



Transcript of “How Technology Will Help You Live Longer with Christine Peterson”

Bulletproof Radio podcast #21



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Dave: Today's cool fact of the day is about germs. What's the dirtiest place you might actually touch on a regular basis? It turns out it's not your toilet, probably because of excessive cleaning with all sorts of strange chemical products that most toilets get.

According to the Wall Street Journal, the average office desk has about 400 times more germs than the toilet seat. If you think that's bad, the ATM machine is probably at least as bad as the door knob of a public restroom.

It turns out, if you're going to be germophobic, you need to buy even more of that hand sanitizer and start smearing it on yourself all the time. No answers about what that will do to your liver.

You're listening to episode 21 of [Upgrade Yourself 00:49] Radio with Dave from the Bulletproof Executive. We have a great interview today with Christine Peterson, an expert on life extension and new technologies for maximum performance.

If you're one of those people who wants to do everything possible to extend life and become better at everything, this show is for you.

Christine Peterson writes, lectures, and briefs the media on coming powerful technologies, especially on nanotechnology and life extension. She's the co-founder and former president of the Foresight Institute, the leading nanotech public interest group. Foresight educates the public, technical community, and government policymakers about nanotechnology and its long-term effects.

Christine joins us today on [Upgrade Yourself 01:30] Radio to talk about some of the latest technologies for extending life and improving performance. Importantly, Christine is in charge of the Life Extension Conference, which is coming up in the San Francisco Bay Area where I, along with a bevy of other leaders in the fields, will be talking about various ways to manage your health.

Christine, welcome to the show.

Christine: Great. Thanks, Dave.

Dave: Our first question today is one that you've probably answered many times in your role as a spokesperson here, but what are some of the most powerful new emerging technologies that you see for extending human life?

Christine: It depends on what time frame you're looking at, Dave. You're in this field, of course, so I think that you know. I think if you look in the longer term then things like nanotechnology and artificial intelligence look very promising. We can expect, really, stunning advances from those.

The particular conference where you'll be speaking soon is focused more in the nearer term. There, we're aiming at a near time frame, say, either things that are available now or within the next couple of years. That would include, on the longer term, end of that, things like stem cells. We're starting to see applications.

Then in the near term, we're starting to see substances that can affect your telomeres, the ends of your DNA strands that you lose over time. It's a wide variety of things. We'll be exploring all of them. Of course, we're counting on you, Dave, to help us with the Bulletproof Diet.

Dave: I'm more than pleased to be presenting it at the conference, and the toxin avoidance thing certainly. Maybe we can help with the telomere thing. We've also had Bill Andrews on the show previously, who did a lot of really good stuff around telomere extension and different compounds that have an impact there.

When we get a little bit further beyond what are we going to do around some genetic repair because we're taking the right antioxidants, we're just saying nitric oxide and other things that we'll be covering at the show, where does it go when you get a little bit further out there?

Christine: You're looking at what kind of time frame? 10 years? 20 years?

Dave: Let's go out like 50. We're talking about being super human on the show. We talk about literally, what can you do to extend your performance beyond what you thought you could do? Of course we're talking about what we'd do now, but when we go to that kind of time

frame. Put on your future hat and tell us what superpowers are we going to have when we get that far out.

Christine: That's great fun, if I didn't realize I was going to have this much fun. Let's say, seriously, at 50 years, now you are really talking into the range of molecular nanotechnology. That's when we get into the more exotic applications for medicine and health. Things that we call today as cell repair machines. Who knows what we'll call them then.

The point is that, at some point - and I would imagine this is going to happen in 50 years - we'll be able to send in devices down at that nanoscale that can do things like deliberately repair DNA, repair cellular structures, repair whatever. At that point, you say, "What health problem are we not able to address?" At that point, you think, "Gee, I'm having trouble thinking of one." That's where you go in and you actually fix whatever is wrong.

Then the question of aging becomes, I guess, a volunteer process. If people want to do that for whatever reason then you just don't do the repairs, but probably most of us are going to say, "I really would be interested in being healthy and staying healthy." Aging becomes an optional process.

Dave: Do you believe that we now, or even over the next 50-year time frame, will have enough kind of an engineering level of understanding of all the different biochemical pathways and epigenetic responses to the environment to actually know where to send the robots to do their work?

Christine: That's a great question. Obviously, there's an immense, stunning amount of science to be done before we can actually apply these technologies to aging human bodies, but the point here is that, with the technologies we're discussing, we'll have the tools to do that science. Yes, it's extraordinarily complex, but if you have these tools - and, of course, you also need pretty advanced software tools - this isn't just a hardware problem; this is an analysis problem also. Those tools also are improving rapidly. If we're serious about a 50-year time frame then you'll see pretty darn dramatic stuff happening in that time frame.

Dave: One of the most important areas for all of these to happen, in my mind, is what we're calling big data. I'm one of the very, very early cloud computing kind of forefather guys, when that first emerged as a technology that made large-scale computing accessible for relatively cheap amounts of money. In fact, I'm speaking at another conference, the one put on by Gigaom called Structure Data in New York in a couple weeks.

I see the progress curves there growing enormously. We can analyze the stupefying amounts of data. The problem is we don't collect these data very well. We have the quantified self-movement where there's people - geeks like me - who measure various things about their blood chemistry or about the way they breathe or the way their heart beats and everything else, and toss it up in a big database in the sky where we can start learning things that no one has ever known before about humanity.

Is that sort of reverse engineering process going to be what drives this, or are we going to sort of engineer things the way we engineer the iPhone today? Are we going to be sort of predictive, or are we just going to be more introspective about looking at large sets of data and just figuring stuff out?

