

Speaker 1: Bulletproof Radio, a state of high performance.

Dave: You're listening to Bulletproof Radio with Dave Asprey. Today's cool fact of the day is that scientists now believe that if we took all of the ice and water out of the moon's interior that you could cover the moon in about an ocean of three feet of water, which is kind of cool. [inaudible 00:00:30] think there was no ice on the moon. In addition to running Bulletproof Radio, I'm also a full time CEO at Bulletproof. We're a coffee company. We make nootropics and things like that, and one of the things that I pay attention to is hiring. Something that I'd like to share with you is if you're hiring, do you know where to post your job to find the best candidates? It just isn't enough to find quality candidates.

If you want to find the perfect hire, you need to post your job on all the top job sites and now you can. With ZipRecruiter.com, you can post your job to a hundred plus job sites including social media networks like Facebook and Twitter all with a single click. Find candidates in any city or industry nationwide. Just post once and watch your qualified candidates roll into ZipRecruiter's easy to use interface. No juggling emails or calls to your office. Quickly screen candidates, rate them and hire the right person fast. Find out today why ZipRecruiter has been used by over one million businesses, and right now my listeners can post jobs on ZipRecruiter for free by going to ZipRecruiter.com/Bullet. That's ZipRecruiter.com/Bullet. One more time, try it for free, go to ZipRecruiter.com/Bullet.

Today's guest is a friend and a guy you may have heard of who's done some things that I've always been impressed by. His name is Naveen Jain. Naveen came to the U.S. as an Indian entrepreneur with \$5 bucks in his pocket. He founded InfoSpace, one of the companies that actually helped me graduate for my undergrad degree because I was doing online research when everyone else was using microfiche. It was an unfair advantage, and this was way pre-Google. At one point this company was worth \$31 billion at the time when I was working in an infrastructure as well. In fact, I think InfoSpace was an Axis Communications customer, if I remember right.

Naveen: Yes.

Dave: Since then Naveen's gone on to own, I think with Howard Schultz you owned one of the big sports franchises, the Seattle Sonics. You've started Moon Express, one of the most prominent asteroid and moon mining kind of companies out there, which is shocking and amazing. Now you've moved in the last couple years, since we've gotten to know each other, into hacking the human body in a really meaningful, interesting way using research funding out of Los Alamos National Labs. I want to talk with you today about how you got to be who you are. I want to talk certainly a little bit about hacking the human body because our audience is all about human performance, but really I want to know how do you possibly go from "I'm an Internet guy" to "I'm a moon mining guy" to "I'm looking at the RNA inside the human body" guy?

These are such diverse fields and you've been very successful in two of the three, and I believe the third one is coming. I want to hear your story. I think our listeners are going to be profoundly interested. Welcome to the show.

Naveen: As an entrepreneur, it's really all about execution. People get so focused on the ideas. Ideas are a dime a dozen. As an entrepreneur, all we have to do is simply focus on what are the biggest challenges facing humanity? If you want to create a billion dollar company, it's trivial, all you have to do is solve a \$10 billion problem. As long as you find what are the biggest problems that we can solve, and now the most interesting thing that I find is that confluence and convergence of exponential technologies, you and I and a small group of people are capable of doing things that only the large companies or the nation states could do.

Imagine when we land on the moon this year, not only we become the first private company ever to do so. We become the fourth super power. Just think for a second, we become the fourth super power ever have to achieve the feat of leaving earth orbit and landing on any planet we body. What that shows is the next set of super powers are not going to be nation of states, it's going to be the entrepreneurs like you and I who are going to go out and solve the problem, whether it is creating the abundance of fresh water, creating the abundance of energy, getting rid of the fossil fuels and making completely clean energy, it's going to be an entrepreneur, whether it's the Elon Musk or Jeff Bezos or Richard Branson or Dave Asprey. It is going to be one of us who's going to go out and solve the biggest problems facing humanity, and we have technology at our disposal to do so.

Dave: There's a bunch of people, let's say, I'm one of the advisors for the Peter Teal 20 Under 20. I've mentored some of the people in this. For listeners, this is a program where Peter Teal actually pays you to quit college and start a company when you're young and you don't know any better because then you don't even know what you're not supposed to do. You'll just go through and you'll break stuff that needs breaking. That's the heart of disruption, which my whole career's been disrupting big telecoms that do stupid things, like let's make the Internet. You've clearly disrupted things that are actually really hard to disrupt though.

It's easy to sit here from a position of a guy with a lot of money who can write big checks and you can fund your own things and you're a professional investor who's backed a lot of successful companies. You have this weight behind you of momentum and resources, so you can solve a \$10 billion problem. Now let's say you're a sophomore at Stanford and you're like, "Okay, I'm inspired. I believe I want to make the world a better place. I'm mission driven. What do I do?" What you say there is kind of a big thing.

Naveen: What's very interesting is that just because your vision is big, doesn't mean you have to boil the ocean on day one. What you do is you take a small slice of the problem and you start solving it. The thing you have to start with saying is when you start a business, ask yourself a question. God forbid if I am actually successful in doing what I'm going to do, can it actually scale, can it actually help billions of people? Is there a market that's big

enough that I can go saturate and then go out and prove it in a very small market? Make sure you tweak it and you get everything working. Once you get everything working the beauty of the thing is the capital is not [inaudible 00:06:43].

Capital goes with a portion that is [inaudible 00:06:45]. You may be the sophomore at Stanford, but guess what, if you creates something that you have proven in a small market that it works and it's scalable, the money will come to you because every one of the guys with the money has two things: they're greedy and the fear of missing out. They will come and give you all the money you need so you can go out and do the things that you can do because they want to be part of the success. Every one wants to associate themselves as success. The advantage you have as a sophomore at Stanford or any other colleges, really simple. When you're a non-expert, you're able to look at the problem very differently just like you mentioned.

Once you actually become an expert in the field, it's a good thing to some extent, but you're only able to improve things incrementally, maybe 10 percent or 15 percent, which is not bad, but that does not cause disruption. If you want to disrupt something 10X or 15X, you really have to challenge the foundation that everything that people have taken for granted who are experts in the field and challenge that. When you look at in the human body, doctors are taught we are a homogenous organism. We consist of our DNA on our genes and that's all that matters. Until we all start to look at ourselves and saying we are an ecosystem, which is only 10 percent human and 90 percent microbial. We have the whole climate inside of us, and when we don't take care of the climate, we all know what happens. The organism gets sick.

The company that I started called Viome, our goal is really not that big. We want to make sickness optional. We want to make sickness elective. People should never get sick. The only reason they get sick is their gut flora, the gut microbiome is an imbalance, and when that's an imbalance your immune system goes in imbalance. If you don't have a proper diet, your nutrients and your biochemistry of your body goes in imbalance, and that's how you get sick.

Dave: There's really only five or six environmental factors that compose all of the epigenetic factors for you. It's the toxin exposure sort of thing.

Naveen: And [inaudible 00:09:02], diet.

Dave: Yeah, the diet's part of your environment, right? You basically have light, you have vibration. You have radiation including ... well that's part of lights basically but you have electromagnetic frequencies that are also part of the whole radiation spectrum, and temperature and time. Other than that, it's all there. All of those influence the gut bacteria. They influence our cells, all the living systems listen. What you're doing though, tell me a little bit more about this. One of the reasons that I'm here today is I just found out over the last few months about what you're up to. You know I've been working on Hacking the Human Body. That's part of my goal with Bulletproof is give us control of our biology, and because we're both old Internet guys, we know the first thing you do to get control is you instrument.

If you can measure it, you can control it.

Naveen: Absolutely.

Dave: You have a very different vibe on measuring the human body than anybody I've ever talked to. Walk me through what you're doing.

Naveen: Of course. What we're doing is if you can analyze your body at a molecular level, if you really think about it we may be really complex, but we're really, really simple. At the end of the day our body is a biochemical industry. There's the biochemistry of our body. That means if you're able to measure all of the metabolites, the small molecules in your body. Then you focus on all the gut microbiome, which is 90 percent of the cells in your gut. As opposed to getting focused on the DNA, you simply focus on the things that are actually happening, which is RNA. By looking at the RNA, you're able to see what is active and what the functionality of these things are because you can look at the enzymes and the proteins.

What we do is we look at your gut and we say in a gut, since at the end of the day 90 percent of the import that you have really is coming through the gut. If you can figure out what is happening inside your gut, you can essentially see how human body is going to react to it. In fact, 25 percent of all the metabolites in your body are produced only by the microbiome. When you start to see that why do we have so many diseases that never used to happen before, whether you start to think about autoimmune diseases, the allergies, the eczema, the Alzheimer's disease, the autism, the depression, the ADHD and anxiety, they may look all different. The symptoms may be different; the underlying cost for all of them is exactly the same, which is imbalance of your microbiome and your immune system responds to the environment that you are in.

