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In this episode, Taren Grom, Editor-in-Chief of PharmaVOICE magazine meets with Retsina Meyer, Ph.D., Head of Strategic Projects and Alliances, Delix Therapeutics.

Taren: Dr. Meyer, welcome to the WoW podcast program.

Dr. Meyer: It's great to be here.

Taren: Retsina, your résumé is super impressive for our audience. You obtained a neuroscience Ph.D. at M.I.T. where you are presidential fellow and a graduate woman of excellence. You served as a science advocate with the Science Policy Initiative, and before your work at M.I.T. you were a Fulbright Scholar serving as a representative of the US to Norway where you worked in the lab of the 2014 Nobel Prize winners Drs. May-Britt Moser and Edward Moser. So what drew you to the field of neuroscience and as a follow up, what was it working with Nobel prize winners?

Dr. Meyer: Great. It's great to be here. So I was actually born into a family of scientists. My mother was a medical technologist in the local hospital and my father was an organizational psychologist at US Air Force. The science is really in my blood. And true to my soul I've been a scientist for forever.

So, what does that mean? I've always been curious. I've always asked questions. I find absolute joy in learning something new, unearthing new truths, and I'm in constant awe of the beauty of our world and the structure in it and when you can find those patterns.

I came to neuroscience because I felt like the brain itself, the organ that allows us to ask those questions, that allows us to make those discoveries and allows us to experience that awe, it's beautiful, it's mysterious. We're all using it everyday to navigate the world, and so I've always been drawn to it. And it really did allow – I had quite diverse interest educationally so from human behavior to biochemistry and physics and mathematics, and I felt like neuroscience was the convergence of all to those interests.

Taren: And I can't even imagine what those dinner table conversations were like growing up. Fascinating. Did your mom and dad bring the work home with you and so you sort of absorbed this into your DNA?

Dr. Meyer: We were always allowed to explore and we were always able to engage on any of those questions or curiosities. I think having parents who know the scientific method, of course that imbues their parenting, right? And so I think I have always really liked to think about the

scientific method of first you're reading the literature, you're looking for answers that other people have found and then you're forming hypotheses and testing and probing them and then using that data to re-inform your views and your paradigm. So I think it is a place where we could be extremely curious. We had a lot of independence in my house as well, and so we could go off and really test some of our ideas in a playful way, and so that safety and curiosity is something that I think is really impactful and allows me to take the risks that I take both scientifically and career-wise.

Taren: Wonderful. Really fun. You make neuroscience sound fun, so I'm excited. And you currently are head of Strategic Projects and Alliances at Delix Therapeutics. Tell me about the work you're doing there. You told me right before we jumped on the call neuroscience is hot. There are 300 companies in this space right now. So talk to me about what you're doing.

Dr. Meyer: Absolutely. Delix is a neuroscience company with a platform to design and develop what we're calling third generation psychoplastogen. And psychoplastogens are compounds that promote rapid structural and functional changes in the brain which then those structural and functional changes elicit therapeutic effects. So think ketamine and its fast-acting antidepressant effects. What we found in the science that we're commercializing was the discovery that psychedelics are some of the most potent psychoplastogens we have found.

So when we say we're third generation or final generation, what we mean is we're generating novel non-hallucinogenic analogs or versions of those first generation psychedelics that are optimized. So when I say optimization I'm thinking IP, manufacturing, delivery, commercialization and our goal at Delix is to really bring these breakthrough medicines to patients by making them orally available take home treatments to meet those unmet needs in brain health.

It's a bit different than some of the first generation psychedelics because it doesn't have to be administered in a clinical setting. What that allows you to do is democratize access. So the promise of psychedelics right now it's tremendous and the unmet need is staggering. I mean there's hundreds and millions, if not billions, of people who have mental health and neurological disorders. And so the opportunity to develop safe take home medications without hallucinations would allow for a greater portion of that patient population to be treated with psychoplastogens. Because some patients aren't able to take the first generation psychedelics due to comorbidities, for example, and some others won't take them because of the risk of a bad trip.

