

# Disrupt Yourself Podcast

## EPIISODE 385: NINA TANDON

Welcome to the Disrupt Yourself podcast. I'm your host Whitney Johnson, CEO of Disruption Advisors, where we help you build teams of high performing people -- because organizations don't disrupt, people do.

What does it mean to turn a dream into a business plan? How do you take your vision of a better future, whatever that looks like, and translate that into a company? It's a difficult leap! This grand vision has to be broken down into steps, arranged on a timeline. Then your dream becomes tied to the bottom-line profits, to your employees and your board.

We've had guests before that have made that leap, whether it's Austin Hillam's ZipString or Jennifer Smith's Scribe. But our guest today has a dream we haven't seen before on this show--revolutionizing how we treat broken bones. Nina Tandon is the co-founder and CEO of EpiBone, a biomedical engineering firm that brings together stem cells and 3D technology to grow bone grafts. Yes, you heard that right - Nina is growing bones.

Her method's already been shown to work but turning those studies into widespread adoption - now that's a big dream. So how does Nina balance her two selves - the researcher, and the CEO?

I hope you enjoy.

**Whitney Johnson:** So, Nina, you spent a lot of time as a kid taking apart old televisions. Not every child has access to a supply of ancient CRTs. And you can tell everybody what CRTs are. So where did you get them? And what did you get out of this experimenting that you did?

**Nina Tandon:** Well, you know, I'm not going to lie. I mean, I grew up in an apartment building, so there was a ready supply of trash, you know. So, you know, all I had to do was just, you know, there would always be somebody throwing something out, interesting. And, you know, get after it, you know? So, what did I learn? I mean, I remember the first time I saw an old TV and thought to myself, wow, these parts, like, what are they used? Why is there a tube inside a television? And of course, you know, people used to say, I'm watching the tube, right? You know, and I just I think it's really cool to look at old technology. I feel like it gives you a sense of something that's, philosophically what, you know, as a scientist or what we're taught as a scientist is that you're always building on the knowledge that came from before. And so, it gave me a sense of like, how did we get here? I just I love technology. And even when I was in undergrad, my favorite, we learned I was an electrical engineer, and we did all kinds of cutting-edge stuff at the time. I mean, this was a long time ago, but even then, I kind of liked what I gravitated most towards was microchips. You know, digital logic, like, instead of, you know, there's computer code that you can write on computers with your hands at a keyboard. But I like the kind of code that you could build with chips.

**Whitney Johnson:** Huh.

**Nina Tandon:** So, something about the physical world and that intersection between, oh, I have thoughts in my head. And I can make them real with chips and sometimes program those chips, but in a very low level way, that was what I gravitated towards, And I think, you know, I see a through line between that and what I do with biomedical engineering, because we treat cells the same way that I think looking back, I thought of little chips as is that they were a smaller unit than a computer. I could sort of understand how they worked, and I could build all kinds of things with them. And the same thing is true with cells. They are conscious, in my view and by working together, they're like a unit that, you know, comprises us as organisms. You know, many of those cells are kind of that building block, but they themselves have their own internal logic. So, I think there's a bit of a through line there.

**Whitney Johnson:** For sure.

**Nina Tandon:** And not to just get right into it, but.

**Whitney Johnson:** Yes, get right into it. So, we're going to back up for a second and then move forward on that. So, I'm curious, you said you grew up in an apartment building. What city did you grow up in?

**Nina Tandon:** New York City.

**Whitney Johnson:** New York City?

**Nina Tandon:** And I actually live in the same apartment building where I grew up. Now, my parents are still here. So, I look at that, those trash rooms all the time, and it's on a little island called Roosevelt Island. In between, it's in the middle of the subway map. So, you know, if you've seen a subway map or a map of New York City, we are right smack dab in the middle of it, and no one's heard of the island. I mean, even now, the number of times people say, oh, you live on Roosevelt Island, you're the first person I met who's ever lived there. And I think to myself, well, yeah, that's Roosevelt Island for you.

**Whitney Johnson:** How did you end up living in the same building where your parents live? That's so amazing.

**Nina Tandon:** It's great. I mean, well, and I'm not the only one. Gosh, my parents moved here. They met at Dartmouth as MBA students and came to New York City. And my dad's from India, my mom's from Buffalo. And so, New York City is like, neither of those places. Closer to Buffalo, maybe. And so, someone that they met, I don't know, there was some serendipity to it. When they first came to the city, said, oh, you should consider Roosevelt Island. It's a great place for having a family. Because, of course, New York is, you know, infamous for

being terrible for kids, although I think it's a great place to be a kid. So, they moved here. I grew up here. I'm one of four kids. And I grew up babysitting a bunch of kids here. There was a babysitting co-op. It's a very kibbutz type of place. So, everyone kind of helps each other out. It's a small island. And so, growing up here and now, what I said is I'm, you know, I started this out by saying I'm not the only one. A lot of those kids I grew up with have kids now moved back to be near their parents. And so, our kids are friends. I see their parents. It's this multi-generational community in the middle of New York City and no one's heard of us. It's amazing. It's a nice secret. And yeah, some friends I have now are looking to move here because they just want to be part of this village. But I did it because my parents are here, and I'm one of a, I'm part of a cohort of townies that has done the same, and I just came from my five-year old's graduation at the and the school where she graduated from or is graduating from is what became of that babysitting co-op. It became a school.

**Whitney Johnson:** Wow.

**Nina Tandon:** So, I'm an alum of the preschool.

**Whitney Johnson:** So fantastic. And you know what, for me...

**Nina Tandon:** It's so cute.

**Whitney Johnson:** Yeah, I love it. So, we lived in Manhattan for 11 years, so I know where Roosevelt Island is. And just hearing you talk about it sounds like this idyllic small town in the middle of a very large city. Magical.

**Nina Tandon:** Yeah, magical. And, you know, I've always searched for enclaves within the craziness. Yeah. I think it set me up for that pattern of always looking for what's the small, homey place within the middle of. What's the eye in the storm you know?

