Exosomes, Stem Cells, and the Next Generation of Skin Health Transcript

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Introduction and Guest Background

Welcome back, ladies and gentlemen. My name is Nathalie Niddam. I am your host for the Bioregulator and Peptide Summit. And today I have the great pleasure of welcoming Doctor Jordan R.

Plews, who is an innovator in biotech and stem cell research specializing in regenerative medicine and esthetics. He's got a bachelor's degree in biochemical engineering, as well as a doctorate in molecular biology and stem cell research from University College London, as well as a postdoc and business school training from Stanford.

How long were you in school from Stanford? His pioneering research has advanced the understanding of cellular reprograming and induced pluripotency, which you're going to tell us what that means in a minute.

Jordan co-founded factor five skincare in 2015 and lives in 2020, developing cutting edge skincare products, leveraging human stem cell and exosome technology, advancing medical esthetics and regenerative skincare.

Who Doctor Plews now applies his expertise at the intersection of regenerative medicine and longevity, advancing innovations that leverage cellular and molecular pathways to optimize skin and scalp health, extend healthy lifespan, and redefine human performance.

Isn't Vitale lucky to have you? Doctor Jordan Plews, welcome to the show. It is a pleasure to have you here today. Pleasure to be here. I'm looking forward to this.

I mean, we've we've talked before, but I, you know, you we can never really learn enough about this stuff. And there's so many questions around, you know, and I think it's just also the this the space of stem cells and exosomes, the regenerative space is moving so fast that, you know, certainly as a consumer we can't keep up.

I, I'm guessing with all these degrees and things you've got, you are at the forefront of this business. But it's it's a fascinating area. And, you know, you've had an interesting career arc where you started biochemical engineering.

You moved into the research side of stem cells, and then you had kind of an epiphany, right? You decided, yeah, this lab work isn't doing it for me. Do you want to talk to us about that a little bit?

Sure, yeah. Now, when I was doing my my postdoc, I got an opportunity to branch out and go down the entrepreneurship track. And, you know, I was really impatient.

You guess you could say, after doing all this research and feeling like we have so much information on stem cells, I want to see this technology applied.

How do we get practical benefits from stem cell research? And that actually drew me towards esthetics.

From Stem Cell Research to Aesthetics

Ultimately, I didn't expect to end up in a medical statics at all, but there were a few skincare products on the market that were cell derived all the way back to 2001.

And basically I was challenged by some partners and some investors like, hey, you know, we could probably do something better here, right? We could put some some of this technology to practical use.

And that's how I ended up kind of walking back and forth across this line from kind of biotech into medical statics. And I've kind of wandered back and forth over the last 10 or 15 years.

Yeah. And so how much more advanced do you feel we are now relative to when you started? In some ways, it's been a huge jump, and in other ways it's still not moving quickly enough.

You know, I don't want to go down a whole rabbit hole and get on my soapbox, but I do feel like the methodology on how some of these technologies have been evaluated and getting them to the clinic has been so stringent that there have been things that have been developed that are really incredible, that just have never made it actually into use.

And so we have to keep pushing the envelope and finding ways to show safety, finding ways to show reproducibility so that we can eventually benefit across the board, across the body with these sort of regenerative technologies.

Right. So you're talking about regulations right now, like all the safety rulings and the the restrictions on what material, where it comes from, where, what you can do with it, that kind of thing.

Yeah. And I'm not anti regulation at all. I think that it's there for good reason. But I do think that there is a methodology that's been put into place that's based more around approving things like a pill of aspirin and Tylenol than they are regenerative therapies.

And unfortunately, you know, there are things that there's great evidence that it can have a substantial impact that are just not out there yet. And I think this is where, you know, oddly enough, esthetics has had an opportunity to be at the tip of the spear sometimes on some of this technology.

Yeah, no for sure. So you are the scientific advisor for Vitali, who's one of the sponsors of the summit, which is amazing, one of my favorite companies.

And you share this passion of GCHQ copper peptides, right. Like was the copper peptides, were they on your radar before they approached you or did they kind of say, hey, have you checked out this guy's work being Doctor Lauren Picot?

Oh, yeah. No, I actually had a friend who unfortunately had non-Hodgkin's lymphoma. She had something on lymph node removed from her neck, was having a scar.

