Introduction and Professor Pollacku2019s Background

– Well, Professor Pollack, it it's such an honor to have you on this segment of regenerative medicine, the General Medicine Summit. So thank you so much for joining me.

– I'm delighted to be back with you once again, – What I like to just for the audience to kind of get to know, I'm not, I'm sure that the majority of them already know all the amazing work that that you're doing, but I just want to kind of highlight some of the things that that uh that you are part of.

So, Professor Gerald Pollack maintains an active laboratory at the University of Washington in Seattle. He is the founding Editor in Chief of Water, a multidisciplinary research journal, Executive director of the Institute of Venture Science, co founder or Fourth Face Incorporated and founder of the annual conference on the physics, chemistry and biology of water. He has received numerous honors, including the probably Gonna butcher this prick again.

– Pretty jean. – Okay, thanks to Pretty jean medal for thermodynamics, the University of Washington Annual factual lecture, The NIH Directors transformative research award and the first Emoto Peace prize.

Why Water Became the Focus of Research

He is recognized internationally as an accomplished speaker and author and most notably his last book, the fourth Phase of water. Well, I'm curious why water, I know in our prior discussions, you you mentioned that water was you were actually suggested to not study water and here you are. – Well, you have a good memory.

Yeah, it was I was in a department of biomedical engineering for my PhD and by by some coincidence, completely unrelated to what we do and now there was an emphasis on water in biology in that, in that department.

And as a student, my interest in that subject was as close to zero as as could be. It held almost no interest. And one of the professors in the department came to me a friendly guy and he said to me, you know, in your career you can do anything, you want to do, study anything you like, but don't study water.

And why? He said, well, he was referring to um I guess at that time there was only one debacle that had taken place. It was a famous Russian scientist guy named Boris Derjaguin who got into trouble.

He was probably the most famous and most recognized of all physical chemists in Russia. And there were a lot of them in Russia. And apparently he screwed up.

He didn't really screw up, but he apparently he got into trouble, he found, or someone came to his laboratory and demonstrated to him a peculiar observation regarding water that if you put water into some cylindrical kind of container, that the water exhibited or formed some kind of dendritic structure, long, narrow um structure.

And this structure behaved. It was water in some sense, but it behaved differently from ordinary water. It had a higher boiling point, a lower freezing point, higher density etcetera etcetera.

And he was he began touting this as maybe an interesting new characteristic form of water. And boy was he beaten for it. And without going into great detail because I know you have a lot, a lot to ask basically. He almost lost his career.

And ultimately he wrote an article saying that, you know, after having been criticized is that we were wrong, we screwed up. And that's the public face of what happens. There is a bit happened.

There's more to it. I spoke to two people who, who had been really close to Boris Derjaguin. One of them is an institute director in push china where the same place where um uh Gary again had spent some time and another

was his last post doctoral fellow independently, they told me the same thing that although he recanted, he was forced to recant by the soviet regime. They, they didn't want to be blamed.

You know, soviet science was impeccable. So they shifted the blame onto dairy again himself and he really had no choice if he didn't do that, he'd wind up probably in some work camp in Siberia or something like that.

So he recanted. But until the day he died, both of these people independently told me he was sure that he was right. So anyway, that's one of the more famous stories about water and it's one of the reasons why why scientists don't particularly enjoy or they have no real proclivity to enter into the arena of water.

You know, it's pretty risky if you immerse your toes into the water you may sink.

Structured Water and the Fourth Phase Concept

– But I mean looking at, you know the I mean just looking at our bodies, I mean we're two thirds water and I know you you mentioned that if we line up all the molecules you know that we have in the body, it's it's like 99.5% of water.

So just looking at that obviously when it comes to life and comes to our function, water is fundamental. So the research is really needed in that area.

– Well, it depends on your point of view. Of course, I agree with you without question, its fundamental, but you know, if you read a standard biochemistry book or physiology book, the water molecules don't do a whole lot. They basically form the solvent for the more important molecules of life. And so chapter one, whether it's cell biology or biochemistry always talk about water and then they forget about it as though there's an obligate torrey mention of water and then, you know, water doesn't do anything. It just sits there and and you know, It's hard to imagine. It's hard to think just if you think of it from a layman's point of view, it's hard to argue that 99% of the molecules in your body don't do it basically don't do anything, you know, um it's not like mother nature, everything is there for a reason and a purpose. So just from that naive point of view, it's really hard to argue that the water doesn't do anything, but of course there's so much beyond that that is indicating that water does a lot.

And in the first book that I wrote about about water sales, gels and the engines of life has a pretty cover. And that first book half of the book, the first half argues that there is such a thing as so called structured water that Gilbert ling, Albert ST George e and others have been arguing for years.

I tried to present that story in a way that was understandable. In the second half dealt with what, what does that water do And I presented evidence um each one chapter per per system that various systems in your body, like for example, muscle cells, nerve cells secret Torrey cells etcetera, etcetera, that in each case that a transition of the water from this, so called structured variety we now call it fourth phase or EZ water transition from the structured phase to ordinary liquid water and then back again is a cycle that these fundamental cells undergo.

And if these fundamental cells do it and probably other cells do it too, of course we, you know, we couldn't consider every cell in the body, but basically the some of the more important cells, the evidence contrary to what you read in the text book, the evidence suggests that the water is intimately involved.

