THE MODEL HEALTH SHOW

EPISODE 763

Dramatically Extend Your Lifespan, Get Stronger, & Heal Faster With Regenerative Medicine

With Guest Dr. Adeel Khan

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SHAWN STEVENSON: Reversing chronic pain, accelerating the recovery from injuries, eliminating chronic diseases, and turning back the clock on the aging of ourselves. That's what we're talking about today. It is very rare that I have my mind completely blown, but during this episode, my mind was blown several times. Today we're talking with the individual who's at the forefront of regenerative medicine, and I'm telling you, these are some of the things that you need to know about because this is the future. The future is happening now. And obviously having a healthy lifestyle matters more than ever. You know, being mindful of the latest science regarding our sleep quality, our nutrition, our relationships, our exercise and movement practices, all these things matter more than ever because we live in a world that is very abnormal from what we evolved in. And so we need to make sure that our bodies and our minds are resilient.

SHAWN STEVENSON: But even with that, where do we turn when something goes wrong? How do we really insulate ourselves from all the rapid changes that are taking place in our environment? That's where some of these new treatments that you're gonna learn about today come in and really save the day. And I'm telling you, this stuff is remarkable. But again, I wanna keep in mind everything matters in a certain context. So I don't wanna take the context out of this equation. Keep in mind that we need to be dedicated to doing the things that our genes expect from us for healthy expression. You know, again, being mindful about what we're eating and our movement practices and stack conditions in our favor. But I wanna make sure that you have access to this information because as mentioned, this is the future. And the future is now. It's happening right now.

SHAWN STEVENSON: There's so much emerging evidence and what we can do to maintain our youth. But not just that, but literally being able to print out younger copies of ourselves in essence. But in particular in the context of healing from chronic pain, of reversing some of the most chronic illnesses that have absolutely skyrocketed recently in our society. There are sustainable solutions that supersede our current model of standard care. So this is the treatment of symptoms predominantly through this lens of pharmacology and of course, surgery when necessary, but really seeing a system to where our epidemics of chronic diseases we're fascinated. Our system is fascinated with treating symptoms and not actually helping people to address the underlying cause, the root cause of their symptoms. And so we now have protocols that help our bodies to heal from within, to heal itself, to change the signaling, which we're gonna learn about today, so that we can reach an optimal state of health and to defend our bodies from the chronic conditions that are causing so much unnecessary suffering.

SHAWN STEVENSON: So truly, truly excited about this, and by the way, when our special guest got here, I wanted to make sure, I always offer my guests a plethora of goodies. And when I offered our special guest some electrolytes, that's the one that he put his hands up for. And in particular, he is very much aware of how electrolytes are minerals that carry an electric charge. These electrolytes enable our bodies to do essentially every function that it needs to do. Electrolytes are required. Electrolytes enable ourselves to communicate and to run a plethora of different processes. And in particular, if we're talking about sodium being one of the most important electrolytes, researchers at McGill University found that sodium functions as what they called, I quote on-off switch in the brain for specific neurotransmitters that support optimal function with our brains and protect our brain against numerous diseases.

SHAWN STEVENSON: So how crazy is that? That electrolytes, sodium in particular, helps to defend our brain against some of the most common degenerative diseases and dysfunction that is happening right now in our society? A lack of high quality. This is the key. High quality sodium. Most of the sodium that people are getting in the standard American diet, for example, and this is the most recent report, and this is data coming from published peer-reviewed papers, but somewhere in the ballpark of about 70% of the sodium intake that the average American is getting is from ultra processed foods. Alright. So the lowest tier, because there isn't one type of sodium, there isn't one type of salt, there are many different types of salt, and there's magnesium salts, there's potassium salts, there's calcium salts, but high quality sodium is essential for our cells to talk to each other. But on top of that, another electrolyte magnesium was featured in a fascinating new study.

SHAWN STEVENSON: This was featured in the journal Neuron they found that magnesium is able to restore critical brain plasticity and improve our cognitive function. Plus a double blind placebo controlled study published in the Journal of Alzheimer's Disease found that improving magnesium levels in adult test subjects, and these folks were between the age of 50 and 70, could potentially reverse brain aging by over nine years. So again, if we're talking about reversing the aging process, this isn't just hearsay, this is real and certain elements are required for that to take place. And key electrolytes are very, very important in that. And so I'm a huge fan of the electrolytes from Element because they contain no artificial colors. There's no unnecessary sugar added to this. And this is what we see in these staples on store shelves and at sports events and things like that. That's the past, these Gatorades and things like the Powerade and all that, with these crazy artificial colors that have been proven multiple studies to cause issues with our cognitive function and with our health.

SHAWN STEVENSON: But we're getting rid of that stuff and just getting the highest quality electrolytes possible. And that's what you're getting from Element. Go to drinkLMNT.com/model and they're going to send you a free sample pack with every

electrolyte purchase. So whatever electrolytes you get, you're gonna get a free sample pack to try all the different flavors that they have. Right now, I'm really, really vibing with the grapefruit salt. I love it. That's my favorite right now. And again, I highly recommend you checking them out. They have literally hundreds of thousands now they're into the millions of data points from athletes, from high level performers in business. The list goes on and on looking at what is the optimal ratio of electrolytes when we're talking about sodium, potassium, magnesium that benefit the most people. Alright? So they're not just guessing what the optimal ratios are. They're basing this on, again, hundreds of thousands, even up into the millions of data points that they've collected now at this point. They really know their stuff, they're great people as well. And again, highly recommend checking them out. Go to drinkLMNT.com/model for a free gift pack with every purchase. And now let's get to the Apple Podcast review of the week.

ITUNES REVIEW: Another five star review titled, "I Didn't Know What I Didn't Know" by Mama B 1983. My friend introduced me to this podcast a few weeks ago, and since then I have been hooked. SHAWN presents information in an entertaining and easy to understand way. I've been shocked by the point of yelling what? At my stereo in the car, who knew vegetable oil could change your DNA? SHAWN, you now have a follower for life and I can't wait to start implementing changes. Thanks.

SHAWN STEVENSON: Thank you. I love that so much. And by the way, the study that was referenced there was published in the journal in Halician Toxicology, and these researchers found that in fact, just smelling the fumes of vegetable oil during cooking can damage human DNA. Which if we think about it with toxicology, the dominant way that we're interacting with our environment and pulling things into our bodies is really through our breathing process, right? We tend to think about what we're eating. We tend to think about things we won't be rubbing on our skin and the like. But absolutely our air quality and the things that we are proactively putting into our air quality if we're talking about cooking with vegetable oil, is something that we need to be aware of because we just take certain things for granted. And there are much, much better things to cook with much, much better things for our health.

SHAWN STEVENSON: And my special guest is very much aware of all these things and so much more and has really been pioneering, yes, lifestyle changes, absolutely. But let's stack conditions so that you can actually do these lifestyle practices so that you feel good about them, so that you feel energetic, so that you feel youthful and continue to live your best life possible. Our guest today is Dr. Adeel Khan, and he's a Canadian board certified physician and at the forefront of regenerative medicine, utilizing remarkable treatments that you're gonna learn about today. He's really transforming healthcare from the inside out. And he's working alongside scientists in Canada, the US, Dubai, Italy, and Japan. And he's helped to shape

Eternal health clinics, a revolutionary concept in specialized healthcare offering unparalleled treatment options that truly stand out in our current medical landscape. Let's dive in this conversation with the one and only DR. ADEEL KHAN. Man, so good to see you already we're matching colors, you know, got a matching vibe going.

DR. ADEEL KHAN: Yeah, man, I'm excited. I read your book almost a decade ago, so it's cool to actually talk to you in person.

SHAWN STEVENSON: That's how powerful you are. You've got all these incredible people in your life that you might have picked some things up from years ago, but now you're really becoming this kind of really emerging star for all of us in regenerative medicine. But we're gonna talk about what it really is today because there's a lot of things that aren't really that, and I can't wait to dive into that. But first and foremost, I just wanna ask you a general question about muscle. Why is muscle mass so critical as far as longevity is concerned?

DR. ADEEL KHAN: The number one reason is because muscle helps to regulate your immune system. So chronic inflammation or inflammaging as it's been termed, is probably the main driver for aging. The definition of aging is, is kind of still, there's not a unified agreement on what that means exactly, but one of the theories is called the unitary theory of aging. And what it posits is that basically inflammation and oxidative stress are probably the two biggest drivers, which lead to reactive oxygen species, mitochondrial dysfunction, senescence associated secretory phenotype, genomic instability, all these different things that are basically the hallmarks of aging, which cause your body to get older and degenerate over time. And so what muscle does is upregulate something called T regulatory cells. So Treg cells, it's very nerdy, but they're probably my favorite cells in the body.

SHAWN STEVENSON: Shout out to the Treg cells.

DR. ADEEL KHAN: Yeah. As a cell therapy specialist kind of doctor, I love to nerd out on cells and Treg cells are these cool little molecules that... So T-cell in general, people probably are wondering what are T-cells, so T cells is thymus, they come from your thymus gland, and they're just B cells that come from your bone marrow. So there's basically, those are B cells and those are both part of your adaptive immune system. And so adaptive immune system means like they have the memory and they can kill infections and pathogens and things that don't belong, but it's not just about killing viruses, it's also about protecting your immune system from dysfunction. 'Cause that dysfunction over time as it accumulates, that's what leads to loss of muscle aging, all these degenerative conditions that we know are the main bane of existence in society. So what muscle does, and obviously Gabriel talks about the organ of longevity, but I think the one thing that people don't talk about enough is immuno

homeostasis and immunoregulation, because that regulation of the immune system is really gonna prevent you from a lot of chronic disease.