So when we think about this scaling of these treatments beyond the production limitations in clinic throughput, we think that removing that hallucinogenicity factor can really help meet patients' needs. And so what we're seeing is that the neuroplasticity is a core component to their efficacy.

Taren: And how did you all come about to find the positive impact of some of these psychedelics on neuroplasticity? What sparked this area of research for you all?

Dr. Meyer: Oh Taren, I love that word spark. It's a really important one. It's in science and in what we do, so when we – our founding science comes out of UC Davis and Dr. David Olson's lab. And so he was training when he first started having some of these ideas around how it's ketamine having this really fast acting therapeutic effect that lasts for up to a week after a single dose. So he went in and started exploring that and found that – and this is work coming out of Yale group and everything as well, that neuroplasticity seemed to be the core component of the therapy effect and not the drug being onboard.

So that's to say that the drug came onboard and it sparked neuroplasticity and then that neuroplasticity was actually the therapeutic mechanism of action. And so he went about looking at what other compounds, what other receptor systems could potentially spark that same neuroplasticity, and that's when all of this work around the therapeutic effects of the psychedelics started coming up.

Now, one thing that we want to be clear here is that we don't think that the neuroplasticity is the only way for these drugs to be effective rather the hallucinatory experience and the mystical experiences that folks experience when on these drugs could be effective, but we think that the neuroplasticity part is a really important part to that.

So we just want to kind of think about this as not an either/or story, but like an 'and' story. And so when we're seeing these amazing results with the recent studies from MAPS and in the recent psilocybin studies and these large effect sizes and this broad profiles, we think that there's room for neuroplasticity to be a part of that conversation.

Taren: It's fascinating. And when you talk about ketamine, there's some research in terms of that for Alzheimer's. Do you see this as a potential therapeutic area of investigation for you going forward?

Dr. Meyer: Absolutely. Neurodegeneration is at the core of a lot of these dementias, so in addition to the proteinopathies and the inflammation the neurons themselves are getting thick and they're dying and so if you have compounds that can promote resilience of neurons then you potentially have something that could be really transformative for patients. So I'm definitely following the ketamine work closely and definitely looking at that.

Taren: That awesome. I mean there's so much research that needs to be done in terms of Alzheimer's and I feel that this area of neuroscience and psychedelics is really it's hot and it's really on the cutting edge. So congratulations to you and your team at Delix for venturing into some uncharted territories because I'm old enough to remember when psychedelics were trippy and not necessarily considered a positive in terms of a therapeutic exercise, so this is interesting.

Dr. Meyer: So there have been scientists who had been carrying that torch, who have been diligently pursuing this work over the last decades that are enabling us to have this resurgence and renaissance that we're having today.

Additionally, the first generation, the second generation psychedelic companies, they're navigating regulatory paths. They're navigating that clinical path. I think every step of the way it's this really big effort and it's not a single company. It's not a single scientist; it's really this whole ecosystem that's moving that science forward and we really are proud of the contributions that we're making, but nobody could do this alone and I think that's something that's really important.

Taren: Fascinating. And I'll keep track of what you all are doing as you progress along. Dr. Meyer, not only you are expert in neuroscience, but you also have a penchant for innovation and entrepreneurialism. So talk to me about this aspect of your world.

Dr. Meyer: Yes. Some people I think they wanted to be entrepreneurs since they were young and that wasn't me. As a scientist, a neuroscientist, the path forward to me I saw was academia and becoming a professor and really expanding the boundaries of human knowledge in an academic setting. But what my major goal in life is more abstractly is to have an impact and to really see where can I deliver the most help or benefit to the world. And what I saw is that in academia, you can explore all these ideas, but you definitely need somebody who can then take those ideas, take the potential technologies and bring them to patients because academia is not a commercialization entity.

And so I think of myself as a translational neuroscientist, and I pick that word very thoughtfully. Because not only do I like to think about how preclinical to clinical leaps are made or clinical to commercial leaps, but also academia to industry and science to business and so I feel like I was well suited and well-groomed for any number of paths, and I chose to be an entrepreneur because it couldn't not be an entrepreneur because some really beautiful science that could really impact patients needed to be delivered to them. And if there is nobody to take that baton then I would be the person to take that baton. And so for the last 12 years that is what I've been doing.

