Episode Title: Beauty and the Biome with Jasmina Aganovic of Arcaea.
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JASMINA: It was very nostalgic. It was like those times in childhood where you got outside and you got dirty and that was completely okay and you came indoors or your mother hosed you off and like you were good to go. None of this like scrubbing every day and using these really strong soaps.

Intro

KARL: Hey, Erum.

ERUM: Hey Karl. How are you?

KARL: What a fantastic, crazy interesting week, right?

ERUM: Oh my goodness. Yeah. The whole thing with SVB. I was just floored that happened. It was like this train wreck was seeing it happen. I have a lot of friends that bank with SVB. I've banked with SVB in the past, and I empathize with founders who couldn't access their money. They have so many things that are tied up to their banking accounts. They're paying their employees, receiving money, sending money. I was scared, even though it didn't affect me directly, I was scared. What about you? Like how did you perceive this whole event?

KARL: I tried to be and continue to try to be positive about it. We're now four or five days post the announcement that they shut the bank down. I was on a phone call with a biotech founder on Friday, the day that it was announced, and she mentioned that they were doing all their banking at SVB and she'd been talking to investors for two days straight. She was taking it in stride, but I could only imagine how hard that situation was for her.

We have seen that in the UK a bank already offered to buy SVB and we're seeing different banks in the US buy for those assets because SVB did have a very unique niche servicing entrepreneurs. Even though it was called Silicon Valley Bank, they are present all over the country and they are a very important bank for startups. And biotech was a big part of their portfolio. So I think a lot of people are affected. And I also feel for them because anything that has to do with banking just harkens back to, 2008, 2009, but I think this is gonna resolve itself and I'm hoping this is not a sign of something bigger or worse coming up.

ERUM: Yeah. I read some analyses on it and it seems like it won't be that big. Who knows what other things can trigger a situation that happened in 2008, just never can predict these things sometimes. Yeah, so hopefully this helped Some companies

scenario-plan. If something like this were to happen again, what would they do? Like, how do they plan for emergencies? It's always a good thing to have in your arsenal as a founder or CEO of a company.

KARL: Yeah, I mean it's crisis communications is one of those things people never really think about. We don't actively push that as something that we offer as a service at Messaging Lab, but we do it, and we are very good at it, if I must say so myself, because we've been through it and we know what it's like, and more than anything, it's about having a contingency plan and it's about being clear and open in your communications with your staff and investors in the greater world.

But let's change topics you went to something more pleasant or something more sunny. You went to the museum this weekend. Tell me about your museum visit.

ERUM: Yes, I went to the museum and you went to the museum. So we had a nice cultural weekend. So I'll tell you about mine. I went to the Brooklyn Museum. I'm so lucky to live right around the corner from there. So I'm always visiting it. And they had an exhibit which honored Thierry Mugler. And he was an amazing fashion designer. I had no idea who he was, so I feel bad that he just came in on my radar. But I'm glad he did we're gonna talk about materials with Suzanne. We spoke about it with our friends at Polybion and just the innovation of textiles, he used steel in some of his designs. There was a bodice where it looked like a car from the sixties, and I was like, what? And like a part of the bodice, there was a lighter that the person wearing could just take off like one of those old school, like push lighters in the cars, like it was on that bodice. It was nuts. So I was very blown away. I recommend anyone that's in the area to go see this exhibit, anything with Thierry Mugler, look him up online to see their fashions. It's very inspiring. It's very bold. I love it. He dressed. Madonna, Naomi Campbell, he was in Georgia Michael videos, and I'm a big fan of Georgia Michaels. So it was a great museum trip.

KARL: Yeah, the Brooklyn Museum has done very well when it comes to these kinds of fashion exhibits and pop culture related exhibits. They did the Christian Dior exhibit previously. They also did the designer who was the lead designer for LVMH and Off-White, whose name I forget right now, but I should know it.

Ablo. That was an amazing exhibit. Yeah. I actually saw that both in Boston and here at the museum, and each one was different and was very privileged to see that. And then I went to the Museum of Modern Art in midtown Manhattan to see the Refik Anadol… installation, I guess is what you would call it. It's a video wall. And what he had done was take all the digital assets that the Museum of Modern Art has created over the years, runs 'em through a kind of AI, some type of AI algorithm. That AI algorithm is influenced by traffic through the museum weather, humidity. And creates this wonderful, fantastic, inspiring wall that takes up a huge space on the first floor of MoMA and you can just sit there for hours.

Erum, you and I will go on a work trip there and anybody who's coming through New York City, if you wanna meet up and go to MoMA, I'm more than happy to meet you there. It's a great place to have a cup of coffee. And this Refik Anadol exhibit is gonna be there for a few more months. It also really got me thinking about, kind of digital representations of the workings of a cell. We don't really have any very good models of how a cell works because there's so many things happening simultaneously at any given time within a cell, the number might be 10,000, it might be a hundred thousand. It is still unclear. It's still undiscovered territory, and seeing that kind of AI art that Refik has done, and all the work that's being done with the new ais that you know are coming online very quickly, I'd like to think those things are gonna accelerate this kind of modeling of what happens in a cell, which will be a huge accelerant for biotechnology.

ERUM: Yeah, absolutely because there are a couple people that are working in the space in terms of visualization and being able to see what's happening in, not necessarily the cell, but like biological processes. But it was really interesting to hear about the confluence of data that this artist had put together to make this art insulation.

And it's interesting that it's at this intersection of culture, right? Oftentimes, it's just, data and, ones and zeros just zipping past and it's very analytical. But the way that he brought that, and now that's happening a lot more, especially with Midjourney and Stable Diffusion and all these other AI tools are generative in creating images. But it's something that we talk a lot about. We definitely go to exhibit as part of our culture club. And maybe. do some live video from that, and that may be really cool so we can share it with all of our friends that can't be here in New York City to see it.