SHAWN STEVENSON: That's so fascinating. Again, that's the last thing people think about in regards to muscle. But what's so cool about, it's something that we can proactively make, it's really cool.

DR. ADEEL KHAN: Yeah, no, exactly. You're fighting, you're kind of fighting this natural process as you get older, after age 30, you lose something like half percent of muscle mass per year. So you're naturally gonna lose muscle if you're not gonna do resistance training and other things to slow that down. So the fascinating thing about regenerative medicine is that we can manipulate your body using cell gene therapy and even like bioelectricity now and all these cool things to change the signals so that you slow down this loss or even put it in the opposite direction, like regenerate tissue.

SHAWN STEVENSON: Now what's so interesting is that, okay, so we've got this dynamic with muscle in the immune system, but it's really important for people to understand that muscle itself is really an endocrine organ. So it's producing a lot of other things that would support longevity as well.

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: Is that right?

DR. ADEEL KHAN: Yeah. So I obviously talked about the Treg cells, but there's actual signals from the muscles called myokines and exerkines. So kines basically just means movement and myo-muscle, exer- related to exercise. And then there's, so these are different cytokines and cytokines, what that means are signals to the cell, cyto means cell, but kine is just like movement. So there's movement of these signals and they go throughout the body. And so myokines are very interesting because what they do is they go throughout the body, through the brain to reduce neuroinflammation to help protect against dementia. There's myokines that help to improve insulin resistance, so it helps prevent diabetes. There's all these exerkines too, which are only released when you exercise. So you can't get the benefit. Like I know there's a lot of gimmicky kind of, let's say products out there where you're just like, oh, you just stand on this thing for like 15 minutes and you'll vibrate your body or whatever, and you'll get the benefits of exercise. But I think you need to actually physically move and sweat and there's all these other benefits that only happen when you're actually, and there's no way around it. I think you have to train.

SHAWN STEVENSON: Yeah. Well of course, like that's one of those things where can we get a pill for that? Can we get some kind of futuristic input? But the cool thing is life is movement really, if we wanna just kind of bullet down to that, but I was thinking about kines and kinesiology and studying that in school and just studying human movement. And in reality, again, our bodies give us all this great feedback and reward for moving. And if we're lacking these inputs, then our bodies gonna be lacking in doing all kinds of cool stuff that it can do. And so what I've really picked up from studying you and your work, the past month really is you are inputting things to help people to continue to move and to extract all this value, right? And this gets us driving us into this domain of regenerative medicine because as you mentioned, there's a significant loss in muscle mass as we get older. In particular, number one for the average person isn't doing sh*t, you know that in of itself. But for people that are proactively training and wanting to maintain their muscle mass, there's a lot that can be done there. But there's another level and I wanna talk to you about, well, first and foremost, what is regenerative medicine? And let's just start there.

DR. ADEEL KHAN: Yeah. At a very high level, it's basically just repairing or regenerating tissue back to a previous state. So you're basically trying, if your body's in a degenerative state or if there's some sort of damage, you're trying to take that back to the way it was. So the perfect example is like a tear in the muscle or tendon. So instead of getting the standard of care would be like surgery, like you have to go get surgery, you sew it back together, and then you're kind of on your way. So instead of having to get surgery, is there something we can do to kind of manipulate the body so that it will heal? And obviously this was a huge promise, even like 30 years ago is when it really started. Like Dr. Arnold Kaplan who recently just passed away, he was the one who coined the term mesenchymal stem cells, which we'll chat about, but he was kind of like one of the godfathers of regenerative medicine. And so it was this whole promise that hey, we can actually repair tissue instead of just having to cut stuff out or take this pill or just mask it. So it's this amazing idea that instead of having to take a pill to mask something or just having to cut you open, that we can actually get your body to heal.

SHAWN STEVENSON: Alright. So first and foremost, our body in many ways. It already knows what to do to fix a lot of problems, but it's having the right conditions and the right...

DR. ADEEL KHAN: Signals.

SHAWN STEVENSON: The right signals. Exactly. And so with this being said, let's talk specifically about an injury. Alright? So say somebody has a chronic shoulder injury that they've tried all this different stuff and they're just not getting better. This is oftentimes when people come and see you.

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: So let's talk about what you do versus a conventional approach.

DR. ADEEL KHAN: Yeah, and I mean, the reality is I treat a lot of high-end pro athletes as well, like NHL NFL players, stuff like that. And they have their own team doctors that are orthopedic surgeons. But what's a surgeon gonna be good at?

SHAWN STEVENSON: Surgery.

DR. ADEEL KHAN: Yeah, everything looks like a nail when all you have is a hammer. So unfortunately this field of regenerative medicine is becoming its own specialty, meaning it's evolving so fast that they can't keep up and they don't really know what's going on and they don't know the nuance. So a lot of times they brush it off and just be like, oh, well if you have this chronic pain, the standard kind of orthopedic surgeon will say, okay, try cortisone, which is an anti-inflammatory drug. If that doesn't work, you can take some anti-inflammatory medications and then just kind of manage it with physiotherapy.

DR. ADEEL KHAN: And if after like three, six months not getting better, then you can do surgery. So that's kind of like the standard of care. It's still pretty, that's still pretty the standard approach. But then there's this kind of huge gap of patients that aren't getting better with physio and that don't necessarily want surgery. Plus they're, I think they deserve access to an option that is viable. And so that's where we come in and we say, okay, is there something we can do to get the body to heal on its own? And you told me your story earlier, like you did it just with nutrition and movement. So imagine what you can do when you're actually sending signals, like the actual raw ingredients in there to kind of help your body to heal. So a lot of times we'll do our own assessment with ultrasound.

DR. ADEEL KHAN: I think the best story I like is when I went to... The first time I went to Dubai was to treat this man named Mohamed Alabbar, he's the owner of the Burj Khalifa and Emaar property. So he owns the six tallest buildings in the world. And he's the wealthiest man in Dubai, business wise. Obviously, there's a royal families and stuff like that, but he's well connected with all them. So he flew me down because he had the shoulder issue for 20 years, and this same story, right? Cortisone orthopedic surgeon, blah, blah, blah. And so he was kind of like, can you fix me? And I'm like, pretty sure I can. And so we did an ultrasound, assessed it, we found some partial tears and then we just use platelet-rich plasma injections to fix it, and for a lot of tendon muscle tears, PRP works great. It's just where we take your blood, we concentrate it, but there's also nuance and PRP, which is the problem, there's different ways to prepare it, how fast you spend it, what temperature do you do at it, 'cause it changes to cytokine profile, which are the growth factors, and anti-inflammatory signals. And I was

fortunate 'cause I got trained by Dr. Anthony Galea, who was kind of the godfather of PRP, he treated like Tiger Woods, A-Rodlots of people.

DR. ADEEL KHAN: And he was the one who actually invented PRP for musculoskeletal conditions. He actually was the first one the world to do it, so obviously he's... I learned from him, and so I got to learn about the nuance of how to prepare PRP. But that was just like a simple case where you just need the right signals, the body, once you give the right signals, 'cause the plasma... What is the plasma? All it is is growth factors and cytokines that are just telling your body, okay, it's okay to start healing now, so there's stem cells that from the endogenous area start coming in, their signals that start coming in and start preparing the tissue and then... Yeah, and then he's pain free now and he's good, and his wife also had a simulation or knee, so they were obviously like, what the heck how come we never had access to... And this man also has access to it, and pretty much any doctor in the world, right?

SHAWN STEVENSON: Right. Right.

DR. ADEEL KHAN: So it's like if you're struggling with this for years, it's really hard for a regular person to know how to navigate the system.

SHAWN STEVENSON: And that I would imagine this is a pretty high-stakes situation.

DR. ADEEL KHAN: Just a little bit. If you screw up, you may not return.

[laughter]

SHAWN STEVENSON: Wow, man, that's really remarkable, you know again, having access to all these different treatments and trying so many things and just struggling. What can block somebody from healing when it comes to these signals, being able to do what they're able to do?

DR. ADEEL KHAN: Yeah, and that's always fascinated me is like, your body has this ability to heal as you've seen yourself, but what, I think it's a combination of genetics and obviously the inputs you give it, because if you're not putting the right food, you're not doing the right movement, and then there's always gonna be just that factor of just we don't fully understand, but most likely, there's some genetic pathways in terms of regenerative medicine pathways, 'cause there's all different pathways that signal and tell your body to heal, like there's a pathway called the Wind pathway WNT, but maybe there's some people who have genetic polymorphisms or some sort of variants that just don't allow their body to heal as well as other people's body. 'Cause I have some patients who just... They're so fragile and they just don't heal from any it, so far, and they eat well, the exercise to do all the basic

stuff, but for whatever reason, their body just doesn't heal well. And so we have to, oftentimes, we're working with those patients whenever they get tears, they just don't heal, and we have to help them to heal.

SHAWN STEVENSON: Alright, so you mentioned PRP being one possible treatment, but you... And we talked a little bit about this before you got started, or somebody who's really at the forefront of understanding this, and it's super exciting. I actually did a lecture on this at my ... the university I graduated from for the biology class like 10 years ago talking about stem cells.

DR. ADEEL KHAN: That's so cool.

