



DNA Methylation and Trauma Healing

Guest: Dr. Kara Fitzgerald

Alex Howard: Welcome everyone to this session where I'm super happy to be talking with Dr Kara Fitzgerald. Firstly, Kara, welcome and thank you for joining me.

Dr Kara Fitzgerald: Absolutely, Alex. It is great to be with you again.

Alex Howard: Yeah, I really enjoyed our interview last year that we did for the Fatigue Super Conference. And I think part of what you do is you bring a pretty complex topic and make it accessible and I think this is a really important piece of the overall trauma, my body picture.

So just to give people your people, your background to those of you who may not know; Doctor Kara Fitzgerald completed her postdoctoral training in nutritional biochemistry and laboratory science under the direction of Richard Lord, Phd of Metametrix laboratory.

She authored and edited Case Studies in iterative and functional medicine and was a continuing contributing author to laboratory evaluations for iterative and functional medicine, the *Institute for Functional Medicine's Textbook for Functional Medicine*, and coauthored the e-book, *The Methylation, Diet and Lifestyle*.

Dr Fitzgerald runs a clinical development program for professionals and maintains an active blog and podcast series.

She's on the faculty of the Institute of Functional Medicine and maintains a functional medicine practice in Sandy Hook, Connecticut.

So, Kara, we're gonna be talking about DNA methylation, and I think some people have the acronym DNA or the word methylation, and they make me think that sounds complicated.

What are we talking about when we talk about DNA methylation?

Dr Kara Fitzgerald: So really simply it is a tool the body uses to regulate whether genes are on or off. So we're just looking at what is controlling turning them on or off. And obviously, we want to turn on good genes and inhibit bad genes. So how do we do that? And that's it in a nutshell really, on the very simplest but correct levels.

Alex Howard: And you did a really important research study where you looked at the effects of diet and lifestyle on DNA methylation. Do you wanna say a little bit about it?

And also, you mentioned that we started recording, which I'm really excited about. You just got a book deal where you were going to be bringing this out to the wider one. I think it's important research. So say let's say a bit about that.

Dr Kara Fitzgerald: Yeah, I'm so excited about it. Alex, and one of the things that I want to do, I want to say it now, in case I forgot as I was, I have a two year old as we were just talking about so I've got mom brain. So I don't want to forget.

I want a piece of this expansion, so a piece of the regular consumer book; the easy straightforward book, it's going to be an invitation to folks to actually participate in measuring their DNA methylation and seeing how they can favorably influence it with diet and lifestyle. So I am so excited to just, like, bring this to everyone and take it out of sort of the hallowed halls of science.

To my original question, I probably, I'm sure I talked to you about this last time was, you know, all of the research or the bulk of the research, and certainly when I first asked the question was in cancer and we know that the little cancer, the cancer tumor micro environment will hijack DNA methylation and it will turn off tumor suppressor genes.

So those genes that go around and, you know, produce proteins that stop cancer, the cancer will actually turn them off and it will also turn on oncogenes. So the proteins that push cancer forward are turned on by the cancer and the ones that stop cancer are turned off.

I mean, it's so scary, but this is an area of very aggressive science and they're developing a lot of drug development is going on to control epigenetics in the world of oncology. And so that was my first foray into it.

I've thought about DNA. I've thought about methylation in general in terms of like high homocysteine and, you know, how it regulates metabolism of certain toxins and we make hormones and neurotransmitters and so forth.

So anyone in functional medicine has been thinking about sort of the biochemical methylation, but this entry into looking at how it regulates genes; for me back then in about 2013 was this huge A-HA, and it was related to cancer.

And it immediately got me thinking about how we then manipulate methylation into the safest and most powerful way. And ultimately, that's what prompted us to create a diet and lifestyle program.

When we drove into the science, what we saw was that while A) you know, foods are a good, healthy diet, you know, plant centric, lots of greens and so forth with some of the superfoods and the adaptogens that we'll talk about is remarkably helpful. It looks like, in allowing us to turn back on those tumor suppressor genes and also in our study, as I'll talk to you about, there're many other really favorable things that we are unpacking. So it's a safe intervention.