KARL: Yeah, so video and digital art is something that I've always been a huge fan of. I love installations given that Kristen, my wife, is an art teacher. I do spend a good amount of time going to museums and being inspired by art. But I've always been really into what people have done digitally and visually with video; it can be very creative. One of the pioneers of that was Nam June Paik. I love his work and going to a museum is always a good exercise for the soul. It's very inspiring and I think that those of us who are day-to-day working with life sciences or just the sciences in general, could always use a retreat from that.

Now, Erum, you mentioned, we've been reading Annalee Newitz's new book, Terraformers. I was curious why you brought that book up, because I want to talk about it in detail sometime in the future.

ERUM: Yeah, a part of it is that we're talking about the cultural aspects of going to the museum and, Terraformers is a part of our culture club. This book is amazing. I'm just halfway through to give you an aspect of what's going on in this book. It starts in the year 59,000, right? So you have to really stretch your mind to think about everything that could happen to that point. I can't even think what's gonna happen in the year 2099 or 2100.

So this is magnitudes farther into the future. And one of the things I thought was really interesting too, is that they do talk a lot about biotechnology. Of course we're talking about terraforming planets. That is part of the setting of this book is that they are on a different planet and that they've terraformed it over centuries.

But they also talk about biology and different animals. And one of the things that they talk about is that your body is an ecosystem. And so still taking elements of things that we can relate to, and I really wanted to hone in on that aspect for this particular episode. Because it's apropos to what we're gonna be discussing.

KARL: **Yeah. Your body as an ecosystem, I think, is a fascinating concept. We have just mentioned the microbiome in past episodes and we'll get into it a little bit more in this episode. So if you don't know what the microbiome is, that is the environment or of all the different microorganisms that live in and on your body, and I think that something like 20% of a human's weight is composed of all these microorganisms.**

They live in your gut and help you digest food. They live on your skin. They keep your skin healthy, they live on your scalp, they keep your hair healthy as well. If you wash them away, that is a cause of a lot of problems. Our interview today is fascinating because we're talking to Jasmina who previously had a company called AOBiome or Mother Dirt, which had a product that was specifically designed to help keep your skin microbiome healthy.

ERUM: **Yeah, I'm very fascinated about that. I'm excited for everyone to hear our conversation with Jasmina.**

KARL: **Yeah. So take it away. Jasmina Aganovic of Arcaea.**

Transition

KARL: **Jasmina, we're so thrilled to have you on the Grow Everything podcast today. Thank you so much for taking the time to meet with us.**

JASMINA: Thanks for having me.

KARL: **You've been working at this intersection between biotechnology, beauty and personal care for more than 10 years. Correct me if I'm wrong. But what drew you to that part of the industry, and how has your perspective on biotech and beauty changed?**

JASMINA: First of all, that's like a crazy stat. I have to pause and think about that. Has it actually been 10 years, I guess 2013, 2014 was really like when it started my time at Biome and Mother Dirt. Yeah. So I guess I'm coming up on 10 years here. That is crazy. Oh my God. Okay. How did that come to be? I stumbled into it, which perhaps people give that answer for a lot of things. That's more true, in people's career paths than folks recognize. The way that I got down the path first of science and beauty, had a lot to do

with connecting to passions that I had. So I really had this engineering mindset. I enjoyed chemistry, I enjoyed biology. I thought that all of those things were really relevant in the world of beauty. And so I wanted to apply my knowledge and my technical background in this industry that I was really passionate about.

The way that biology really started to play a bigger role, I will say is, right prior to my time at Mother Dirt, I'd met the founding team at AOBiome. They had isolated this microbe from the dirt. they believed that it had a lot of skin benefits, and I was just fascinated by this as an idea. I felt like it was like a very different way to think about skincare. I was fascinated at, frankly, the challenge of seeing how we could tell such a complicated and loaded story. So that was really what attracted me to something that was so centered around biology. But once I was there, I started to see how powerful biology was, but how few tools there were to work with it.

And whereas many people would've said, "Hey, biology is cool, but kind of tricky to work with. Let's just shave off some of those things that make it tricky so that I can fit into the way that we've always been doing things," I was like, "Hey, like what if we actually really tried to bring to life all of these amazing facets of biology?" And so yeah, that ended up shaping the trajectory of, really ultimately my time at Ginkgo and Yeah, it was "stumbled into it". But it evolved over time.

ERUM: AOBiome, I remember when you guys first came out with the product and I was a customer I just love the approach, the concept because at the same time I was getting more, knowledgeable about the microbiome and the skin biome and the way that Mother Dirt was positioned as a probiotic for the skin. And I was like, that makes a lot of sense. And I purchased a product, I remember I had to keep it in the refrigerator, I forgot about it cause I was using it like regularly for a week and then I forgot that it was in the fridge because like my beauty routine is in my bathroom.

But just go back to like the probiotic, the skin microbiome that is I think very interesting. Are you looking into that space? Do you have any insights for our audience about what the skin microbiome is?

JASMINA: Yeah, absolutely. In the most basic sense, the skin microbiome is the ecosystem that exists on our skin. And we are still learning about the impact that it has on how our skin looks and feels and potentially has an impact beyond just our skin. So there's a lot that is unknown. A lot of people are fascinated by this space because some links are starting to show up, between certain skin issues and inflammatory skin disorders, the integrity of the moisture barrier, things like that. And so it's become an area of a lot of fascination. However, it has been more complicated to understand than people would have expected. In some cases people view it as having a few false starts in the beauty industry.