SHAWN STEVENSON: I was talking about totipotent stem cells and pluripotent stem cells and all these different things, just what we knew at the time, but there wasn't any valid interventions in medicine at the time to really talk about.

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: But we've come so far. Can you talk a little bit about that?

DR. ADEEL KHAN: Yeah, it's exploding. And so I think for people to understand, 'cause stem cells is such a blanket term, and there's different types of stem cells. So first, just the broad definition of a stem cell is something that can divide and potentially turn into different types of tissue and help to repair tissue and the cool thing about stem cells is obviously their ability to regenerate new tissue, but the issue is, there's so many different types. So there's embryonic stem cells, which come from an embryo, and that's kind of like in the Bush era, there's a lot of controversy 'cause obviously you're taking them from embryos, that's very different, and a lot people still think like, you're like, Oh, so you take... Are you taking...

DR. ADEEL KHAN: They still think that. They're still a misconception, we're not taking that from embryos, we're taking them from umbilical cord tissue, because that's a very rich source of what I call mesenchymal stem cells. And mesenchymal is just an embryological term. But the point is, these mesenchymal stem cells are still very pluripotent, meaning they can differentiate into different types of tissue, but they're not totipotent, meaning they can't turn into any type of tissue. So there are certain cell lineages where they have a propensity to differentiate into, and typically that's gonna be cartilage muscle, tendon, bone, but we still use it for other organ systems, not because we're trying to necessarily...

DR. ADEEL KHAN: We know it's not gonna regrow you like a new pancreas, but what it can do is it can improve the micro-environment and allow your body to improve that chronic

inflammatory process that's causing that degeneration in the pancreas with Type 2 diabetes. That's why there's been trials done where you inject just mesenchymal stem cells into the pancreatic arteries and patients can actually get off insulin. And we've treated patients with that too, with Type 2 diabetes. So, mesenchymal stem cells have this amazing ability to heal and reduce inflammation, but then it's like, Okay, can we engineer the cells to control the signals, and this is the part that I'm really excited about. It's called Synthetic biology. So meaning, instead of just taking umbilical cord stem cells and manufacturing them and then injecting them in, we actually genetically engineer these cells in a lab. And how we do that is using skin biopsy, so we take a skin biopsy from a patient, it can be from your own body, or it can be a donor, and then we use cellular reprogramming, and this is kind of passing the reset button on the cell. It's called The Yamanaka factors.

DR. ADEEL KHAN: And Professor Yamanaka was a Japanese Nobel scientist, and the reason he got the Nobel Prize is because he figured out these are the four transcription factors, if we over-express them, you can turn any somatic cell, so you can take any muscle, fat cells, skin cell and you could turn it back into a baby stem cell, which is like embryonic in nature. How crazy is that, right? People, it's always hard to comprehend. It's like, Wait, you mean I can turn anything in my body back to a baby again? Essentially, that's what he discovered. But the problem was with this, they're called Induced Pluripotent Stem Cells or iPSCs, and/or I like to just call them Yamanaka stem cells, easier to remember for people. So these Yamanaka stem cells, the problem was they're like embryonic, so they're too much stem nets, meaning they can turn to tumors or they can keep growing. And so this issue in the last five years has been, how do we use these cells clinically without causing tumors? There are some people using them, but I would caution to be careful just 'cause there's always a risk of these iPSCs or Yamanaka stem cells to keep on growing uncontrolled like uncontrolled proliferation.

DR. ADEEL KHAN: So, what we're doing is we have this unique cell line that has a gene edit to prevent uncontrolled proliferation, so these Yamanaka stem cells will not grow into tumors, and that's the patent technology that we've partnered with the company for. And what we can do is we can take these Yamanaka stem cells and we can turn them into different cell lines and that we can control them, so we can almost control the signals that they're gonna send. So instead of just being like umbilical cord stem cell, we can control the signals that they're gonna send.

DR. ADEEL KHAN: So for example, we're working on making a mesenchymal stem cell that's specifically gonna target aging by targeting the inflammasome. So this is genetic engineering, and then we can also create beta islet cells for the pancreas, that's what's been done in clinical trials, there's what's called iPS-Derived Dopamine producing neurons, which can be transplanted into the brain for Parkinson's, and that's clinical trial was published this year, and the results were amazing. Patients actually going to remission and you actually get

growth of new neurons, so you're actually treating and reversing disease. You're not just saying, Okay, well, I guess I have Parkinsons. I will take this pill for the rest of your life. That's why it's such an exciting field, so it's kind of this intersection of cell therapy and gene editing and gene therapy coming together for that next generation of cell therapy.

SHAWN STEVENSON: And this would, I would imagine, be a much more lasting treatment versus something, again, you gotta take a pill every day, whatever the case might be.

DR. ADEEL KHAN: Yeah, because you're actually repairing the tissue and you're re-growing new tissue that's gonna be permanent and it's in grafting. And this is already happening. And this is just the beginning. So imagine where we're gonna be in five years, or 10 years. It's gonna be amazing for people with chronic illness.

SHAWN STEVENSON: Alright, and I want people to really get this, so essentially the data or the signaling, which once you said this just now, it just makes complete sense because we're so fascinating, life is so fascinating, but there's data when we're born there's data in ourselves and our genes to make an adult. The date is there, right? But it's just a matter of signaling, it's a matter of, I would imagine certain things getting read a certain way. The same thing holds true as an adult, there's data there for younger you. And you are talking about innovations that can read that data to control the signaling to start to basically print younger copies of ourselves. Is that right?

DR. ADEEL KHAN: Yeah, yeah. And that's the holy grail, I would say, of Anti-Aging Medicine would be happy Genetic reprogramming, which means basically imagine one day we can just reprogram all your cells back into a younger state, which is not science fiction. I think that would happen at some point. For now, what we can do is we can still infuse these stem cells into your body, which has a systemic effect on inflammation, they're immunomodulatory, so meaning... 'cause a lot of people think they're like, why would you put stem cells intravenously? 'Cause they think you're trying to repair tissue and regrow tissue, but the first generation is just stem cells especially more than anything, are signaling molecules, meaning they are gonna help to reboot or reprogram your immune system, which is called immunomodulation, and that's why it's been shown to help with inflammatory bowel disease, rheumatoid arthritis, lupus, all these different conditions that are autoimmune-based because it's rebooting the immune system. 'Cause your immune system is kind of becoming haywire, so it's like, how do you get it back to a state where it's not sending the wrong signals anymore.

SHAWN STEVENSON: Alright. So hearing some of this previously, I had certain concerns bubbling up, which I want everybody to know. I'm gonna get to those questions, alright? So just buckle in tighter and we gotta keep on this roller coaster. Now, the next place I wanna go

to is actually we're circling back to something you mentioned, which is just mind-blowing in and of itself, you mentioned this as a highly effective treatment for diabetes, and not just again, this isn't a symptoms treatment, this is actually addressing the root cause, so can you talk a little bit more about that, because obviously diabetes has exploded in our population today, so let's talk about that a little bit more.

DR. ADEEL KHAN: Yeah, and again, what's one of the main drivers of diabetes, it's the inflammasome. Inflammasome is this pathway called the NLRP3 pathway, it's a very nerdy thing, but basically this pathway, when it gets activated, it activates Interleukin-1 beta and all these inflammatory cytokines and those inflammatory cytokines are what lead to insulin resistance and prevent the cells from being able to read those signals from insulin and lead to this chronic inflammatory state that goes hand-in-hand with Type 2 diabetes. So with that understanding, because obviously people understand that my blood sugar is high, but why is your blood sugar high? It's because insulin-resistant was conducted back to chronic inflammation and the inflammasomes. So that's kind of the gist of it. So with that understanding, what the stem cells are doing is when we inject them into the pancreas, so what we do is we infuse them, be a pancreatic artery injection, and we infuse them into the pancreas and liver, which helps to basically reduce that inflammatory environment, allowing your beta islet cells to produce more insulin and reducing the inflammation, so the signals get sent better, so your insulin sensitivity improve. So then that's how you can reduce the medications and even get off insulin.

DR. ADEEL KHAN: There's a trial in India that was published this year, and they had, I think, 400 patients or so, but it showed with just mesenchymal stem cells like the first generation ones, that patients, many of them got off insulin, the ones who were on insulin actually got off like how crazy is that? And just with one treatment.

SHAWN STEVENSON: Right. And this will be an endogenous insulin production, I would imagine like the receptor sites, all these...

DR. ADEEL KHAN: Exactly.

SHAWN STEVENSON: Your body's intelligence is going to take over.

DR. ADEEL KHAN: Exactly, and that's the thing, your body has this innate ability to heal and we're just putting the right signals and environment for it to do it. And Type 1 diabetes is definitely more complicated, 'cause Type 1 there's an autoimmune component to it, and then there's also the fact that you don't have those beta islet cells that produce insulin. The beta islet cells are in the pancreas that help to make insulin, and so those are gonna be a lower number and they get attacked by your own immune system. So for that, the first generation

stem cells will help, but they're not gonna cure it. So what's being done, there's a company called Vertex that published a trial this year about injecting beta islet cells.

DR. ADEEL KHAN: So you use that Yamanaka stem cell, you make a baby stem cell and then you differentiate it into a beta islet cell. So now you have these beta-islet cells and you transplant them via infusion into the pancreas, and now you have new beta islet producing insulin cells, and that can get patients actually into remission. But the problem with that specific cell line was that they were immunogenic, so people have to go on immunosuppressants. We're gonna be doing a similar trial later this year, but what we're gonna do is we're using the technology we have. You don't have to go on immunosuppressants, and then we're also gonna have an autoimmune protocol using fecal microbial transplant transplanting U gut bacteria and the peptides and by regulators to reboot the immune system so it doesn't attack itself in combination with the beta islet cells.

