there was a different phase of water just as what, what we are talking about. Um so, it was pursued really actively and there was a, a, a lead article in the Journal of Science which is one of the, the couple of really major journals, and the title was Polywater, why Polywater? Because the water behaved like a polymer. Instead of a collection of individual molecules who behaved as though the molecules were somehow linked to one another. And because of this linkage, the behavior changed markedly.

Um so uh one, one group, I believe it was an American group just a couple of months later, found out, or did some experiments, and they found out that it really wasn't pure water after all. They found that if you put water in these capillary tubes, um it actually, the material, the silica from the capillary tubes actually dissolves in water, not much of it, a trace of it, but still the Russians had argued that this was pure water, and uh this group found that it was not pure at all. Actually it was contaminated by silica. And so they said it was a silica gel, and therefore no big deal about these interesting properties.

And then what made, made matters worse is that there was another

group. I believe this was an Australian group, and they put salt in the water. And, and when they put the salt in the water and measured the absorption spectra, the same as, as the Russians had done, they got practically identical results. And so they said, "Well, you know the Russians must have been sweating into their water when they did their experiments." And it was really embarrassing for uh for the soviets. And a couple of years later Derjaguin himself uh drove the nails into his own coffin if you will by publishing a paper saying that all of his critics were right. They screwed up, they made a mistake, forget polywater, forget everything that we found.

So that seemed to be the end of the story. And, and the end of the story is that well, if, if the greatest scientist of physical chemistry in all of Russia could screw up so badly, then uh near mortal scientists had better stay away from water, because they are going to screw up even worse than that. There was that, that potential. Um and it seemed like that's the end of the story, but it's not the end of the story. I've had now from 3 different people who were close to Derjaguin that despite the fact that he wrote that paper, he was actually forced to write that paper, because uh you know, it's an embarrassment to the soviet uh government, and it's, it's easier to place the onus on that particular scientist than uh soviet science.

So he basically took full responsibility, and I suppose his alternative was who knows what ...

Dave: Yeah, right.

Gerald: Maybe Siberia or something like this. So they professed that until the day he died, he was absolutely sure that he was right.

Dave: Wow.

Gerald: But yeah it's, it's an interesting story. It could make a good movie.

Dave: We have a better way in the US. We, we simply make it impossible for, for researchers to work if they say something that's not popular, so it's

not ...

Gerald: Oh I know, I know well about that phenomenon. It was not that different, but uh I think the consequences are maybe more dire, well more dire for him.

Dave: For Gulock's change of career. Yeah, you got to point that.

Gerald: Maybe Gulock, I, I'm not sure. But, but certainly he would not, not have been the famous scientist that he and respected that he remains today. But you know uh as I said, mere mortal scientists were encouraged to stay away from the subject of water. Uh so then you know uh water began; the science of water began its recovery. Um and then the second debacle took place. This one was in France and the French are equally proud of their, their science. They have uh biological scientists, mathematicians and many, many distinguished French scientists.

Then along came this guy, Jacquesques Benveniste who is a famous immunologist, a really high level guy with a lab of 50, 50 people. He was doing some uh experiments on, on cells, uh white blood cells called basophils. And he would, he would pour some and perhaps you know the story, he would pour some antibodies on the cells, and when, when the cells received the antibodies they got activated and they secreted something, I believe it was histamine. And they were, they were studying this as part of their immunological research.

And some guy came along, he said, "You know I can dilute those antibodies again and again and again and again just as the homeopaths do, and I could really so many times that essentially there, there are no molecules of an, no antibodies left, just water. Uh essentially water that had been in contact with the antibodies, and I can pour that on the cells and get the same response." He said "Impossible." But you know being an intellectual, and open minded guy, he said, "Okay, you know uh there's, there's a corner of the laboratory there and nobody is working. You can show us what you are doing and you know we'll see what, what goes on."

Dave: The reason I'm laughing, sorry to interrupt you there, is that, that I think 80% of people out there go, “That’s impossible, therefore it can’t happen, therefore we are not going to test it.” And they’ve just ignored a potential of really real things. So I love it, okay. And this experiment you had a real scientist who said “Well, if it's real, prove it, okay.” Then what happened next, I got to know.

Gerald: Well, what happened next is that pretty soon everybody in the lab was hovering over this guy to see his results, because apparently it worked, and he could do those dilutions. He did it exactly the same as the homeopaths do. You dilute say 1 to 10, uh and then you shake it, they call it succussion. And then they do it again and they shake it and so on, down the line. And so, so he produced it and Jacques who, I, I knew personally, he died about 10 years ago um was of course so curious about this, and, and found that this experiment was so interesting. He had no interest whatsoever in homeopathy, uh but he was really interested in what these dilutions could do and, and the response.

So uh he decided to publish a paper on this. So he sends the manuscript to Nature, Sir John Maddox the editor of Nature received it, and he said, “No way.” He said, “If you are right, everybody else is wrong, and I refuse to believe that everybody else is wrong. Sorry, we won’t publish your paper.” So Jacques being a determined uh, uh scientist, and, and believing in his results though he didn't really understand uh the mechanism. And when I chatted with him he said, “You know I'm just an immunologist, I'm not a physicist or a physical chemist, so I don't understand the mechanism.” And, and you know he was honest enough to say that, but as you said there was something going on there and something that needed explanation.

So he thought, “Okay, nature rejects it, I'm going to ask my colleagues in different countries to repeat our experiments exactly as we did, and if they get the same results we’ll publish together.” They got the same results, they submitted the manuscript to Nature, the response was the same. And by the way this is, the, the story is written in several books. The books with, you might say different tilts. Some tilt in favor of the scientist doing the experiments, and 1 or 2 in favor of Nature, uh the

editor of Nature who they, they believed had some, some good points.

And pretty soon what happened is that the homeopaths uh realized this famous scientist, famous uh, uh scientist was basically able to figure out, to demonstrate that what they do clinically actually has some kind of physical basis. And pretty soon Nature's headquarters are across the channel in London, uh heard about this. It was published in the newspapers and such their, their protests um had to do something, had to respond in some way. And Jacques when I was visiting his lab he said, "Oh yeah, and Maddox he telephoned me on that telephone right there, and he said, I'll make a deal with you." So what was the deal? "The deal was we'll publish your manuscript next week, next edition uh if you allow uh a group of peers to come to Paris and watch you do the experiment, look over your shoulders, and then we will report back to our readers in Nature."

So Jacques thought, well this makes total sense. We can get our paper published and we'll demonstrate to them that, that this is real. So they published the paper with a disclaimer saying you know we are not really sure about this, but in fairness, in "fairness" we're, we're publishing uh this paper. So the next step was that uh Maddox got together his committee of peers to go and visit. And the committee consisted of 3 people, 1 was Maddox who was himself who, who was trained as a physicist. He, he never quite made it through this PhD. He became a journalist and worked his way up to being the editor of Nature, a rather distinguished position.

