**Targeting the Toughest Diseases**
Script: Episode 5 — Targeting Acute Pain

**That's Damian Sanchez — or if you are a jazz fan living in Miami — "Damian J."**

***Damian J:*** *Well, I play all types of music, but yes, my passion lies in the jazz genre. The history of jazz inspires me to create. I get very passionate about talking about the history of jazz from its very beginnings until today.*

**His passion started when he was 12 years old.**

***Damian J:*** *I saw a picture in a magazine that changed my life when I was that young. It was a picture of a young man who was holding every single woodwind because he could play them all, and so I wanted to be like that kid.*

**Damian started with the oboe… then the flute… the alto sax, the clarinet and even the bassoon.**

***Damian J:*** *I also play guitar, I also play piano, and I also play various percussion instruments, mainly Latin percussion stuff because it's part of my project to perform Latin jazz.*

**But on a day that should have been a musical celebration… Damian's life took a terrible turn.**

**Hi. I'm Jordan Gass-Pooré, a member of the University of Southern California's Center for Health Journalism.**

**This is "Targeting the Toughest Diseases," a podcast produced by Bloomberg Media Studios and Vertex Pharmaceuticals. In this series, we look at some of humanity's most challenging diseases, and how Vertex — a Boston-based biotech company — is using innovative tools, methods and a unique philosophy to search for treatments and cures.**

**Today, we're looking at acute pain.**

**You might think "pain" is just a sign that something else is wrong in your body, but Vertex is looking at pain as its own unique condition. They're researching it as a disease.**

***Damian J:*** *It's December 2022. I just finished about a month of rehearsals with the symphony, a very specific symphony made up of nonprofit organizations sponsoring young musicians and professional musicians here that play classical music that is unheard of, by composers of color.*

**This was the day of the inaugural performance.**

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***Damian J:*** *I wake up early that day. It was a Saturday. We were performing at the Broward Center of the Performing Arts, this wonderful hall in Fort Lauderdale, Florida. I live in Miami, so I grabbed my scooter.*

**See, Damian doesn't like driving. He's not a guy that likes sitting still, and South Florida's traffic can be bad. So, instead of a car, he uses an electric kick scooter and public transit. Getting to Fort Lauderdale means riding his scooter to the train station, taking the train up the coast, and then using the scooter again to get to the venue.**

***Damian J:*** *I have my English horn and my oboe and my music in my backpack on my back strapped on. I had my helmet.*

**He's also wearing a brand-new tuxedo.**

***Damian J:*** *And I remember looking to the left and looking to the right and saying, ha ha ha traffic sucks.*

**Damian was in the bike lane… going down a steep hill… when a driver, apparently attempting to get out of the gridlock, suddenly turned into the bike lane.**

***Damian J:*** *I hit the front of her car with my scooter — which I do not let go of — which actually ends up flipping me over the front of her car. I fly into the air, and I land on my ribs which get cracked and my foot, my right foot gets caught up in the accident, and my tibia and my fibula both are shattered in many, many places, and my leg is completely discombobulated, disjointed to the side.*

**Damian didn't lose consciousness. In fact, he tried to stand up.**

***Damian J:*** *And as soon as I put one ounce of pressure on that right foot, then the pain started coming in very, very strong, as you can imagine. I have all these broken bones in my right leg, and I'm trying to walk on it and walk it off like nothing ever happened.*

**A crowd gathered and someone called for an ambulance. Within minutes he was in the emergency room of a nearby hospital. The pain in his leg was unbearable.**

***Damian J:*** *This one guy says we're gonna give you morphine and we're gonna manipulate that leg until they're ready to operate because it needs to be manipulated. I said I've never had any drugs. I don't take drugs. They said well you're gonna want it. I said okay, and they gave it to me through my IV and I felt like I was really drunk, and then he grabbed my foot and he put it back in place.*

*I really did feel inebriated. I was laughing. I was joking. You know, I was being very bubbly, which I usually am anyways. But I was kind of scared.*

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**After a few hours… the drugs wore off and the pain returned.**
**It was time for a second dose.**

***Damian J:*** *I wasn't gonna take anything. I didn't want to get hooked. My family has a lineage of substance and alcohol abuse. My brother fights it, and my uncles fought it, and I've always had that trauma in my brain.*

**It's a horrible decision many patients face. Choosing between pain and the risk of addiction.**

**The doctors tried their best to persuade him.**

***Damian J:*** *They were all about it. They were all about it. No, you sure? You sure you don't want to take nothing? What are you gonna do? I'm just gonna deal with it.*

**And that's what many patients do when faced with acute pain: they "just deal with it."**

***Damian J:*** *I never took any pain medication. No matter how bad it hurt. But yeah, the first three months were hell.*

**Pain isn't entirely a bad thing — it's actually an important warning system — it's our body's way of telling us something is wrong.**

***Dr. Norman Buckley:*** *Typically, you expect a broken limb to hurt a lot when you injure it, gradually get better, it'll be achy for a few weeks, but as it heals, after three months, you would not expect someone to still have pain from that broken limb.*

