Stem Cells vs. Exosomes: Safety, Aging, Regeneration & the Future of Personalized Medicine Transcript

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Podcast Introduction and Disclaimers

Hey there, welcome to the Recharged Biomedical Podcast. I'm Dr. Edward Park, and if you're curious about regenerative medicine, you've come to Hi everybody, this is Dr.

Ed Park from Recharged Biomedical. Today we're going to be talking about stem cells versus exosomes. And I've repurposed this diagram, the Pac-Man, and I think in this field there's really very little that we know, even the experts, if they're honest, don't really know a lot.

And there are some things that they know they don't know, but what they do not even know is the majority of what we are going to be alluding to. As a disclaimer, the use of exosomes or stem cells has not been FDA approved.

There are many trials in the case of stem cell but they have not approved for the treatment or prevention of any disease. This video is for educational purposes only.

It is not an advertisement for exosomes nor stem cell therapies. Anecdotes, if they are alluded to, are not to be construed as rigorous scientific proof, although they're evidence.

And all patients of mine were treated within the context of a patient position relationship. The goals of the talk will be to discuss what is a stem-cell versus an exostome?

A lot of people are a little fuzzy on that. We talk about how they're stored, how their thawed. We'll touch upon immune compatibility and incompatibility, and we'll talk safety considerations vis-a-vis infection and also the media in which they are transported.

And we will talk old stem cells and kind of speculate about the ecology of stem cell. Then we go into the cost, the efficacy and the value of the different treatments.

Finally, we speculate the future when combined approaches will be used. When we talk exosomes, they aren't stem-cells. They are not even on the same scale as cells.

In other words, these are the little 1,300th of diameter messages that are sent out to communicate like you and I would send a letter or FedEx box or package.

The cells are much, much bigger and they have machinery to copy DNA to make proteins, to package stuff, and to unpackage stuff.

Stem Cells vs Exosomes Overview

So for that reason, they're one size fits all. On the surface they have certain antigens. In the case of mesenchymal stem cell exosomes, we have these CD9, 63, and 81. But there are different stem cells you can learn about in the scientific lecture I did a few back.

They're 100 nanometers, which is very small, same size as the coronavirus. And that's because they use the same machinery to be packaged. Again, they're not cells.

They don't have self antigens and they can't be reacted to in the way. So your body doesn't know to destroy them unlike with cells, so I like the exosomes to the songs or the music or tracks or CD, cassette, whatever.

That's the songs that the Rolling Stones made. The cells themselves are the musicians. Musicians can play many different songs according to what the requests are in the environment and the audience.

So that's a very important distinction. Of course, when we talk about handling stem cells, there are many protocols. You can look them up. Basically, a common way to do it is to store them in liquid nitrogen, which is like, I think it's 80 minus Fahrenheit.

Anyway, the purpose of this is you can't just keep the cells alive forever. They get contaminated, they get old from repeated copying. Ooh, I put contamination there twice.

And they got membrane damage as well. As you freeze them they can create ice crystals, osmotic damage, and that's a problem of course. when you cryopreserve a human like Walt Disney or Ted Williams, it's a bigger problem because you magnify it and you multiply it.

But they've gotten pretty good at freezing these suckers down. They use phenobarbine serum, 90% DMSO, 10% to stabilize them. they cool them very slowly.

In contrast, they thaw them rather rapidly. And I made a mistake on the earlier lecture in the foundational series. I had read that The viability was very low after thawing.

Apparently a lot of these authors and these commercial companies claim upwards of 75% viabilty once they thaws them. So that's really good news. And then finally, how do you know you're dealing with a mesenchymal stem cell?

Well, there are out of the box kits like for testing CD or cellular differentiation marker. It's a surface protein 73, 90, and 105. Those are positive.

That's suggestive of MSC. And what should be negative is CD45, 34, 14 and HLA-DR. They also can do a provocative challenge where they give certain reagents and they can make the mesenchymal stem cells play certain songs.

In other words, they become osteoblasts, adipocytes and chondroblasts. This is a very trivial but magical thing that stem cell scientists love to do. And it proves that we have this at least multipotent meséchymals stemcells when we saw them.