So, you know, when a cell springs into action, it's not just the proteins that undergoes some kind of change to bring about this effect, but it's the water and the proteins together And and this kind of transition of water and proteins from one state to another is called the phase transition. And that was that was the essence of what was presented. So, this book is now, has been out now for more than 20 years, I think it was 2001 and I think the evidence is pretty clear that the water is absolutely centrally involved in everything the cell does. – So all the studies that you've done, you know, since then, because obviously in 20 years there's a lot that you've set up, a lot of research that you've done since then, it's it's still these theories still hold water sort of say, I mean they still – Hold water right, thank you for that.

They hold water. I need to adopt that into my lexicon. – So, explain a little bit for the listener. I know obviously you

talked a lot about this in the past, but to kind of in a simple picture explain what easy water is structured water or you know, all the different terms that you use.

– Sure. Yeah, well, so the word structured water is the old, you might say classical term and and the idea is that that the water has structure to it. So if you think about this kind of water which I should be drinking more than I keep getting reminded that it really is important to drink water, I should know, but you know goes I'm too busy.

So this this kind of liquid water, the molecules are not structured, so to speak. So the individual molecules of H. 20. They're bouncing around at a fierce number of times per second or even perfetto second and they're randomly disposed in in in here. And so that has no real quote structure.

But the argument has been in the past, Gilbert ling especially and Albert ST George e ST Georgie is considered by many to be the father of modern biochemistry. He won a nobel prize for discovering vitamin C.

And you know, his intellect was really rich. He was revered even by other nobel Laureates as a really creative guy who came up with so much so these two guys and and Gilbert link by the way he passed a couple of years ago, just shy of 100 years old. And he was chosen, and he was in the first cohort of people who came from china in 1948, the Chinese government um chose from throughout all of China. They picked three people, three young people to come and study in the US Now the drain is kind of moving in the opposite direction but so all of china in all of china they picked up a chemist, a physicist and a biologist, and Gilbert ling was a biologist.

The chemist went on to win a Nobel prize in his field. The physicist went to win a Nobel prize in his field and Gilbert ling should have won a at least two Nobel prizes for all that he did, but but he was not so fortunate.

His work in water was controversially with everything in water is controversial anyway between the two of these guys. They talked a lot about water structure, the idea being that in biology at least and we know now that it's way beyond biology only in biology at least the water molecules were somehow organized or lined up or structured if you will, you know like soldiers at attention. And that was a really controversial view.

However that's where the word structure originated and it's it's it's not really a great term to use because everything has structure. Even if it's random structure, it has structure. But I think, you know, people understand when one talks about structured water. Well when we started our studies, I'll explain a little bit about about the the water that so called structured water, we gave it different names. I'll talk about the characteristics of that in the moment. But um we because the properties were so vastly different from ordinary liquid water. We we opted to call it 1/4 phase of water a different phase where where the molecules were not like liquid water as I just described, but somehow ordered. Not the way Gilbert link suggested we found, but the same kind of idea that there was some kind of order ordered waters and other is used as well. So we call the fourth phase, we also call it exclusion zone or easy, easy to remember.

Easy exclusion zone water because because this kind of water is like a crystal, you know, when the molecules are organized or aligned with one another, that's the characteristic of a crystal and crystals tend to exclude salutes and particles otherwise they wouldn't be pure, you know, you've got to get rid of what's in the the original solution in order to gain purity and so they excluded sort of like at the bottom of the glacier when ISIS formed, you have a glacial moraine with all the junk that had been in the water that was freezing. So, that's where the name Easy water and fourth phase water. That's how they acquired their name.

So what is, what is this? Easy water? Well, you know, some years of study with a lot of talented students and postdocs and colleagues and led to an understanding.

So the first the first characteristic when we began studying it, we were looking, we're looking for an experimental preparation where we could find something that's crystal like. And and we exploited the characteristic of crystals that they tend to exclude. So we took a chamber and we put in particles little spheres called microspheres. And we plunked into the chamber a gel hydrogel, that is a water, a gel that contained water.

It was a polyvinyl gel that we started with. And we looked in the microscope and what we saw next to the surface of

the gel is that these microspheres.

These particles began to get excluded and and they got pushed away from the surface of the jail, creating a zone that had no particles. So we have a jail.

Easy Water, Charge Separation, and Cellular Energy

And next to the jail is this zone with no particles. And all the particles are shoved out out here. So that's how it got the name exclusion zone. But but of course we studied many characteristics of of the water that was in this zone. And everything we studied looked different from ordinary water. And that's how we derive the name the fourth phase of water. So let me just tell you just a couple of characteristics of it that are really important. The first was that it's not neutral.

So water H 20. Is neutral. But this zone we found is typically is negatively charged and they to find out that it was negatively charged. We basically made direct measurements sticking electrodes into that zone. And we found a negative charge in that zone.

So from that we surmised, you know, it didn't take a rocket scientist to figure out if if this stuff is negative, it can't be H 20. Because H 20. Is neutral, so it had to undergo some change. And and we found that the actual structure is H 302.

And we found also through a whole bunch of different studies that what happened is that the water molecules, you know, all of it starts with water molecules with liquid water, you pour the liquid water in the chamber next to the gel or next to the some kind of hydro filic water loving surface. and the transformation begins and it begins with the first molecular layer of water. So it interfaces with with that solid or gel. And the gel creates a kind of template the gel surface that propels the transition of the water molecules into a sheet like structure. That's a honeycomb.

