Are Stem Cells the Future of Healing? Uncovering the Science and Ethics Transcript

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Introduction to Stem Cell Consulting

What's the optimal solution for stem cells, you think? So right now with a lot of, companies are doing in academic centers, is platelet lysate. You know, it all comes from human blood and typically the platelets.

It's packed with nutrients and growth factors, just like the fetal bovine serum. And it's considered a good alternative to fetal bovine serum. I mean, it's human based.

You don't have to, you know, you know, any type of xeno issues. The only catch is it's more expensive and it requires extra steps to prepare. But it is actually seen as more ethical choice.

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Get ready to unlock the secrets of lifelong health and vitality. This is Doctor Talks, real talk from real doctors on the issues that matter to you most.

All right. Welcome to another episode of Recharged Biomedical Podcast. And I'm your host, Doctor Edward Park. Today we're very lucky to be joined by Darcy to feed.

And did I pronounce it wrong? Yes. Pretty. Pretty close. Okay, well, Darcy is, a wonderful experience person, and we'll get into that. We met when we were both lecturing in Cancun, Mexico, about two months ago.

It was a great time. And she gave two brilliant lectures about stem cell, her experience building stem cell labs for people who went on to be successful and not successful, but a lot of folks in the space, you know, they don't know what they don't know.

Right? That's the Yogi Berra ism. So in life, you have your beliefs and then you have your experience and your wisdom and wisdom comes unfortunately, with making mistakes.

So Darcy will come in and be the cleanup crew. I should tell you all this is where you screw it up on the line. But better to hire from beginning. And she does consulting, as she did to build a facility in Morocco so that you can set up the protocols, get the right equipment to train the staff appropriately.

So it's amazing. And you would think that with all this information, she would be doing it on her own, but she specializes in helping other people. But in addition, she has another hat at being a clinical researcher.

She ran the Stem cell, division at the University of Miami. And then she's been involved in more than 16 clinical trials, helping to run them. And she also, trains and helps, nursing students and other people in trials.

So she does a lot of different things at a high executive function. So, Darcy, thank you for joining us. And, tell us about how you got started in stem cells.

Well, thank you for inviting me.

Darcy's Stem Cell Career Path

I'm so pleased to be a part of your wonderful podcast. So I first got my start in stem cells back in 2005. I started at the University of Miami. I was there since 1997, and then I went into cardiology.

But prior to that, I was in urology, I was in genetics, and then I went into cardiology because cardiology was the one area of disease that there was hope in my mind because you could always get a heart transplant.

So with that philosophy, we also started at that time stem cells, and we were giving stem cells via IV to patients. I had had myocardial infarction within the first 24 hours.

It was a funded study and several sites throughout the US. And that's how I basically got my my passion for it. My first question when I started working there was I will only work with adult stem cells.

I'm not going on the embryonic. And they're like, no, no, no, we only do adult. So I was like, okay, we're good to go. This is a great and and from there, you know, in building out the, interdisciplinary Stem Cell Institute, I was the director of the institute.

I ran all the clinical trials. We would get all of the, the FDA investigational new drug application. We went from the heart. We started looking into, Crohn's disease, with fistulas.

And then it took us to orthopedics. It took us to psychiatry. We started delving into spine issues. So once we started in the Stem Cell Institute, everybody was, you know, tapping into this and we said, okay, we need to include all disease groups.

So from stroke. And then finally we just said let's do one for aging frailty. And that was I would say our home run from there. One of the there was a spin out company from the university that started, I actually started the whole entire medical tourism program for them in the Bahamas.

And with that, I mean, that just set the stage for where, physician scientists can actually start in an academic setting and spin out their own biotech companies and become IPO, etc., etc..

So so it just opened up the whole new possibility worldwide for a bunch of really amazing for scientific. And so it's amazing. And that's the thing I, I got there immediately.

It's like you don't have an MD and you're in N, but you know, the actual level of practical experience from the deep, granular level of what words to use in your manuals up into this strategic FDA planning and approval and site inspection.