We also noted and again, we'll talk more about this, but that exercise, that stress reduction, you know, community, there's all of these pieces that directly impact methylation and DNA methylation that don't have anything to do with the common nutrients we think of when we think of methylation; B twelve and folate and so forth.

So there are many interventions we can do and we really need to do. So that's what our study was about. We used a huge DNA methylation array, eight hundred and fifty thousand sites. And we measured those three times at three different time points in our study population and the control group. So we've got lots of data that we will be analyzing over the years. And we were able to see really cool changes. But I'm going to stop and take a breath and just make sure I got what you wanted and you can.

Alex Howard: Yeah, no, I think we are saying it, and I think what's really important people to realize here is that eating and living well is not just about eating and living well - you're directly impacting your genes.

Dr Kara Fitzgerald: Yeah haha.

Alex Howard: So you're actually turning on and turning off what you need to support living your best life. It's not just, oh, if I eat well, I feel better. It's a much deeper biochemical impact that is actually happening.

Dr Kara Fitzgerald: Yeah, you're turning on and you're turning off your genes, and in fact, we know that it's heritable. You know it's heritable just in that, you know, our cells divide. So we have generations of cells as normal cell turnover happens in the body. So it's heritable in that way. But, you know, we pass our epigenetics on, we pass our DNA methylation patterns, at least some of them. Some of them are wiped clean. But we pass them on to our kids. I mean, it's really pretty extraordinary.

Actually, as a mom of an adopted child, I know that there are ways in which we share our epigenetics.

I mean, you know, I'm going off track here Alex.

Alex Howard: Go for it, follow the path.

Dr Kara Fitzgerald: So I don't share my genome with my daughter. But because we live together and I've been with her since day one. I've been her mom. I've been the one whose arms she runs to and who, you know, rocked her through the endless sleepless nights, et cetera, like that contact sets her epigenome.

And it also influences my epigenome. And it's you know, it's kind of a sidebar, a sort of emotional area that I would really love to look at more and more in my work. But it sets her stress response, as you mentioned earlier, we were gonna talk about. But, you know, it influences both of us.

So I don't share her DNA, but her Eppy DNA, her epigenome, as it were, has very much converged with mine and key ways. Our diet influences it, of course, what we're exposed to in our life. So it's just powerful, important and moving to me.

Alex Howard: Yeah, well, what comes to my mind, as you were speaking, as well as you, you share a nervous system, right? Because she's learning to regulate her system in contact with your system. And so as much as the actual DNA might be different, the holding, the emotional piece and part of the environmental piece for that emotional piece is absolutely connected.

Dr Kara Fitzgerald: It's extraordinary. And, you know, one of the one of the scientists in our study, who's been just really key in making this study what it is, it's been so important, he is one of the first AP geneticists who actually started the journal epigenetics way back in the day. He's been in this world since the 80s, like the way before anyone was thinking about it.

In fact, he said back in the day, you know, they would look at methylation groups on DNA and they thought it was useless. Like they just thought, who would even put any time into thinking about methylation. It's just a carbon and three hydrogens and they're on, you know, certain regions of the DNA. And it probably doesn't make a difference.

I mean, you know how sort of science can be pretty arrogant before they get something. And then, of course. Right. Lo and behold, now we see that it is one of the most important processes in regulating genetic expression.

So Dr. Mosley was one of the early folks who has been with us, and he's been really just a great human to work with. He's just so brilliant. And his original work where he actually still continues to do this. But one of the big things that put him on the map very early on was looking at this early maternal contact with offspring, first in animals and then in humans. And what it does to epigenetic expression and the fact that we can absolutely, like my contact with my daughter Isabella, influences her stress response. And it will have an impact really through her lifetime.