Christine: I think we're going to be tackling this problem from multiple directions. I probably am not in the position to predict which of these various approaches is going to make the most rapid progress, but I think we should try them all.

It's a big problem. It's an extremely important problem. Whoever has the pathway that they think is going to help should throw their effort at that and help the way they can.

You have a special skill in cloud computing so you're going to be contributing there. There may be others who come at it at a different way, and that's welcomed as well.

Hopefully they will all meet in the middle. That's when we solve this problem.

I like to encourage a hundred flowers to bloom in this space and say, "All right. Everybody takes their shot. Let's see how fast we can go."

Dave: That's pretty inspiring, at least to a biohacker like me. What about this little problem of what I'll just call maybe scientific ego, where we get someone who has this theory gets promoted, it enters government regulations, enters the public's sphere, and it won't die. Something like, say, a low fat diet and kind of high in soy. We kind of have enough data now to know that it's bad, but the average persons who isn't into personal performance or anti-aging or something just probably just doesn't understand all of the things we know there. The lag is like maybe a 30 to 50-year lag between when we figure something out and when it enters the human consciousness. Do you see that changing?

Christine: First, you're right about the lag. The lag has been very large. I think there is hope though that that lag is going to decrease. I think that people more and more are turning to information sources where there's at least some crowdsourcing element, where instead of saying, "I need to know something about health. Gee, I'll go to a federal government health website and see what is the accepted wisdom," more and more people are just going out and saying, "Let's see what's on the internet. Let's see what people are citing. What's being linked to whether some interesting sites where I can get things I can really understand." There definitely is hope. There's definitely hope.

Now I think we have a long way to go before the quality control mechanisms, let's say quality indicators. Let's say that the quality indicators for information that's crowdsourced are not quite there yet. We need to work on that so that people can realize, "Okay. Just because it comes out at the top of a search engine search doesn't necessarily mean this is correct."

On the other hand, we've all been surprised, I think, at how relatively good the information is on sites like Wikipedia considering how they're generated. Not that I'm saying it's perfect, I know very well it isn't, and it can be quite hard to correct, especially on political matters, but my understanding is they do better on science.

Yes, there absolutely is hope. The new insights on diet that we're seeing that we'll be talking about in the conference, even though they're, as you say, probably decades away from working their way into government websites, I think they're making much faster progress in terms of spreading out among the general population.

Certainly there will be subsets of the population, very large ones, that are not reached, and there's not a whole lot you can do about that, but for those who know how to use the tools and know how to judge quality information without, say, official government stamp of approval, those people are developing new ideas and testing them much faster, I think - and you know, Dave, this is true - much faster than we used to in the old days of paper, which I can remember quite well.

Yeah, absolutely, there's hope. It's distressing that our government agencies are on the other side of the battle, especially in areas of supplements. I've heard some really distressing stories from people who are trying to bring these out to market, about how difficult that can be and how they're being discouraged, but we'll just keep plugging away on that and try to maintain our freedom in the area of health.

Dave: I had a chance once to ask the former associate surgeon general, basically the guy who is responsible for heading the FDA efforts. I asked him the day after he retired from his position at this very small investor conference - it was about 25 people - why he was blocking investment in nutritional supplements because it was an investor conference after all. He just looked and said, "Oh, you'd have to ask Congress about that," which just drove me nuts because he's with the agency that's been ordered by Congress to adhere to the rules Congress made, and they just won't do it - referring to the 1994 DSHEA Regulation that basically says if a nutritional supplement exists in nature, it's a food; it's not a drug and you can't treat it like a drug.

I share your frustration and also your hope there, where, really, things are changing so quickly and knowledge travels so fast these days that it's going to be really hard to sort of pull the wool over people's eyes for intentional corporate reasons 10 years from now than it was, say, 30 years ago.

Christine: Yeah, I hope so. One of the things I've been advocating, Dave, is that those of us who want to experiment and take control of our own health and who want to make our own decisions on things like nutritional supplements and dietary supplements, we need to be able to defend ourselves legally in Washington.

My suggestion is that we need to do what we know works, which is do things like setup a standard lobbying organization, have our own pack, things like that. There are ways to turn money into influence in Washington. They are very well known. We really have to break down and say, "All right, let's just do it. It's not fun. You kind of have to hold your nose." Otherwise, we're very vulnerable.

I think the people who are interested in this, who can write large checks, need to come together and actually form that organization and say, "All right. We're going to write some checks here and we're going to defend ourselves."

I've been promoting this idea in various venues. I'll just keep at it until we can get this going.

Dave: It seems like guys like Bill Gates, who has sort of a [hair brain 15:09] and mosquito vaccine sorts of things going on, as well as Larry Ellison and Sergey Brin, who have pretty much sick amounts of money and also have this desire to not necessarily die, certainly each one of them has sort of made their own contribution and has their own interest in anti-aging just from a pure selfish motive.

It seems like guys like that would be really interested in sort of supporting their own right to choose radical life extension or life enhancement technologies, but I haven't seen much lobbying from that perspective. Am I just missing it, or they're not doing this even though they easily could?

Christine: They're not doing lobbying, no. The lobbying organizations ... I haven't really heard of the kind of thing that I'd like to see happen.

No, I don't think that the billionaires yet had stepped up much, especially the ones you've mentioned, those particular ones have not stepped up to taking on the political side.

Yeah, there's a lot of work to do here. It could be that rather than go for the name brand billionaires that you and I can just rattle of, it could be we should go for the less well-known ones who aren't approached every microsecond for money. There are a lot of well-off individuals who want to live longer who are not name brands. We may need to reach out to those folks.