And for the other 2 peers, uh 1 of them was the amazing Randy, a magician, and perhaps, perhaps thought of, by many as the world's greatest magician with wonderful capability of figuring out the tricks of other magicians. Uh and the third one was a guy named Walter Stewart from NIH uh who, who was uh you might say the fraud department. It's called the, the division or department of scientific integrity. Uh and, and what this division is, does is to investigate uh claims that uh appear to be um outrageous. And, and, and they go and they, they look and hear the evidence from both sides, and they come to a conclusion as to whether the scientist findings are real or are actually fraudulent.

So this was the committee. This was not exactly a committee of peers as a biological experiment. Uh it was uh you might say a commando committee uh designed to figure out what the trick was, because they were sure that it was a trick, so they came to Paris. They came to the laboratory, and uh and the first day, the technician who does the experiments regularly did the experiments, and the results turned out exactly as they had published. The second day the technician did the experiments again, and each of the tubes or the viles was coded by the committee, only they knew could decode it. And when they decoded they actually uh found that the result was again just as they had predicted.

And the third day, um the delusions were done by Walter Stewart the, the NIH fellow, and the results didn't turn out that way. And I should say that in their paper they mentioned that the result didn't, doesn't always turn out the way they, they suggested, but statistically an overwhelming the percentage of times that they get the result that they claimed that there was no question. But they didn't know exactly why sometimes it, it didn't work. Anyway, it didn't work and, and so the um the committee of peers huddled and they decided that well, you know when the French do the dilutions, it works, and when they visiting committees does the dilutions it doesn't work and therefore it must be a fraud. They couldn't figure out what the fraud was ...

Dave: Kind of like by the French paradox, right?

Gerald: Yeah, well, okay yeah. So, so they, they … And this was the end of Benveniste career, because the headlines in Nature was that this was, this is a delusion, a trick of uh of some sort and of course everybody wanted to believe it was a trick, because, because it's unimaginable that water has the capacity to store information. And the implications of this was that it did, because this water had been exposed to the original antibody molecules, and it must somehow have acquired information from those molecules, otherwise the experiment wouldn't have worked.

And Jacques told me that it was a real mistake to call it water memory,

because for most people it didn't conceivable that water can remember something. Um it turns out that, um well I should say that uh a couple of things about, about Jacques Benveniste, a heroic guy. And his, his experiments have been repeated. They were first repeated by people who said they couldn't get the same result, and that was published in Nature happily for the Nature people, because they wanted to be vindicated. But the response from uh from Jacques Benveniste crew is that you know if you really sincerely want to repeat some of his experiments, and you can't get the same result, the first thing is call them and say what am I doing wrong if you are sincere about it.

Um and, and so he argued that these people were, they didn't follow the same protocol, and therefore it's unlikely that they would have gotten the same result. However I found that afterward that this was maybe 5 years afterward, I, I met a guy at a review in, in Japan. And this is a high level foreign scientist who was in advisory to the prime minister or the president or something and he said, he was on the committee that made sure that Benveniste never got a grant again despite the fact that his work was confirmed, and he gave me the papers that confirmed his results, and now it has been confirmed many times since then. But he said, he said that the reason that they discontinued his funds is not that they didn't believe his work, but that it was an embarrassment for French scientists, and for French science. It's, it's quite analogous to the Russia debacle that took place.

And so, so French science was vindicated and, and Jacques Benveniste was, was guilty. And he became a scientific joke, you know you are having, having trouble remembering? Drink some water and you know water memory will, will restore. And, and when I began my work, uh I was discouraged from beginning this work, because first you have uh Boris Derjaguin, and then you have Jacques Benveniste and these 2 debacles. So many people have been really fearful, many scientists of immersing themselves in water. So it's a long story and it's an interesting story, and that's why water is not a discipline. Uh you know we have disciplines of nanotechnology and genomics and such, and you think that water would be important, but there's almost no field.

We, we try to nucleate one. We have annual meetings that I organize. Uh it's called the, the uh annual conference on the physics, chemistry and biology of water, and that it attracts really interesting people who are doing ground breaking experiments, a very exciting meeting to, to attend. It's, it's … During the past 3 years or so, we held it in Bulgaria which may sound like a strange place, but Bulgaria has healing waters, and maybe I think it's something like 40% of all those in Europe are in Bulgaria. So it's, it's an appropriate place for a water conference.

Dave: Sorry, I have a random question related to that.

Gerald: Please.

Dave: I drink San Pellegrino even though it's owned by a big mean water company Nestle, but San Pellegrino or Saint Pellegrino healing waters, I, I think it's better also, like there is bottle in glass. Is there something special about, like I don't want to call that one brand, but about drinking bottled mineral water and things like that, or am I just deceiving myself whether this is BPA free?

Gerald: The answer is yes.

Dave: Both?

Gerald: Well, you know I, I can't profess that you are deceiving yourself. I, I think um … Well, let me say that I've seen evidence that some waters have healing uh capacity. And I'll just tell you about one, one example. On the other hand, you know you buy, there so many waters that you can buy, either, either in the supermarket or online, uh there, there must be dozens of them online, and they all profess to have healing uh powers. There's one that I came across um I got a phone call 4 years ago from a guy, and uh he told me that he worked a famous laboratory. The laboratory shut down, and he took the apparatus they had and he created the water for his own family, drinking uh drinking water. And, and uh they, he told me they haven't had the flu or anything for 2 years since they started drinking that. And so you know my reaction was, okay, big deal, you know uh maybe many reasons why your family

hasn't had the flu for a couple of years.

But then he told me that the neighbor, next door neighbor who knew about this water that they were drinking, the neighbor knew of a friend who was on dialysis, irreversible kidney pathology. And uh and she wanted to drink the water, so he managed to give her the water and he told me, he said uh that after 30 days of drinking the water, uh she went from irreversible pathology to no pathology.

Dave: Oops.

Gerald: Her reaction was I don't believe you. Actually I did believe him, but I … So he sent me the hospital records uh which confirmed that that was the case, so I invited him to our conference uh to present his, his work because obviously, you know if you have, if you have water that can reverse irreversible kidney pathology that's, that's quite amazing. And by that time he had more evidence and one of the people at the conference went uh to visit him with the prospect perhaps of providing this on a larger scare for humanity. He called me, he told me that the business arrangement didn't work out, however he interviewed, so the hospital records and he interviewed every patient who this guy had claimed, uh the pathology was reversed, he said it's true. So I, I became really impressed, and he actually is, is selling this water right, right now. So this is, this is one case where it appears that there is real evidence, you might call it anecdotal evidence, because there've been no clinical trials, but it looks promising.

Dave: So just so to bring that out for, for the kind of skeptic around, anecdotal evidence is still evidence, right? This one is strong ...

Gerald: Yeah absolutely, yeah, yeah, right it's, it's statistically speaking uh you know the point is there, there may be, there may be other people who drink the water and with no result, so and I guess a proper way will be to, to do an extensive series of tests, and, and blind or double blind test and see, see what works and what doesn't work. Actually we propose that, because there are so many waters, and I think some of them look promising, and, and need to be done uh by an independent agent,

someone who understands about water. To do that requires you know 4, 5 million dollars to do it properly to test patients, to test animals with tumor, or animals with, with irreversible organ disease like the liver pathology, or with kidney pathology. Otherwise it's difficult to tell because uh you go on the internet, and you find these waters and, and they're very sincere sounding claim that that water can really help reverse pathology, you just don't know to trust it or not to trust it, and, yeah.

