Dr. Zach Bush: Life is a Community (E49)

with Charles Eisenstein on *A New & Ancient Story* Podcast

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SPEAKERS

Charles Eisenstein, Zach Bush

Charles Eisenstein

Hello and welcome to a new and ancient story. This is a podcast, a series of conversations, interviews, and occasionally speeches dedicated to the transformation of self and society. The basic idea is that we are moving from a story of separation to a new story - new for the dominant culture, at least - of interbeing. What that means will become apparent as you listen to the series. We explore things like technology, spirituality, agriculture, healing, economics, politics, ecology, relationships, education, I mean, pretty much everything that is undergoing a transition today, as our old story nears collapse. If you want to engage these ideas more deeply, you can come to our website, charleseisenstein.net. Yeah, all right. Great. Yeah, so like just a meta note. A little thing that was going on in the back of my mind is that I know you've been on a lot of these podcasts. I'm on a lot of them too. And I and some of my audience would like to go beyond the basic information. And there's also probably a large segment of my audience that doesn't know very much about, you know, terrain theory, or microbiome or soil ecology or anything like that. So people are generally better at filling in the blanks than we give them credit for. So I don't think we have to do too much basic stuff, but you know, it might be sometimes good to kind of footnote it a little bit. Yeah.

Zach Bush

Especially around the viruses. There's so much confusion right now around virus that I think that it's worthwhile to do a little bit of a dive on that if that's the direction of the conversation.

Charles Eisenstein

Yeah.

Zach Bush

But yeah, I think I'm very comfortable with it. I feel like every conversation brings new space for new information to come forward even within the basic stuff, so I couldn't be more excited, Charles, to be in this conversation with you. Honestly, I've been looking forward to meeting you for years, you are just - honestly, I'll just get emotional if I really try to put it into words, so I won't go much further there. But I'm

just so grateful. I'm so powerfully grateful for what you have done for all of us in opening up a real pathway to renew the science of philosophy in our generation. It is so devoid and so much what's going on in our generation and I just couldn't be more excited that a great mind like yours has devoted itself to to the philosophy of the future here. So thank you for your devotion. And the truth that you're channeling in for us is so, so powerful.

Charles Eisenstein
Wow, thank you. That's really special to hear that coming from you. Zach is an MD who seems to have gone a little renegade here in defying certain aspects of the official narratives. I think I had some idea of you before, but I really only became aware of you as the COVID-19 crisis got going and I saw you on a couple podcasts. So I'm like okay, this guy is drawing from the same spring that I am, touching on so many things that I've been devoted to for about 15 years, that were crazy land 15 years ago. If I joked to somebody that I was a neo-Lamarckian, if they even knew what that was, they would roll their eyes, you know. It was better if they didn't know what it was. For those of you who do not know what that is, that's somebody who believes that acquired characteristics can be inherited through the DNA. So like, that used to be anathema to science. When I tried to goad a scientist at some conference a couple years ago by saying I was a neo-Lamarckian, and he's like, oh, everybody's a neo-Lamarckian today. Like I have this weird - still - level of buy-in to the established ways of conferring legitimacy on somebody, where if somebody who has, you know, a PhD or an MD actually agrees with me on something I'm like, see? But then I'm like, hold on a minute, just by even doing that am I validating that system of legitimacy? So maybe I'll start by asking you: what happened to you? I mean -

Zach Bush
[Laughs] Yeah, that's never been asked quite that way and I appreciate that because that's definitely - what happened is a bunch of stuff happened to me. You know, it was a long process. I was 17 years in academia and kind of Western medicine paradigm and drug-focused. I was doing chemotherapy research and I was practicing endocrinology, so a lot of diabetes and heart disease and chronic kidney disease and hormonal disorders, thyroid cancer, you know, all this stuff that's just like epidemic in our environment. So I thought I was really doing my purpose there at University of Colorado, then the University of Virginia. And I really felt on purpose, felt very excited to be caring for patients and doing all of that. And when I got into basic science and chemotherapy research, it was very exciting to be glimpsing things on microscopes that had never been witnessed before. And there is a real drug-like quality to that existence, where you're like, in this constant feedback of like, yes, you are right on the cutting edge, right on the cutting edge. You just saw something nobody's ever seen before and you push further and you can see more. So that is the rabbit hole that has a drug-like quality to it for a researcher and ultimately that's the problem that we actually have in our modern science in some ways: that our scientists are given the opportunity to kind of go down this addictive drug-like pathway of new information, new information, the heady kind of experience of "I must be smarter than everybody else". And then of course, our funding is channeled towards that. So if you have some new protein that you're following down the rabbit hole, and you're one of five people in the world that are studying that, you're going to get funding. And so there's this warp towards this kind of new information desire, this new information race. And after 17 years of that I was sitting by a bedside of a patient one evening. I had just gotten funding for my first clinical trial with this new compound that has some chemotherapeutic action. I was super excited, you know, as a scientist - I'm now taking what I learned in the laboratory,

and I'm about to apply it to humans for the first time. And in that journey, this woman is delivered these little blue pills that the nurse has to like, glove up and do all these like, biohazard things just because it's a general clinical research center and there's protocols. And so this nurse coming in looking like she's handling some sort of biohazard, puts these pills in this woman's bare hand and says, you can swallow those now. And the woman looks at the nurse and is like, so why am I safe holding this in my hand? And why am I safe swallowing this if you have to go through all of that to protect yourself from even holding these things? And, you know, watching that happen, it was frustrating for me because I was like, this is actually very safe. This is just protocol. But somewhere down in the core of this woman, she knew she wasn't supposed to swallow these pills, and over the next 45 minutes, I really worked to deconstruct her worldview, and reconstruct my worldview in her mind and overcome not just her fear, but really her intuitive knowledge that this wasn't helpful to her, and I convinced her to swallow these pills. You know, these pills were safe, it was chemotherapy that I had developed, actually was quite safe, it was a vitamin A compound and all that. But I think at that moment, I really failed as a physician because I broke that woman's spirit and I broke her trust in her own intuitive thing. And so I give that example of like, how can we come to do the most patriarchal, most broken pathway of honoring this human body that we're supposed to be taking care of, through this addictive effort to be the first one to have a clinical trial, to be the first one to discover something? So that pathway, you know, started to really reveal itself in 2008 to 2010, which happened to be during this massive recession that was hitting medicine and the department of medicine, and my department of endocrinology was collapsing due to lack of funding, and the whole research center got defunded through the NIH and all this. And so there was a freefall happening in medicine at the same time my psychological and philosophical freefall was happening. And so that whole point bumped me out of the common paradigm into a rural practice that I decided to start. I wanted to start a nutrition center in a food desert and see if I could find a pathway to reversing chronic disease in the most impoverished county in Virginia. Because if I could find something that would work there, I felt like it was something that was scalable to the country and maybe help, you know, stem the tide of this collapse of our entire healthcare system. That was so obvious then, and [laughs].