It has a hexagonal motif. So, if you were to look this way, you would see hexagons, um you know, it's very common throughout nature. And that first sheet then serves as the template for the growth of the second sheet from the water molecules and so on and so forth. So this grows sheet by sheet.

And it can grow, you know, many sheets easily hundreds of thousands and maybe close to under the right circumstances of a million or millions of of these sheets.

And when you translate that into a dimension that we know, you know, half a millimeter is not atypical. And we've seen sometimes a full meter or more in the right kind of chamber. So this can grow huge hugely.

And so that's the second characteristic. A third characteristic is, you know, I mentioned that typically it has negative charge. If if anybody is thinking, I'm talking, they would think, well wait a second, Something's wrong here because you start with water, water is neutral. If you got a zone with negative charge.

What happened to the positive charges? We found that they're pushed out as the exclusion zone forms and they're pushed out into the water beyond. So you got negative and then you have positive and they remain separated from one another, that's a battery. And we found that if you stick electrodes one in the negative one and positive, you can light up an led.

For example, you get current out of that. So so you can get electricity out of that. You and and, you know, the electricity in in theory could be when properly engineered, it could it could yield appreciable amount of current and could serve as as a a new, you might say revolutionary source of electrical electrical energy. And also for the cell because this stuff exists inside your cells. Your cells are full of hydra filic surfaces, the proteins and nuclear gasses and this stuff builds next to those and essentially fills your cell every cell in your body. If it's healthy, it should be filled with easy or fourth phase water, you see.

So, the energetic implications are are important, but just one last thing before I rag on and on you know, every battery needs charging. So you have a smartphone, right? I think you do and I'm the only one.

– Well I yeah, I try to be as smart as my phone but it's not working. – It doesn't work for any of us. Well, you know, some of us don't own cell phones. – Good for you.

– Yeah, but I'm on the threshold of relenting because it's just impossible. So I, you know, I go I just went to see an optometrist. It's been it's been years and they instructed me don't come into our office, sit in your car, tell us you're here and then we'll text you when we're ready for you to come in if you have no phone, you know, you can't be texted. So this is just one of so many examples now of how it's becoming impossible to live without a cell phone anyway.

That's beside the point, but but the point I'm making is is that your cell phone and all others need to be plugged in. You go to sleep, you plug it in, you wake up in the morning, it's refreshed, it's got new energy. All batteries need recharging and, and so what I'm talking about with the water is essentially a battery you got plus and minus, just like your battery inside your cell phone and it needs to be charged.

It can't just keep producing electrical energy without some input energy of some sort, you know, nature can convert one kind of energy to another, but it can't create energy, right? So it's got to come from somewhere and we couldn't figure it out. And, you know, I spent a lot of time scratching my head. That's why the hair is kind of missing.

You know, trying to figure out where does the energy come from. You know, you can't take the chamber and attach a plug and plug it into a receptacle and well, you know, that's not working, not feasible.

So where's it come from? And we couldn't figure out. And finally, it was, it was a student who figured out a student was doing, he didn't know he was figuring out he was doing something that he was not supposed to do.

So he's got one of these chambers that I just described and – That's usually how inventions come to places is when you do something you shouldn't and you see the effect of it. – Well, you know, Michael, you, you're right and I'm not telling the story exactly as it was, I encourage the students to do that. You know, do something you're not supposed to do? And it's been remarkable how the students come up with observations that we never would have thought of just by serendipity.

So the student took it was it was a lamp, a goose neck lamp that was sitting next to the chamber and took the lamp and then shined it on the chamber. And he saw that the region of the chamber that had been illuminated that the exclusion zone just grew and grew and grew and he ran to my office called me in, take a look at this. So I took a look and I was astonished because you know, it seemed pretty obvious the region that received light was growing.

The easy was growing, fourth day was growing. So, you know, it seemed pretty clear that light photons, some kind of optical energy was responsible for for for building the easy, you know, And then we check different wavelengths in genuine bonafide experiments and we found that that most wavelengths were didn't do anything. We tried UV we went through the visible spectrum and when we got to the infrared, the long wavelengths then it was like gangbusters, just a small amount of infrared energy.

Built the exclusion zone like crazy. We could with an L. E D. A week led generating infrared light at a wavelength about three micrometers. We could expand the easy by 10 times.

It was yeah, it was incredible. indeed incredible. So that's the maybe – So how did you ever try then to have it in completely black? You know, where there's no light coming in and then seeing how the the easy, how that zone behaved.

– We have. But you know, you need to realize that infrared is a wavelength that we can't see. So if you were to turn off all the lights in your studio or room or wherever you are, and you can't see anything and if you whip out your smartphone and try to get a photo, you won't even with a sensitive detector, you won't get anything if you took your phone and replace the sensor with an infrared sensor, you get a beautiful image of everything despite the darkness. So it's always there.

And even if you go into a deep cave that is dark and black and you still have plenty of infrared energy, you can you

can get beautiful images of everything around you with an infrared camera because everything is generating infrared energy comes, you know, ultimately comes from the sun whose energy is roughly half is in the infrared region. That's why you feel warm.

So we generally equate warmth with infrared. The two are not exactly the same, but, you know, close enough. So yeah, we've done that. – It seems to me that, you know, because as a human being, we all talk about mitochondrial health. You know about the energy production.

And the cells need energy in order to be able to repair and to to live healthily to detoxify and all these different things. So it seems to me if we can maximize the amount of easy water within the cells that we can then also maximize the youthfulness of the cell.

