Liz Parrish:

If we can get you to 180, yeah, that would be early technology. That would be technology that is just repairing a little bit.

Dave Asprey:

Yeah, it's at least 180 is the goal.

Liz Parrish:

If we can make repair over damage, you create more repair in your body than you create damage, people who put time limits like a thousand years, why would 1,000 years be a limit?

Announcer:

Bullet Proof Radio, a state of high performance.

Dave:

You're listening to Bulletproof Radio with Dave Asprey.

Dave:

Today's cool fact of the day is that CRISPR human trials are showing early promise. Now, if you've lived under a rock or you've never heard the show before, you might think that CRISPR is something that is what happens in the refrigerator drawer where the lettuce is stored. But for the rest of us, this is how we're now able to edit DNA. We can go in and make precise cuts.

Dave:

This just came out in 2012 and all of us were so excited that CRISPR, or it's also called Cas9, would treat or cure all these genetic diseases. And in 2019, this year, researchers in the US started testing it on people. It's basically a bacterial defense system against viruses that scientists have repurposed, so that we can edit DNA, which is pretty neat.

Dave:

Problem is, in three clinical trials in the US, those cuts are disabling genes, or cutting out bits of DNA that they may or may not want to cut out. And these are a little bit controversial, but they're nothing like editing human embryos that stirred up all the controversy in 2018 in China. And the kind of changes that we're talking about with CRISPR are not meant to be inherited by future generations. So this is editing you, not editing all of the things that come out of you if you reproduce.

Dave:

So I'm pretty excited about this space, I've often said I want to CRISPR edit my mitochondrial DNA to increase resilience, increase the amount of amperage my body makes. So if I'm ever in the Matrix and someone looks at me and says that I'm a coppertop, I'll be like, "yeah, but I'm a D cell."

Dave:

I just made none-other-than Liz Parrish laugh at me. Because Liz, who is our guest today, is a very interesting human being. We just actually were chatting in-person a few days ago at the American

Academy of Anti-Aging Medicine, but I didn't get to interview her there, so I'm interviewing her the way I often do, over Skype using technology that did not exist even 30 years ago if you think about that. What's going to exist 30 years from now? We're going to have CRISPR built into Skype, it's going to happen. It will edit your genes as you talk to people.

Dave:

Liz is the founder and CEO of BioViva Sciences and she's working on hacking healthy lifespans. And I'm just going to have to edit that right now using my verbal CRISPR and say, extending healthy lifespans. That's just, I was afraid to say living forever. Did I get that?

Liz Parrish:

You got it.

Dave:

All right, there we go. Using gene therapy. And Liz has been widely recognized as the woman who wants to genetically engineer you and she's a leading voice for our right and our ability to hack our own DNA, our own genes. She serves as a motivational speaker and she's behind BioViva Life Sciences. Also, and I've actually had a bit of a... I don't want to be inappropriate like "crush," like high school crush, but normally you'd say man crush, but we'll call that a geek crush on you.

Liz Parrish:

Oh.

Dave:

Because in 2015, I'm like, oh my God, Liz was the first person in the world to take these dual gene therapies for your own aging. I'm like, I want to do that! I want to do that! And I actually asked my EA, can you reach out, can someone get ahold of her, see if I can get this stuff. Like I want to do it, I want to talk about it. So now, a couple years later, what do you know, we're finally connecting. But I still don't have custom-made genetic engineering onboard. Liz, No. 1, welcome to the show. No. 2, can you hook me up?

Liz Parrish:

Thank you, it's so cool to be here. Yeah, I can hook you up. We did just see each other at A4M and that was so awesome because I came off stage and you said, "we got to do a podcast" and I said "we have a podcast scheduled for next week." And you said, "oh, that's so cool."

Dave:

Yeah, I totally don't know which podcast I'm going to do, because I have this long list of people I want to talk to and then my amazing team is like, "oh, okay we slid all those in to the Tetris that is your calendar and your life." But I never know what's coming up because I prep, but I usually am prepping the day before, reading through everything and getting everything done.

Liz Parrish:

Yeah, I knew. I knew and I was really excited about it. So can I set you up? So BioViva is a bioinformatics company, so basically we're looking at the performance of how these drugs work now, how gene

therapy works in humans and specifically how regenerative genes work in human bodies. So that's pretty exciting and how do we do that? Well, we have a partner company called Integrative Health Systems and what they do is they help people get access to these technologies today.

Liz Parrish:

Now, you have to do it through a medical doctor because that's the best thing to do when you're doing medicine and you have to share your data with BioViva so that we can make more better innovative drugs through our research that we have going on at Rutgers University.

Dave:

Rutgers, that's a pretty impressive university. Let's talk about how you ended up here. Tell me about your son's type 1 diabetes.

Liz Parrish:

Yeah, so from 2011-2013, I was volunteering for the advocacy of the use of stem cells and I learned about this whole world of regenerative medicine, which is really exciting. And then I heard that some of the technology was doing amazingly well and studies in Harvard and other great universities. But there were also doctors that were doing this work offshore and there was a lot of debate about how well the technology worked in humans.

Liz Parrish:

So I thought, well, the interesting thing here, what we need to do, is bring researchers together with medical doctors. But I wasn't able to do it, the two groups didn't want to combine. So how do you prove the technology is working in humans without actually having research documents and having all of the technology highly documented to figure out what the outcomes and the endpoints were.

Liz Parrish:

Well, in 2013, my son was diagnosed with type 1 diabetes and I was thrown into the hospital, a world of sick children, children's hospital in Seattle. And I looked around and I realized basically that these technologies do not translate to humans. They sit in research for decades and these kids didn't have access to this technology. And there were kids there that are dying of diseases that we had cured in animal models for years, right?

Dave:

It's so unjust actually.

Liz Parrish:

It's really unnerving. So I ended up saying to myself, you know, something has to be done about this. It's not just studying what's happening, it's not just looking at anecdotal research, it literally is getting this technology to people in a meaningful way and we need to mix doctors with researchers.