SHAWN STEVENSON: Alright, this is revolutionary in this context with Type 1 diabetes, but just to turn back a little bit with Type 2 diabetes, which the vast majority is, the onset of this is because of certain lifestyle factors, inputs into the body, lack of movement, these different things we know these are key components. And my question is, if we're coming in and utilizing these treatments, are we not interfering with the body's adaptation or signaling for behavior change, right? If we're not addressing what caused this issue in the first place, because basically some of these symptoms would manifest as the body is trying to inform us to stop eating those fucking twinkies.

DR. ADEEL KHAN: Well, yeah. If we transplant these new cells and you go back to twinkies, and you're probably just gonna destroy your body again, and so you have to have that behavior component to it, and that's the reality of it. I think the problem for me is that I've been studying this stuff forever, and I just... There's so many systems issues for people to sustain behavior change, meaning the environment, the food industry, the soil is depleted, like there's all these factors and plus now there's, socio-economic stress too, it's hard to live, it's expensive to live a healthy lifestyle too. And it's not always easy and accessible, so it's like, what's gonna have the most impact on society? I think in the long run is gonna be these interventions because they're gonna allow people to at least heal and then hopefully give them a chance to be able to maintain it afterwards. I just think there has to be so many changes at a regulatory and systems level for people to sustain behavior change, unfortunately. Because it's just like... It's not like our rates are going down, I feel like a lot of people know how to live a healthy lifestyle, but they can't maintain it, and it's a really difficult problem to solve.

DR. ADEEL KHAN: It's like, how do we get more people to maintain positive behavior change? I do think these therapies will help with that because there is data to suggest, for example,

like the microbiome, there's people who are less likely to work out and more obese have dysregulated dysbiosis, meaning they have an imbalance in bacteria and it can affect their behavior, so meaning, there's actually been study showing, for example, depending on type of gut bacteria you have, it may actually affect the response you get to exercise, so meaning you don't get that same dopamine rush and you don't feel good after exercise, so you don't want to stick to it because you don't feel good. And that has to do with your gut bacteria, so if we can change how your body responds to exercise with these therapies and you feel great, then hopefully they'll help with compliance.

SHAWN STEVENSON: This is fascinating. Alright, so I think it would be a prerequisite ... We're talking about changing our current system of health care. Alright, so yes, with the new technology, but also with having a more... And I don't like to use this word holistic because it's been...you know this.

DR. ADEEL KHAN: Yeah, that's what I say.

SHAWN STEVENSON: Yeah. And so, but more of a holistic approach, looking at all these factors saying, Hey, you know what, we've got this incredible treatment where you're not gonna require these constant insulin injections anymore, but you have to understand what caused this condition in the first place. And so we have to have these adjunct lifestyle changes in addition to this treatment, and so it's like really treating the whole person, the whole lifestyle, versus today, I'm just gonna... I can't really give an estimate, but I'm just gonna say like nine out of 10 times, the physician is not walking the patient through what caused Type 2 diabetes in your body, here are the lifestyle factors that you changed.

DR. ADEEL KHAN: It's because they don't know it.

SHAWN STEVENSON: It's because... And this is where I wanna ask you about this, how did you get into this field? At this level, because your back story is fascinating.

DR. ADEEL KHAN: It's just because I have ADHD and so it's also obviously I'd like to ask questions. I was always curious in medicine. So we study allopathic medicine, which is a traditional medical school training, but then during that time I studied Integrative and Functional Medicine, which I'm sure your audience is familiar with, 'cause you guys talk about that. But functional medicine, the whole idea behind it is, okay, can we actually figure out the underlying molecular mechanisms that are driving the disease, and the science of that has improved dramatically in the last 10 years. So I'm kind of calling it interventional functional medicine, where it's like we can actually intervene with these different cell and gene therapies and peptides and bioregulators and now microbes, and we can actually intervene

to a cellular level and understand exactly what we're doing to affect specific pathways to get your body to heal, so that specificity is improving so much.

DR. ADEEL KHAN: But unfortunately, the medical education system is still what's called system-based so you learn about the heart, you learn about the brain, you learn about the gut, but they're all connected. And what better way to demonstrate this to the world than aging, and that's why I think this huge investment of hundreds of billions of dollars going into aging research is gonna help humanity so much because aging is the most complex chronic disease, and if we can solve for that we can solve for so many other chronic diseases.

DR. ADEEL KHAN: And because aging... And we figured it out. It's 10 to 12 hallmarks, which I talked about earlier. We know what are the drivers of aging. This is a pretty good unified theory now. So now that we have that fundamental principles, we can intervene and create interventions to actually address those. They're still being worked on, obviously, but the point is, those molecular mechanisms, let's call them... I like to call them first principles or fundamental principles of biology. Just like in physics, they had first principles that governed different laws, like Newtonian mechanics, like Newton's three laws, right? And so once you have those laws, it gives you a basis on how to innovate and how to figure out how things work. And the problem is, doctors don't even know what those laws are, because we're not taught them, and it's not their fault.

DR. ADEEL KHAN: So we're taught just, okay, this is a problem at a surface level, and this is how you're gonna intervene from a drug or surgical solution. But they don't understand the molecular mechanisms because... And it's also like, I don't blame them. It is a lot of work, and it's a lot of science, and it's not as dry in a sense, if you know what I mean. It's like you have to go back to molecular basics, biochemistry and cellular pathways and all this other stuff, and that's not the most exciting stuff for a lot of physicians. They just wanna do what they wanna do.

SHAWN STEVENSON: So when you were in med school, you were already, so you had your workload there with your conventional training, but you were studying some things that were not a part of your curriculum, I would imagine.

DR. ADEEL KHAN: Yeah. No, they were definitely not. So I read a bunch of textbooks, so that were not anything to do with what we learned about.

SHAWN STEVENSON: And then, so how do we go from med school into practice? What was your pathway to again, working with the Burj Khalifa guy and Tony Robbins and all this stuff?

DR. ADEEL KHAN: I was lucky, because I think I just saw things a little bit differently, and I knew I didn't want to be a conventional doctor. I had to start out that way, 'cause there's no way you have to still pay the bills, right? So I still worked at Emerge. I still did the traditional stuff, and I had to, but I never... It wasn't like I was passionate about that stuff. But then, I was fortunate because when I worked with Dr. Galea, he was obviously kind of the pioneer of PRP and sports medicine. And so working with him, I saw, okay, this guy is obviously, and there's a reason, like why are... I was like, why are all these like high profile people coming to him if this stuff doesn't work? Let's just say it doesn't work, or it's quackery or whatever.

DR. ADEEL KHAN: Like these people whose lives depend on their bodies, like high professional multimillion dollar athletes are coming to him, there must be a reason. And that's how I got exposed to regenerative medicine. But regenerative medicine is so much more now, especially. It's like we were talking about its signaling and it's so many, it's more than just plasma injections, obviously. And so that's kind of, when I started going down that road, I kind of became very good at treating people with sports injuries. But then I was like, okay, what else can I do with regenerative medicine? And then that's how I got into cell therapy, and then cellular engineering and then gene therapy. And then also like manipulating the body using peptides and bioregulators, which are signals that will help with organ function. And so that's how, and now it's like I treat a lot of complex chronic diseases that fall out of the regular realm of what doctors can normally do, because we're looking at it from a fundamental principles approach.

DR. ADEEL KHAN: So meaning, 'cause a lot of people are like, oh, what kind of doctor are you? And I'm like, I don't even know how to explain it anymore. I just say I'm a cell and gene therapy specialist, because I don't, it's like, I'm an interventional pain sports doctor by training. But like, I treat people with PTSD and trauma by injecting their vagus nerve and rebooting their nervous system. I treat people with all these weird immune conditions and like long COVID and all sorts of stuff, because I'm looking at the body from a molecular mechanistic first principles approach. So it's very different. It's like, so it's hard to put me in a bucket of just saying, I'm like this type of doctor. And that's the whole system that eventually I think medical education, and there's a paper written by a great infectious disease doctor in like 2011, so it's not like new.

DR. ADEEL KHAN: He actually said like, we need to change our curriculum to be based off molecular mechanisms instead of system based. And that was like over 10 years ago, and no one listened to the man. So we're still, I don't see much change happening for a while, but I'm hoping to at least help with that movement. But it's gonna take, the only way I see that change happening is for us to become like an institution, which means we become like a large entity with a big biotech clinic based company where we're worth a lot of money. And then we can do endowments to universities and then we can change the system.

SHAWN STEVENSON: Oh, you just said it. I was gonna ask you about this, because you, in many ways, this is a battle because we have a certain structure and it's very lucrative and it's very integrated into our current system of education. You just mentioned endowments to universities. And these universities for example, they're not trying to lose out on this money, neither is right now our gross domestic product, like a huge portion of that is our healthcare system is kind of cropping up.

DR. ADEEL KHAN: And the tuition fee. And tuition, right? Tuition debt in the U.S. is crazy.