Case in point, even around the time that Mother Dirt was starting, there was like a lot of interest in this as a space. It was heralded as like the next big thing in beauty. And then what science was not yet able to show was how to tie changes in the microbiome

to perceivable benefits for people. And a year or two years ago, even Allure Magazine wrote a mea culpa on calling it too early on the skin microbiome. And just to underscore like that isn't because the skin microbiome isn't something that is important or won't have an impact. It's really just that it turned out to be a much more complicated thing for us to understand than we expected.

But the science is getting better. The rate at which we're starting to understand skin biology and the microbiome is increasing and increasing. And so I'm extremely optimistic as to what that will mean for the future of the industry. But, with Mother Dirt, yeah, you had to keep it in the fridge. It created complexity for the consumer experience. There's been this big theme in my career around “Hey, having a product be successful or having a technology create the maximal impact that you want it to is not just about good science, it's about how it reaches the people and how it connects with them.” And so inevitably you end up getting into these tenants of messaging and storytelling and logistics and operations and supply chain. and that puzzle really fascinates.

KARL: **I want to come back to Mother Dirt and Tools, but just thinking about that product and other products, people want simplicity in their lives. And it just seems your beauty routine is in the bathroom, then you, all of a sudden you have to walk over to the fridge to pull out something, it just seems like it's an extra step that most people aren't used to. Not to say that they wouldn't incorporate that into their lives.**

I wanna come back to tools because I'm really interested in that and the whole microbiome thing. But one of the things I remember you said when you're at Mother Dirt was that dirty is a new clean. So what did that mean at that point and how has that evolved over time?

JASMINA: Yeah, at Mother Dirt, if you think about what like the two thousands were all about and really what messaging around hygiene was, it was really… Being clean meant effectively being sterile, right? So,like how I was taught skincare when I was a teenager, it was about making things squeaky clean.

It was like, you didn't even have acne or any sort of a skin issue, but you were told to use, I don't know, clear cell and like benzoyl peroxide because it would make your skin extra clean. And that was our perception, right? Cleanliness meant the absence of bacteria because our only view of microorganisms of any kind was that they were bad, and that they led to issues. So this idea of being dirty again, has a lot to do with, something that we observed with a lot of our early users, which was that they kept referencing this like story from childhood, which was like, they would go outside, they would play, they wouldn't necessarily, feel like they needed to live in the sterile kind of environment that modern hygiene, really hyped up.

And it was okay. It was okay to do that. And so for them it was very nostalgic. It was like those times in childhood where you got outside and you got dirty and that was completely okay and you came in doors or your mother hosed you off and like you were

good to go. None of this like scrubbing every day and using these really strong soaps. And so that was really our reference, right? Like dirty is the new clean. We found that people connected with that point in childhood.

KARL: **It speaks to this greater understanding that you mentioned the two thousands where cleanliness was about being, antiseptic and we see that also for example, in agriculture where over the last 10, 15 years people have come to realize how important it is to maintain this soil microbiome and how important that can be to reducing fertilizers. I'm not sure that it's a lesson to the pandemic, but it's a growing awareness that we do live with all these microorganisms all around us and killing them off is not gonna solve any problems. In fact, it makes things worse for us.**

JASMINA: That's right. Yeah. And the impact of the pandemic created a lot of questions around what was gonna happen to the future of the skin microbiome, right? Are people gonna go back to having things be more on the sterile or antiseptic side? I don't know that I've observed that things have slowed down. The interest in skincare in particular that really took off over the course of the pandemic, preserved the interest in the skin microbiome because people were interested in taking care of themselves.

So all the data is indicating that the microbiome in terms of consumer awareness has only continued to grow. And that requests for products that are good for the microbiome, even though we don't fully understand exactly what that means, are increasing from consumers. And even at Arcaea, we're noticing that with customers that we're talking to, which is that they're craving microbiome oriented ingredients, but they're definitely looking for solid data to back up what the heck that means.

KARL: **I just want to interject. You mentioned that when you started working at AOBiome and you got interested in biology, you felt that the tools weren't quite there. Could you describe what does that mean at that point, and how is it different now?**

JASMINA: So let's take what we were talking about with the refrigeration thing. People are like, that's a really hard problem, like stabilizing bacteria into a formula, oh, that's really hard. And I don't mean to say that it's like simple, but I just like to remind myself that SpaceX is making rockets land backwards in the middle of a barge, in the middle of an ocean. We can figure out how to stabilize this bacteria. Like we can totally do that. But the willingness to do that from stakeholders in this industry was minimal. And I thought that was interesting.

Another anecdote that I'll share, back from our AOBiome Mother Dirt Days, we got a lot of interest from companies in the space that have phenomenal expertise and resources that really wanted to play around with our bacteria inside their labs. And so you're talking to PhDs, people have been working with microbes for a really long time. And we hand over our microbe and we're like, listen, this is what it eats. It's not like everything else. It doesn't eat sugar, it like, eats this other stuff. So if you want it to grow, you need to feed it this other stuff, aka you can't put it on your standard agar

plate petri dish. And then it grows really slowly. It's like a 12 hour doubling time. And just as a reference, e. coli is like a 20 minute doubling time. So if you want something to grow and it only grows over the course of 12 hours, it's gonna take you a long time to see something emerge on a Petri dish. We walked them through this, and this is not hard. And yet, when they got back to us, they just said, “Oh, sorry, there's nothing in your Mother Dirt bottles, nothing grew.” And we were like, “Whoa. We have a really rigorous QA QC process. There is something in there, because it is hard to make sure that just that thing ends up in there.”

And then they take us through their process and like they did everything that we told them not to do. And so you're scratching your head and you're like, but wait a minute. Why do they do that? And then you realize that many of these organizations have standard processes, have standard procedures, and their teams are trained across all of that. And their training is that microbes in products are contamination and that is their only framing of microbes.