Charles Eisenstein
OK. Yes. Yeah, it sounds like that was maybe just one landmark moment in a larger journey. I mean, already, you were studying some agent that was not strictly a pharmaceutical agent, right? It was a vitamin?

Zach Bush
Yeah.

Charles Eisenstein
And this thing about the addictive quality you were talking about, of being first. And how that impulse then receives the boost of funding, of prestige and so on. But then there's also the light side of the force, which is the exploration of the wonders of the universe, which is maybe what science at its best is, which then gets hijacked by the financial and other institutional mechanisms that run things today. And - because most scientists that I talk to I can detect, underneath, that impulse, and I wonder: how have you translated that impulse into your work today? What is bringing you into that state of wonder at apprehending the magnificence of biology, of the world, of the body?

Zach Bush
So it's a good question. Yeah. I think that the process that began from that moment was realizing that there hadn't been a single case of cancer in human history that had been caused by a lack of chemotherapy. And so when you start to back yourself out of the rabbit hole and ask these root cause, root solution kind of questions and start to pursue answers in those directions, you realize that you are so far down the stream of pathology towards cancer or heart disease or whatever you're studying, that you've failed to remember that there's a complex process that's been in play for decades before the physiology that you're studying occurs. And so that is really the fallacy of Western medicine as we've become a disease-centric disease management system. The wonder happens down at this collapse of physiology rather than the wonder of a newborn baby. And how does that baby at, you know, days old know how to survive in the context of this massive ecosystem of bacteria and fungi and viruses that are teeming across its body long before it can make an immune system as we would see it? And so, we directed now as a science group, I think, and as a team, our attention way upstream now to ask how does physiology happen as it's best instead of how does physiology function as it's collapsing? You know, instead of trying to find stopgaps for disease, how do we actually start to provide support to the fundamentals of biology? Under the most ideal circumstances, how do you support actual healing to happen? And the word healing is actually really poorly used and really not used in western medicine. One of my last lectures I gave at the university before leaving in 2010 had the word healing in it, and nobody came to the lecture. And I was used to, you know, a couple hundred people coming to these lectures around my cancer research and everything else, but by throwing the word healing in there, it sounded New Agey, or granola or, you know, fill in the blank. It didn't sound scientific to these colleagues because we've never worked that word into our education. There's a lot of appall over the fact that we don't use the word nutrition much in our medical science or education. We get maybe two or three months of medical education around nutrition and it's very dogmatic and old school, you know, food pyramid and BS. But I think it's much more devastating that we're never taught about healing. We literally are, I think, blinded to the reality that bodies heal. There's not a single course called Physiology of Healing or something like that, and yet, if a two-year-old trips and falls and skins their knee, somehow there's the intelligence within that body to regrow different layers of tissue back to its original form. The skin knows exactly where to grow to and knows how to, you know, cover that thing with not so much as a scar. As we age, then the wound repair gets a little more disorganized, and we end up with scar tissue and all this stuff rather than normal physiologic tissue. But nonetheless, there's never a course in your entire medical school training that will teach you any of those processes. How does a scar form? How does skin heal? How does a liver heal after injury? And yet, we see all of this evidence that it's happening at every age, and so it's treated as if it's a non sequitur or nonentity. In fact, of course, it's the only reason we're here. If we weren't healing at an extraordinary rate, we would die very much in the first week of life.

Charles Eisenstein
I think that there are deeper ideological reasons why healing is a bit of a taboo word. Because as you know, the word means to come to wholeness. Etymologically, the word "heal", and the word "whole" are from the same root. So, to invoke a process of coming back into wholeness first requires that you believe that there is such a thing as wholeness. You don't talk about the wholeness of a machine, really. And if it breaks down, you don't expect it to heal. You don't expect it to get better by itself. Well,

actually, I kind of do sometimes. I'm like, maybe if I, you know, don't drive my car for a couple days and let it rest, the oil will stop leaking. But generally speaking, we don't expect machines to heal. And the more that we live as a society in amongst machines, physical, literal machines, as well as machine processes that have been stamped onto society through industry, the more we expect the world to be like a machine, and in medicine that is translated into the paradigm of the doctor fixing the patient. But to recognize that life knows how to heal, that there's an innate tendency toward wholeness that is present already in the body - that kind of recasts medicine into terms of how do we support that process? Why, if that process isn't happening, why? What's missing? And it also requires us to think about what is being made whole, in this process of healing? What is a self? And if we understand, this gets to a lot of your other work that I've heard you talking about, around the idea that our selves are a collective, are a set of almost infinitely huge set of relationships that are not just the expression of your nuclear DNA, as kind of old school biology named the self as the phenotype, the expression of the DNA, but it includes a host of other beings that live within our bodies. And most people are familiar with this at this point. People know that we have, whatever, 10 times more bacterial cells than human cells in our bodies, and that these are an essential part of the self. And so this is a step in expanding our idea of wholeness, like what needs to be made whole? And then we could extend that to external relationships as well. Like, is it actually possible to be whole when you are not in ongoing relationship with other humans and the rest of life, as happens when we are locked down and quarantined, which is a whole other topic, which we can get into as well. I wonder: a lot of people are familiar with the importance of the gut microbiome and stuff. But I'd like to maybe get into the topic of viruses and the genetic plenum, as you might call it, and what role does the interchange of genetic information play in health? And we could even go into evolution as well. Do you have -

Zach Bush

I love it. I knew this was gonna be one of my favorite conversations of the year when you invited me, so - I'm so in love with this concept of wholeness being the underpinnings or the structure function of healing, and therefore, because - what you just laid out is so important for all of us as an audience to mull over, is where have we made the mistakes in our lives of thinking that we're machinelike, rather than these quantum beings that are capable of so much? And I mean, I feel conviction on a lot of levels just listening to that, because it starts to get into some of my stuckness as a person, like, why do I, you know, relate to my kids or my wife or, my coworkers in the same way day in and day out? Or what is it that I am dumbing down there to a machinelike quality, and where am I failing to be an adaptive creative force in their lives? And where am I being machinelike is a very important, deep thing there. So, as we start to then move to this virome concept, it's actually in line with that, that we believe for, you know, millennia really, but really strongly in the last hundred years or so that the genetic information that we were handed from Mom and Dad predicts who we are. And so we have this very Newtonian, very mechanistic belief that Mom contributes half our DNA, Dad contributes half the DNA, that there's a sperm-ovum event, and you get this whole 46 chromosomes and the whole thing goes into this cell production. And then we're born and then we deteriorate from there on. So the aging process starts at birth, and we just get less and less functional as time goes on. But, in fact, it's not at all that, and the last 20 years has really revealed a whole new world of plasticity in a place that we once thought was very concrete, and that is the genome, but also the end products of that genetic information, like the brain. We used to think the brain was this, you know, machine that was slowly losing connections throughout the course of its life and dysfunctioning as our computers do. And it's

