FUTURUM
PODCAST

Dr. Kelsey Fisher-Wellman

In this podcast, **Dr. Kelsey Fisher-Wellman** from **Wake Forest University School of Medicine** shares how he has become a successful cancer biologist despite coming from an unconventional educational background and he discusses the benefits of taking a different path from everyone else.

Break the podcast down:

00:58: Hello Kelsey, welcome to the Futurum Careers podcast. How are you today?
I'm doing great, happy to be here.

It's really good to have you with us. I'm going to start by asking you three quick-fire questions just to get to know you better as a person. So, the first question is, what is your favorite color?
We'll go with blue.

Great. And the second question is, what does your ideal Sunday morning look like?
Oof! Okay, we'll go with coffee on the screen porch, followed by 18 holes of golf, followed by football.

Yeah, cool. You're big into sports and I think we'll probably talk a bit more about that in a little bit. And the third question is, if you could be any animal, what animal would you be, and why?
Oh man, these are tough, Joe!

Throwing you in at the deep end!
Okay, I think it'd be cool to fly. So, I'm going to go – bald eagle. Does anything kill bald eagles? I don't think anything kills bald eagles.

I don't think so. Maybe other bald eagles? I don't know. Yeah, I think you're pretty safe as a bald eagle.
Yeah, I think that's a good one.

02:01: Great. So, Kelsey, you run a cancer biology lab and specifically you've been researching the mitochondria of cancerous cells. Could you give us a little bit of background on the kind of work that goes on in your lab?
We're a cancer metabolism lab. I think anybody that does cancer research, I think the goal is, we're all trying to cure cancer. I think it should be your goal if you're doing cancer research is to try and treat the disease. And the difficult thing about cancer as a disease is, it's a disease where the treatment is designed to kill the cells of the body. And so, you can probably figure out that that's going to be a difficult task because you have to kill the cancer cells and not the normal cells. All successful drugs are based on identifying some specific part of the cancer cell that is necessary for the cancer cell and not necessary, or as necessary, for the normal [cell].

We're doing the same thing. We're just looking for those cancer-specific signatures within the mitochondria of the cell. And the reason we look there is, based a long career of working with mitochondria in different cellular contexts, we knew going in that if you just pull mitochondria out of, let's say a kidney cell or a heart cell or a blood cell, they are highly specialized within those cell types.

And so, we knew that they were different from those cells. So, just right off the bat, let's just say you had a blood cancer, well, even if I just had a therapy that just killed all blood cells, that's actually still better than a chemotherapy that kills blood cells and all proliferating cells. We were hoping that we'd get even more granular resolution – we'd be able to say what specifically is different about the cancer cell: 'Okay, we found this thing, let's go drug that.' So, that's our 30,000-foot view of what we're doing in the lab.

03:56: Yeah, so looking for those things that are specific to a cancer cell so that when you treat them, it's only affecting the cancer cells, or affecting the cancer cells more than the normal cells.
Yes – *more*. If I could find something that *only* affected [the cancer cells], with that type of binary result I'd be a very rich person!

04:14: Now, if we could talk a little bit more about your personal career journey, which I don't think has followed a typical route. I think you

started off as a personal trainer? So, how did you move from there to where you are now?
Yeah, that's a good question. I didn't grow up knowing what I wanted to be. I was always good in school. I didn't push myself. Not that I didn't try. I did try, but I didn't try to push the boundaries, so to speak.

I guess it's hard to push the boundary if you don't have a clear idea of what you're pushing for.
Yeah. I graduated, I went to a state school, University of Memphis, and I knew I wanted to do something that was health related, but I didn't want to go to medical school. I knew that, but outside of that, I didn't really know. And at the time, I was really into weightlifting and bodybuilding and so, exercise science, I was like, 'Oh that sounds cool! I like sports!'

So, that's why I majored in exercise physiology and that's how I became a personal trainer. It really just came down to at the end when I was graduating, they let us do an internship in your last year. So, I initially did an internship with the football team. And the first week, I was like, 'This is not intellectually stimulating. It's mostly grunt work, like get people water.' It was not interesting to me at all. And that's why I switched to the other internship track which was research.

That was my first exposure to what it was like to work in a lab and the whole concept of it. Like, you control everything that you can control. You have a problem. You design experiments to try and answer these questions that you have. In the end, you actually get an answer. That just stimulated all the things in my brain, like, 'This is exactly what I'm supposed to be doing!'

06:03: Once you figured that out, what was the journey then to becoming focused on cancer?
I was a bit behind the eight ball, I think, because by the time I figured out that I wanted to do biomedical research, I didn't have an undergraduate degree that you typically have to enter into those biomedical PhD programs. And so, I had a hard time and I *was* kind of behind.