**Whitney Johnson:** Yeah. All right. So, Fulbright scholarship, tell us what it is. You used to go to Rome. What did you learn by studying abroad?

**Nina Tandon:** I mean I always had a bit of a wanderlust as a kid. I mentioned I'm one of four kids, it meant we couldn't really go on planes that often. And so, I became really interested in studying abroad when I was in undergrad. And I had a chance to do that in London. Travel around. But I studied Italian in undergrad, and after I was working as a software programmer for a couple of years. I mean, I graduated right into the dotcom bubble, and I worked in telecom, which was being highly disrupted. So, everyone's panicking about their 401 S. 9/11 was my second day of work. Okay. So, it was a really tough transition, very bumpy. And in a time when many Americans, especially New Yorkers, Americans, were questioning our place in the world and New Yorkers like myself, you know, our home had been attacked in this way that it hadn't seemed possible. And so, I found myself really thinking a lot about, you know, New York's relationship with the world. Where I wanted to fit within it. And the Department of State, you know, the Fulbright program was meant, was set up, actually at the end of World War 2 to foster intellectual discourse and to serve as kind of a diplomatic mission to connect thinking people throughout the world.

**Nina Tandon:** And I really latched on to that mission. I applied for a Fulbright as a newly minted grad, and I applied to go to Rome, to Italy, which, you know, Rome is such an ancient place. So many layers of civilization there. I mean, just it's a place that will, you know, you'll either be repulsed by it, but many more people are really attracted to it. I was one, and I was interested in, I think I said a moment ago, you know, that chips to me seemed like there's a through line between chips of computer chips and our bodies. And this was something that after 9/11, I was really sad. And I was working on this new job. My two grandmothers had recently passed away. I felt very lost and unmoored, let's say. And one thing that I've known that's kind of become a pattern now that I'm a lot older, is that I guess when I feel lost, I start enrolling in classes somewhere, you know, now it's more online. But then it was the local community college, and I started taking anatomy and physiology classes while I was working as a software programmer.

**Whitney Johnson:** Hmm.

**Nina Tandon:** And my mind, because I was kind of alone in this new job, I again, this sometimes happens to me. I kind of get lost in the sanctuary of my own mind and the synapses firing, seeing so many parallels. And at that moment, the parallel was, wow, DNA, that's like a four-bit number system. That's just like a hard drive or discovering that the same equations that govern nerve conduction were also the same cable equations. I'd been taught as an electrical engineer and undergrad. And I was really interested in applying these ideas towards hacking the human sensory system. And I became really interested in artificial senses. Umami had just been discovered. That's the taste bud for yummy food. And I was really interested in blindness because my brother was going blind. So, I remember having this aha moment of, I'm going to study artificial senses, and I'm going to try and contribute to this effort to cure blindness using technology. And so, I remember googling Artificial Senses Italy, because I love Italy. And I found 3 or 4 groups working on artificial sensory systems in Italy. I wrote to all three of them and I said, if I get a Fulbright, could I study with you? And I got three yeses, because I guess if you show up with a bag of cash. Not that that's what the Fulbright is, but if you show up funded, it's a lot easier to study with people. This is something I've learned actually as a scientist, and I ended up getting a letter of recommendation from someone who was studying artificial olfactory systems in Italy.

**Nina Tandon:** And so, I was off to the races. I applied for a Fulbright. I worked on this artificial olfaction system that's smell. And because it was post 9/11, I thought I was going to be using it as a bomb detector. You know, helping bomb detecting dogs sniff out explosives. So, the Italian government didn't want to give me explosives. I get it now, looking back. And they also didn't want to give me illicit drugs either to test out on this system. That was pretty naive of me to think. But they were working on this really amazing project with lung cancer patients to see if and this, this. I'm half Indian. So, the idea of something that was based on an Ayurvedic medicine principle, which is that you could smell disease on the breath, was something I was really attracted to, so I pivoted. I thought I was going to go to Italy to do bomb detection and drug detection, you know, mimicking these dogs. But instead, I found myself deeply humbled to be working with lung cancer patients. I don't think I realized how generous those patients were with their very precious time to be working with, you know, pipsqueaks like us who are taking their breath and analyzing them. But this was a beautiful project, at the Forlanini hospital in Rome. I got to meet wonderful, generous patients.

**Nina Tandon:** I got to work on my favorite thing at the time, which was chips, because we figured out that the humidity of the patient's breath affected the measurements we took, and the humidity of the patient's breath was very much related to their oxygen therapy that they were receiving. And so, I didn't quite know what to do with that. But we, it was my idea to build a humidity and temperature detector to put into this olfaction system, and that was my small contribution to the project. But I got so much out of it by being there, you know, being near the patients, seeing another health care system close up. Being in a city that is so eternal, like they call Rome the Eternal City, and seeing the layers and layers of civilization built one on top of the other, in which, from my history books, it always seemed as if new people were taking over and conquering, conquering and conquering. But what you see architecturally is that is the persistence of human culture. And my favorite churches were always churches built on top of Roman temples. Santa Maria sopra Minerva. It's like Saint Mary's over Minerva, who was Athena, one of my favorite goddesses. And just seeing the through line between these goddesses and the saints and feeling that by being in such a beautiful place, it was really amazing. And I felt like I was a little bit of a diplomat, you know?

**Whitney Johnson:** Yeah. I mean, it's a great example of soft power, but it's also interesting hearing you say this. This is in the wake of this traumatic experience that you've had with 9/11. And for you, it's even more pronounced than most people because it's so, you know, just a couple of miles from where you grew up.

