Exosome Products Compared: Quality vs. Hype Transcript

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Introduction to Exosomes

If you look at the cartoon in the middle, there's bigger things. And at the Melbourne conference on exosomes, I asked, well, what's in the bigger ones?

And one of the scientific researchers said, well, it's largely the same, isn't it? So why not include the bigger ones? Big ones have more payload. Well, the answer is to the right of the cartoon, you can have apoptotic bodies.

So when a cell suicides and ruptures into different fragments, you can get 500, 1,000, 2,000 nanometer blebs, which are basically dead cells. This is Doctor Talks, real talk from real doctors on the issues that matter to you most.

Hi, everybody. I'm your host, Dr. Ed Park, and welcome to another episode of the Recharged Biomedical Podcast. Today, we're going to be addressing a frequently asked question.

How do we compare exosomes? I thought I'd set the tone by using an oft quoted line from Erasmus, in the land of the blind, the one-eyed man is king. And then another slide I use a lot, what you know, what you know you don't know, and what you don't know you don't know.

And those are pretty important points. We talk about the fact that I'm not a molecular biologist, so my understanding of this is limited. This is for educational purposes only.

It's not an advertisement. I do sell chimaera products to providers and in my practice. And the use of exosomes has not been approved by the FDA for the prevention and treatment of any disease.

So the history of exosome science, the electron microscope itself is very old, 1930s, and they saw these occasional extrusions which they deemed to be poop.

In 2008, the relatively obscure field of exosome science started to grow, and now it's a very robust conference. I have attended twice. There's a lot of science, thousands of papers published, so people decide it wasn't just poop.

In fact, like the supermarket toy bubbles, there's messages inside, and so that's why my book is called Songs of Healing. Because if an alien was looking at this, let's say, John Coltrane on the loo, he might be only interested in what he output down below and not in the music of the saxophone or his compositional gifts and improvisational gifts.

What Exosomes Are and Why They Matter

I'm often asked, is it like buying gas? And the answer is no. And how many exosomes am I getting? And the answer to that would be, I don't know. But then again, neither does the manufacturer.

And so if that's all you want to know then you can tune out because that's really the rest of this lecture will just be explaining why that could possibly be the case.

Remember back in the 70s we had gas and you assume that all the gas are the same. Pretty safe assumption. Above us we see what constitutes different kinds of refining of petroleum products.

So why would they lie? Well, the answer, of course, is for money. People make money on these things. And so if we look at the recent last year study they did by Chimera Labs, they analyzed the mRNA, which is really stuff that you're interested in reprogramming.

And it was up to 400 times their competitors' concentration, if you believe their studies. So what is a mesenchymal stem cell? The video above me is not playing, but it should show an amoeboid-like movement.

So all of life is going from one to zero. And what I mean by that is you're one stem cell when you're a fertilized egg, and then when you die, all the stem cells die and you have zero viable stem cells.

Stemness is defined generally by two characteristics. That is asymmetric division, shown in the middle. That means the progenitor or mom becomes a differentiated daughter and a same mother.

And then telomeres activation, which I've spent many years studying and describing, they can immortalize themselves to a point by transiently turning on the re-lengthening of the chromosomes.

So let's talk about size. Sequoia is big, 100 meters, and Adam is small, 0.1 nanometers or 1 angstrom. And we're right there in the large virus section, coronavirus exosomes, all about 100 nanometers.

Now when we look at a blood cell, that's about 10,000 nanometers. The biggest human cell is 100,000 nanometers. So size matters, and these are very, very tiny.

actually quite literally invisible. And the reason they're invisible is because something's called Abby's limit of light, which is 250 nanometers. That means when you melt your exosomes, they should be completely clear.

There's nothing in them. So what do I mean by that? Well, with an electron microscope, you can see there's plenty of stuff in them, but with any kind of optical resolution, you cannot see them.

And so we talk about exosomes being songs of healing. In these tiny bubbles, there are many, many kinds of messages which we'll go into. So bottom line, they are invisible.

And that's the problem with counting them. So what are cells? It's alive. Well, in fact, cells are alive. They are musicians and they can play many different songs depending on the terroir for a wine or oenology term.