I tell the story all the time that my first year in my PhD program, we had a class that was called 'organ system physiology' and it was the first time in my life that I sat through an hour and a half lecture and I legitimately had no idea what the guy was talking about! And I went up to him after class and was like, 'I don't understand this!' And his word, and I'm grateful that he said it this way, he's like, 'You should go buy a physics book and you should read it.' And so I did. I went to the bookstore, I bought the physics book, I read it. And that was just an example of like, I was behind because I didn't quite know what I wanted to do, but I really wanted it. I wanted to be there and so I was willing to do whatever. I just needed somebody to point me in the right direction and I needed him to say that. I needed him to say, 'Sorry, you got to figure this out, this is how you should figure it out.'

07:15: So once you had that direction, even though you were behind, you had that drive that you needed to have the persistence to keep going at it.
Yeah, I'm stubborn! That's the right word.

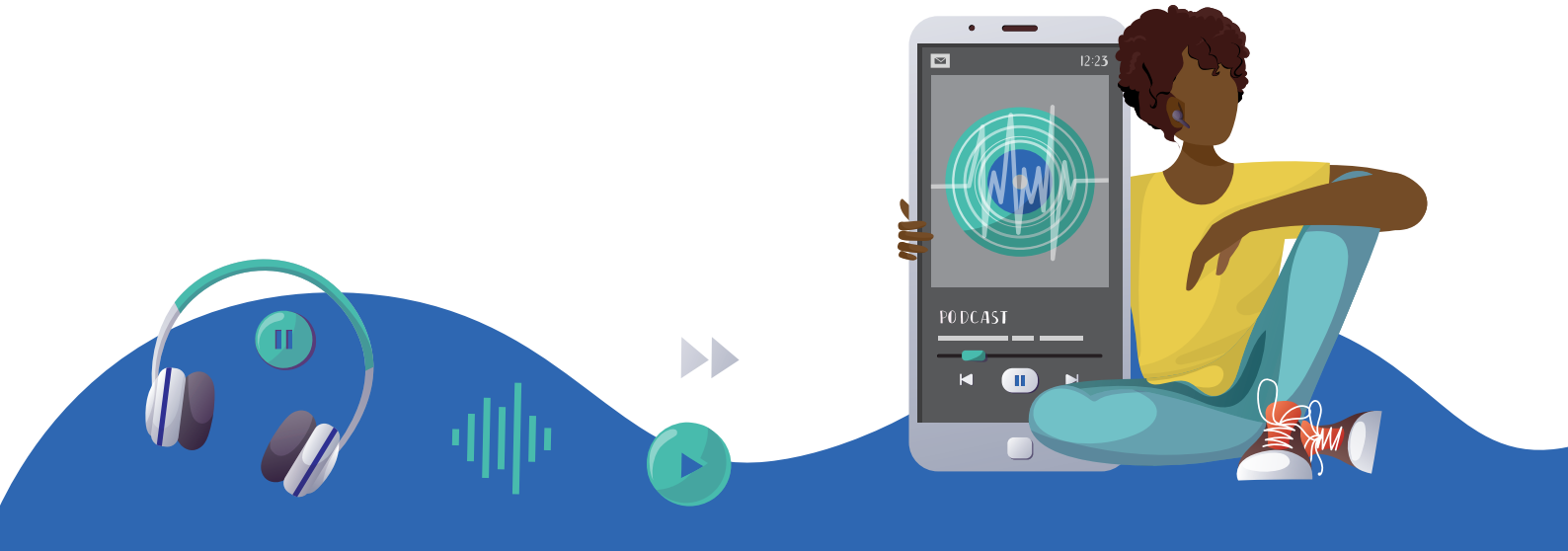
07:27: Sounds like you really thrive in challenging situations, and you seek out a challenge. So, are there any other challenges that you've faced, besides these steep learning curves throughout your career, and how have you overcome them?
I would say the biggest has been I've changed academic disciplines a couple of times. Each one of those steps was a pretty steep learning curve. But outside of that part, nothing crazy. I lived in Australia for a year. That was cool. That was an adjustment.

What was that like, adapting to a different place?
I think all that stuff is so good. So, here's this cool thing. I used to have this chip on my shoulder about being a professor in a medical school, but my degree is in exercise science. In my younger days, I didn't want people to know that, because I felt like I was trying to get out of the exercise science shadow so that I could be recognized in the biomedical arena.

And I gave this talk at a medical school in Canada and the guy who introduced me, this guy Aaron Schimmer who's helped me out a ton in my career, he introduced me, and he said such a cool thing, that 'his background is in exercise phys[iology] because he thinks about things differently.' And that was the first time I heard somebody else say that and I was like, 'Yeah, you're right!' Having a varied background is a real strength because you're bound to think about things a little bit differently.