**Nina Tandon:** We could see it out the window. Yeah.

**Whitney Johnson:** So, it sounds.

**Nina Tandon:** We knew people.

**Whitney Johnson:** Yeah. It was a healing experience for you to be able to be in Italy.

**Nina Tandon:** Yeah yeah. It was my eat pray love moment.

**Whitney Johnson:** Yeah. So...

**Nina Tandon:** Mostly eating.

**Whitney Johnson:** But you have a patent out of it. So, a little bit different, but... All right. So, how did you get from doing these experiments and working and doing research in Italy with patients with lung cancer to what you are doing today. So, tell us how the idea what's the origin story for EpiBone?

**Nina Tandon:** You know, and it's always standing on the shoulders of giants, you know. So, I applied for the Fulbright at the same time that I applied to go to grad school. Never thinking in a million years would I get both. And so, I found myself in this position of getting accepted to MIT and telling them, can I take a year off and go to Italy first? And they were so generous, and they said, sure, it's actually a pretty normal thing to do. So, I took this year to Italy and then, but I knew I was going to be coming back to MIT. And I ended up in such an amazing lab, I get, you know, the universe has a way. And I ended up in the lab of Bob Langer. Now, Bob Langer coined the words tissue engineering in 1988, and I showed up in 2004, so I wasn't it was, it was a new field, but it had been invented. It was something that they'd been thinking about for quite a long time. And Bob Langer, for those of you who don't know, is not a household name, but his technologies are household names. So, you may have heard of cancer immunotherapies. He has the original patents on those. You've probably heard of controlled release drugs. Well, he has the original patents for those. And everyone's heard of Moderna. You know, he was one of the founders there, too. So, he's most famous now for Moderna. But his lab was like one thing that made the lab really different than any other lab in the world. And this was by a factor of ten. So, it's worth mentioning is that ten times more companies had come out of his lab at MIT than this than the lab in second place in the world.

**Whitney Johnson:** Wow. So, an order of magnitude more.

**Nina Tandon:** Order of magnitude. So, these were people who were scientists and clinicians. A lot of people were, you know, and it attracted the best people in the world. He had this very international, eclectic band of merry, merry, merry band of misfits. I sometimes thought of us as, and many of them were much more senior to me. I was the starting graduate student. They were mostly postdocs. They were the powerhouse of the lab, and some people were doctors. And there were eight of us in this tiny little office. And I was just lucky to even have a desk. And it wasn't even a desk. It was like one of those, like TV carts. And we're all packed in like sardines in this office. And one of them is this doctor who's like always on two phones and also typing at the same time. I mean, these were people that were really, really movers and shakers and I was an electrical engineer in this lab, this biomedical hive of activity and, and tissue engineering was one of the things going on there. So, I met my professor who worked in his lab, Gordana, because she was my recitation instructor at MIT, and I was a bit of a misfit. I was an electrical engineer coming into biomedical engineering. It was actually a bio electrical engineering program. So, it was the only one of its kind. Pretty much. But I had to learn a whole lot of new math that I'd never seen before because it was very much related to chemical engineering, because that was the language that people used to understand the body. And I may have been a bit ahead of my time with this because there weren't a lot of people to guide me. But Gordana was my recitation instructor, and she worked in the Langer lab, and I would often find myself talking to her after class, after class, asking questions, being lost, having a hard time understanding this type of math that we were learning, and...

**Whitney Johnson:** Pausing for just a second. What do you mean when you say a recitation instructor? I've never heard that term before.

**Nina Tandon:** Oh, really? Oh, yeah. So, I guess maybe, I don't think it's only an MIT thing because I've been to a few different schools where they have this concept. So, you do lectures, and you do recitations. So, lectures are when you're sitting in that like big auditorium and there's the professor at the front and you're in this big room and it sort of looks like what you would imagine a movie of a, you know, hazing ritual of undergrad kind of thing. And so, that was, you know, Denny Freeman, my professor, who I mean, these people changed my life. They exposed me to so many beautiful ideas. So, Denny, who kept winning all these awards for teaching and as an academic, that says something because it's not rewarded, he's teaching. But then you would meet in a smaller group 2 or 3 times a week with your recitation instructor. And so, that's the person who would give you the

quizzes, who would discuss the homework, and kind of take you into a more conversational relationship to the material than you could get into in one of these big lecture halls. So Gordana was the. And I, you know, because I had just come out of a job and I wasn't like a baby, you know, I was only a couple years older than the other kids. But I volunteered to be the student representative for the class for this class, quantitative physiology.

**Nina Tandon:** It's a hallmark class of this program. So, I got to know these professors. I got to let them give, get, give them the temperature of the students in the class. It was I mean; I look back and I was like, oh my gosh, that's such a Nina thing to do. Like volunteer, like on day one. But I got to know these professors and see things from their point of view, and I've always just gravitated towards that type of thing. So Gordana was one of 3 or 4 recitation instructors that would spend much more one on one time with the students. And she also worked in Bob's lab because Bob's lab, Bob was the professor, but he had professors working under him. I mean, I've never seen a lab like this anywhere else. So, Gordana, I remember I would just, I was just attracted to her as a person, and she seemed so kind and obviously smart. But one time, and I was very sad at MIT, I was, it was a tough transition for me. But I remember one time, you know, I would just, like, mope around, and I would like there's so many hallways at MIT. It's like the Kremlin. There's the infinite corridor, and I would. And the infinite corridor has, like, infinite corridors on top of it.

**Nina Tandon:** You can just walk inside for miles. And sometimes I would just walk in a hallway and just, like, sit down and pout. You know, I'd be, I'd be so sad feeling very sorry for myself. And I remember kind of pouting or maybe looking, maybe waiting to meet Gordana outside her office. And I noticed she had a poster outside her office, and the poster said electrical stimulation enhances cardiac tissue development. And as an electrical engineer reading that statement on her poster, I thought to myself, oh my goodness, how do I have no idea what Gordana was studying? I mean, because like, I showed up at MIT thinking I was going to cure blindness, I actually joined that retinal implant project, which I'd been told about as a kid when my brother was diagnosed with RP, retinitis pigmentosa. And so like, it was my dream to like, join this project, but I was like highly disillusioned when I joined it. Huge crisis of confidence. And then I'm sitting under this poster and I'm like, heart disease kills more cancer than more people, than all cancer combined. Heart disease. And I came here thinking that I was going to, you know, in hubris, thinking that I was going to help cure the blindness that affected people in my family. But I ended up thinking to myself, well, I suppose I could pivot and work on cardiac tissue engineering, because, you know, that helps as many people in my family, if not more so, I started studying cardiac tissue engineering with Gordana and branched out actually into growing all kinds of tissues with Gordana.