– Precisely. Yeah. I mean, this is you should be working in our laboratory. Yeah, I mean, this is precisely the point. So, your sales when they're healthy, they should be full of easy water. And by the way, parenthetically easy water is negative, your cell is negative.

And I've argued before that the reason why our sales have potential differences of minus 50 to 100 million volts is because of the water because the Ez water is negatively charged, that it has nothing to do with the pumps and channels in the membrane.

Light, Infrared Energy, and Building EZ Water

And this is the commonly held view. And it explains why if you have a gel, you know, no membrane, no pumps, no channels, nothing like that. And you stick the same electrode that you stuck into the cell, stick it in the gel, you get the same result.

But there there there's no membrane gadgetry. But you've got the same result. So, I think the the reason for the negative electrical potential inside the cell, there is the water that has negative charge. You know, you have a, you have a container, you feel it with negatively charged stuff and of course you measure negative electrical potential. It's it's as simple as that.

The corollary of that is from what you said, You know, is that six cells don't don't have a full complement of easy water. And if you look in the literature from 60 or 70 years ago where people were many people were making electrical measurements inside the cell, including ourselves. If you look at cancer cells, for example, Cancer cells instead of -60 -70 -80.

Billable, it's -10 or -15. Billable, implying if our argument is correct is not much easy water inside the cell. And so for me, this is a really important clue that in terms of cancer that you know the cell well, you know, cancer cells tend to be rather undifferentiated and and so the surface of the solid surfaces that are required for building easy water are not in huge quantity. And and this could be a fundamental clue as to the genesis of, of cancer. And the same with, for example, pathological kidney cells. If you look at the literature, same thing 10, 15 million volts negative instead of 60 or 70.

Not enough. Easy water. So, the corollary that is, if you want to keep the cell healthy, you've got to make sure that there's enough easy water. And there are many expedience that can be used to build easy water.

You know, common expedience. The most common of which is to do this. Yeah. So you know you drink the water and some of that water not all some gets peed out but some of it gets converted into easy water, a fraction of it gets gets converted and that's one way of you know basically you're rehydrating the cell and that's why you know everybody says drink more water, drink more water, drink more water. I wish I could learn that.

– It's too much to do. – Exactly right. It's too much to do. – So the key, I mean it seems very fundamental to me. So you need to hydrate. I mean I I know what was that book?

You know the cure for all the water, the cure for all disease or there was a general in the – Iranian one. – Yeah.

Yeah exactly. Exactly. Where where he was treating prisoners just with. Yeah. Yeah.

– Amazing. Yeah. He can cure all kinds of diseases by drinking more water. – Yeah, it's incredible. So it seems there are fundamental to me to just drink plenty of water and then be out in sunshine. I mean that that that seems to be a very kind of a strong driver for health and mitochondrial activity.

– Absolutely yeah being out in the sunshine. So where I live here in Seattle in the wintertime we don't get much sunshine, we get clouds up there. You know a lot of people get depressed because of that many people leave for places farther south where there's more sunshine and then they return, the summers are really glorious here. But the winter can be you know pretty pretty depressing for a lot of people. So yeah the sun is important and if you don't get, if you don't have the sun, you know basically the argument would be that the sun is providing infrared energy and we need the infrared energy to grow easy to build easy from whatever water we drink. Some of it comes from inside because we have heat that's generated metabolic heat which is essentially generating infrared energy.

So we have infrared coming from inside from the core of our body and from outside both. So now if you don't get enough of that, then you're not building easy water sufficiently. But there is a solution and the fins discovered it and the Russians long time ago called, we call it sauna, they call it sauna. The Russians call it Banya, you know what is it? It's heat whether it's moist heat or dry heat.

It may matter but it doesn't it's not the critical factor. The critical factor as the heat. So you're getting infrared energy. As I said not exactly the same as heat but close enough and that energy builds easy water and so you know, you immerse yourself into the sauna.

You come out 20 minutes later and you're feeling like a million bucks, your headache is gone, your depression is gone, your etcetera etcetera. And why is that?

Well? So I would argue that the reason is very simple. It's the infrared energy is building easy water. So there is some other expedience besides besides that. So for example, some substances that are known or you know have been known for thousands of years since um you know ancient china or even ira vedic times to be to be good for health. And of course lots of people have speculated on why these substances are so good for health, like curcumin and turmeric for example, that's just you know, classic example, you know, no matter what, what ails you. It's suggested that you take some of this stuff and you'll feel better and seems to have worked over the years of modern medicine is largely forgotten about it. But there's a resurgence and revival.

So we wondered some years ago, so there there seemed to be two possibilities. One is that we have receptors all over our body for turmeric somehow it's built into us.

That's one hypothesis. And the second one is that simpler one is that turmeric has an effect of creating easy water, you know, and since the water is all over your body that could impact every conceivable region of your body right? And so we tested it.

We tested not only turmeric but holy basil. And and you know a half dozen other substances including for example and all of them we found in experiments had the the capacity for building easy water over a wide concentration range, a range that would be relevant for your body.

So we concluded from that That one way of building easy water and thereby building health is to take some of these substances, you know 5000 years ago.

They knew that we know it now but I think we provided a reason for it. – So and another substance that I know you study is populous. You know that Yeah. And that's the same thing with that substance as well. – Same thing with with populace the bees use it to you know to build their hives and we use it to and we can use it to and that also builds easy easy water.