So thinking about microbes in a more expansive way meant that they didn't have the methods internally to evaluate it, which meant that they also might not have had the reagents or the materials or the whatever. And so this is what I start to think about as tools, right? What are the methods that a biology-equipped organization needs to help understand and validate the efficacy of biology?

Now, these organizations have really been investing heavily in this, so that's changing. but also it's hard to do that if your starting point is somewhere else, right? You're retrofitting things in. So it can be challenging to build out a very new framing. But, but yeah, I hope that answers your question. That was what I meant.

ERUM: There's a lot of companies that are exploring the microbiome, not just on the skin, but in the stomach, and how those microorganisms relate to our mental health, all the messages that are being sent that we're still trying to understand all of that. A company that we should probably get on this podcast too is Kallyope. I don't know if you've spoken with them. But we were talking about your work at Mother Dirt, but now you're at Arcaea. You just launched an ingredient you were telling us before we got on the recording. Can you talk about what that ingredient is and what it does and a little bit more about Arcaea?

JASMINA: Sure. I call Arcaea a biology-first beauty company. And what I mean by that is that we are working with an expansive slate of biology centric technology. So we are not using biotechnology as our sole tool to deliver solutions to the industry. What we see is that there are a lot of ancillary technologies related to biotech that can deliver a lot of value in beauty. And moving beyond biotech, it's things like DNA sequencing. It's things like the skin microbiome. It's things like protein design and engineering. It's things like bioinformatics. These are all technologies that have emerged and matured over the last 20 to 30 years, and our thesis is that they can help unlock, when used in creative combinations, new solutions for the industry or new possibilities.

So at Arcaea, when we think about introducing technologies into the industry through our ingredients, we're often asking ourselves, what can biology do that the current slate of tools, primarily focused on chemistry, cannot do.

The ingredient that we launched is called ScentARC. And just to take you through an illustrative example of what we mean by biology first, if you look at the underpinning science of deodorants, it was invented in the late 1800s and since then, it's pretty much been the same mechanism, the same type of science that we use. It's about masking, smells, absorbing, or blocking, and then broad antimicrobials. And yes, deodorants have gotten much more pleasant to use. It's become like a really large category, but the analogy that I give that's like a little bit cheesy, it's saying that, we just have prettier typewriters that are easier to use. We haven't yet gotten to like the MacBook Air, so the underlying science has been the same.

There hasn't been like a quantum leap in, in deodorants. And so what we're doing at Arcaea, trying to build those quantum leaps through progressive shifts in how these products utilize biology for science. So our ingredient ScentARC, what it does is it looks at the biological causes of body odor. So now we know that body odors are caused by certain microbes that produce these smelly compounds. And from a biology first lens, we know that organisms can behave very differently depending on what we feed them. And so what we wanted to develop was a very precise way to target these microbes that produce odor. And so we used a mix of high throughput nutrient screening, a knowledge of the skin microbiome, and specifically the microbes that are in the armpit, bioinformatics and machine learning to build this progressive model around predicting what types of nutrient blends can create the behavior that we want, and then a bunch of like analytical methods to measure all these smelly compounds. And so ScentARC, what it does is it's a standalone deodorant active, so you don't need to use like baking soda or essential oils or any of that stuff. And what it does is it shifts your microbiome in a direction of non-smelliness, if that makes sense. That's our first step into this world of,like biology curse products for deodorants.

KARL: **And so that's an ingredient that say, I don't know, like Unilever, even though I don't know if they would be a customer, but like some big brand would buy the ingredient from you and include it in their deodorant formulations.**

JASMINA: Exactly. Yeah. So we started sampling in December. We had a soft launch and we already have hundreds of people that have requested samples of this product to start, formulating with, and they've started. So it's pretty exciting for us just to see that response.

KARL: That's amazing. I wonder, Jemini, if you could just step back and give us the journey becauseyou spent this time at, AOBiome and helped with the Mother Dirt launch and now you're at Aaia.

do you want to give us some, further background on your journey from, working at a brand and becoming a founder?

JASMINA: again, not fully expected, or anticipated. at Mother Dirt, just to pick up there, I was seeing how powerful biology could be.[00:27:00]

and I found myself really interested in like helping biology achieve its full potential in beauty. I was like very excited by that, but there were no tools to work with, right? There were no methods, no ways to like validate things. It was like hard to formulate and develop. I'd known, several people on the Ginkgo team for a while then, and they, were really interested in understanding more applications around beauty and the potential for beauty.

And so I came into an entrepreneur in residence role. At, ginkgo, and my objective was really to learn about the latest and greatest of these like biology centric technologies. So really in, in Ginkgo's case, it was understanding their foundry, what was happening in the foundry, what types of technologies and tools they were deploying, how those were being used, what it was capable of today, what I could be capable of tomorrow.

and despite my technical background in like chemical and biological engineering from like a school that runs a really challenging curriculum. , it was still very intimidating [00:28:00] because 80% of the people that work at Ginkgo have PhDs And the field had evolved so quickly that many things were already being taught differently.

so there was a lot of catch up for me to understand. So part of my journey at Ginkgo started with like the core understanding of what Ginkgo was doing and talking. Organism engineers and getting a keen understanding of their foundry separately, what I was doing was talking to people across the entire value chain of.

Of my industry of beauty. And what I started to do was like piece together where there were points of connection, right? oh, there's this like really amazing capacity here or capability that could unlock ways to do blah blah blah differently. there's this need that I see here. What could some like Lilypad product be that could get us to that, holy grail or like North Star.

and so that was where I started to develop really what ended up becoming. The business plan for r km, and the core [00:29:00] platforms that we wanted to build the, build the company around. so that was really my time at Ginkgo. It was about two years. most of it, unfortunately was during the pandemic, so it was very, unusual, as an experience and I wish I could have spent more time at the offices.

