

Im a Mortal Episode 14: Oliver Zolman – Longevity Levels, Sleep, Medical Doctor Perspectives

Speakers: Oliver Zolman (Guest), Sufal Deb (Host), Marvin Yan (Host)

[MUSIC – Im a Mortal Theme]

Oliver Zolman 0:27

I'm Oliver. I'm a medical doctor from Cambridge in the UK, where I'm currently based. I'm setting up a clinic, where we're measuring the biological age in all 78 organs across both genders that is. Then, using an evidence-based protocol called LongevityLevel123, which we'll probably talk about later, try and lower these biological age markers across all organs.

Sufal Deb 0:58

That sounds really cool. As usual, our show is called Im a Mortal, a little bit of a play on the word immortal. We like to ask all our guests, "What does the word immortal or immortality mean to you?"

Oliver Zolman 1:10

I guess, I don't really think about it much, because it's not really clinically relevant, day-to-day. What's more relevant is negligible senescence or negative senescence, which requires— there are slightly different meanings compared to immortality. As you may be familiar, there are certain animals that don't really have an increased risk of dying as they— per each year, as they get chronologically older. That's known as negligibly senescent. Of course, they can still die from freak accidents or if the world was destroyed by meteorites, that kind of stuff. That's probably a more clinically relevant question, I'd say, achieving negligible senescence, which is a reduction in the risk of dying each year, compared to how we are currently.

Marvin Yan 2:10

Okay, well, that's a good answer. I'm guessing that's the whole purpose of Longevity. School, right? Trying to educate people on this idea of being negligibly senescent.

Oliver Zolman 2:21

Yeah, exactly. Once we achieve these super high longevity scores— which I'm calling Zolman Age Reduction (ZAR) scores, how many years younger you are and each organ for each marker below your chronological age. Once we have super high scores in them, that's the best evidence possible that we've achieved longevity escape velocity (LEV), which you guys probably know about. That's the concept where you basically achieved negligible senescence or you're predicted to achieve negligible senescence within your lifespan, taking into account predicted innovations in the field. A lot of the terms we covered already are quite confusing concepts.

Sufal Deb 3:14

Yeah, definitely. I'm going to make an effort to consistently use them, as I'm about to in this question. If you had the option, would you choose to be negligibly senescent?

Oliver Zolman 3:24

Yeah, of course, who wouldn't. I think there was a survey a couple of— two years ago, where they— the problem with most of these questions when people ask, "Who do you want to live for a really long time." They never make it clear that— people make the fair assumption that it would just be in bad health most of the time, there wouldn't be any advances in medicine. That's what they assume when people are asking the question. But, when people ask the question and they say, "Would you like to live to 120 years old, but with the looks and quality of life as you had in your 20s?" Then, I think 80% of people say yes. When people don't put a number on it, they're like, "Yes. We're beyond 120." I think it's about 50% of people. It just depends on how you phrase the question to do correct scientific surveying of these psychological concepts.

Marvin Yan 4:26

Okay, well, jumping back a little bit. You mentioned Longevity School. We're curious about this because we have some friends of ours who are doctors and they always have a story about why they got into medical school, what interested them about it. I haven't heard of any doctor— you're the first doctor we've ever interviewed for *Im a Mortal*. How did you get— what piqued your interest in longevity in the first place and how did that develop? How did that lead to the development of Longevity School?

Oliver Zolman 4:55

It's just the most— most healthcare is just for age-related diseases so if you want to do good health care, you have to do good longevity care, geriatrics or preventive X specialty. Every specialty, whatever you want to call it, regenerative medicine, rejuvenation biotechnology or evidence-based anti-aging medicine, it's basically just normal medicine. Most medicine is already longevity medicine. You go to your doctor, and you have high cholesterol, he'll put you on statins; that's basically longevity medicine. Treating someone for a heart attack, that's longevity medicine. It's not all diseases 90% of the time, these things. It's just normal medicine really, to me there's no difference. It's just the difference is, ironically being evidence-based because you think there wouldn't be a non-evidence-based practice of medicine but there actually is because evidence-based has a more technical term, at least in my opinion. People might think if we have bad evidence-based medicine, good evidence-based medicine. The good, perfect up to date, extremely informed consent-based evidence-based medicine. That's the kind of difference that I'm trying to try to implement. It's evidence-based longevity medicine at a level that's never been done before.