**Nina Tandon:** Mostly electrically active tissues, like neurons, skin. Actually, it turns out every tissue is electrically active. No one could tell me that then, because, like I said, I think I was a bit ahead of my time. So, I had, I was looking at how we could use electrical signals to mimic the electrical signals that happen endogenously with things like wound healing and embryonic development. It was fascinating work to think that electricity, like those little chips, could be the language that cells use to speak to each other, to call each other to the site of injury, to serve as a homing signal. And I did all kinds of really deep electrical work, built robotic cell culture systems to do those, perform those experiments. And it was a highly fruitful time in my life. I didn't think I'd start a company. I ended up working at McKinsey after I graduated, moved to Columbia in the middle of it all because Gordana got a job where she got to be her own. You know, she got to spread her own wings and grow her own lab.

**Nina Tandon:** But after being at McKinsey for a couple of years, that's when I truly had the aha moment. Because all these companies at this time, I mean, disrupt yourself. Right? I love the name of your show. It was around the time, this was in 2009, ten, when all the big pharma companies realized that a-the Affordable Care Act is coming and b- we don't have any patents. They're all going. All these patents were sent to us set to expire around 2016. So, a lot of these companies were kind of panicking and, and I noticed something that a lot of people noticed at the time was that they kept buying their pipeline from these small companies. And moreover, those small companies were coming out of labs like Bob's. So, my aha moment was a-I know how to grow tissue and b- if that's ever going to become a technology that's going to help people, someone's going to have to shepherd it. And so, Gordana had the brilliant idea to sponsor my MBA at Columbia. And we used it as a kind of accelerator. Every single class, somehow, we found a way to work EpiBone into it. And so, all my professors and classmates, it was like an intensive for in preparation for starting the company. So, it was really a beautiful time.

**Whitney Johnson:** Okay, so, this is fascinating. So, you say to yourself, I'm going to start a company around tissues and you're going to we'll talk about the bone grafting in just a, or you can correct me if I'm wrong, bone grafting in just a second. But you purposely, deliberately said I am going to use my MBA at Columbia as an accelerator and a lab, just like you had been in a lab to incubate tissues. Now you're going to incubate a business.

**Nina Tandon:** Yeah, exactly.

**Whitney Johnson:** Wow. Okay.

**Nina Tandon:** Exactly that.

**Whitney Johnson:** Fascinating.

**Nina Tandon:** I mean, it looked like it was deliberate, but it was also, like, it very much was deliberate. Like when I look back at my personal statements, extremely deliberate. And but looking back, I think it was prescient because I how could I, I was I had all this conviction. But those, those, the, those trends turned out to be true. Wow. You know, and I'm wondering now, how is there how are those tectonic plates shifting? Because they're shifting. My goodness, I think I'm in the middle of a new one. A new pivot. And I go back to that moment where I say, Nina, you saw that one coming with academia 15 years ago. You saw it. You know, and 15 years ago, 2011. So not quite 15 years ago is when I met my first friends who were in the middle of starting a biohacking space, the country's first biohacking space in Brooklyn. Community Bio Space. And I got in on the ground floor with that. You know, in 2014/15, I had my finger to the wind, and I could sense that psychedelics were going to become mainstream. And now, of course, it's something everyone's talking about. I think I'm having another moment like that right now where I think medicine is being disrupted less and less by academia and more and more by doctors themselves. And I don't quite know what I'm going to do with that. I gotta do something with that.

**Whitney Johnson:** Mhm. Okay. So, let's put a pin in that.

**Nina Tandon:** So, I love this idea of like you know because I don't think of myself as a super, I mean I'm an intellectual person. Like I don't want to say I'm not. But my intuition I feel like I have this, like it's not a thinking process. There's like this organic, intuitive side to me that every once in a while, has a moment like you call it the aha. Yeah, but they're not fast and furious for me. They're like once every five years.

**Whitney Johnson:** Okay. So, I want to come back to that because I think that's fascinating. Before we do that, I need you to just fill in a couple of details, which is, what does EpiBone...

**Whitney Johnson:** Sorry.

**Nina Tandon:** No, don't apologize. It's fascinating. I just want to make sure that all of our listeners know exactly what your current company does. What does EpiBone do? It makes bone grafts less intrusive and painful. What does it look like today? The surgery look like today, and what are you solving for or how are you solving it?

**Nina Tandon:** Okay. Yeah. I mean, so what we do at EpiBone is we combine a bunch of deep tech, you know, things you've heard of, like 3D printing, AI, robotics. We combine all these deep, deep tech modalities to do something that's really natural, which is, you know, grow bone and cartilage that's just like the bone and cartilage in your body, but grown from cells in the lab. And bone is the most transplanted human material after blood. As a society, we're replacing millions of joints per year, really just oftentimes because of a couple millimeters of damaged cartilage. So, and I noticed something that I guess naively, because I'm still butting my head up against this wall. But the powers that be were not solving this problem, in my view. You know, bits and bobs. I don't know about you, but if you're, if do you want to replace your entire joint just because of a couple millimeters of damaged cartilage? I don't. And yet, the people who could connect the dots for how to do it differently were few and far between. And so, I kind of looked to my left, looked to my right, and I thought to myself, well, if we don't do this because we had developed actually, and it wasn't quite me. So, let me be let me be clear about this. I studied bone. I studied, you know, cardiac tissue, skin, neuron. I was a bit of a generalist with tissue engineering. My co-founder was going deep on bone and cartilage, and he was in the office next to me. And when Gordana, I