Dave: In the new book that's coming out in April, the new Bulletproof book called Headstrong, I read a lot about the mitochondria in the body. When we were sitting down before the show, you were saying but those are all just bacteria anyway. For listeners, the mitochondria, these power plants in your cells, you have like a thousand in the average cell and 10,000 in some of your more powerful cells like your brain, your eyes, your heart. They're really just bacteria that have highly specialized to work within our body. Do you consider the mitochondria to be a part of your microbiome?

Naveen: It is to some extent. Think about it, it's an RNA, right? What we're doing is, if you think about in the beginning we were a single cell, and as we became this multi cell thing, this symbiotic relationship, mitochondria was a bacteria and then it became an organelle within our own cell. Now in fact our human DNA only produces 20,000 genes. Our microbes in our gut produce 10 million genes. You can see who's controlling who. What really is happening and the latest research is showing whether the disease like Parkinson's actually starts in your gut. They don't start in your brain, and you're able to control what happens inside of your body through your diet and nutrition.

I know you and I are going to have a bounty on our head from all these pharmaceutical companies because at the end of the day the biggest blockbuster drug is something we

do every day, which is the food we eat. All we have to do is take the right supplements, which are nutrients that your body needs, because what's the biochemistry? It requires the molecules, it requires the enzymes, and it requires the co-factor. If you know what enzyme is not being produced by your body or is less or what co-factor is missing, you're able to complete the energy cycle. When you're tired, it's not there is something wrong with you.

Dave: That's not weakness.

Naveen: It's not the weakness. It's just simply the biochemistry of your body is not working because you lack certain enzymes or co-factor. That's why I love Bulletproof. I love Bulletproof because honestly at our home we have a pantry full of Bulletproof supplies. There's nothing better I would do than to wake up in the morning, start with a Bulletproof coffee and have Bulletproof supplements. The thing that we have really done now, which I think is so synergistic is now working with Viome, with Bulletproof, we're able to recommend exactly what supplements you need, and as your body is adapting you can keep changing, but better than that. You don't have to have a fate anymore that is this Bulletproof [inaudible 00:14:20] actually making your mitochondria better or not. You can see it.

The point is Viome will show you why Bulletproof actually works. It's no longer a religion. It's no longer afraid. It's a science. That to me is what the beauty of the thing is. I knew it works. Now I have the proof it works.

Dave: A lot of us have learned not to trust our felt sense. I think it worked but maybe I'm being deceived by myself.

Naveen: The placebo effect.

Dave: The bottom line is we understand a lot of biochemistry and we can talk about it, but what you're doing is different because there's various mitochondrial function tests and in fact one of the sets of research that I wrote about in Headstrong, 48 percent of people under age 40 have mitochondrial dysfunction. They call it early onset. Everyone over age 40 has mitochondrial dysfunction; they call it aging. It's always there. In my view of things, after this really deep research, is that the gut bacteria, they talk to our bacteria, which are the organelles in our cells, mitochondria. They talk actually via biophotons, via light. People are going, "What?"

This is now well established in bioengineering circles. There's a semi conductive thing for one femtosecond, these little photons come out and we know mitochondria are photo reactive. There's a chemical messenger ...

Naveen: Of course.

Dave: ... and a very high speed, just the way we used to build data centers. There's high speed signaling and low speed signaling. Hormone may change or a signaling molecule or an enzyme. At the same time, there's almost real time, like fiberoptic kind of

communications. This is why you eat something and 20 minutes later you can be like, "Something's not right," and it may be a blood sugar drop, but it may be more of a signal of an energy crisis that came from the bacteria in your gut going, "You just ate antibiotic tainted meat, so now I'm going to shift your energy regulation down."

What are you doing at Viome that's going to be different? I can guess oxygen consumption, there's all sorts of ways to know if mitochondria works.

Naveen: The interesting thing is we are actually measuring every single biochemistry of your human body. When you're doing the [inaudible 00:16:24], in other words we're looking at RNA, every single thing that's being expressed.

Dave: I think some listeners will get lost by that. RNA comes out and it reads DNA. Your DNA is where your genes are stored, and RNA has to unpack a gene using, by the way you use apple cider vinegar, you get acetal groups, which allow you to unpack your stuff better. Side note, brain octane increases ketones, which make it easier to unpack DNA so RNA can read it. What you're looking at is not the stuff on the hard drive. You're looking at the thing that copies the stuff on the hard drive to see what it's doing.

Naveen: What's in the memory?

Dave: Exactly.

Naveen: The beauty of the thing is just because your genes have a potential to express something, it doesn't mean they're being actually expressed. The epigenetics, the acetylation and the methylation of the DNA are the genes actually controls if they're going to be expressed, how much they're going to be expressed or they're going to be all expressed. Actually the microbiome actually controls that. When you're eating and you say, "I'm feeling full or I'm feeling hungry," well you know where that signal comes from? That comes from your microbiome. You live to feed your microbiome. When they say, "I am full," you know what happens? It releases a leptin.

Your brain releases Leptin and says, "Oh my god, I think I'm full." When it releases ghrelin, it says, "I'm hungry."

Dave: One of the things I learned in the Bulletproof diet research is that I don't actually trust my gut biome because it's not acting in my best interests. The bacteria in my gut believe that I'm a Petrie dish and they're going to control me like one. The bacteria inside my cells, the mitochondria, they believe that I'm a Petrie dish and they're going to control me like one. Their goals are closer to mine than my gut bacteria. There's a symbiotic relationship, but it's kind of like we're getting a signal from the gut bacteria, and then our own bacteria are saying, "Well you know what, I think you should use this energy to go out and reproduce, so don't work, go out on a date instead and do something fun and run away from things."

All of our core base behaviors seem to be driven at a cellular level.

Naveen: It is true, but I don't think your gut bacteria actually is really a parasite. It is a symbiotic ...

Dave: Sometimes it is right?

Naveen: Actually very rarely because you remember what's happening here. For example, then you eat fiber. Our human DNA, the human body cannot digest fiber. It goes to your large intestine and the microbes eat the fiber, and do you know what they do? In turn, they release the short-chain fatty acids. That is what our body needs. In some sense we feed them and they feed us. Nature was very, very smart. Nature thought, "If I have to create this complex human body, it is going to be so complex that I have to create a massive amount of genetic thing in a single cell to do that." Nature realized, "Wait a sec, all these functions are being provided by different of these bacteria. What if we can put them all together to do this complex thing?" That's how we became an ecosystem in ourselves.

When we eat processed food, when we eat the things that are bad for our microbiome, it's like putting a fossil fuels inside your body and watching it just completely getting destroyed. When you take antibiotics, it's like nuking the planet. It's nuking the body. It completely, it doesn't care, good or bad, it kills all the bacteria. Guess what happens. The bacteria that survives, it just takes over.

Dave: It also gets pissed off.

Naveen: Oh god yes.

Dave: One of the things that I learned about in my own course of healing from toxic mold in my house and just losing a hundred pounds and all is that when you stress a bacteria or a fungus or a yeast, whatever, they make 10 to 100 times more of their own natural toxins. Like something just killed everything, I better get aggressive. Those toxins are called lipopolysaccharides. They cross the gut barrier, and they cause brain fog, fatigue, autoimmunity, leaky guy, and pretty much tied to every bad disease including cancer and Alzheimer's that you can name.

Naveen: Absolutely correct. That is by the way the cancer does exactly the same thing. Cancer is not the homogenous cell. It's heterogeneous, and it's actually an organism in itself. When you do the chemotherapy and it survives, first thing what does it want to do? It wants to spread.

Dave: It's way more aggressive, right.

Naveen: It wants to spread because it knows it's under attack. When it's under attack, it wants to spread all over your body because that's how the organism survives. If you ever fight evolution, evolution wins. If you want to go out and you want to attack this bacteria, not only do they become antibiotics for this strand, and then they become so toxic that it starts to eat the organisms. The other thing that happens is when you don't feed this microbiome, especially if you don't eat fiber in your body, these bacteria starts to eat

the mucus lining. When they start to eat a single cell of mucus lining, that essentially is protecting your epithelial cells and they're needed.

Most of your listeners may not know 70 percent of our immune system actually is in our gut. The reason it's in our gut is we may not realize it, we as human body are like a donut. We're holey all the way out and our body is built around these odd things.

Dave: We're a hollow tube.

Naveen: We're a hollow tube. That hollow tube is where most of the input comes from. Guess what, the immune system is right there. Our microbes in our gut actually train our immune system, friend or foe. They are the one when you inject some parasites, guess what, they are the first line of defense. They say, "Uh oh, don't like these guys. They're going to come take away my home. I'm going to kill it." A lot of the parasites that actually we take in our food is killed by our gut flora before even our immune system gets to it.

Dave: There's an interesting thing called fasting induced adipocyte factor. If you don't eat anything, your liver makes this stuff, which basically says burn fat, but if you eat something it says store fat. Gut bacteria, they want to make sure you survive a famine, so when you fast they actually influence the levels of fasting induced adipocyte factor, so they make you burn extra fat when you fast because they don't have anything to ferment. Then when you store fat, they make you store extra fat to make sure they have a backup supply, which is phenomenal. You get these things amplifying your own signals, and in that case you can argue my liver did that already. I don't want these guys hacking the system. On the other hand, maybe it's good for me, and those same things also make healthy bacteria, so the symbiosis is very complex.