So there's just one more I I don't want to fail fail to to mention it. And that is er thing or grounding right? And there's

been lots of studies on this and you know lots of people ground themselves and they take off their shoes and walk on the beach right right near the water. And you know most of us who have done that we feel good afterwards or we take off our shoes and socks and walk on the grass, Especially wet grass and we feel good. So what's going on?

Hydration, Sunlight, Sauna, and Natural EZ Builders

Multiple theories exist and lots of people, there are lots of biophysical studies and you know, it's clear that grounding or er thing ourselves create health.

But why? Okay. So simple again, I'm a believer in simplicity. If it's too complicated, I don't understand it and if I don't understand it well, you know, I used to think that the reason that I don't understand it is because I'm stupid and that still applies. However, however um you know, sometimes the mechanisms that you read about in the textbook, they're so complicated that they're simply not understandable.

And you know, I now realize that in some cases at least it's simply because they're wrong and you can never, if something is wrong, you can never make it simple.

It's always complicated. And anything that builds on it is equally complicated. So I've kind of changed my two. Okay. So what about when you when you ground yourself, what what happens when you when you do that? Well, so um I used to think that the Earth was neutral, No net charge. And I started my career in electrical engineering.

And no professor ever told me that the Earth that if we that if we plug in, you know, an electrical plug into the socket this third round. Nobody told me that it connected to anything other than a bland neutrality.

Never did I hear a word. And so I was surprised about 15 years ago when a Russian guy in my laboratory began telling me, began talking about the Earth's electric field. I said, andre what are you talking about?

You mean the Earth's magnetic field? I never heard of electric field. He said he was shocked, so to speak. You never heard of the electric field, don't you know that the ionosphere is positively charged and the earth is negatively charged, It forms a kind of capacitor with an electric field in between.

I never heard such a thing. he said – That was Tesla, he did a lot of, you know, studies with that, you know, to to draw the energy because of that separation of charges.

Right? – Well, I'm no expert on that, but yeah, I've heard heard the same. So Tesla knew about all this stuff, lots of people knew 100 years ago, this was well known.

But somehow the American education system has failed us. So the Russian guy, Andre in the laboratory was telling me that in Russia, every middle school student knows that the earth is negatively charged, you know, and here, you know, someone who got a degree in electrical engineering, never heard of such a thing. So, I I went home that evening with my head spinning and next day one of my students brought in the lectures, the Richard Feynman, you know, the great Nobel laureate, three, volume set that almost every physics graduate student in the US reads and there it was volume two, chapter nine, an entire chapter dealing with the electrical charge of the Earth and the evidence for it. So there's plenty of evidence for it.

It's just that, you know, we're not educated in it because somehow, the our educational system, people who were involved with it, think it's somehow not so important or superfluous or whatever, but it's it's absolutely critical. So, you know, with that fact, we don't know it, many people don't know it, but it's a fact if the earth is negatively charged and you connect yourself to the earth, some of that electrical charge will seep into your body, especially if some region of your body is not so so well, electrically charged. Um you know, it's gonna gonna seep into our body. The current electrons tend to flow.

And so we found separately in laboratory observations that if we stick some wires into water and pass current, the the the the electrode of the wire that's passing the negative charge right around it grows um easy region.

It converts by putting electrical charge. The electrical charge. The electrons convert easy water, which is neutral to, I mean, ordinary liquid water, which is neutral to easy water, which is negatively charged. It's very simple.

So you walk barefoot, um near on the sand, near the water or on wet grass. And the negative charge that enters into your body, that seems, And is going to build easy water.

And so the reason you feel better, I would I would argue could well have to do with the fact that your cells are building easy water and any regions any particular cells that for some reason are deficient and easy water that get filled up with easy water.

So anyway, and yeah, – Cause that yeah that's another way then to recharge your battery just like the sunlight. Now you can then recharge your battery by restoring the Ez water within your body just by walking barefoot.

– Yeah, that's probably the best way to say it recharge because really that's what it does, it charges. Yeah. And it recharges. Yeah. – And so I like to get back a little bit into the cell.

I mean, we we have like the mitochondrial activity. We talk about the electron transport chain or chain transport. And that is how the energy is produced.

Is, Do you agree with that? I mean, do you agree with our look at mitochondria and and that is the energy produced. It sounds to me that it's more all these kind of easy exclusion zones with separation of charges that then started then generate energy within the south.

– Well, okay, so if you look at the mitochondria, look at the structure of the mitochondria, it's got internal membranes and these internal membranes are just right for building easy water. So I would surmise that in inside the mitochondria is a build up of easy water which contains negative charge, the cell needs negative charge. And this could be a source of negative charge.

Now services one point second point, which maybe even maybe even more relevant. Is that there there actually was something of a controversy about the role of the high energy phosphate bond.

And this is not something that originated with me, it actually. So, when when the high energy bond phosphate bond was first revealed how many years ago, 70, 80 years ago or something like that by some physical chemists.

Everybody was excited because you know, finally we can understand about the energetic of the sail. Cool, exciting, interesting, amazing. One year later.

And this is all pointed out by guilt the same Gilbert ling. And if you look on his website, which I think still exist, Gilbertling.org. he discusses the issue.

And so one year later, another equally distinguished physical chemical group said, no, no, no. You guys last year what you published is wrong. You made a simple arithmetic error. And there is no such thing as a high energy phosphate bond.

Now, according to Gilbert link, nobody has ever followed up. So, we don't know whether these guys were wrong or or perhaps a group that challenged them.