Sufal Deb 6:33

Before we jump into a little bit more about longevity, I wanted to ask this to help, hopefully, clarify to the listeners out there. What exactly is evidence-based intervention or medicine therapy? What role are they playing with life extension technologies?

Oliver Zolman 6:50

Evidence-based medicine basically means looking for evidence; that's step one. Collating the evidence in a way that's useful to make decisions; that's step two. Then, making decisions based on evidence in the context of the clinical picture in a personalized way; that's step three. That's quite a technical definition of evidence-based medicine, but that's kind of what it is. It's also using the biostatistical hierarchy pyramid of evidence to guide decision-making and informed consent. Of course, we have a meta-analysis of randomized controlled trials in a random population, showing highly clinically and statistically significant outcomes and highly important outcomes, such as clinical outcomes or all-cause mortality, that kind of stuff. That's the gold standard for anything in evidence-based medicine. That's the top of the pyramid. As you go down, the evidence gets weaker, the biostatistics gets weaker, and you're making decisions based on observational studies or majorly flawed studies. At the very bottom, you're making it based purely on expert opinion or animal evidence. It's taking into account this whole biostatistical approach, which is basically how most medicine works anyway, but it's very complex and time-consuming.

Most doctors don't really have time to stay up to date and search PubMed and all these things and learn dozens and dozens of new areas of medicine, which you need to for longevity, because it's very time-consuming. You'll require a specialist. People are normally specialists in their own area, and they can keep up to date with all the papers in their own area if they're various specialists. Often if they have a Ph.D. or master's, they're better at doing that as well but most of the time, doctors don't actually have the skills or the time to keep up to date with everything that they need to keep up to date with for all the patients that they see. There's evidence-based medicine in theory and there's an evidence-based practice, which is actually very hard to do. That's why I'm creating this Longevity School training program, which will be both one version for clinicians and one for patients as well. With different styles of content, of course.

Marvin Yan 9:25

I'm going to attempt to elaborate on that. Hopefully, this makes sense. Sufal and I, we're not medical students. We do have to go through the literature sometimes for our school projects and whatnot. For people who are interested in longevity, I feel like we do want to find evidence-based medicine because that's like you said, the gold standard. But there's so much out there and some studies can really be misleading in terms of all data is— its data is not necessary, I don't know how to put it. It's data, but you can skew data and make it misleading in ways that are biased towards a certain answer. I want to ask— because I know Longevity School, you're trying to have something that is accessible to everybody for them to understand. How can people who are not necessarily doctors go through longevity information and find the best

sources of information without having— there's a boatload of stuff out there, how can they find what's the best?

Oliver Zolman 10:22

Well, rule one is PubMed. Rule two is a special type of PubMed called PubMed Clinical Queries. You go to the PubMed homepage, then you click on the Clinical Queries link, or you do the PubMed URL, then you put slash, clinical at the top. This will get rid of all the crap studies like animal studies, protocols, and everything else. They give you high-accuracy searches for clinically relevant studies like randomized control trials. That's the first step, you just go to that website, save it on your favourites. Whenever you've got a question, whatever disease you want to cure, or try and get more info about or become more informed about it, just type it in on PubMed, on PubMed Clinical Queries and start reading stuff. That's often the best source of information that you can get.

Yeah, it is complex. You have to learn some scientific terms and how to read an abstract. It's not that hard. I mean, you can learn it in a couple of weeks really and you start getting used to it. If that's too complex, then there's Wikipedia. Wikipedia is surprisingly good these days. It was pretty bad 20 years ago, but it's quite good now. There are also clinical guidelines, but I don't really like to rely on that, because they're normally biased towards public health for a lot of age-related conditions. They're really out of date, normally five years out of date. It's not ideal. I'd say go to PubMed and search stuff on there. The only reliable source of information is our actual scientific papers, most of the time, in my experience.