Liz Parrish:

So I went looking for cures for kids and a lot of people don't know that I got into the aging area, the aging arena, by looking for cures for kids. I ended up at a conference, it was a SENS conference, SENS 6 in the UK. I met professor George Church there, he is now a scientific advisor of our company. And I

learned all about aging and I learned that when you treat biological aging, you're treating the biggest unmet need on the planet.

Dave:

Yes.

Liz Parrish:

So you have lots of patients and that each one of these treatments will treat a childhood disease. So how do you expedite cures to the world? You treat the biggest medical unmet need on the planet. After two years of a winding road of learning about the technology, I decided to start a company called BioViva to prove in humans which one of these technologies or which technologies here, there will be many, work in humans, which ones don't and try to create the combinatorial therapy that will create an optimal, robust human that stays in homeostasis for the longest period possible.

Dave:

One of the reasons that I wanted to create this biohacking field is the problem you talked about there, the gap between researchers and scientists. After studying complex systems, that's what my degree is in, decision support systems, was one of the areas of my study, what I find out is in academia, there's these amazing words that you have to put at the end of your research study, so you can get another grant. And it doesn't matter, if you just prove that oh, I can double the lifespan of every mammal except for humans, at the end you say more research is needed. This is a curse on academia, because if you don't say that, then you're too confident on your results and if something is disproven later, then oh no.

Dave:

Once that's there though, a doctor looks at that, it's like... More research is needed and if a doctor says screw that, I got a patient who's going to die, someone who's in pain and suffering and this looks like it's probably going to work and the risks aren't very high and rewards are much great than the risks, let's do it. The doctor says, well, I have this dumb Hippocratic oath that says "first, do no harm," which also translates to first, do nothing, because everything has a little bit of harm associated with it.

Liz Parrish:

Yeah. That's 100 percent likelihood of death, so that actually is doing harm.

Dave:

There you go, because we're all going to die. So I look at that and you look at, "okay, if I'm willing..." And you and I both know the doctors who were willing to say, you know what? I'm going to do what I would do for my parents for my patients, it's a very different mode of medicine and they're willing to say, "okay, I'm going to try these peptides, I'm going to do these things," but they're living in constant fear of losing their license that cost them at least half a million dollars and more than a decade of science because someone could come along and say, well it said right there more research is needed and no one did the research because no one is going to pay for it. You're sort of damned if you do, damned if you don't. Number one, is that an accurate description of why the system might be where it is?

Liz Parrish:

I would say that that's one really accurate description.

Dave:

Is there more?

Liz Parrish:

Well, there is another one and it's called nonreproducible, that's the other problem. And we only work with technology that has reproducibility over multitude of labs. So that really slows things down even for our company. So if you have basically some research on a gene and it looks really good in one lab, that doesn't mean that we can use it in a human. So it's lucky in a sense that this technology has sat for so long because there's a lot of reproducibility between several labs. But the problem is, is that if somebody essentially wrote a paper and fudged some data, well, that can actually hurt people later on down the road. Then you look like you got a really great technology on your hand that is grantable, you know, you can get some more grant money like the problem you're talking about. But then it could severely hurt people later.

Liz Parrish:

So the therapies that I took and the therapies that we're moving forward with, one of the guidelines is that they have been reproducible, more than one lab, more than one study was done in more than one place on the technology.

Dave:

When I last gave a keynote at the A4M, this group of thousands of anti-aging doctors. I went up on stage and I said, hey guys. I just have to tell you, I don't have a medical license, so I can tell you the truth and you can't take away what I don't have because I'm an unlicensed biohacker. But, 80 percent of the room chuckled and was like, "yeah, go for it, go Dave." My work is generally well-respected in that group. Then when I looked at the comments afterwards there was the four percent, which is right in the same ratio of sociopaths and psychopaths, just saying.

Liz Parrish:

Yeah.

Dave:

They were like, "how dare a person who did not go to medical school have the audacity to address me." I'm like, I don't know, you don't have to listen to me, but that's how I dared. Do you catch a lot of crap? Not just being an unlicensed, I'm going to call you a biohacker, an unlicensed advocate, is it an issue for you?

Liz Parrish:

I think that internally, it was an initially an issue.

Dave:

Internally you mean in your head or in your organization?

Liz Parrish:

I would say in the community of longevity enthusiasts.

Dave:

Oh, yeah. Those guys, our friends. Yeah.

Liz Parrish:

I think that what happens is everyone feels like they're on a common goal, but if they feel like their feet are getting stepped on or they feel like you're disrupting their space, then they want a reason why people shouldn't listen to you. Obviously, it's a really dangerous thing to do because it holds up progress. But I think that the only time that I've ever seen a debate about that was internally in somebody who felt maybe concerned that the company was getting ahead of itself and might beat them to something. But actually, our company is for all companies.

Liz Parrish:

So BioViva's platform in these technologies through these different outlets of medical tourism and research and development and the idea is to help other biotech companies actually be able to test their drugs in humans too. So how do you help people right now? If you have a promising drug, get it into humans. How do you help investors and help your own company get investment is you find your human endpoints.

Liz Parrish:

So right now, if you go through the clinical trials and you want to go through and create a regulatory approved drug, phase three, if you ever get to phase three has a 94 percent failure rate. That's vastly not knowing your endpoints. So if we can help you understand what happens in human bodies with your great and awesome drug, if anything and we can help you find your endpoints, you can turn that 94 percent failure rate into a 94 percent success rate.

Liz Parrish:

So we're not here to take over the market and to say, oh, our drugs are the only drugs that'll work. We're here to actually platform the multitude of technology that we'll need to get there. We believe in everyone's research, we believe that all research going towards the ends of ending disease is good research to do. So we don't dispute over people's technology, we just suggest that they try it in a human so that we can actually find out if it works in humans.

Dave:

Now, historically, in the 1950s, we would just do it on prisoners. I'm kind of laughing because we were actually nicer to prisoners back then than we are today. The for-profit prison system is one of the most evil things in existence on the planet.