So what he showed in one of his earlier studies in the animal model was that this or the stress response can either be resilient or kind of turned on, you know, ready to be active depending on that early life contact. So when there was not enough contact, the stress response was heightened and ready to go. Whereas if there was a lot of contact and in a mouse model that's like licking and grooming the pups, they were resilient and they didn't jump into sort of fight or flight immediately. And that was carried on.

Alex Howard: Yeah, and I think it's not, it's not just what happens then, it's what happens in that childhood place is so important, but then it's setting that nervous system for the rest of one's life.

Dr Kara Fitzgerald: For the rest of life, and indeed, you know, this is heritable. This can be impactful in a way that's passed down generation to generation, it can be very profound and very lasting.

Alex Howard: Can you say a bit about some of the actual findings of the research that you did. So ultimately what you found was that changing diet and lifestyle impacts on DNA methylation, but say a little something about that.

Dr Kara Fitzgerald: Yeah. So the big thing, our first study is looking at the biological clock. So that's where we focused our attention initially. There will be subsequent papers. We've got a lot of data. But the first thing we looked at was, are we actually slowing down aging? And, you know, and coming back to this whole stress piece, there are a number of biological clocks.

Now they're out of Steve Horvath at UCLA, out of his laboratory. So postdocs in his lab have developed biological clocks and he developed the very first one in 2013. So we can actually, a large chunk of the regions of DNA methylation that we're looking at have to do with a stress response. So it's pretty extraordinary to me. We're looking at biological aging. Did our diet and lifestyle intervention slow it down? And a big chunk of that has to do with this. It looks like the stress response. It's pretty extraordinary.

So when we say stress is killing me or stresses aging me, indeed it appears to be playing a fairly key role. So the biological clock is what we looked at. And again, we had a diet that will walk you through. I'm going to talk to you about some of the key elements in our diet. We prescribed meditation twice daily, a brief meditation to elicit what they call the relaxation response twice daily.

We wanted folks to exercise at least five times a week, not really intense, like hitting maybe 60 to 80 percent of max. We tracked sleep as well, so we wanted people to shoot for at least seven hours a night. Yeah, we just had them record that and pay attention to it, and we gave them some basic sleep hygiene tips. So we cast a wide net. We wanted them to eat in a

relatively clean lean, not use so much plastic, etc.. And in doing that, our intervention was eight weeks long in our study group, we were able to reduce their biological age by an average of two years. And it's the first study of its kind to demonstrate that.

So just prior to that publication, there was a study that had similar outcome with using growth hormone and metformin, some were aggressive interventions over the course of the year. So the fact that we used a diet and lifestyle, very safe intervention and turned things around is, I'm just really excited, it's pretty extraordinary.

Alex Howard: I think that people watching this, the fact that they could make some relatively doable changes that might require a bit of behavioral change and add two years to life in eight weeks.

Did you can't gather any more longer attuned to any kind of further data points beyond the eight weeks?

Dr Kara Fitzgerald: We'll continue to unpack that, we've got a ton of data that we'll be looking at forever and then will actually make it publicly available so other scientists can dive in and pick out other things.

So, you know, in the best of all worlds, this will be something valuable for humanity for a while. I'm so excited. So we'll continue to look, we saw some favorable changes in hormone regulation based on DNA methylation patterns, and we saw a little bit in immune response. But I need to tease them out before I talk to you about them.

We prescribed a probiotic lactobacillus planetarium and we used a green food powder, which is a concentrate of these DNA methyl transfer acet regulators. And I'll talk to you about that in a second.

So in addition to the diet and everything else we used to do those two things. We noticed that blood folate levels rose, so blood metaphore late rose, even though there were no supplements, no B vitamins used.

We noticed that the pain response dropped in the participants cholesterol dropped in the participants and a handful of other markers just indicating good health were changed.

Alex Howard: I mean, one of the things that to me, so staggering about the research is how short the time span was. In eight weeks to find those sorts of things? I think really it's something.