Sufal Deb 12:14

Speaking of reliable sources of information and truth, how can certain companies— especially longevity companies, there's plenty of them out there who claim "Oh, take this, this is better for you, it'll make you age slower" Something along the lines of that. How are they able to do stuff like that and falsely advertise? Is there no regulation on it out there?

Oliver Zolman 12:37

Yes, there are overseas regulations on prescription-only medicines or medicinal products but when you get into the inside of the supplement industry it's very loosely regulated in some countries and not regulated at all in others. I think it has more to do with lifestyle and supplement stuff. Which isn't really— I mean, they're not going to have that much effect anyway so it can't do that much harm, other than financial harm. People that are buying really expensive pseudoscience supplements, they're not going to— they probably have the money to waste, most of the time. I think on the whole of things, it's not causing that much harm to society. I think there's more harm coming from just slow progress in research, which, I mean, isn't slow compared to— it's always getting faster every year and it's amazing. It's like 50,000 randomized control trials published every year and so on but it can always go faster. In terms of proving stuff that's evidence-based, it's tricky because, ideally, you want to do a randomized trial. If you can't do

that, you have to hash together some non-randomized study which is never as good but if you have really remarkable results, they can often compensate. It's quite hard to do that as well. It's still quite a skill to run these studies, so I don't know. I don't know, is the answer to that question.

Marvin Yan 14:25

Okay, let's go back to something more familiar than because you mentioned Longevity School. You mentioned this three-level framework, do you mind elaborating on that a little bit.

Oliver Zolman 14:35

This is the protocol I've been using on clients and myself, building for a long time, collating all the evidence, putting together basically every possible aspect that can affect the aging process in every organ into a single evidence-based protocol. Level 1 is where you start, obviously, and that's where you're going to get most of the bang for your buck because it's all just cheap or free stuff or stuff that even saves you money. It's also got decades of scientific evidence behind it already. We know the effect sizes and everything. It's the 80/20 principle at this point in time for most people. You're going to get 80% of the benefit in your markers from doing the Level 1 stuff in the near term. Otherwise, just six things which if you do gives you, from my mathematical estimations, 95% chance of living to age 75, the vast majority of which is a high quality of life.

The six things are no smoking, basically no alcohol intake, other than a small glass of wine. A certain type of diet; there's the alternative healthy eating index 2010, which is like 10 different dietary things which are quite easy to do once you understand what they are, they become effortless. Then there's exercise, which most of the benefits you get from during the first hour or so per week of vigorous exercise, which is a specific type of exercise. BMI. Having that ideally under the 20.5 range, but under 25 can be fine in Caucasians. The last one is calorie restriction, which is the most complex part of Level 1, ultimately nutrition. That's where we're going through every micro/macronutrient intake, optimizing it based on dietary analysis software called Cronometer and doing blood tests or urine tests. In the case of iodine to optimize all those markers and restrict calories below what you'd normally have on an ad libitum diet. That's Level 1. It sounds very complex, but it's really quite easy. Once you get into it, it takes a couple of months for people to start implementing it really. It's crazy, you get really good results from that in your biomarkers. All your aging biomarkers will drop if you're the average person starting to implement that.

Then Level 2 is a bunch of things that will increase the quality of life but don't have evidence for increasing median life expectancy, in studies. They're a bunch of things that aren't going to reverse the aging process but they're really important for the quality of life and just really important to prevent accelerated aging as well in some people. There are 12 modules in Level 2. The main ones, for example, are sleep, mental health, and environmental exposures like air pollution, medical radiation, exposure, these kinds of things. Sleep and mental health are

probably the ones that are most relevant to the average person. They're not going to raise your life expectancy or slow your aging significantly even if you have perfect sleeping, perfect mental health. If you do have sleep conditions, mental health conditions, you live in a super polluted area, have a dangerous job, or live in a super high crime area, these are Level 2 things and they're going to increase your risk of accelerated aging beyond the average person.