skipped a few steps. But when she invited me to come back to the lab and sponsor my MBA, she said, look, Ike, my co-founder, could you help Ike write a business plan? And I said, sure. I'd be honored to. So, it wasn't my PhD work. I wasn't the inventor of this particular technology. I became the nonscientific and finger quotes "co-founder", which is, it's funny because I was his TA, and I was a few years older than he was in the lab like I was, I was more senior to him in the lab. But in terms of his science, he was the domain expert. And so, I didn't know I'd be signing up to, you know, almost 20 years later, kind of be, I don't know if he's my work husband or my work brother, but we're definitely family at this point. So, we started the company together. The MBA was like this incubator, and then we launched in 2014, almost ten years in October, it'll be ten. And we said, look, we're going to make bone and we're going to, you know, because it's the most transplanted human material. And we set out to do the requisite work to bring that to human patients, which was a lot of animal studies, we had to translate the technique. It's called translational work. When you take science from the lab and try and move it to the bench, the bench side, sorry, the bed side through the bench. So, the bedside being you're from the doctor and there's a patient. So, bench to bedside. But we call that translation and it's, it's really tough work. And it's the kind of slog that doesn't get a lot of glory.

**Nina Tandon:** You know, you're taking protocols for how to grow the tissues, and you're trying to take out all of the ingredients that wouldn't pass muster with the FDA and replace them with materials that the FDA would be okay with. That's like really painstaking, non-glorious work. We did that work. And then we, you know, in 2017, sorry, 2019, we got permission to do our first in-human clinical trial. And I know it was 2019. It was May, because I had a three-month-old baby at that point. And she came to lab to celebrate with everyone. 2019 was a big year because 2020 came soon after, and so we were greenlit for clinical trial that then couldn't start. That was one of many bumps in the road for us. And we soon thereafter this, well, once we finished it. So, we did this clinical trial. We implanted six patients with bones that we grew. Let me just, maybe it's worth mentioning how we grow the bone. We use digital fabrication because we're making bone to be a perfect shape to match your skeleton. So, we take two things from the patient for making bone. We take an image this three-dimensional x ray called a CT scan. And we take a sample of fat tissue from the patient. And fat tissue contains about 1% of the cells are stem cells, stem cells that can quite readily make bone, cartilage and ligament and tendon. And we infuse the stem cells that we extract from that fat tissue onto a biomaterial, which we call the scaffold.

**Nina Tandon:** And that scaffold is shaped based on the CT scan. So, there's a perfect fit. And I love the translation between the world of bits and atoms, bits being what we can program digitally and atoms, you know, the physical world, and we infuse the stem cells onto that scaffold. We grow it inside a robotic cell culture system called this, called a bioreactor. This is where robotics comes in and we mimic this is the fun part. We mimic the natural conditions of tissue development. So, it turns out that diet and exercise inside our bodies make our cells grow. Well. Well, it turns out if you grow cells outside the body, they don't know they're outside the body. And so, you can trick them into thinking they're inside a body. And not just any body, but a body that is, you know, undergoing tissue development. So, we grow these cells into tissue. It takes three weeks to grow bone, four weeks to grow cartilage. But it's a platform technology that allows us, at least in theory, to grow any bone or cartilage throughout the body. And I say in theory, because that's become a bit of the bane of our existence. Um, we can grow bone or cartilage for any part of the body, but that's not how our hospitals are organized. That's not how our regulators are organized. And so that has been a key challenge for us. How do we take this platform technology and not just allow it to be relegated to very niche applications that don't get investors excited? So, it's um, that's been a key challenge for us.

**Whitney Johnson:** So interesting. So, this is a so it sounds like from a management theory perspective, this is a classic challenge of you've got this technology that will work, and you've proven that it works. And yet, because of the way the system is set up, it's rejecting the innovation.

**Nina Tandon:** Yeah. Yeah.

**Whitney Johnson:** Are there any countries...

**Nina Tandon:** And this is where we are now. In the messy middle. Yeah.

**Whitney Johnson:** Are there any countries where people are willing to do these experimentations?



**Nina Tandon:** So, funny you should ask. Look, and this is a risky question to ask because I'm so proud of the work that we've done, and I'm so proud of the way that we've woven ethics and, you know, kindness into this very rigorous scientific development that we've done. And we've worked with all the top hospitals, top surgeons. You don't want to compromise that reputation by saying, well, how do I move fast and break things? You know, you don't want to be experimenting on human guinea pigs, right? And capitalizing on their desperation. So, it's a tough needle to thread. However, you know, don't never let a good crisis go to waste, right? Covid, the Covid slowed us down. We weren't the only ones. Covid affected everybody and everything. But what Covid brought was an upgrade to many countries' clinical trial infrastructure. Fancy that. And it opened up the possibility for the question you raised, which is what about us geographies? You know, regenerative medicine therapies are treated with nuances and different geographies. Some places are, you know, the Wild West. I'm not so attracted to those places. I think those places, you know, they're, I call them fly by night clinics. You know, they're injecting people right and left. They've been doing that for about ten years. But there are pockets of geographies in the world and there's a few that are really interesting to me these days. You know, the UAE is one place I'm really fascinated with lately, where they have a top tier medical infrastructure. You know, the Cleveland Clinic, we worked with the Cleveland Clinic on our first in human clinical trial. They have a location in Abu Dhabi. And so, and they've upgraded their clinical trial infrastructure in response to Covid.