You have put in the work to get that information, and you've helped along the way. A lot of people in this space that have successful businesses, some don't.

But you're the gal they go to when they need to actually build a lab and grow out. Right? Because there's a lot of people in this space who are making money.

And one of them we know and Matt, who, well, most of them actually. Who white label. So tell people what that is, because a lot of people who are selling exosomes, they don't have control.

And it's all about control, isn't it? Over their manufacturing process. Right. I mean, so a lot of companies will will choose to just do the lab, you know, the white labeling from a lab.

So that also takes a lot of investigation. So you have to, you know, kind of pick and choose which labs and look at their their quality programs and see if they actually have any FDA and see what kind of regulations, what kind of Https, or if it's a 361 or 351 and just see what kind of compliance program they have and, you know, you've underwrite them and then you finally say, okay, you know, we'll make a deal.

Will white label this product and, and take it to another level that way? And it's just making sure, you know, one of the most important things that I always caution everyone is the label.

Label is extremely important to make sure that, yeah, I can make a supplement to. And we had that very, tension filled dinner with our colleague who got an FDA letter.

Yeah. And so, you know, at the end of the day, on the one hand, is kind of a fig leaf. Well, I don't know how they make it, but then again, if it's your product, shouldn't you know how you make it?

So there's no one path where you're risk free, is there? No, actually there isn't. And that goes with anything. I mean, as a physician, you would know there's no you're not risk free.

And even being a physician with a patient, you know, the same consents there. You know, there's always risks and everything is just how we mitigate them.

That's the one thing that's also important to note. I'm going to just put this out there for whatever nurses are listening. If they're listening, you know, I am a nurse.

So as a nurse, they're the possibilities. And the realm is just wide open to really do anything that you want to do within your nursing scope, outside of your nursing scope.

Don't think that being a nurse, your bedside, you're not. I went from bedside to making product to building GMP's to, you know, going and training physicians and nursing staff on cellular therapy.

So that's. Yeah, you essentially, you're the leadership succession chair for the Beta Tao chapter of Sigma Theta Tao International Honors Nursing. But again, let's talk let's have some fun with that because, you know, training an ObGyn and delivering a baby specialty labor and delivery nurses are special.

Great. They're like I see nurses, ICU nurses, they like taking charge.

White Labeling and Manufacturing Control

And they have a lot of autonomy, a lot of great judgment. And so there is always that tension with the doctor who is ultimately going to have his name on the chart and the nurse. Right.

But I remember they used to really write us freshman year, like they would make a point of like the first year as an intern. They would call you Mr. Park, you know, and they just give you a hard time because they knew eventually it was coming back.

But even talk about the gender differences, because I know a lot of female physicians coming up and we'd have problems with the female nurses sometimes.

Know what I mean? I know that they have different roles, and doctors excel in sort of the rare disease critical management, but they don't know everything.

I mean, it was very humbling last week to be, out diagnosed diagnostician by an eye. This guy said he had, multiple myeloma and only that like third year e. R.

Guy figured it out. Everyone else was on their own. You know, confirmation bias, blinders, siloed thinking so doctors can make huge mistakes. And I think for the lay consumer, why is it so dangerous to admit a hospital?

Well, first of all, you got the intake physician or team and they might not get a good history like I had a patient in Miami or it was somewhere around there.

And he I think someone forgot to write that he was diabetic. So the family member called me and said, I'm going to

sue the nurse and the hospital because his glucose is 400.

I'm like, well, that's probably why he's delirious. He's in ketoacidosis. But it's like not only they're failures in the system that can kill you from just not knowing what meds you're on or what disease you have, but you know it.

You know, these Sentinel reports rarely get file, and someone screws up and they put like 500 instead of 50 of something like potassium. I mean, there's thankfully the pharmacists say both our butts, but you've seen it all the time, right?

Like there are a lot of points of failure within the system. I mean, talk about that. Like, first of all, do you think that female nurses are harder because there's male nurses too?