But as we were all pretty much, at home. But, but yeah, that was the prelude to, to arch.

Wow. So you made a, an ingredient

ERUM: pretty quickly. I assume that Akea was, a lot older, Ibecause you already have a, ingredient that you're selling to the industry, so that's really fascinating.

JASMINA: but I'm

ERUM: really interested in about this ingredient because, the purpose is to, train the microbes to not emit an odor.

is that what it is

JASMINA: think about it this way. we as humans, If we are fed a junk food diet, we will feel crappy and probably act crappy. microbes are very similar, much simpler, but very similar, right? If we feed them certain types of food, they can either behave badly or behave well.

So we were looking to see what different types of food [00:30:00] combinations resulted in an ecosystem that acted the way that we. Two. so part of it was understanding like which food sources. The smelly microbes responded to in the ways that we wanted and didn't want. And then it was understanding how when you put those microbes together in a community, because like the community has an influence on one another, that the overall community acted in a way where overall it was producing less, odorous compounds, but that the community itself was still stable, if that makes sense.

So you're not like wiping out microbes. you're not doing any of that. does that make more.

KARL: No, that totally makes sense. I'm curious because, like over the past few years, and we know it because we've been, intimately involved a little bit behind the scenes, but.

clean beauty, biotech beauty have kind of been a trend in the media. And,I'm fascinated by this, what's the difference between clean beauty and biotech beauty, and why should people understand what those terms mean?

JASMINA: complicated subject, because as clean can [00:31:00] mean a lot of different things to a lot of different people. the way that I look at the like primary intrinsic motivator around clean and why it became what it is. Is because people wanted sort of reassurance of safety and transparency from the industry.

so that was the primary driver there. with biotech, there's a growing interest in that. I'm not sure that people fully understand what biotech is. so for example, even when I was raising the series A for arch, From people in the industry. there was a lot of education I found I needed to do to help explain biotech.

And there's nothing wrong with that. It's just a data point around where the industry is. what is more interesting to look at is what does this all mean for the general direction

of where things are going in? The driving trends that I see is like consumers are still always, and they have a right to, want reassurance around safety.

they're gonna want, reassurance around sustainability. they're gonna [00:32:00] want reassurance around transparency. So these three Themes are always traveling together. and they are not gonna wanna sacrifice on performance, right? they're not gonna want that, right? So all of those things are like very closely tied.

They are,an underlying current to what consumers are asking for. And the reason I'm really excited about biology and biotech is because the perfect antidote to all of those. It like checks all of those boxes. there's a. Strong chance that biology and biotech are really going to meet consumer needs, because of how all of those things are moving.

KARL: just to clarify again to our listeners, it's like there's a couple of levels of this. One is, biotech for just production, production of ingredients that are in nature that are rare or hard to extract.

Ginkgo uses a rose oil example. Instead of having to grow hundreds of thousands of acres of roses to extract a few milligrams or milliliters of this wonderful oil, you can instead engineer yeast to produce it and [00:33:00] brew it. that for sure is one angle where biotech intersects.

so any kind of natural ingredient can be produced this way. and then the other way is, this idea of performance, and that this is where the consumer still needs to be educated. through biotechnology, through all the tools that you mentioned and the tools that are evolving, you're able to.

Biology in a way that hasn't been done before. maybe take inspiration from what's in nature to create, ingredients that have performance that don't exist in nature, that are probably better suited for, humans,depending on what they're trying to do.

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JASMINA: That's right. That's right. there's this idea of. Finding an alternative source that is more sustainable. And then there's also this element of new possibilities, right? this, as a technology starts to open up new possibilities. The example I usually give to illustrate this is, hyaluronic acid.

So in the seventies and eighties, hyaluronic acid was already an ingredient that formulators really relied. However, it was sourced from [00:34:00] animals and the animal rights movement around that time was really starting to pick up. And the industry became very proactive in finding alternative sources. And Shiseido was one of the first companies to really develop a biotech version of hyaluronic acid.

So they have some of the first patents around developing a yeast to produce ha. And so they replaced it. But the more interesting thing to follow along is, Everything that's happened to hyaluronic acid since then, because now scientists look at this molecule and they could say, oh, well, if I.

Change the molecule in this way, it would have these other amazing properties. And if I changed the molecule that way, it would have all these other amazing properties. So now ha comes in many different forms and factors. It's used topically, it's used as an injectable. And that would not have been possible if biotech was not the way that we were making it.

we would never have been able to do that, if we were still extracting it from animals. So it was like replacing what was found in animals, but then it was also about enabling all of these other opportunities, because now [00:35:00] we could tune it. since

ERUM: you have a possibility of all these high performance, functionality in these molecules.

I bet your mind runs wild, like of different things that you can create. And right now you're focusing on the, odor. , there other things coming on the pipeline, or even just when you're daydreaming, do you think of oh, this would be a good molecule to create to help people with X, Y,

JASMINA: and Z?

So we have initiated work across four technical, platforms. the first platform is focused on the microbiome, and so Cent arc is the first ingredient that's coming out of that. But we're doing a lot of other work,in the microbiome as well. to give you a sense of some of the other areas we're working on,one is in the, sun care space.

So the cool thing about biotech is that we can start to access natural molecules anywhere in the tree of life ethically and sustainably. And so when we were seeing the challenges that exist in some care now,we asked ourselves, okay, where in nature has. Same problem already been solved, and [00:36:00] marine life has really phenomenal capabilities to protect itself from the sun.