**Nina Tandon:** So, I'm definitely exploring whether or not there are ways that we can, because, you know, this could be a virtuous cycle. We can speed up time to getting human data that also speeds up our time to market, allows us to potentially, you know, do something that's been impossible in biomedical research, which is to innovate in tandem on the business model and the technology. At the same time, because the canon of our field has been phase one. Now, everyone knows this because of Covid, there's a phase one clinical trial followed by a phase two, followed by a phase three. And then you can sell your product. And that's tough for investors because you're taking a ten-year bet with illiquid investments, okay? And in a high interest rate high inflation environment right now that's just like not a thing you can easily sell. And we're saying well what if we could sell product at the same time? It may not be selling a ton of product, maybe only selling it cost, but to change those inputs to a, you know, when I see it in my mind, it's this discounted cash flow model where we make a net present value. I mean, these are like business model concepts where you can just see the inputs to this mathematical equation being shifted if we can shift our mindset. And so that's what I've been chasing this past year. I've been running around the world like a crazy person. Yeah. And I don't know the answer to your question, but I think the answer is yes. And I'm going to find where it is. Yes. And I'm going to do it right. I'm not going to do; I'm not going to rush it.

**Whitney Johnson:** It's interesting because as I hear you talk, it's, you know, one of the things that we talk about in, in our work is, you know, people will say, well, I want to disrupt or I'm trying to innovate inside of my organization. And by definition, if I want to disrupt, that means you are going to get disrupted, right? So, it's not you don't disrupt in a vacuum.

**Nina Tandon:** Zero sum game, right? Yeah.

**Whitney Johnson:** It's, and so the question always is how do I, I think about, you know, jumping to new s curves. How do I pack a parachute for you to jump to that new S curve? How do, what proof points do you need? How, what do I need to do to make it feel safe enough that you're willing to do what I'm suggesting that you do? And it seems to me that that is the that is what you are doing right now. Because what you're saying is the technology, it works like the, you know, the process itself works, but how? Where do you need to go? Who do you need to talk to? Where do you need to experiment? How do you need to structure this in a way that you can get enough proof points, that you can get the buy in that you need so that it can become something that goes mainstream? That's what I hear you saying.

**Nina Tandon:** I know I love that methodology that, you know, I remember when we first met and you described those s curves, and I can just picture them in my mind, you know, there's a leap of faith, but it doesn't have to be reckless. I think if we can lock down a customer and do some customer discovery. Right. You know, I think there's, I think I'm sniffing around. I'm hot on the trail. But I think that's the way you put it was, is what my, the exercise really is right now, is to get enough proof points to convince ourselves, and then hopefully we won't have to convince as many others as we've had to in the past, because instead of looking for new investors, we'll be

looking for customers. I think the aha moment I had with this, where I realized maybe this is the time, I mean, FDA approving us and getting human clinical data. I mean, that's proof in the pudding and that's highly exportable. Okay. But I think that the next aha moment that I had came from, you know, I get a chance to meet a lot of interesting people in my work. I'm sure you do too. You know, you go around the world, there's some serendipity, and I get a chance to meet a lot of people whose knees hurt, because that's a lot of people, and everyone loves to tell me about their ailments. I love to hear about it, too. So, it's, it's the feeling's mutual. But I noticed that a lot of these people that I thought could be potential investors for me, for my company, they wanted rather than buying shares in my cartilage company. They wanted the cartilage, and they wanted it now.

**Whitney Johnson:** Yeah.

**Nina Tandon:** And I thought to myself...

**Whitney Johnson:** Let me give it to you.

**Nina Tandon:** Let me give it to you. Let me find a way to give it to you safely. And you know what? All these fly by night clinics that I was looking not, you know, looking down on a little bit with some snobbery, you know, the academic snobbery of, um, you know, I'm doing my tried-and-true science and you're just experimenting, you know, actually, they were, they didn't get a lot of adverse events. They didn't get very consistent positive results, but they didn't get a lot of adverse events for these patients. So, in a way, they had proven a set of proof points.

**Whitney Johnson:** Right.

**Nina Tandon:** Right? They've sort of proven that things are safe, and that the biggest downside is financial. So, you know, so when people would ask me, should I go to this fly by night clinic and get an injection, I would say, well, you know, do you have money to spare? You're very unlikely to be hurt, except in the pocketbook. And it might work. And so, I can leverage that and say, look, you know, it's safe. Let's, you know, if it's snake oil, snake oils safe. Now, let's prove efficacy and maybe we can sell product while we prove efficacy. That's that has that's been a shift, a tectonic plate.

**Whitney Johnson:** One of the things that I hear happening, though, Nina, is that basically it's, there's a jobs to be done piece here. And you're saying, okay, there are people who want me to do this job functionally and emotionally. There are places in the world that are willing to let us do this job. And so I am going to disrupt this by number one, going to these, those, these silly little places that no one thinks is valid, but in fact it is. And perhaps equally, if not more importantly, is you are disrupting your own mindset. You're saying, yes, I'm an MIT person. You have a PhD. Is that right?

**Nina Tandon:** PhD, MBA.

**Whitney Johnson:** PhD from MIT.

**Nina Tandon:** I have the training, right?

**Whitney Johnson:** You have the training. And you're saying to yourself, I have to disrupt my own mindset and say, okay, I know this works. This person wants this. What do I have to do to give them what they need and want? And I know it's safe and then we'll get the proof points. But it's your own mindset that you have to disrupt as well. Fascinating.

**Nina Tandon:** And it's so easy to have these blind spots. I mean, this has been so many, so much stress, so many tears. This, you know, the past two years. I mean, I met you, I met you around the time that this was really starting for me, this really difficult time, which they call the biotech winter. And I think, you know, and I spent so much time trying to raise money, trying to raise money, trying to raise money that I, it's so cliché. I didn't have time to critique myself because I thought, I'm just going to keep working harder in this one way. But at a certain point, I had one too many people whose concierge medical team I was interacting with to try and figure out how I could treat them. And coming up short and I thought to myself, my blind spot is the hubris around. Kind of almost build

it and they will come with biotech. I'm going to do my phase one, and I'm going to do my phase two, and I'm going to do my phase three, and I'm going to increase value on paper all the way, and everyone's going to pay me because that's the canon. And you prove your science and then people pay, and that world does not exist anymore. And I was operating in the past and I'm not sure how many people have woken up to this, by the way, I and I'm not sure I'm right. I'm not sure I'm right, but I feel like I had to kill my own part of myself. It's not. This doesn't come easy. Goddess of death. Goddess of birth. They are the same person.