So you want to stress out the stem cells that are making the exosomes. It's like you want to request the musician to play a certain song of healing. People ask, well, how could you use the same batch from seven years ago pre-COVID?

Well, if you remember the Star Wars movies, Boba Fett's dad, Jango Fett, was made into many clones. And that's what they have. They have clones and they made hundreds of vials.

So they're good for the foreseeable future from a single donor. which is great.

Size, Visibility, and Counting Challenges

There are some very legitimate concerns about quality control in an older population, but effectively, as long as you maintain the quality control in your existing frozen banks, every time Jango Fett comes out of the freezer, he's good to go and a young, strong signal maker.

We see the chickens being farmed for their eggs, and so that is a good analogy. Watch my podcast with Darcy DeFede. She's built many stem cell labs as an expert in how to grow and maintain stem cells at a high quality, and that'll address some of your issues.

So the fundamental question comes down to, well, how many exosomes do, let's say, a million MSCs? You know you have a million MSCs because they're big.

You can measure them. how many exosomes would they make in 24 hours? And the answer is no one can know. Just like chickens in a farm, they say years ago, before factory farming and breeding, the chickens made much fewer eggs than they do now today.

So above me is the illustration that you really want to save the bathwater, because that's where the eggs are, that's where the exosomes are. And there are many cookbooks on how to increase yield, but the fact is that just like the chickens can make various quality of eggs, The cells can make even more infinite number of combinations of signals.

Now let's look at the picture again to my left, which people thought was poop just because they arbitrarily decided that. The crux of this is why do we want a certain size exclusion?

Well, if you look at the cartoon in the middle, there's bigger things and at the Melbourne Conference on Exclusions, I asked, well, what's in the bigger ones?

One of the scientific researchers said, well, it's largely the same, isn't it? So why not include the bigger ones? Big ones have more payload. Well, the answer is to the right of the cartoon, you can have apoptotic bodies.

So when a cell suicides and ruptures into different fragments, you can get 500, 1000, 2000 nanometer blebs, which are basically dead cells. Are they bad?

Are they good? We don't know. But the rationale for size exclusion and inclusion, we can see from the electron microscope what the size should be. So let's just narrow it down to that size.

None of the small stuff will be in, none of the big stuff will be in, and none of those apoptotic bodies will be in. So they're about 50 to 150 nanometers.

They do not reproduce. They don't have machinery and they don't have self antigen. So there's no way for your body to know it did not make them. So keep in mind, which is in common sense, size exclusion allows for smaller particles to get through.

So next to me is a home birth. Of course, you know, there's a lot of particles in there. Do you want them all? Perhaps not. The way that they isolate them is through this tangential flow of filtration which we'll go into.

But basically you have a mashup in my book of the size and on this diagram of a cell, it's not even like a grain of salt the size of the exosomes. So for your sushi lovers, the exosomes would be like these flying fish eggs above me.

The salmon is like laying the cells, they're huge. And the micro-besicles, are big and we don't want those because there's certain uncertainty. So the presumption is that the ones that are made by the endosomal pathway are the ones we are more specifically used.

If we let in bigger ones as one of the manufacturer tried to tell me we're better, well then we enter some more randomness into the system and some more variables and perhaps even more some more reactions.

So again, I can't stress enough. You can always see stuff that's bigger than 250 nanometers. These things are smaller. So what does everyone do? They use what's called a nanocyte, which is a diffusion light scattering a device.

What does that mean? It looks at the particles and infers from the Brownian motion how many and what size distribution they have. So you can see, you can standardize with known size beads and then you get a printout of the nanocyte.

Are they saying they have exosomes? They cannot.

Stem Cells, Yield, and Quality Control

They cannot because all they can say is they have particles. Particles could be any protein kind of fragments and even lipoproteins. So there can be a lot of schmutz in there that they can't count the exosomes, yeah?

One of the competitors, the brand they use, sent off a vial to a lab and they analyzed it and they said it's just normal saline, which is correct. Unless and until you melt it with the soap above, a soap is of course a amphiphilic molecule, one hydrophilic, one hydrophobic, you don't crack open the eggs.