Dave: There is a really rough thing here, because I learn a company, and when, there're rules right now, where the government says like you may not make a medical claim about something that is not a drug. So if you have a water that, that makes people young again, that actually works and it works even in a bunch of trials, if you make that claim, those might finish your company down. It's like you're making a claim about water that is not a drug therefore you can't do this, which is entire science on his phase, but it's true for every food item out there. So these, these pull like I've met I few that probably maybe some of those same as people, where they're working on these amazing water machines, and you drink the water and you're like, I can feel there is something in here and I'm pretty sure this is in placebo just like you know you feel like caffeinated the decaf coffee, it's pretty hard for that placebo effect, because like something happened from the caffeine.

Gerald: Yeah.

Dave: So, you drink it like okay, like I don't know if I can finish this because I'm kind of buzzing. But then if they go out there and they start saying this stuff works, then as soon as they hit a level of commercial success they'll get shut down. I have this over and over, it's my great frustration. And I don't, I, I don't really know how to get around that, because what we need is, is a little bit of freedom of speech for businesses to say we don't know, but we're pretty sure and here is our evidence and you can decide for yourselves, because it is unlikely to cause harm. But until we get that right in this country which we don't have right now, do you think that any of these water companies have a chance to start seeing the light today?

Gerald: Well, they have seen the light and some of them are more successful than others, but as you say you know they can't claim what might actually be the case, there is one that's different. Perhaps you know about the Kangen water in Japan.

Dave: Yeah, what do you think about that?

Gerald: I know comments, I don't know we sometimes we, we drink it, uh but I got to tell you that in Japan they did do clinical trials that and as a result of the clinical trials there is a whole bunch of evidence as a result of the clinical trials. If you have any kind of gastrointestinal problem in Japan from your mouth down all the way to your anus, they put you on this water and the government pays for it. Governments don't pay for something that you know that it, that doesn't have efficacy. So they have done enough, enough trials on that, but I mean still there're, there're some people who claim there are some long-term effects that maybe uh, uh negative. I'm not sure about that, but I just want to point out that in Japan the clinical trials worked, and, and people are put on that water.

It's actually very simple, you just put the water through 2 electrodes in the machine, one is negative one is positive and you drink the one that goes and passes through the negative electrode, which has a high PH, and the stuff that comes out through the positive electrode, there is low PH and if you try to drink it, you spit it out immediately. It tastes like something like highly chlorinated water, and it kills bacteria, but it's, it's certainly not good for you. I think that the, the you know our, our research shows that the, the negative charges is, is really important for uh for health. And um it is a different issue but um it's not something that is a kind of a mainstream kind of uh idea, but, but it goes back to the water the kind of water that with this fourth phase that we're discovering which is negatively charged, that's one of the features of this water. And it's the kind of water that fills your cells, so ...

Dave: Does the kangen machine make water like the fourth phase water?

Gerald: I'm not sure, we, we tried testing the, that kind of water and using the

test that we usually employ, it didn't show it. However, in laboratory when we did experiments uh putting the negative electrode in the water, we actually did find this kind of fourth phase water that we discovered, so the answer is I'm not sure if it does or doesn't. But for sure it has negative charge, and, and, and yeah, and you know so you know your cells, this, this kind of water that we're talking about, the fourth phase water forms next to hydrophilic water loving services, and the cell is just filled with water loving services. All the proteins and other macro molecules are charged on the surface, and so the water that sits next to those services should be easy water, or we called the easy exclusions on the fourth phase, it's, it's just different terminology for the same thing.

So, this star phase is your cells are replete with this kind of water; it's not ordinary H2O that's in your cells. And, and you know physiologists know that cells have net negative charge, uh and it's been … There's been some, some uh hypothesis as to … For 50 years or 60 years as to why the cell has a negative charge. But since we found that the water that populates the cell has a negative charge, we kind of understand that one possible reason for the cells negative charge is because it has this kind of negatively charged water. You know you have a sack with some negatively charged stuff, and then it's going to … The sack is going to have a negative charge, and we've nurtured that. And so um if your cells don't have enough of this water, then your cells are going to be less negatively charged, and If your cells have a full complement of this stuff, they're going to have more uh negative charge. So we, we've come to uh kind of a hypothesis that more negative charge that you have in your body the healthier you're going to be.

Dave: Now that's different than the PH of your cells, all right, because of …

Gerald: Well, yes, yes and yes and no. So you know we think of PH, we think of PH as the concentration of hydrogen ions OH minus. But some of the experiments that we've been doing indicate that when you have low PH that is a lot of proteins, you have a net negative, net positive charge, and when you have more OH minus groups, you have excess negative charge. So it's not that um it's not that, that every solution is neutral, uh

you know uh and it's possible we're studying this right now. It's possible that as a rule when, when you have something that's acidic, that is a, a an abundance of, of proteins that you actually have that this solution that you're holding, the beaker actually has net positive charge, it's not neutral.

Um chemists like to in invoke the principle of electron neutrality, everything should be neutral, but we know everything is not neutral, because um you can actually measure, you could take 2 beakers uh with 1 substance and another substance, and you can actually measure potential difference between this, and you can get current flow from one to the other. And so it, it seems possible it's not likely that, that you know that liquids can sustain charge. And we do, we made measurements of people, uh and so you are negatively charged. I'm negatively charged too, but I think you are more negatively charged because you are healthier than I am. Or at least you don't have as much grey hair, so … And that's why you know uh there is this uh idea about earthling yourself or grounding yourself.

You take a walk on the beach where you take off your shoes and you feel good after 10 or 20 minutes or so of, of doing that. And the people who have studied this understand that what you are doing is you are actually soaking up negative charge from the earth. The earth has a net negative charge, this is another fact that is not widely known, but among the Russians and in other countries 50 years or 60 years ago it was common knowledge, but we've forgotten that. And so when you connect yourself to the earth, you sup up this negative charge and you feel better. You feel healthier, so the research has, has shown that. So I, I just want to make that point that, that um if you … Anything you can do practically, anything you can do to gain negative charge should in theory be good for your health.

Anti oxidants are, are one of those because, because oxidation is, is lose of negativity, and so anti oxidation uh means you don't lose that, that negativity and negativity is really important. The body actually tries its best to get rid of positive charge. If you think about it you know every time you go to the toilet and pee, the PH of that is low, it's uh, and, and

so you are, you're getting rid of proteins, you are getting rid of positive charge. Every time you exhale you are getting rid of Co2 and water which is carbonic acid, acid getting rid of positive charge. When you sweat uh it's similar, you uh you uh sweat, the sweat actually has low PH. And a colleague of mine uh was actually measuring his, his, his body's charge and took a dump, and found out afterward that he got more negative. And so apparently he was losing positive charge that way too. This needs to be studied of course in, in greater depth, but it's a kind of principle that comes out.