Dr Kara Fitzgerald: Oh, yeah, yeah, he is Steve Horvath consulted with us, so the man who developed the clock actually helped us along the way. He was pivotal. One of our

biostatisticians has worked with him elsewhere. So it was. I'm very grateful that he was willing to kind of jump in and assist with certain pieces. And he didn't. He didn't. He doesn't he didn't expect a diet and lifestyle intervention. He doesn't expect diet to really have any major influence on the clock.

I mean, like I said, the study just before us, it was called the TRIMM study, and it was amazing, and a yearlong study, a small yearlong study, you know, that was the first evidence that we might be able to shift the biological clock and we're, to my knowledge, where the second piece of evidence and it's a and it's a very safe, and what we think, is a doable intervention.

Alex Howard: So say a bit more about the diet piece of it. So you were saying that it was eating clean, it wasn't overly kind of restricted. But you say a bit about roughly what the core principles are.

Dr Kara Fitzgerald: Sure. So we want a lot of methyl donor foods. What would that be? Those would be the folate rich greens, lots of greens every day. We want the Petain, you know, beets, a beat or two every day.

We want the nutrients that populate the methylation cycle. So we want to make the cofactor that some of your audience may be aware of. S-adenosyl-L-methionine. That's the compound we make when we use volaid, and V12 and magnesium and zinc and so forth.

We make this compound called S-adenosyl-L-methionine and that has the methyl group that has the carbon and three hydrogens that then goes around and kind of fuels the DNA methylation process.

So we wanted the body to have, you know, adequate amounts of 'Sammy'. And so, you know, beets, greens a little bit, not too much of animal protein for the methionine; that's a key player in the methylation cycle.

Liver, you know, believe it or not, for those who are willing and not everybody was. Well, you know, one of the interesting things about this diet is not everybody was willing to follow it impeccably, like there was a little bit of wiggle room. I mean, people are doing the best they can. So not everybody ate liver, but liver is you know, it's got B vitamins and it's got, you know, science and it's got a whole bunch of different nutrients; that if you can get them exquisitely clean source of liver, we consider it to be a superfood.

What else? Eggs for the choline. Again, choline is a really important methionine donor. And of course, there's other really good nutrients in choline.

And there's a host of nuts and seeds that we think are really good, just to aid in pushing methylation forward. Shiitake mushrooms, salmon, you know, DHA can actually impact methylation favorably.

So a diet that is not dis-familiar to folks. I've just everything I've just talked about here, with the exception of maybe the liver, people are probably eating relatively regularly. So those are the methyl donor components.

And then we've got what we call the methylation adaptogens, which I think is the coolest part.

So remember that I said in the beginning that, you know, methylation has to be balanced. We don't want to shut down genes that we don't want shut down, like we don't want to shut down our good guy genes and allow our bad guy genes to be expressed.

So we don't want a hyper methylation situation in certain genes. We don't want a hypo methylation. It's Goldilocks, like we want the right amount.

So we don't want to just push methylation forward with all of these methyl donor rich foods or supplements without giving these regulators; and those regulator nutrients are, you know, again, a group of nutrients that we're familiar with.

A handful of my favorites are: curcumin, so the polyphenol, the curcumin humanoids present showed an ability to regulate DNA methylation and this is probably why we think of curcumin as one of our mainstay interventions in a cancer therapy plan.

EGCG, again from green tea. This is an important epigenetic regulator and probably why it's used commonly in cancer. We're likely going to see that's a piece of it.

Diindolylmethane and cruciferous veggies is another major player. Luteolin that we can find apples and some other players. Actually, we just discovered Mexican oregano, if anybody's using Mexican oregano, it's got a lot of just a darling flavonoid called Luteolin. Blueberries are key players; rosemary, Rosmarinic acid are super important.

We encouraged our participants to get in a good daily dose of these methylation regulators in food. And then we also gave them, as I said earlier, the Greens powder, which is like a methylation adaptogen concentrate. So we mixed both together and what we showed, this is a really interesting point, Alex, we turn back the hands of time, the biological hands of time and we didn't have a net increase in methylation as compared to our control group.