Naveen: The symbiosis is extremely complex. Also I think we're constantly learning about our human body. Just last week ... imagine we humans have analyzed a body. We looked at a dead body. We have cut it open multiple times, and guess what. We're still finding new things. Last week alone we found a new organ.

Dave: I missed that one.

Naveen: Yeah. Essentially the lining that connects all the [inaudible 00:23:24] all throughout connects to our body, they thought there was separate tissue, it turns out it's a one single tissue, it's a new organ that we define.

Dave: Wow.

Naveen: imagine, we used to think that all of our immune system actually stopped at the neck. They found the immune system is all the way to the brain, so guess what's happening. They found the immune system was hiding in our brain that we did not know. Now when we talk about having Alzheimer's, suddenly we realize it's actually the infection and our immune system is the one that corners the inflammation, tries to capture this infection, and that's what causes the things. What's happening is that when your

microbiome is imbalanced, it cleans the immune system wrong. The immune system starts to get active, and that active immune system is the one that causes autoimmune diseases, or when you have a leaky gut you start to get all kinds of food allergies.

When your immune system is too active, it starts to eat our cells, which is autoimmune thing, but sometimes as you start to age, our blood brain barrier actually gets weak and that's how you start to get infection in the brain and the immune system in the brain starts to inflame and it starts to kill the neurons. Some of the toxin remover things are not working. I think you have been really good about improving the brain thing. Imagine you're able to take a blinking light at 40 yards and suddenly it just starts to melt away the beta amyloid. You have been a pioneer Dave in terms of understanding how the human brain works, and getting people to feel so good about themselves simply by using your device as optical. It's not like you're going out and drilling a hole in the brain.

Simply through diet and simply through light to be able to activate the brain functions so not only you feel good, you actually are better.

Dave: It's that difference where I used to just think I was weak. I'm sitting here, I made \$6 million, I'm 26. Well still when I was 28. I'm sitting there, I'm like, "I'm so tired, I can't focus and it's because I'm not trying hard enough. It's because I'm not strong enough, I'm not smart enough. I'm not fast enough." All that was completely wrong. It was because there was a biological hardware problem. Everyone listening, when it stops being a moral failing and just becomes a configuration issue, it's so much easier that way.

Naveen: Exactly. Then we can tune it, because the point is we start to blame the nature. It's my genes. Uh-uh.

Dave: Screw your genes.

Naveen: It's not your genes, it's your diet. It is the nutrition that's lacking. If you can control and imagine your diet and nutrition is the best blockbuster drug you're going to ever have.

Dave: That has been my experience. Here we are. We're two Internet geeks from [inaudible 00:26:17], successful entrepreneur and we're talking about this stuff. I imagine people listening, we have a lot of functional medicine, anti aging people and a lot of just interested people commuting or working right now. They'll listen to this going, "All right, this guy must have a new poop test, because he's talking about microbiome." That's not what you're doing at all.

Naveen: We do actually have, not the microbiome test, but we do a poop test.

Dave: Oh you do? Okay.

Naveen: That is actually one of the best ways to understand what is happening inside your body, the two places. Your urine test and your poop test is so powerful because we just don't look at ... Today's microbiome really has become a bad thing, because most microbiome

testing today when you go to the companies they'll do something called 16S, which is a genus level thing. Which is really as useless as not doing it.

Dave: It's like percentage of men and women in Asians versus African Americans or whatever.

Naveen: That's all it is. If you look at America, the whole of United States, they'll say well there are some blacks and there are some whites and there are some brown people, and by the way some of them are named Smith and some of them named Jones and that's it. That's what America is all about. When you and I look at that thing and say, "Well gee, they are doctors, they're an engineer, they're plumbers. They all have very different function." What we do is we look at everything that's going on inside your body by analyzing your poop. What happens is not only we see every single screen of bacteria, not just a species. Every screen, we look at every virus, we look at every phage. We look at the human RNA.

Dave: You said something there, phage. Most listeners have never heard of a phage even though you should have, except they don't teach you this in biology and in the West we pretty much ignored them. The Russians pioneered phage research. They just basically control viruses, which can control proteins, if I remember right.

Naveen: Basically phages actually attack the bacteria. What happens if phages don't impact humans but they impact other bacteria, so they start to attack the good bacteria. Phages are important, to some extent they could also be used for attacking specific type of bacteria, so instead of taking antibiotics you should be taking phages for specific bacteria.

Dave: Phages live in the soil, unless you spray the soil with Round-Up and you sterilize it, which we've got to stop doing that because these are actually more important than antibiotics in controlling unhealthy bacteria.

Naveen: Absolutely correct. I think a lot of counterintuitive thing. Imagine why the first world or the developing countries has so many of these diseases. Number one, the children are born to caesarean section. Bad, bad, bad, bad, bad.

Dave: Thank you for saying that. The U.S. is the leader in ceasarean section.

Naveen: Interesting thing is the nature works extremely well, during labor your gut flora actually starts to move toward the vaginal canal. When the baby's born it actually flows and gets the first introduction of the microbiome in the body. The first seven days, with the breastfed milk, it is not to feed the baby. It is simply to feed the microbiome so they start to grow and they start to digest the food because a lot of the digestion happens through these microbiome.

Dave: I have an alternate theory here.

Naveen: Tell me.

Dave: Any parent of a small child knows that half the small child's calories are absorbed right through their face, which is why they smear the food all over their face. Is that true?

Naveen: I've never heard of that.

Dave: I'm just kidding. We're both parents, so we've both seen it. There must be a reason they do that.

Naveen: The second thing really happens is we actually don't allow our children to play in the dirt anymore. First of all, we have to stop putting all the Round-Up and all the toxin and all the fertilizers and all the crap into the thing, but good old farm soil is absolutely wonderful because that's how the humans became one with nature. As we start to live in urban areas, we in fact are not being exposed to all the things that used to be exposed to when we were living on the farm. People are now selling the farm air, because you really need all the things that you used to get from all the farms, because you want to get all those microbes so you don't get allergic reaction so your immune system is trained properly.

Dave: People wonder, "Dave, why did you move away from Silicon Valley?" Well I have two young kids and we live on an operating organic farm and they go out in the dirt every single day, and I did that for my kids.

Naveen: Let them eat the dirt.

Dave: They do.

Naveen: It's a really good thing. Don't wash your hand with Purell all the time because you're essentially making these bacteria resistant. I think that some of the things that happen is we have become too hygienic. I really think as humans we're supposed to live with nature and a little bit of the thing that we've become part of it is what trains our immune system. I think we should talk about some of the cool stuff about going to the moon next.

Dave: Yeah, okay, let's get to the moon stuff, but I have a couple more questions for you, the new work you're doing around RNA analysis.

Naveen: Gut inflammation.

Dave: You're doing gut inflammation but you're doing a poop test and you're doing a blood test. You're looking at the blood biome. The two things have got me really excited about, let's actually just do an interview instead of just chatting. One of them is that when you're looking at poop, instead of just bacteria, you're looking at very specific types but you're also looking at phages, viruses and very importantly you're looking at the fungal biome, which no one does, and it's at least as complex as the bacteria.

Naveen: Regardless, we're looking at parasites. We're looking at human RNA that shows you how your gut inflammation is doing, and we're looking at the metabolites that the microbes

are producing, and the blood volume which nobody has ever done. Once you're able to do that, since we are able to look at all the RNAs, we're looking at the mitochondrial function. We're able to see the bacteria, phages and viruses in the blood that no one has ever looked at. That I think is going to be so phenomenal that we'll be able to find the predictive bio markers of the diseases so we are able to cure the things before you even see the symptoms of it.

Dave: That's how it's supposed to be. Everyone listening by now, if they've heard more than three shows and they know that mitochondrial are at the very core of performing well. If you can't make enough electricity in your body, it doesn't matter how hard you want to do something, you won't do it. How can they get access to a mitochondrial test? By the way, I don't have a recommended one yet.

Naveen: Every one of your listeners should really sign up for Viome services and for the listeners of Bulletproof we're going to actually have a special quote for them to put them ahead of the queue, because as opposed to waiting for tens of thousands of people who already signed up, every Bulletproof listener is going to get ahead of the queue and they're going to be the first one to be able to get the service.

Dave: That's awesome. We didn't even plan that. We talked about doing some sort of thing. Here's the deal. You know how important all of the biome stuff is. You've heard many different podcasts where we've talked with Jeff Bland and Mark Hyman and all these various different people, but I couldn't find a way to get a reliable mitochondrial test that didn't require an oxygen mask and a laboratory, which is what I do. Being able to get this for you is really powerful. You want to be first in line. The code is going to be Bulletproof. What's the URL.

Naveen: Bulletproof. Go to Viome.com, V as in Victor, I-O-M-E, dot com.

Dave: V-I-O-M-E dot com, and what is it? It's \$100 a month?

Naveen: \$99 a month.

Dave: Cool. You get four tests a year?