Dave: Sort of like the middle millionaire kickstarter for political lobbying for life enhancement. We need a better acronym, but I hear what you're saying.

Christine: Right.

Co-host: Christine, let's bring the conversation back to what our listeners can do right now. What do you think of DNA testing? Is it a good actionable piece of information to go out and have your genetics test and determine your susceptibility to certain diseases or conditions, or is it just something you shouldn't worry about?

Christine: Absolutely. It absolutely is actionable. I know that because, when I had mine done, it gave me something to do, which I took action on immediately. I know for a fact that it is. The prices on that, by the way, have come way down.

If any of our listeners have ideas that, "Gee, this is very expensive," you really need to check the websites again because the prices have come way down in the last few years to the point where I would say almost anyone really should do this and should do it soon.

One of the reasons you want to do it soon is there is at least some movement in government to try to inhibit your right to get this information. You do want to get it soon, just in case.

In terms of action, I know that one of the things that you get back are some data regarding how well certain prescription drugs will work on

you. That could be needed at any time you want to have that. You want to have that information before you need it. You don't want to wait on that.

In my case, I was told that I had an increased susceptibility to a particular health conditions. I realized, now that you mentioned it, I've seen some early signs of this. I was able to take immediate action to kind of head that off.

I should mention that, in addition to getting practical information, there's some fun stuff in there that actually is enjoyable and kind of entertaining to hear. I'll give you an example of that.

One of the things they check - I have no idea why they check this; it's just an interesting thing they are able to check - is do you have the gene that means that having been breastfed, if you were breast fed, did that probably give you about 6 or 7 IQ points? In other words, are you the type of person, do you have the genetic profile, to be benefited from being breastfed? I had no idea this was a genetic condition.

It turns out you find out, yes or no. In my case, it was yes. I was able to call my mom and say, "Mom! Thanks! Good job!" We all got a big kick out of that.

It has an entertainment factor, as well as being very practical actionable information and very inexpensive. Absolutely, that's something to do right away.

Dave: It's kind of funny that you brought that one up, of all the topics. The topic of my book that's coming out from Wiley some time soon is what do you do to influence epigenetics in order to have a smarter baby. Most definitely eating good food and breastfeeding will change the intelligence 6 or 7 points right there, is one of the things you can do, and many other things.

The idea that we can change ourselves as adults is really cool, but talk about plastic, easy to manipulate things. If you want it, just make sure you have adequate nutrition and low stress, and things like that when you're planning a family and when you're first having a family.

The difference is that happens over multiple generations of humanity are pretty profound. It's a short amount of your effort and a huge gift that lasts a whole lifetime. It's kind of like the easiest thing you could ever do.

Christine: Yeah. This is something I'm not an expert on so I'm looking forward to looking at your book, but I think this is a great example of something that very few people know about yet. The whole epigenetic technique thing is ... The insiders, such as you, Dave, are familiar with this, and the information spreading through kind of relatively knowledgeable people such as the attendees at the life extension conference, but the general public is just clueless on this, including your educated general public.

That means there's a wonderful opportunity to get that information out there and do people a tremendous amount of good. I'm glad to hear you've got that in your new book.

Dave: I'm sort of itching trying to get Wiley to move up the publication date. Let's hope they do that because even if someone doesn't know about this, the idea that you can have a healthier, smarter baby, and even healthier and smarter grandkids by doing a few things now, you don't necessarily have to fully grasp, or even want to grasp the concept of epigenetic. You just sort of need to trust that someone's figured it out and that there are some easy things you can do and pick the laying fruit. Lo and behold, there are results.

I think, for life extension over multiple generations, that's probably one of the most powerful things you could ever do, and it doesn't even require a robot or a laser.

Christine: Very Exciting. What's the name of your book, Dave?

Dave: It's called The Better Baby Book.

Christine: Okay.

Dave: We have some initial blogs, things about Vitamin D and things like that are up at betterbabybook.com, but, overall, we're saving most of the big stuff for the book itself. There's 1300 references behind it. We're

publishing 900 of them in the book for length. It's pretty well researched. Things come out every day.

I think this is one of those things people can act out of self-interest and say, "Let's extend the quality of my life and let's add years to my life and life to my years," sort of thing, but there's this step beyond that which is what do you that species-specific so that the entire species evolves in a better way. Doing that is a kind of profound gift you can give back and it will improve the quality of your life, too. It's one of the reasons that we wrote the book.

- Christine: As you know, Dave, one of the strongest human drives is to make life better for your children. If you can point out some easy ways to do that, I think people will do them.
- Dave: Here's a question that actually may have epigenetic impacts, I don't know. Maybe you know. Bill Andrews - we mentioned him earlier - who's been on the show, who's really looking at extending telomere length and looking at ways of preventing telomere degradation. Do you think that's a good direction to go in terms of life extension and in terms of even increasing quality of life, or are we kind of barking up at another tree? I'm not sure. What's your take on that whole "We need better telomeres"?
- Christine: As far as I can tell, we definitely need better telomeres. I think it's just one aspect, though, of the problem, right? This is a multi-dimensional problem. You've got a system which is sailing in many different ways at one time.

As far as I can tell, I don't think it's the case that solve the telomere problem and you've solved the aging problem. Most people, I think, would not go along with that, but it does seem to be an important aspect of the problem. It does seem to be the ones where we're making some progress, which is great.