Liz Parrish:

It is a nightmare. How do you expect anyone to get well in a system like that? What they do is they don't expect that, it's a punishment. We have a punishment society from grade school and on, everything is based on punishment. That just isn't working. We see over and over again that's not working.

Dave:

We see it's not working and it's unethical to force anyone in prison to be experimented on with Frankenfood and toxic mold and circadian disruption. Oh, wait, they just do that, it's not an experiment, that's just how it always is. And we have to fix that, that's probably a different podcast.

Dave:

What I do want to say though, is we don't have that ability, however, what we do is we say, "oh hey, would you like to make $50? Join this trial." And the drug companies do this, a lot of people don't know about it. $50 or $500, there's people make their living as professional guinea pigs, who have tried all sorts of weird drugs and treatments and laid down in beds for six weeks to see what would happen.

Liz Parrish:

Yeah, talk to students in college. A lot of students in college do that.

Dave:

I actually think that's an ethical use, as long as there's informed consent and I think quite often there isn't really for that group. But that's a different issue as well. The ultimate thing there is to say, hey, here is something available for testing, here's what might happen that we know that's bad, there's stuff we don't know that's bad and here's some good stuff that might happen. As a fully functioning, free human being, do you want to do this? That's what you've done, that's certainly what I've done with biohacking and all. But the fact that doctors who probably would help me are afraid to help me because they say well, I don't want to lose my medical license, or the fact that some regulatory agency in some country, I'm not saying anything specific about the US, they think they have a right to tell me I'm not allowed to do that. But I'm allowed to go smoke a pack of cigarettes, drink 64 beers.

Liz Parrish:

Jump out of an airplane.

Dave:

Yeah and take drugs, pharmaceutical approved drugs that increase my cancer risk and whatever else. It doesn't even make sense.

Liz Parrish:

Oh yeah, sure. I mean, I would argue that this year, more people will die of adverse drug effects, taking their drugs as prescribed than will die in the next decade or maybe even two decades of gene therapy.

Dave:

Okay. Is that just because no one's going to really get access to it?

Liz Parrish:

Well, no, I think that a lot of people will get access to it. That is a good point, but I mean if it was prolific.

Dave:

Okay.

Liz Parrish:

As long as we choose good candidates, if it was prolific, we will do better with gene therapy than we will on these drugs.

Dave:

Tell me about the gene therapy that you do.

Liz Parrish:

Sure. So I did two gene therapies. One was called a telomerase inducer, so it lengthens the ends of the caps of the chromosomes called telomeres. And telomeres are important because with each cellular division, they get shorter and shorter and they're correlated with all of the diseases of aging. Actually, depending on their length, we can see about when you'll be diagnosed. Now, they're not a perfect clock of aging, because they can stay short for a long time. But children who have short telomeres tend to suffer from various diseases, the worst one being progeria, which is considered accelerated aging. Then as aging adults, as they get shorter, it leads to things like genomic instability, which is a precipice for cancer.

Dave:

Yeah.

Liz Parrish:

So that was one of the gene therapies I took. Then the other one is called follistatin. And what it does is blocks myostatin, which is another enzyme in your body. It blocks it from blocking essentially your muscle growth. So myostatin blocks muscle development, follistatin blocks it, allowing the body to muscle-up. This is very important for an aging population with sarcopenia that was originally tested in kids with muscular dystrophy, both Duchenne's and Becker's muscular dystrophy.

Dave:

Now, when you say you've down gene therapy, you're taking these genes, you're putting them in viruses and injecting them into the body.

Liz Parrish:

Right. So we used adeno-associated virus, it's called AAV and it doesn't essentially do what old gene therapy does. It doesn't give you a big immunological effect. So you don't get sick when you take it, because if you get sick then you're going to not uptake the genes. So it basically is a really great viral vector that cannot get you sick. The ability to get you sick is taken out.

Dave:

Yeah.

Liz Parrish:

In that space is put human genes and then it delivers those genes. And viruses are still the best gene delivery method there is. They get genes into the nucleus, we don't integrate these genes. We don't use CRISPR with this technology today. We just put what's called an episome, we put the gene into the nucleus, it sits outside of the chromosome and it just codes for protein or enzymes and those enzymes and proteins change you.

Dave:

Now, I'm a huge fan of The Walking Dead.

Liz Parrish:

Okay.

Dave:

Do you ever worry that one of these harmless things might do something unforeseen, interact with another virus or basically do something that we didn't think it would do that could cause it to spread to other people. It's not going to create zombies, let's be straightforward. But is there any kind of a risk that that AAV could talk to HHV or become an STD? I swear I'm like Milli Vanilli at this point. You know what I mean? Is there something that could happen?

Liz Parrish:

This is why we use AAV. Actually 80 percent of the population have already seen the virus. You've probably already had it. It's one of those benign viruses that goes around and everybody gets it and then it's only modified to target different cell types. So you'll see that AAV has a whole slew of different numbers or letters behind it and that's just how it's been modified to target certain cell types instead of other ones. So it's about as safe as you can go.

Liz Parrish:

We're also using another viral vector in our research at Rutgers University. It is a bigger viral vector, but it is just as prolific in humans as this one is. So I would say these are about as safe as you can get. Remember, these viruses are modifying you every year. You know, you get viruses and influenzas and things like that and they all do their little dance. We're just making them do a dance that only up-regulates therapeutic genes.

Dave:

What percentage of human genetic material is viral in origin?

Liz Parrish:

Oh my gosh, we have to look that up for what just came out yesterday. I mean, literally there is a lot of it.

Dave:

It's like 80 percent or something, right? It's a giant number.

Liz Parrish:

Even our consciousness now they think has to do with a virus, our ability to speak was a virus. The ability to carry more babies long-term without having them be attacked by common viruses and abort the fetus is now thought to be because of one virus that we integrated years ago. It's huge. Viruses are the ultimate gene therapy machines.