SHAWN STEVENSON: Right. Right. And so I shared this years ago, man. It was already like a $4.2 trillion healthcare system. And here in the United States, it is the, we invest more into healthcare seemingly, superficially than any other developed country. But we have some of the worst health outcomes. Like something's not matching up. And we've gotta be honest about this. I wanna ask you about this. When you are really, when you're bringing in some treatments that are highly effective that don't require this constant kind of revolving door of treatment, taking a drug over and over and over again, which is a cash cow for the pharmaceutical industry, we're talking about moving in on trillions of dollars of income for these entities. I would imagine they're not gonna be happy about this.

DR. ADEEL KHAN: No, I've been told by multiple people I should get a bodyguard. But I'm not there. I'm not there yet.

SHAWN STEVENSON: Your bodyguard that you brought today is she... Okay, okay. I'm gonna watch myself.

DR. ADEEL KHAN: She's more fierce than that.

SHAWN STEVENSON: It's true.

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: She'll beat you with fashion.

[laughter]

SHAWN STEVENSON: But that's just...

DR. ADEEL KHAN: But yeah, it's... And the analogy I always use is Tesla, because I was an early investor in Tesla, and so I saw firsthand how much mainstream media can create a narrative.

So Tesla started like IPO like in 2010, and then from 2015 to 2020, all the big Hedge fund managers, all the big, all the CNN, NBC, everyone was like, sell, sell. Tesla is going bankrupt. Like there's no chance. 'Cause why? Because they're disrupting an entire industry that was based around internal combustion engines, right? So these other manufacturers, and there's only really four of them, four of the big four types of... And it's like you're coming into their space that they've been around for like 100 years, and no one's ever succeeded before. So they're gonna do everything in their power to make sure you don't succeed.

DR. ADEEL KHAN: And Tesla was the most shorted stock in history. At one point, it was shorted 33%. Shorting just means like these hedge fund guys are betting that they're gonna go bankrupt and they're gonna make money when it goes bankrupt. And so that's why Tesla went something... There had something called a short squeeze. And that's what I was a beneficiary of that because these guys obviously, because they were shorting it so much and the opposite happened. Tesla did well, then these guys got burnt and then that's how the stock went, 10x in like a couple of months. But what I learned from that experience was that the media has a really powerful way to control the messaging, and what people believe and see. And you can't always believe and see everything you read, and that's just a fact. And I think it's, if I didn't see myself with Tesla, I'd be like, oh no, you're just a conspiracy theorist.

DR. ADEEL KHAN: But after seeing that, it's like, and then COVID was just, amplified that, right? By like, and then it's actually, I think COVID was good for society in a way, because it opened up a lot of people's eyes to be a little bit more distrusting of what their doctors say, of what the media says, and do your own, educate yourself a little bit, get different sources. Don't just trust me and you either necessarily. Do your research, like find multiple people and find multiple sources. I think the best way to educate yourself is to always try whatever view you think you know about something, challenge yourself by looking at the exact opposite, and then try to figure out, okay, what's, where's the truth?

SHAWN STEVENSON: Yeah. And this could be obviously a very profitable business model, but the current business model is set up in a certain way where there's this, I have mentioned this earlier, revolving door of patients and treatments largely ineffective. We just keep getting sicker and sicker, losing more and more function. It's not really matching up to good outcomes, right? But that's the way the system is right now. And so encroaching on that with something, again, that can be profitable if the system isn't set up for them to reap the benefits of what you're doing, that's a big part of the struggle. So I would imagine also, which happens a lot, you see a certain industry starting to take off, and then the kind of later adapters or adaptors start to jump on board, right? And you see the same thing happening with organic labeling. So at first there's some fringe people doing this weird thing saying, we're not spraying our foods with pesticides, herbicides, rodenticides, suicide, whatever. We're not putting that stuff on our food. And it's just like, it's this weird thing, and then

suddenly we see more and more people demanding it. The next thing you know, General Mills or whoever is just like, we have organic too.

DR. ADEEL KHAN: Yeah, exactly.

SHAWN STEVENSON: We're just trying to get in on a trend or something that's in high demand.

DR. ADEEL KHAN: Yeah. And Big Pharma isn't stupid, obviously. They're a massive entity and they are figuring this out and they're starting to get into cell and gene therapy manufacturing, but they are very far behind. And they're also trying to do it in a way, what they tried to do was sell psilocybin, which was like, they try to patent these things and then try to say like and make the price like a hundred times more and then try to corner the markets. So it's a very unethical way of operating. And the other thing is they're very reductionistic, which is that they're always trying to just find one way to treat the body, because that's patentable. But a protocol isn't necessarily a patented thing, right? And so the way we're gonna do our clinical trials is gonna be more protocol based, but then, we actually wanna get people better permanently.

DR. ADEEL KHAN: We're not just trying to keep them to coming back. And obviously, making pills is also a lot cheaper than making cells. So from a leverage perspective long term, it's obviously gonna be way more profitable for them to continue to push pills, and make it seem like this stuff is not really there yet, when in reality it's already, we're already treating so many people. And it's not just me. In Japan, in China, in Korea, in Dubai, these are all places where these things are legal and approved for over 10 years. In the US, it's still illegal to do culture expanded stem cells, which are the ones that are manufactured and grown. So anyone doing them in the states is obviously taking a risk, but they're also... But then you also have to question where they're getting it from. That's why I'm not a huge fan of the doctor. There's so many stem cell clinics in California, in Florida, but they're all not doing it the right way.

SHAWN STEVENSON: You actually posted something about kind of opting out of this, the system in Canada, and somebody reached out to you. Talk about that.

DR. ADEEL KHAN: Yeah, that was so interesting. So someone from, they work with this Contract Research Organization, CRO, and then they work closely with Health Canada and they're like, please don't leave basically. And so we're actually doing... So they helped us to get approval. So we're actually doing a phase two study for our fluvastatin gene therapy in Canada for Sarcopenia.

SHAWN STEVENSON: Amazing.

DR. ADEEL KHAN: So fluvastatin since now explained what it is, fluvastatin is a peptide that's been around for like 20, 30 years, especially in the body-building community because it inhibits myostatin, which is an enzyme that sets a limit on how much muscle you can put on. So people have probably seen those jack cows, like those really yolk cows. There's, because they have a myostatin deficiency, they have genetic mutation where they make no myostatin. So obviously, having less myostatin means more muscle.

DR. ADEEL KHAN: So it's not like, so there's always this interest in a fluvastatin for bodybuilders, but the problem was it has such a short half life, it only stays in your body for like 90 minutes. And so no one can really figure out okay, like who's gonna inject themselves like 10 times a day to be able to do that? I'm sure there's some crazy people, but for the most part, that's not a sustainable approach. So what our gene therapy vector does is it basically is a delivery mechanism to keep your fluvastatin levels high for about 18 to 24 months. And so that way, you have one injection, and your fluvastatin, it stays good for 18 to 24 months, and that helps to de-age your body. We've shown it in our... We did our phase one trial already. We had some patients who de-aged their body by like 10, 15 years based off intrinsic biological age reduction. And then they have more muscle, more energy, more strength. It makes it easier to put on muscle, and you just feel great. You just feel a sense of vitality. And it's been... And obviously, it's also gonna be, we're trying to get to be the first treatment in the world for Sarcopenia and then hopefully have insurance companies cover it eventually.

SHAWN STEVENSON: Oh man, this is amazing. Amazing. So I wanna circle back because a big part of the longevity equation for just the conventional mindset, and treatments that are available right now is hormone therapy. You've got some really cool things going on as far as testosterone is concerned. Let's talk about that.

DR. ADEEL KHAN: Yeah, yeah. So using that same delivery mechanism, we can create what's called luteinizing hormone gene therapy. So you do one injection, and luteinizing hormone is the signal to your body to help produce more testosterone. So you're not taking exogenous testosterone, you're just having this peptide vector. The vector is this plasmid, which is just a circular strand of DNA. And what it does is it just produces more of this luteinizing hormone, which will help your body to produce more testosterone. And the cool thing is with the LH gene therapy, you don't have to inject yourself with testosterone every week or take the cream. You just do one injection, and you're gonna be good for 18 to 24 months. So it's gonna disrupt obviously the traditional TRT and HRT kind of industry. So it's gonna be exciting to disrupt a lot of industries at once. [laughter]

SHAWN STEVENSON: I really wanted to have this conversation because a lot of people listening are very interested in and invested in taking care of their health. But I also wanted

to be known and for us to be aware that we are living in very different circumstances than the environment that we evolved in. And we need to have things at our disposal, accessibility to things to help us to adapt and to address this ever-changing very strange environment that our genes just aren't vibing with right now. And so utilizing science, utilizing innovations to help us is just a smart way to go because we're all living here in this glorified snow globe together, and we don't have off earth living as of now to our knowledge. Adam Sandler has a movie coming out. I don't know if you saw this, it's called Spaceman or something, where he is like living off planet in like a space pod and I think it's like over a 100 days, and he starts to have a friendship with an alien maybe, which he doesn't know if it's real or not. But I just got this from the preview. I'm saying all this to say that that reality isn't our reality right now. We're all here together and the very air that we're breathing is very, very different. We need to stack conditions in our favor to be more resilient.

DR. ADEEL KHAN: Exactly.

SHAWN STEVENSON: But what I really was connected with, with your work is helping us, giving us the opportunity to move our bodies, to train more, to be stronger, to be more resilient in a very practical way by even just to circle back, and this is my question I have for you in this conversation with testosterone. Obviously TRT is a very popular treatment right now, and taking endogenous hormones, whether it's hormone therapy for menopause or with testosterone, whatever the case might be, but giving your body, putting... The signaling in your body for your body to create it itself, and also doing this to where you don't have to keep on doing this treatment over and over again, that's so powerful.