There's something about the evolutionary path, like we as humans, a long time ago, used to have this like same group of molecules, but we like evolved away from it for whatever reason, but. Marine life still has it. and it's an amazing group of molecules. and we are developing a biotech process to produce this class of molecules.

the first molecule in the pipeline is called Gaol. There's some publicly available information about,the work being done there, on the internet. so we're very excited about this. we think that it's going to help improve the overall. Experience of sun care actives, and also be a really good skin care active period.

And then another area we're focusing on is hair care. So a very interesting thing about the science of hair care is that it's, solely reliant on surface chemistry. So like coding the hair to make it feel a certain way. and our thesis is that by using principles of protein design [00:37:00] and engineering, we can move hair care away from just surface chemistry and start to actually think about hair care strands.

Lego blocks, if you will, that we can change into different shapes. So we have, a lot of active work happening in, in that area too. So a lot of possibilities open up with, biology, that we're really excited about. .

KARL: biotech on its own already requires a change in the way that you tell a product story,

earlier I talked About simplifying routines, what has to change on the consumer side for them to understand why these are all beneficial. that's our responsibility on the brand. And, on our side, on the messaging side,

JASMINA: my point of view on this, and it might be controversial, is that the performance is really what's going to drive this.

the analogy that I give is, like the iPhone, it's totally changed human behavior and yet I have genuinely no idea how this thing comes together. I don't know how to program an app. I don't know, I don't know the battery thing, [00:38:00] like I still don't even understand like the memory specs of this phone.

I just, I don't understand. So for us, it's. Performance, improving people's lives, like it's something that works for them that they can rely on. And that's it. If they want to understand, how biology made that happen, we will obviously like have that content available. But we hope that the draw is these like new dimensions of performance that are uniquely accessible Through biology and sometimes people misinterpret that and they're like, oh, you don't believe in whatever transparency and like explaining to people like why this is important or more sustainable. And that's like totally not at all. It's just about the journey that you create for the person and understanding that different people are gonna be interested in different things, but people use products because they work for them and it improves their lives in some sort of, capacity.

KARL: people don't really wanna know how the sausage is made. They just wanna know it tastes good. So it's along those lines. and so I know that you speak publicly, on panels regularly, and [00:39:00] I'm sure that you get the biotech question or the product question, why don't you share what kind of questions you get asked regularly and what question do

JASMINA: you wish people would ask?

The regular questions are around how did you come up with this? tell me about your career path. and all of those are great questions. I,I love answering them because it's

important to be transparent around how twisty and turn, paths can be. what I wish people would ask me, , that, that was an interesting question for you all to put in the prep materials.

I like thought about that one for a little bit. as you embark on this, what are you afraid of? Because what's glamorized often by like entrepreneurship in general is somehow the stories come across in a way where it's.

Oh, like you were just like so brave and you had this brilliant idea and it was like an epiphany that came to you in the middle of the night and then you just were always just so focused on that idea and like somehow you achieved it. I have no idea why, but that has felt like my experience of consuming media around [00:40:00] entrepreneurship and that has not been my journey.

I feel. Whenever in our team, when we joke about like fearless leadership, I'm like, oh my God, it's not fearless. It's just like fear managing leadership. Right? Developing a healthy relationship with that because it's, along for the ride. So the rollercoaster is very real. There are days where you're like, oh my God, I'm so lucky to be working on this and this is gonna be amazing.

And then there are days where you're. , are we crazy? is this gonna work? Are we gonna be able to figure this out? And I don't know what dictates what day I'm gonna have, when I,show up to work. But talking a little bit more openly about that is like always there.

KARL: you talked a little bit about transparency earlier and then to build on this answer that you just gave us.

do you wish people would ask you more about, the safety of these new ingredients or what are the unintended consequences of creating these biotech ingredients? Do people ever ask you that? Do you wish they would? What's your answer if they did?

JASMINA: that's a pretty standard question.

One, like very specific case [00:41:00] where that was very front and center was during our series A,people were asking, about that and how we were validating that. and that's great. that's really important. that biology has. an opportunity to set a new safety and transparency standard.

But the thing that I always say when I'm answering those questions and those questions inevitably lead into the land of like GMOs and all of that. is that there are no words on a page that will satisfy 100% of people asking that question. what is most important is that we talk openly about it.

We talk openly about how we are making those decisions, and then it is about Corporate responsibility and commitments from people across the industry to do that, right? To be transparent in how they're making those decisions. And then to demonstrate to consumers how it helps make their lives better and how it aligns with their values.

And so this is gonna be like a thing that takes time. Like it's not just gonna be one. Great answer that I give. And the industry can have as [00:42:00] like a sound bite. It's it's a mix of things. It's education, it's talking points, it's demonstrating and it's, corporate trust too.

KARL: Yeah, biology is inherently complicated.

We started this conversation talking about the microbiome and people realizing how it wasn't a simple fix, and we still really don't understand, or are probably not even close to understanding all the interactions that the microbiome has with human biology. and, you're putting things in and on your body that are being created with new technologies, it requires a level of transparency.

It requires a different way about talking, about them.

JASMINA: so you work with Ginkgo right now, like what's your

relationship with Ginkgo? Sure. If there are cell engineering programs that we need to do, then, we work with Ginkgo as a partner if they're a good fit for that.

So we've had several projects we have already worked with them on, and have others,coming down the pike. .

KARL: you're creating several ingredients. You guys are, changing the beauty [00:43:00] supply chain, and,if you think about what does a future look like, with, AAIA being successful, what does the beauty industry look like?

in three or five years, if you guys are succeeding your mission,

JASMINA: ourvision for the future is a world where limitless expression is possible. and so we think that biology can really,make that happen. our purpose is cultivating and appreciation for beauty.

Without the ideals. and so interestingly in on our team, like we had a bunch of conversations about like how we talked about our association with the beauty industry, right? Like we love the beauty industry, and then we also found ourselves like a little hesitant to be like, we are in the beauty industry because we felt like we were gonna be judged.