So, of course, the elephant in the room is immune incompatibility. It's something that the people offering stem cell treatment, allogeneic at least, don't even talk about.

But it's a big deal and it is commonly held and is true to an extent that stem-cell transplants or transfers or infusions, they're relatively non-immunogenic.

You know, it very rare to have side effects reactions. That's because the MSCs have a low level of class one self antigens. That means all nucleate cells have this self signature.

Stem Cell Storage, Thawing, and Identification

It's the personal fingerprint of all the cells and they don't have class two, which is a specialized type of histocompatibility used by immune antigen presenting cells.

Furthermore, MSC's are notorious or famous or specialized in shutting down the immune system. And so they get you out of that inflammation and into regeneration.

They do this by activating the Treg cells, TH17, and they shift the phenotype from T1 to T2. Again, a regenerative, not inflammatory thing. Now that said, when you look at the literature that's out there where people have addressed this question, what we have are undeniable proof that these cells don't last.

In one of these studies, I don´t know if it was one or these two that are cited, but they found that if you take your own stem cells, freeze them, thaw them or you took your stem cell and infuse them then at 200 days, 80% of them are still somewhere around there.

And they know this because they give them a special gene that causes them to light up, luciferase and glows. You can see it. Whereas when you take someone else's cells, they are easily chewed up within days by your immune system.

And that's what the immune is for. So furthermore, one of these studies sites that there is a B cell T cell response, meaning, I mean, you wouldn't really get somebody's stem cells or you might if you go to the same company.

so the next time you get them. You have an anamnestic response, in other words, not forgetting for Greek. So you even destroy them faster. The question is, off the shelf, allogeneic stem cells, yeah, they don't do a lot in terms of harming you, but your body clears them very quickly.

How effective can they really be? Now, basic stem cell biology, what is a stem-cell? A stem cells is cell that is asymmetrically dividing. That means she makes a perfect copy of herself, the mom, model, and then a daughter, specialized daughter.

So when she divides into, she make herself the stemcell and the daughter that's more specialized. As a general principle, it's an abstract concept. Secondly, She has telomerase or she has mechanisms to lengthen her telomeres so that she can copy indefinitely and she is immortal.

Now, we talk about the distinction between embryonic versus adult. Now embryon means truly when you're an embryo, even before fetal, and that means that you have a lot of more potency.

So obviously, you come from one cell, from the sperm and egg, that's totipotent or tutipoten. It becomes all your cells. As we become more aged, certain switches are switched off in the gene expression through the epigenetics, probably, and the cells lose their potency.

Now, the reason we don't use embryonic stem cells other than ethical considerations is because they retain too much potence. In other words, that the cartoon in The Middle shows what happens when you use Embryonic Stem Cells.

They become teratomas. Teratoma are multilayered, they express multiple germ lines. Without getting too technical, weird things because they have too much potency.

So you can get like an adult woman or even a man, you even get teeth in your ovary. It's because these cells have to much potent. They know how to do too many things they haven't specialized.

If you put them in a dish, they become embryoid bodies. Same thing. The problem is too potent, too may options. Part of cell ecology and development is that they lose their options to become more specialized, but they still retain stemness.

To be truthful, Again, above me is the pack. I'm reminding us, nobody really knows how many stem cells are there, how are they controlled? Do they become stem-like?

Or do they de-differentiate? How many is too much? Nobody really understands any of this, to be honest. Of course, when we look at different types of stem cells, you can fly to Germany or Switzerland and get some black sheep stem cell.

To me, this is not logical because if you think about immune rejection of another human, rejection another species is even more Christian. So these really don't.

They shouldn't work at all. Of course, an allogeneic or somebody else's is going to get rejected because of major

histocompatibility mismatch. So you'll clear those as we talked about.

The best is autologous. Now we talk about autologist, it's from you. There's no rejecting your own cells in general unless you developed autoimmunity.

Immune Compatibility and Stem Cell Biology

We look at the Rolling Stones when they're young and the rolling stones when their old. Probably the ability to play songs is better in the younger ones.