Dave:

We're really scared of viruses because there are some deadly ones. But go for a swim in the ocean, just look at the number of viruses, including some that we've never characterized, just in a liter of seawater anywhere and a huge part of our evolution is driven by that. So when we need to add a skillset that we don't have because we're going to die without it, we're pretty much engineered by mother nature and so is all other life to be able to work with these viruses to pick up skills.

Dave:

It's kind of scary to think of it on one hand, on the other hand, well maybe we could pick which ones we interact with, because there's a whole bunch of viral DNA, and everyone listening to the show, that we now count as human DNA, but we now have the ability, just think the last 20 years of research to pick through that and go, oh, that came from over there, that came from over there. We're an amalgamation of all sorts of weird lives.

Liz Parrish:

Well, and one of the best fights against viruses might just be integrating pieces of them, so we see that in some of the new immunizations that are starting to come out where they're actually looking instead of trying to give you a shot every year against an influenza that may or may not be the active form that year, to actually give you a little bit of the capsid so you would be immune to any influenza virus that might try to get you in the next 10 years or more. So we know that integrating the viruses actually can protect us against them. So it might be really interesting going forward. Now, the viruses that we use we don't integrate. We take out their ability to do that, so we're just putting in the therapeutic regenerative gene and then the capsid, you're going to pee it out.

Dave:

Got it. So it's pretty darn safe in the overall scheme of things. Well, depending on what genes you put in, but the virus itself is probably safer than driving to the grocery store.

Liz Parrish:

It is. So when you deliver gene therapy, you're delivering two things, at least two things. If you're doing CRISPR/Cas9 you're delivering three things. You're delivering two drugs at least, the viral vector. And AAV now has been in over, what, 400 clinical trials and has not had a problem. It has not had a problem for it. The gene candidate is the second drug. So the places where we've seen negative outcomes are in cancer therapies and there are some but it was likely because those people were amazingly sick to begin with.

Dave:

So you used these and you got all bulked up. Where did you inject the follistatin?

Liz Parrish:

So we injected the follistatin into my leg muscles. You can have it injected into any series of muscles, but the legs are good and it has an effect on the entire body. So all of the muscles mass up. It's based on titration, how much you do is the output you get of the therapy, so the more you take the more you're going to increase in mass.

Dave:

Now, I may or may not have injected follistatin into my shoulders.

Liz Parrish:

A lot of people have and I go all over the place and a lot of people have injected follistatin under various methods.

Dave:

Now, the reason I may or may not have done that is because I don't know if that's medically approved and certainly I wouldn't do anything that wasn't medically approved without making me a bad person. But there's a lot of bodybuilders who use a lot of peptides and things like that. I didn't see any difference from it at all.

Liz Parrish:

Did you use a peptide or a gene?

Dave:

It was a peptide, not a gene.

Liz Parrish:

Oh, okay. The peptide. That's the thing is the peptide is pretty cost prohibitive and it's only going to last a matter of hours.

Dave:

Yeah, it was pricey. I felt really good for four hours, like I had big shoulders and they went away. It was literally, oh, there goes a few hundred bucks.

Liz Parrish:

Yeah, you would have to do an enormous amount of follistatin every day. You'd need to do it every few hours, it would be cost prohibitive. The beauty of turning your cells into the drug factory of what would be the peptide, but the gene and the downstream effect is much more beneficial. But the gene therapies are pretty cost prohibitive as well.

Dave:

I have a $26,000 medical scale that will measure my muscle mass and body fat down to .1 percent. What did you see in your muscle composition after you did the gene therapy?

Liz Parrish:

Well, we did MRI imaging and that's what we do with patients as well. We saw increase in muscle mass and we saw a decrease in white fat, which was amazing because I went from exercising five, six days a week to not exercising at all after the therapy, I was pretty much running to airplanes and jet lagged and I didn't expect to see a change. I think it was about eight months later we did the second MRI and I was like... We have increase here. I'm not sure what percentage it was, we actually have to get someone get down to the bottom of that, our doctor never said. He said increase in muscle mass, decrease in white fat.

Dave:

Now, there's lots of things, bacteria could've changed, there's other things that you have a sample size of more than just one or something like that. Are you organizing trials on that? Do you have a dozen people up there?

Liz Parrish:

Yeah, we have studies now. So in my data, we saw on the blood work before and after through Harvard and through a private clinic or private lab rather, that my follistatin level did go up. Right now, we mostly look at the markers of imaging and blood work to test current patients on that.

Dave:

So how many patients are on it now?

Liz Parrish:

I think this year probably six.

Dave:

Why am I not one of them?

Liz Parrish:

I don't know, you got to get in there. It's really expensive.

Dave:

How expensive is really expensive? I could've got a Tesla but I got stem cell therapy instead. I did like six hands, whole body, inside my brain, I went all in on that for my book.

Liz Parrish:

Okay, yeah. That's an expensive stem cell treatment. I believe that the lowest dose of a gene therapy for follistatin is about $75,000.

Dave:

Okay, so it's up there. So this is like a model three Tesla.

Liz Parrish:

Yeah, this is like the whole works. Then they go up from there, larger doses will probably go up to $150,000.

Dave:

Now, for people listening to this, you're going, you rich jerks. Here's the deal, I worked in an auto parts factory for five years and putting parts in boxes and I scooped ice cream at Baskin-Robbins. I didn't come from money and I'm doing all right now. And there's been times when I've been paycheck-to-paycheck. In fact, most of my career. That would've just been no, I should do a down payment on my house or a kitchen, right? The reason that I'm just talking about this so bluntly, if it's that much now, how much is it going to be five years from now would you say if you put on your future hat?

Liz Parrish:

Right, I would say it would probably be about $10,000 by then. I mean, a lot of people are concerned about that. They're concerned about only certain people being able to access the technology, but this is new nascent technology. You know, these gene therapies take 16 weeks to make for one person.

Dave:

Yeah.

Liz Parrish:

These people who are able to afford this technology are literally creating a better world for you tomorrow.

Dave:

Yeah.