Naveen: Four tests a year.

Dave: These are four poop tests and four blood tests?

Naveen: Yes.

Dave: Okay, cool. If you compare that to what you would spend for normal lab testing that doesn't get you mitochondrial, it doesn't get you a lot of that stuff ... Do you do telomeres at all in that?

Naveen: Telomeres is totally separate.

Dave: It's totally separate, all right, cool. That's still not a small amount of money, but it's also a very good deal for four lab tests to track how you're doing on a regular basis. It's actually one of the most affordable, comprehensive things like this I've been able to find, which is why I'm super stoked on it. Viome.com/Bulletproof, and just so you guys know I get a small commission on that, but at the same time ...

Naveen: It's not about the commission. You and I both know this.

Dave: No, it's not. I want to be full disclosure so people know. I don't want anybody to feel like I'm sneaking something in. Also, we are working on getting Bulletproof supplements so that when you know what's going on, that Viome can recommend Bulletproof supplements. We're just helping each other out here. You guys should know that, but more importantly, I've been wanting this stuff for like 10 years and now I'm going to get it. I think a lot of you will be interested as a standard health tracking service, the \$99 a month is actually a very reasonable thing and it's actually less than I give as a bonus. It's a compensation. All of the employees at Bulletproof get more than \$100 a month of discounted Bulletproof stuff because it helps them be healthier.

The ability to spend even less than I'm doing that way in order to get the data so you know you're not wasting money on supplements, that's huge.

Naveen: That is the big. Plus more than just not wasting money, the reason people continue with something is because they know it's working. If you can't measure it, you can't improve it. This shows you it's working so you continue taking it because it's working. I don't know.

Dave: Exactly. There's all kinds of stuff out there. Learning to trust that sense versus just to deceive yourself is so tough. We talked about Hacking the Human Body, and if you're listening to this going, "What the heck?" We are Internet entrepreneurs, engineering systems thinking geeks. Neither one of us has a medical degree.

Naveen: No medical degree.

Dave: Unlicensed bio hacker. This goes back to what you said earlier about being an entrepreneur. You go for something you don't know, you're like, "Well why aren't they doing this?"

Naveen: Exactly my point.

Dave: Since I don't know the reasons, I'm just going to do it. All people come up through a certain industry see the box because that's what they grew in, but you didn't see this box.

Naveen: Actually we saw the box, but I applied the thinking of my engineering box into this box that nobody has ever applied. I want listeners to know something that's really interesting here is this technology was developed at a national lab. They spent billions of dollars developing this technology and it took them 10 years. What you're really seeing

is 10 years of hard work and billions of dollars that were spent by the government to really for a national security. Now that work can actually be applied for the benefit of humanity. You and I are benefiting because our tax dollars are already spent on this.

Dave: That's something really cool. There's a lot of innovation that actually has been funded by national laboratories. By the way, my father spent his entire career since college at a national laboratory in Albuquerque, the one that's Internal Combustion Research Sandia National Laboratories. I grew up in a laboratory family, and much of that research, they discover it and maybe it ends up in the ...

Naveen: It sits on the shelf.

Dave: ... space program or something, but it's not used. What you did is you're an execution oriented entrepreneur, you had a big problem. You had your own health issues, family health issues just like all humans have. You're like, "Wait, I'm an engineer. There's all these solutions. Maybe I just need to match them up," but then you executed. Before we get into the space though, how did you execute on matching, how did you get something from the government and then make a private company out of it?

Naveen: Actually I started a company called Blue Dot. The purpose of Blue Dot was exactly, is to look at some of the space technologies coming out of NASA or some of the technologies coming out of national labs or at the DOD Labs, and trying to see how you can apply the technology for something that is something totally different. For example, we also are working with NASA at JPL where they had a technology that they designed for Hubble Telescope. Think about what Hubble Telescope does. Hubble Telescope is able to detect a very, very faint light from a very, very distended star. Now most people look at a star and say, "Cool."

I start looking at that and thing, "Wow." Imagine, I thought every bacteria has auto fluorescence. You put a UV light on a bacteria, it has very faint auto fluorescence. Light bulb. I said, "Ah ha. Can we take this UV sense and put a small camera and you spit when you're sick, and you see fluorescence." You say, "Holy shit, I need to take antibiotics. I got a bacteria infection."

Dave: That's so cool.

Naveen: Now you have a simple test for virus, viral [inaudible 00:38:52] bacteria infection for something that was done way back when for Hubble Telescope. Now we are able to apply that for something that is totally different and will change the trajectory of how humanity lives by just simple adapting. That's what you and I do best.

Dave: When you cross over, stuff happens. I had coffee a while back with a guy who holds the first patent ever for [inaudible 00:39:17] to 11B. This is in Mountain View, California. I said, "What are you working on?" He said, "Well I know you're doing this anti aging stuff Dave." He said, "I took the really sensitive signal detectors we use to troubleshoot our radios and I pointed them at my own body, and oh my god, there's a huge signal coming

off of my body," and he showed me all the data. It's like, "This is so cool." He's not a doctor, he has no idea, but he's like, "I'm pretty sure I can get diagnostic criteria."

What's happening is the fields of engineering and biology are becoming bioengineering, and bioengineering is a new specialty. There's a few people educated in it, but most of the them ...

Naveen: Bioinformatics.

Dave: That's a whole thing. Most of the time you're getting engineers who are coming into bio, you don't get a lot of doctors that become engineers, but it does happen. There's engineers who don't become doctors but they're like, "I'm tired of my knees hurting, so I'm going to do something wacky," but it works.

Naveen: The interesting thing is actually the doctors becoming engineers are very, very different because they come from very different mindset. Engineers are actually really cool kind of people. They simply look at the data. To them, it doesn't matter whether data is a sensor data, it's coming from biochemistry data, it's coming from blood, it's coming from poop. They don't care. Here's the data and I can apply the software and the patter, the machine learning, and guess what, I find the pattern. That's what engineers do. They actually are just data junky. We all are information junky and by looking at information, we are able to deduce things that people who are taught a medical degree have never even looked at.

The beauty of the thing is the humans have never had the technology that could look at the human body in such a detail. Until the Hubble Telescope was invented, we thought there are few stars here and there, and suddenly when we pointed the Hubble Telescope in a one square inch of area, we saw there are billions and billions of galaxies in that area. Imagine turning that Hubble Telescope inside your body and suddenly we say, "Oh my god, look at the climate of our body. What have we done to ourselves?"

Dave: Exactly.

Naveen: That technology has gotten so affordable, just like landing on the moon. The first time we landed on the moon it cost us \$25 billion. The mission that we had that's going out this year is going to be under \$10 million.

Dave: This unmanned, right? Just robots?

Naveen: Unmanned mission.

Dave: Why do you need people on there?

Naveen: Why do we need people there? Because you can actually get everything then robotically. As you mentioned, I'm going to go back and step back for a second.

Dave: I love the moon stuff. By the way, I have an analysis stick on my laptop. I'm a huge fan.

Naveen: Maybe we should meet up separately, another part [inaudible 00:41:49].

Dave: We could. I'd be up for that. Guys, leave us some comments. We'll talk about some moon stuff here, but if you want to hear a lot more about creating a company that can go to the moon and all that, we can do a whole other episode on that. It's a bit different than the human performance thing, but as long as we tie it back to the entrepreneurial, the cognitive and emotional side of things.

Naveen: Here's a very interesting thing is to me, the going to the moon is not about just going to the moon. It is simply about a proof and the showcase of what entrepreneurs are capable of doing. When we land on the moon, I want every entrepreneur to be able to say if they can land on the moon, what is my moonshot? My moon should could be cure the cancer, cure the Alzheimer's, understand my human body and make it completely high performance. Whatever your moonshot is, now you have the technology at your disposal to solve it. To me, we were talking about as an entrepreneur thinking, they're really simple. Dream so big that people think you're absolutely crazy. When people tell you what is that you're doing and you tell them what you're doing, and if they don't think it's crazy you're not thinking big enough.

Think big and never be afraid to fail. As an entrepreneur, you only fail when you give up. Everything else is just a pivot. That means if the things are not working, you change, you adapt and you pivot, and then until you give up, you have not failed. Every idea that does not work is simply a stepping stone to a bigger success. Now to me, as you become successful in life, always remember, stay humble. The sure sign of success in life is the humility. If you have to tell someone how rich you are, then you have not achieved success. Success comes when you say I am still learning. The human curiosity, the best parenting advice ... we're both parents. I can give you the best parenting advice, to me, is really is make the children intellectually curious.

As a parent, I've seen the parents who say, "Well I can only take the horse to the water, I can't make him drink." I keep thinking why do you think you need to take them to the water or make them drink. What if you just make them thirsty?

Dave: There you go.

Naveen: If you make them thirsty, what will happen? They will find their own water and they will go out and drink. Our job as parent is to simply make them thirsty. As an entrepreneur, our job is not to get bogged by what it is, but focus on what it can be. When people talk about is the glass half empty or is the glass half full, and my question always is do I want to fill the glass? If I want to fill the glass, does it really matter if it's half empty or half full?