So we didn't see more methylation happening in either DNA.

So what we actually proved, it appears, was that we rearranged the DNA methylation. We sort of achieved exactly what we wanted to achieve in that we changed where the methyl groups were towards a healthier pattern as compared to our controls. Does that make sense?

Alex Howard: So you're clearly giving the body the resources it needs to do what it knows it needs to do.

Dr Kara Fitzgerald: Yeah, it's like, very upstream, 'here's the information we're going to give you just copious amounts of all of this good information and then trust body wisdom to direct it for the best.'

And that appears to be what we know, what we found out, what we did.

Alex Howard: I often think the more upstream you can provide that, the better it is, because the body then does the work itself; than when you go too far downstream and you're more likely to create dependencies and push other things out of balance by having to hide. So I think it's a much more sustainable and healthier way of making change.

Dr Kara Fitzgerald: I think so, and that was why we went this way. I had to ask myself if I'm prescribing a patient, particularly as we get older, so we looked at a middle age population in this study.

If I'm giving somebody a whole bunch of B twelve and folate sort of just long term, could I be hypomethylating good genes also. I mean, that had to be a question. And it appears this is a new area of investigation, but it appears that, you know, the answer is, yeah, that's possible.

So we don't want to just push methylation forward without thinking about how we're going to balance it. I am a firm believer in using supplements, while using folate, you know, all of those guys when we need them. But let's also think about bringing diet and bringing lifestyle and having an endpoint to those supplements, lowering the dose.

So if you have to go high dose initially because somebody is profoundly B twelve deficient and they've got, you know, severe peripheral neuropathy or they're anemic. Yes, of course, you're going to be giving them the nutrients and in the dose that they need, but have an end point in mind and, you know, use diet, lower the dose as you can, et cetera.

So I just think we need to nuance our approach a little bit, or at least I need to nuance mine. I mean, I'll own it. This has changed the way I do medicine.

Alex Howard: Yeah, one of the things that's in my mind as your speaking is that we've talked quite a lot in this conference around adverse childhood events and how, you know, I

remember the exact numbers, but something like if you've had more than five aces and a 20 year reduction in lifespan, what's in my mind is this is how you fix it.

So if someone wants to support on a very physiological level the healing of the impact of trauma. This is actually how you do that.

Dr Kara Fitzgerald: That's right. That's right. I know it kind of gives me goose goose bumps because of the possibilities. It's just huge.

And it may be, you know, when we have access to epigenetic panels more routinely, you know, we get them early on; we get them preconception. We get them when babies are first born, I mean, you can just get a little saliva swab and you look and see what needs to be tweaked.

Dr. Moshe is thinking about that already. I podcast it with them. And so, you know, in your notes you can put a link to that podcast or, you know, just a link to my Website and people can listen to my conversation with him about just this topic, an extraordinarily interesting ongoing study that he's been involved in up in Montreal.

He's at McGill University, and is looking at a Montreal ice storm. So in the 1990s, there was a severe ice storm that shut things down for a week or more, and they followed women who were pregnant at that time and their offspring and noticed increased incidence of autism as well as allergic allergic disease; I think asthma in particular the long term.

So it was based on either the perceived, the emotional stress response, as well as the physiologic stress response of the stress of being pregnant and, you know, not having any power and you're in the middle of the winter and maybe you're running out of food, et cetera. So that that real physical stress, as well as the emotional burden of that experience, had a profound epigenetic influence on offspring. And that's been held.

And so a big question for Moshe has been, how do you know? How do we identify that pattern early on and then reverse that? And it may be in those situations where we are a little more aggressive, like we go in with B vitamins or we go in with us adenosine miss ironing for a period of time until we actually change those patterns.

The implications of this are just extraordinary. And I want to say, too, we're talking about early childhood stressors, but total life stress will actually also influence.