Liz Parrish:

So the therapies are going to get better, they're going to better understood over time. Follistatin being the lowest hanging fruit because it's already through safety and efficacy for muscular dystrophy. It's probably if there was a no-brainer of gene therapies, that would be one of them. But still, vastly for most of the population, how to use them are unknown, so we work at low and medium and higher titrations and those may go way up or they may go down over time. So these people are actually helping with their money that they earned spearhead technology for the future. They're really pioneers.

Dave:

They're paying to be guinea pigs and the knowledge comes out. Yeah.

Liz Parrish:

Right and then when the rest of the world gets access to the technology when it's more affordable, they get a better treatment potentially.

Dave:

There's a video, this is one of my favorite videos on YouTube and I'll put a link in the show notes. Go to daveasprey.com and I'll have it there. It's with monkeys. And there's two monkeys in cages that can see each other and they're trained to put a rock in a bucket or whatever they do. So the first monkey does it and gets a cucumber and it's like, "oh, great, I'm so excited, I got a cucumber." And then the next monkey in the next cage does the same thing and he gets a grape.

Liz Parrish:

Uh-oh.

Dave:

The first monkey's kind of eating his cucumber going, "wait a minute." The scientist goes back to the first monkey, he puts the rock in the bucket and he gets a piece of cucumber again and he looks at the

cucumber just pissed off and throws it at the researcher and jumps around the cage trying to get out like "I'll kill you, I didn't get a grape, he got a grape. He both put a rock in a bucket, it's not okay."

Dave:

What's going on there is the biological basis of envy. Just reframing this was like someone had to pay for this crazy stuff and you could say "well, this isn't fair." I will tell you, you go back however many, 10,000 years to the beginning of the Iron Age. You know who had the iron sword? The king had the iron sword. You know who has iron that you throw away in the can that hold your beans today? You do. Right? This is how technology and evolution of everything works.

Liz Parrish:

Pretty soon, everybody gets benefit. You know, the supercomputer was much like gene therapy, it costed an enormous amount of money to make it, like the first gene therapies did. I mean an enormous amount of money. Now, everybody has a hand-held device that's more powerful than that supercomputer by a multitude fold. This is what we're looking at. Now, of course we hope that the early adopters of this technology massively benefit and they're generally people who want the benefit now because there's a common saying, "live long enough to live forever."

Dave:

We talked about one of the gene things you did. So now you're walking around, you're like a fitness model underneath your sweater. What is the other one you did?

Liz Parrish:

That was the telomerase induction, so that was one that lengthens the caps at the ends of the chromosomes.

Dave:

Okay.

Liz Parrish:

So when we treat biological aging, we're looking at the hallmarks of aging. There's about 10 different hallmarks of aging that we're looking to reverse. We believe that those are the real disease states. So mitochondrial disfunction is something you alluded to earlier. We have a gene therapy that massively increases your little powerhouses in your cells.

Dave:

Okay, how much is that one? Because I'll be there tomorrow for that.

Liz Parrish:

Well, that one is a new therapeutic, that will be out later in 2020 and it will start in pretty low doses. We're bringing on a specialist, a PhD who did their thesis in that gene therapy to understand dosing in humans the best. All of these gene therapies start at lower doses, so they probably will start around the $75,000 layer and go up.

Dave:

Sign me up, I'm not even kidding.

Liz Parrish:

Oh, it's going to be amazingly cool.

Dave:

Can I put it on my AMEX? I want the points.

Liz Parrish:

I don't know, you have to ask them if they take it.

Dave:

Totally kidding. My book Head Strong, which isn't my anti-aging book that just came out Super Human, I talk about the seven pillars of aging and mitochondrial decline is one of them. But in Head Strong, I really dug deep to the point it hit the New York Times Science Best-Seller list, which was an amazing thing, because that wasn't what I thought would happen.

Liz Parrish:

Cool.

Dave:

I dug in, but after that book came out, a study hit and it changed my life to make my mitochondria work better. The study came out and they show that when mitochondria make enough electrons, and if you're under the age of forty, 52 percent of you might have that and everyone else you don't, if you're over forty or if you're one of the 48 percent who don't have enough mitochondria working. This is a massive aging thing. But when there's enough energy, it's that energy that powers the cytosomes in cells to go in and fix nuclear DNA. So in other words, if your mitochondria work well, you won't get nuclear DNA mutations the way you did or you'll repair the ones you did. And no one understood this until three months ago I think that study came out. So for me, as an anti-aging guy and the guy who loves a brain that works and just wants to do all the cool stuff, at any mitochondrial upgrade I could get would be exactly what I want. I'm not even kidding, I'll sell some shares.

Liz Parrish:

So telomerase induction hits mitochondrial function. Actually, it's been shown over and over in cells that yes, you can make the mitochondria healthy and it helps the DNA stability. But if you lengthen the telomeres, it actually helps the mitochondrial function. A group overseas just recently contacted me with their basic research and said, do you know this? And I said, yes, we know this, we've seen this in research before. But they had just done some cellular research.

Liz Parrish:

But the gene that I'm talking about is actually called PGC-1alpha. A lot of people who are active in working out and things like that know about that gene because when you get active, that's what gets up-regulated, one of the genes that gets up-regulated. But when you up-regulate it specifically, you get more robust mitochondria. They're actually bigger, they're more robust and there's more of them, they're very proliferative. So it's pretty cool.

Dave:

Guess what my favorite PGC-1alpha stimulator is?

Liz Parrish:

What?

Dave:

Guess what my favorite PGC-1alpha stimulator is?

Liz Parrish:

What?

Dave:

That was one milligram of nicotine.

Liz Parrish:

Really?

Dave:

Nicotine is a potent PGC-1alpha stimulator.

Liz Parrish:

Really?

Dave:

And low doses of nicotine will increase mitochondrial function and density, which is why in Super Human, I explain one milligram, if you're over forty, two milligrams per day if you're over fifty and you just add one milligram. And since 1988, a research at Vanderbilt who's been on the show, I call him Dr. Nicotine, has said, "look, it reverses Alzheimer's disease." Reverses it. Smoking's bad for you, tobacco's not good for you. Nicotine as an isolated substance is a PGC-1alpha stimulator. Who would've thought?