And so I went down a rabbit hole trying to figure out how do you get rid of the scar for her? Because she was, you know, 22 years old at the time. I stumbled on the work of Lauren Picot, who basically developed the copper peptides and did a lot of great work all the way back to the 70s on this.

And then I went on to form a couple of companies and a variety of products, and regularly would put GHG copper peptides in those products. So when I was introduced to Vitali by a friend, we just it was like kismet.

We really understood each other. We had this shared passion and it was basically, we don't want to be making things to just cover up problems. We want to nourish the skin, we want to leverage the biology.

And I think that's what Vitali has been doing, and that's what I've been trying to help further, you know, grow that that kind of mindset with, with these new products.

Yeah. Well, I mean, so what's interesting now is what we're seeing in the skin care world is these two worlds colliding, right? The peptide space and now the stem cell exosome space.

So let's let's talk a little bit about these. You know the adipose derived stem cells the zero age and derive stem cells help us to kind of get oriented in that space because we're going to move from stem cells to exosomes.

But let's start by getting the audience oriented around this world. And by the end of the podcast, guys, we're going to bring it together and talk about why we think stacking these things really make sense.

Yeah, yeah. So if you go all the way back to the 1970s with Lauren Picard, he basically found that GCHQ copper peptides were a critical part of what's found in plasma.

That's doing a lot of the work is affecting thousands of genes, and we keep finding more interesting use cases from it. But you could think about it as like the most important factor that's pulling out of young plasma.

Copper Peptides and Vitali Partnership

We know it goes down with age, but on top of that, when it comes to stem cells, we understood in 2001 with products that were fibroblast conditioned media derived.

The fibroblast is one cell that makes up the skin and it's a dominant one, but it's one component. And so we were taking that. There's a couple of products that have been out like say over 20 years now that have been fueling skin with those kind of factors.

And that's a small piece of the puzzle, and we evolve from there to understand that there's even more factors in platelets. And we saw the rise of things like PRP, the vampire facial that was really popularized by Doctor Charles Reynolds, who I consider a friend.

But now we've really moved on from that to say that what's even better than what you're getting from the platelets, what the platelet factors are really talking to in many cases here is, is the stem cells.

And so in the adult body, the adult stem cell or the medicine stem cell or MSC is really the one that you want. And I started there by using adipose. That was the first set of products.

Because people are getting liposuction done every day. They're throwing that away. They don't they don't ask to go home with that. But really what this happy to get rid of it.

Really pretty happy to get rid of it. We were saving them a biohazard disposal fee, frankly, to take that fat and isolate from it about 1%, that is, stem cells and use those.

But as you can imagine, if you're pulling fat from somebody with their probably not in the best shape, they're probably not the healthiest. Sitting there thinking, what else are you pulling?

Yeah. Right. So so there was a there was a slight concern that we could do better. And there are certain use cases where I think adipose is very interesting, but generally speaking, younger is better.

And what I was kind of going down this path, that was sort of a common sense answer. Now, the science really does support that. There's a variety of papers to show across a variety of cell types that younger cells are producing a different blend of factors.

They're producing different exosomes, different extracellular vesicles, different proteins, different microRNAs, and that phenotype, that snapshot of what those cells are producing at a young state versus an old state is different.

And as you might guess, the younger state is better. And I say this is kind of common sense, because if I asked you, you know, hey, if you needed a liver transplant, would you want it from a 15 year old or an 80 year old?

You probably wouldn't hesitate to say, I want the young one, right? You don't need to be a scientist to do that. But I think the science is now catching up to really explain why that is how that is.

And so I did move from the adipose to bill as the preferred source. And I think really where the science is at today is youngest possible ethically sourced mesenchymal stem cells or in some cases progenitor cells.

These are the earliest cells that are helping with repair, helping with maintenance. And so to me it's a frame shift on how do we think about aging. It's it's more this idea that we're degrading slowly death by a thousand cuts.

And if you can maintain the maintenance system, the repair system, in real time, then you slow the whole thing down for sure. For sure. So okay, so we're talking we've been talking about stem cells.

Mesenchymal stem cells help us to make the leap to the exosomes because exosomes is really right now, at least in skincare for the most part, is where it seems to be, where it's at.

There have been a couple of big launches. Talk to us a little bit about what is it about the exosomes, and are you getting those as well from the same material that you would be getting the zero age and derived stem cells like talk to us about exosomes.