So real time stress that we can be experiencing PTSD will have a similar impact on the epigenome. And remember, in the beginning, I talked about some of the biological clocks, actually a significant chunk of the biological clock. Those methylation sites appear to be associated with glucocorticoid receptors, with, you know, HPI axis and so forth. So it does

look like the stress response could play a big role in aging. I mean, it's it's I mean, that's not rocket science. Like, we've all thought that. But it's interesting to see the evidence of it.

Alex Howard: And to understand the mechanisms of how that's happening as well. Because one of the things I'm quite mindful of with talking about the impact of trauma on the physical body is as much as it grabs people's attention and they go, oh, wow, that's something I need to understand, there could be someone's watching this and they're halfway through their life or in the later stages of life, it's like, well, 'I can change the behaviors and the habits and I can release the trauma of my body, but how do I actually fix that impact?'

And I think what's particularly empowering and exciting about what you're saying is that the changes are doable changes. And even in eight weeks, one's adding two years. I think I'll be fascinated to see if those behaviors are in place for six months, 12 months, you to three years, how much more time that's adding? How did you find it in the study? How was compliance with the people in the active...

Dr Kara Fitzgerald: Such a great question. Yeah, thanks for asking me that. First of all, just in response to your previous one, yeah I'm so excited to continue this work.

And folks, if you're listening, you know, just pay attention and jump on when you can if you'd like to participate. I just want to have the study open and broad and as invitational as possible. So stay tuned on that.

Compliance. So our study was relatively complex; we were doing diet, ee wanted you to do a meditation, we had an exercise prescription. And for some folks who came into it, they were major cross fitters and they actually had to dial it back a little bit. And that was probably the hardest, right? Those guys that were just full tilt had to turn the volume down, and that was a struggle for some of them. We're tracking sleep and we had them take a couple of the Greens food and the probiotics.

So, you know, it was a study that one had to wrap their head around. And we ran our study at the Helgott Research Institute, which is out at my alma mater, National University of Natural Medicine. And Ryan Bradley out of Helgott Research Institute is my co PI. So I'll give him a shout out because they're doing really amazing work over there. He was equally wondering, yeah, what kind of compliance are we going to get with a relatively involved program?

And so he studied us administering this program. He studied us. I honestly, I think and Ryan, if you happen to hear this. I think you were expecting us to faceplant. That's my opinion. He didn't think that we'd actually be able to pull it off. Having done a lot of nutrition intervention studies, he's seen really poor compliance.

So what we did, which I think was different, is I've got a nutrition internship program here. In fact, my nutrition director is a Brit, Romilly Hodges. So we've got a little bit of a presence over there from your neck of the woods thanks to Romilly.

We have a nutrition residency program and we were able to harness these really brilliant people to administer to be available, as you know, nutrition coaches to the participants.

They had to follow a script though, because this is a research study. They couldn't go in and say, 'go, go, go, go. Yeah, you're doing great. Yeah. That joint pain is going to go away.' They could not add anything other than; Do you have any questions? Are you understanding the diet? Do you need recipes?

Alex Howard: Just a short interruption, it's really funny you say that, because I think we touched on it last year, that we I think I haven't told you since we finally got NHS Ethics for a randomized control trial that we're doing.

One of the things that's really funny and annoying in the design is one of the things The Optimum Health Clinic does really well is getting people inspired and motivated to follow protocols. And you put that secret sauce, which is the star.

So it's actually quite hard to get compliance when you can't have anything that may risk a placebo effect by giving people the sort of success stories and the stuff that that kind of helps inspire them.

Dr Kara Fitzgerald: That's exactly right. That's exactly right. It was a dialog that I would have with the team; that Romney and I would have how to dial it back, you have to turn the volume down. You can't do that.

And it was a restructuring because when you're a clinician or when you're working with humans, you are just naturally there with them. You're empathizing with them. You know, you want them to succeed and you have to remove all of those touch points.