Most of what I've heard so far from friends is anecdotal. I don't think there have been any really big studies yet on this, the substances that are being tested for lengthening your telomeres, or even just preserving

the length of your telomeres, but friends of mine who've tried these things give good reviews. They think they see a result, and fairly quickly.

For example, one friend reported a fairly dramatic improvement in her vision. As we all know, as we age, we have more and more trouble on getting our eyes to focus quickly between long distances and short distances. It gets harder and harder to do that, but she saw an improvement and a pretty dramatic improvement after not too long taking one of these. I believe it was TA-65. That's just anecdotal, obviously, but it is a dramatic improvement, and pretty interesting to me anyway.

Yeah, it's not the end of the story, but it is a key part of the story. If we can find ways to keep those telomeres doing better, I think that's going to be very exciting, not just in terms of lengthening maximum lifespan, but improving immediate health right now - even just squaring the curve, improving quality of life for people who are getting older.

Obviously, this has positive consequences for society as well. We're increasingly burdened with frail seniors who need more and more care and more and more expensive health care. If there is something we can do to get those costs down and make these folks more independent, everybody wins big time.

There's helping them as individuals, there's helping society. It all points in the same direction. Let's see what we can do to alleviate these symptoms of aging.

Dave: That's maybe one of the most important points that I hope some of our listeners ... And we have a lot of the Singularity Institute, people who enjoy this podcast. I hope that you guys, in particular, are listening to that message, because when we stand up and say, "We want to extend human lifespan to 200 years," I fully believe, given all the technology curves, yes, we can do that and we can probably go beyond that.

The average person, when you say that, looks at you like you've got an extra eyeball growing out your forehead. It makes it very hard to have a

conversation because you've already lost them just because you sound crazy.

Likewise, 50 years ago, if you said, "We're all going to walk around with these little tiny TVs that fit in our pocket and let us have a video call with anyone else you wanted," you sounded crazy and you probably were crazy.

It's just technology moves like this and that's just the way it is. The people who are at the very cutting edge, oftentimes, are nearly indistinguishable from people who are a little bit nuts.

The way to bring what we do to the mainstream really involves what you just talked about, which is you can feel better, you can do more, you can be more. The message of adding more life to your years resonates with every human being. The notion of you can add more years to your life is just harder to believe.

I think by focusing on, "Oh my God. Look how good it can be. Oh, by the way, you're actually going to have an extra 10 years out of that. Pretty cool, huh?" we can bring this to the mainstream in a whole different way than we do today at the edges of life extension movement.

Christine: That's right, Dave. I think it's hard for those of us who are used to these ideas to realize how deeply ingrained among the general public is the idea that living longer means being ill. That's what it means to them. It's going to take quite a bit of persuasion and re-education to get them to think differently about this.

For many people, if you just say life extension or longevity, they are picturing living longer in a nursing home bed. That's what they're picturing.

That's why those messages don't work with them. It is not an appealing picture. It isn't an appealing picture to any of us, obviously.

That's why we need to come at this a little differently. I may even change the name of the conference. Right now, it's the Personalized Life Extension Conference. It pulls in people who understands that, by life

extension, we mean extending your healthspan, but if you want to make it really big, you've got to let that term go because it conjures up pictures of living longer and older and older and more frail.

It's possible I'm going to have to let that go and go with just a simple health-oriented message. There's a huge education process needed, and we've only just started that.

Dave: There's that picture of sort of the aging Borg, full of tubes and all that. That's sort of a living hell that a lot of people do envision as what happens when you get old.

I would support your thinking there that says the Healthspan Conference, or whatever else, whatever other words resonate, it's the same reason that we changed the Smart Life Forum, this almost 20-year old anti-aging, non-profit group that I lead. We changed the name to the Silicon Valley Health Institute because it's a more mainstream thing. People understand health, but if you use Silicon Valley Anti-Aging Institute, it conjures up those things.

To the people who listen here, you can focus on living a long time or you can focus on living more. If you live more and you feel more powerful and you feel better, you'll live longer, too. They go hand in hand. They're not mutually exclusive. They're not opposites.

Christine: Yeah. I think that probably the listeners to this show are probably pretty sophisticated and they get this point, but to the mainstream, it's a tough point.

Yeah. What we talk about for this particular conference ... And you can divide these longevity conferences into two groups. One is the research conferences.

For example, Aubrey de Grey's conference, which is wonderful, where they're really trying to attack the maximum lifespan problem. Then there's conferences like this one that we're talking about here, the Personalized Life Extension Conference, where we're really talking about squaring the curve. In other words, Aubrey wants to help you live

longer than 120. This conference wants to help you get to 120 in excellent health.

We're hoping by that time Aubrey's help will kick in, but regardless of whether he's successful or not, at least we've got our 90 to 120 years of excellent health. That's what we're trying to do here.

We want to help people do things right now because, even for very young people, there are things that you can do right now that will make a difference in terms of your healthspan. We have people under 20s who come to the conference and I explain to them, "Look, you've got to get a baseline right now. Given today's technology, you're as healthy as you're ever going to get. Find out, do you want to characterize your body as in great detail as you can right now so that 10, 20, 30 years from now, when you go to your doctor, you can give him or her that data and say, 'Here, make me into this person. What can you do for me to get me back into this state? I want to be as close to that as I can.'"

It doesn't matter how old you are. There are things that you can do right now.

Co-host: Christine, you make an excellent point about that. That's one of the things, I think, a lot of people should be doing. I wanted to talk a little bit more about this conference.

One of the things you talked about a second ago is how a lot of people have the idea that aging just means being sick when you're older. Another one of the things a lot of people I hear say is that technology makes people weaker, lazier, dumber, and less healthy.