Dave: I have definitely been sleeping with one type of earthing or another for 8 years now, I think 9 years. And talking about it ...

Gerald: Really?

Dave: That's one of the, the hacks that you can do, but I used to weigh 300 pounds. I had chronic health problems as a child, arthritis at 14 and, and all, all sorts of stuff that shouldn't have been. Including basic mitochondria poisoning as far as I can tell from living in a water damaged building where you get airborne micro toxins that inhibit mitochondria respiration. And I've since we covered pretty down dramatically from all that kind of stuff.

Gerald: It seems so.

Dave: (Laughs) and one of the things that helped the most was ozone therapy, which uh you actually use ozone gas, small doses of it directly which has lots and lots of free electrons in it, right?

Gerald: Yeah, (laughs) yeah you figured it out another way to do that.

Dave: Yeah, and they actually do it intravenously as well, and, and I've also done a lot of electrical current stuff uh over my body that seems to have played a major role. As well as I had an alkaline water machine starting in 96, I bought one before Kangen came out I think. But it, it actually just caused diarrhea because it turns off stomach acid where you kind of need acid, so I, it turns out for me I'm already too alkaline. So I had a

weird situation where I was actually not making energy well in the cells, yet I was almost on hyper alkaline, which, which still didn't make sense, but it was because something was inhibiting respiration. So you go through all that, a lot of people okay we call that chronic fatigue syndrome, fibromyalgia, lung disease, all that stuff.

Gerald: Yeah, yeah.

Dave: What, what is your discovery have to say about like those situations, those people are running around running at half strength, like do they need more easy water, do they need more grounding like, like I mean you are studying bioengineering, some of them are most interesting stuff I can think of. If, if everything sucked in your life, because you just never had enough energy and nothing seems to be working, right? What would you do with water in order to turn things back on?

Gerald: Well, okay uh there are a couple of things; um, um besides um drinking the right water which is not, not so clear which one is, is the right water. Light is, is also one really powerful agent, and so why is light a powerful agent? Well, so this water that we are talking, this fourth phase water is built by light. If, if you start with water um and you want to create ... You start with ordinary water and you want to create this fourth phase of water, light is the agent is the energy that, that does it. And especially infrared light, so um infrared light is all over, you can't get rid of it, is if, if, if you turn off all the lights in the room and, and shut the shades and wipe out your infrared camera, you can get a beautiful image, it's sort of like this night, night cameras. Everything generates infrared at night, no visible light, but lots of infrared, so you can get an image.

So it's all over, and it's actually literally free energy, it's not the kind of free energy that we learn about in our chemistry class, but it's literally free for the taking, it's there. Which means that this water, this fourth phase water is, is also there. However, um you know if you are sick, uh there is a fairly good chance that you are deficient in this easy water, there, there are scientific reasons that we, we which this conclusion that maybe beyond going, going in, into here. But I can just say that you know your, your cells, it's the proteins in your cells that act, they fold in

certain ways, and, and that makes the cell work. And the usual environment for folding is that each protein is surrounded by fourth phase water. And if you don't have enough of it, then your proteins are not surrounded by their usual mildew and they can't do what they ordinarily do, and so you are suddenly sick, it's not actually functioning.

So one, one possibility is that you want to build up this easy water in uh in your cells, and the way to do it is to … One way to do it is to expose yourself to infrared light. A way … I, I just came from Russia, I was there a few days ago, and the way they do it is uh we call it sonar, and they call it bonier, it's the same sort of thing you know they ... You, you go into a, a room and uh it's either with water or without water, humid or not humid with infrared, it's, it's a very temperature and so you soak up this infrared. And when you come out 20 or 30 minutes later you feel like a million dollars or robust if you like. And, and so why is that? Well, well the thought, or one thought is that this is purely psychological, and maybe some of it is.

But you know our experiments show that if you add infrared light, um infrared energy, you build easy fourth phase water. And uh and the same thing happens inside your body; your body soaks up this infrared energy, because water in your body likes to absorb that kind of energy. And from our experiments we know that that build easy water. So one possibility hypothesis is, is that by sitting in the sonar or the bonier, the reason you feel good is that your cells, particularly the cells that had been deficient in easy water to begin with, the water builds up and you have then a full complement of easy water. And so if your muscles were aching, a reason why they might have been aching is that they are basically dehydrated.

They don't, for whatever reason don't have enough of this water, they get re-hydrated with it. So, so therefore and it could be uh the same thing happens in your brain, you are feeling depressed, your cells are not … Your brain cells, your neurons are not functioning optimally. You want to get them to function the way they should function, so you add the infrared, it builds up the water, and then your cells begin functioning normally. So it's that kind of general effect um that is

infrared …

Dave: Sorry to interrupt, is a camp fire good enough, I mean is a radiant heater good enough?

Gerald: Well, that needs to be studied. People are using different wave lengths of, of light. Sitting in front of a camp fire usually you feel good basically. You know the same, same kind of light. I hadn't thought about that, but perhaps it is good. I, I know that in Asia and some countries like in Korea they have uh different stones, different crystals that they heat depending on what your, what your issue is, and what your, your problem is. And this needs to be studied as well, but it seems to be quite effective, so you know if you have a stomach problem you, you subject yourself to one set of wave lengths of infrared. And if you, you have a liver problem perhaps uh another set of wave lengths. So I just want to say that it's not, it's not just the sonar, or the bonier, it's actually light therapy is, is used for, for many issues uh from depression to skin disease and, and more and more light therapy is, is becoming routine. And it's expanding rapidly.

Dave: I've had uh different color lasers for doing light therapy, low level laser therapy became low level light therapy. Um going back about 15 years, with, with profound results uh on, on my own like muscle relaxation and speed of healing, and things that are almost unexplainable. I think we are discovering it now. And your book I think explains some of the reasons why that might work, because I can't tell you all the reasons it works. Uh there's are some things about nitricoxide that are interesting depending on whether it's a red light or whatever else.

But I can tell you, you put an infrared LED or a red LED or, or some, some cases blue but not usually, you put those one and something very tangible happens. And, and as a scientist minded person you are like, "Okay, uh I don't know why, but I, I know if I do A, then B usually happens, I'm going to take advantage of the fact well, I discovered, I discovered why."

Gerald: Absolutely, absolutely, sure. You, you need to. I, I, I just was exposed

recently to uh another kind of therapy; these guys were using ultra violet light.

Dave: Oh neat?

Gerald: Um yeah, so this is, this is done … Uh it's a local …

Dave: Intravenous or?

Gerald: Yeah, actually intravenous.

Dave: I do that too.

Gerald: You stick a … Oh you've done it?

Dave: Yeah, absolutely.

Gerald: Oh you, yeah how, how did you feel?

Dave: It makes you feel amazing and ...

Gerald: Yeah.

Dave: So Why do you think that might work? I know there's a vitamin D effect that's that's, that's little known, but, but what is your experience. I'm really interested.