If you send eggs to the lab, it'll say you got nothing but saline, because the eggs, or in this case the exosomes, are suspended in saline. But if you do what you're supposed to do and crack them open with soap, then you know what's in them.

And on the left is a printout of what's in them, clearly a non-random distribution of proteins of mRNA. You do proteomics, you do RNAomics, and you see that it is non-random.

And so there must be a purpose to these notes, if you will, comprising these songs. Most interesting, I was talking to the chief science officer and he said that microRNA is actually very overrepresented.

It's smaller, only 23 base pairs instead of these very long messenger RNAs that can encode larger proteins. So what is that? Well, next to my head, if I duck down, is 22 or 23 base pairs that are an anti-sense message.

So if you have a constitutively expressed mRNA, meaning the mRNA for, hey, let's not become primitive is always there, then a microRNA can come in and gum that up and your signal to not become primitive or youth-like or youthful is temporarily blocked.

You can see that there is mRNA specificity in exosomes on the upper left from stem cells, from cancer cells and others, and you can see there is some overlap.

It's a language, it's a music theory that we really do not understand yet. I do think that the reason why we get such young behaviors is because of this de-differentiation potential.

So we see the great John Coltrane in his Giant Steps session, only about a month after recording Kind of Blue. And this man was conscious and he wrote this great circle of fifths chart by hand.

There's like a pentagram shape in it, but he composed some beautiful songs, one of which was Spiral. And so it reminds us that a musician could play whatever they want, especially if they're a skilled jazz musician.

So what are we doing with the XS films? We're playing songs and these whirling dervishes, singing Yahoo! can all of a sudden become younger dervishes and rekindle and recoup from some accumulated damage.

We age because our telomeres shorten and our stem cells deplete. But what if we could support both? I've been taking TA65 for 17 years. It's the only supplement I trust to support better mood, better sleep, and exercise recovery.

And at age 57, I don't have any gray hair and I don't need reading glasses. TA65 is available now. Go to rechargebiomedical.com slash TA-65 and enter promo code recharge10 to save 10% off.

There's three ways. In the old days, they used to do centrifugation. I think this is probably a little harsher on the exosomes and you lose some yield.

So you can also do agglutination with antibodies, but then you have contamination with the antibodies. The best is any form of tangential flow filtration, which allows only the small stuff to get into these honeycomb sort of threads, many different designs for that.

But the bottom line is you want to do some kind of size exclusion at the minimum. So you see all the schmutz here. In this picture, you see radio labeling pink and purple for the specific antibodies that we want to target a known exosome.

They tend to have CD9, CD63, and AB1 on them. So if you paint them and it's on these bubbles, then yeah, you

got an exosome. All the other schmutz there that is overrepresented is debris or we don't know, unidentifiable.

Isolation Methods and Verification

Perhaps not exosomes. Perhaps they are. But again, this is the problem with counting exosomes directly. You need some kind of verification. It's important to remember that the song does not remain the same.

Exosomes are neither good nor bad. In a bad disease state, they can be bad. They can confer problems such as breast cancer, transformation. In a person healing from liver cirrhosis, they can be good.

So there's no good or bad songs, just like there's no good or bad musics. And the combinations are used for both stuff that you wouldn't want and stuff that you would want.

So it's very important to understand that they're just collections of notes and songs and harmonies and melodies. I've talked to pretty much all the manufacturers of exosomes.

They want me to try them and represent their product positively. But sometimes they get baffled by reps or chief science officers who say, oh, we have pool donors, which is better for risk.

And of course, if you look at this TD exposure chart, of course, it's illogical to assume or to presume that your risk of sexually transmitted infection will be less from more donors, right?

So on every file, we get a certificate of authenticity and it's tested even though it's a single donor, not exposed to other people. And yet, it's always tested for sterility, endotoxin, and about 30-something known infectious diseases.

The biological active unit, or the ROS unit, is a way that I think only Chimera has used for quantifying. So basically, it looks at the RNA concentration, of course, after you melt the exosome capsules, and divide it by protein to standardize it, and there's a coefficient or conversion factor.

and it gives you some kind of objective measure of potency. Older study they did attempting to quantify, so we have four shopkeeping units. This is the old one, XLGlo Pro.