Level 3 is where we start doing the rejuvenation protocols. There are 79 Level 3 modules, so there's one for each organ. There are 78 organs in my classification system across both genders, about 70 organs in a single gender. The last module is these multi-intervention therapies which aren't targeted at a single organ but rather targeted at the whole body. It's just another way of looking at rejuvenation medicine, not just the organ level but also the systemic level. An example of that would be hallmarks of age— therapies that target a hallmark of aging or multiple hallmarks of aging throughout the entire body, so taking systemic therapies, whether that's intravenously or orally. That's a quick overview.

Marvin Yan 19:23

Okay. Thank you, Oliver. We probably won't elaborate on the 79 organs. Regarding Level 1, one question I've always had was— because there are a lot of people who are promoting lifespan and healthspan, usually both. One question we had— as far as I'm aware, most people would die right now because of age-related disease. If we do all the things in Level 1, we don't smoke, we exercise the vigorous type and moderate and we drink a little bit of wine but not too much red wine. Will that just delay the time before we get an age-related disease? Or will it—

Oliver Zolman 20:04

Yeah.

Marvin Yan 20:04

Yeah? Okay. It's not just— so delays it and what about the duration we actually suffer from one? Does it also affect that as well?

Oliver Zolman 20:13

Let me think. I don't know really, I don't know. Well, yes. You're asking a theoretical question, which isn't relevant to real life because in real life there's innovation. We're not in a static, closed system, right? The answer is yes, in real life, but unclear in the evidence base. It's probably yes, in the theoretical scenario as well, but in real life, technology is getting so amazing. Every year, there are 50,000 new randomized controlled trials that you can use to treat diseases. You will live to a— this is just a longevity escape velocity concept, so you'll live to a future time, whether that's 1, 2, 3, 4, 10 extra years or even 20 extra years compared to if you're the unhealthiest person ever, you started doing Level 1, you'd gain like 20 years. Then you'll be around when there's another million, 50,000 times 20, another million randomized controlled trials, which doctors are using, and you have access to the therapies from which you can benefit. Yeah, you'd have a

longer healthspan as well because all those therapies will increase health span, the relevant ones. It's a bit of a complex answer, as you can see but you have to take into account, the technological progress. We're not in a static, static environment where no innovation occurs.

Marvin Yan 21:47

Okay, got it. All right.

Sufal Deb 21:49

Before we jump into more of our questions relating to how you became a doctor and things like that, I just wanted to ask because we just mentioned wine, how exactly is wine helping us ageless or age healthier?

Oliver Zolman 22:01

Yeah, the evidence isn't brilliant. I think the best answer is going to be to go on the website and go to the wine span page. I've summarized an in-depth analysis of the 10 main studies which are the observational studies or randomized controlled trial studies which show exactly how this mechanism of action might be working. It's the best summary of the evidence for wine I've ever seen. We don't really know but it's probably the red wine polyphenols, which are a specific profile of polyphenols that you can't get from anything else. It's literally from fermented grapes made in the wine process. It's this specific combination of polyphenols at a specific dose. Maybe it has to be in combination with the alcohol as well, for some reason. It's the polyphenols and what the polyphenols may be doing is decreasing lipid peroxidation or oxidative stress, a little tiny little bit from when you eat food, and that little bit accumulates over decades to add up to a small number of lifetime gains.

If you have half a glass or a small glass of red wine, on average, every day, for your whole life, you'll live like two years longer than someone that has no alcohol intake. That's why it's not showing up in the randomized controlled trials for clinical outcomes because my theory is it's a very small effect that builds up over 10, 20, 30, 40 years. You'd have to do an RCT, randomized control trial, that was at least 5, 10 years to start seeing the power; for it to be biostatistically powered to pick up that clinical effect size. The polyphenols specifically in alcoholic red wine are reducing the molecular damage from food. It'll reduce oxidized LDL and malondialdehyde, for example, raise catalase levels, these kinds of things, which reduces the damage from food every time you eat. As long as you drink it when you're having a meal. It might not work if you don't do that.

Sufal Deb 24:26

Just a quick follow-up for our audience and a curious me. It's not just any alcohol that helps aging, it's specifically the red wine polyphenols and possibly a combination of alcohol with it.