Dave: I like that. That's actually a great analogy. What's in it? That would matter. How did your parents make you curious? You've had an interesting path.

Naveen: I think interestingly we grew up in very, very humble beginnings. We grew up in India. There were times when we didn't have food to eat. We moved from village to village. I

came to the United States 35 years ago with \$5 in my pocket. God has been amazingly kind to us. What my parents taught us was it's about learning. It's about being curious, about able to go out and do things. Even though my mother could read, she sat me down and she would point and say, "Tell me the answer to this problem." I would say, "Mom, the answer is seven." She would say, "Don't make me look. Do it again." I'll do it again, and I'd say, "Mom, I think the answer is seven." She said, "Good, now go to the next one."

The point was she cared. She wanted to really show that the only way to get out of the poverty is to really learn, to be curious. She was completely okay when I would take anything that I found in the house and open it up. My dad would get so angry, "Look at what your son did now. He just broke this thing." She would say, "He will fix it. Don't worry about it." I was so curious that I was willing to go out and try things, and my mom encouraged it. She said, "It's okay if we can't fix it. You know what, we'll put it back, and if you can't put it back, so be it." The point was that curiosity is what allowed me to be who I am today, that I don't really care what the problem is because I know I can open it up and take complex problem, break it down into simpler, simpler, simpler problem, it's small modules that you can execute and you start doing small, small slices. Next thing you know, you're boiling the ocean.

Dave: The idea of breaking down into a small problem, that ties into what Clayton Christensen, the guy who coined the term disruptive innovation. You probably met Clayton.

Naveen: Of course I've met Clayton.

Dave: I've worked with his consulting firm, but I've never actually interacted with him like on a phone call.

Naveen: He's a wonderful human being. As a human being, I have more respect for him than most of the professors I have ever met.

Dave: He saved my career a lot, and probably doesn't know it.

Naveen: Have you read his book?

Dave: Yeah. In fact Disruptive Technology was ...

Naveen: No, not that one. How Will You Measure Your Life?

Dave: That one is the latest one.

Naveen: It touched my heart.

Dave: It's a profound book from someone who's spent his whole time looking at this. What you're saying matches what Clayton did. Clayton analyzed how do these small annoying startups suddenly topple big industries? His seminal work was on the hard drive industry where you have these companies doing several billion a year in revenue, and then two

years later these small web startups are buying them because of this crazy disruptive thing that's happening. What you're saying is you start small, you solve one problem, and it's not big enough to be a threat. Then all of a sudden, it just grows and grows. By the time the big guys notice, it's too late. They try and buy you and essentially the industry's broken. The telecoms got broken by the Internet this way. Frankly, lost cost servers broke mainframes this way. We've just been doing this forever.

Naveen: Actually it's better now.

Dave: oh it's much better.

Naveen: What's really happening is with the convergence of exponential technologies, it doesn't matter what lifecycle you're on. Every five to 10 years, whatever is being done is becoming obsolete. You and I and everyone listening to it, we're living in the most amazing time in the human history. Next 10 years there's going to be more changes than happened in human history.

Dave: Amen. Everything is changing rapidly.

Naveen: Here is the thing. In the next 10 to 15 years, half of the fortune 500 companies will go bankrupt. Here's the beauty of it: when the old guard dies, what happens? You and I and everyone has an opportunity now to be the new king. Every technology that exists today will be obsolete in five to 10 years. What that means is you can be the guy who disrupts the current industry. It doesn't matter what it is. Let me give you a couple of good examples here for your listeners here. It's not about the technology that you look at what it's doing. It's the secondary and tertiary in back of the technology that most entrepreneurs miss out on, but that's where actually the opportunities are.

For example, everyone knows about a self-driving car. You will say, "Well that's going to have a massive impact on the automobile industry because you no longer need to own the car. You can be on demand, and by the way, if I'm going out on a date I can order a Ferrari. If I'm going out long distance, I can order a Prius. I don't need to own the car anymore." Now imagine if you ever start driving car, what happens to the parking lots? You don't need the parking lots. Could they become the affordable housing now? What happens to all the parking lots? Could they become the parks? Could they become the housing?

Secondly, if these cars are communicating with each other, we don't need to build as many roads. That means what happens to the Caterpillars of the world? If these cars are not going into an accident, what happens to the automobile insurance? What happens to the life insurance? More than that, what happens to the real estate prices in the urban areas because now you can live in the suburbs and your car becomes your office. Holographic images, you are sitting there. It doesn't matter where you are, your location's shifted now. The real estate is impacted, the insurance is impacted. The insurance companies are impacted, and suddenly you have abundance of housing.

Dave: It's happening, for sure. I live on Vancouver Island in the sunniest part of Canada, and in the last five years the shift, there's tons of successful entrepreneurs moving there because they want clean air and because it doesn't really matter where you're living.

Naveen: It doesn't matter where you live anymore. The other thing is understanding when you're looking at solving a problem, are you solving the symptom of the problem? Are you actually solving the real problem? Let me give you an example. Let's assume you're an entrepreneur and you say, "Look, I want to solve the fresh water problem because people don't have enough fresh water." You go out and start to build a [inaudible 00:50:55] technology and everything else. Until you realize why do we have a shortage of fresh water and you realize majority of the fresh water is used for agriculture, and it's ah ha. What if I can use aquaponics or aeroponics and suddenly I don't need this water. That means now I can solve the fresh water problem simply agriculture problem.

Then while you are thinking, "Oh my god, I got it," some other entrepreneur comes along and says, "Wait a sec, the majority of the agriculture is used for cattle. All I have to do is instead of raising the cattle, what if I'm able to take a stem cell of a cow and create the bio factories and only create muscle tissue than beef." I'm not the moral just to tell people they shouldn't eat beef, but I don't need to have a cattle to peel of this living animal. I can have the beef simply grow up in a bio factory.

Dave: That was interesting because we were talking about the human body, it's this complex system and it's about the environment they're in. I do not see a future where we can grow laboratory meat with an environment that creates the equivalent of what comes out of animals because they'll end up making it like tofurky. I'm a little concerned about that one to be honest, but I like the vision that says if we can make an equivalent health product with all of the small [crosstalk 00:52:20].

Naveen: By the way, no antibiotics. What's happening is to live and you eat beef, you're not eating beef. What you're eating is so much of antibiotics that has been put into the cow.

Dave: I eat the cows that eat the grass that grow in the front quarter of my farms. I'm getting real cow, but one in a hundred people order grass fed meat that way.

Naveen: Very, very few people get that. My point is what I was starting to say was that suddenly the fresh water problem actually becomes a synthetic biologic problem, and that's the point I was trying to make.

Dave: I got it.

Naveen: It is really understanding the root cause. Yes, by the way, if you care about the environment, the biggest damage to the environment is done by the cows. The cattle.

Dave: You don't think it's the pig farms? I've looked into this a lot.

Naveen: The cattle and the pigs.

Dave: The pigs are a lot worse.

Naveen: The pigs are a lot worse, but my point is ...

Dave: They're delicious.

Naveen: Cattle and the pigs, but here's the best part. If you care about the environment, all you have to do is eat less of that one day. Don't eat meat one day, you will do more for the environment than driving a Tesla.

Dave: I would agree with you if you're talking about industrial meat, but if you care about soil integrity, you would want to eat grass fed cows so they'll poop on the soil to make healthy material in the soil.

Naveen: Actually if you really care about the environment, the next big thing is going to be the microbiome of the soil.

Dave: That's exactly right.

Naveen: If you're able to adjust the soil microbiome, you can increase the yield of a crop 100 percent to 500 percent. Suddenly you're able to feed not just seven billion people but 30 billion people because you've adjusted the yield of the crop by simply changing the microbiome of the soil.

Dave: That's real. That stuff happens, and you don't have to make GMO crops, you don't have to [crosstalk 00:54:07] poison.

Naveen: No, not at all.

Dave: There's so much simpler solutions.

Naveen: So much simpler is simply understand the ecosystem of how this plant grows.

Dave: I have a question, and you may have even seen deals like this. I haven't come across any. I want to stop spraying antibiotics on our soil because living soil makes living biome and your gut makes living humans. We are based on soil. It seems like with robotic technology we have today, you can have free roaming robots with visual recognition stuff that are solar powered. Every time they see a weed growing, they just take a metal rod and stick into the soil where the weed is. Why do you need to spray poison on soil to stop weeds?

Naveen: There are many, many ways of killing the things that we don't want, especially the weeds. You could laser to death.

Dave: I'm just looking at power. You can laser them, there's all sorts of things, but the number one thing you don't have to do is pour toxic stuff on them.

Naveen: Why is that? Because it goes back into your body.

Dave: Have you funded something like that? This is such an obvious problem. People listening, do this.

Naveen: There you go. My point is when everyone comes across a problem, the question shouldn't be why didn't someone do something about it, the question should be what can I do about it? Anyone who's listening, you just got an idea from Dave here.

Dave: There you go.

Naveen: Go out and solve the problem for the weed without putting any toxin in the soil.