Maybe they were wrong. Nobody knows. It seems to me absolutely urgent that this be followed up because you know, if it turns out that the high energy bond really doesn't exist.

You know, then the question arises. Well, you know, if the energy for running our machine, our body doesn't come from the high energy bond, where does it come from? And there, you know, we can look at the electrical energy that I was talking about from easy water.

So inside the cell, for example, you've got lots of negative charges.

Grounding, Earth Charge, and Recharging the Body

Those negative charges want nothing, but nothing more than to get away from each other because they repel one another. You know, and so the fact that they're squeezed together inside the cell means that the sale has got potential energy and that energy could be used.

And we showed and various studies that if you ask me, I can tell you more, that this energy is used. And so the more general question arises um where do we get our energy?

Do we get our energy completely from a T. P. From the high energy bond? Which is what essentially everybody thinks right now? Or do we have some of our energy from this electrical energy?

That is there is potential energy and, you know, might as well use it if it's there. And even possibly if the A. T. P. Idea turns out to be wrong, I'm not saying it's wrong, I'm saying it needs to be checked, it could be that we get all of our energy from electricity basically from charge.

That's what runs it. And you know that if it turns out that that that's correct. It can kind of better explain the people who somehow survived pretty well without eating the so called breed Arians.

And there are quite a few of those and I personally know some of them who who go for, you know, long periods of time eating nothing. And for example, the dancer, dancer contacted me a few years back.

She said, she said, you know, sometimes I just don't feel like eating. She said I stop eating for a month at a time and I keep dancing, you know, and dancing is not the amount of energy that's required for dancing is is appreciable. And she'll go on for a month and then she'll decide, okay, I feel like eating, so I'll start eating again etcetera, etcetera. And there there there are quite a few such people. So where do they get their energy?

You know? And a possibility is they get their energy from the environment from the infrared energy that then builds charge and provides energy. This is a real possibility. So I'm not saying it's right, I'm saying it's possible and I I think all of this really needs follow up because what what could be more important for us then, you know, where do we get our energy, – I mean exactly, these are that the fundamentals in life.

And I know also you you've kind of taken a crack at like the origin of life, you know, in regards to, you know, how cells come together, if they're like, you're talking about that there, you know, both of them are negatively charged. So how do they come together?

You know? – Well, yeah, if you're asking me to respond to that, I guess. Yeah, yeah, Okay, so it's kind of amusing holding because, you know, if you ask anybody out on the street, what happens when you got two charges that are the same, like two negative charges? Do they repel each other or do they attract each other? And probably 100% of the people will say, well, they repel each other, right? And but it turns out that if you put them in water more often they attract each other instead of repelling each other.

And that's been demonstrated for for many years and we demonstrated ourselves with with at least one paper that we produce, you know, just putting, you put two negatively charged spheres um in the water.

And what happens, you expect them, you know, the reflexive responses, they're going to do this come up, but actually they do this, they come together and so there there are, you know, lots of observations of this that are not mostly not taken seriously, but they were taken seriously by one Richard Feinman the same guy, I was talking about the Nobel physicist to, you know, many will label not only the funniest guy in the second half of the 20th century, but the Einstein of the second half of the 20th century, So a sense of humor and a brilliant guy. And so he talked about this and I think it was his Nobel lecture where he talked about it, and he called it the phenomenon, like, likes like, so like charged, they like each other, so they come together um Right, And he said like, likes like because of an intermediate of unlike So he said somehow you didn't know exactly how you got these two negatively charged blobs, and if you have positive charge in the middle, the positive charge will attract these negative charges and they all come together and they'll come together just to the point where the attractive force

that's bringing them together is balanced by the repulsive force between these, then they're stable that some sort of so like, likes like because of an intermediate of unlike C. So where does it, unlike, where does all this come from? And we studied this and we published it.

So if you have like a sphere that's negatively charged, you put it in water, it's going to develop an easy and and Easy has negative charge and that's the negative charge negatively charged, easy builds around this one and around this one it casts off protons, because that's that's what happens when, when this build and that's the way you get a balance.

You know, you start out with neutral water and you get negative here and positive beyond. So in between these two spheres will be the highest concentration of positive charges because the positive charges are coming from this fear and this fear.

So their highest here. So they'll draw together and we produce evidence that this is indeed. So what was the original question – I'm talking about the original life?

How cells come together? – Right, okay. – So or how molecules cells to, you know, you have sperm, you have egg, you have I mean all these different things, you have tissue regeneration, you know how how to sell structure and kind of place themselves, you know where they're at and the structure. – Absolutely yeah.

So you can imagine on the on the primitive earth before any life began you got substances and they're they're spread all over the earth, there's no reason to think that they would be at the beginning that they would be concentrated but in order to form a sale, they need to be concentrated.

You know, you need something to come together in a blob. There was plenty of infrared energy to build easy water and there was an acquis and supposedly an aqueous environment. And so there we are we have all of the necessary components or ingredients to bring things together.

I mean this is not the full story of the origin of life. Not too many people who were present to witness it. So, you know, we don't know but but at least I think this is an important starting point.

– And so when we're talking, I mean this this summit is about regenerative medicine. So in order to be able to regenerate, I mean it seems to me that by building this the higher amount of easy water, it will then create more of a like likes like sort of say, you know, which will then build stronger tissue, regenerate joints, regenerate muscles. You know when you have more of that, that kind of concentration of separation of charges?