So we probably, if we're going to freeze them and catalog them, it's probably better to do it when we are 21, as opposed to when were 61. Finally, the two methods that are readily available for extraction of your own stem cells, presumably for storage and later use, are liposuction in abdomen or buttocks and bone marrow aspiration, which is a local anesthetic over the hip bone.

It's not that painful. Arguably preferred. And we see that life and aging and disease is just a depletion and a deterioration of the quality of stem cells.

So those young rolling stones become old rolling stone, they become damaged and they are less able to perform. Finally, the sort of genealogy chart above me shows what we've been talking about.

Stem cells, okay, They can be embryonic. They could be adult. Or they can be fetal. Basically, as you go to the right, you get more differentiation, less ability to become anything.

And of course the field of stem cells has been transformed by the, I always get it wrong, Yamagata or Yamanaka factors. They found that if you just introduce three or four genes, even three of four proteins, You can coax the old stem cell to be induced pluripotent or a young almost embryonic stem.

So that's a very exciting thing and that kind of. points to how complicated and fluid our understanding is. So let's talk about safety considerations.

There was a movie or something called Bad Bats. The field is very cognizant of this problem. In 2018, the major player in the field of alginic stem cells was Livion slash Genetech, not to be confused with Genentech.

And their product Regen was sent out and it was a quote, bad batch. Now those people got chills and discomfort, probably just a simple endotoxin contamination.

Bacteria produce this lipopolysaccharide thing in their cell wall. And this is everywhere, it's ubiquitous. This is why people pasteurize milk. It's why canned food is heat sterilized.

There's bacteria everywhere. A low level is tolerable. But if they reproduce in the storage media and you ship it and inject it, the endotoxin will cause a reaction.

And so that's a nightmare, of course. The chances of viral infection are arguably very low because they screen them, both the donors and they scream the samples for all these common viral illnesses.

But every time you handle a substance, you introduce bacteria. That's why you tell the kids don't drink out of the milk carton because it's bacteria being introduced.

Of course, most of these places claim to have good manufacturing practices and their FDA monitored, which I don't know what that means. That's a good, good thing, but it's no guarantee.

Every time you touch and open anything, there's chance of contamination. And that's why when I was doing Botox, you know, You really had to use the Botoc standing there.

You could kind of game the system by putting bacteriostatic saline in there, But everything there is a give and take, what you gain on the swing, and you lose on a roundabout as the British say.

Anyway. The cold chain is crucial so you don't reuse them after opening. Exosomes are frozen and shipped on dry ice, minus 109. Cells are shipped in refrigerated packs and so they have to be used within three days of thawing.

I'm not thowing, of shipping. Finally, quality control sheet from at least stem cells should include the viability, the percent of viabilty, and the bacterial anaerobic and aerobic counts, whether there was mycoplasma and whether was endotoxin and at what level.

A little bit is okay, a lot is not good. Another thing that people want to talk about is fetal bovine serum or fetus calf serum. They basically take, you know, the blood from baby cows and they get the cells out and that serum is what they're using.

Now think about this for a second. It's cheap, it's effective, its standard, but you're expressing all the exosomes in the serum, so you are becoming a fetal calf in a way, but this is how the cell husbandry has been done.

It's less ideal. Now everyone's trending towards serum-free and chemically defined kind of interchangeable terms. Basically, we don't want feto-calf serum, fetorexosomes.

We want something that is just chemally defined, perfect like Star Trek food for the cells. And indeed it makes sense that if you're expressing calf or cow antigens, you could be getting reactions.

Some of the vaccine reactions might be because of previous sensitization to cells that were cultured in fetal bovine serum. So why introduce more complications if you don't need to?

Of course the movie above is cocoon and they get these old folks and then they bathe in the water and get young. You know, it's fiction but it speaks to an important point which is that your old Mick Jagger and indeed, unfortunately, Charlie Watts the drummer just passed about six weeks ago.

Cells get depleted in number and depleting in quality by two mechanisms. One is over-copying and replicative senescence. And I described this in my two books, The Telomere Miracle and Telomer Time Bombs.