Where do they fit in? Sure. Yeah. So I started from a place where I was working in a heart lab and my old Pi, he was until recently head of the American Heart Association.

And we were looking at it because heart disease is the number one killer. And so if you can affect that with stem cells, that's really awesome. And so members of my lab were injecting stem cells of different kinds into the heart.

Stem Cells, Age, and Regenerative Signaling

We were differentiating them into cardiomyocytes injecting those into the heart after causing a heart attack. This is usually in a pig model. And what we saw was in all these different cases, there was some improvement.

But the surprise was that there was if you take the factors, they're being released, the tone of the exosomes and put that into a hydrogel and inject that into the heart.

After an MRI, you saw improvement as well, and sometimes even a greater improvement than putting the cells in there. And I think that comes from this basic idea that we thought that the stem cell at one point might be turning into a heart cell when it's placed near a heart injury, but in actual fact, it's more of a signaling cascade.

So the injury is releasing signals, the stem cells picking up the downstream of those signals and then responding by releasing exosomes, by releasing exosomes.

Interesting. And so yeah, so really it's a set of instructions that's being given out after a specific stimuli and that that you can take those and you can concentrate them.

You can make them in abundance. And they're not alive. They don't divide. They're not like some people talk about them like their cells or their life.

They're not alive. And this was a big deal for me because stem cells require all this fancy equipment. You have to have incubators, you have to have the right guess.

Make sure the right media make sure so many little things that you have to track for the microenvironment. I can't put that in a bottle on the shelf. The cells would not survive.

And so I know there are products out there that claim that their cells in there that there's not isn't it's not real. But exosomes right. The vesicles you if you do the chemistry right and you're careful with them, they can be stabilized, they can be applied.

And there's a variety of different ways to do that. But as a biochemical engineer, that was sort of like a task I thought I can tackle that. And that frameshift led me to, you know, basically what I've done over the last 10 to 15 years where I would argue what we're trying to do now is grab a snapshot of what the stem cells producing after a specific stimuli so that it thinks that there's this damage that has occurred, and it's responding with those anti damage signals.

And then we're applying that and topping up those factors that your skin was making in abundance naturally when you were younger and you didn't need any products frankly.

Right. That's what we're trying to get back to. So let's say for a product like the Vitali product, do you basically treat the stem cell like do you take a population stem cells, subject them to a specific stimuli in order for them to produce these specific exosomes that you then incorporate into the product?

I'm trying to get my head around this because would you would you take mesenchymal, you know, those zero age stem cells and would you expose them to a different stressor?

If, let's say, you were trying to fix somebody's heart versus trying to fix somebody's skin? Yes, yes. So as a scientific advisor to Vitali for this Vita product, we talked about the things that are important to look at the ways that you want to look at this in the laboratory, the types of testing and every kind of turn of the crank here getting better and better with how we do this.

But effectively, there is a level of control that you want to have. You want to have as much consistency and reproducibility as possible. You know, I think people in their heads often imagine that maybe there's a different umbilical cord coming in every week and that there's this batch of batch difference.

But that's not that's not what's happening. Actually. There are a variety of methodologies here around cell banking and, you know, controlling lab protocols so that you get a very reproducible output.

And, yes, the signal cascade, you want to tweak that and prove that. And I would argue that the best thing for the heart is probably not the best thing for the skin or the brain.

And over time, you know, we've learned various ways to tweak it better and better and to tweak it in the same way so that what you're getting is consistent.

I think that's important because so many of the cell derived products I see out there, they have so much inherent batch to batch variability that could be tied to the various donors.

It could be tied to lab processes not being very methodically done. So how do you ensure because you're not going to use you're not using just one umbilical cord, like you're still going to have to get.

Yeah. Like you can because isn't there a story where the that there's variability also in how often the stem cells are being asked to excrete these exosomes.

And then over time quality of the exosomes might decline. And so there's a number of times that you're going to pass the quiet. Yeah. Before you're like they're done.

We need a new batch. So the jargon here is, is cell passages. You could think about it as cell doublings, generally speaking, as the cell is dividing in the dish.

You can think about that as synthetic aging. Right. It's just growing dividing, dividing the same way your cells are dividing dividing over time. But we could speed that up or slow that down in the laboratory environment.

So generally you want to keep low passage low number of cell doublings. Yeah. Generally you know you don't want to have one single donor that, you know if there's one thing wrong with it, you know you're stuck with it.