Taren: And you've been doing that a lot through the Greater Boston STEM entrepreneurship ecosystem, correct?

Dr. Meyer: Absolutely. Absolutely. So your context matters. I know there's people who are listening to your podcast and thinking about what learnings they can get and how they could apply them to their own lives and this is one – this is a big one. Your context matters and it takes a village.

So when I started my first company, I depended on the Boston biotech ecosystem to support me through that process and to make introductions and to provide insights and knowledge and just financing, every step of the way it was group effort, a team effort. And so I see that Boston is it's friendly, it's open. People are really mission-driven, and so I play an active role to this day because of all – I couldn't have gotten here without the help of these professionals, and so I want to definitely pay it forward and continue to develop and contribute to that ecosystem.

Taren: Well and kindly and to your generosity you're doing so, and I know that you also consult with a number of different biotechs in lending your expertise and your knowledge base. And so what are some of the advice that you provide to some of these other companies, things you may have learned along the way that you're now willing to share?

Dr. Meyer: A good question. So that's really the advice people need is very different from individual to individual, from company to company and whether it's working with one company to figure out how to license their IP, working with another on how to develop a hiring system and operationalize that, working with people to make sure they are well networked, coaching in communications, these are – I had a real diversity of people that I enjoyed working with and a diversity of needs that they had as well.

But yeah Taren, if you wanted to ask any more about that I'm happy to dive in, but it was – everybody was quite different. So there wasn't one major piece that I was focusing on unless it maybe communication and really...

Taren: No problem, but and I was thinking at the same time as you're talking through all of this, Retsina, that you know most women scientists aren't entrepreneurs. They're more comfortable behind the scenes and yet you found a way to really break through and bring your personality and your knowledge to the forefront and as such, you really are a role model for other women in the industry who have that scientific background. How does that mantle of responsibility in being a role model sit with you? Do you consider yourself to be a role model?

Dr. Meyer: We don't get to choose to be role models. People decide, that they see what you're doing and especially STEM entrepreneurs which are a rare subset of entrepreneurs and then female STEM entrepreneurs as well. By being in those rooms, you do become a role model. So I consider it an honor and a responsibility, and I think that it really inspires me to always act with integrity and benevolence and compassion and empathy in all of my activities. And what I hope is that by having navigated a path that I can act as a guide for anybody else who's trying to navigate that path as well.

Now, what I'm very clear when I come to speak to professionals, speak on panels about professional development and should I go into entrepreneurship and things like that, and I don't think that entrepreneurship is for everyone, but I think that everyone should be able to pursue entrepreneurship and to dig into that more I think that there are people with more or less risk tolerance, that if you have that tolerance and that resilience entrepreneurship is a great avenue to explore high risk, high rewards situations. If you don't, if it's not, there are a lot of high stakes – or at least everything can feel quite high stakes, and additionally I think that where you are in your technology readiness and what the technology means to you.

So I mentioned I couldn't not be an entrepreneur. So I'm thankful for all the mentors and guides and programs like Mass Bios, Mass Connect Program, which was incredibly valuable because there's not one path, but none of us is as smart as all of us. So the more people you could bring to the table to help guide you, the better.

Taren: That's great. I love your passion when you speak about it, and I love the thoughtfulness too in terms of how you approach it and just being in the room, as you said, makes you automatically a role model. So women especially can look to you and say maybe I do have that entrepreneurial bit, I can do it too. So thank you for being there and thank you for being on those panels and being upfront. It's wonderful. If you don't mind, I'd like to talk to you a little bit about your passion to advance the field of personalized medicine and neurological disorders. First of all, is this possible? And if so, how?

Dr. Meyer: I 100% believe that precision medicine in neuroscience is possible. And that's because when I talk about personalized medicine or precision medicine in neuroscience I'm not talking about a single gene disorder, right. It's a very complex system.

I think when people think personalized medicine they think you genotype the tumor... they think oncology and you genotype the tumor and then you pick the appropriate therapy – the targeted therapy. And in neuroscience, it's much more complex. There's no one gene. There's no two genes. It's definitely several different genes interacting with the environment and your experiences and then you can go up a level and look at your proteome and your interactome and you can go up a level and think about the circuits of the brain and how they're working together, and then you can go up another level and take the whole body and behavior and interaction with the whole biology of a person.