Will anyone at the conference be talking about that? Do you think that's true?

Christine: We will be looking at technologies, technologies that are health-related.

One of my favorite ones is, for example, the Zeo Sleep Monitor. It's a technology. It's a gadget. It's a thing that you wear when you sleep. Basically, it records the quality of your sleep, all the different stages, like the REM and the deep sleep and the light sleep, and it gives you a chart.

Then what it will help you do is graph that versus various things you want to change to see how well you can optimize your sleep, which great sleep not only does it make you feel fantastic, which is really nice, but it also has an impact on lifespan and lots of health conditions, obviously.

Here we have a piece of equipment, a piece of technology, which really helps you get in better touch with how your body is doing and helps you make personal behavior changes, because, really, a lot of what's going on with healthspan today is behavior based. It's what you eat, what kind of exercise do you do, all these kinds of behavioral things, stress levels. Any kind of technological tool that will help you monitor yourself, learn your body better, learn what works for you, and then give you some kind of signal that will help you make those habit changes, because it takes a little bit of willpower.

For example, you may be pretty heavily dependent on caffeine - a lot of us are. You may have a suspicion that that caffeine level is interfering with your sleep, but you're really pretty dependent. It's not an easy thing to change.

What I found for myself is that once I had concrete data ... I did a little experiment. I got some concrete, clear data that said, "That last caffeinated beverage of the day, that one is really messing you up. You will feel better and have a better life if you can just, for that last one, switch from caf to decaf. Just that one. Everything else stays the same. It's not like you don't ever get to drink caffeine again; it's just we're going to make that one change." And I was able to do it because I had the data and the data told me, "Your body doesn't like this. Maybe other people can do it, but you cannot do it. You're going to be happier if you stop."

Those kinds of uses of technology, where they help you improve your life by changing your behavior, I just think they're very exciting and I think they really work.

Dave: They do work and they also have the potential to teach us new things that are totally unexpected. For instance, if you were collecting your

heart rate variability data during this experiment, you would probably notice that after you had decaf, your heart rate variability would drop and your autonomic nervous system stress could potentially go up.

This is a function of what happens when you decaffeinate coffee. It turns out decaffeinated coffee makes a ton of people feel awful because it's almost universally contaminated with mycotoxins.

Caffeine's an anti-fungal that keeps coffee from molding. When you wash the caffeine out, you get coffee that is just about unstable and is almost certainly unhealthy. You might be better off going with, say, a decaf green tea or some other substance, but the cool thing is, whether or not you picked that up with your system, if we have enough data from enough people and we put that all in one place, we're going to find, wait, there's a trend.

When people are doing this decaf stuff, whether or not it's Swiss Water process or whether or not it's the traditional chemical solvent extract coffee, it seems like it's not having no effect on people, it's having a negative effect that's different than any perceived other effects, say, from caffeine or the other bioactive, psychoactive chemicals in coffee.

Christine: That's right, Dave. In my case, I was dealing with tea. I'm hoping that maybe this issue doesn't affect me.

Dave: Oh, it's not the same in tea. It's a specific prone to coffee. That's cool. Decaf tea is good.

Christine: Okay. Thanks, Dave. Just checking on you. Two things. One is I think one of the points you're making that I think is important for people to understand is that we are dealing with extraordinarily complex systems here. You can fix one problem and screw something else up at the same time.

There's no other choice. We have to do what you say, which is we have to collect a lot of data, both on our own self and then group it with other people's data, to try to tease out those patterns.

I'm always looking for patterns either in my own data or in group data to try to say, "All right. What should we do differently?" because the problem with aging is it's very hard. We're going to really have to push. It's going to probably take dozens or hundreds of different approaches to try to solve this problem.

We're just taking baby steps right now. We're in the very early stages of addressing this issue. It's really going to take everything we have to try to solve this in time for some of us, like me, who can remember before the internet.

We need to push hard on this and work together as a team. I think that's the point you're making.

Dave: It's totally true. There's also this risk of sort of getting lost in the data. If you collect too much data and you rely exclusively on algorithmic interpretations of the data, you lose that creative intuitive spark that's been behind the enlightenment, that's been behind the discovery of the structured DNA. I forget if it was Watson or Crick who woke up from a dream of 2 coiled serpents and said, "Wait. That's the structure."

There's a lot of, what I would say, non-linear things that happened with some of the great thinkers across history and even today with great thinkers. I'm hoping that, as we progress and we work on this aging problem together, that there's room for both data and also for those great gaps or great leaps of faith or intuition, or whatever you call it, that will come together and let us, for some mad reason, test the things that matter the most sooner rather than just sort of crunching through every possible algorithmic perturbation that we could.

What do you think about that? Are we killing creativity as we look at more and more and more data or is there space for both?

Christine: The way I see it is they play together. To me, I think they play together to some extent synergistically because you have, on the one side, human genius. I think there are some very brilliant people - and we're going to be having some of them, I hope, at this conference, speaking in in the

audience - who have those sparks of creative genius, who see the patterns that others miss.

Then, obviously, there's a role for the data as well. You need the data. There's no question. Algorithmic techniques may pull out very interesting things.

I don't see these necessarily as conflicting. I think this is another case where the hundred flowers bloom, where you say, "Look, we're going to try everything. Let's collect the data and see what we can come up from that. Let's let the geniuses loose with their creative sparks."

They tend to be kind of unusual people, Dave. I don't know if you've ever noticed this.

Dave: No.