just as plastic in the end as the genes that would have predicted its original form. And the plasticity happens on many levels. My background is in endocrinology and you know, certainly there's an explosion now of information about how hormones and our environmental influences of pheromones and other hormones are floating around us and everything else, as well as the hormones that we come in contact within the home or other situations, like you've heard that women will align their periods if they are roommates for long enough and stuff like this. Like the endocrine system will adapt to its environment, to change the behavior of the organism that it's governing. In the same way and at a much deeper level, the genomics are extraordinarily plastic now, and this is really performed at the global level through viruses. The viruses have been miscategorized I believe, by medicine and by the general public and most obviously, recently by the media as part of the microbiome, that there's these living germs that attack us and all this. The word micro and the word biome - the microbiome is the description of small living organisms. And so the virus being a nonliving organism and a nonliving, you know, a sheath of genetic information already doesn't fit into this. And so if you go into Wikipedia or whatever right now and look up virus, it says it's part of the microbiome because it's so small. And so that's not a rational categorization. Just because it fits the first word so well, we're going to go ahead and push it into this category. And so the danger that's in this miscategorization is that we assume it has features similar to bacteria, fungi, archaea, protozoa, all these microorganisms that are in the microbiome. And in fact, it's impossible that it has any similar traits because in fact, it's an information stream coming out of biology as a whole targeted specifically at other parts of biology to update the genetics. And what we see in the virome, which is a description of this global genetic information that's coursing out of biology - the virome is the machinery of adaptation, and it's the language of adaptation within life. And without the virome we would never have had the first bacteria or the first human cell. We've been built literally by the compilation and insertion of genetic information by these viruses into life forms around the planet for billions of years. The first viruses can be found in the fossil record some three and a half billion years ago. And so that's fascinating to me that this genetic information has been really the building block by which we now have life. And yet we've demonized it. And in demonizing the building blocks of life, and perhaps more to the point, demonizing the creative force, the adaptive force of biology - what have we done? What have we so missed? And where are we going as a species if we remain in this demonized behavior and belief system towards this fundamental building block of life? And I think the last pandemic has really shown what happens.

Charles Eisenstein
So right now I'm in a little bit of a dilemma. On the one hand, there's like a lot of basic information here that you're presenting that is super important for people to navigate our current public health situation (choosing my words very carefully here). And then I also, on the other hand, really want to geek out and talk about how perhaps bacteria preceded viruses and create viruses and how they transfer genes horizontally and accelerate evolution by millions of times what it would be if it were only random mutation and natural selection operating. And so there's two different directions I want to go but maybe I'll start with the first one. Yeah, the demonization of viruses is kind of inevitable when we have a broader context of seeing the world through an us-versus-them lens, through a competitive lens.

Zach Bush
That's right.

Charles Eisenstein
And one of the expressions of that basic worldview is the exclusive germ theory of disease, which says there are these pathogens out there, they don't care about you. Some of them are harmless because they're, you know, operating on some other animal or some other plant, but some of them are basically these parasites or these predators. And you have to protect yourself from them. Because basically, life is a vast war of each against all. That's how biology, the study of biology has conceived it for quite a long time. And that way of seeing it resonates with the economic circumstances that we've lived in, in modern society, where we have a money system that also sets us up in a war of each against all. And our religion and our psychology have also been conditioned by this worldview, which actually goes back thousands of years, to the origins of domestication and technology that made the world into an object and that conceived progress as a matter of coming to greater and greater dominance over these competitors and these indifferent forces of nature. So progress became a matter of harnessing them or insulating ourselves from them or extirpating them, destroying them. And so in that basic psychic field, the germ theory of disease - it's quite natural to think that, and it causes us to resist other ways of seeing it, like bioterrain theory, which says, okay, and I heard you saying this on Del Bigtree's podcast, which I kind of want everybody to watch that first, just to get some of this background information. And I'm curious also, like, is there anything that you said in that podcast about COVID that you've changed your mind on? But anyway, maybe we can return to that. Okay, so this predisposition to see the world as full of enemies. If you accept that, then you're probably going to accept the response, our public response, our government response with the broad participation of society, to COVID-19. When we see life as a community, and as relationship, and we see viruses as one of the ways that these relationships are maintained, that genetic information is shared, then we ask new questions, like, assuming that we see COVID in terms of a virus we ask, okay, well, what is this? What communication is trying to happen here?

Zach Bush
Yeah.

Charles Eisenstein
And maybe we can talk about exosomes, too. Do you want to fill people in on that?

Zach Bush
Yeah. I think you kind of started a cool spot there looking back at you know, bacteria versus viruses at the beginning of life in some ways, and there's a division in science right now as to which came first, you know, the chicken or the egg here, but it is fascinating that these archaea, which are the ancient bacteria that preceded what we consider the more modern or more technologically advanced form of bacterial life, but the archaea had a different mechanism for differentiation and proliferation. And you nailed one of the main mechanisms that was abundant in this was this horizontal gene transfer phenomenon where any tiny little organism that abutted another one could pass its genetic information to and fro. And this still very much happens in bacteria in a hospital, for example. When you give an antibiotic and that hits, you know, one and a half quadrillion bacteria within your body, there's going to be a significant portion of those bacteria that have developed enough genomic alternatives and alternate pathways for adaptation that they're not going to die under the pressures of the antibiotic, so that they get narrowed down into this kind of drug resistant population. They can then pass that

sideways to all the other bacteria in the environment so that the next time you see that drug, it's a lot less likely there's gonna be a knockdown of the population.

Charles Eisenstein
I want people to hear this. This is not that they just - Zach is not saying that they're just passing the antibiotic resistance to the next generation. They're actually passing it to their friends. Like, the bacteria meet up, and sometimes they even conjugate, they even like, open a channel in their lipid membranes, and actually, like exchange genetic - it's like they're having sex. They're like exchanging genetic information.