Now, arguably, even having this extra human contact in our intervention arm is going to be criticized as a bit of a placebo effect, you know, and so be it. And maybe in our new design will have some sort of contact built into our control group. Maybe we'll change that but I don't know.

You know, I think what it bears out is that the total plan, all of the pieces have evidence around them as being beneficial. you know, worked. I don't know that I need to study each of them now individually to figure out what percentage each contributed.

I mean, honestly, I'm a clinician. I'm always prescribing a systems based plan. You know, I'm not a research scientist. I'm not a bench scientist. So, you know, I'm kind of OK with that.

Alex Howard: And that's also I think that is the evolving edge of science, because in a clinical context, you don't just give everyone one supplement for three months. What you do is you do a combined approach because you know that that's what's going to be effective.

So it sounds like building up to the climax of the story here, you got good compliance because clearly.

Dr Kara Fitzgerald: Yes, we did. Thank you. Long story long. Yes, we did. We really did. And we've got food frequency. So we have to use all these validated questionnaires, which frankly, I don't think are remarkably useful but they would come back and do a food frequency questionnaire. So they would say, 'yes, I remember eating broccoli five times this week or whatever'. And so we have all of those data. And yes, indeed, those will be crunched and written up and published in some of the things that perhaps don't go into peer review that are important I'll blog about, but we'll yes, we'll get all of that information.

So indeed, we clearly achieved some level of compliance because our study group scored two years younger than our control group.

Alex Howard: And you've got to assume that part of the reason why you have compliance was that people started to feel better. Like it isn't just that you were reversing the biological clock and you were adding two years onto life, they were actually feeling better as a result of those interventions. Well, it's interesting.

Dr Kara Fitzgerald: Yes, so the coaches, the participants would tell the coaches that and the coaches, I don't know, would have to respond with, like, no, no response.

Alex Howard: No enthusiasm.

Dr Kara Fitzgerald: But, yes, we would have those reports, you know, routinely people losing weight, you know, pain going away, etc.. So, yeah, we did have good anecdotal reports from this and people wanting to kind of take it on and adopt it.

I am just absolutely thrilled and look forward to just continuing the research journey. I didn't anticipate being a research clinician and feel just blessed and grateful to get to do this and get to continue it.

Alex Howard: Yeah, like, I think it's really important and I think that the often the as you know, the big criticism that's often laid at the door of functional medicine is where's the evidence? Of course, there is a body of evidence.

But these actual real world applications beyond saying, well, we know there's evidence for this nutrient unless they actually put together programs and to show the impact, I think that is absolutely what is needed for these things to move forward.

But research, talking of someone who has done it, it's hard - so congratulations as well for not for not only putting these studies together, getting the ethics and getting it through, but also being at the beginning of moving through the publication journey of that data as well, because that that's a big mountain to climb.

Dr Kara Fitzgerald: It is big and you I mean, you know, you now you're speaking from actually more experience, you've been doing this, you've been on this road show or whatever the saying is here for, you know, longer than I have. So.

Alex Howard: Trauma journey, yeah.

Dr Kara Fitzgerald: Oh, my gosh, Alex, well, it's just been great talking to you. Do you have any other questions for me?

Alex Howard: Yes, I have two questions. One is for people who hear this and are thinking, 'Well, I would like to reverse my body clock by two years and potentia, a lot more than that'.

What are some of the things people can do? They can go to your website. And also, I know, for example, in your ebook; *The Methylation Diet and Lifestyle*, people can get some of these principles in those places. But just if people were to start with a few things, like a few simple pieces, what would you cherry pick?

Dr Kara Fitzgerald: What would I do? So here's something that I do. I have some rosemary with the grinder sitting on my office desk.

I just like throwing Rosemary on everything. Rosemary is beautiful, it's actually anti viral. I mean, there's so many different important flavonoids. But Rosemaritic acid is what we would call a rockstar DNA methylation regulator or DNA methylation adaptogen.