Dave: Give us robots, even to pick off insects. It's not that hard. It's well within our capability. I'm serious, if you actually do that I will talk about what you're doing. I'll give you a leg up. I'll introduce you to investors, whatever it takes because I actually want to see that. I'll put it in my garden too. It would save me time and it would be really cool. Not that I actually pick my own weeds. I'll admit, I have a gardener help me with that. We talked a little bit, you got some technology from the government for Viome, and your moonshot stuff though, you actually don't want government technology because the stuff they use is from the 1980s because it's radiation hardened and it's easier just to put 10 android phones with duct tape and send that to space essentially, right?

Naveen: Actually on a moon [inaudible 00:56:06] what we're doing is we're taking advantage of all of the latest exponential technologies. We're able to 3D print the rocket, we're able to 3D print our lander. We're able to use the hydrogen peroxide for our fuel.

Dave: Which is nontoxic.

Naveen: Nontoxic, and by the way, all you get out of it is water vapor. The reason we're using hydrogen peroxide, because we can build that on the moon because it requires H₂O too, which is water on the moon.

Dave: One of the things that was actually really just a huge mind shift for me was when we first met, was with Peter Diamandis and I went to the 10th anniversary of the Ansari X Prize. We were at the Space X fabrication, and I watched them 3D printing a rocket engine. It was the coolest thing. We got to have dinner and talk. If I remember right, we were making little lunar landing stations out of legos as a contest. Just to see the level of these technologies that are mostly hidden. We hear about self-driving cars and all that, but even if you're relatively well read, you have no idea what's happening in terms of the speed of change in 50 different fields, and that's what's coming together. You're saying it's going to cost \$10 million to get a robot on the moon. Are they going to bring stuff back from the moon too?

Naveen: Yes. The interesting thing is my prediction is within 10 years we're going to have a boots on the moon for under \$10,000. Imagine that for \$10,000 you'll be able to go to the moon and come back, which is really a first class ticket cheaper ... I mean I think it costs

more to go on a first class from here to Dubai. My point is the costs are coming down so much, and the reason is once you start to get a reusable rocket, the cost really becomes the cost of the fuel. What if you don't have to take all the fuel from earth, because 93 percent of the weight of the rocket is the fuel. What if we can re-fuel on the way? We actually take the water, hydrogen and oxygen, rocket fuel and the fuel for humanity, and you put them into earth orbit, you put them in the moon orbit so you're able to re-fuel yourself as you're going up instead of getting all the fuel yourself.

Imagine one day we are able to live on the moon. I understand that Elon wants to go to Mars, but moon is only three days away. You'd rather be a lunatic three days a way than to be a martian six months away.

Dave: I have biological questions about the viability of both of those.

Naveen: I'll tell you [inaudible 00:58:28].

Dave: Our mitochondria are not well adapted for that.

Naveen: Ah ha.

Dave: We can hack that, but the human body's going to require some upgrades and some environmental changes in space habitats.

Naveen: It is. The beauty of the thing is go back to the nature. What we found is that nature has already done this. You find that there are bacteria which are not only surviving, they are actually thriving in radioactive waste in the high radiation. [inaudible 00:58:55] and the radioactive waste, the bacteria has evolved to not only survive but thrive using the radiation. Now imagine if you can take the genetic material from these bacteria, use the CRISPR technology, so CRISPR-Cas9 or CRISPR-Cas3, CRISPR-Cas1 or CFCF, C1C1, you're able to now modify all human genes so that we became radiation resistant, but better than that, instead of eating pizza, we'll be saying, "Baby, give me some more radiation."

Dave: Just have uranium tablets for breakfast and you'll be good to go. Now that's a pretty darn trans human vision. A lot of people listening to this ...

Naveen: It's going to happen.

Dave: It is, unquestionably. A lot of people listening to this are probably a little bit wiggled out by that. At what point do you see a difference between say changing our genes so that we can live in environments where we want to live versus replacing yourself with robot parts.

Naveen: Today when you get your hip replacement, what's happening?

Dave: You got a robot part.

Naveen: Right. You get your knee replacement, you get your heart replacement. Now the only different is instead of using a big heart, you're actually maybe growing your own heart. You can take your skin, the skin can work them into IPS cells and can work them back into the things, and grow a 3D printed liver or a 3D printed kidney or a 3D printed heart. Now imagine if you have the nanobots in your body that are not only cleaning up your body and repairing the DNA, repairing your mitochondria, re-feeding your mitochondria, but suddenly are also providing oxygen. They stay put, they don't do anything. Let's assume your heart stops working. You don't die. Your nanobots kick in. They start to supply the oxygen. You pick up a phone, you call your doctor and say, "Hey doc, I think my heart stopped. I'll be there in 30 minutes. Can you print me a new heart? I'll be there."

Dave: I got a meeting at seven.

Naveen: You call your doctor, you go drive the car. He gives you a new heart, you put it back in and you're good to go. The point is it really is freaky to think about augmentation, but it happened slowly enough that people don't realize it. For example, when you and I were young what we did, we met someone we remember their phone number. Now all of that has been augmented with the iPhone.

Dave: We just swipe right.

Naveen: Now it's augmented. Now our memory is now on cell phones. We don't remember the facts anymore, we remember the keywords for the Google to find the information. We now have our cell phone that's augmenting our brain. Imagine slowly, slowly we're going to start doing more and more augmentation. Now imagine if you can have a brain computer interface where our brain is constantly connected to the Internet where all the information is being fed. Our nanobots in our brain are communicating. Who is this guy? What did we discuss last time? All the information is coming back to you. I think what happens is when people are worried about self-driving cars, they don't realize that planes are self-driving for a long time. People get so worried about "I'm not going to have a robot in my house." Your dishwasher is a robot.

The point is when things start to happen, as Peter says all the time, the day before the breakthrough is a crazy idea and the day after the breakthrough is [inaudible 01:02:27].

Dave: Then it becomes self-obvious and all the people who said you were crazy suddenly said it was their idea in the first place?

Naveen: Well being rented in the first place.

Dave: You got to love that. It is what happens on a very regular basis. I believe all the things you're saying here, and we've talked about this stuff. Certainly I'm in that camp. For people who are listening and are saying I don't want to lose my humanity, what do you have to say to that?

Naveen: The point is what is it about losing humanity? Let's talk about what makes us human. If we say, "I don't want to live forever," what is that I that we talk about? If I is your body, your body actually never lives for any day because your body's constantly changing. Remember when you were a tiny baby and now you're this adult? It's not the same body. If you say it's my DNA, your DNA are propagated through your children. At the end of the day, irrespective of how proud we are of ourselves, we're simply a container. A beautiful container for parasites is who we are. What differentiates between Dave and Naveen is our memories and our experiences. That's really what separates the two of us is that the experience we have had, the memories we have had, all that is who we really are.

If we can take that memories and experiences, now let's assume people are able to do the head transplant.

Dave: Right. Someone's going to try it.

Naveen: Already they're already doing it in China. They're able to do a dog transplant.

Dave: Wow, they did a dog head transplant?

Naveen: Dog head transplant.

Dave: That's creepy.

Naveen: How creepy this thing will be, you see someone working out and you say, "Wow, that's really nice body." That's creepy, right? Imagine, suddenly does the body really need to be biochemical body anymore.

Dave: These are real questions. The thing is, I was talking about living to 180 plus as my personal goal.

Naveen: Why not 300?

Dave: That's why there's a plus on there. 180 is the worst case. I look at ...

Naveen: What does living really mean?

Dave: That's a question. If you upload yourself to the Internet, are you still alive. I think there will be debates about that even after someone succeeds in allegedly doing that. The nature of [inaudible 01:04:51] is do we have a soul, all that kind of stuff. I do think though if you, like you said, you look back to what we did when we were kids or you look back 30 years ago, how did we do research? It was on optical microfiche in a catalog. You could spend two weeks to find one fact. Then you launched InfoSpace, and what would have taken me weeks at the library to get my degree took me like 20 minutes and then I could go out and have pizza. It changed everything from a research perspective.

You look at the cell phones that we have now, and your iPhone is the sum of the world's compute power in 1960 and all of that. I would just encourage listeners, you live in the future, you see the future. I do the same sort of thing. None of this is crazy because it's all happening within our lifetimes.

Naveen: Here's the thing. Not only in our lifetime, in the next 10 years there's no doubt in my mind we'll be able to understand the human biology, are cells good enough. As we said, the sickness will become optional. What if the aging, as we all know, is one other disease? What if the aging becomes optional?

Dave: It will. Absolutely.

Naveen: That's my point. Why do we age? It's really simple. It's because somehow our cells are no longer able to keep up because either nutrients are lacking, our DNA repair machine is broken or the mitochondria is not functioning properly, but all those things will get fixed up. When they get fixed up ... People say, "I don't want to live up to 100" because in their mind, 100 is a fragile old man. Can barely walk, in a walker. No. Think about when you were 30 year old, and if you could actually be like that for the next 300 years, who wouldn't want to be?