Zach Bush
Yeah, yeah. And it's interesting. I mean, we've so long considered genetic swapping as a sexual event. And that's one of the things that's limiting our worldview right now around genomics. But we need to start to realize that the sexual transmission of information goes way beyond the genetics of the cell. We're now realizing in cloning experiments, for example, that you can't actually clone an animal, unless you also clone the mitochondria inside of those animals, inside of the cell you're trying to clone. And the mitochondria are these little bacteria guys. Mitochondria is an ancient archaea that's been absorbed by a methane-producing bacteria. And this happened, you know, billions of years ago and it became a very important part of the infrastructure of multicellular life is that these organisms could live inside of eukaryotic cells and produce energy through this, you know, fermentation or ultimately oxidative phosphorylation or oxygen-rich energy production. And in that, you know, archaea, within that is this little strip of DNA, this little ancient piece of genomics. And it has extraordinary variability, such that if you look in a single human cell, you will have somewhere between two hundred and two thousand mitochondria living inside that cell. And if you look across the genomics of that mitochondrial population within a single cell, there's massive variation. And so we're starting to realize that the massive variations of genomics within the mitochondria are constantly swapping information with the nuclear DNA that was received by Mom and Dad human, that nuclear DNA is being changed and transformed by the mitochondrial DNA that's responding to its environment second to second. And so we're starting to realize that even the phenotype of a single cell or therefore a whole human body is not determined by Mom and Dad's DNA very well. That's a rough template, and then it's the environmental influence on the mitochondria, which are the microbiome. And then as soon as the child is born, the vast amount of genomic information that's available within the bacteria and the fungi of the gut or the skin, or now we realize that there's fungi and bacteria in every single organ system in a healthy state. So the brain has bacteria and fungi, and the liver, the kidneys. And so without all this genomic input, we don't actually look like who we are today. And so we're super plastic in that way. And so, in the same way that these archaea were horizontally gene transferring information to their buddies so that they could immediately adopt this antiboiotic resistance, the same thing happens in weeds in a field when we spray herbicides and pesticides on large scale farms. There's always a couple weeds that will have a genetic resistance to that. And they can horizontally gene transfer to the other plants such that even in the same field during the same season, without reproduction happening, you'll see increased resistance happen across the strains, and so -

Charles Eisenstein

That's incredible. I just love that. And they're doing that with viruses then? That's the main - among plants and animals, would you consider that the main avenue of horizontal gene transfer?

Zach Bush
Yeah, I mean, the viruses - the word viruses needs to be a little bit loosely held there, just in the sense that you mentioned the word exosome earlier, and exosomes are, you know, an external transfer of genetic information over short to long distances. They are packaged in a little envelope of phospholipids, this little safe package of genetic information to be sent out into the air and then transferred. And so if we consider that word virus very loosely, just to mean the exchange of genetic information through space and time, then yes, it's all done virally. And I would say some of it's done by exosomes, some of it's done by more of a classical virus kind of thing. The differences between those two seem to be, again, starting to blur, but historically, meaning five years ago - like, all of the science is so new now - but five, ten years ago I would have said, well, a virus has all of these very intentional surface proteins that target it to a specific tissue in the recipient. And so I'll make a virus. It's important for us to remember every coronavirus ever in history that infected the human being was made by a human being. We make these things, and we make them intelligently designed to hit the recipient at a very specific receptor. And so we'll cover the viral package of information with a smart bomb kind of approach of saying okay, we're gonna move this thing to right in the right location. And the word bomb is very erroneous there; I should use like, smart delivery system or something because again, the bomb word harkens in someone who's going to damage something but in fact, it's an intelligent update. So picture this more like your IT personnel coming into your computer and saying okay, I need to traffic this new piece of code to the hard drive, or this needs to update the screensaver or whatever it is. And so they put a piece of data on each end of the code that will target it to the right place within your computer. In the same way, when I put out viruses I'm going to target that specifically to, in the case of Coronavirus, ACE2 receptors inside the lung and vascular system of the recipient, because I'm trying to update my own genomics to handle new toxins in my environment, things like cyanide or air pollution or herbicides and pesticides and food. So I'm adapting to this toxic environment that I'm breathing every day and I need a genetic update to make a more resilient lung surface or vascular tree behind that lung to adapt to this new toxic environment as we start to approach some sort of massive extinction threat. And so the biology is always updating, always is. An exosome historically has been thought to be less smart-targeted. It's just a packet of information that can combine to the surface of any cellular material and be absorbed. And so it's more of a general, here's some new genetic information I'm sending out as much to tell you what's going on in my body as anything else. And so I think that many of us in the science realm of genomics right now think that much of the genomic information that we exude in the form of exosomes is not to go and update other people's genomics, as much as it is to tell them I'm under this kind of stress, you might want to prepare your body for this stressor. And so instead of integrating the DNA from an exosome, which can be the large genes of RNA and DNA, but it's more common that it's actually microRNA. MicroRNA don't ever go to make a protein, microRNA are actually modifiers. They're corepressors and coactivators of other genes that we're expressing right now. And so by exuding microRNA, if I'm sitting in a room with you, within a few minutes, you're starting to get updated as to what are the stressors I've been under over the last 24 hours, and what genes have I activated, and maybe it's not the stressors, maybe I've had a really wonderful creative 24 hours and I wrote a piece of music yesterday and I was playing guitar by the pool and I was relaxed and blah, blah, blah. I'm going to turn on a different set of genes, which are going to express these microRNA that are

exuding in these packets of information out of my breath, out of my sweat, etc. And so I'm putting out this cloud of information to tell you as somebody in my proximity, what my last 24 hours has looked like. And it's not surprising that we start to see patterns of diseases in families that make it look like it's genetic. Type two diabetes, for example. If your mom and dad had type two diabetes, the likelihood of you having it is high. And yet, the risk factors around type two diabetes are far more environmental than they are genomic. And so this is how we can start to get familial traits or familial patterns of disease, when in fact, they're not genetic. They're environmental. But through our environmental exposure, we express a microRNA exosomal experience and then everybody adapts to our stress around us in a similar fashion. So that's the overall kind of, you know, terrain, and viruses really are intended to be large RNA, DNA strands that will get integrated into specific tissues to do new information, adaptation in real time, whereas the microRNA are more of a short term modification of behavior that partners genome but not necessarily insertion into their genome.

Charles Eisenstein
Uh-huh. So I'm just curious. So the viruses have all these surface proteins that allow them to be taken up by certain receptors. Whereas the exosomes, I've seen the pictures, they're just basically a smooth membrane.

Zach Bush
That's right.

Charles Eisenstein
They don't have these proteins on the surface. So, but they still have to get taken up somehow, by cells, in order to convey the information that they're trying to convey. Which, okay, as you say, their function isn't to pass DNA for incorporation into the chromosomes, but it's just to let them know, maybe, what's happening. But it still needs to be taken up somehow. So is there like - so maybe some of these receptors - like, how does that work? Like the ones that are keyed by proteins, then maybe there's some - those are the effector proteins and there's like some other step that actually intentionally transports it to the nucleus. And I mean, like, what's actually going on?