Oliver Zolman 24:38

Yeah. Yeah, the evidence for any alcohol is much weaker. There is observational epidemiological evidence for it but the best epidemiological evidence, which is backed up by multiple randomized controlled trials of surrogate markers of aging, suggests it's red wine, not even white wine. Also, red wine has— it's got loads and loads of polyphenols per litre, I think 500 milligrams per litre. Whereas the polyphenol levels for white wine or rose they are a magnitude lower.

Marvin Yan 25:18

Okay, you mentioned all the Level 1 factors and wine was one, we were— people might not understand the relationship between that and aging. The second one was sleep because I think people generally get the idea that smoking is bad because of this reason. Diet and exercise. What's the relationship between sleep and aging?

Oliver Zolman 25:41

There's not much good evidence that total sleep time above four or five hours actually makes a difference because all those studies are majorly flawed. They're not adjusted for sleep quality, or objective or subjective sleep quality like insomnia or sleep apnea. Sleep will only do so much. You can actually get away with more than you think, based on the evidence. The main thing to worry about is insomnia and sleep apnea. Insomnia is when it takes more than 30 minutes to fall asleep or get back to sleep for three nights a week for more than three months. It's where insomnia starts clinically. If you have that, then yeah, that's bad. That's associated with an increased risk of hypertension, cold hypertension, or diabetes. That's bad.

If you have sleep apnea, especially moderate or severe sleep apnea, then that's really bad as well. There's not much evidence to say that sleep causes aging outside those contexts. There's a lot of weak evidence that suggests having regular sleep, within plus or minus half an hour of sleep and wake up times each night and having more than seven hours sleep, there's some weak evidence there that that slows emerging aging markers like epigenetic age or low telomeres as well. The evidence is so bad, it's not really convincing. I think the American Sleep Association, or whatever the name is, I think they've got it about right, in terms of their recommendations. It's more about preventing insomnia, preventing sleep apnea, and ensuring you have good quality sleep, rather than total sleep time. That's the most basic thing to understand about sleep as it gets extremely complex with all the sleep arcs, polysomnography, and stuff.

Sufal Deb 27:45

I'm just going to jump ship here and go on to some of the other questions we have unrelated to sleep and wine. If someone is interested in aging, and they decided to go to medical school, what exactly might their options be to continue pursuing aging there?

Oliver Zolman 27:59

Basically, in every medical specialty, other than pediatrics, you will be treating aging. Cardiology, dermatology, rheumatology, whatever. Is that what you mean, or do you mean in terms of innovation?

Sufal Deb 28:19

Probably both. Obviously, there's a bunch of different curriculums, pediatric rheumatology, cardiology, there's also geriatrics but not necessarily a field that's specifically built around just looking at aging. It's more so you look at aging in the various fields. For example, myself, say I'm interested in aging if I go to medical school. I don't necessarily have a direct option for aging. It's more so other options and a little bit of aging in between there.

Oliver Zolman 28:46

Yeah, I published a paper on this a couple of years ago. I had to make a new medical specialty because like you said, there isn't one. I made the longevity escape velocity, medical specialty, which is basically what Longevity School for clinicians will be. You'll get certified in that and we'll have a Registration Board, revalidation and all that stuff. Yeah, it doesn't really exist. I've got a paper which describes how all the other specialties like geriatrics, GP family medicine, or the current specialty framework doesn't really— it is not optimal for maximally reducing all-cause mortality because you'd need like 20 or 30, or 10 to 30— depending on how old you are, and how bad your organs are you'd need 10 to 30 different specialties to actually provide you maximal all-cause mortality reduction normally. Yeah, it's quite a different approach to medicine, when you think about how to slow someone's aging in every organ from the outset, compared to the current medical specialty framework.

Sufal Deb 29:49

With the current medical specialty framework, do you think you learned enough about aging throughout your entire curriculum?