Are they harder on the female nurses or is just interpersonal stuff? And then how can people avoid these medical mistakes when they're hospitalized? Well, I mean, I would take it from everywhere in the field, right?

Even in the scientific field, females have it very difficult. You're still in, believe it or not, we're still in a man's world. You know, the pay. The pay scales are very different, right? And, discovering your own science.

I mean, how many women have to actually go into legal battles for IP and trademarks with the physicians or academics that they worked with? There's always that, you know, there's some level of of difference within the gender gap, right?

So yeah. Yeah, I think we're not there yet. I think we're getting there. You know, when when I could say doing clinicals in residence, you know, hey, I would tell all the residents I don't make you coffee and I don't bring gloves.

So you better everything nice and clean. Oh, no. We would never even dream. Oh my God. It's like teaching, you know, raising kids. How are you going to raise your kids to be rambunctious or to follow orders?

And, you know, the nurses, I would say are the heart of every single hospital and every single training program, because every resident that you talk to once they're physicians will always sit back and say, there was this one nurse that was always so hard on me, and that's the one nurse like that English teacher growing up in school that you'll always remember right?

And oh, they got to they got to keep it real. Yeah though. And our nursing was revered where I trained at Beth Israel in Boston. So we knew who, you know, was in charge. But, I think it's interesting, you know, but in terms of like the, the, you know, I was shocked when you're on the stage in Mexico and Conclu and you were like, oh, you know, the nurse gave my, loved one non warm saline, even though it was all over the chart that they had cryo issue.

Right. And so people make mistakes and nurses are people. Therefore nurses make mistakes. So but but I think sometimes people are a little hesitant to be advocates.

But I really think that if you were to plot out the adverse outcomes with the time spent by family members, someone close by, you know, there's times when the curves cross, like you're going to be too much of a nosy Nellie, but being there and showing that you know you care is important.

I think you get better empathetic care and receptiveness rate and and you know, nurses, I, I will always say we are empathy. We are nurturing. It's the heart of us.

Whether you're a male or a female nurse, I can't tell you that I see a difference. I see us all as one. I see the nursing profession as a true profession, and it's because of the way that we take care of our patients are vigilance.

And, you know, just we're able to actually come down and put things in layman's terms to help our patients better understand, and they actually feel more at ease.

And they'll tell you different types of medicines they're on more so than the physician, because I guess with the physician, they're just trying to, you know, not yeah, they might have 2.5 minutes around and that's it.

Like you are the point of contact. Exactly right. But it's so exciting for those that are watching to see that there's many different ways that you can pivot within nursing.

So you chose to be maybe mainly clinical, but also in actually, helping people build labs.

Nursing Leadership and Hospital Safety

And from that, I want to talk a little bit about your experience, because I don't know a lot about stem cells. I thought it'd be great if we asked the audience, you know, are the audience can get the information from you.

So in your presentation, you talked about, okay, we're only about 20 something years into the stem cell revolution. Here's the beautiful chart where they discovered the liver stem cell or the neural stem cell.

This is now the question I put to you is, you know, you can with induced pluripotent say we can get regular cells to become stem like. Right. And it's always been thought that in, in an organ like, say, the liver or whatever, a region of the brain, there's neural stem cells or there's hepatic stem cells.

So it's like a queen bee. There's one queen per hive. Now the analogy fails there because there's many little sub niches within a liver. Some might be older or from a different queen. Right.

They live together. But my greater question is like, how much do we really know about stem cells? Because, you know, every stem cell scientists will say, oh, I'm such a genius.

I can give the MSC this, that or the other factor, it'll become bone or cartilage or whatever. Right? Great. But if you can do that, don't you think nature can do that?

And so the follow up question is is stem. That's just a characteristic I can they get regular cells to act more stem like or what do you think you think there's only one queen bee per niche or what's the missing piece here.

I mean so for me stem cells is, you know, our cells, the ability to grow and turn into different types of cells. Right. Well, it may be a temporary it may be a changing trait in some cases.