And I would say that's also true for living somewhere else. When you get the experience of moving to another country, you see that we're all different and yet we're all so similar. And both of those realizations are very rewarding, at least they were for me. I learned a lot about myself and about the world from living in another country, even though Australia is pretty similar to America. They're not that different, right? I mean they are different; they talk weird!

Both of you talk weirdly from my point of view!



09:25: I guess it's realizing that, just because maybe on paper you're slightly behind, actually the fact that you've come from a different place means that your perspective is different and that is actually a benefit if you use it in the right way.
Yeah. And I look for that now when I'm hiring people. I'm interested in trainees that have a different background because I think that really is a strength.

09:45: You mentioned that it took this other person saying that about you for you to realize that. So, have there been any particular mentors or other people in your career that have helped you and given you those realizations and helped you along your way?
Yeah 100%. I'm very lucky. Everything I know I've learned from other people. Part of the thing I like about science is the shared problem solving. You develop these bonds over time and all those people that I trained with, my PhD mentor, my postdoc mentors, and then even when I was independent, I still had people that I would consider mentors. I have always valued that part. In fact, I think I've always sought out if I'm going to go into a new field, like 'Okay, who knows the most? I'm going to go talk to that person.' I did that at each one of those steps because I have no problem saying, 'I don't know. But I know that if you tell me information, I can work hard. I'll get there.' I've always sought out those mentor relationships.

10:49: Do you have any advice for younger people who are at the start of their career or still in their educational pathway on how to go about forging those relationships?
I think now I'm in the opposite role – now, I have people reach out to me. So, I'll just speak for myself. I remember thinking when I was younger, you have this perception like, 'I don't want to bother them. I don't want to send them an email.' Those thoughts don't come into my head anymore. Because I just know from my own experience, I've never received an email from a potential trainee or even a colleague, somebody who's interested in my work, my expertise, whatever, those are always the emails that are like, 'Oh, cool! I can't wait to respond to this!' And that's the truth, right, most of the time. And that's not true for everybody, but it's true for me. And I think it's probably true for a lot of people.

So, reach out. I have an undergraduate that's working with us right now and that was literally because he was interested in our work. He had done an internship at a different lab, sent an email. And for me that's an easy, 'Yeah, I'll bring you in, come on! If you want to be here and you want to learn, we'd like to have you.'

I think people like it when someone else shows interest in what they're doing. So, to have that is always a good thing.
Yeah, because most of the time, it's just a bunch of rejection and people criticizing you! So, the off chance you get to talk glowingly about what you do, it's like, 'Absolutely!'

12:19: So, I guess, if you're interested in something, reach out to someone who is involved in that field. Like you said, you always look for the person who's going to be able to teach you stuff and who knows what's going on. Just ask them about it.
Yeah, that's the cool thing about the traditional academic biomedical enterprise. I mean, there are situations where maybe I have an open position and I create a position and I post it and people apply, like the traditional job market. But a lot of academics doesn't work like that. It works like, 'Hey, I got an email from somebody. They look like a great candidate.' And then we spend the next year and a half figuring out how to fund the position. And so, that's what I mean by there are hidden opportunities that you're not going to see if you're just searching for jobs, but they're all over the place in the biomedical world. But you do have to be willing to put yourself out there and be interested. See if there's anything available.

13:16: Do you have any final advice that you would give to young people who are interested in pursuing this kind of work or a career in the world of science and medicine?
I think there's a lot of hidden opportunities that people just don't know. If you want to do this job, that's the number one criterion because you can study whatever discipline you're interested in. If you're interested in biochemistry, physiology, molecular biology, psychology, you can find where you want to go. But at the end of the day, we all follow similar principles if you're in a scientific lab.

I think the coolest part about being a scientist is even at a very small scale, there is a point in every single scientist's life where there's a moment in time where you know something that no one else in the world knows. And I think I've always thought like, 'Man, that's so cool!' Even if it's like, 'Hey, this buffer gives you this result.' It's still a cool thing to create new knowledge that builds on top of all the previous knowledge. There's some… I don't know… There's some higher… I don't know how to say it correctly, but you get what I'm trying to say!

14:24: Yeah, it's not just the fact that it's new knowledge that no one else knows, but it's the fact that you and your team have created that knowledge yourselves through your teamwork.
Yes! And it lasts, right? Once you've done it, it's like, 'Oh, I did that!' And I think there's something about it that's very, very satisfying.

Awesome. Yeah, that's great. I've got more than enough unless there's anything else that you wanted to add that we haven't spoken about?
I think we've covered it and it's been fun!

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