As you get the telomeres too short, the chromosomes mutate like chopped scallions, and that's bad. But there's also epigenetic silencing. Not easy for me to say.

And that means methylation. I believe that methylation is a gainy process. In other words, it's over 100% efficient. So a lot of the genes are shut down in these cells.

They not only depleted in number and they get genetic errors, but also their software functions less efficiently. Yet, even old cells can respond when they're in the mood.

That's the premise of what we're doing with the exosomes. We're playing that old Glenn Miller song, In the Mood. It's all very sub rosa back then. But you get them in the mood and they can act young and act to regenerate.

Safety, Contamination, and Culture Media

And most of the problems that we have throughout the body are depletion of our stem cells and A, they've just phoned it in. They're no longer copying.

So we get tendinosis because the existing stem cell in tendons or in bones are there, but they have over copied. Then they're not able to do their job.

For a little while, you play the… And they get in a mood, and then they start acting young again, like the swimmers in cocoon. So as we near the end, let's talk about value.

So value is kind of this amorphous thing and it's value for you may be different for me and maybe different in retrospect. But as a general concept, you know, the more efficacious divided by the cost is a way to express value, but also you have to multiply it by a variable safety.

Like is it safe? Like, are we talking about a one in a thousand reaction of endotoxin shock or whatever? Probably not even that, but what are the risks of bacterial contamination?

What are they risks other procedures? And what the risk of generating an immune response? These are all considerations. To speak to the efficacy of exosomes, you can go to webinar25 at tinyurl.com slash exoweb25.

I talk about repeat injections and 26. best cases and perhaps one of my best videos was 27 unhappy patients. So we talk about why people are unhappy and it's not just that it didn't work or only lasted a short amount of time, but we talked about the overall challenge of taking a very broken system and remediate someone, how people react to that.

So what is the efficacy of stem cells? You know, this is a very anecdotal about three, four years ago. I want to get into stem. So I tried the infusion myself, I trained in different techniques.

And to me, it didn't do anything, which is just an N of one, as we say, but I'm pretty sensitive to these things. push this or sell this, or offer this if I didn't do anything.

I talked to a lot of patients who've been in and out of these stem cell clinics and you know, the reports are about 50-50. 50% say they seem to do better for a time.

It's not always long lasting. So that's good. And I think that the safety really favors the exosomes because it is sort of mass produced, but in a very sort bespoke and controlled way.

So every month they take a new batch of master cell stem cells from the same donor, so there's no risk of infection. And then they get fresh, fresh exosomes.

They isolate only the exostomes, there is no calf serum or anything like that. Then they resuspend them in normal saline. We're talking about, and then the freeze them and ship them.

The ability for human error, bacteriological contamination, even medium contamination is very slight. Of course, autologous stem cells are much safer than getting it from a donor because you don't have an immune reaction as much.

You can have some immune reactions for unknown reasons, but autologist stem-cells are more safer, I would say, and longer lasting. The cost of exosomes right now on the street value is about $500 per billion, although that can vary quite a bit.

Whereas the cost autologists or allogeneic, strangely, it starts around $5,000 and can go up from there. So of course, if you're talking about somebody who needs to harvest your bone marrow and or your lipo suction, their procedure fees associated with that, you know, anesthesia fees, et cetera, but it's not cheap.

And so I think that the risks involved with exosomes tend to be very small. Approaching over 800 injection sites, 170 patients now haven't really or haven' seen any shock-like reactions, immediate reactions immune reactions and toward things.

So I think they're pretty safe across a wide range of dosing. Finally, the cost of autologous storage. If you want to do this, I mean, if money is not an issue, gifting your 21-year-old's stem cell storage.

They can store it indefinitely for $250 a year. The initial initiation cost is $3,000 from Bone Marrow. So for 3, 000 and then $2.50 a- year, we're not talking about baby placenta bank, but we don't want cells that early.