**Whitney Johnson:** Well, and I think this goes back to what you started to say a moment ago, which is, where you said you, you know, you're this highly trained scientist and you have a highly trained intuition. And so, one of the things I hear you saying is that your intuition brain of like, I think that the innovation is going to come from the doctors. I think you're absolutely right. You know, I was looking at, you know, medical, my kids were like, you know, medical tourism is a thing, right? I'm like, what?

**Nina Tandon:** Oh, it's huge. They're buying boats to put hospitals on, in international waters. They're starting islands that are in the middle, that are libertarian governance.

**Whitney Johnson:** Fascinating. Okay. So...

**Nina Tandon:** This is happening right now, and scary.

**Whitney Johnson:** So, here's the question, Nina as we start to wrap up.

**Nina Tandon:** Isn't it scary?

**Whitney Johnson:** Yeah. No, I don't think it is. I don't think it is scary. Here's why. And I think this goes back to your intuition. And this goes to disruption as well. I mean, what is disruptive innovation? It is a willingness to play where no one else is playing. It's a willingness to do that silly little thing that people think doesn't make sense. And so, you go do that thing from a business model perspective. So, the technology isn't your issue, it's your business model. And what does that look like? And are you willing to do there. And then use all of your training to mitigate the risk and make sure it's safe? I mean, I get really excited for you, and I hope that you've got some type of goal or KPI that you're going to do, you know, 10 or 20 of these experiments in the next year with people who are willing to say, I will fund your business, but I'm going to fund your business by being your customer. That gets me excited. And I would love for you to make a commitment right now to say you're going to do that.

**Nina Tandon:** Sounds like you're manifesting that with me.

**Whitney Johnson:** I am manifesting it. I love that.

**Whitney Johnson:** So, what commitment do you want to make, right here?

**Whitney Johnson:** Five, two?

**Nina Tandon:** I want to find. Five, what? So, help me, help me with this. This is. This is coach me Whitney.

**Whitney Johnson:** Yeah.

**Nina Tandon:** What do I need? Help me with this KPI. Five customers or five geographies or what am I doing?

**Whitney Johnson:** Yeah. So, I think from a KPI standpoint I would say, I'm going to find three possible geographies. And it sounds like you've already got that in the hopper. I've got, you've probably got ten people who want you to do this. And you say yourself, we're in the beginning, we're in June. So, by the end of the year, I am going to have one of these experiments set up to do, a person...

**Nina Tandon:** All right. I'm going to have one hospital customer. I'm going to have a hospital customer by the end of the year with a product that is possibly tweaked from my current pipeline, but minorly so that I can sell now. Legally, ethically.

**Whitney Johnson:** Perfect.

**Nina Tandon:** Elegantly.

**Whitney Johnson:** And the beauty is, is that because of who you are, you're of course, it's going to be legal because of who you are. Of course, it's going to be ethical because of who you are. Of course it's going to be elegant. You just have to be willing to again, disrupt your mindset and go make the business model.

**Nina Tandon:** I didn't realize how hard this was Whitney, I didn't. I have to say it's really great to go through a, this is my first downturn down cycle as an entrepreneur. I've gone through them before as an employee. So, thank goodness it's not my first downturn, right? Not my first rodeo. And I can look ahead and think, okay, this is the moment when, you know, but I have had to go back to the basics in a way that has been, I think, you know, just heartbreakingly humbling. You know, because you ask yourself as the entrepreneur, like, how have I failed? You know, you can't help the buck kind of does stop with you in a way, but like, don't let a good crisis go to waste. I mean.

**Whitney Johnson:** No.

**Nina Tandon:** The privilege that I've been granted by having by being forced, in a way, by external circumstances to face these questions has been a gift, because it means that I've got the freedom to innovate. Now, I think sometimes when you're successful, I don't know if you find this with some of the other people you work with. It's hard to disrupt because you're like, dude, it's working. Why am I going to like, break my golden goose? But in this case, I have the freedom that comes with a breakdown. And you know, and I get the chance to rejigger with time. With time. I mean, we haven't, like, we are still standing. We have great clinical data.

**Whitney Johnson:** Yeah.

**Nina Tandon:** We are shifting.

**Nina Tandon:** And it's, gosh, it's really exciting to think about shift shifting into this new phase for EpiBone, which is being commercial because I've essentially led a translational research group now for ten years. Now I'm excited to kind of go to get back to that babysitting, you know, like I was a kid, I was, I had \$500 in my pocket in seventh grade that I just carried around with me because I babysat so much. I had a, I'm looking around here because I live where I grew up. I started out babysitting. That was my first business, and my mom would do biz dev coming from the subway, be like, I have three teenage daughters, do you need a babysitter? And I'm hearkening back to those roots of I'm going to be in business. And so anyway, I can't say it's done yet. It's definitely the beginning of this phase. But I've had the hardest part was exactly what you said was recognizing that I had blind spots. I'm not a loser. I'm not an idiot. But sometimes we can be blinded by our own training for sure. Our own experiences, our own training, all those things that make us wonderful and efficient in some ways can blind us. And that's the thing I love about being at this age, you know, like I'm, I have gas in the tank. I'm in my mid-40s, but I have some, I have this, I'm in the messy middle. I've got the balance of some experience and a horizon or two ahead of some chapters that are coming up. And it's really nice to be at this point in my career. I think I mentioned that when we met. Just like it's a sweet moment. Everyone loves their 40s. I totally do. Thank goodness.