Dave: I don't understand that. I've met a lot of people who say, "I think I'd get bored." I don't understand boredom. There's always something interesting.

Naveen: You know what, if you are actually believe you're going to get bored, you need a new life.

Dave: Hey man.

Naveen: My point is I can't find enough hours in a day. I only sleep four hours a day because there's so much to do. I wake up in the morning, I jump out of the bed because I'm thinking, "Oh my god, there's so much happening." I'm just so excited about life. I love life. I love learning. Where is the boredom? The day you stop learning is the day you actually have died. Most people who are bored are actually already dead, so I don't know why they're just not ...

Dave: Get out of the way.

Naveen: They're zombies. They literally are zombies now. The minute your brain is no longer growing, you have become a parasite on society.

Dave: Wow, that is powerful and I agree. If you're not here to do something, it's okay to get out of the way. You said something that's interesting there. I went through a period when I was a new dad, I was working as a VP at a big tech company, head of Global Evangelism so flying around a lot, and I started Bulletproof. I'm sleeping five hours max a night, I did it for two years and often I'd do was three or four hours night. I lost weight. All the biomarkers I had were fine. I don't think it was necessarily good for me. It might have shortened some telomeres and I sleep actually six hours, not six hours, it's six

hours and four minutes for the last three and a half years according to my data stuff. Last night was four and a half and I'm fine today. People can't see us.

You're getting about four hours a night, but you're also running now a health company, and there's pretty good data you should be getting six hours. What do you say to that?

Naveen: I think the answer absolutely true. There's no doubt in my mind I probably need another two hours. It will probably will happen, but I'm just so excited. I'm so excited about what I'm doing. I think to some extent when you get to our age ...

Dave: How old are you?

Naveen: 57.

Dave: Okay, cool. God, you don't look 57.

Naveen: Oh thanks. My point is everyday I think, "Oh my god, there's so much to be done." I just get so excited about doing things, but I'm going to make it a point to actually start getting additional two hours, and I do want to get to a six hour time because I know it's good for me.

Dave: Do you monitor your human growth hormone, your testosterone, all your biomarkers?

Naveen: In all honesty, I don't but I should.

Dave: I monitor my RNA expression to see if my mitochondria work, but I don't look at my human growth hormone. That's cool. That's funny.

Naveen: It's one of those things, it's like I feel good.

Dave: Also, as someone who's worked with a lot of people including people with chronic fatigue and people who don't, you have the eyes and the skin of someone younger than you are. Those are very obvious giveaway things. Your energy level is, I don't know, you're probably not on Adderall, but every time I've ever talked with you, I've ever interacted with you, you're always just passionate and full of energy, which are probably better indicators than a lab value. You can tell. You're not substantially overweight or underweight and all that. I believe in very heavily tracking what you're hacking. You can spend all your time tracking every five minutes everything, that you're never going to change. Who cares? That's not useful data.

Naveen: I think that's what happens. People get so caught up in the data that they first of all can't change. For example, looking at a DNA. Why bother looking at DNA? You can't change it anyway.

Dave: Or for that matter, let's look at cholesterol because it's easy to measure even though it's a terrible indicator of health.

Naveen: Cholesterol is good for you.

Dave: Oops.

Naveen: Nature is not that stupid. Too much of everything is bad, but cholesterol in itself is not a bad thing. Like fat. One of the things that people just don't realize, fat is not the enemy. Your enemy is the glucose, your enemy is the sugar.

Dave: Or just damaged fat. Trans fats and things like that. It's one of those things where I think guys like Mark Hyman and David Ludwig, who I've become friends with, Dr. Perlmutter, they call it the fats out of the bag instead of the cat's out of the bag. I think it's becoming increasingly hard for the 1970s physicians who've been recommending these low fat diets for a long time. People just don't listen because it's not credible anymore.

Naveen: First of all, it has never been credible. Second, personally I believe there's no one diet is good for everyone. Even as humans, we have 90 percent common DNA between us and a plant.

Dave: And politicians are actually 98 percent.

Naveen: They're probably 98 percent with the parasites. My point is what makes us really different is our microbiome. If our microbiome between two individuals, less than 10 percent of our microbiome we have in common even though 99 percent of our DNA is the same. My point is the same diet that is good for you may not be good for me. That's really what I believe the next big plan is going to be the diet that's based on the test. That means personalized diet based on your microbiome, based on your metabolome. You're really looking at your metabolites and adjusting your nutrients and diet based on those two things, your metabolome and microbiome and gut inflammation. Really the key to in terms of how you're going to adjust your diet, and no two diets are going to be alike.

Dave: What about fecal transplants? I've looked at that. The FDA somehow thinks that poop is a drug now, which kind of makes me laugh.

Naveen: I hate to say it, but I really think the best way to actually repopulate and re-wire your microbiome is really a fecal matter transplant. FMT is the best way to do that, probiotic. When you take probiotic, it's transient. It tunes the immune system but it does not stay there. You have to constantly keep taking it because you do train the immune system, but most of them actually die in your stomach anyway.

Dave: Couldn't you just put the probiotics in the other end?

Naveen: The answer would be [inaudible 01:12:59]. Basically your poop is nothing but essentially a microbiome re-transplant.

Dave: Yeah, it's human compost.

Naveen: I really think to some extent that is the key. I think what a lot of the research is showing is that they're able to find the obesity. Autoimmune diseases, all those things, you take a fat mice and take a poop from a fat mice, give it to the thin mice, the thin mice becomes fat.

Dave: That was in the Bulletproof Diet. You read about that study.

Naveen: Thin mice, you take a microbiome, the poop and put them in a fat mice, the face mice becomes thin.

Dave: Does that mean are you going to be able to buy Michael Phelps poop on eBay? How do you know where to get this stuff? You're doing microbiome testing as a part of Viome, and I absolutely love doing once every three months so you can see what changed. It changes in 48 hours when you eat pizza.

Naveen: It does.

Dave: All the bad ones come up that make the cancer causing things. It's pretty fast.

Naveen: It is.

Dave: What about this? Where do people get that? What's your though?

Naveen: I think that at the end of the day, you need to, instead of just storing your stem cells, you should also be storing your poop. When you're healthy you have your poop and when you actually get sick and God forbid you have to take antibiotics and you're going to essentially carpet bomb your gut flora, you need to go back and re-populate with your own healthy microbiome.

Dave: Do all those bacteria and phages and all that, do they survive [inaudible 01:14:29]?

Naveen: They absolutely survive.

Dave: Interesting. There's actually a real business opportunity there. I would do that. In fact, one of my kids has never had any antibiotics. The other one had one for a rapidly spreading infection that was necessary.

Naveen: That's my point. If they had a poop, they could they have re-planted that.

Dave: I have a seven year old's perfectly healthy poop, but I know it won't last in my freezer, but I have liquid nitrogen at home because of a cryo therapy chamber. I could work something out. We need a bank for that.

Naveen: You need a poop bank. I really think the poop bank and stem cell bank are really the key.

Dave: That's such a cool idea. Somebody start that. I'll make a deposit.

Naveen: Actually the interesting thing is the same type of thing is that you talk about living long and living healthy. Another thing you could do is the research shows that when they're able to take blood from a young person, a young mice to an old mice, it actually reversed aging.

Dave: I've looked at the feasibility of just hiring a college student who doesn't do a lot of bad drugs and things like that that are going to mess them up and just be like, "Here's the deal. Here's a sizeable check which is to encourage you to live a healthy life and to pay for your quality food and all that stuff. Since giving blood every six weeks is good for you anyway, it doesn't harm you in any way, why don't we just do that?" I know Peter Teal, people are like, "He's a vampire." Who the hell cares? This seems like a great way for a young person to help supplement their schooling or something, and why wouldn't you?

Naveen: The interesting thing is you don't have to do that anymore because you should be able to take your own blood when you're young, a child, store it, and take the stem cells from the blood and actually multiply them. Now you can multiply the stem cells outside your body.

Dave: You would do blood stem cells or fat stem cells?

Naveen: What do you mean?

Dave: I've had my stem cells taken out of my fat.

Naveen: No, but you would do from the blood.

Dave: Interesting. Blood doesn't have tons of stem cells in it.

Naveen: The plasma.

Dave: The platelet, plasma kind of stuff. Okay, cool.

Naveen: My point is you're able to in fact take the stem cells from your fat from your skin and able to grow them.

Dave: I've done that. I have my banked. I have 25 doses banked.

Naveen: More than just bank. I'm saying you can actually multiply them.

Dave: Yeah, we took one dose and grew it to 25.

Naveen: You can amplify them and re-inject your stem cells every now and then.

Dave: I do it every six months.

Naveen: There you go. That actually will keep your body healthy and continuously repaired.

Dave: You're not doing this yet?

Naveen: I'm not doing it yet, but I'm still looking young.

Dave: You are, but you should store them now because they do age. I've got a hookup for you in Seattle if you want. It's about a 20 minute drive from our offices where we can just make it happen.

Naveen: I might just do that.

Dave: Even if you don't have them re-injected, just to get them harvested and stored. When you're 90, you want 50 to 70 year old stem cells, not 90 year old stem cells.