And then we were like, wait, why do we feel like we're gonna be judged? And this tenant of beauty is something. is really important to us because it's about identity and expression and it plays a really important role in people's lives. But the moment beauty is taken and turned into this thing that is positioned as an ideal, that's [00:44:00] when we have mixed feelings, about that.

So the cool thing about biology is that it is inherently individual, right? Like even going back to centar, the way every individual's person's microbiome is, Shift their microbiome in this direction of nons Smelliness is going to be different, right? And so even with the wording that we were using with this product, we were trying to detach it from the feelings of shame that have typically been associated with like how the first deodorants were positioned.

But you could also see a future where body odor is not just something that we manage and like this, like grudge part of our personal care routine, but actually something that, we can choose, right? We can choose how we want to smell that day, right? So biology can really change the game when it comes to individuality and expression and really making it impossible to develop, an ideal,of beauty.

so yeah, that's my somewhat philosophical answer. , are you wearing any cent right now? I am, yes. It's like the only deodorant [00:45:00] that I wear our team is like developing a bunch of different form factors. Deodorants. we even joke if we should even call it a deodorant because it isn't deodorizing, like the mechanism is completely different, but Oh yeah, I learned that along with an.

Yeah, a new name for a new Reor, uh Reauthorizingso yeah, we're always the endless Guinea pigs for what we're working on. And

KARL: how has it changed the way you feel about the way you

JASMINA: smell? So that's very interesting. I will say it is an interesting experience to just like notice that you sweat but you don't smell. that's pretty cool. interestingly, when we did a third party consumer perception study, there were some comments in there where people were like, I have this stick that does not, and I normally smell, but after I sweat, I have no smell.

So like where did the smell go? So people are really used to like, I smell and then the smell like has to Happen. Like it, it's somewhere. so that was very interesting for us to, [00:46:00] for us to see. We also did ask people in this study how their personal scent evolved over time, and the vast majority of them said that it became more pleasant.

we're just getting started. we've built a bunch of core competencies around body odor, lucky us, and the microbiome. So that there's gonna be a lot more to, to come there. And I don't know if

KARL: the, is this a personal question?

If I ask are you aware of other people's sense? , are you one of those people who is, if you're around someone you know who I don't know, they smell off or I say off because, I'm just curious for, personally, do you notice other people when they smell and I don't know if you, the heightened sense of smell?

JASMINA: Yeah. there have been circumstances where yes. that has been the case. . But what comes to mind more for me is like the series of months where like our whole team was prototyping these actives. And so everything from testing the actives on both armpits to like having the placebo on one armpit and the active on the other, and having this like lopsided smell.

And, we all made like a bunch [00:47:00] of jokes and there were days where like I needed to have my micro. Swabbed and I was like so proud of myself because like I didn't think that I smelled, but my colleague was like, you definitely do smell. So it's . We got real cozy, real fast. all in the name of Biology for science.

And then we all reached a point where we were like, it would just be really great to not have to sniff myself like multiple times a day. I'm just ready for this to be done. .

KARL: Okay. And so then here's another question that,you don't have to answer it, but will you do like longitudinal studies to figure out what the evolution is of microbiomes and the impact of your product?

JASMINA: longitudinal studies. So do you mean understanding how the microbiome shifts over time? Yeah. With your product, more broader studies? Yeah. Yeah. So we are actually, in the process of doing a clinical study that's going to be monitoring, just that, so we look forward to sharing that later this year.

Cool.

KARL: That's so cool.

ERUM: here at GR everything we wanna inspire people in

what's going on in biology and what what the, future vision could [00:48:00] be. And oftentimes we get that through books or media or movies. Are there any books or movies that inspired you or resonates with your passion for biology and the science?

JASMINA: I have become very inspired by Grow Magazine, which Ginkgo does.

it's just like such a fascinating, fantastic, set of content and art. So I really enjoy that. for anyone who's like into solar punk, if you know what solar punk is, there's a book called Monk and Robot. There's like this whole series,that's like solar punk inspired. So that's pretty cool because it makes you live in.

Future. That is really exciting. It's like very modern and it's lush at the same time. And it's much more aligned with where we as humans want things to go versus how we, strangely talk about the future. so yeah, those are a couple for you.

ERUM: thanks for that. so it's called Monk and.

JASMINA: Monk and Robot. Monk and Robot. Have

ERUM: you read that Carl and a Carl's a big fan of solar

KARL: punk. I don't, no, I have not read those. Yeah. Put that letter last. The last solar punk book I read was Sarah, the [00:49:00] Wind Keeper or Wind Seeker? Wind Sweeper. Oh, I haven't heard of that one. Okay. Oh my God. It was a fantastic book.

It was written in the early two thousands and they're growing their buildings and they grow their computers and they've got like a living, internet and it was very, prescient for, being written when it was. you know, Jasmina, this has been such a great conversation.

Just to close it out. Was there anything that we should have asked you that we didn't ask you or anything that you wanted to talk about that we didn't get to?

JASMINA: No, this is really great. I appreciate you having me. I really enjoyed the discussion and I hope that the listeners, do as well.

KARL: I'm sure they will.

Thank you so much.

JASMINA: Thank you.

ERUM: Thank you, Jasmine.

Transition

KARL: Wow, that was a great episode. Iram,

ERUM: I felt I fangirled her because of AOBiome and I had bought their products and it was just great to speak with her directly and hear about her journey, her whole journey, but specifically from going from AO to aia, and she's always had this focus on skin and as I [00:50:00] mentioned in the episode, skin's really important to me.

I've always had some type of issue. But knowing that it's related to the microbiome I know she's focusing on deodorizing or but there's a big opportunity here and being

able to understand the microbiome and the biology of skin and coming at it from, Perspective rather than traditional cosmetic chemistry, which is a one size fits all.