You know, sometimes tennis, as temporary as it is, can turn on or off, depending on the environment or the signals the cell receives. So, for example, you know, certain conditions in the body might take on a stem cell, decide to specialize into a particular type of cell, maybe a muscle or a skin cell.

And it might stop acting like a stem cell. So I'm saying, don't you think? I mean, that's my intuition because like, we had to have had muscle stellate stem cells, and just because you see them now doesn't mean they'll be that in 20 days.

So I think that, you know, the body has this innate ability to become more primitive and regenerative and stem like, and it's on a spectrum. That's my intuition. I don't know. Right?

I mean, you know, one of the key features of stem cells of the 70s is it can be transient, you know, it can come and go depending on the situation. And this is why it's so important for, you know, the stem cells to keep in order for them to keep their stem state longer, you know, so that they could be used in treatments or in future studies in research.

So, you know, scientists really need to keep on studying the stem cells in their stem state. That's interesting. Yeah. I'm going in June to Hong Kong just as a total beginner to the Hong Kong, international stem cell research thing.

And, next month I'm going to the zoo or something. But I love just being the guy who loves the least in the room,

because I get the most insight. Because I have. I'm a total blank slate.

I'm really I don't know. So, you know, but let's talk about the bioreactor, because in your presentation, you show this bioreactor. And I did talk to the equipment manufacturers.

And so for those that don't know, if you just put stem cells in a flask, they'll just stick to the plastic. I just hang out. So there's not a lot of surface area in one pentagonal flask.

So they've developed these things that are like making spaghetti, right. They're like fibers with all credible surface. So it looks like a bag hanging there.

But there's so much more surface area like a honeycomb to make the honey. So if you want, if I'm waking up, you know, in half a year and I'm building my own stem cell lab, I'm hiring Darcy, and she's going to buy one of these off the shelf bioreactors.

They call them. Right. So explain what the limits of the bioreactor are, because I presume it allows you to have more live cells in that culture. Right, right.

So let's let's take exosomes for example. Right. I don't work for terumo. I'm not getting paid for them. So this is not a kickback I'm receiving. But I what about the Terumo quantum bioreactor.

You know, it does allow for high density cell culture and it can actually enhance exosome production when compared to traditional methods like the flask.

So you know, but it does depend on several factors. You know, the cell type and the density, the media and nutrient supply, harvesting efficiency. You know, the fluid handling and waste removal.

So for me, the to the quantum bioreactor, it can significantly increase the exosome yields. When you're when you're talking about okay, so a person flies to Panama or Morocco and they buy stem cells and they typically number them in tens of millions.

And so you might be looking at 10 million for six grand or whatever USD. But this bioreactor can keep alive what up to a billion like a thousand million cells or what's the limit. Yes.

Well so that's that's the little trick. So some scientists that are very familiar with the mesenchymal stem cells in the quantum, to, to remote quantum, they've been able to actually fine tune conditions to maximize their exosome output while maintaining the cellular health.

So again, you know, we're not talking trillions and we're not talking thousands. The highest rates of billions. Yeah. 1 or 3 billion maybe. I'll tell you now something that, you know, as a layperson, I mean, I've never done a Western blot.

You know, I've never, used a pipette except to mix wine in a contest. So, the difference between a passage and a population doubling. And I saw your slide, and I kind of understood.

But explain to us, because they passage, they take whatever's there and they move it to something else. Like. And a population doubling is like an estimation of, you know, a doubling of the cell population.

So what is can you give us a simple way to understand between passage like five six and doubling five and six, or are they similar overlap. So think of a passage as a transfer of cells to a new vessel, and think of population doubling is being a measure of how many times the cells have doubled.

Rates are correlation. Not necessarily. Right. No. Because for example, when we're doing passages right, they're counted as P1, P2, etc. when you're doing population doubling, doubling, you're using a logarithmic formula.

So that's the tracking. It's different. And then what you're also thinking of is as you move into passages with the impact of the cells, you know, the more you passage, the more stress you cause on the cells.