**Dr. Norman Buckley is the Director of the Michael G. DeGroote National Pain Center in Hamilton, Canada.**

***Dr. Norman Buckley:*** *There certainly are settings where people continue to report pain and then you have to consider, what's the reason for that?*

**He says doctors have used medicine to manage pain for centuries.**

- **Opium in the 1600s**
- **Ether and chloroform in the 1800s**
- **Then morphine and even heroin in the 1900s**

**More recently, NSAIDs have been used. Those are nonsteroidal anti-inflammatory drugs… and of course opioids, which can be effective, but bring tolerability concerns and carry the risk of addiction.**

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**Innovation in pain management has been slow, in part because pain is both common and complex. It affects individual people differently. Those differences might be influenced by gender, genetics and age… as well as other factors.**

**Pain represents exactly the kind of medical problem Vertex likes to target:**

- **There's a long history of research to build on**
- **There's new technology available, or Vertex thinks they can develop it**
- **There's a large unmet need**
- **And Vertex thinks it may be possible to make an impact**

***Dr. David Altshuler:*** *We've picked a set of diseases: cystic fibrosis, type 1 diabetes, sickle cell disease. Also, pain.*

**That's Dr. David Altshuler. He's the Chief Scientific Officer at Vertex Pharmaceuticals.**

**What he's really on is a quest for something innovative. He's in search of new ways to think about old problems.**

***Dr. David Altshuler:*** *The real question in our mind is can we succeed? Can we make a difference?*

***Dr. Paul Negulescu:*** *Pain itself can be a disease.*

**That's Dr. Paul Negulescu. He's leading Vertex's research in this area.**

***Dr. Paul Negulescu:*** *So, while pain is a symptom of diseases, many diseases, it can also be a disease in and of itself.*

**Vertex has been working on that puzzle for decades.**

***Dr. Paul Negulescu:*** *There are tens of millions of people in the U.S. that get pain experiences every year, either acute or chronic pain.*

***Jordan Gass-Pooré:*** *One thing that really interested me is why does it seem like some people are more sensitive to pain than others?*

***Dr. Paul Negulescu:*** *It's a very subjective thing, pain, and it's actually, we don't understand what makes different people sensitive or not to pain. I would say, though, that there are outliers. I mean, there are definitely some people that are way off the charts in terms of their ability to detect pain or not.*

***Jordan Gass-Pooré:*** *Would you be able to break down for me a little bit further into what exactly is pain?*

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***Dr. Paul Negulescu:*** *That's a really good question. So, pain is an unpleasant sensation. It's something that you experience and so, therefore, it is something that has been processed by your brain and depending on your state of mind, literally, that affects your ability to sense pain. So, it's a complicated process by which we perceive pain.*

*Now, the way that we're trying to approach it, which is to kind of take it out of the brain part. Because we know it starts in the periphery, in most cases, it's due to an injury or a surgery or damage to a nerve that's outside the brain. So that part of the body is sending signals to the brain. "It hurts! It hurts!" And then you're processing those signals, and depending on whether you're awake, asleep, distracted, you feel different levels of pain.*

*Our goal is to try to cut it off so it never really gets to the brain. Opioids work at the level of the central nervous system; they actually suppress the inputs that are coming into the brain. And so, we're trying to work from the outside of the brain to reduce the pain signals into it.*

**That's the unique aspect of Vertex's approach — to research innovative approaches based on the underlying mechanism of the disease.**

***Dr. Paul Negulescu:*** *The way we're approaching pain is by targeting these proteins that have been identified through human genetics as playing a key role in the transmission of pain signals in the pain-sensing neurons.*

*If you think about the pain-sensing neuron as a wire, it's transmitting a signal that says, "I've got pain in one part of my body" to the other part of your body. And for that signal to get transmitted, it has to be conducted along that wire — to conduct that electrical signal through that sensory nerve.*

*It's kind of like a bucket brigade. One channel opens at one end and it passes the electrical signal to the next. And that gets passed to the next one and so on. And that's how the signal gets propagated.*

*And so, you know, we're trying to interrupt that transmission.*

**The work is focused on researching the mechanism of how a pain signal travels in the body with the hope of making a difference for patients.**

**It's been two years since Damian's accident, and other than walking with a slight limp, he's moved on with his life. He doesn't dwell on those pain-filled months after his surgery. In fact, he says he really doesn't remember most of it.**

***Damian J:*** *You tend to block out memories that you don't want. You really do. They're painful. So, I think that's why I don't remember more about that time in the hospital.*

**What he does remember… is that when the pain was so bad it made it difficult to even stand up… he never lost his passion.**

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***Damian J:*** *I don't want to give up on music, I don't want to give up on my music. As long as I'm close to the music and keep playing music, I'm very happy. So that's, that's what I want to do. I want to be at peace.*

**This is Targeting the Toughest Diseases, a podcast from Bloomberg Media Studios and Vertex Pharmaceuticals.**

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**I'm Jordan Gass-Pooré, thanks for listening.**

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