**Whitney Johnson:** Yeah, yeah. And you've got young children and. And the story that came to my mind was Adventures in Babysitting, but adventures and building. And it does, I do love actually that metaphor. And I'm going to give you an opportunity to, I'm going to ask you the question in just a minute, or our sort of penultimate question. I do love the idea of, I don't know, there's an imagery. You said it, but I want to drill down on it a little bit of like you had the co-op, you had the babysitting, you're creating the community and what does that look like of creating this co-op and this community where people can be healed and creating that enclave for people. And

so, I'm really, I'm very excited for you and for your, your patients that are going to have this opportunity where you're going from research to market. I think it's beautiful.

**Nina Tandon:** God bless you. I mean, your lips to God's ears, like the image I keep getting in my mind because I think I get a little philosophical and mystical when, when I go through these kind of things. And I kept thinking to myself, this is when I shift from being the sorcerer to being like the medicine woman.

**Whitney Johnson:** Mhm. Mhm.

**Nina Tandon:** And you know, just the idea of, of healing as opposed to fixing.

**Whitney Johnson:** Yeah.

**Nina Tandon:** And working with patients, I'm yearning to work with the people who are going to be healed by this, not by the fortune 500 companies that are going to be my exit partners. You know, I'm yearning to think you said the setting even you were alluding to, you know, the setting in which the healing will take place. I'm attracted to the idea of designing a hospital, you know, for a healing experience. You know, the it's my creativity is just going wild. And it's really about wanting to be more of a healer than a technologist at this stage. And so, I hope that your words are prophecy.

**Whitney Johnson:** Yes.

**Nina Tandon:** But your lips to God's ears. Whitney.

**Whitney Johnson:** I believe that they are actually. I'm willing to go on record with that. I don't know, prophecy might be a little bit strong, but certainly belief that it can be true. So, Nina, what's been useful for you in this conversation?

**Nina Tandon:** Well, I mean, you're lending me access to your genius Whitney, which is a real gift. And I think, you know, it served as a useful reminder. I think the takeaway that will reverberate with me is the disrupt yourself piece. You know, because those words go together, and I've heard other people speak them. I've spoken them myself. But I feel much more heavily that, that really has been, that's been the crux for me was, you know, realizing that I, that the change had to come from within, you know, truly. And that's the inverse of the statement that we learned in business school, which is the fish rots from the head, you know, like which, you know, but yeah, it's, there's pride associated with that. And I've, I've been really humbled and in this experience that I've had of, of this disruption.

**Whitney Johnson:** Yeah.

**Nina Tandon:** It's painful.

**Whitney Johnson:** So good.

**Nina Tandon:** But it's beautiful work. And it pays off in the long run. You know, it's like what my dad always said. You know, you can't be afraid to jump off the merry go round. And you know, you've got to keep your eye on the long-term view, because you may go up the vectors of each piece of your, each chapter of your life may not look like they're in service of that long view, but the long view and I hope I'm going to have the chance to live a few more decades and, you know, continue to be on this journey truly, you know, it's a gift and a privilege to get a chance to work with amazing people and the cells that grow our bodies, you know, to get a chance to think about the beauty and wisdom of nature and the consciousness of these cellular beings and what we can do with them, I mean, I've been so blessed to get a chance to follow my curiosity. You know, so many times people ask me like, oh, as a female entrepreneur, are you frustrated by this and that? And yeah, sure, I've got my own bucket of frustrations, just like any other entrepreneur. And I don't know if there are any bigger or smaller than anyone else's gender based or not. But one thing I am so grateful for is that my struggles are different than my grandma's, you know?

**Nina Tandon:** And that's a mark to me. I get, I get a chance to I'm complaining about like my, you know, the life path that I had a huge part in playing like painting that you know that this and that is going wrong. But my you know the I got to make more of my own decisions than I think even just a couple generations ago, women got to do. And so, I, I'm grateful to just be in the game to get a chance.

**Whitney Johnson:** Yeah.

**Nina Tandon:** To be in the arena, you know.

**Whitney Johnson:** Well said. And with that, Nina. Thank you, thank you, thank you. What wonderful, meandering, delightful, disruptive conversation. God bless.

**Nina Tandon:** Thank you. Whitney. Thank you for this opportunity. It's a true pleasure to see you.

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Part of translating our biggest dreams into reality has nothing to do with the outside world, and everything to do with our internal environment. We're the ones responsible for bringing this baby of ours into the world, and if we're not showing up as that first pillar, then everything else falls apart. And one of the hardest demands of that responsibility is when it asks us to change.

Nina had to disrupt her view of herself as a scientist, in order to show up for her company as a CEO. The method you use as a scientist to prove success – phase one studies, then two, then three, then FDA approval – that method doesn't line up with the financial side. Nina called it her hubris, thinking that you show product viability, and the money will just line up. Because why wouldn't it? I just showed the world that you can grow bone from your own stem cells. Doesn't the innovation speak for itself?

And here's where Nina had to get out of her own way. The money just wasn't there. She built her personal canon on the idea that if you build it, they will come, and now that just wasn't true. So, you can either double down on that personal canon, clinging to what you know... or accept that your internal game has to change. When the dream is that big, helping humans move and live better, we have to separate ourselves from that dream. Because if we cling to ego, we'll bring down the whole effort in the process.

And that is perhaps why I most loved this conversation because -- Nina has become willing to disrupt herself so that she can disrupt an industry!

For more on disrupting the healthcare, there's my episode with Dr. Bill Kapp, [episode 346](#). On learning to recognize when our personal canon is in the driver's seat and we're sitting passenger, I'd point you to [episode 353](#) with Tara Swart. And if you know you have to change, but you're not sure what the first step looks like, there's my talk with Katy Milkman, [episode 227](#).

Thank you again to Nina Tandon and thank you for listening. If you enjoyed today's show, hit subscribe so you don't miss a single episode. If you want to know more about how DA can support you and your organization through upheaval and change, you can reach us at [workwithus@thedisruptionadvisors.com](mailto:workwithus@thedisruptionadvisors.com).

Thank you to our producer, Alexander Tuerk, production assistant Etta King and production coordinator, Nicole Pellegrino.

I'm Whitney Johnson.

And this has been Disrupt Yourself.