Oliver Zolman 29:58

No. It's hard though because I've had to learn especially level knowledge. It's not really how the medical society works because currently, you just go when you're sick or you have symptoms. If you don't have symptoms, then you just get a personal trainer or a dietitian, as a luxury, basically. That's kind of the paradigm currently, so preventive medicine doesn't really exist, as much as people like to think it does, it doesn't really exist. I think that's the root cause, the mindset. It's probably related to the financial aspects of public and private insurance companies. They won't really reimburse these preventative therapies because the evidence isn't there to prove that it's cost-effective and that they can stay in business. It might even make the— I don't know, there are complex financial reasons behind it. That trickles down to the medical schools, probably in terms of what's actually in the medical school curriculum, or postgraduate curriculums, as well. It's complex. It's complex why it doesn't exist and why I didn't learn it. Regardless, it doesn't

really matter because that's why I've made Longevity School. I'm going to teach you everything I've learned that I should have learned.

Marvin Yan 31:47

Alright, say, in the ideal future, Longevity School's doing great, and we have all this preventative medicine going on, it's not just treatments. Have you noticed— life extension technologies and all that is not really a matter of, "if" but "when?". Being the medical professional you are, have you noticed any demographic differences in terms of acceptance of the new preventive or radical technologies?

Oliver Zolman 32:20

What do you mean by new preventative or radical? Do you mean, like statins? Do you mean flaxseed?

Marvin Yan 32:28

Yeah, I guess? Yeah, what kind of people would be more open to life extension technology in the future based on what we are currently seeing?

Oliver Zolman 32:37

Well, it's just pills and all that translates into the real world. There are just pills, foods, or injections. That's really kind of it. I mean, all devices— most of the modalities covered. It's not really a big deal. It's like, "Will you take this injection for this new therapy? Will you take this pill?" It's just like old medicine. It's like, would you take vitamin D? But it's a more advanced version of that. I guess it's all about risk, more about risk perception. I think that's what your question is. I think that's what you mean. Yeah, I'm sorry. It's just that all of a sudden people are attracted to taking more experimental therapies that are not less evidence-based or are evidence-based but come with a high-risk profile/ Maybe it's more like that kind of question. I don't know. I don't know. My sample size is too small. I think everyone is like— as a doctor, everyone kind of trusts you. It's more about— well, not everyone trusts doctors, but there's a certain level of trust. It's more about a lot of it's in the doctors' hands, really. But if you train the doctors to do stuff, then they're the ones convincing the patients. You don't have to convince patients as well. You can just convince doctors, and they'll do a lot of the legwork in terms of spreading the innovation.

Sufal Deb 34:20

This is kind of the opposite side. Are there any scenarios, any diseases, or any conditions where somebody is healthy won't permit them to take some type of radical life extension therapy? Living an extra 50, 60 or 100 years is actually much more of a deficit for them?

Oliver Zolman 34:42

Trying to understand the question, but yeah, obviously there are contraindications to interventions for pretty much every intervention out there. Even water. The whole point is to have personalized medicine. Obviously, all medicine is personalized. By personalized medicine, I mean next-level

personalized medicine, where you're really taking into account— you spend a lot of time and have a lot of data points to back up your decision-making. It's biomarker-guided decision-making, to an extent, which isn't normally done. Normally, if you take someone— you want to try to optimize someone's blood pressure, then you're thinking about all the risks and benefits behind the different options. The next level for that would be to have access to 24-hour blood pressure, central blood pressure, and having this monitored. Then having real-time feedback, the side effects are based in the app, which directly goes to the doctor. It's a nicer workflow. That's an example of next level personalized medicine.

Then at the same time, you're not just giving them the standard ace inhibitor, or whatever, as first-line therapy, rather, you're showing them, "Okay, here's 20 dietary options of stuff that's just as effective as ACE inhibitors for improving clinical outcomes. Why don't we try these first for three months, based on your dietary preferences? Let's have a chat about that and run it with a nutritionist." Doing that first to bring blood pressure down, plus exercise plus calorie restriction, all the Level 1 stuff. Then it's like, "Okay, that didn't work because you're so old. You need blood pressure medication to reach the optimal range for clinical outcomes, and all-cause mortality." Now we're going to prescribe something at a dose based on a lot of biomarkers like central blood pressure, augmentation index and 24-hour blood pressure. We're also going to adapt it to your genetics, based on your FDA-approved allele for this blood pressure drug. That kind of stuff is like next-level decision-making and decision-making should be. Obviously, it's expensive and time-consuming. Work can be done, but it isn't done. Even though it's evidence-based but is decision-making that you need. That's kind of the answer to your question if that makes sense.