We want adult cells when they're 21. And the person would just go in for a local extraction and then store them for the rest of their life. And when they're 31, 41, 51, 101, they can always get copies of themselves as the young Rolling Stones, as The Young Van, very healthy, you know, jumping from 10-foot walls and staying up all night.

These are the kind of cells that we want to be able to freeze and reintroduce to ourselves. That's going to a huge biohack in the future. And speaking of the future, I love these pictures of people looking in the mirror and you see what they imagine themselves to be and what there were as young, younger people.

So we look at this guy, maybe he was a stem cell scientist, if he'd only had the means and there was company that could save his stem cells when he were a young researcher, he might have been able to hack his own aging.

And so ideally in the future, instead of all these other government programs, everybody would be entitled to bank their stem cells at the age of 21. Again, I mentioned that when you take stem from yourself, they're 80% viable at 200 days as radio labeled by Luciferase or whatever.

They're still there. So they are alive. Your body is not killing them. Now, exocetals, because they lack any histocompatibility issue, we all react to them in a similar fashion.

They come from a newborn baby's placenta, and yes, they're still adults. So there is no risk of teratoma formation that we've seen. It can be mass produced and again, it's one size fits all.

Cell Aging, Value, and Clinical Efficacy

I think in the future, what we're really talking about, if we step back and think about what we're up against. We have aging in all these different niches in our brain and our heart and thymus, very important, as John alluded to.

And so everything is aging by telomere attrition, by epigenetic aging or gene silencing. So, you know, we may be able to freeze mesenchymal stem cells, okay, easy, but maybe in the future we'll freeze slightly differentiated cells, maybe will freeze neural stem cells or kidney cells are liver cells.

Maybe not from direct extraction, but from purposeful manipulation of those extracted cells? I don't know. So maybe in the future, we'll have a whole library of spare hearts that we can go back to in decades later.

And that would be great because that's really where medicine should be heading, a logical, not fringe, scientifically-based biological method of reconstructing what nature does to keep us younger and healthier.

And of course, if we have specific exosomes from those cells or that act efficiently in those use cases, then that will be even more synergistic. So if have kidney failure, we could have renal-derived exostomes and we can have And then everything would just be a simple matter of refurbishing our old car with our own parts.

So just think of aging and disease as stem cell niches throughout the body that are depleted and defective. And so in the future, we're going to have a combination of stem cells with exosomes to stimulate them.

The musicians and the music to get them to play. That'll be like a time release phenomenon and that'll the best of all worlds. As we talk about the fact that excess homes are not FDA approved, we need to talk to the FDA as a business entity, intellectual property entity.

And we see from this meme that I've redacted that Scott Gottlieb is the former FDA commissioner. Now he's on the board of Pfizer. This other fellow, Stephen Hahn, it was FDA director under Trump and now he is Moderna board director.

The guy Smith James is a CEO of Reuters and he was on board at Pfizer, so Operation Warp Speed, Record Time, Approval of mRNA, Fermentation to Induce Immune Reaction.

These companies made a lot of money and they had a very easy go of it. In fact, arguably people are judging it,

prejudging it as effective and safe out of their fear.

The days when bespoke personalized medicine are going to be approved by the FDA are probably approaching infinite. Whereas things that people have a clear profit motive get approved very quickly.

Allogeneic stem cells probably are immunogenic. As I alluded to, you can do a literature search. It's very clear. If they do work at all, it's because they're around for a few days and they are pumping out these exosomes.

So why not just take the exostomes and forget about the whole problem of strangers moving in and having to kill them. Thankfully, they don't engraft. I never asked Duncan Ross, but I think the name of his company Chimera with a K is an allusion to the fact that every time you take someone's stem cells, you hope that they work by staying around.

But then again, do you really want to be a chimera or a mixture of different animals? Do you want it to, be you know, patient X, patient Y? living in your body, I don't think so that causes mosaicism genetically.

And a chimera is like a Griffin part, you know, yes, lion and horse or eagle. Sphinx is a lion, and an eagle and a man. I think you really want to mix species.

Things are complicated enough as they are. Anyway, in the future, I think the premise of what we're doing is not crazy. It's not fringe. it's just biologically based and it seems to be substantiated by clinical anecdotes.