What else? Blueberries. I had some blueberries this morning. I mean, once you have a sense of the nutrients, and we have a cookbook on our site, too, so you can read the MDL book, the sort of science behind it, it's a little bit dense.

You can download the cookbook, though, which is much more straightforward, and you'll see all our methylation adaptations. We actually could give you a methylation handout if you want, and you can just make it available with some adaptogens.

So today I've had some rosemary, I've had some blueberries. I actually had beets. I had a little bit of pork. I don't do a whole lot of animal products these days.

I've got some tomatoes, so the lutein in tomatoes made their way into my lunch.

So there's a lot of really good food. I try not to eat after seven and before seven. So there's a very modest caloric restriction structure in my life and we actually encouraged our study participants to do that too.

There's no full tilt fasting, mimicking diet and what we did and we still showed benefit. I mean, it may be. So this diet is a layerable. So if you wanted to use this and layer in fasting, mimicking, you could do that. If you're vegan or if you're on a food map or if you're on any if you're on an autoimmune paleo or if you're on an elimination type diet based on the reactions that you have; this at the principles of the program are imminently layerable into whatever it is, whatever dietary patterns that you're engaging in you can add these components.

You know, greens, a big serving of one of my favorites is broccoli raw, I eat a ton of that. I eat a lot of cruciferous, I eat a lot of arugula on various greens, a lot of kale. Like so many greens, so that will figure into my day somewhere today as well.

Alex Howard: Yeah, and I think, again, kind of reiterating a point, but these are very doable things and what I really like about what you're saying is it's not like you have to go totally ketogenic, or you've got to go completely raw.

You're talking about adding things into a diet you're already eating and making some lifestyle changes where you could do the full thing or some pieces of but there's a real impact that happens there.

Dr Kara Fitzgerald: Yeah, I would argue that we want to incorporate these regardless of who we are and what we're doing, we want to incorporate some of these principles.

I mean, you can be full tilt by a biohacker who's, you know, fasting and taking rapamycin, et cetera. And you still when you go back to eating, I mean, you should absolutely be incorporating some of these principles, no matter how sophisticated you are or if you're, you know, restricting calories all of the time or whatever it is.

I think all of us need to be embracing these principles in meaningful quantities. And then, you know, sometime during the year, maybe once or twice, you just jump on to the full plan that we prescribed in our study if you want that outcome. So that's that's how we're thinking about it now.

Alex Howard: That's really cool. For people that want to find out more about you and your work, you mentioned that your blog and kind of people find much more information, say a bit more about work, where they can go, what they could find.

Dr Kara Fitzgerald: So it's just my name, it's DrKaraFitzgerald.com. That's our Website and that's kind of the hub for our professional content.

So we've got more dense discussions on the methylation, diet and lifestyle and a whole lot of other stuff, actually. And then we also have more straightforward content or a consumer area, also more accessible.

We have a recipe tab you'll find, and anything that's methylation, diet and lifestyle friendly, you go on the tab and you'll find out.

Just recently, actually, I made a lemon tart and I made it a methylation, diet and lifestyle super tart by adding my favorite rosemary to the crust. It's a nut and seed crust; so I used pumpkin seeds. I use sunflower seeds, I use pecans because I love them. Pumpkin and sunflower methylation superfoods. And then I threw a bunch of rosemary in there. I threw extra rosemary in the lemon. What else? I had some coconut.

So medium chain triglycerides are, you know, we're using in our program or recommending it and so I kind of took a standard tart and just doctored it with some of the things I'm familiar with and made it into that.

So you'll see recipes that are already in the structure of a methylation diet and then you can also learn some of the basic tools and make recipes, methylation, super recipes yourself.

Alex Howard: That's supercool, Dr Kara Fitzgerald thank you so much. I think you're doing amazing work and I really appreciate you making successful companies. Thank you so much.

Dr Kara Fitzgerald: Absolutely. Yeah, it's just a pleasure to talk to you again, Alex. Thanks.