Sufal Deb 37:36

Since we're on the topic of living longer, if we were to somehow eradicate age, change life completely and live forever. How might medical professionals change? Obviously, we have geriatrics now, should we be expecting a new field? A new scenario? What should we be expecting exactly here?

Oliver Zolman 37:55

Yeah, so it depends. Depends on how far you go into the future, of course. There will be— as you know, there's always— medical specialties are always adapting. There'll be new medical specialties, people that specialize in prosthetic organs, rather than being a traditional kidney doctor, for example. Maybe you start specializing specifically in prosthetic kidney implants, or a kidney surgeon starts subspecializing in prosthetic kidneys. I think there'll be more subspecialties. There'll be this longevity escape velocity, medical specialty, of course. There'll be just new specialties, as well, but I think it's going to start— the existing specialties will branch out to being more subspecialist is probably the way that is going to go.

Marvin Yan 39:06

We have one more hypothetical futuristic question. Pretty much as far as right now, a lot of people put health secondary. We don't sleep that much, or we work excessive hours. More often than not, our health is something we put on the side. With, let's say, a bunch of life extension technologies, maybe we eradicate aging, like Sufal said, maybe there's no biological age anymore. In that case, would you expect people to take care of their health more because it's something that can now— life was finite and now it's maybe something that's not. Would you expect them to take care of their health more or would it be the opposite where because there are all these technologies, people would just be more risky?

Oliver Zolman 39:50

I don't know. It's hard to say. You have to think that everything will be autonomous, and it will be increasingly autonomous each year. Your diet will just be tracked automatically and optimized automatically. You'll have an implant, which will measure what normally takes 30 vials of blood to do right now, they'll just do that 24/7 using some crazy chemistry in the implant. It'll all be automated and done for you. Yeah, there'll be increasing leeway to take molecular damage and revert it. But, we'll also be increasing safety in terms of stuff that we can do. Maybe there'll be— you can get super drunk, but it only targets certain regions of the brain which— and then the antidote to protect those regions from the ethanol toxin is in the drink as well. It's a bit of everything, I think. Obviously, people would want to just eat whatever they want, all the time or just not eat at all, like they don't have to eat. People will start doing these weird things because they can get away with it and just get a replacement liver very easily and very cheaply.

Sufal Deb 41:24

Actually, the idea of prosthetic organs is very interesting to me but changing— since we're near the end, I just wanted to ask. We've spoken for 45 minutes now, if there was one thing for everybody to take away from this entire podcast what do you think it should be?

Oliver Zolman 41:42

Level 123. The concept's really important. It could save you and your friends, families, patients' lives, etc. People forget the Level 1 stuff, super important. People for years, their whole life, the whole quality of life is ruined because they have bad sleep or bad mental health. It's never properly resolved. There are hundreds of randomized controlled trials for evidence-based therapies, these things were just never used. People never seek help for their sleep or mental health. It's just ruining the quality of life. Then Level 3 stuff. No one's thought about it as systematically as I have before. It's going to be hard to get away with just rejuvenating one organ, you really have to be monitoring, especially when you get to advanced ages, like 80+, 75+ the super high-risk ages. Initial tracking and solving for all organs. There's going to be one critical organ that goes wrong and then causes you to have a horrible disease or die. When you think about health, you think Level 123. That's the new framework for medicine for me.

Marvin Yan 43:00

For people who are interested in learning more about the framework or about your work in a journal, what are some places that they can go?

Oliver Zolman 43:06

It's my name dot com. oliverzolman.com.

Sufal Deb 43:11

For all of you guys listening, any links or things we discussed throughout the episode will be in the description below. Once again, thank you Oliver for coming on Im a Mortal, your source for all things immortal. We really appreciate you taking the time to come and speak with us.

Oliver Zolman 43:23

Thanks very much.