So what really doing it is reducing inflammation, which is universally bad. And then we are regenerating and proliferating cells in their local niches.

I think the quality assurance and safety advantages from standardized purified exosomes is, is manifest. I mean, it's very clear the extraction is just getting the pure exostomes and then suspending them in normal saline.

There's a very few moving parts. We don't need media for nutrition. So we don' even have the serum free or. chemically defined media, these things don't require media.

So again, infectious-wise, media- wise, immunogenic, I guess, genicity is less. I think the exosomes come out on top. Of course I'm very biased, but I feel like the margin of safety, therapeutic index is very wide.

In other words, the ability to give a lot and not hurt people is wide, and so I it's a good way to go. If money's not an issue and you have someone in your life that's still in their twenties, probably banking of stem cells is not a bad idea.

So those are just my two cents. I'm going to open it up to people. And I'd love to hear experiences. If you know someone that has done stem cell, again, I am not expert in this.

Just present what I can figure out. and so I don't think anyone's a true expert at any of this because nobody really knows what it feels like to be a cell and do what they do.

Future of Banking and Combined Therapies

I'm going to go ahead and go off presentation and take questions. You can raise your hand, ask to be muted or type them into the chat as you like. Does anybody want to ask a question?

You're going raise a questions from Adam. I will unmute you now. Yes, Adam? Yeah. Hi, thanks for the presentation. Um, I got, uh, you from Christine Peterson, who's a friend.

And I wanted to, to two questions, So I was looking into exosomes as a potential intervention for my mom who hurt her ankle, a heavy weight fell upon it and she's been suffering some continuing inflammation, even though the doctors can't see any damage to the bone.

And what I'm wondering is, first of all, could in your experience an exasome injection at the site be helpful in having anti-inflammatory and or regenerative properties.

And secondly, once such an injection is carried out, how long does it take and what is the process by which the exosome load is then dissipated and I guess in general handled by the body.

Um, and maybe a third note on this is she, she's currently outside the country and if you are outside of the. How would you get even get access to, to this treatment?

That's, that's basically the question. Okay. So in reverse order, yeah, I had met with Duncan Ross and they're trying to open up European offices. And so that's coming maybe a year from now and the EU is one zone, minus UK.

I'm not sure where she is, but the short answer is no, you can't really transport them effectively internationally unless you're willing to risk up, seizure or some other legal problems.

So even that, it even applies to Canada. As far as the dissipation of them, you know, They dissipate very efficiently through just diffusion, lymphatics, blood circulation, binding to albumin and binding the albumins on cells.

So they're moving all around. They're hitchhikers. There are like little dandelion seeds or nerf balls. they are going everywhere always in many ways.

so they get diffused out very efficient. Indeed, that's a problem. And that is why some people have advocated sort of other media, platelet rich plasma.

placental matrix, yada, I'm not a big fan of that. I just believe in starting it where it's needed and letting it diffuse out to have a systemic effect.

With regard to your mom's injuries, she dropped the dumbbell on her ankle. There's no x-ray damage. So, you know, it is not bone. It's probably partially torn ligaments.

And so, yeah, in the acute injury setting, the pain comes from the the attempt to repair and the inflammation is really five things. It's rubor, redness, tumor, swelling, fontial loss, loss of function, heat, color, and dolor, which is pain or nerve irritation.

So there's a lot of extra blood flow in that area. You gave it IV, it'd probably go to the ankle anyway in this setting, but probably better to start off in the angle, let it diffuse away.

It should help rather quickly to shut down inflammation. I remember my first and only gout episodes, gouts supposed to last two or three weeks, I drove into the office, injected my big toe and within six hours it was feeling pretty fine.

So it's very anti-inflammatory and it'll start the healing and much more efficient process as well. You'd have to fly into LA and see me. Okay. Actually got it.

Yeah. Thank you. Okay, good question. I'm going to go ahead and answer a typed question we have from Edmund Lou. In your experience, are nasally inhaled exosomes helpful with dementia, tinnitus, eyesight, COVID, anosmia?