Naveen: That is correct.

Dave: You owe that to yourself. That and your extra two hours of sleep might be a good [crosstalk 01:17:09].

Naveen: There you go. That rarity.

Dave: Awesome. Naveen, it's been a fantastic conversation. We talked about Moon Express, we talked about Viome. We talked about just your background as an entrepreneur, how much sleep you get. If someone came to you tomorrow and they said, "Look, I want to perform better at everything I do in my life, what are the three most important pieces of advice you have for me," what would you have to offer them?

Naveen: First of all would be to start dreaming big. Really start to think about what are the biggest problems. Don't be afraid that I know nothing about it. If you look at the most successful entrepreneurs, they are not the experts in their field. They all started because they saw a big problem. When you see a big problem, you essentially start to take a small, small slice, then start executing on them. The thing that you should be doing is that when you meet a successful person, to start following their habits, which is one of the bad things I hear constantly.

Dave: I love this.

Naveen: People say, "Seven habits of successful people." Actually it makes no difference. Following peoples habit is not what you want. Following the part process is what you want. How they think about the problem, how they think about life, how they think about what is going on. Follow their part process, don't follow their habits. Yes, love Tony Robbins, love him, but just because he goes out and takes a bath every day doesn't mean if you take an ice bath you're going to become Tony Robbins.

Dave: Yeah, Tony's a special guy without the ice bath.

Naveen: Exactly my point. He's just a special guy.

Dave: It works for him.

Naveen: If he didn't take an ice bath, he would be great Tony Robbins without the ice bath.

Dave: I hear you. I do all sorts of weird bio hacking stuff that makes a difference for me, but maybe someone wants to try it, I'm a professional guinea pig. I hear you there. One of the reasons I don't disclose my entire list of supplements, I don't want people doing what I do. I'm a guy with autoimmune issues who used to be obese who's 44 and does all sorts of weird stuff. God forbid that you copy me. Do what's right for you. That's why I talk about what some things do. Thank you for saying that. You're the only guest in 355 guests whose ever said that.

Naveen: Thank you.

Dave: I love that answer. That was one. Learn how to think, not habits.

Naveen: Number two would be dreaming big and not be afraid to fail. The number three would be constantly stay intellectually curious. The day you stop dreaming, stop being intellectually curious, you have actually died at that time. You've become a zombie. To me, remaining intellectually curious is one of the most important things you do. I think even people talk about playing golf. If you have so much time in your life that you can spend eight hours on a golf course, I think you should give somebody, saying, "Hey, you have a right to shoot me that my life is such a waste that I can spend eight hours of my life on a golf course. My life is not worth living anymore."

Dave: I got to confess. I know some of the golfers are horrified right now. When I graduated from Wharton, a bunch of my friends and I were like, "We should learn to golf. That's what successful people do." All of us and we're in Palo Alto, we go to the golf course and we take six weeks of golf lessons on a Saturday morning. At the end of six weeks I think nine out of 10 of us looked around, we're like, "This takes incredible amounts of time. Screw this noise," and we never went back. The other ones are like, "This is good sunshine." I don't know why they went. I'm with you there.

Naveen: My point is they're really focused on what you care about. Find something that actually moves the needle. To me, people talk about having a passion, talk about, "I want to do what I'm passionate about." My feeling is not actually about things that you are passionate about. It's something you need to be obsessed about. It is something that you can't sleep because you just are obsessed about what is going on. That to me, and people say "How do I ever find what my passion is?" I think what I found is the best way to find what your true passion is, imagine if you have everything that you want in life, you have \$1 billion, you have wonderful family, you have everything that you always wanted. What is it that you would do then?

If you do that now, you would get everything that you want. That means your true passion is something you're going to do when you have everything in your life. That is your true passion. If you do that, you will get everything you want. Making money is never should be the goal. Making money is the byproduct of doing things that you

actually care about. Making money is like having an orgasm. If you focus on it, you're never going to get it. If you enjoy the process, you will get that. That's my point is if you focus on making money, you will never make it. If you focus on solving a problem, you'll make money as a byproduct.

Dave: I got to double down on that one. I was extremely focused on making money until I was about 30, but it was like that's all that matters.

Naveen: By the way, you never made it.

Dave: You can't keep it, and you're miserable all the time. It's a horrible life. It's absolutely just as shitty as life could ever be. I'm happy you offered that to listeners as well because it's true. It's the meaning and the experiences that matter.

Naveen: Once you started Bulletproof and you started doing things that you cared about ...

Dave: It's easier.

Naveen: ... guess what, now you are making money that even though you've been wanting, you didn't focus on it.

Dave: It wasn't when I started the company. I already had a salary and stock options and stuff.

Naveen: There you go.

Dave: It was there to do something good. If people took nothing else away from this whole thing, that one piece of advice, focus on value creation not on money, the money happens even if it doesn't feel like it's going to.

Naveen: That's right. Once you become successful anyway it's not about living a life of success, it's living a life of significance is what matters. Other thing that I would say probably at least I always follow and I probably should offer to everyone else is surround yourself with people that are positive. Walk away from anyone who laughs at your ambition. Walk away from people who are negative. You don't want a negative energy around you.

Dave: It's okay to fire your friends if they're not doing it.

Naveen: That's right. The minute you find people who are negative, whether they're your employees or not, so I tell every single person who works with me in my company, my simple advice is your total contribution to this company is your productivity times your attitude. If your attitude is negative, I don't really care how productive you are, you're a negative contribution to the company. You've got to go.

Dave: It's a very healthy way to keep your culture clean. I'm very fortunate at Bulletproof because of our mission I think we attract the positive people. All it takes is a couple of people with a bad attitude and it spreads.

Naveen: Bad apple, rotten apples. I think that right thing as an entrepreneur, which really is to clean that culture. That's a subtle difference between a cult leader and an entrepreneur. A cult leader wants to keep the loyalty of people to themselves, and a great entrepreneur takes the loyalty and makes it the cause of the company. That actually survives and thrives beyond the entrepreneur. People who are working, they don't work for Dave, they work for Bulletproof. The cause of Bulletproof is their cause. Their cause is not to make Dave Asprey.

Dave: Thank goodness.

Naveen: That's what I love.

Dave: It makes me kind of mad really. What do you want? What's best for everyone, that's what I want. Maybe I don't even know.

Naveen: The thing that I love about you Dave is we have spent so much time together, is that your energy, your passion and the product that you build they actually work. You're not selling the snake oil. In this industry, I have to add there are too many people who just sell snake oil. The thing that I love about Bulletproof is every product is something you have tested, something you know scientifically works. When I buy Bulletproof, I am buying the credibility of Dave because I know Dave would not sell it unless it actually worked. That is the kind of credibility that every entrepreneur needs to have that every company you start, you put your name on it. Everyone knows that it's my company and if I do something wrong, you get to take the blame.

I know when you put your name to it, I know that product works. I hope all of your listeners know that it doesn't matter what product you introduce, they're buying it because of you and your credibility, your science is really something that has really built what Bulletproof is.

Dave: Thanks for saying that. That's great praise. I appreciate that you talk about the fact that you use it. That's really cool and I'm grateful. As we wind up this show, earlier we mentioned people who want to get first in life for tracking their data using this monthly model that works really well for me. Instead of having to get blood drawn, it's a finger stick home. You can do it all at home.

Naveen: All at home.

Dave: Without any annoyingness.

Naveen: By the way, there's no shipping in the ice container.

Dave: None of that, okay.

Naveen: There's nobody coming to your house doing the intravenous blood draw. None of that stuff.

Dave: It's completely disruptive to the way you're used to getting this data.

Naveen: That's right.

Dave: You're getting data that's actually not available in normal lab tests, like your mitochondrial function.

Naveen: By the way, we're not a lab, so we're actually a service. It's a [inaudible 01:26:42] service. You have an iPhone app and an android app, and you're able to essentially see what is going on. You'll be able to understand what you need to be doing, and it's your constant companion.

Dave: It provides good advice and it gives you the data. I'm really excited about this. That's Viome, V-I-O-M-E, dot com, and then the code is Bulletproof, which will put you at the front of the line.

Naveen: That's right.

Dave: Which is pretty cool. Guys, remember that, and if that's interest to you, please do it. If it's interesting to someone else, send it to them. If it's not interesting at all, don't go there. Just know that we are disrupting what was once something that took a doctor's note and some sticking veins in your arm and refrigerated blood shipping. I used to run a lab testing company about 10 years ago. It's horrible business. You're disrupting all that just so people have clean data about how things are changing over time, and that's a holy grail for me.

Naveen: Actually more than that. You couldn't get this much data 10 years ago. It didn't matter what you did.

Dave: I tried. I could not get it.

Naveen: That's the point. Today we have access to kind of information that was never available before, and that kind of disruption is what will change who we are, how we live and make sickness optional.

Dave: Exactly. Naveen, thanks for being on Bulletproof.

Naveen: Thank you Dave. What a pleasure.

Dave: It was great fun.

Naveen: Thank you.