Gerald: Um I haven't, I haven't done it myself. I just saw that machine that's used to, to demonstrate it. But well I think it works because uh well, this is a bit of a, a longer story but, but I, I think that if you, if you look at the blood flow that occurs in the very small capillaries, I think it's different from what, what, we, we presume. And I, I found this out actually in, in Russia. I started my career studying the uh dynamics of the cardiovascular system, and you know the heart developing pressure and pumping into the arteries, and arterioles and such. And I thought for sure that we had all the answers, and um that I could explain practically anything.

People who develop models almost uniformly think that, and I guess I, I was one of those. And when I was in Russia, I, I go there fairly uh frequently. I admire the Russian research, these, these are people who really think. I was in Moscow university, and uh some friends of my friend uh sat down with me and they told me this a real problem. And the problem is, is, is that you know you have capillaries and for young adults, healthy adults, the capillaries are 3 or 4 micrometers in diameter, but the red blood cells that need to pass through are almost twice the diameter. So it looks like Mother Nature screwed up, and there's a pluming problem here and sort of like you know you go to the toilet and the stuff that needs to go through can't go through and you need to plunger to … Yeah, so you know what I'm, I'm um talking about.

So, it's kind of similar because the question is that they raise is, well, I mean how do you get those red blood cells to pass through something that's narrower, and if you look at videos showing, showing this you can see that the blood cells actually they kind of squange down in order to get through, but that squanging requires energy you see. And what they pointed out is that if the heart were really responsible for driving those red blood cells those tiny capillaries, the amount of pressure that they would need to develop is something like 1 million times the pressure that the heart actually develops. So, so something else is going on there. There needs to be some of kind of assist to this. And I think the assist comes from light, and the reason I think so is, is that we can put a, a tube in water and uh like a straw. Just put it in the water, lay it down horizontally, and flow goes through that tube automatically and endlessly. It just keeps flowing. And we discovered that about 3 years ago, and we have a few papers on it.

Dave: That sounds like a perpetual motion machine. It sounds like someone should just take away your license right?

Gerald: Yeah it sounds like it.

Dave: I mean, you can't talk about these things (laughs). Tell me more, I'm so interested.

Gerald: Yeah. No, no, no it sounds like a perpetual motion machine. And of course it does … Usually what you need is pressure to drive fluid through a pipe, and if you have no energy then … But we know about the energy because water absorbs energy from the environment, the infrared energy for example, or any kind of light energy, some wavelengths will absorb more than others. The water is receiving energy all the time and transfusing that energy, converting it into other type of energy.

And so we pinpointed the energy is coming, coming from light. And you can look at the flow going through the tube, uh the water flowing through the tube, we put little uh particles in the water, so we can actually visualize microscopically, you can see the flow going through, and we turn up the light and we were able to get up to 5 times faster flow just by turning up the light intensity, that's all.

Dave: Wow.

Gerald: And then turn it back down, it's slows down.

Dave: In darkness, there's no effect.

Gerald: Yes, and no because, because infrared light is dark light. I mean you know it's not in the visible wavelength range. So turning off the lights in the room, we moose the visible wavelengths, but since it's mostly beyond the visible actually some of it is, is infrared red, but also ultraviolet light has an effect as, as well. And, and, and so um and we found the fact that ultra violet light, it was really effective in, in speeding up the flow through the tube. So in the laboratory we turned on the light, we get flow through a narrow tube, why shouldn't the same happen inside your body. You turn up the lights or the light that's being absorbed uh may be actually driving those red blood cells through those narrow tubes just as we saw in the laboratory. And we are now doing some experiments to test this idea.

Dave: Does it matter, UVA, UVB, UVC?

Gerald: Well, we are testing that right now.

Dave: Oh cool. I, I want to see your research. I, I expose myself every morning for about 10 minutes, because I live on Vancouver Island up near where you are in Seattle. There's not enough sun here, so every morning for 10 minutes I get my ultraviolet radiation from the sun lamp. I, I remember just on a call with, with one of the members of my team, and I'm sort of like naked standing in front of a light, but fortunately it's not a video call. So it's all good. Uh, but I'm hopeful that maybe beneficial for the staff, but I don't know but I know for other things like vitamin D and sulphation of vitamin D is probably good, but … Is that a good practice? Would you recommend it or not?

Gerald: I, I, I can't say, all I can say is that, it probably is uh but I, I, I you know, I … We, we haven't done trials on that, so I'm not sure.

Dave: By the way thank you for that answer. The, the average uh scientist when you say well I know you don't know, but if you had to bet, they, they are so hesitant; I don't really want to bet until I have done a double line study. And you're like saying and you are willing to say probably is actually a really courageous thing. So thank you for that, because …

Gerald: Oh well (laughs) uh I had the risk uh criticism from my colleagues. Um yeah, I mean it's great to, to have hypothesis and uh, uh then you get somewhere.

Dave: As long as you're qualified I think you, you are being very scientific. I had, I had a chance to ask Craig Venter like given everything you know about the human genome and all those incredible research, like what should I do today based on your best possible guess? I said or should we just have pizza and beer and figure it out. And he goes, let's talk about it over pizza and beer (laughs). And so they'll pull their hair out, because he was such illuminated but that's scientific theory of I'm not going to pick a direction until I'm really sure or I'm not going to, I'm not going to choose a direction. And what I want to do, I want to live 180 years old. I'm going to pick a direction, because if I don't pick a direction, I'm

probably going to go the wrong way. And I might pick the wrong direction, but at least I tried and ...

Gerald: Yeah, and you might pick the right direction (laughs). 180 that's, that would be impressive.

Dave: I'm working on it, I ...

Gerald: Good luck. Hope you get there.

Dave: Do you do any work with the piezoelectric effects of cell membrane by any chance?

Gerald: No. Um, why do you ask?

Dave: I, I have a machine downstairs that's made out of, of, cock pit from a fighter jet. And it takes you to 22,000 feet elevation, drops to sea level, back to 22,000 in rapid succession which pumps all of your cell membranes, and has a bizarre piezoelectric, like it generates electricity on the cell membrane. And it's, it's a really cool thing and it's a little non effect. But I've just thought of anyone I've ever spoken to on Bulletproof radio if that might be an effect that you come across.

Gerald: How do you know it's the membrane?

Dave: Um there's actually 2 studies, I'll send them to you afterwards, uh talking about a, a cell membrane piezoelectric effect about a little lipid uh spheres on the surface of the cell membranes. That they themselves are piezoelectric apart from like bone piezoelectricity, and things like that. So I was blown away to see it, and you certainly feel an effect from it, but it might be a nitricoxide effect not anything more, and there appears to be a stencil effect, but it's all certain things where you can't say what it doesn't even if you think you know, because then you will be selling drugs. So it's a machine that makes you feel good (laughs).