DR. ADEEL KHAN: It is. And it's, you took the words out of my mouth, which is, I always say it's about resiliency. So what we're doing by transplant, I like to use the word transplant, because we're transplanting cells into your body. We're transplanting plasmid vectors into your body. We're transplanting gut microbes into your body. And all these different things by transplanting them, gives your body more resiliency to deal with the evolutionary mismatch that we have. As you said, there's a huge mismatch between our genes and our current environment. And that mismatch is only getting broader. What that... And that means we're gonna have more and more chronic diseases. As we can see, the rates just keep increasing. So what can we do from an interventional perspective that can say, okay, let's bring it closer together so that gap isn't as wide.

DR. ADEEL KHAN: And one of my favorite studies I read recently was about, there was this Olympic athlete who is from Taiwan and who happened to be a microbiologist as well. So she's like superwoman, right? And she was like a world champion weightlifter. And so they studied her microbiome and then they found this bacteria called OLPO one. And so like Olympic, they call it Olympic, something by fatal bacterium. And when they transplant that

microbe into other people, it actually improves their cardiovascular fitness. How crazy is that? So it's like, and so we're gonna make that product, where this is in our pipeline. We're doing FMT manufacturing. So our first one is just for longevity and anti-aging, but our second generation will be more specific.

DR. ADEEL KHAN: So we're doing, we have our own manufacturing plan for that. But basically, imagine you can take just a microbe that's gonna make your body more resilient, because you're gonna be healthier and fitter. And that's what these cell and gene therapies and all these different things are designed to do. As we said before the show is, it's kind of this medicine 4.0 concept, which is using cell and gene therapy and manipulating your body, so you can do healthier things longer like training and eating well and all that stuff. Because eventually, aging catches up to you. So it's like, how can we extend that curve so that you can have more good years?

SHAWN STEVENSON: Yeah. And there's a huge industry right now obviously for superficial treatments for looking younger, right?

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: So obviously plastic surgery is huge right now, but just let's talk a little bit about another super popular treatment that people have done. Botox, right? So something like Botox, again, this is a superficial treatment of something that you could possibly do. And I wanna ask you about this with some of the protocols that you have.

DR. ADEEL KHAN: Yeah, exactly. You can combine them if you want the more immediate effect of your wrinkles, looking less for sure you can do Botox. But let's come back to molecular mechanisms. Why is your skin aging in the first place? You lose elastin, you lose collagen. There's oxidative stress. There's inflammation. The mitochondrial dysfunction. It's the same underlying mechanisms as to why the skin starts to lose its elasticity and why it starts to lose its volume. A lot of it. And that's atrophy as well. Fat loss and muscle loss and whatnot. And so if you look at it from a cellular level that's like, how do we restore functioning of the skin? Guess what? You can do that with cell therapy. And engineered cell therapy. Especially now because, so we have, we have what's called an engineered exosome product. It comes from a skin biopsy and then we use that for the face because that exosome, 'cause it stimulates fibroblasts, which stimulate collagen production.

DR. ADEEL KHAN: And then we can combine. And then exosomes are also very anti-inflammatory and help with oxidative stress. So they're targeting all these different mechanisms. And then if you want, you can do it with Botox at the same time, if you want something more immediate. 'Cause that's slowing down the skin aging process, but it's also

gonna give you a more natural look. And the other thing is this technology is only becoming better. Like we're gonna be able to, like there's companies working on engineering cells specifically for the face to fight the aging process in the face. So I think for skin health and skin vitality, this is gonna be a long-term solution. And we do something called the stem cell facial, which is using these 30 million stem cells or so in combination with these skin fibroblasts cells, the exosomes, and then we inject them into the face and it lasts for like three years or so. So you don't have to get them done all the time. And this is something I learned in Switzerland and Japan. The plastic surgeons I worked with over there, they've been doing this for like a decade. So it's like, and they're plastic surgeons, so I'm like, if they're plastic... They're not doing facelifts on everyone. They're doing this. So why is that? It's because people want, don't, like, it is an actual way to make your skin healthier. And I think it just looks better anyway, but.

SHAWN STEVENSON: Alright, let's, that part, let's talk about some of the truth about Botox. Like what is it actually doing?

DR. ADEEL KHAN: Yeah, it's paralyzing... It's just basically a toxin. And that's basically stopping a signal for your muscles to contract. So it's paralyzing them. But what does that do over time? It atrophies the muscle. So what happens when the muscle atrophies, then you lose that volume. So you're actually gonna look worse.

SHAWN STEVENSON: And you gotta keep doing more and more and more.

DR. ADEEL KHAN: This is a, it's a cult. It's like once you're in it, you're in it for life. And if you get out, then you see the effects of it very drastically. So I think for young women especially, a lot of them are considering Botox. Like I would really consider this approach the cellular medicine approach. But the problem again is there's like, to do it the right way, which is the way I learned it in those countries, is you can't do that in the US because you can't do those culture expanded stem cells in the US. So the dosing is important, 'cause if you don't... A lot of people in the states who do stem cells, they're using, when you take just the stem cell from your own body or you're just using, call it non expanded stem cells that are not grown, you're getting maybe 500,000 to a million stem cells.

DR. ADEEL KHAN: So the dose isn't there. So we use like 30 million for the face. For IV we use like 200 million or 100 million. So the dose is very important. 'Cause a lot of people will be like, oh, I had stem cells at this clinic in Florida and it didn't work. I'm like, ah, you didn't have stem cells, those are technically called committed progenitor cells. So it is a very technical term, but basically they're more, they're not actually true stem cells, meaning they don't have that ability to really repair tissue the same way.

SHAWN STEVENSON: You gotta talk more about that because this is the difference. When people, for example, believe that they're getting regenerative medicine treatment, there's really a huge difference.

DR. ADEEL KHAN: There is because it, committed progenitor cell just means progenitor means it's not fully differentiated, but committed means it can only go down to certain cell lines. So they're not... They can only turn into like when you take your fat or bone marrow, which is what's allowed in the US and that's the type of stem cell, but it's not really a stem cell because it's mixed in with so many other things. And you need to isolate the mesenchymal stem cell from the bone marrow or the fat, and then you need to grow it for three to four weeks in a lab. Then you can inject it or infuse it. And that's a true stem cell product. So that's illegal in the U.S. still. And so why it's illegal is, you know, beyond me, but FDA's, FDA, and I wouldn't be so skeptical until I traveled and I worked in places like Japan and Dubai and all these other places where they've been doing it forever. And those are legitimate countries, you know what I mean? They're not like Columbia or Panama, no offense to those countries, but like they're not the most technologically and innovative countries. Japan's a very high technological, innovative country and they actually have some of the best medicine in the world in terms of actual, technological advances in surgeries and stuff like that.

SHAWN STEVENSON: And their lifespan is longer than ours. Rates of chronic disease are significantly lower.

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: So something's working.

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: I wanna ask you about this because a big part, we started this off talking about muscle and that is a huge component of longevity and of course maintaining function, being able to do the things that we wanna do, but also being a reservoir for hormones that help to keep us youthful and energetic and strong. And also, as you mentioned, the immune system component to that. Now it's one thing to utilize treatments to build and maintain healthy muscle mass to keep us younger, but what about everything else? What about, you got somebody who's just absolutely jacked and energetic, but they can't remember where they are. You know what I mean? Because of the brain and the nervous system not coming along for the ride. So how does that integration happen? How do we keep our brain and nervous system young as well?

DR. ADEEL KHAN: Yeah. The best... I think there are different interventions to DH the brain as well now, like intravenous exosomes. So exosomes, when you grow stem cells, I always say the chicken, it's like chicken soup. The chicken, the meat part is the stem cells and the soup is a broth. And that broth is, sorry, the broth is basically the exosomes. So the exosomes have all the nutrients in there, the cytokines, and they cross the blood brain barrier. And I've actually had an NFL athlete who I think you might know, John Welborn.

SHAWN STEVENSON: Yeah.

DR. ADEEL KHAN: He's friends with Rob and yeah, so John Welborn. So he had MRIs done in 2011 and he had a brain damage from football, right from chronic traumatic encephalopathy type of stuff, where there's actual 'cause of repetitive head traumas. And then after doing a couple intravenous exosome treatments, he also did hyperbaric oxygen and a few other things. But he found out that the exosomes was the thing that made the most difference. Like he cognitively and mentally he actually felt so much better and had no symptoms. And then he did an MRI like 10 years later and his brain was back to normal. Like he didn't have the damage anymore.

SHAWN STEVENSON: Amazing.

DR. ADEEL KHAN: So like how crazy is that? Yeah, exactly. That's what I was like, I just like, and when you see those actual changes, you're just like, wow, this should be more accessible because obviously we're using it for dementia, we're using it for different type of neurodegenerative conditions. I have a Neurointerventional radiologist on my team and he actually injects the stem cells directly into the brain. And it's just like, it can be life changing for people. And this is just a first generation stem cells, the second generation where we differentiate them into neural progenitor cells or into actual specific cell lines that can regrow new neurons. It's just like they did in that study for Parkinson's. So that's where we're headed.