Yeah. And one of the approaches to this, I don't think I'm giving away any secrets here is that you have multiple donors that you blend together. So imagine you have ten people lined up, and this guy has one gene that's not expressing.

And this guy has another gene that's not expressing. But you put them all blended together. They cover each other. They cover for each other. Right. You might get 90% expression and that one guy is not right.

But the idea is to normalize. And this is how this is just a cell therapy approach in general. You want to normalize the the production. So you want to normalize the protein output.

So if there was one important protein that one of these cell lines is not producing, the likelihood that the other nine or other 99, in a perfect world we'd have 100 going in.

Right? But in practical sense probably five, ten, 20 that are blended. You normalize against it. That's that's sort of the approach and helps with consistency in that way.

Okay. And now what do you say to people I saw this on there was some social media posts that another company had put up. And there's some guy who claims to be highly qualified at something other than being really angry and who was basically calling out any company that claims to have exosomes in their products, claiming that, well, exosomes have to be stored at -80 degrees.

It is physically impossible to have exosomes that are going to do anything in any product that's sold off the shelf and not kept in a -80 degree fridge.

Exosomes and Their Role in Skin Repair

So, you know, his view is so out there. But I wanted to bring it up because I think it's important for people to understand, like, what do you say to that?

Like, clearly he must be missing some kind of information because, you know, I think there's a lot of like the vitality people are not in the business of pulling the wool over people's eyes.

Like, these are not those people. So I don't think help us understand. Yeah, certainly I'm not interested in making products that don't work and neither are they.

And while I could say that there are a variety of factors involved, and that to say that every single interaction that's possible has been accounted for is, is not likely.

Right? There's there's an understanding here that, you know, we're looking at a variety of different pathways that are all working together. And this is sort of a group approach. Right?

I think the previous approach to skincare has been mostly like what I call the hero ingredient model, where you make one thing really well, maybe some synthetic chemicals, synthetic peptides, something usually that's not natural and we throw it at the skin and we look at, you know, the typical markers like what's going on with college and what's going on with elastin when in reality in the body, it's a symphony.

It's a variety of hundreds of thousands of factors interacting with each other, you know? And to your point, there are folks that when exosomes first launched in the market in the United States, they were sold frozen in a vial.

And there's some reasons for why they did that. And there's some reasons they had to do that. But it wasn't because exosomes are active or only active in those temperatures.

I mean, you're 98.6 degrees. I hope and hopefully tell you that your body is full of billions of exosomes right now. You're it's not something that only stem cells produce.

All of our cells are talking to each other all of the time. And so, you know, really the game here is how do we create an environment that is sufficiently similar to what's going on in our body, right.

That that these exosomes can remain stable and outside of the body. And it's not a temperature thing because again, if they were if the temperature was the reason that they just degraded, then they wouldn't work in your 98.6 degree body.

So this this idea of that. Yeah. And this should be common sense if you stop and think about it. But it is a lot of right. And the other the other angle to this is I know that the first companies that came out with this, I won't name names, but they were in the United States.

And another big location that was this work was being done as over in Korea or internationally. Yeah. And they had to figure out a way to ship them. And when you ship cold, you know you're not going to get them within three days.

Right after customs and everything that dry ice that you usually ship them on, it's going to be exhausted. And so then you're upset. So what they did was a lot of companies started going down the path of life.

And there are strategies that work, particularly for proteins and growth factors. But they typically don't work for RNA, which is can be a component like the microRNA which is a regulatory RNA and a variety of things, honestly.

But there is some there's some clear drawbacks to life, but the main thing is solved for these companies internationally was a way to ship this product without having to use dry ice and worry about it getting, you know, ruined in customs effectively.

We took a different approach here. I've taken a different approach in general to say rather than try to take something that we know has water in it and freeze it, and therefore water expands kind of.

Right. Yeah. It could lies the cells, right? Yeah. Well, definitely will lie cells if you don't use a preservative and it can lies exosomes if they don't have a preservative.

And generally speaking most preservatives are set of toxic. They're not actually something you want to put in or on your body. And so most people don't have a lab to wash off the cry of protectant.

Like, you know, I would. And so we have to come up with better ways. And so, you know, our approach has been how do we stabilize it in an environment where we're removing as many of the sources of degradation, you know, and this has been something that's been a long journey and a lot of things to work on.