Zach Bush
Yeah, I'm gonna say some things here that everybody needs to keep in mind as current science. And so in five years, this is probably not going to hold up. Because this is such new science. Again, I think we're - I already want to tell you that this is a gray zone, that we're going to find out that exosomes actually can target specific protein binding and all that, and I have some hunches as to how that happens. But they're nothing more than hunches at this point. But the way in which they bind could be as simple as possible. Lipid membranes like to combine, right, and so if you're lacking extracellular matrix, which is this complex structure of proteins that hold one human cell adjacent to another human cell to create an intelligent barrier of the gut or intelligent vascular tree - when you're lacking that extracellular matrix to make a multicellular organ system differentiate, know its own structure function in each different organ system, then phospholipid membranes without that protein scaffolding have a tendency to want to mix together. You can picture like two oil droplets moving together on a hot pan - as soon as they touch they combine. And so that's how two phospholipid membranes that are not limited by protein ultrastructure can behave, and because exosomes are so devoid of, or at least have

far less protein expression within them and across their surface, they're likely to combine with any phospholipid membrane that they touch. And so I think it's going to be that kind of oil-to-oil combination event that opens it up, and what it's dumping into the cell at that point is this tiny microRNA material that can quickly transit to the RNA translation to proteins. And so that's happening in the cytoplasm of the cell. If you go deep into the cell at the nuclear level, so inside the cell is another cell that we call the nucleus. And so you have to go through another phospholipid membrane, and in there, you have DNA being translated to RNA. And RNA then leaves the nucleus and turns into a protein or codes for a protein in the cytoplasm. At each of those locations, the microRNA can bind to the enzymes that are responsible for doing all that translation work. And so in binding it can either show an affinity for the behavior of translation, or it can block that.

Charles Eisenstein
So it can change the proteins that are being produced without having to write itself into the genes.

Zach Bush
That's exactly right. Yeah. Modifying the behavior of genes without inserting itself into the genome.

Charles Eisenstein
Okay. I mean, there's this whole concept of pleomorphism, that viruses possibly originate as exosomes, and then they kind of grow or change into something more and more complex that eventually becomes something like a virus. Do you have any opinions about that theory?

Zach Bush
Yeah, I think life is definitely pleomorphic. So we should have a loose hand on all of this religious orthodoxy of categorization that we're so into in science. And so we'd love to believe that a fungi is a fungi and of this specific species and all of this. And I think as we continue to advance our science of genomics, we're having this humbling experience of realizing how plastic everything is, and so pleomorphism as a concept, I think, is in its infancy. I think that as we start to understand much deeper than the biology, we start to understand quantum physics of cellular events, it's going to get really bizarre. Because we're starting to realize that there's so much electrical energy that's produced by mitochondria, for example, within a cell, that it's quite possible that we can transmute elements within the periodic table within ourselves. And this has been extensively studied, you know, back to the book Biological Transmutations. It was written in the '60s and -

Charles Eisenstein
Mm, Kervran.

Zach Bush
Yeah, Kervran's work.

Charles Eisenstein
There's a whole, I mean, there's a whole lineage of people who have studied that. And that's going down a really deep rabbit hole. Maybe - yeah, there's a certain territory that if you go there, like, I mean, all of a sudden you are in violent contradiction to prevailing paradigms. Biological transmutation -

Zach Bush
Woe is us, woe is us!

Charles Eisenstein
Right. Like, I love going there, but I don't think people have to believe in biological transumutation of elements or, you know, biological cold fusion or anything like that, in order to broaden the concept of contagion. And I wanted to ask you about contagion because - so, you know, here you have the dominant pathogenic model of contagion. And then both of us are familiar with people who radically deny that and even go so far as to say there is no such thing as viral contagion, you know, and they cite these experiments - which I buy, you know - that they would take mucus from flu, people with the flu, and actually like swab it into the nostrils of healthy people and they wouldn't get sick, you know, usually they wouldn't get sick. Yeah. And then I'm like, okay, and why? Because the terrain wasn't accommodating to that. And I'm like, okay. But here we have a situation where the terrain is very, very accommodating to a lot of what we call illnesses, because given the stressors that afflict modern humans, there's a lot of software upgrades that need to happen. So just as genetic mutation and viral contagion increases when bacteria or weeds are subject to antibiotics or Roundup, so also our own - in the old language we would call it susceptibility - is heightened when we are subject to all of these new environmental stressors, which could be electromagnetic, chemical, psychological and so forth. And so we need these upgrades. You know, we need this new information coming in. And I would say you know, maybe sometimes that upgrade is such a massive upgrade that the system, the body can't handle it. It's like too much information. I can't make that big a change that quickly. The upgrade process is uncomfortable. It's like maybe the symptoms of a viral infection are basically the process of integrating all this new information. And for somebody who's very weak or very elderly, maybe they can't even handle that upgrade process. But as far as contagion: so some people say then, viral contagion has never been proven and I'm like, hold on a second, like, what about chickenpox? You know, like, you take your kid, it's not that he's got a, quote, "weak immune system". I mean, that whole concept of weak immunity is ridiculous. People can be very susceptible to one thing and not another thing. It's not like your army is weak and any invader - anyway. But you know, you take your kid to a chicken pox party because you understand that children need this upgrade, this kind of information. Chickenpox, measles, mumps, you know, some people believe that these are actually important. Important challenges, on a physical and psychological level. Like, wow, I got better. You know, I had this disease and I got better. That's a landmark in psychological development. But I go back to the discovery of viruses, which - what got it started was the tobacco mosaic virus, which was discovered because of contagion. They saw a transfer - you know, going from plant to plant, they took some of the serum and they put it on another plant, the healthy plant; the healthy plant got sick. And it wasn't because these plants were generally subject to a stressor necessarily; it looked an awful lot like contagion. And then they tried to identify the contagious agent, by filtering out every particle they could filter out in those days, and they couldn't filter it out. So originally it was called a non-filterable virus. And sometimes they even thought maybe it's liquid, like maybe it's not even a particle at all, until they developed more powerful microscopes and they did then find viral particles that they could identify. And that's kind of how virology got started, as far as I know. So you're not saying that there's no such thing as contagion. Or even the term contagion, I think we would agree that that's problematic. But do you want to riff on this?