I'm very excited to see what she's going to be doing

KARL: in the future. Yeah, so here's a kind of a horrifying statistic that I just learned over the weekend. Something like half of all newborns are born with an inadequate microbiome in their gut.

Whether that is because of the place that they're being born or the food that their mother is eating. Even some of the microbes that are essential for a child's health, a human's health are not found in half of all kids that are born today. And that has, has

ERUM: that always been the case? Has that always been the case?

KARL: No, not at all. This is something that's recent. I don't know how [00:51:00] long I'll have to check the statistic as to when this started. Oh, okay. But it has really profound implications for health because a lot of the allergies like pet, the peanut and tree nut allergies that kids have come from having a microbiome that's just not able to process.

Those foods and they say playing in dirt is healthy, being outside is healthy. Having a pet is healthy for kids because they're exposed to a lot of different microbes. But unfortunately, that's not true. That's not possible for many people, especially those that live in urban environments where there's not parks or parents who.

Tend to keep their kids extra antiseptic. We need to be exposed to dirt and microbes and so those kinds of things are really important for our microbiome. And We wanna live in harmony with these microbes that live on a symbiotically, because otherwise it has health effects.

ERUM: I think there's another statistic, halfway

of the cells that make up who we are are foreign dna, right? So that includes all of the microbes which include, [00:52:00] bacteria, fungi, mites that live on our skin. They all are, like you're saying, working in harmony.

And when it's out of balance, then it starts acting up and you start seeing different reactions that your skin or your stomach or wherever on your body starts retaliating or. Sending you a signal that something needs to change. I think that's what I was really wondering about, I wanted to bring this up in the episode when we were talking to Jasmina about her product scent arc and how they're reprogramming the bacteria to not smell right.

Is that how it. And then you and I had an offline conversation about smell is there for a reason to signal to you to not go near there or not in interact or do something right? Sorry if anyone's eating, , our poop smells, and it's a signal back in the day.

our ancestors might have got confused and accidentally ate it. So maybe it smelled over time. I don't know , but I wonder if deodorizing. Your the bacteria under your [00:53:00] armpits, what that would do, right? Is a signal of stinking, is it a sign that you need to wash whatever bacteria is there off your body or it's okay.

it's going to reo otherize and need to make sure you are some of that showers regularly. I think these days most people do , so it's okay, if it's. Bacteria under your armpits, that smell, does that make.

KARL: Yeah, we talked about what happens when those bacteria suddenly become immune to the compounds that reor utilize them, or how will they evolve over time if a lot of people start using these products.

I think it's a really interesting question, and then it actually brings up like this kind of. Deep philosophical questions about, who are we to reiterize these bacteria and change them so that they no longer stink? Damn . That was like a you, there was an article in Ginkgo's Grow Magazine a couple years ago that was all about, you grow all these bacteria, you scientists are engineering them, and then, when you're done with them Dispose of them.

[00:54:00] But do we really have a right to do that? I know we wanna live in harmony with the bacteria that are our bodies, but we also want to be very cautious of the bacteria that can make us sick. So those are some deep ethical questions that I don't think I want to get into because it's just I want people to be able to have a healthy relationship with biology and I do believe that.

We are changing the world for the better with genetic engineering. But I think that, there we do know there are downsides and it's just one of those things we have to be aware of.

ERUM: that's a whole concept of. Organism, ethics or bioethics?

KARL: Is that a class? It is, yeah.

Bioethics is a whole field of steady and it's something that we need more of because as life becomes increasingly one of the most important technologies on the planet, we need to be asking these deep questions about, who has a right? Is it okay to appropriate?

Do cultural appropriation, but with bacteria from one place or another. I know that's part of the no. Goya protocol, In terms of, taking microorganisms or plants from one

place and putting 'em into another, there's a lot of really deep questions that I think are really [00:55:00] important to bring out into the open.

ERUM: We'll have to find a bioethicist or someone who's really working on this. And maybe we should ask Henry from Cultivar. he's been talking more about biosecurity, but this is, related. We'll have to bring him on and talk about it.

KARL: Yeah. So I'm super excited this conversation with Jasmina was fantastic and we've got a number of really interesting conversations coming up. We're talking to Suzanne Lee of Bio Fabricate. We're gonna be talking to Amanda Parks of Panaya, which is a clothing company that use.

Novel biomaterials in the work that they're doing. We are hoping to get Sine Tahi the founder of K 18 hair, where they do a lot of talk about the microbiome and then also about, using nature to repair hair from the inside out. So there's a good series of very interesting conversations that we're gonna have over the next couple weeks.

And we want to thank you, the listeners forSupporting us and giving us feedback and letting us know what we could do better. [00:56:00]

ERUM: Yep. Absolutely. And everyone check out the show notes. Please send us your thoughts, send us any suggestions of other topics you want us to discuss or people that you want us to have on, and we will find them and bring them on.

And just wanna say, Carl, it has been a pleasure speaking with you. Thank you so much for all of your insights and everything that you do.

KARL: Thank you, Erum. I feel the same way. So thank you . I love the kind of mutual admiration society that we've got going on. And thank you to all our listeners.

And I will say we have had some really good comments. We've had a number of people reaching out to us, not just uh, the website, but also I've been getting people on LinkedIn who. Given us some really good positive feedback. And I'll read some of those next time we're on and thanks for listening.

Support us. We've got a Patreon page because we do this podcast and it is not free. And we have big plans for expanding this. Thank you so much and stay tuned for the next episode.

ERUM: Oh, wait. And what, just to remind everyone, we are [00:57:00] the fastest growing biotech podcast in the universe.

KARL: Yes, we are.