Gerald: Yeah, yeah. There are, there're mechanal electrical effects for sure, because you know uh if you have easy water sitting next to ordinary

water, one is more dense than the other, that is the easy water is denser than the bulk water. If you squeeze it, put pressure on it, then the tendency is to go toward the more dense uh of, of the 2. And so we found experimentally that if we did that, if we applied pressure, we get more easy water. And easy water is negatively charged, so it means you, you apply force and you get charge out of that, so it's essentially a piezoelectric effect. And that's why, that's why I asked you how sure you were that it was a membrane effect. Many scientists attribute almost everything into the cell membrane.

Dave: Membrane doesn't really affect, it doesn't really exist when you look at what happens when you strip the membrane, and the inside of the cell still works. So the membrane is not what you think is up with you there.

Gerald: Absolutely, absolutely. Yeah I think that's true, the membrane is overrated.

Dave: Now, okay. Let's assume that I have a couple of thousand dollars. And I'm, I actually live on an organic farm um doing my best to, to keep everything working in my body. And I can do whatever I want to my water filtration system. I already have activated a charcoal, I guess a well that's not, not polluted. I run it through a UV filter and the various polishing things is absolutely neutral and from a PH perspective. Do I need to install a big bank of infrared LEDs in, in a clear tube; do I need to install electrodes? Like what do I do to like basically shower in easy water that drips out of the fossil like straws up every day? Like what should I do here?

Gerald: Again, I, you know I'm not sure, but I can certainly uh speculate, or hypothesize. I think light is really important. Um I spend your $2000 uh putting light into it, and if you ask me which wavelengths, I'm not sure. I, I would say that probably … Um we found that infrared light at roughly 3000 nanometer wavelength is very good for building easy water, especially if you have a little bit of salt, if you have minerals uh in the water which you probably do, yeah, well … And you … Because what happens is that the easy fourth phase water builds around the minerals themselves.

And, and so if you, if you had light, the, the wavelengths you can get more easy water. And I, I think that water, at least the evidence so far is that if you drink water that contains easy water it's likely to be good for you, because that's the kind of water that's inside your cell. So you are basically refurbishing water inside your cells. So I guess that's probably what, what I would do, but again I'm speculating.

Dave: It's, thank you for labeling it as speculation. I, I totally understand it's speculation, and everyone listening, if you go and you buy this and it does the opposite of what you expect it to do, it could happen, right. This isn't a …

Gerald: Yeah, it could happen you know. But this is, you know, you, you really put your finger on something that's terribly important. Water is so important for our health is central, but there's almost no funded research on, on water. If you try to get money from the National Institute of Health, if you want to study a drug, it's fine. There's no problem as you pointed out earlier. But if you want to study water, then this is something that they almost never heard of. Um and so there, there are no funds available to do that. And uh with, with your influence perhaps you, (laughs) you, you could change that. It's really, really important to study uh, uh water.

Dave: I'm really intrigued, I do work with the, the XPRIZE foundation, they're the guys who did a 10 million dollar uh grant to basically uh turn on private space exploration, and it worked. There are a bunch more XPRIZEs like that. So this makes me think that maybe we need to do an XPRIZE with neuro X uh around funding some fundamental research. Let me keep my mind working on that because this does deserve a, a lot of attention. Uh have you looked at uh the, the O16 versus 018 DDW, like deuterium depleted water? Is that anything that they are spending on your research?

Gerald: No, we haven't done it, but I, I know that there are some scientists who are studying that, and you probably know more about that than I do. It seems to have a positive effect.

Dave: I'm thinking about getting something that makes DDW water which is a, a sizable investment, but I want to live to 180. I just don't know if it's kind of it's worth it, right?

Gerald: What about drinking the Hunza water. You know about the Hunza?

Dave: I know about the Hunza people, but I'm not sure about Hunza water.

Gerald: Henri Coandă who is a Nobel laureate studying fluids went to visit the Hunza to find out why they lived to, not 180 as far as I know, but certainly 110, 120 they have babies at age 90 …

Dave: I'm going to raise Ray Kurzweil as well, that's my goal (laughs).

Gerald: Oh (laughs). Well so, so he found, he found out that uh it's the water; uh it's full of minerals. It's actually thick with, with minerals, and the tourists who go there drink the water. I'm told they actually filter the water for them, because those people won't drink that water that's, that's kind of thick with, with minerals. So I'm not sure they get the full benefit of it, but, I, I'm not sure if you know Patrick Flanagan who … Yeah, he's, he's started out and he produced uh a product that …

Dave: The miracle crystal stuff. The little droplets you put … Yeah, I used to use that.

Gerald: Yeah, apparently mimics what the Hunza have, have, have used. And um again that, that might be another, another uh good approach. I must mention one more since we are talking about health, and that is juicing. Probably you do that too.

Dave: Yeah I have to juice and in have apple trees. I drink the sap that comes out before you concentrate it into syrup. That's basically pure easy water as far as I can tell.

Gerald: Yeah, it must have a lot of easy … Uh but I'm talking about the, the sort of more standard way of taking vegetables and maybe some fruits yeah,

or kale, it doesn't taste great, but you kind get used to it and begin to like it. And you know, so what you are doing, what you are drinking is essentially cell water, right because it's the water that you squeeze out, it's water that's inside the cells of the plants. And, and uh the physicians I've spoken to you might call them alternative complimentary medicine. Many of them use it.

And the patient comes in and it doesn't matter what the problem is, it depends uh including some of the ones you've mentioned fibromyalgia, and kind of vague, vague symptoms. And it seems like they are almost always drinking that stuff for a few months is, is of great help. And as I said I think the reason it helps is that you are adding cell water to the water that maybe deficient in, in your own cell which reminds me of the famous book that you probably know about, the one that's you are not sick, you are thirsty? You know that book?

Dave: Right, right.

Gerald: Yeah. And, and that also is a antidotal evidence, but powerful antidotal evidence by, by this Iranian physician who well became a political prisoner, because he was a supporter of the shah. When the shah was deposed he was thrown in prison. So, so he was a physician, and so he was the one who had to treat all the other political prisoners, and all he had available was water. And, and so finally he wrote the book uh that describes his experiences not only in prison treating patients, but when he emerged from prison he continued his studies. I found myself really; really impressed by the sincerity of, of this book which by the way his son who I met by chance told me sold more than 7 million copies.

Dave: Wow.

Gerald: Yeah, really popular. It's cheap. You can buy it on Amazon. It's very impressive uh once you have to deal for example with diabetes in other words heart disease. And he, he tells stories about his patients who came in and he said, just drink a lot of water. And they got better just by drinking a lot of water.

Dave: I had a weird experience back when I was living, it turns out in a mold damage, water damage building. So I was getting daily exposure that was causing me the inflammation. I did a 24 hour urine challenge; you had to collect all your urine for 24 hours. I collected 7 liters of urine.

Gerald: 7 liters?

Dave: Yeah, okay granted I was probably 280 pounds at the time, but I wasn't trying to drink extra water, probably I was because like I knew if I drink more water I would be healthier. I was always thirsty, but it was like the water wouldn't stick in my body. Like no matter how much I drunk, I was always thirsty. Is, is this a water structuring issue or is this like my kidneys are over toxic? What was going on? Do you have any idea?