Liz Parrish:

Wow.

Dave:

That's why people lose weight and get lean and ripped when they're chain smoking all the time, it's because of PGC-1alpha. Is that cool or what?

Liz Parrish:

Wow. Well, how would you like to come in and just take an injection of it?

Dave:

I'm in, hook me up, I'm not even kidding.

Liz Parrish:

Okay.

Dave:

I also write in Super Human about GW501516, which people call a SARM, but isn't really a SARM, selective androgen receptor modulators. It is something that increases mitochondrial biogenesis and it's also a PGC-1alpha stimulator. They call it exercise in a bottle and it was a drug candidate for a while, you can buy it and just take it orally.

Liz Parrish:

It is a real thing. There are papers all over the place. When we did our literature review on it earlier this year, I was like, okay, anyone on the call, you can actually go to this article which is written in such an easy way to read, easily understandable, or you can go to this really difficult research paper, which is where all the doctors and the researchers went. But it was amazing to know how much information was out there about it, because we just want to up-regulate that. WE want to make it so you don't have to remember to take anything, you just have it.

Dave:

So you're saying the mitochondrial treatment that you're developing, that's coming out this year, 2020, is directly working on increasing PGC-1alpha?

Liz Parrish:

Yes.

Dave:

Oh my God.

Liz Parrish:

It is PGC-1alpha, it's the gene. It's the gene.

Dave:

I would sell a car to have that. That is the juice of life right there, okay.

Liz Parrish:

That gene, all it's going to do is code for that protein that's beneficial for you and in the mouth studies, if you look back to the research that was done in it, the little guys, the little mice that had it compared to their counterparts, they ran so much longer, they spent much more time being active and they lived longer. They lived longer than their peers.

Dave:

I'm going to say this, you're not saying it, I'm just putting words in your mouth, so are replacing exercise with gene therapy. Fantastic.

Liz Parrish:

Well, here's what I'm hoping. Now, for those people who don't want to exercise, I think they should be healthy. I think that it can create a liability to the medical system if you're not healthy. So these gene therapies will vastly help them, but I also think that people who were not active before because their bodies just weren't genetically set up to be sports athletes, might get active.

Dave:

Oh, come on. That's just marketing. Who wants to exercise five days a week? We don't have time for that crap.

Liz Parrish:

Well, what if you could do it two days a week? I think that most people who get into this technology, get excited about this technology are going to want to do more.

Dave:

Of course.

Liz Parrish:

They're going to want to take everything that Bulletproof has, they're going to want to get out there and move their body. What we're hoping is people get interested in their biology and actually making it over the top, going over the top.

Dave:

Yeah. Well, you're going to develop those superhuman abilities that we all want. Really it comes down to number one, having so much energy that you just wanted to go for a hike with the kids.

Liz Parrish:

Yeah, exactly.

Dave:

Instead of, "I'm so tired, I have to go for a hike so it'll make me a good person because I can say I exercised today. It's a totally different mindset. As someone who had mitochondrial insufficiencies for a long time and has high-functioning mitochondria now, the difference, it's exponential in what you can do in your life without feeling stressed too.

Liz Parrish:

Yeah, absolutely. People talk to us and often I'll get questions, I think I did at that last conference about is this gene doping? And the truth is, read the book called The Sports Gene, it's pretty cool. It shows you that people who are professionals at sports, generally already have genes that make them... I mean all of them, they generally, they all have genes that make them better than you. And they're specified to certain sports.

Liz Parrish:

So people who play baseball have better vision. It just pays off to have 20/10 vision. People who play basketball generally have longer arms than the rest of the population in correlation to the height of their body. People in soccer or what is called football in most of the world, they have more fast-twitch

muscle. So there already are people who are genetically superior to you in those athletic senses. So this is just leveling the playing field, making it accessible for everyone.

Dave:

It's fascinating. I had an episode where we compared my genetics to an Olympic athlete and I was 2 percent better at whatever it was genetically than he was.

Liz Parrish:

Oh, nice.

Dave:

Of course, he could kick my ass in all sorts of things, but I could put on muscle pretty well. But this comes to the downside. What you mentioned with basketball players, it turns out that your wingspan, that ratio, if you have a greater wingspan than height, which I do have, you are almost certainly an HLA-DR4 subtype, which means you will be more sensitive to toxic mold and you're more likely to have hyper mobility, which is why so many basketball player scrub their ankles and knees, because their ligaments are stretching.

Liz Parrish:

So we got to fix that too.

Dave:

Exactly.

Liz Parrish:

It's another thing for me to do.

Dave:

I want to be able to tweak collagen formation, you can look at the RCCX phenotype and say, all right, what do we do for that? Because that's oftentimes tied in with that whole thing. So now you have the super power. I have the long arms, I have the basketball abilities, I have the muscle thing. But the downside that all of these come with, we can hack the downside so that you can sort of dial in, okay, if you're four feet tall, you're probably not going to be a high-end basketball player and you're probably not going to be able to change your height once you're an adult. But if you have risks for some things, the flip side of that is a gift for something else, what if we reduce the risks side of that and leave you your gift or amplify your gift or give you a new gift.

Liz Parrish:

Yeah.

Dave:

This is the coolest stuff that's possible out there.

Liz Parrish:

Yeah. This is where it gets really cool Yeah.

Dave:

Let's take off your "what am I allowed to do" and let's put on your fifty-year vision hat, which for you is just a drop in the bucket of how long you're going to live. What are the top abilities that you want to hack using genetic engineering?

Liz Parrish:

Oh, I mean, there are so many things that I want to do personally. I mean, vision is one of the first things that I want to go at. I'd like to have pentachromacy, I'd like to see in billions of colors instead of millions.

Dave:

Oh, yeah. I want that too. So do you think we'll be able to do gene therapy to give people 20/10 vision?