– Absolutely, yeah. Right on nothing more to say, you're right, I'm with you. – And another thing that I wanted to kind of get into is, you know, talking about, you know, things like high blood pressure. Talking about how does you know, blood flow through blood vessels, you know, how does things move, you know, in within two bills are within tubes, you know, is it just the heart that's pumping it? Is that the only thing or does easy water play a role in that? And then by maximizing the amount of easy water.

Will that help them in regards to blood pressure and so forth? – Well, yeah, absolutely.

Mitochondria, ATP, and Alternative Energy Ideas

So you've read and educated yourself in in in the material. So yeah, let me discuss this. The bottom line is that our conclusion is that it's not just the heart that drives the blood flow. It's also the vessels themselves.

We've got two sources the heart and the vessels. So it starts with an observation of another another undergraduate student who was doing what he wasn't supposed to do. And we had just discovered that one of the materials that we had been using pretty often for many of our studies, a polymer called Nafie in. We were using it in sheets and we found out it comes in tubes.

So I asked the student, as young, eager undergraduate student to take a look at the tubes. And even though they

had a cylindrical kind of geometry, please, could you check to see if they form easies?

And we knew that easy is formed next to planer surfaces. But we didn't know about curved surfaces at the time. So he went into the lab and you know before, before I knew it, he was he had he had confirmed that, yeah, it was both outside and inside the tube.

If you immerse the tube in water, you get easies. And I I was busy doing something or rather I didn't have time to discuss with him what he should do next. So, he was further initiative.

And he did some more and a week or two later, I'm sitting in my office with a visitor. And as I recall, it was a kind of important guy. But the discussion was sort of dull. There was not much happening during the discussion. And so I, you know, I was eager to be interrupted. And and the student comes barging in.

Usually the students are a bit more polite. You know, I leave my door ajar and they'll kind of peek their head in and say, oh, you're busy or something like this. But this guy pushed open the door and without even a hesitation, he said, I found something interesting.

I thought you'd like to know, okay. You know, tell me what you found. That's so interesting. You know, with some degree of skepticism, some feigned annoyance at he had the temerity to barge in with while I speak into this important visitor.

And he said, you know, I'm looking and what I see is that I immersed these tubes into water. And I observe what's going on and the water flows through the tubes, like flowing through a straw. He said, the tube is immersed in the water.

And he said, he keeps going, it doesn't stop. And I'm thinking if he's right, this is really important because, you know, usually usually you need a pressure to drive fluid through a tube, right? And, you know, like in the cardiovascular system, the heart develops pressure to drive the blood through the large arteries and into the smaller, smaller vessels.

So I'm I'm thinking there's no pressure difference here because it's just a tube that's immersed in the water, that's all. And, yet the flow is going through the tube.

So I'm thinking, if he's right, and we quickly confirmed that he was, he was right. This is pretty important. And probably indicates somehow that the infrared energy that's being absorbed by the water is somehow getting converted, getting used, easy build up, which is then converted into some kind of mechanical energy.

So we were really, really eager and, you know, in retrospect, I was thrilled that the student actually came in to bother me to disturb me. The students. You know, without those students, it's their, their amazing, really open minded at the young age.

So, I then propose an idea to a different student of mine. And he reiterates that he thought I was on some kind of drug when I proposed this experiment, until he got a positive result. And he changed his mind.

And I suggested to him that, you know, he might want to have a look at at the cardiovascular system because there are lots of tubes, You know, and maybe maybe there's propulsion in in those tubes.

I I would never, never have thought so, because, you know, I began my, my career studying the cardiovascular system, the pressures and flows, doing modeling of the cardiovascular system.

And I thought we had it all worked out. You know, we knew all the answers. I thought, I had a pretty arrogant sense until I went to Russia. And my friend Vladimir Polyakov introduced me to his neighbor. And in five minutes the guy had me convinced that there was something that was terribly wrong with our understanding of the cardiovascular system. It was very simple.

He said you know your capillaries and and mine or especially young people there, they they can be down to three or four micrometers in diameter. But the red cells that need to pass through those capillaries are twice the diameter.

There are six or seven micrometers. You know, it's sort of like a plumbing problem. You know your toilet gets stuffed and you know in order you got to take the plunger and you push push and push and exert a fair amount of energy to kind of squeeze it all through and clear, clear the line.

Well, the same thing's gonna happen in the cardiovascular system. And if you look at the videos of the red cells passing through those capillaries, you can see that, you know, ordinarily they look like a plate or donut.

And as they're going through their actually squeezed like this. And so he calculated how much energy. I don't know if he used the plumber analogy or not. But so he computed that that the amount of energy required to squeeze these red blood cells and push them through is something like one million times uh the the pressure developed by the left ventricle. So, you know, you mentioned earlier something about high blood pressure, this is this is high blood pressure.

And even, you know, if the guys, it's easy for calculations to be off, even if this guy's calculations were off by a couple of orders of magnitude instead of six orders of magnitude a million times where it could be four orders of still uh you know, an immense problem. So where does this energy come from?

And he'd been thinking about the problem And he had a few suggestions. And meanwhile I'm thinking, oh my goodness, you know, we just completed these experiments immersing the tube in water and you get flow through the tube and the energy is coming from infrared from outside.