Gerald: It could be a water structuring, yeah I mean, so, so the ability to hydrate may depend on the type of water, and I bet it does. Again, we have a theory as to why this, this might be. You know the cells are negatively charged and um if you, if you um, expose water that has charge, so called dipole water where you have plus at one end, minus at the other, uh it should be absorbed more quickly by this negatively charged cell, because what happens is that you know you got a blob of negative charge, and then you have a, a dipole sitting here with a plus and minus. This is negative, the plus will orient closest and get pulled in, and, and the fourth phase of water is definitely charged separated. It's a dipole. It has huge amounts of negative at one end and positive at the other. So it should be sucked in by the cell more quickly. Again this needs testing. It's just a hypothesis.

Dave: Of course we, we are in the land of theories now. Are you at all concerned about these LED lights that make no infrared whatsoever, but have lots of the blue spectrum?

Gerald: Yeah, I am because uh I heard some talk at one of the conferences about so called light pollution. And you know in some, in some cities uh it's light all night, and the blue light is assimilatory. And it is assimilatory because I, I, I think the energy from the light uh creates more of this, um it separates charge and the separated charge gives you, gives you

energy. So it keeps you energized just when you want to go to sleep, and uh so I think this is problematic.

Dave: I switched all of the exterior lighting on my, on my house, so I'm in the country like I have seen those lights from my house. And I switched them all from whatever they were halogen for the most part to red LEDs that are sea turtle friendly and all. And the night I did that the owls started hanging out right next to the house.

Gerald: Oh wow.

Dave: Before they would not be anywhere near, there is 2 or 3 species that are nearby, and it was profound with the effect on wildlife was not to mention my own where I could walk outside and see the stars and things like that.

Gerald: Fantastic yeah, this is a growing issue uh you know along with electromagnetic pollution uh, but a serious issue because it's really not clear what, what cell phones and such, but it's sort of clear you know some people have done studies and the studies … I have a colleague in Seattle who's been studying this most of his, his career. And, and he says you know the studies that are, that are funded uh by the cell phone companies, 95% of them report no problem, but the studies that are funded by foundations or other organizations, uh not the cell phone companies 95% of them report serious problems. So I actually thought I was the only person on the face of thee earth who decided to own no cell phone, but I, I met another one yesterday uh, and so apparently there were at least 2 of us without cell phones (laughs).

Dave: (Laughs) is this because of the effect of EMFS on water or cellular biology, mitochondria activation, like what's your specific concern there?

Gerald: Uh well, the, the colleague of mine had studied DNA breaks ...

Dave: Uh there you go.

Gerald: That occur from ... Uh you know and so it's not the kind of thing that you want to happen. Uh we haven't yet had all the study to the effects of different wavelengths on, uh on water. But you know um since water absorbs many of these wave lengths you know you put your, put your water in the microwave oven, and it heats up and that's because these wavelengths are absorbed by the water. But we don't know what each of those wavelengths actually does to our, our, our body. Um and this needs to be studied, it's really important to, to do this because well you know for, for obvious reasons …

Dave: Because life depends on it?

Gerald: Oh yeah because life depends on it, (laughs) it's terribly important.

Dave: There is one more question I want to ask you before we come up on the end of the show, and that is well 2 of my questions, or kind of final question. But the other one is I know that when you drop the temperature of water it's easier for easy water to form. I do cryotherapy with like with nitrogen. So I stand in air that's chilled to 260 degrees below zero, so it's a very outer centimeters, so my skin gets a real strong signal about how cold it is. It doesn't freeze, but it drops the temperature pretty down far. Am I doing something cellular with easy water do you think, I know this is the land of speculation here, or is this more about signaling for essentially more calories burned and brown fat activation and things like that?

Gerald: Well the latter is certainly possible, I couldn't comment, but, but I think what you are doing is um you're, you're, you are generating a lot of infrared energy in the core of your body, all the metabolic reactions do that. And when you stand outside in the cold, then you have a gradient, a huge gradient of temperature on the inside to the outside. So the infrared energy for that's generated in your body goes through the body to the perforated and out towards the cold. It's passing through your tissues, and when infrared energy passes through your tissues it builds easy water. And so yeah so yeah, so I think that might be what's going on uh ...

Dave: That's cool, I've never heard that and that makes so much sense.

Gerald: Well, (laughs) it's, it's interesting to have a conversation, because some of these, these issues uh you know simulate both of us to thinking, there is nothing like thinking.

Dave: Right, my, my unusual path has led me to believe that there is quite often 5 or 6 different effects that's stuck on each other when you really feel something work. And you can hypothesis these ones, and so much of western sciences around looking for single variables. But almost every problem that's ever been meaningful to me has been a multi varied problem which makes it very hard to study because you know ...

Gerald: It's really hard yeah, yeah, that's reason for some basic science if you could … If you start at the fundamental level and figure out what's going on, then you can apply it to the body and you know that at least that's perhaps one of the factors that's involved.

Dave: Yeah, it might be why it works, but we still can measure that it works, so let's keep looking for all the reasons right, and that's, that's what gets me up in the morning, it's so exciting. Speaking of getting up in the morning I want to ask you the question I have asked every guest on the show.

Gerald: Cool.

Dave: And this is if someone came to you tomorrow and said based on everything you've experienced in your life not just with science, but certainly including that, if I want to kick more ass at everything I do, like I want to be better at everything, what are the 3 most important pieces of advice you have for me, what, what would you say?

Gerald: Oh, okay, I think motivation is, is one, but um you know the question is how you develop motivation. People without motivation are really not going to get very far. Um curiosity uh and uh you know audacity um the, the world around is actually tends to be pretty conservative, we feel comfortable with what we know. We, if we are bombarded with

something as you said earlier that we can't explain, we, we have a tendency to dismiss that, uh because if we can't explain it, it must not be true.

Dave: Yeah.

Gerald: Yeah, and this is a very serious issue and I think it's … It affects many scientists who will reflexively dismiss ideas. Because, oh if was … If it's a good idea somebody would have discovered it before, so don't, don't, don't bother us with, with this idea. And that is really a, a, a critical one, it's critical, it's not, not just for science, but uh for other realms and other disciplines too.

It's uh having the audacity to go ahead and follow your, your belief system with, with some reservation you know you have to listen and, and hear the facts. But um it's one of the reasons uh I feel really strongly about this is one of the reasons why we've created an organization called the Institute for Venture Science IVS, the website is ivcsci.org. Um we haven't, we haven't seen during the past few decades uh very many scientific revolutions or, or breakthroughs. Um 100 years ago there were many of them, you can go back and there are familiar, familiar names of Einstein and Max Plunk and you have Pasteur and there, there were so many that clearly that occurred. And the question is you know at that time there was very little money for science, now there is a lot of money, we all complain that there is not enough and it's true.