Liz Parrish:

Oh, I think that we'll be able to do a lot of things. Now, stigmatisms and actually changing physical attributes, I mean, we can change muscle mass. Can we make people taller? Maybe, but it'd probably be some sort of combination of growth hormone stimulation and various things we don't understand yet. I want to create that, I guess it's called morphological freedom for humans so that they can live where they want to live and do what they want to do. I'd also like to move into integrating some of this technology that we have external to our body that's becoming vastly important for our extension of our brain. You know, we have all of these technologies that actually make us smarter because we have this phone, we have this computer, we're dialed in, how do we do that biologically. There's more and more evidence that a biological programming of systems that might be able to be more incorporated biologically than we think in the future. But that's a very future...

Dave:

You mean integrating hard technology, chips and whatnot into the body? Or do you mean building it internally?

Liz Parrish:

Building externally, incorporating it internally. But building it as biology.

Dave:

That's the right strategy that a few people talk about.

Liz Parrish:

Biology works faster than all of these things. The central nervous system is absolutely amazing. So I don't know how we do that yet, those are future facing technologies. But right now, it feels pretty limited when you're thinking in a limitless way that we're really just trying to combat aging and childhood disease still. But this is the technology that gets us to those bigger steps.

Dave:

I want you to start a gene therapy club, kind of like the Costco of gene therapies, so I could become a member and write a $10,000 check, I'll just take my kids out of school, it's no problem.

Liz Parrish:

Yeah, yeah, just forget their education, okay, no.

Dave:

Then I can get a discount on all the future ones, right?

Liz Parrish:

You know, we do that in the sense that people can invest in the company, although it doesn't come at that low of an amount, I think our lowest investment is kind of high, but it gives people the ability. I mean, that's why people want to invest in BioViva, they want to be part of the technology and get access to it at lower costs. Although, the costs of these gene therapies are almost as low as you can go. Here's one incentive, you get 10 people together, it decreases the cost of a gene therapy significantly. If you're making gene therapies for10 people, it's less expensive

Dave:

For a new gene therapy you're saying?

Liz Parrish:

Yeah.

Dave:

But for these existing ones, because I could get probably 500 people on PGC-1alpha just from this episode, like hey guys, email me, let's hook up.

Liz Parrish:

Well then we could probably get the cost down to about $10,000-15,000 per person if you can get that many people.

Dave:

This is a done deal. Here's what I want you to do, if you're listening to this and you're saying I want this long-life exercise kind of a thing, hit me up on Instagram, dave.asprey, just DM me, send me your email and all that stuff. I'll build up a list of people and when we have enough people, I'm going to hit up Liz and we're going to have a buyers club. Right?

Liz Parrish:

Yeah. Yeah.

Dave:

I'm not even kidding, I'm so in on this.

Liz Parrish:

Yeah, do it. Do it.

Dave:

So the two things, Klotho and PGC-1alpha, those are at the top of my list. And if you haven't read Super Human, just read it, it'll tell you exactly about those two things and why they matter for aging. Then we'll put together the list. And seriously, I'm in. At those numbers, give me two.

Liz Parrish:

Yeah, yeah. Do it.

Dave:

Okay.

Liz Parrish:

Yeah. So that was at 500 people? If we have 10, it might be double that, but that still is not bad. If we have 100. It might be obviously one and a half times.

Dave:

We'll get details, there's no promises here. We just made this up, but I'm not joking.

Liz Parrish:

Let's do it. Let's do it. No, I'm ready.

Dave:

There are hundreds of thousands of people that hear this episode and dave.asprey on Instagram, DM me, I'll have my team just gather all the stuff. I'm going to need your email address and no joke, we are going to... In fact, you know what we'll do? Maybe we can do this at the Biohacking Conference. I don't know if there's enough time to do that, but all right, we got all kinds of stuff we're going to talk about because there's a huge community of dedicated biohackers who want to upgrade their biology and they're all listening right now. So we're going to get together and we're going to all make it affordable to get some gene therapy.

Liz Parrish:

Yeah and we'll get you a bunch of kits that you're going to do before and after and then you're going to have a little bit of protocol. You're going to have to get some blood work before, you might have to get some images depending on which gene therapy you're doing. You're going to go visit a doctor, you're all going to have a big fun time together getting treated.

Dave:

Gene therapy parties, like Tupperware.

Liz Parrish:

Yeah, gene therapy party. We'll pass around some Tupperware. The thing is, once we create homeostasis in a human, right now, what we'd be showing is that we can affect biological aging, we can affect the biomarkers and we would make hypothetical guesses off of how healthy, how good your biomarkers are today to how long you'll live. Now, some of those are going to change though. So when you have a gene therapy, what we're going to look at in populations is if there's some outlying change. Let's say, look at the people who have the Milano A-1 gene naturally, they don't get cardiovascular

disease. They're a big outlier in the whole human population, but they have high LDL levels. So we have to be prepared to see things and have a different meaning for those things because you now have a different biology in a sense.

Dave:

Yeah.

Liz Parrish:

If we can get you to 180, yeah, that would be early technology. That would be technology that is just repairing a little bit.

Dave:

Yeah, it's at least 180 is the goal.

Liz Parrish:

If we can make repair over damage, you create more repair in your body than you create damage, people who put time limits like a thousand years, why would 1,000 years be a limit?

Dave:

Every single new discovery in the history of humanity was impossible until it happened. Every one of them.

Liz Parrish:

Exactly.

Dave:

When someone says the biological age limit for humans is 38... Someone just came out and said that.

Liz Parrish:

Yeah.

Dave:

Well, the world is changing and I am so stoked that you're reaching out to the big money people with this "we're going live a longtime." It's going to change economies, it's going to change the way we take care of the environment. It's going to make the world a much better place.

Liz Parrish:

Yeah, that's what we need to do. We really need time. We need time to create even more innovation on the back of this intervention and we need time to take care of the planet and actually understand how it works and what it needs and what we need to do to ensure that it is the best biosphere to live in and we can maybe replicate that in other places. You can't replicate what you don't understand. We really need to get people working together. We're at a real social deficit right now, people treating people badly, people attacking other people.