Zach Bush
Yeah, I think you just hit it. And so the transfer of genetic information through viruses and exosomes is constant. And it's happening at such a rate that it boggles the mind. So there's an estimated 10 to the 31 viruses in the air we breathe, there's an estimated 10 to the 31 viruses in the ocean, there's an estimated 10 to the 30 viruses in the soils of the earth. So these are numbers that are, you know, 10 to the 31, for example, is about 10 million times more than are stars in the entire universe. So these numbers are so vast, there's literally the reality that you can't take a breath, you can't, you know, walk a step in the world that we have developed in and thrived in for 200,000 years without being in constant interaction with these viruses and the genomic information within them. And it's important. You need this constant, you know, updating, as you were speaking to earlier. So this is where we run into the problem of categorizing viruses in the same catch-all title of the microbiome, because bacteria and fungi produce energy, which means they need a food source, which means if you have an unbalanced ecosystem, those bacteria and fungi can outstrip the competition for those resources of food. And so that's what it looks like when you get cellulitis or die of pneumonia in a hospital, which is what - everybody who dies from COVID complications are dying from downstream events within the vasculature and bacterial pneumonias that have nothing to do with the trigger that may have been a viral update. And so the phenomenon that we see in hospitals around bacteria and fungi, this phenomenon is you have living organisms that are competing for an ever more scarce resource. The more you try to sterilize the environment, the more abnormal the ecosystem gets, and the more aggressive everybody needs to get for those limited resources. And so that's where we see overwhelming infection and pathogenesis happening. In a field of organic soils, and wildflowers and massive biodiversity of a jungle, you don't see viruses affecting the plants, you don't see viruses taking up. It's only when we start to monocrop anything - and that's why it wasn't really discovered until tobacco - until we started monocropping potatoes in the great Irish famine or the phenomena of corn, soybean and wheat and all of this - until we started monocropping we never saw viruses behave at all pathogenic. And so I would argue that it very much was a change in terrain that led to the emergence of the discovery of the tobacco mosaic virus, as you laid out so beautifully, and to say that they were unhealthy plants - like you said, it's not like they were stressed or having - this was a healthy field of tobacco. Well, it's because we keep trying to define health within a single organism that we're failing there. And in the same way, we fail to identify what a healthy immune system is, as you pointed out there. Health, actually, now that we back up to the 30,000 foot view that we've seen in the last 20 years, has nothing to do with the individual organism. Health is entirely dictated by, entirely necessitated through and entirely created by biodiversity. And as soon as you lack biodiversity, you become vulnerable. Because the genetic updates that are happening to the virome, for example, are unbalanced in their messaging. You don't have, you know, 10 to the 31 viruses in that same pocket of air because you've sprayed herbicide, pesticide, or you've created a monoculture environment where you've overplowed the soils, you've destroyed the bacterial microbiome, so they're not producing the same exosome-like bacteriophage, introduction of viral information in the environment. And so a single virus that now blows into that environment can overwhelm the genetic, you know, matrix or the genetic update process that's going on and that can take on the behavior of a pathogenic process, when in fact, there was no pathology intended. The virus that was causing that had no intention of harming tobacco. It was simply giving it a genomic update, but the terrain had become this monocultural environment. And so we suffer a very severe version of this philosophy when we look at a child today. We think we

have to protect this child from all the bacteria, the viruses and everything else, and so we want that child, like you mentioned with the chickenpox example, we want that child to be introduced to the maximum amount of biodiversity as early as possible to make for the most resilient biological organism possible. We've taken the opposite approach. We put Mom on antibiotics now while that child's in the birth canal because Mom had strep B or something like that, some bacteria in her vaginal swab. And so now we're depleting the entire ecosystem as the child comes through the birth canal. Or even worse, we don't allow Mom to move into a normal system of labor and we induce early, or somehow otherwise compromise the natural process towards labor. And we do a C-section which is a completely sterile delivery of that child, no contact with Mom's vaginal flora that will no longer populate that child. Instead the child gets pulled out of this surgical incision, sterilely and then put on a hospital gurney for the Apgar score, immediately adopting the three or five strains of bacteria that are common to the stripped-down version of the microbiome in the hospital. So it's in this monocultural behavior of tobacco, wheat, soybean, children, that we have extracted biology from its biodiverse capacity for balance and we create the appearance of pathogenesis. And so I would argue that, you know, chickenpox is a very important update to the organism and the fact that it manifests like it does - it integrates into the dermis, it integrates into very new areas of the immune system, meaning the respiratory tree, the gut and the skin which dominates 99% of what we call the immune system these days. And so that virus is updating all that information throughout, and if that child now goes on through a healthy - or goes on beyond the chickenpox, we see that that child's more resilient against, you know, the confusion of autoimmune disease, and has reduction in cancer risk and things like this. Whereas if that child never gets exposed to these, you know, genomic updates that challenge the immune system to get to a higher level of intelligent surveillance, we see higher rates of these chronic diseases emerge in the decades after. There's been some interesting graphs that are hard to find on the web, because they seem to get taken down pretty quickly. But there's some interesting graphs that have been out there in the published data showing the rates of autoimmune disease since the 1950s. And what you see is this leap in the prevalence of autoimmune disease every time we introduce another vaccine, meaning as we disrupt the experience of this natural genomic update and the appropriate stimulation of the immune system that would follow, we develop confusion about what's outside and what's inside. Autoimmune means our immune system is now mistaking our own body for a foreign invader. And so our intelligence to our own biological self-identity relies on this external information coming in from viruses, bacteria, fungi and the rest.

Charles Eisenstein
Yeah, the real pandemic of our time is autoimmunity. And it doesn't lend itself to the same mentality of conquering evil and finding the bad guy and destroying something and controlling something, as easily as so-called contagious diseases. Because it's the body itself that is rejecting other parts of itself, which is kind of, you know, metaphorically true for the human relationship to the planet, where we are destroying parts of nature that are actually parts of ourselves, but we don't recognize it. But I want to just sum up here. So earlier, you were basically, to sum it up, and you can tell me if this is accurate or not: that what looks like virally spread disease is happening kind of for two reasons. One is that we are facing so many stressors, we need so many updates, we need to get these updates and it can be kind of difficult to integrate that information and - but what you added to that is also that we have destroyed much of our ability to even receive those updates, through the decimation of the microbiome, for example. And -

Zach Bush
That's right. Deeper than that, and again, people can go watch that Del Bigtree thing if you want more detail on this, but not only did we destroy that biodiversity, we also alter our receptors for these viruses in an abnormal way. And we also alter the way in which the virus is moved through the atmosphere in a couple ways. So, first of all, when a virus is produced, it's supposed to disperse very evenly through the air through aerosols. A very small percentage of viral transfer over the surface of the planet is done through respiratory droplets, which is, of course, why everybody's wearing masks right now and everything else, they think they're gonna stop this virus from moving around. In fact, it moves most aggressively and most functionally through the air combined with dust particles, or, most aggressively, it looks like, to carbon particulate from air pollution. So PM 2.5, or particulate matter 2.5 microns in size is very good at finding influenza and these other viruses like corona. And so coronaviruses bind to that air pollution in an unnatural way and you get this clumping of the viral genomics. And so now if you breathe in this clump of air pollution, you might have, you know, dozens of viruses in a very small amount of space rather than dispersed throughout. And when I say dozens, it's probably more like millions. But you can see this clumping phenomenon happening which, when that hits the receptors of your lung, the ACE2 receptors, you're going to pull more virus into that very small cellular environment than you would have otherwise. And so we altered the air terrain by which it transits to create an artificial hyperintensity to the viral signal, and then we upregulate the receptors through our pharmacy. So, a couple of common drugs that treat cardiovascular disease, diabetes and kidney disease are statens and ACE inhibitors. And it turns out those three co-morbidities: cardiovascular disease, diabetes, and kidney disease are exactly what predict the deaths from COVID-related experiences. And so what's happening with those two drugs is they upregulate ACE2 receptors and so now if you have a pharmacologically upregulated elderly population with cardiovascular disease, diabetes and hypertension slash end-stage renal disease, you're going to now have a propensity to deliver an extreme load of genetic information into these elderly people. And so the virus may have been benign 150 years ago, when we didn't have air pollution at this current concentration, or if we didn't have the pharmaceuticalization of these elderly peoples. But nonetheless, respiratory death is common. It's the fifth leading cause of death in the world. And so it kills millions of people every year. And as hyperbolic as we want to get in our estimates of how many people are dying related to COVID, it's still far under the total amount that we would expect year on year for respiratory death to occur. And so it's this malfeasance of information and this PR campaign, this fear campaign that was given to this name of a virus that happens annually. Every year new viruses will come through for genetic updates, and if we change the terrain such that, like you said, we can alter the physiology on the back end of that, we can develop complications. But again, we should remember that people aren't dying from a virus. The virus is gone within three to five days of peak production of the virus and the initial symptoms, and people aren't dying three to five days later. People are dying weeks later, typically, from this and it's way downstream as the physiology has broken down in a hundred other ways. And so nobody's dying from a virus. People may have been triggered by a viral exposure, but it's the endogenous or it's the preexisting imbalance within that biology that's then leading to the mortal event.