But again, without giving away all the secrets here. Yeah, you can imagine most exosomes are in a little vial. They're sitting at the bottom. They got a bunch of air on top of them.

This is how they're sold. That air is going to get into the liquid. It's going to oxidize the lipid bilayer. And that's going to lead to degradation. It's not that they just magically pop like bubbles.

In fact, if you look at the physics behind the bilayer, which is supported by quitters equation, you can see that as they get smaller and smaller, they actually get stronger.

And this is what allows them to fly through your arteries, your veins, your capillaries, changing pressure along the way and still being able to do their job.

They have to be able to get around within your limp system. I mean, we found them in every biological fluid in the body saliva, urine, blood, everything.

So anyway, we're talking about now exosomes. Yeah yeah yeah. Okay. So why exosomes and GCC. Well I mean gcc I think about as being the best thing you're going to pull out of plasma.

And a lot of the Lauren Picard work supports that. It also we know is a part of the signaling cascade. So if you look at the canonical four phase of wound healing model, you know, you have the hemostatic inflammation, proliferation, and remodeling.

Platelets play a role in those first couple of phases, but they don't cover all four phases. Fibroblasts, which have been source of various products, are kind of in the middle, mostly in the proliferation phase.

But then there's some gaps. And if you look at that model, there's a great paper in 2021 by it's Yang yang, Yang it out. Great way of laying it out where it shows the cell types involved.

You can see that there are some gaps and that the stem cell or in some cases progenitor cells actually cover all

four phases. And that's really the goal is how do we guide through all four phases of the wound healing cascade?

Because the idea here is that your repair system, which is related to wound healing, related to repair and maintenance, is breaking down with time. And we need to top it up just in the same way.

We've learned that topping up the hormonal system in the right way can be helpful, right? Crude analogy, but this is the thing is, as we're aging, we're producing less and less.

It's not just collagen that's going down. It's not just to last and going down. I know we talk about that a lot in a static, but there are hundreds of molecules that are going down with age.

And so GCHQ so so is the approach basically the GCS taking care of one piece of the pie, and then you've got the exosomes taking care of another piece.

Now you were mentioning wound healing but aging skin is not wounded. So. Right, right. So how do we. So number one, the interaction between the two or the complement between the two.

Product Stability, Delivery, and Regulation

Let's talk about that a little bit. And then let's talk about in in a world where and or maybe is that why we should all be micro needling regularly or whatever the case may be right like to is it a good idea to be doing the performing these micro injuries?

But what about in between? Like do the exosomes? How do we know they're going to stimulate any kind of repair or regeneration, if you will, of the skin when the skin is not actually injured?

Yeah. So a lot of the best stuff I'm seeing in the last ten or so years has come from the wound healing space. And it's the basic understanding that, yes, I'm a fan of micro.

I'm a fan of controlled micro injury. I do think it has benefits. I do think it helps with uptake of a of things, but at the same time, when your skin was young and healthy, you didn't need any products.

Your cells were releasing all these factors without that. Right. And so one of the ways to think about some of these more minor injuries, I mean, not even like a like imagine when you were a kid and you got sunburn, right?

Like a week later, your skin is fine. You don't notice it. You might pay for it down the line, but it's that sort of repair system. So I know we think about the wound healing as a literal wound, but a lot of the same parts of that cascade are activated regardless of what the insult is, right?

We just need the, the, the cells that are tied to maintenance and repair to kind of wake up and go. There has been damage here. We got to do some cleanup.

We've got to do some repair. Now, when it comes to topical factors, the skin is a great barrier. We know that. But there are a handful of studies now, including double blind studies that do show even histology improvements underneath the skin.

So people say how is it getting in? Right. How is it? And you ask somebody who's used a quality product like Vita for a good amount of time, they see it in the mirror themselves.

This is not a debatable thing. You've got you've got sweat glands, you've got hair follicles that are hundreds to thousands of times larger than the diameter of these exosomes.

I don't think people quite grasp the difference in size between an average exosome and the pores and things in your face, and I think everyone already knows the skin around your eye very thin compared to other parts of your body, so the absorption of products differs.

I think while people, especially in a lot of the skincare industry, talk about the skin like a metal plate with holes of a specific size drilled into it, you know it can't be bigger than 500 dolphins.

There's various tropes I've heard over and over. There's just as many additional papers out there that show a benefit that you know does not make sense based on that model, that that's this firm limit.