Right? But then on the higher population, doubling it could lead to senescence.

Stem Cell Biology and Cell Expansion

So these are there's okay, so let's take it back because I don't know what I don't know. So using terms that you understand like so for me for example, in my primitive way of thinking, I'm doing two things.

I'm going to take out a vial from my donor and I'm going to make as many as I can without compromising the quality. And then I'm going to use them for, you know, whatever, two, three months to lay my exosomes.

Right. So is there a different phase in which you give certain factors to clonal expansion? Double, double, double versus keeping them alive and productive as little chickens.

Well, so that's when you're talking about the exosomes. The yield may change with your passage number. And and you know, just as the exosome quality declines with the higher population doubling.

So yes, depending on how many times you're going to be, let's say with the mesenchymal stem cells, you're going to culture expand them and you're going to be feeding them over time.

That's why it's really important to always have lower packaging, because, I mean, that makes sense to people intuitively who understand the Hayflick limit and Epigenomic gene silencing, you know, and stuff just happens.

Contaminants get introduced. But let's say I pull out my file of 10 million mesenchymal stem cells, right? And I passage it, one, two, three times. Then I have two and then four, and then 80 million stem cells.

Right. That's probably too low a number for commercial scale exosome production. Right. So I might have to go to passage like, five six, get 320 and then 640 and then have my bag full of quantum terumo or whatever, stem cells.

Right. So in that passage from my, from my working cell bank or my archive to my working and doubling it six times, is that stuff good? Still mostly good. Sometimes good. You don't know.

You know. You don't know until you start doing all of your testing. Right. So we know that as the cell divides more times, you're going to have epigenetic changes, right?

The genes are going to turn on or turn off improperly affecting the function. You know, that your telomeres are going to shorten, making cells less able to divide.

Which is also going to contribute to this cell aging or the loss. And that's why you always want to try to use lower packaging for the therapies, especially with the MSCs, because we know that they produce healthier and better quality exosomes at the end of the day.

Yeah. No. It's great. I mean, so it's really unknown. It's an active, constant quality control thing. I mean, you can look at the omics, you can look at the karyotype thing.

Yeah. I guess you could look at the gene silencing profiles, but that remains true as it does for us as people, our cells. Also, the more times they have to double and double and have that reproductive burden without the telomerase recovery, you know, it's stressful.

So the quality is going to decline. Okay. So what kind of things talk to us about a little of the horror shows without naming names of what can go wrong when you're trying to grow Stem cells in a kitchenette in a strip mall in South Florida.

Well, remember, over time, their DNA, their own mix change, and the structure karyotype being. So, this is, you know, what will basically cause the aging of the cells and they accumulate damage.

The genes may not work as well. Chromosomes can also become less, you know, stable. And the slow, decline is your key sign of what cellular senescence is.

Yeah. And this is the they lose their ability to grow into function properly. So it's just basically taking all of the biological function decline into account while you're doing, you know, all of your expansions and your passages and everything.

It's a it's a it's it's it is a true science. Yeah. No, but it's like animal husbandry. It's like, you know, cows have to be like lactation. Chickens have to be, you know, fertile or whatever.

Yeah. And, like, you know, you wouldn't keep milk in the fridge for three months. So, like, stem cell, your production line. I remember someone was accusing someone of stealing their, stem cells and going out on their own because they didn't know that they get old because you know, you don't know what you don't know again. So.

But let me ask you a question because your slide reference exosome isolation and centrifugation. And when I went last year to the, international side axillary Vesicles conference, I know that the early literature is largely focused on cancer diagnostics and using, ultracentrifugation.

And so there is some talk like it it causes aggregation. It changes the corona or the protein coding, which may or may not have functional implications.

So I know some people prefer just to use more, but, tangential flow filtration. What do you think? Do you think centrifugation is harmful in isolation of exosomes?

I mean, I'm not talking about, you know, some such variation for initial processing, but I'm talking about for isolation. I mean, whether it's the gold standard, the TFF is gold standard, it is becoming more popular.