Charles Eisenstein
And ironically, our responses to COVID-19 intensify the imbalances. And the more that we destroy our microbiome and our immune system in general, the more we need to protect ourselves from these

pathogens. And the ways that we protect ourselves prevent the replenishment of our inner ecosystems even more, requiring even more and more until like, you end up in a future where everybody has to live in an aseptic bubble all the time.

Zach Bush
A hundred percent. That's right. Yeah, that is the direction we're moving. You know, you saw images of people dressed up in hazmat suits with with dusters, you know, walking the streets of China and Korea, spraying herbicides and pesticides into the air. They repurposed snowmaking machines in Switzerland and Italy to spray these toxins into the air to kill the microbiome. You can't kill viruses in the same way you do bacteria and fungi. You can try to sterilize the air, but like you said, you just predispose that same pocket of air and then it leads to more abnormal influx of genomic information and the rest. So you're exactly right. We're behaving in this warfare mentality still, when in fact, we need to realize that health is only going to come from restoration of biodiversity and vitality of life within our soil systems, within our air systems and water systems. And if that was our response, we would be doing the right thing. And the silver lining to the pandemic for me, was that the population seemed to know what to do. We saw seeds sell out across the country, we saw people planting gardens that have never been planted before. We see a revival of the Victory Garden concept where we could grow our own food in the backyards to overcome the fragility of our food systems that we saw so exposed through this pandemic. And so the people did the right thing, I think, finally starting to realize, Oh, the government's not going to take care of us here. They don't even know what's going on. They don't know how to react to the situation. And so if anybody's gonna take care of us we have to do this ourselves. And so I'm very excited about the realization that we are going to have to make a local solution to these global crises that are at hand. And we also have to recognize that we are going extinct. The population as a whole, it is very easy to map out our own extinction over 70 to 80 years. And so over the next seven to eight decades, we could go extinct as a species, that's 7.8 billion people that are going to disappear and die through horrific processes or subtle processes. And so this was a ripple effect. This pandemic, as it was termed, will not even slightly change the population growth of the humans. And so this was a ripple and we behaved incorrectly at the governmental level, bureaucratic levels, at the kind of public health response levels. We did exactly the wrong things over and over again. And so if we don't quickly learn from that, then we're going to accelerate this extinction event. We could reverse this extinction event, however, if we look back to the viruses. And I think this is an interesting place for us to maybe - I can't wait to hear your response to this. It's fascinating. Viruses, it turns out, have exploded biological diversity intelligence every time there's been an extinction event. And so five great extinction events preceding this one that we're in. And every time that's happened, the amount of stress you put all those organisms that are going extinct through, produce a massive amount of genomic information for adaptation, that then results, once things settle down and the extinction stressor disappears, there's so much more genetic variation on the planet that was created by the stress of the extinction event. Then we get more biodiversity, we get more intelligence of life after that extinction event. And so if we were to halt, in the next decade or two, our extinction event behaviors and the stressors we're putting on the planet, we could see the most explosive biodiversity recovery of the planet that it's ever had before, because that's its pattern. And I kind of want to stick around to see that. I want to play in that new co-creative environment where the updated genomic information of the stressors we've caused, creates life more abundant, more biodiverse, and more extremely beautiful than anything we've seen before. So that's compelling to me.

Charles Eisenstein
Yeah. Yeah, I think that will happen if we don't continue to suppress that process. I don't think that what you speak of is an inevitability, however. But I do think that it is a possibility that requires us to embrace that, and on a deeper level to embrace what we began with, the movement of life toward wholeness, and not only toward wholeness, but toward increasing complexity and the expansion of that whole to include more and more levels of organization. Life unfolds in complexity, naturally, and there are, as you were saying, these crisis points that precede the next explosion, the next unfolding. And this particular one involves us. And we can choose to be part of it, or we can choose to fight it. In your interview with Del Bigtree, a phrase struck me. You said that the prevalence of childhood chronic conditions has increased from 1.2% to like 52% in the last, I can't remember how many years it was.

Zach Bush
Since the 1960s, yeah.

Charles Eisenstein
Yeah, and then you said, we wonder why childhood chronic diseases have increased. And you were speaking in terms of, I don't know if it was birth practices or all this other stuff, but I thought gosh, I wish that we wondered why. But are very many of us actually wondering why, or are we kind of taking it for granted? Taking it for granted that half the kids in class are going to be allergic to one thing or another? And if we take it for granted, then, because we are very clever, we adapt to it and we create these technological crutches that enable us to cope with our degraded conditions, our lower levels of health. You know, you can't go up the stairs anymore, you get a chairlift. You can't breathe outdoor air anymore, you get air filters. A lot of people cannot breathe. I'm at my brother's farm right now. When I come here, I have several days of quote, "allergies", because the level of pollen is just enormous. And it takes me a few days to stop streaming mucus and having puffy eyes all the time. And I'm fortunate to be able to adapt to it, maybe because I haven't been to a doctor or taken antibiotics in the last 30 years, and maybe because I eat, you know, raw sauerkraut or whatever I do that at least I can make this adaptation. But a lot of people have been in in a kind of lockdown for decades and have not had the blessings that I've had, of access to alternative information and you know, people are in poverty. There's all kinds of reasons. You can't blame, I guess I just wanted to mention that. It's not like, oh, people are so stupid, they're not taking care of themselves. It's like, we live in conditions where people don't even know how to take care themselves. And so there's a lot of people who have become technologically dependent. And I don't see any guarantee that this will not continue forever, and that instead of facing extinction, we will face a kind of nightmare - to me at least - a nightmare dystopia where the decimation, the destruction, the biocide continues until we have one of those like, Jetsons futures, where everybody's always in a bubble, the atmosphere is toxic, there's almost nothing alive on earth and everything that is is a danger to us because our ability to live in these relationships has been destroyed. And I feel like this is a dimension of the choice that faces us right now, which fundamentally is: do we step into service to life? Or do we continue the war on life, the suppression of life, the conquest of life?