I think there's certainly improvements that can be had by doing things like micro needling. But I think we're also gravitating towards a future with less pain, more gain.

It used to be more pain, more gain, more wounding, more, more result. I think this is a step in the direction of you can do benefits without all the pain.

Can you get more benefits, better benefits by causing some wounding and opening some things up? Yeah, sure. And both the GCC and the exosomes are coming from this wound healing background, in my opinion.

And there's there's additional things that we've learned across the last ten years that go beyond just the wound care as well. Nice. And so actually, I wanted to ask you this.

You were saying copper peptides plural. And we talk about GCHQ copper. So is there is there more than one form. There are other forms that exist. I think most of the the research is on GCHQ copper.

There's actually some interesting stuff on copper as well. I think I've read that somewhere. Yeah, but that's not operated. Yeah, yeah. No, this is an area again, I think if you're looking at hair in particular, there's some interesting stuff with HC, but GCHQ copper peptides, this is the law and Picard version is really the foundation and I would argue probably the most clinical data and studies based on that.

It's somewhere in the realm of 3000 genes. I believe that we're activated by this. So very powerful for for a single peptide. It's very powerful. And not all peptides fall into this, this bucket.

I would say most single peptides, single molecule are anything like this. And this is again why I think exosomes and some of these regenerative, this regenerative mindset is so important because our body is not run on like an A plus B equals C mentality.

It's much more like a biological soup. It's much more like a symphony with all these different actors playing together in harmony. And we need to bridge to that.

And it's much more complicated. It's difficult to get there. But, you know, this is where academia has been focusing for at least the last 20 years. I say in the last ten we've seen a dramatic increase.

Like if you search Google Scholar today for exosomes and skin, you'll find over 100,000 articles that pop up. So, you know, a lot of people go, oh, this is not very well studied.

This is new, this is cut. You know, it's cutting edge, but it's also not this area that is totally misunderstood or not well researched. It's not well translated.

It's not been brought into practical use fully. And it's not in the clinic yet. But, you know, I think this is coming. It's just a matter of time at this point.

Yeah. So what do you think the title is? I mean, you would think that at this point that in the medical profession for wound healing, these, you know, you're using this in, but it shouldn't be too big a leap into the wound healing world to be applying some of these products.

Like not not that it would be Vita particularly, but the ingredients in Vita that are being leveraged like the exosomes that have been I guess they've been pro not programed, but maybe they've been harvested from a cell that's been triggered in a certain way to produce the information packets that will drive the regeneration at the skin level or

under the skin, really.

And then the GCC, you would think that they would be they'd be going there right now. There's there's definitely things in the clinic. There's some things definitely things being worked on.

You know, I started from a place where originally products were conditioned media products. They're taking everything that the cell is excreting, but then you're also grabbing potentially apoptotic bodies.

You're grabbing things that are maybe not wanted. And so the next step was to kind of filter that out. And then you have these products. And then exosomes are really a filtering of the tone.

But it's this idea that we if we know that the soup the condition media, everything is secreted is helpful. And we know that purifying that is even more helpful.

We might trace this right down to like a handful of things and what the FDA would like. I think what regulators would prefer is to say we have found this one molecule, and this one molecule is actually doing all of these things that we've been seeing.

And the truth is that that's very, very unlikely.

Reprogramming, Longevity, and Future Applications

It's much more like we've got a symphony of actors here that when they're all put together, they have checks and balances, they work together and they're synergistic.

And this is why this is a hard to explain thing and hard to push through a regulatory pathway. Whereas something like an aspirin, like a very specific molecule, you can define it very, very well.

That's what the FDA likes to deal with. That's what regulators like to see. So I think we're we're slowly moving to a middle ground where the FDA is understanding.

We've got to look at things more complicated. We've got to be able to work with the soup, even if it's a it's a very defined soup. If it's a very reproducible soup, you know, that's more important than getting all the way down to, you know, what's the of a single molecule.

And, you know, you've seen things like the Sinclair clinical trial that's been been approved and some of that work. And that traces back to, you know, I did my doctorate work, like I said, I'd induced pluripotent, see, you know, published the first paper using mRNA to try to activate pluripotency genes.

And ultimately, I think this line of research is going to bear a lot of fruit, and we're seeing a lot of investment in it. But, you know, I was working on this in 2007, and now we're just seeing a lot of investment here in 2025 2026.