SHAWN STEVENSON: Alright, now I'm gonna ask you the big question. Alright. Now all of these are big questions but one of the biggest fallacies that has taken place in recent human history when it comes to our health and medicine is this strange separation of our mind and body. It's just very, it's remarkable to me how strange it is. And recently as of this recording, you know, the last person actually sit in this chair before you, she's really considered the mother of mindfulness. She's been at Harvard as a psychologist, the first woman to receive tenure in psychology department. I think she's been there for 40 years, something like that. And all of these studies just affirming how much our mind influences our health outcomes. Yeah. How our thoughts, you know, every thought that we think is altering our chemistry. And so I'm saying all this to say, what about this intersection with our minds and being able to appropriately process our environment. What I'm trying to ask you is we have all these

different environmental inputs, and our bodies are making adaptations based on our perception of these things. With these treatments, are they going to be interfering with our body's innate intelligence to help us to adapt?

DR. ADEEL KHAN: No. They actually helped to kind of re... They only work where they needed. That's the cool thing about, and I'm sure you know about peptides, that's kind of how... So peptide, the first peptide isolated and synthesized, was like insulin like a 100 years ago, right? And it's a signal to your body to lower blood sugar. But now we have peptides that can help with brain health that can help with concentration, talking about like Ozempic that helps with weight loss, right? And so these signals kind of work where they're needed to. So it's more modulating as opposed to like a drug which is forcing something. That's a big difference. And we see that clinically. So one of the treatments we do for helping with mind body connection is a vagus nerve treatment. So what we do is we inject exosomes and peptides into the vagus nerve and then we do what's called a Stellate ganglion block into the sympathetic ganglion, which innervates your sympathetic nervous system.

DR. ADEEL KHAN: And a lot of people are in this hyper aroused state where it's obviously if you have PTSD or trauma or unresolved emotional trauma, which is very common, but even just in modern day environment with everything that's going on, a lot of people hold all this anxiety and stress and it sits in that nervous system. And so people can't build that mind-body connection because they're disconnected from their body, they don't have it. It's like you can tell them to meditate all day, but if you have this nervous system dysfunction, it's not gonna do anything for you. So how do you rewire your body so you get the most benefit from those inputs? And that's what these interventions allow to do that. One of the patients I had recently was a perfect example. He's a special forces operative and he had really severe PTSD and he tried all the conventional stuff including mindfulness, every therapy and so many different pharmaceuticals.

DR. ADEEL KHAN: But just after the treatment, it calmed down his nervous system to a point where he started crying after the procedure. 'Cause he was just like, I haven't felt relief in years. And it was just unbelievable. And now he's not suicidal anymore. He's back to playing hockey. He's with his kids. Like he's just happy and like living life now. But now he can do the therapy and the meditation, but some people state is so hyper aroused that they can't benefit from meditation. So that's where these interventions can be really powerful.

SHAWN STEVENSON: Amazing. Amazing. Now with all this being said, obviously, you know, you've been at the forefront of so many aspects of regenerative medicine, really for many of us, redefining what that is and tuning us into something that's just mind blowing. But where is the place for our mind as a human being within this? And is there still a role here for us

training, not just through interventions, but training our mindset to be compatible with these treatments and not taking the mind out like conventional medicine has.

DR. ADEEL KHAN: Of course, chronic pain, which is a huge part of my practice, is to a certain degree, a mind-body connection. And I've seen this when I had a patient where I did that vagus nerve injection and then his chronic pain in his knee that he had for like 20 years went away. And I was like, how's that even possible? It almost makes you question everything. Like I was just like, I couldn't understand it. And then, so obviously I started reading and there's this communication between the nervous system and the immune system. So what you were saying is that if your mind and your thoughts are disconnected and you're not having the right signals being sent, 'cause thoughts are signals, food is information, everything is information to your body. And so if you're not sending the right signals to your body, you're obviously communicating with your immune system and then you're starting that chronic inflammatory process that we keep talking about and how that leads to this dysregulation.

DR. ADEEL KHAN: So if you can do these interventions, not only to build resiliency, but what you can do is you can enhance that mind body connection, which allows for more healing, but getting your body ready for these procedures, so to speak, is also a part of it. Meaning that your body is gonna respond as well as the kind of the body is set up for success. So I always say, 'cause a lot of people do these therapies, but they're not doing anything to prepare their body for it either. So if your body is in a state of ready to kind of heal, let's say, I think that success is gonna be better. I know it sounds a lot of voodoo e but I've seen it. And if people believe a treatment isn't gonna work, it's less likely to work. And that's called a nocebo effect. People have heard of a placebo effect, but there is something called nocebo effect, which has been studied.

SHAWN STEVENSON: Yeah. Oh, right. I love this. Okay, now with all this being said, I wanna talk about some of the concerns I wanna talk about, number one, this can be transformative. As you know, pain is a huge motivator in our lives. A lot of times just to get out of pain will do just about anything. And so having something that's effective and viable to help people who are struggling so much in their lives, because pain can just be that big interrupted force with you just doing things that you wanna do in your life and making the most of this opportunity being a human. What about accessibility for people right now? Because obviously we could stack conditions in our favor with certain lifestyle practices, but again, something like chronic pain and not really being able to cut it with conventional treatments, it's not working for folks. Is this going to be reserved right now for people who have accessibility to it? Because there's those barriers of finances, there's those barriers of connections. Like a lot of this isn't even approved to be done here in the United States. Let's talk about that.

DR. ADEEL KHAN: Yeah. And that's why this is a long-term vision is basically we build off, build enough data and we show the work. And there's a community of scientists. It's not like I'm the only one doing it. Obviously there's so many people around the world doing amazing work. And I think as we come together and show to the regulatory bodies and to the insurance companies that, hey, this is actually gonna save you money, [laughter] just take a knee pain example. Like if you do stem cells for the knee and it works, you've saved thousands of dollars in surgery and the rehab and everything that comes from a knee replacement, right? And so you're actually saving the system a bunch of money. So to me it almost doesn't make sense why this stuff isn't more accessible or isn't covered. Like in Japan, there are many stem cell procedures that are covered by insurance companies.

DR. ADEEL KHAN: So super accessible over there. But right now you're right. It's fairly inaccessible. You have to travel out of country, you have to, obviously it's not covered by insurance. And then you also have to, you also, you kind of, there's also predatory people out there, right? Because of medical tourism, unfortunately there's not much oversight in like Mexico or Colombia and all these other countries where people are doing it. And so you have a lot of doctors who are just taking advantage of vulnerable patients because when you're in chronic pain and/or you have this chronic illness and you've tried everything, you're desperate for help. And you, if people are like, oh, stem cells will fix you, it's not that easy. Like someone's people aren't always candidates and you have to really individualize it and you have to look at them and you have to assess them and be honest with them.

DR. ADEEL KHAN: And that's... I think that's something, being a Canadian physician is a little bit different. I think we're just taught to always just not think about the money aspect of things and just focus on like how do we help our patients? And so to that end, we recently treated a bunch of military patients because we got a donation from a stem cell company to be able to treat them. And we are starting a foundation and a charity to help cover the cost for people. But that's obviously gonna take time. And these things I think over time are just like any technological innovation are gonna become cheaper, right? You remember, I always, I love the example of plasma TVs in like 2003. They were super expensive, like $50,000 for a TV and now you can get them for like 500 bucks. And so selling gene therapy is gonna be the same. The manufacturing process, the accessibility, all that stuff is gonna improve over the next decade.

SHAWN STEVENSON: Alright. Let's talk about gene editing because as soon as I hear that, I start thinking about designer babies. I start thinking about being able to basically have a menu and pick what you want for yourself but also for offspring. And then getting to a place where we're like, this is the dominant race or dominant way a human should be or whatever the case might. We already have little examples of this where there's a certain body type that

people are manipulating their body to have that. And doing some of these sketchy surgeries, for example. So let's talk about that a little bit.

DR. ADEEL KHAN: Yeah, I mean, just so people understand, our gene therapy is not gene editing your body. All it's doing is having a plasmid that's producing this peptide. So ours is really cool that way because it's very safe. There's no offsite targets and we're not changing your genome. But there's CRISPR which has been around for a long time now. CRISPR is kind of like the world's premier gene editing technology. And to your point, this is what happened in China and that doctor actually got arrested. But I'm pretty sure they just did that as a, so basically he...

SHAWN STEVENSON: For optics.

DR. ADEEL KHAN: For optics, exactly. Yeah, because I'm pretty sure they're doing this in China, they're already doing this because he gene edited embryos and he gene edited embryos for saying that it was for helping them with the medical condition. But everyone, the medical condition wasn't really like, it wasn't actually true. And so that's why they, he went to jail and stuff. But the reality is the technology is out there. And if he's doing it, what's stopping other doctors or scientists or people who are willing to pay and like to do that stuff. And especially in other parts of the world where they may not have the same regulatory or ethical frameworks that we have. And so it does open this whole concept of designer babies and gene editing embryos and being able to customize them to have certain traits like increasing intelligence or height or make them an athlete or this type of stuff.

SHAWN STEVENSON: Chinese, LeBron James.

[laughter]

DR. ADEEL KHAN: It's not, I mean it's technically, it's technically a possibility, but it's more about, no one's gonna allow that, like, at least in the open public eye, say we're gene editing embryos because there's just so much ethical issues that have to be considered. And I hope if it will most likely happen in our lifetimes, but the key is how do we create a framework to regulate it properly. I think that's the key to it. It's just kind of like with this big not big tech stuff, right? We didn't realize how much harm these phones have on our bodies and for kids and all this stuff, but there's no regulation created around it. But now I think we know we probably shouldn't be giving them to children at a young age. But it's like this stuff. And so with any new technology, I think you have to think about, okay, what's this gonna look like in 20, 30 years down the road? And how do we prevent from the bad players in the space from taking advantage of it?