Conceptually, what problems respond better to PRP injections, exostome injection? Okay. Multiple questions there as well. You know, I never got into PRPs.

trained because mainly I don't really want to centrifuge and do all that technical stuff. It's doable. But if you look back at foundational lecture number five, I think it's tinyurl.com.

understand my rationale. PRP has always been somewhat in the prolotherapy inflammatory camp. So you're going

two steps back to go three steps forward and they tell you don't take aspirin, ibuprofen because we want inflammation.

Audience Q&A on Exosome Use Cases

I don t want anything that wants inflammation, I want exosomes which immediately shift as I said earlier from Inflammatory T1 to T2, regenerative, and I want anti-inflammatory actions.

I don't have experience with nasal exosomes, I know that's the preferred technique. In the case, of course, COVID anosmia would be the exception. because COVID anosmia affects the receptors in the nasal area.

And so that would be quite good. You can refrigerate them for 24 hours and inhale them. My technique is probably the only one, I'm probably only doing it by injecting the submucosa above the nasoturbinates or the concha and pretty good results in.

Mentation, memory, word finding, other things I've talked about in terms of tinnitus. In one case of brain trauma, it did help. Double vision, It did helped.

I haven't really seen frank dementia corrected, but people kind of on the border, yes, quite a bit. But conceptually go back to foundational lecture five.

Want to talk about why I don't ever touch. Prolotherapy or PRP and I'm not even a big fan of placental matrix though, because I don't want any kind of inflammation.

I want to complicate things, I wanna stick right to be good stuff. Hope that answers your question. All right, any other, you can raise your hand or you could type in a question?

Hey Larry, Sam, how are you doing? JP? Couple folks I'm not sure. Hey Courtney, I think that's Courtney. I know Courtney Alright, looks like I covered all of it.

Nobody has any questions. Again, it's shocking to think about how little people know. Even the people giving these. Now I am not talking about just the techs or the scientists.

Everyone's kind of operating off the playbook. Like if you really ask someone a bunch of, just a couple of and why questions, you'll realize that people's true profound understanding of stem cell ecology and biology is quite shallow.

And I'm just the only one willing to admit it, but nobody really knows how these things work or communicate. So, we're going to dump a punch of your stem cells in there and we are going Put some exosomes in there.

We're going to say our prayers and hope for the best. And it's up for them, the cells and the exostomes to do what they know how to. It's really way outside of our scope of understanding.

Closing Remarks and Course Promotion

it is probably too complicated to even understand, even with like AI modeling and all this. Maybe a non-starter, but we're just biohacking in the same way that your body every day, all day tries to do.

It's replacing itself with its own stem cells and it's using exosome signaling to that. So what we are doing is not one of the more fringe or radical ideas, it is just biomimically just copying what your bodies trying to.

All right. Well, thanks everybody. I have to go into the office and treat a patient. Unless there's any other questions, I think we'll wrap. Okay everybody, hey, Thanks a lot for coming.

Dr. Ed Park finishing up a discussion on stem cells versus exosomes. And I don't think it's one or the other. Hopefully it is yes and, but I'm not a big fan of allogeneic off the shelf, non-immune matched stem cell that I will

say.

okay. Everybody. Thanks. A lot. Take care. Many clinicians are getting interested in exosome therapy and they hesitate for good reason. Questions like, does this work?

What forms do I need? How much should I charge? how do i stay out of trouble? All these questions are addressed in my online course. That's why I created it to help you get started.

The online Course is your permanent turnkey resource to get start either treating yourself, friends and family or to expand your practice and help more people as well as increase your revenue.

Thanks for tuning in to the Recharged Biomedical Podcast. If today's episode got you thinking, you'll love my book, Exosomes, Songs of Healing. It's packed with cool analogies, full color illustrations, and all the science you need to understand how exosome are changing the game in aging and regenerative medicine.

You can grab it in paperback, ebook, or audiobook, whatever works for you. Now head over to www.rechargebiomechanical.com to check it out. And don't forget to like and subscribe so you never miss another episode.

See you next time.