So, you know, once again, it didn't take a rocket scientist to figure out maybe maybe the same phenomenon that we saw in the laboratory inside those Nafie in tubes is occurring in our blood vessels which have hydro filic surfaces. So I then proposed it to to my student who I told you, who said, who told me he thought I was in some kind of drug. But you know, he listened to me and he politely went ahead and he got a positive result. And what we did was we tested on the chick embryo, looking at the cardiovascular system. So the first thing is what he did.

I say, we but he did it he stopped the heart by injecting potassium chloride. So the ventricle wasn't pumping anymore. So you'd expect we'd all expect that the flow would stop, didn't stop, kept going much lower velocity, but it kept going.

Blood Flow, Vessel Propulsion, and Regenerative Implications

So if it keeps going, you know, there's got to be something that's driving it and driving it now against the obstacle of a heart that's just in the way it's not beating, it's just sitting there, you know, you try to prominence is kind of blockade but still there's some flow that that keeps keeps going. And by the way, I should say that this has been reported over over the past century and some half dozen times in different preparations. People noticed but nobody paid attention that flow kept going even when the heart stops beating, you know, So – It's almost like the beating of the heart serves a different function or or maybe it's kind of a small function in regards to kind of moving the blood, but maybe there's some other function that relates to the creation of easy water within, I mean there may be some other function of the beating of the heart other than just creating pressure. – Well, yeah, that's right, and my student likes to think Jing Lee is his name is it it kind of gives a kind of momentum to the blood to make sure that in this vessel propulsion mechanism that is going in the right way toward the periphery rather than back to the heart.

I'm not sure that's his idea. It's an interesting concept. But anyway, you know, we we don't know at this stage what we tested is whether the signature feature of this mechanism that we found in the laboratory also exists in the cardiovascular system, namely give infrared energy.

And it drives it faster. That's what we we found in the laboratory. We found it also in in the cardiovascular system. So it looks as though this mechanism really is operative, which means in turn that, that our cardiovascular system runs.

We have 22 drivers and one is the heart and and one is the vessels themselves. And we don't know what fraction, you know, if you don't have this obstacle heart, that's in the way we we don't know how much of the energy is actually comes from the vessels versus from the heart.

It could be, it could be that the heart is driving 99% of it and 1% comes from the vessels, or it could be the opposite way. We simply don't know and we need to do experiments in the future too, to try to find out what's going on.

So, you know, it's a kind of, it's a kind of new new concept in in our cardiovascular system and, you know, like with any any new concept, if it's correct. And then new therapeutic modalities will, will inevitably arise.

Some of them are ones that we could never even have imagined. You know, it's it's it's only after the discovery comes that that you find applications that you would never have dreamed of. So, this is pretty exciting, you know, – And it's exciting. I mean, it's really exciting time to when, when science shifts or you're part of that process of of shifting the way we look at things and then seeing the implications and how that can be utilized and then develop therapeutics, you know, based on the new way of seeing things.

So, I mean, that's really exciting time. – It's it's an incredibly exciting and on the other hand, you know, the flip side that you're probably well aware of is that many scientists don't like new findings, you know, this isn't, you know, you you learn something and you feel you've got a body of knowledge and when someone challenges some aspect of that body of knowledge.

Well, Michael, you, you know, there's a lot of resistance that comes and we've received some some resistance. I got to tell you that the the excitement that side is greatly exceeds the resistance. So many people have taken up these ideas and begun to run with them, but it provides, provides them or poses an obstacle when you try to get funding for your laboratory. So you understand that very well, we were really fortunate to have a private funder who absolutely generously was funding our laboratory for the past, I don't know, six or seven years I think. And he suddenly ran into financial obstacles.

So, what had been a smooth ride from a private funder getting money from, you know, the national organizations is is a real problem because the people who are making judgment or Europe, the people you're challenging.

It doesn't it doesn't usually work to your advantage that way. So we have this funding and suddenly we lost it. So we're now in a position of a real real jeopardy and keeping our laboratory going and, you know, any anybody who's paying attention who has, who has done well and is as excited as we are by by these findings. Please do contact me.

We would really appreciate your your support. – Well, I mean, and the implications and why it's important that your work continues. I mean, you're talking about cancer, you're we're talking about mitochondrial activity.

You know, all the diseases that relates obviously with premature generation, all the inflammatory conditions, you know, cardiovascular, I mean, it's just layer upon layer of implications that that can then benefit from the type of research that you're doing. – Well. Thank you.

I feel precisely the same way. And we don't even know some of the implications because, you know, sometimes you trip over some finding which leads to other findings and so on and you go in directions that you can predict.

It's just, you know, having, having that, you might say confidence that we're going in productive direction with a fundamental new fundamental understanding. Can, you know, all kinds of amazing dividends that are not even predictable. It kind of reminds me, I I just got to mention, you know, we know the name kelvin, Lord kelvin and perhaps you know the story Lord Lord kelvin, famous chemist, I guess physical chemist, you know, and he was famous for a grand pronouncement, he said and I quote, it's kind of a quote nothing heavier than air will ever fly a few years later came the Wright Brothers. So you know, it's easy to come out come up with pronouncements, but those pronouncements don't always hold water, so to speak. – Exactly and science is there to always be proven wrong. – Oh yeah, it's so true.

But you know, we're also humans and as humans, we we we we can't become familiar with a certain way of thinking and we often don't like to be challenged.

– Exactly. – It's human nature. – Well Professor Pollack, it is such a pleasure, such an honor and what you bring to the world is revolutionary. So thank you so much for spending this time with me.

– Well thank you for the opportunity, I really appreciate that. It's been my pleasure