So things do take time. But this is where I say there's there's always been this gap between where the technology is and then where the world is, where the regulatory world is, where the clinical ability is.

Yeah. The Sinclair child. Do you want to quickly explain that to people what that is? Yeah. So Shinji Yamanaka got the Nobel Prize for four factors in 2012 for socks to Simek and Kayla for Simek is in about 70% of cancers.

So Sinclair and a variety of others realize we we can't move forward with using CMAC. This is too oncogenic. And he pulled that out and use the remaining three factors.

And to show that there was a partial reprograming and that this partial reprograming often takes an older cell back to what appears to be a younger state, a younger version of that cell, and he's shown in a mouse model that he could reverse vision loss.

And so that has now been extrapolated into a human trial. And that's very exciting. You can imagine if you have functional loss and you could regain it with these factors that could be life changing.

And so I think we're all patiently waiting and hoping that that works out, and that this could be a bridge into the next generation of regenerative medicine here.

But yeah. Do you think it'll ever translate to skincare? I do. There are people that are looking at it, working on it. I was at a longevity meeting at the Buck in December, and I saw a few inklings of that already.

I do think part of the reason I started, I started from a place of pluripotent stem cells, which was, you know, back in the early 2000, embryonic. And then I said, look, we're, you know, there's issues there.

People don't want to use embryos. And was working on that transition to induce pluripotent stem cells. So how do we take a skin cell, for example, push it back to a state that's very much like an embryonic stem cell.

And then from there go forward into heart, into brain, into lung. And that's where I spent a lot of time until my postdoc and after that, where I started to shift more towards mesenchymal.

Because frankly, if you get one pluripotent cell that's not fully differentiated, that presents a risk. And so you can't cure someone's problem and give them cancer at the same time.

And so that's why most of the practical applications have been using this in stem cells or progenitor cells or things that are much more locked in and don't have this apparent oncogenic activity.

But if we can crack the code on this and get all the benefits without the oncogenes, I think that's going to be really exciting, right? But in the meantime, we have so many time we have had in the meantime, we have Vita.

And Vita brings together this world of the exosomes that are somewhat specific to skin regeneration. We've established that given their size, how many Daltons are they typically the.

So Daltons is a mass measurement. Sorry exosomes, we talk about really the diameter being between 30 and 150 nanometers. They usually are more close to 100 nanometers.

You got to get under an electron microscope typically to visualize these things. They're very, very small. To put it in comparison, a typical cell is about 200 times larger than a typical exosome.

Wow. Roughly only little and so small enough to get across the skin barrier, right? Well, this is another way to think about it. Remember, we started in the 90s with making these synthetic proteins where we would modify any coli.

And I did this when I was at Pfizer. We genetically modified and IT coli to produce a protein like a growth factor. And then, you know, people forget that these bacteria that are getting these synthetic growth factors at it, they don't have an elastic reticulum or Golgi apparatus.

So a lot of times they don't have the right folding. They don't have the right glycosylation tail. They're not stable. They're not quite as good. Right.

So but then we took those and we put them onto skin. We saw some improvements. And they're seeing the movements in a lot of things. But what improved it even further was to lipid encapsulate it.

So you might remember as far back as early 2000 where lipo encapsulating proteins were lipo encapsulating everything, and then what we discovered was making it smaller.

Micro lipid encapsulation was even better, right? And so smaller. Now, ironically, we find nature is actually beat us to the punch here. Exosomes are nano lipid encapsulation.

That's really what they are. And so nature. Yeah from nature it's a built in delivery system. And like I say, if you do some digging into the physics behind the Cordis equation, you basically find that the smaller the diameter, the tougher these things are from the outside in.

It's sort of akin to the arc physics of like a bridge holds a bridge together, but on a spherical model. And so it's very interesting. Right. And this is the reason why when you, when, if you, if you go all the way back, if you were involved in early exosome research, what we were doing is taking condition medium and running it through an ultra centrifuge.

It's 100,000 g forces. Okay. Like right now they're trying to launch satellites into space from Palo Alto using this giant centrifuge. And they're doing 10,000 G to launch a satellite into space.

Okay, so we're talking ten times that amount of central force is being used to put an exosome at the bottom of a vial. And then I then I have people telling me that they're super fragile and I'm like, I don't buy it.