So what I say is let's embrace that complexity and really start to think about what the individual in front of us is experiencing and what help that would be the most beneficial for them. And so when we think about precision, it could be precision of the circuit. Which circuit are you targeting with your compounds? It could be precision of the construct. So I think here's where neurological disorders have certain diagnostic criteria that are not strong boundaries and you can have depression and you can have depression constructs and depression symptoms across a number of disorders, psychiatric or neurological.

And so is there a way to rethink how you're addressing a biological component of a disorder or multiple disorders and target that. So, for example, at Delix Therapeutics we like to think about that circuit specificity and how targeting certain cells in the brain and potentiating neuroplasticity in those areas will allow you to regain capabilities and regain your brain health versus having a compound that might ubiquitously promote neuroplasticity.

Taren: Wow. Thank you so much for making that understandable to a layman like myself and I find it fascinating, the research that you're doing and thank you for clarifying how you don't have to think about neurological disorders as potentially unsolvable as we look to the future. And towards that end, where do you see the next big leap in neuroscience happening? If you had to create your blue ocean, what would it be?

Dr. Meyer: It is this idea that one day we'll be able to go in and have a blood test that tells us more concretely what the biological underpinnings of our symptoms might be. And so I think here we have an opportunity to then take the knowledge that we're gaining from this sort of systems biology approach that gene transcript protein up to behavior and then think about the

therapies and interventions that we would develop. And so neuroscience of all the organs of the body – the brain of all the organs of the body has three different modalities that can cause really impactful change.

So we've been talking a lot about medicines and here we mean small molecule or biologics that we think will go and bind to the cell and cause beneficial changes, but the two other modalities that can really alter your brain are electricity and behavior. And so in the future, I could imagine that we have these multimodal therapies and interventions that would allow you to really treat the individual in front of you.

Taren: Wow. So that is something to be thought of. That's fascinating. I can't wait to see where you go and where you take this company and your next company and your next company after that. Amazing. I ask this question of all of our WoW podcast folks and I like to ask you is there an accomplishment or something that's happened in your career thus far that has impacted you a change the trajectory of your career? Can you identify a wow moment thus far? And I know you have many more wow moments to come.

Dr. Meyer: You did ask me this question ahead of time and I was reflecting and thinking about I think this – if you're curious and you're really open, there's so many opportunities to be wowed. But I selected one that was particularly impactful for just my mental framing of career and work. Like I said, my personal relationship with science is very deep, and I've always felt that science is not really an individual sport or not of a single institution or even a single country, but that science is a human endeavor.

While I was in Norway as a Fulbright scholar, I was actually invited to be an American representative at the Nobel Peace Prize ceremony. And the recipient that year was Dr. Wangari Maathai, a biologist from Kenya. So this is the peace prize, but it was as a Ph.D. biologist. It's really impossible to overstate how inspiring it is to see the peace prize awarded to a scientist. And what Dr. Maathai had done was she had used her scientific education to really liberate herself and then used her knowledge of biology and ecology to bring freedom and peace and democracy to her people. The Nobel committee noted that we are all capable of similar endeavors no matter our profession, and that science works best if we work together. It's a unified process of discovery if we can all come together and work on that. And so I had always thought of cross cultural diplomacy and these sorts of things necessary for the betterment of science, but when I left Norway I had a greater lesson; that science is a universal language and that truth finding can lead to peace building and that scientists can be diplomats.

Taren: Dr. Meyer, you just knocked my socks off. That's a mike-drop moment. Amazing. Thank you so much. And that is truly a wow moment. I have goosebumps. And thank you so much for sharing your story, your very personal connection to science as well as the amazing work you're doing on behalf of our brains because we need it, so thank you.

Dr. Meyer: You're welcome and thank you for inviting me here today and sharing these inspiring stories that I've been listening to on your podcast.



Taren: Well, I again I wish you continued great success, and I look forward to seeing where you go next.

Dr. Meyer: Thank you.

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