SHAWN STEVENSON: Yeah. Yeah. So one other concern that I've got a few more, but one other kind of concern that might come to people's minds is regarding the stem cells themselves, right? So the accessibility viability of the highest quality. And I'm getting images not now, but previous to this conversation also just, I've been studying this for a little while, but I would get images of like the matrix and like all these babies jacked into this and they're getting farmed for resources, right?

DR. ADEEL KHAN: Yeah.

SHAWN STEVENSON: So can you talk about this, because you mentioned the embryonic stem cells earlier, and there was a lot of controversy over that, but where are we really at? Are we gonna require a bunch of babies jacked into the matrix for this?

DR. ADEEL KHAN: No, I think that's the problem with, especially in less developed countries, like in India, they recently made umbilical cord stem cells highly regulated to the point where they're essentially banned now. And the reason is because there's people taking advantage of like those, the farms essentially where it's just like, 'cause people are, a lot of them are desperate for money and then they'll just have the babies just for getting the tissue and donate and making some money off of it. So the way we do it, which I think is the most ethical way, is that after c-section birth, where it's gonna be thrown out anyway, you have the option to throw it out or you have the option to donate it. And so that's kind of the way we do it. And that's how we collect them. And then there's obviously processes on donor selection and testing.

DR. ADEEL KHAN: There's a lot of nuance that goes into making sure these cells are safe, because you're right, you're putting cells into your body and you wanna make sure they're not gonna cause any harm. And cells can cause harm if they're not grown properly. The most common issue that happens in these other places, in especially in Colombia and Panama, these other places that are doing stem cells, is that they do too many passages, which is how many times you change the cell culture flask. And it's called replicative stress. So if you basically you grow the stem cells too much, you replicate them too many times, then you allow them do like six passages, 8, 10, and essentially it decreases the cell viability and then the cells can actually become senescent. And then that causes more issues 'cause they become inflamed.

DR. ADEEL KHAN: Then they become senescent cells that cause inflammation. And so, and then your immune system has to deal with that and clear it up. So, our cells, we minimize the passages to three. And that's something I learned in Asia from the Japanese scientists doing it for a long time. And then also the culture medium, how you grow them. And there's all these details. So I've done a lot of research and detail, like working with scientists from around the

world to kind of figure out at least for now, what's the best way to manufacture them. And this is for, there is a, that's the biggest nuance though, is we have something called early passage stem cells. And then we also, the other thing to remember is these cells are not integrating with your DNA, they're actually, they're sending... They stay there. They then send signals to your body's own stem cells to start healing and regeneration.

DR. ADEEL KHAN: So there might be a little bit of engraftment, meaning some of them might stick around but they're not, like, it's not like you're gonna become that person. You're not gonna have that person's DNA in your body type of thing. 'Cause a lot of people think that. And so that's, it's not, they're actually... There's been animal studies done where it shows most of the stem cells are cleared up within four weeks, but then they're sending signals and the signals that they send are, that's why it can have long-term or permanent results.

SHAWN STEVENSON: It's fascinating. Alright. One of the things that I really admire about your work is that you have a lot of tools in your toolkit. And I would imagine that this is gonna be personalized, right? It's based on the needs of the person and their goals versus again, just, and this is one of the things we get caught up in, in conventional treatments, which is this kind of standard of care. Like this is just and so I love that so much. And now the question is how do people get access to you? How do they get more information? How do they get access? You've got an event coming up as a matter of fact that people can attend.

DR. ADEEL KHAN: Yeah. Austin, Texas, we got Dave Asprey, Ben Greenfield, Tom Bilyeu. We got a pretty cool lineup of like influencer type guys. But then we got some amazing scientists like the inventor of the mini Circler technology, Walter Patterson and Mac Davis. They're the other founders of the mini circle company that I work with. And they're brilliant people. So, and then we have Andy O'Brien, who's the top trainer in North America, and I don't say that lightly. His first client was Sidney Crosby, who's the top NHL player, but at one point he was working with the top five athletes in North America. So he's worked with Steph Curry, Tom Brady, and a lot of like top guys. So he's an amazing trainer and he's gonna be talking about fitness and longevity. So it's a very unique lineup that I think people will really enjoy.

DR. ADEEL KHAN: And to your point, I have such a broad tool set because I saw all these people in the system not getting better. And so for me it was always about trying to alleviate suffering and trying to help these patients. 'Cause I'm, like I said, I was a sports doctor by training, but then how did I get into all this other stuff? It was honestly just a desire to wanna help people who weren't getting help. And I was like, how do I help this person? And I just kind of kept reading and learning from different people.

SHAWN STEVENSON: Amazing. Amazing. So where can people get just into your world a little bit more?

DR. ADEEL KHAN: Well our website is eternal.health, so our company's called Eternal. And then my Instagram @dr.akhan. I am super inaccessible at the moment, but I do have a team of doctors who are amazing, who've been trained by me, and they're wonderful and they can help take care of lots of patients.

SHAWN STEVENSON: Amazing. And also where can people get information about this event if they wanna come and hang out?

DR. ADEEL KHAN: Yeah. On our website, eternal.health. And there's an event page there, there's still some tickets left. And hopefully people who are interested in this space can make it out there to Austin. It'll be a fun time. And it'll be a cool audience too. Like we got Joe McDonald, Kristof and some cool people who are in space. Gabrielle I think will be there too. And so it'll be a fun networking event too.

SHAWN STEVENSON: Awesome. So as of this recording and this publication folks, you still got a couple of weeks to get tickets if there's any left, so definitely pop over to the website and many of the people you mentioned are good friends and yeah, it's gonna be a good time. And I just wanna thank you so much for having the audacity and the strength, the perseverance, the self-exploration just being really dedicated to learning and to serving, because that's what it really boils down to at the end of the day. And it's also really cool that you have the ability to articulate these things and share it with people because a lot of times that's another big problem with our current system is that there's so many fascinating discoveries that are happening that the general public people who can actually use it in their lives, it might take 10 years, 20 even in the age of the internet for people to become aware of these things.

DR. ADEEL KHAN: Yeah, it's called a clinical translation gap. It's about 15 to 20 years.

SHAWN STEVENSON: Ridiculous.

DR. ADEEL KHAN: So I'm trying to make that obviously, and that's part of the reason there's amazing scientists doing amazing work, but they can't always communicate or get it out there. So I feel like that's part of my mission now.

SHAWN STEVENSON: Awesome. Well thank you so much for sharing your wisdom with all of us. This has been awesome, man. Thank you.

DR. ADEEL KHAN: Yeah, thanks for having me.

SHAWN STEVENSON: Dr. Adeel Khan, everybody, thank you so much for tuning into this episode. I hope that you got a lot of value out of this. This is wanna share out with your friends and family. You could share this on social media, of course. Tag me, I'm @Shawnmodel and also tag Dr. Khan. I'm sure that he will be pumped to see your insights and just to see this information getting out to more people. And also, of course, you could send this directly from the podcast app that you're listening on. And keep in mind that this is, again, I said this in the very beginning, that this isn't just the future, the future is now and being aware of these innovations, but also let's not remove the fact. And also he reiterated this, this is not moving away from the things that are required to be a healthy human.

SHAWN STEVENSON: Making sure that we're being mindful about what we're putting into our bodies, about our movement practices, our sleep hygiene and all those things. But what do we do to sustain those things? What do we do when problems arise? What do we do when we're experiencing and living with chronic pain? There are some real solutions that are available right now that are outside of the common bounds. We're talking about conventional medicine that is largely ineffective for dealing with chronic pain, for helping people with chronic conditions and also for helping to heal injuries as well. There are so many more effective things that are emerging right now, and I want you to be aware of this so that you have this knowledge in your superhero utility belt, should you feel the need to utilize them and/or utilize them for somebody that you care about.

SHAWN STEVENSON: And this is what's so special about this show and about this platform, is that we get to get this information out to people oftentimes years. And if you go back, check my track record, alright, go back years stuff that I was talking about in year one of the Model Health show are now common knowledge and common practice in the domain of health and wellness. So this is another one of those things. Another one of those moments where you heard it here first or very early in this process, and you are ahead of the curve when it comes to this knowledge. And also being aware that the accessibility to these things should you need them, or should you choose, is going to become more and more easy for folks. But right now we're in that phase where the data's just getting out to people and there are people that are already taking advantage of these things, but tend to be high profile celebrities and athletes and things like that.

SHAWN STEVENSON: But we don't have to wait to learn to get educated and also to start to stack conditions in our favor so that we can, number one, be as healthy and resilient as possible, but also know that there are solutions that are available should we need them. And again, I thank you so much for tuning into this episode. We got some incredible masterclasses and world, world-class guests coming your way very, very soon. So make sure to stay tuned. Take care, have an amazing day and I'll talk with you soon.

SHAWN STEVENSON: And for more after the show, make sure to head over to the modelhealthshow.com. That's where you can find all of the show notes. You can find transcriptions, videos for each episode. And if you've got a comment, you can leave me a comment there as well. And please make sure to head over to iTunes and leave us a rating to let everybody know that the show is awesome. And I appreciate that so much and take care, I promise, to keep giving you more powerful, empowering, great content to help you transform your life. Thanks for tuning in.