Liz Parrish:

Right now, it's just so common to be a skeptic, to be negative, to think it's somebody else's fault that things aren't going well. And we are splitting societies, we're fragmenting things into smaller and smaller pieces where people don't have community around them, they don't get along with their family, they don't get along with anyone anymore. They're basically black boxing themselves into a world that is not one that will be friendly and happy going forward. We need to open up communication routes, we need to have compassion for one another, we need to start caring and reaching out to one another so that we can create a social world that we want to live in as well.

Dave:

Yeah.

Liz Parrish:

We can certainly isolate and go into virtual reality and have a really good time there, but we can also start working on meaningful commitments and conversations and connections with humans that will make the planet a better place to live in too. Because I think some of the things that we do that are not really great for the planet and the environment and things like that are things that we do because we've lost caring, we've lost a big picture that's not just about the planet, but it's about our neighbors and our global neighbors.

Liz Parrish:

When you talk about gene therapy and the cost of gene therapy, people jumping out and saying only the rich will have it, that's the sort of mindset that I'm talking about.

Dave:

That's the monkey with the grape.

Liz Parrish:

Yeah, it's the very limited bang-on-the-table mindset. Now you just have a reason to not like another group of people. That's not really how to solve the problem, you know? More hate and distrust and breaking down communities based on race, religion, politics, that's just not the way forward. It's very limited thinking, small thinking.

Dave:

It is indeed small thinking and we can erase that probably without even having gene therapy, but just by understanding the nature of how our brains work and how hate works and all that and working on that from a neuroscience perspective. In fact, I want to write a book about that, because I know the techniques.

Liz Parrish:

Well, you need to. You need to be prolific.

Dave:

Yeah, I know the techniques for that. My book agent's saying that's not going to be a big book, but there's a way to spot when you are falling into that trap before you know it.

Liz Parrish:

Wouldn't that be wonderful? Wouldn't that be wonderful? And then if we had some gene candidates, maybe this oxytocin, maybe some other things that actually helped up connect at a higher level. I think what we want for the human of the future, we may or may not be able to agree on, but what we're not looking for is an android, fully logical being. Because we can create that in a computer. What we want is something artful, meaningful, that still has love and compassion and connection. I mean, I think that's what makes humans so much better and anything we can create that's just a logic-based machine. Sometimes it's a logicalness that creates the beauty in the world, but we can't be so illogical that we don't so anything.

Dave:

Very well said. This has been a fascinating interview Liz. I feel like we could talk for another hour and we probably will, because I am definitely going to be signing up for some of these new trials, because I've got to get my PGC-1alpha and my Klotho levels up.

Liz Parrish:

Yes. We will give that edge, give you that percentage edge. That's what you want.

Dave:

Count on it. Your website bioviva-science or sciences.com? Which is it?

Liz Parrish:

Bioviva-science.com. No 'S' at the end.

Dave:

Awesome. Well thank you for bringing new, thought-provoking and just amazing stuff into the world and thank you for charging whatever it costs to get someone to do it so we can get the data and for committing to making it affordable for all of us over time. [crosstalk 00:56:10]

Liz Parrish:

Yeah, sure. And for Alzheimer's right now, Maximum Life Foundation, which is a non-profit, has offered to donate the money for 10 people to be treated with telomerase induction for Alzheimer's disease. So if you know someone with mild or moderate form of Alzheimer's, they can get access to a free therapeutic right now. They still have to pay the pre and post and travel, but that's over a $50,000 savings.

Dave:

Wow.

Liz Parrish:

So it's amazing and if we can get more people to come forwards and cover some of these more expensive therapeutics where you're not just trying to get it to the brain, but you're trying to get it to more of the body, you can imagine how we can really expedite the help to lots of people.

Dave:

So to get access to that, all they have to do is remember a URL?

Liz Parrish:

Bioviva-science.com.

Dave:

Family members, that's what family members are for.

Liz Parrish:

Yeah, exactly. Well usually they have a caretaker. You need to just remember to get your caretaker to listen to this podcast all the way to the end.

Dave:

There you go. That was not a mean joke, truly.

Liz Parrish:

You know, that's another thing about Klotho, so there was a paper out in September (2019) that showed people with apoE4 genes that make you a candidate for Alzheimer's disease. Even if they had beta amyloid plaques in their brain, if they had up-regulation naturally of Klotho, they were protected against dementia.

Dave:

Wow.

Liz Parrish:

Cognitive decline.

Dave:

That is so cool. Well, we're going to build way more resilient and higher performance human beings, which by the very nature that makes it easier to be happy, you're still going to have to do your personal development work to do that, but it's a huge advantage is you want to show up in the world the way you choose, instead of being too tired to do that much work.

Dave:

Liz, thanks again for your work and love this episode. For people who are listening, I'm serious, go to Instagram, dave.asprey, send me a DM and just say, hey, I want to know about this gene therapy thing and I will put together a list of people and then we'll share the list with Liz, I'll share it with her and we'll see what we can get.

Liz Parrish:

Yeah.

Dave:

I'm pretty excited about that.

Liz Parrish:

Yup.

Dave:

All right.

Liz Parrish:

Maximize it, we'll see how much we can do at one time and that will be the big difference in the cost. We can definitely get the cost down with more people. It'd be great.

Dave:

On that note, if you haven't read Super Human, some of the stuff we talked about in this episode is there. PGC-1alpha is a massive target for my biohacking as well as mitochondrial function, which we talked about. Telomeres are one of the seven pillars of aging that I talk about. And Klotho isn't one of the seven pillars but it's in there, thanks to having a chance to interview Jim Plante who's doing some heavy duty work on that as well.

Dave:

So there's so much knowledge and you could say, "I don't know what any of these are, it's too much, I'm trying to take notes." You don't have to take notes, there's already a transcript. It's on my webpage, you can play this back on YouTube on iTunes, but this is all real. It's happening. Thank you for listening, thank you for being Bulletproof and you're only going to hear more of this in the next episode.