Christine: Not that you are one, Dave. I would never imply that. If you look at our speaker list, these are unusual folks. Mostly. These are not cookie cutter kind of people. These are think-out-of-the-box kind of folks.

That's why they're coming because if they were mainstream folks, they'd all be working for Kaiser or for the FDA. They wouldn't be looking for these interesting creative things as they are doing.

I love those kind of people. I think they have an absolute key role to play.

Dave: I'm really looking forward to the conference. In fact, I would encourage people who are listening who are able to make it to the Bay Area for this. It's over the weekend. I'm certainly going to be presenting, but so many other guys.

Steve Fowkes is one of my favorite speakers. Steve is the author of Smart Drug and Nutrients II. He's an adviser to the Silicon Valley Health Institute, a non-profit that I run.

This guy seriously puts me to shame. I know a lot of stuff, but when I don't know something, he's the first guy I call. I can't wait to hear what

he's going to talk about because I know that I'm going to learn something from him.

That's the caliber of speaker that's on the agenda for the conference. It's going to be fun. Even if you're not into life extension, you just want to feel good, you'll learn something. You'll see things and you'll hear things that, really, most people never get to. I think it's going to be a fun conference even for people who aren't absolute biohackers like you or me.

Christine: Oh, totally. We always were very practical and action-oriented at this meeting. Every speaker, no matter how theoretical, at the end, we pull out of them, "What are you recommending we do? Are you saying we should take this supplement? Are you saying we need to do this other thing? Give us a concrete action item." We always pull that out.

Even the least technical people in the audience always come away with, "Okay. I know what I'm supposed to do here."

I encourage everyone, no matter how ... They can be very technical, they can be very non-technical. They can be oriented toward longevity or they can be just oriented toward being healthy and feeling great. Either way, we will try to fulfill that goal.

Dave: It's awesome. Thank you so much for putting up the conference. This is the sort of thing with a lot of passion. They just don't come together. Getting minds like that in one place is an unusual thing and it's an important thing.

Christine: Yeah. I want to make sure, though ... Remember, Dave, make sure that your listeners don't pay the full price. That's important. We want to make sure they get that discount.

Dave: Absolutely. In fact, the discount code ... I know the one for Smart Life Forum, so we'll use that one. The discount code is SLF. Capital letters. Very hard to remember. If you register with that code, you save \$50 on registration.

Christine: That's right. They can find the whole thing at lifeextensionconference.com.

Dave: Funny, I was just about to ask you to repeat that. By the way, that will be in our show notes, so that everyone who comes to find this will be able to link that directly from the site.

Christine: Yeah. If they go there soon ... The conference starts at the end of March, on March 31st. If they go soon, they'll get the super early rate, plus your discount. That's about the best that we can do. I want all of your listeners there, if they can make it.

Dave: Most definitely.

Co-host: Christine, earlier in the interview you talked a little bit about how some of the people who are interested in stuff are a little weird. I think I'm definitely one of those people. It's hard to find information, or at least a reliable information about a lot of these topics.

What are some of the books and resources that you recommend that are credible pieces of information that our listeners can go out and find and look for when they're interested in this kind of information?

Christine: That's a challenging question, actually - harder than you think because, often in cutting edge areas, the reasons that you have a conference is because the information is outpacing the books. Of course, with the web, there's lots of information, but, as I say, it's kind of hard to tell the quality.

What I try to do is I try to pick our speakers so that they're very good in their area. That doesn't mean they know everything about everything. This is a huge, huge space. The fact is that nobody knows everything. That's why we have to come together.

That said, one of our speakers is Terry Grossman. He wrote a book with Ray Kurzweil. He wrote a couple of them on life extension. Those are both good places to start, if you're just starting.

Another one of our speakers that Dave has mentioned is Bill Andrews. There may be books on telomeres out there. I'm sure there are, but I am not sure any of them really addressed the new substances that are coming out right now that you can take to try to protect your telomeres. That's a case where it's just not there. Even finding information on the web is hard, which I think is one of your points.

Part of what we're seeing, part of the reason we come together, is at least we will take all the best people we can find. We will extract from them verbally what they know. Then, from there, we can try to get it onto the web, we can try to get it into videos, so that people can do something about it.

I know Dave is already working on books. That's great. Of course he has his website which is very knowledgeable.

For example, we have a speaker on hormones. I don't think she has a book out. I think there are some bioidentical hormone books out there, but I haven't read them, so I can't necessarily say you have to read this book and that's the way to go. A lot of this is very cutting edge stuff and there just isn't a book.

I think what the best I've been able to do for some of this cutting edge stuff is find the person, whoever it is, who can speak about it knowledgeably, put them on the speaker list.

One thing you can do is to go to their website and look at the topic they've been invited to speak on and see what's on their website about that topic. Nobody's a 100% perfect on every topic, so I've tried to get them to speak on the topic where I feel the most confident with them.

That would be the best that I can say. It's cutting edge stuff. It isn't always in books. What's on the web is a mixed bag, frankly.

Dave: One of the problems with books is if you go with the big publisher ... I'm thankful that we're publishing with Wiley. It is incredibly well-respected, one of the top publishers, but, my God, the publishing cycle's been like 2 years. By the time it comes out, I know there will be some new study that I really wanted to put in the book. We're building the

website to essentially be an extension of the book, to let people come in and get the latest rev of the recommendations because, literally, I'm starting to use both for the Bulletproof Diet and for the Better Baby program revisions like we do in Silicon Valley for software releases, where we can say, "This is version 1. This is version 1.2," and, in 3 years, when 10,000 more studies are out, we're going to probably change 20% of our recommendations to reflect the latest actual science.