Zach Bush

So well laid out there. You're spot on as always, in that I think we are the frog in the boiling water. We don't realize how hot it's got. And that's why I'm constantly trying to point to where we were just in the 1960s and 70s. Like when I was born this is not how the world was, like within my single lifetime, you can see that we have radically changed our resilience and we are collapsing biologically on a planet that is collapsing biologically. We're losing one species every 20 minutes now, and we've had a 10,000 fold increase in the extinction rate on the planet over the last 40 years. That can't be denied. That is scientifically evidenced. And yet, like you said, we're oblivious to it because we can't see it. We can't, you know, in our daily routines, experience it and so we're oblivious to it. And my alarm, and my dystopian hopelessness that sets in sometimes, is that I see that everything you just described around the technological solutioning and palliation of this toxic lifestyle that we've adopted, is manifest at the worst levels in our most wealthy populations. And that really concerns me. If this was just an issue of poverty and poor access to health care, then that would seem feasibly - but when I go to New York City and I meet with some of the most high net worth people I know, their children are on antidepressants by the time they're, you know, eight or nine years old. Prepuberty we have children on antidepressants. There's actually a big event every year now for pediatricians on how to start antidepressants in children under the age of two. This should not be happening. And yet we are constantly sliding down this track of accepting a new normal of disease prevalence, a new normal biologic dependence on pharmacy that is most adopted, most aggressively supported by these high socioeconomic classes. The very people that we would hope would have the most time and space to have a creative thought process around this are those showing the least creativity, often. And so that's extremely concerning to me. I think that shows that we have a perturbation not in biological health, we have a perturbation in philosophical awareness, we have a philosophical crisis that's creating a medical crisis. And that's where you step in. [laughs] So you need to fix everything, Charles. You know, we're depending on you to bring us into focus from a philosophical standpoint of: who are we? Why are we here? Where are we going? These fundamental three questions continue to be remiss or not addressed by our daily experience, and therefore, we miss in these big categories of soil, water and air, nutrition, fundamental movement, changes in environments and seasonal experiences, change in temperature of skin, we're in air conditioning and everything. So we have dumbed down the human experience through the technological events. But I think it's all just symptomatic of this collapse of philosophical awareness. And so thank you for your diligence and hard work in asking those deeper questions.

Charles Eisenstein
Well, I think that symptom and cause are hard to distinguish here, you know. The philosophy draws from the system, and the system draws from the philosophy. And so I think that any radicalism, any even small arena of radicalism, even if you're just entering through body ecology, or soil, food, birth - we identify this is wrong, this shouldn't be this way. And then, in the beginning, the budding radical thinks if we just fix this, everything will be fine, but then you realize that this birth or death, or, you know, health or soil, agriculture, food, it's embedded in all of our other systems and reflects all of our other systems. And so it's the paradox: wow, this isn't going to change unless everything else changes. But it's also true that if this changes, everything else will change. So that's just my way of saying that I really also honor and appreciate your work and the portal that it offers to the full spectrum transition that is possible for us.

Zach Bush

Yes. Now, I think it's your relationship, ultimately, that will do this. And so I'm just so glad to be in relationship with you now, and your whole community is an inspiration. Yeah, this long-form philosophical format that you have to your podcast and so many other podcasts popping up now with these long-form discussions, is hopeful to me. Like yeah, we are an ingenious creative peoples when we're connected. And so my passion is around that. And so for example, we're trying to extrapolate with the fractal truth that biology and life on earth is only manifest through communication of biodiverse societies, we need to rethink our energy sector and our technology, information technology spaces with that in mind. And so for example, one of my companies is working on a reinvention of the internet to envision how would fungi and bacteria create an internet? And in fact, they obviously have, and so we've studied that in the soil systems and all that. And so we're now trying to replicate that at the societal scale for humanity to start to communicate much differently and with this different value system reflected in that society, so that all of the internet activity actually is empowered by a currency that is fundamentally attached to the necessary resources, and necessary regenerative resources within a natural habitat. So I think if we redesign these things that way, we're going to see a different world quickly emerge, because humans, once connected and once given free access to information, tend to do the right thing. We tend to innovate in the right direction.

Charles Eisenstein
If people want to find out more about your various projects and your work, is there a website they should go to? How do they find you?

Zach Bush
Yeah, we're starting to get those up into the public domain but zachbushmd.com is my education website and there's lots to dive into there. We've got a new website rolling out in the next couple weeks even, with even more in-depth information and opportunities to engage. We're really looking for more and more community engagement there. So zachbushmd.com. For some of the soil science and a deep dive on how all that works, ionbiome.com can get you some more information there. It's a really exciting process that we're seeing happen around this science, that as people start to embrace the microbiome, they make simple changes in their day that really reprograms their biology. And one of these is an Instagram phenomenon that we started, the hashtag #breatheyourbiome, with the understanding that if you breathe diverse ecosystems, you'll ultimately create a more diverse microbiology within your own organ systems. And so #breathyourbiome. If you just page through those tens of thousands of pictures that have been uploaded there, you see children and multigenerational families out in nature, in waterfalls and in jungles and forests. And just a quick page through there, you can see, oh, this is what I want to do with my family. This is how I want my life to look. And so I'm encouraged by the power of images and the power - we're such a visual species. And so #breatheyourbiome might open up those if you're a parent or something -

Charles Eisenstein
Biome should include breathing, you know, not just in nature, but with other humans too.

Zach Bush
Yes.

Charles Eisenstein
You know, the Maori in New Zealand, when they greet each other, they do this with strangers too, you put your foreheads together, and you intentionally share a breath. You breathe each other's breath. And boy, you're getting lots of - you know, you're really getting a much more diverse biome. And that's like exactly the opposite of what we're being told to do right now.

Zach Bush
Yeah. And there's good science that protects you. So there's a nice study in influenza, for example, that showed that individuals who get more than seven hugs a day have a 35% decrease in symptoms of influenza. And so it does immediately have a benefit by that human-to-human contact.

Charles Eisenstein
So I would love to keep talking to you for many more hours, but maybe we can do that another time. There's a lot of topics that I didn't even get to bring up that I was intending to. So maybe we put a pause on it right now and resume another day.

Zach Bush
I love it. I love it. Thank you for the conversation.

Charles Eisenstein
Yeah, thank you, Zach. This has been a new and ancient story with your host Charles Eisenstein. I offer this podcast in the spirit of the gift, by which I mean that I don't withhold premium content for a price or put up paywalls or do affiliate marketing or have advertising or anything like that. Instead, I rely on supporters like you. If you would like to support it, you can subscribe at charleseisenstein.net for a small monthly amount, or you can subscribe for free as well. Either way, you get the same content, everything's the same and you'll be notified every time a new podcast comes out. Also on the site, you can find archived episodes along with everything else that I produce: essays, books, videos, online courses. Thank you very much for listening, and I'll be with you again next time.