It's often seen as a better choice for certain processes because it's gentler. Let's say, however, whether it's the absolute gold standard depends on the specific situation and the type of sampling being worked with.

Right? I mean, for me, I've seen ultra depending on what you're working with. Again. So, you know, with the exosomes and how you're stressing them. And you know, I there's so many factors to take into account that it really is magic.

I mean, it's even more complicated than, winegrowing. So I think that in its early days, people used, bovine calf serum, which I think has been deprecated.

And there are manufacturers of bespoke, sort of artificial, but, oh, safer, like, ways to give nutrition. What's the optimal tuition for stem cells? Do you think so?

Right now with a lot of, companies are doing in academic centers, is platelet lysate. You know, it all comes from human blood and typically the platelets.

It's packed with nutrients and growth factors just like the fetal bovine serum. And it's considered a good alternative to fetal bovine serum. I mean, it's human based.

You don't have to think about, you know, any type of xeno issues. The only catch is it's more expensive and it requires extra steps to prepare, but it is actually seen as more ethical choice.

And it's safer, but it does come with the extra cost. We age because our telomeres shorten and our stem cells deplete. But what if we could support both?

I've been taking tier 65 for 17 years. It's the only supplement I trust to support better mood, better sleep and exercise recovery. At age 57, I don't have any gray hair and I don't need reading glasses to 65 is available now.

Go to Recharge biomedical.com MTA hyphen 65 and enter promo code Recharge ten to save 10% off. Yeah, I mean, speaking of ethics, you know, I got a letter from someone who defected from a company.

He said, hey, I haven't seen you in a while. Use my product. It's from a seven week dropper blast. And you know, I to know because I know what that is code for.

You know, it's from an abortion, which is, you know, I don't really have the same ethical balance as some people. I've been on all sides of the abortion concerns.

But, talk to us about I mean, younger is better, but to a point, most people don't realize that a newborn placenta, which is where the vast majority of these products come from, or newborn amniotic fluid, they are adult.

Explain how they could be adult if they're from a newborn baby. Okay, so you know one thing that is also, you know, important to realize, is they're the we call it age zero cells, right?

Because they're perinatal tissue and they're donors. These are from mothers that are C-section only. You don't want to get from the agile birth. That was, one of the issues that a company many years ago did.

And they had they I mean, I mean, it was it was just it did not go well for anyone. But, you know, you could even take these adult cells and do early and they are still considered early passage cells.

And, you know, it brings me to even talk about pulling from different donors years ago, pulling different donors was always frowned upon by the FDA. And this is, you know, to help create more batches of cellular products or exosomes.

And basically what pooling is, is, is mixing of the cells or materials from the multiple donors into one group for the just to make your process more efficient.

However, you know, you must follow the FDA guidelines on this. And it's, you know, everything always comes down to safety testing, traceability. Yeah, you know, always tracking the product to make sure that you're doing everything within a compliant manner when doing this, because you want to risk, you know, there's the risk of contamination, immune reactions.

So by doing all of the necessary compliance rigor behind making your product, you're ensuring that you're going to have a safe, final product, right? And indeed, the product that I'm currently using is, like you said, C-section, not paid for, screened for 40 different infectious diseases.

Exosome Production and Culture Methods

But, I think that, you know, people don't realize that that back in the George Bush era in the 90s, like the idea of using embryonic stem cells was very, exciting.

But there were problems. As I talked to, Doctor Martin, Scott Martin about there were problems. And, you know, one of the glaring ones was the formation of teratoma.

Like, if you get a cell that's too omnipotent or pluripotent, you can get these multi germline cell tumors. So, when I tell people that, placenta derived when it is an adult, it means it no longer has all that embryonic capacity.

Right? But now you sit there, you've been there. That the mom, the farmer, the grower of stem cells for a long time at the University of Miami. Did you happen upon any of the tricks that no one wants to talk about in terms of?