It's very hard for someone who sends out slabs of dead trees on an 18-month cycle to keep up with the flow of information. That may be one reason that it's harder to know what books are even out there, or read the right ones. We're printing more, and we're doing it too slowly.

Christine: I think part of the problem is, especially in fast-moving fields - and this is what you're finding - is that it's just very frustrating. You want to put out the top quality information, but by the time the actual physical book comes out, it's been 2 years. That's exactly how it is, especially with the bigger publishers.

I think we're going to see some improvement as people move more and more in to the e-books, which I've just started to do. There, you could conceivably update it quite frequently.

That gives me some hope that book-length documents will continue in this space because, eventually, authors will be able to ... Just as you would update your website, you can update your e-book, so that at least whatever you're selling is current information, because it's pretty frustrating. Those long delay times you're hitting are extremely frustrating in fast turnaround information space.

Dave: Most definitely. In fact, this is a good time, as we're getting close to the end of the show, to mention Hyperink Press.

This is a new startup backed by Marc Andreessen ... Or Andreessen-Horowitz ventures. Marc Andreessen's one of the very early internet entrepreneur guys. He was the founder of Netscape, sort of the very first even pre-dot-com bubble.

He's backed this company that takes 6 weeks to publish a book-length thing. They have an army of ghost writers who works with people who are experts, top of their field, to say, "Let's get this stuff out before it's stale."

I'm really intrigued to see how that helps the entire field of life extension, life enhancement, and even just personal performance and productivity, which is more of the Bulletproof kind of perspective. I think getting information out more quickly is going to help everybody. Updating it, like you said, in real-time is also going to help.

Christine: Yeah. I think the whole publishing industry has to change. It's just not going to work. The old models have to go away. They have not been keeping up with the technology.

Dave: Disruptive technologies, here we come yet again. On that note, we have one question. It isn't maybe entirely disruptive, but it's one question that we ask every guest who's come on the show. I'd like to ask you that question as our final sort of parting thoughts.

What are the top 3 recommendations that you would make for someone who wants to be as powerful, high performance in all the aspects of their life? This is based on every bit of experience you have - your experience with aging, with health, with anything else that you can think of. Top 3 things that people should do.

Christine: Powerful and high performance. Do you mean physically or in any way?

Dave: In any or all ways, whatever you think is most important to you. We get a huge variety of answers here. There is no right or wrong answer, but it's sort of like you're a person who've done some really interesting things with your life. We've got you on the show for that reason. You're a leader in your field.

Given all the things you've learned. You could say, "Wake up and have coffee," but just things that matter the most is probably the best way to phrase it.

Christine: I think the first thing is to decide that you don't work for anybody else; you only work for yourself. Regardless of where you make your money, you decide your own goals and those of your purposes.

How you pick up income could be related, it could be unrelated, I think that's a separate issue, but the center of your life. It's not a job for someone else. The center of your life is your own. You determine what those purposes are.

They can be pretty separate from money. Obviously, we all need to eat, we need to have a place to live, but I think focusing on money is, I think, counterproductive in the long term. That's part of it.

The other is - and this is no surprise to your listeners - is that I've seen so many brilliant people make the mistake of ignoring their body. Your body is your tool set. That's how you implement any goal that you have.

If you abuse your tool set, if you don't take care of your tool set, you are going to fail, you're going to do worse at whatever your goal may be, even if you decide your goal is making money, whatever it is. If you don't take care of your tool set, you will regret it either very soon or eventually, but I guarantee you, you're going to regret it.

Then the third thing is your time. Your time is all you have. All you have is your life, and your life is time.

When you deploy your time, you have to think very carefully. It's precious to you. Things that are wasted, things that aren't high value, they just are going to have to go. It's the only way you're going to reach whatever goal you have.

Our lives is so overburdened, but we all have multiple things we're trying to accomplish. We have career goals. We have fitness goals. We have friends and family. We have avocations. Some of us have altruistic goals with respect to society.

You have to look for extremely high value activities that ideally give you some overlap, so they're not just in one category. Because if you add all those up, it's more than 24 hours a day.

How are you going to make things happen? You have to look for some kind of synergy. If you can, it's wonderful if your central life goal happens to make money. That's fantastic. That's a wonderful overlap. That's something that young people, in particular, while they have that flexibility, should focus on really hard.

How do you make it so that your central driving force, whether it's an altruistic goal or whatever, can you also get some income from that so you have that synergy?

Another one is overlapping fitness with family. Can you combine those 2 so that you get twice the bank for the buck for that hour that you're spending?

You have to look for those synergies or else ... Then you have to get rid of stuff that isn't high value, whether it's playing on Facebook or playing Worlds of Warcraft, or whatever it may be. Stuff that isn't fitting in to those synergies, stuff that isn't giving you a powerful push forward to whatever goals you have is just going to have to go.

I guess those would be my three, Dave.

Dave: What an awesome list. It shows an amazing amount of wisdom, I think. I really liked that one.

On that note, would you please tell us the URL for the conference one more time and maybe any other URLs or ways people can contact you, if they like to learn more? We will put all of them in the show notes.

Christine: Great. The website is easy to remember. It's lifeextensionconference.com. Of course, the discount code that you mentioned is SLF. That stands for Smart Life Forum, SLF. We want to make sure your readers have that.

You can reach me through the conference website, or I also wear another hat, which is Foresight Institute which is the nanotechnology non-profit. Their website is foresight.org. They also have really fun conferences.



I look forward to meeting as many listeners as possible.