Okay, okay. Average humans passing out at 5G. Okay. And within 100,000 G to get these things to the bottom. And I'm not saying that they're never damaged. Nothing happens.

But that is an incredible amount of force that's hard to wrap your head around. And so they have to be tough. And it's interesting that the smaller they are, the tougher they are and the better they are at delivery.

So nature again has beat us to the punch. So the next question and the last question is now you've got this super tough little exosome. How is it going to deliver the payload.

Is it merging. Is it the two. Is it the two cell membrane merging with the membrane of the exosome. And then a melding like how does that work? There's a variety of ways that it can work.

But what you're describing is is mostly accurate. They are covered in tetra spans. And there are other markers that can differ from exosome population to exosome population.

But effectively you can imagine it like a lock and key mechanism where the exosome has these markers on the surface.

Vitali, Results, and Closing Remarks

The cell is expressing something on the surface, such as maybe inflammation markers. The two are kind of latching together, and then the cell is bringing it in and taking opening the payload the message and reading the message effectively.

That's that's the kind of canonical way that it's thought about. Now can they just merge? Yes. Can they pop outside of the cell and then release their contents?

And maybe that is doing something as well, like a pair of effect? Yes, that's possible. But traditionally, yeah, this sort of docking mechanism you're describing, I think is how most people envision it.

And that's the way it's understood. Nice. And meanwhile you have GCC that is docking on receptors on the cell, initiating a cascade from that perspective.

So it's really like a multi multi approach strategy to get to trigger regeneration in the cell. Exactly. This is the thing right. Is and we're all talking about molecules here that are found in the body.

These things we're all in in the lab. Exactly right. I think this is the funny thing to me is people think I need to pull something from a plant that is nothing like my biology.

I need to pull something from a laboratory that a chemist cooked up. It's totally synthetic, you know, looking back

on things like margarine. We learned some hard lessons here that synthetically made things are often not processed by your body.

Your body doesn't know what to do with them. So while there's a lot of fear and whatnot. I think you have to remember we're starting with molecules that are or were in the body naturally.

And so there's natural pathways on how to process them. And not to say that there's not a lot of things to think about here, but the amount of misinformation and misunderstanding is still pretty high.

And I think it'll take some time before we can delineate the snake oil from the things that actually makes sense and, you know, really have a science that everyone agrees on.

Yeah. Well, and in the meantime, you have legions of people. And I've spoken to a lot of them who swear by your stuff. They swear by Vita. They, you know, people who've been using it for a couple of months absolutely believe that they're seeing changes in their skin, seeing improvements.

And I think that that in and of itself, I mean, Vitali products, just the GCC copper creams alone were driving beautiful results on aging skin. So even the body cream. Right.

So you're now layering another powerhouse of messaging two cells to communicate very specific instructions. It's pretty powerful stuff. And it's pretty sure.

So you can get it out of a little bottle on your counter. I mean, you know, like if you really think about it, this is pretty wild stuff, right? Oh for sure. Yeah.

And this is something where I think, you know, you might not have heard of the Tully before. They've been around for many years. They use the same source as Lauren Picard, who's behind all the copper peptide research.

And it's because they're not some massive marketing engine. Some of these companies have so much marketing, they are not interested. They're interested in the science, interested in making real products that work.

And so reorders matter. You have to have a product that works so people order it more than once. You can't just slap some junk in there and put some hype on the bottle.

And so, you know, when I realized that we were thinking the same way, it was easy to to work with them and partner with them, I love it. Jordan, this has been a fascinating conversation.

I know that every time I talk to you, I learned something more or I, you know, I fine tune a little bit of the knowledge that I thought I was having. So thank you so much for taking the time to do this, and thanks for your support.

And hopefully everybody listening to this has learned a little something about exosomes and GCC. And I know we have also an interview coming up with Debbie, where we're going to dive a little deeper into the side of things.

So thank you so much for taking the time. I think the I mean, where can people find out more and learn more about Ali and is yeah. On Vitale skincare, you can use the Doctor Talks code to get a discount.

I think it's 20% off with doctor talks on Vitality Skincare, if I'm correct. That's what I think they told me. But yeah, you know, this is a brand that's kind of flying under the radar, I think, for what it is.

And and thank you so much for for having me and giving me an opportunity to speak on this. It's always great to talk to you. Always a pleasure. And the link and the code folks will be in the show notes of the episode.

Thank you again, Jordan. It was a pleasure. Thank you.