Now we use Luxir. Same kind of theme though, one and five, single and triple strength. So that basically plays out to 10 biological active units or ROS units, 30 in the triple strength, and then 50 and then 150. The Luxir is actually stronger at about 20-30% more particles, which we presume are exosomes in the Luxir product.

So again, we visit, well, why would they lie? I mean, I talked to so-and-so company and believe me, I would do the same thing. If I'm buying bed or, you know, some coffee off Amazon, we're price shopping.

That's just a smart and normal prudent thing to do. But I have to tell you that people really don't know what they don't know. They don't necessarily do the quality control.

They might let a batch, a working cell bank go three, four, five months. And then are the products as potent? Are they even as safe? We don't know. It's all motivated by money.

So again, we revisit the chart and the one I use, the one I haven't switched from is allegedly 400 times more potent in terms of its RNA content. Because now you know no one can count directly the number of exosomes.

So what is the take-home lesson? Well, it's caveat emptor, buyer beware. You know, not all chickens are the same. Assuming the math and the methodology is correct, then it kind of denigrates the quality of the other products that they compared.

Cells and culture, yes, they are immortal, but they do acquire epigenetic gene silencing. They become kind of zombies.

Potency, Product Comparisons, and Buyer Beware

and their products could be bad and even senescent. Last week we talked about the senescent phenotype with Therapeutic Plasma Exchange pioneer Dobri Kiproth and that's one you want to check out if you're interested in changing the exosomes transiently and the bad antibodies and complexes.

So there's a lot of companies without a lot of expertise. Chimera has 10 years plus of doing this. Six PhDs, 30,000 square feet, 40 employees. To me, it's a matter of quality control.

It's not a matter of profit margin as much because no one at the end of the day can adequately or accurately quantify exosomes. They can say they have particles, they can say some of those particles have labeled exosome proteins, but ain't nobody in the world can tell you how many exosomes they're selling it, which is concerning.

So if you have questions, feel free to get in touch with me. You could do so at ovu.me slash Edward Park, or you can go to my website, send your question in, book an appointment.

My YouTube channel has all the exosomes lectures, telomere lectures, stem cell lectures and podcasts for interesting guests at Dr. Park 65 and that's my email there.

Also pick up a copy of Exosomes Songs of Healing and you will understand at 8th grade level what we're talking about. So everybody just be smart out there, be careful and know that it is impossible to count exosomes.

I wanted to answer the questions that were submitted to the website. These Ask Me Anything webinars will be mostly monthly, so we'll start taking some of these questions.

I would say yes. Because they transiently are making those little cells act younger, we do see regeneration of phenotype. And so I think that's the principle upon which some of these anecdotes where people are getting better can help.

Jerry Gaeta asks about cell factor. I did look that up. It's just, again, conditioned media. What does that mean? It's not hard to get cells, it's not hard to keep them alive, it's not hard to take the bathwater out and sell it.

A lot of companies just sell versions of the bathwater, which we call condition media. It has food, it has excretions, but they're not doing that size inclusion and exclusion necessarily.

And it's just easier, it's cheaper, and that's one way to go. It could be better, it could be worse, but it does add more variables, doesn't it?

Q&A and Clinical Applications

Jason Marks in Puerto Vallarta asked me through the website, in a case with bilateral L5S1 radiculopathy and denervation, which use stem cells, plus or minus exosomes, nerve hydrodissection, a lot going on in that question, I would say the way I think about it is, You know, your body is trying to heal with its own exosomes.

There's inflammation. If you do PRP, it'll cause inflammation, transiently, which will cause stem cells to come in and secrete exosomes. If you put stem cells in, they're foreign, but they will secrete exosomes for a couple of days until they're destroyed by your immune system.

So why not just cut to the chase and use exosomes from a newborn? So, in conclusion, I hope I'm not the bearer of bad news. It seems logical that you should be able to compare numbers of exosomes, but at the end of the day, nobody can really accurately state what they have, how many they have, and what's in it.

So, the principle I've used is the proof of the pudding is in the eating, and it seems like these are effective and safe over the last 10 years. So anyway, if you have questions, there's plenty of resources at rechargebiomedical.com and on my YouTube channel, drpark65.

Thanks for joining us and we'll see you next time. 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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