I mean, it's published. What? You know, PO2, what oxygen, what CO2, what nutrients? But did you find that your

cells, since they are kind of conscious living things, did better with certain light, certain music, you know, because when we were in Cancun, they were treating it with this magical red, green, yellow Korean light machine, the stem cell that they were harvesting and you actually volunteered for a procedure which was brave.

So for those that don't know, Darcy had a bone marrow aspiration. And they I saw them take her sample. I put it in the create like machine. Is there some Sound of Music or, you know, some kind of magical light frequency that will make your stem cells happier?

Or did you not mess with the dark arts so one thing that I'll always say in most of my experience in the manufacturing and was always women, and why would I always say that?

Because women. I'm sorry men, we are the best bakers and I don't like sing to them. Whatever we did way back when it was a lab that was totally women, there was.

We had, God rest his soul, doctor Ian McNeice. He's since passed away, but everyone under him was a woman and it was amazing. They made the best cells ever. So.

So I mean, the one thing. So I will say yes, certain types of light, you know, for the cells, certain types of music because of the vibrations. I can tell you because I'm an ask Duncan.

I'm interviewing the CEO of Chimeric Labs, who I know you consulted for in the past, and, you know, a from University of Miami. I'm going to see if I can trick him into telling me.

Does he play like Bach or does he play like death metal? Like German? Like, because I don't know if you want the the cells to be angry and like, you know, putting out a lot of high quality healing products, calming products, if you play them like Brahms Lullaby, maybe they'll just phone it in and give Melo, exosomes.

What do you think? Well, I don't know. I want to see I heard I read somewhere the other day, I think it's Beethoven's fifth Symphony. Eradicates cancer. One on one of those.

The one of the symphony says, yeah, you know, it's it's all types of music. So it's always with the vibrational neutral, you know, you make sure you feeding yourself the right way.

Yes. Oxygen and carbon dioxide. Some will help them grow better. Some will help, you know. You know, just you're basically trying to change the payload.

You know, the stem, the stuff stem cells produce by adjusting the factors. So can you change it? Yes, you can. But the specific effects can just vary based on what exactly you're trying to achieve.

Yeah. You know, you'll see the light, you'll see the music, you'll see different nutrients. You'll see different oxygen, CO2 levels. Okay. So you know, nobody else basically.

So that's why I used analogy there, Songs of Healing. Because even for a moment to moment, you know, it's not the cells will produce. I try to explain to people, you can get an average of like the 100 most commonly transcribed mRNAs are proteins and see the quantification.

It's not a random distribution, but from every exosomes exosome on the less than visible nano scale, they're like snowflakes. They all have different contents in them because they're actively produced.

Right. So this leads me to my, final question. Okay. So in the in the university or in Miami right now, I went to a conference in the fall and it was kind of fringy, but it was good.

And there was a gentleman who I know, you know, I won't call him out, but he provides, xenograft, right shape stem cells because the laws in, Switzerland are that you can't use human stem cells as they do in Panama, Costa Rica or wherever, but you can use sheep stem cells.

And I used to have a buddy at my golf club who, on one of these German sheep clinics. So the question is, my understanding as a non-scientists is that when you have the major has a compatibility complex antigens, or that personal identifying antigens that stem cells from another human don't generally survive that many days, but from a sheep they must survive even less.

So my question in a high level is are these sheep or other donors surviving and then grafting? And if so, what are the implications immunologically? So from my standpoint, xeno cells, you know the immune rejection is far higher.

They're not usually a go to choice. I know some patients of ours have always, you know, way back when everybody went to Germany for the sheep. But doing animal studies, we did many poor science studies because we'd have to do our animal studies to use the data into our investigational new drugs.

And we would do, you know, we put human into animal. And we saw that the pigs were getting granulomas and so we were like, well, the FDA was like, no, we want animal and animal, human.

And then do the human in the in the animal. So we did a comparison study and we published it.