Dave: As do I. Christine, thank you so much for joining us on the show today. It's been really cool to talk about robots, life extension, and what's going to happen in 50 years. I totally appreciate it.

Christine: Great. Thanks, Dave.

Dave: You can find the links to everything we talked about today in our show notes that are up at bulletproofexec.com. Of course, you'll see the full transcript shortly after this is posted so you can search it for key words and everything else we talked about.

We'd love it if you left a positive ranking on iTunes, or maybe stop by and sign up for our e-mail list at bulletproofexec.com/mail.

What We Cover

1. What do you see as some of the most powerful new emerging technologies for extending life?
2. What do you think of the idea that we can engineer small nano-robots to work inside the human body?
3. Does DNA testing give people actionable information, or just something to worry about?
4. What do you think of the efforts of Bill Andrews and others to extend telomere length and prevent telomere degradation?
5. What books and resources do you recommend for people who want to learn more about anti-aging?
6. How does diet affect longevity and health?
7. How does stress affect lifespan?
8. What tools or methods do you recommend for reducing stress?
9. What do you think of bio-identical hormone replacement therapy?
10. How can you quantify and improve upon the theoretical benefits of meditation?
11. What nutritional supplements do you think are useful? Which are not?
12. What role do you see exercise playing in longevity, both positive and negative?

Links From The Show

Featured

[Foresight Institute](#)

[LifeExtensionConference.com](#)

[Silicon Valley Personal Health Institute](#)

Food & Supplements

[Bulletproof® Upgraded™ Coffee Beans](#)

[Upgraded™ Whey Protein](#)

[Upgraded™ Chocolate Powder](#)

[Serrapeptase](#)

[Hydrolyzed Collagen Protein](#)

[Vitamin C](#)

[Glutamine](#)



Wobenzym
Vitalzym
L-Carnosine
Vitamin B6 (Pyridoxine)
Glucosamine HCL
Digestive Enzymes
Milk Thistle Extract
Lipase
Turmeric
Ginger
Copper
Iodine
Selenium
Piracetam
Aniracetam
Vitamin D3
Upgraded™ Glutathione
Kerrygold Grass-Fed Butter
Grass-Fed Meat
Medium Chain Triglyceride (MCT) Oil
Methylcobalamin

Gear

Flavorwave Halogen Oven
Ketoconazole Shampoo
HeartMath emWave 2

Mentions

Ozone Therapy

Listener Q & A Summary

- 1.How many times a day should you eat?
- 2.What is the best way to cook meat?



3. What to do about diabetes and pre-diabetes.
4. How much collagen and glutathione should you take?
5. How do you regrow and prevent hair loss?
6. How do you maximize mental performance for a test?

Biohacker Report

A review of the latest studies & research.

[“Vitamin D Inhibits Monocyte/Macrophage Proinflammatory Cytokine Production by Targeting MAPK Phosphatase-1.”](#)

[“Repeated Stress Causes Cognitive Impairment by Suppressing Glutamate Receptor Expression and Function in Prefrontal Cortex”](#)

[“The biological activity of undenatured dietary whey proteins: role of glutathione.”](#)

Updates

If you're interested in getting some of the second batch of upgraded whey, now would be a good time. We're running out very fast, and supplies are limited.

Questions for the podcast?

Leave your questions and responses in comments section below.

You can also ask your questions via...

[The Bulletproof Forum](#)

[Twitter](#)

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Listener Questions

Anon

Great podcast as always. What strategies would you use to address prediabetes / diabetes type II?

In a recent physical, my fasting blood glucose was 105 and my a1c test was 5.5. My doc said not to worry about it, but everything I read online indicates otherwise. Many sources indicate that a very high percent of people that are prediabetic become full blown diabetics.

I've already mostly cut out carbs and sugars from my diet. Anything else I should be doing? Seems a bit discouraging that once beta cells in your pancreas die they are gone forever.

Bonus Answer:

The beta cells in the pancreas can regenerate, depending on how much damage was done. <http://www.ncbi.nlm.nih.gov/pubmed/18834440>

Puppetjunk72

I need to know how many times to eat a day and how to cook my meats? I understand the cup of coffee in the morning but when am I supposed to eat the other stuff? If its like Ori's warrior diet then I know I am basically eating my dinner meal but if its not, then how do I get in all the servings throughout the day? Most of the "Eat" sections on the meal plan say to eat it raw or barely cooked, what about the meats?

MM

Hi, I just bought the Cold Processed Collagen for my dad who has been weightlifting for over 30 years (now in his mid 50s). He has problems with his joints (particularly his elbows) so I thought this product would be helpful. How much do you recommend he should take and when? Is there a loading period? Anything else he can do for joint pain? I also purchased your Liposomal Glutathione for him. He told me that milk thistle helped him a lot so when I heard on a podcast about liposomal for detox I thought he could try it. As I am not with him and he tends not to read directions, how would you take it and how much of it for someone his age who lifts weights?

PS: Any biohacks for regrowing hair back? I have been losing my hair since I was 17, now I have bald spots (not completely bald but not far away). I am taking minoxidil to halt/regrow the hair on my crown/vertex. Any helpful hints and hacks besides eliminating grains? Will aromatase inhibitors make the situation worse?



Guest

What would your diet+supplement+lifestyle protocol be to maximize performance on a test day (GMAT) 1 month beforehand, the day before, and on test day? Paleo, multivitamin, vitamin D3, magnesium, fish oil and good sleep are given. I am going to fast in the morning and only have black coffee (as I don't respond very well to butter / MCT oil in coffee). It would be great to hear something less commonly known and more effective than piracetam, modafinil, etc.

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