But we have a lot of money compared to then, and yet it's really hard if you, if you try to put your finger on fundamental scientific breakthroughs, not technological, even lots of those you know iPhones and such. But fundamental scientific breakthroughs that are the same level as the discovery of the periodic table, or the splitting of the atom, or the structure of DNA which was I think 60 odd years ago, you can't find them, it's really hard. Um revolutions, not promised revolutions, but revolutions that have changed the world. And I think one of the reason uh is, is that it's difficult for, for scientists with, with fresh ideas to gain traction, and the reason is the one that we discussed that, uh oh if that's true people would have discovered it 100 years ago.

And so we created this institute to change that, and, and the idea is that um it works on 2 principles, and one is that if you propose that the earth is round and everybody around you knows that the earth is flat. If you put a proposal then to a standard granting agency, you'll be reviewed by the experts naturally, the experts in the field and those are the flat earth people, your chances of getting money to pursue what you want are vanishingly small. All right and by some quack if you happen to get the money, and you study and you gain, uh obtain even more evidence that the earth is round, um you'll be labeled as a crack pad, because many people are threatened by that.

All the flat earth people don't want you to be correct because many of them are more interested in their uh their careers, than they are in finding the truth shall we, shall we say. Um and, and, and maintaining their career means they have to be right. And if you are right with round earth, they are wrong, and so they are no longer the kingpins in the field, that's very threatening to people, that's a human issue. And so we get around that by actually taking round earth ideas like that ideas that uh we not the experts, uh people who can understand what you are talking about, but don't, don't have the skin in the game uh to, to, to want to dismiss your idea. So we accept your idea, we fund you and then we look for other groups around the world who have a similar vision that you have that the earth maybe round.

And then next year we fund them, and next year at the annual meeting of the shape of the earth society suddenly there maybe 10 or 12 groups using … Each one using a different method demonstrating that the earth is round, and you can't ignore that anymore. And, and, and so this we think is, is the key to breakthrough science revolution if you will funding multiple groups, developing a critical mass. And we think that it's going to be able to restore uh revolutionary science the way it was 100 years ago.

Dave: Well, I, uh I am more than ever motivated to introduce to you into the, the hero X foundation and the XPRIZE people. What they manage to do is put a little price first on it, so instead of just writing grants which,

which is a possible thing, the team that wins, wins a sizable purse even if it's only a half a million dollars. That's still huge amount of money compared to the 10 million they use for space flight. Well when you have that, that element of competition uh it seems to move things forward in, in a really cool way.

Gerald: It could be, it could be, it could be.

Dave: Interesting.

Gerald: Yeah, yeah I mean anything you can do uh the, the world really needs uh fresh, fresh thinking. There are, there're many ideas I come across I'm familiar with many different scientific fields. People come to me because they, they sense an open mind and they like to tell me about what they are doing. It's some other stuff frankly I, I think it's flaky, other is, is, is amazing, I mean truly amazing. Uh there is a guy uh who I met the past couple of years who was actually able to cure cancer with his hands. Uh his name is Bill Bengston and uh he's done experiments on, on mice with tumors, it's a mammary tumor, it's 100% fatal. And he puts his, his hands around the mouse that has been injected with, with the tumor and has already developed a, a large mass.

And he runs through in his mind uh kind of a list of positive emotional experiences he's had in his life and he runs through again and again and his cure rate is 100%. Um this is, this is the kind of stuff people don't, don't know about this, and of course a lot of people will feel threatened by it because it's you know a multi billion dollar business if you will, not only the pharmaceuticals, but all the researchers who were studying uh you know chemotherapy and other kinds of, of measures to combat cancer. So this is entirely different, and um it's not easy for him to, to get research money to, to pursue this.

So this is just one example of, of many out there, many really promising ideas that need to gain traction to see if they are really as worthwhile as some of them appear to be. It's going to change the world.

Dave: It absolutely will change the world, and, and there are some people who

appear to have pretty strange abilities. And, and there is a reflex among the skeptic community which is actually surprisingly small percentage of people, but a very vocal percentage of people. Uh but it's probably 2 to 5% of people where every, everything is glass half empty. But the real scientists out there uh who are actually doing real evidence based medicine versus what is only double blind study based medicine, which isn't real at all, uh in terms of, of you know real evidence there is many kinds of this.

But when you look at something like that, any true science should go that's, that sounds hard to believe, but if it's true it's one of the most important things ever, we need to see if it's true. Whereas we have this, this response which is you know bullshit, that cannot be, therefore anyone who even talks about it is a con artist and a quack and …

Gerald: Pseudoscience.

Dave: Yeah and that kind of reflective stuff it's just fundamentalism, it's no different than ISIS. And it's really bad for the world like I would not have that, it is not okay.

Gerald: Well, good for you.

Dave: Let's look at that stuff, let's figure it out and some of it is totally self deception, that's great let's figure it out. But if you don't apply science to figuring that out and you apply dogma to figuring out, you are jerk and I'm totally happy to call you that. Well I'll go over myself back there, but you got me joking.

Gerald: No I, I, I … Believe me I hear you. Uh and I you know if you are well connected and you, you know some uh people of, of means who want to return something to, to the world. This is the Institute for Venture Science is the perfect place to do, we've just launched and uh and we are looking for, for donors who, who want to see changes in, in the world in their own lifetime, have a front row seat where they, they can see things happening. This is a good …

Dave: I, I think I know a group of extremely financially successful hundreds of millions to billion dollar kind of success, people who will be really interested in your work, and I will be doing some back channel introductions and things like that.

Gerald: Oh that's good, thank you very much.

Dave: Fortunately some of my coaching clients have been very successful. Uh and so let me just drop a few little comments in the right places and maybe something great will happen, if not I can make a few interest to people who can maybe just move the initiative forward. So this is important work and thank you for doing it, and thank you for your audacity, that's exactly the right word. I really appreciate your work, and I'm grateful that you are on the show today.

Gerald: Well thank you for having me, it was really fun, I appreciate it.

Dave: Have a beautiful day.

Gerald: You too, take care.

Dave: If you enjoyed today's show, and let's face it how could you not enjoy the show uh Gerald Pollack has, has spent his whole life doing this amazing, amazing work. And when you read his, his books they are technical, but you realize there is something happening that science did not know about. And he's just had the, the tenacity to dig in, and he's discovered some fundamental things that I believe have a really good chance of changing the way we understand biology, and changing the world. So if you enjoyed the show like that, I would love it if you supported the show. And there is something in line with what we talked about today, and it is the Zen Tech skin protector.

This is something you slap on your computer, you slap it on your phone, you do it one time and it blocks some of that blue light we talked about that comes without infrared, which lowers the amount of stress on the cell membranes in your eyes. And it lowers the uh, it lowers the effect of blue light on the body, because it filters out some of the blue light. This

is a pretty cool thing, and it's a onetime thing you do, you just go to bulletproof.com, and search for Zen Tech, and you could pick one of these things up, and you'll probably feel the difference in your sleep, and if you don't, you can always send it back.

Have a beautiful day, I'm so excited about this interview, I'm super charged by it, I'm going to go get some infrared lights and stick them all over my water spray, have a great day.