Ethics, Donor Sources, and Xenogeneic Cells

And you know, at the end of the day, the only thing that I can say is, you know, allogeneic cells, they have the best chance of survival and success, but there's still a risk of rejection.

You know, when you're doing bone marrow transplant, you have to find a matching donor. There's the risk of rejection. But what do we know that can kind of buffer this right.

There's drugs to suppress their immune system. We know graft versus host. We already know Mesoblast came out with MSCs. And guess what. That to treat graft versus host.

So it's ironic how now the Biol the biological products are also being used to treat immune rejection. So I, I am a full believer of of human allogeneic stem cells.

But I did want to touch on a very important topic you, you brought up when you talked about embryonic tissues. The ethical concerns with that. Years ago when I first started in the clinical trials, we had to prove to the FDA that human adult mesenchymal stem cells from bone marrow did not cause teratoma, did not cause atopic tissue formation.

And, I mean, we did multiple serial MRI's. Everything we did, we ended up publishing on it because they kept thinking, oh, you're going to grow a tooth in a heart.

You're going to grow something in hair, in the kidney. And we just did all these tests just to prove how safe they were. And, you know, this is this is basically where we are today, right?

We're still asking the same question. Yeah, but no, beautifully stated. And, you know, I appreciate that answer. But, as an ObGyn, yeah, I mean, I can only go by my experience.

So like, I had that lady almost die on me with amniotic fluid embolism. So I tend to think it's, for whatever reason, not a safe. Right. And then, you know, I took out plenty of ovaries, with Terry-Thomas and, yeah, there were teeth and hair and sebum in them, so that's a problem.

So I would definitely balk at something that was sourced from embryonic. But it's not that you're getting the cells, even if it's an exosome excretion, you know, it maybe is a totally different song they're playing.

Right? So but, I so appreciate you taking the time to explain and help clear my ignorance, because I really don't know what I don't know. So luckily, we put in the hours and you got the wisdom, so that's great.

And I know that you probably didn't take equity in all these companies that you helped to build. So, tell us about your new venture in terms of, helping my neck crappiness.

The, oleo. Oh, yeah. What is it exactly? So. Yes. I have a dear friend. She's a scientist in Israel, and we just opened up. We're we're starting the beginning process of opening up a company, and it's called Olive biome USA.

And we will be the sole distributors of her product throughout the United States. This is a lipid serum. She has over 40 patents. It is wonderful. It penetrates so deeply through the skin you feel the difference.

It just moisturizes your skin immediately. So it's like not hyaluronic acid. It's not collagen. It's like got lipids to make you like beef tallow face type of thing.

Like, yeah, it's own little patented technology. And you know what I love the most about it is it doesn't leave you greasy. And, you know, most of these high end oils, serums, whatever you want to call them, have odors to them.

This has no. So it's crazy. All right. Well, look, for that, it's going to be called, what's the name of my, la biome I love it. Well, you look amazing. I know I'm not going to tell your age.

I don't know your age, but, let's put it this way.

New Venture and Closing Remarks

You've been, over 26 years in the field, so. Yeah. Yeah. Okay. Excellent, I appreciate it. And the name of your consultancy is what? Again? It's biological consulting.

So my biological consulting is my company. I've had it since 2015, and I consult on Indies with the FDA. I consult on building out GMP's helping patients with, physicians with informed consent, IRBs, you name it.

But I truly appreciate you having me on your podcast. And yeah, a blessing meeting you. Great energy. And this is this is exciting work. You're doing and helping the public gain a better understanding of such difficult and confusing times in every world.

You know, I mean, everyone has, like I was telling Scott Martin, it's like it's hard to get a man to understand something or a woman if their salary depends on them not understanding.

Right. So we all have our biases. We're all trying to reach a greater truth. And so it's fun to be in rooms where opinions were expressed. I don't agree with.

But that's why we, you know more about the light than the heat. Because, you know, whatever works, we're all hopefully on the same team. And so we're trying to figure out what works and what doesn't.

So thank you. Well, thank you for having me again and have a wonderful evening. Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health.

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