

# Fireside Charla Episode 14

## Cancer Research at SDSU

**Dr. de la Torre:** So welcome to the Fireside Charla. Today I'm very excited to chat with Dr. Elva Arredondo, Dr. Christal Sohl and Dr. Wayne Beach. They are three of SDSU's cancer researchers who tackle research from different angles. They're all part of the SDSU Cancer Core, short for cancer convergence research, which is a large cross disciplinary cancer research group, that brings together researchers from many colleges across San Diego State University, including chemists, biologists, public health researchers, engineers, and communication experts. Today we're going to talk about the breadth of cancer research going on at SDSU, and how they each approach cancer research, the impact it's making, advancing our understanding and treatment of this toxic disease, preventative measures, and the importance of good clear communication.

**Dr. de la Torre:** Thank you for joining me today. Let's start with a round of introductions.

**Dr. Arredondo:** I'm Elva Arredondo, a professor in the School of Public Health.

**Dr. Sohl:** I'm Christal Sohl, an assistant professor in the Department of Chemistry and Biochemistry.

**Dr. Beach:** And I'm Wayne Beach, a professor in the School of Communication.(35:24-36:01)

**Dr. de la Torre:** Well, I'm so happy that you're here with us today. So I want to start the conversation with Dr. Sohl. I know you're a passionate cheerleader for undergraduate research at SDSU, and you've developed an innovative program to encourage the pipeline of researchers in chemistry and biochemistry, focusing on studies on mutations and metabolic enzymes that lead to cancer. Could you tell us Dr. Sohl, how you're able to mix this wonderful opportunity for our undergraduates with this important research?

**Dr. Sohl:** Sure. So I'd like to start off by mentioning that I've always been really enthusiastic about research of course, but when I first started out as an undergraduate, I actually had a hard time breaking into a lab, at first. And so what I was able to do finally, is meet someone that was willing to take on a student that was so early in their career. And so I really emphasize now that you know, as I moved on from a graduate career, post-doc career, I really didn't see a lot of undergraduate students in those labs. And so I was so thrilled to see that there's such a strong culture of undergraduate research here at San Diego State. And I'm really excited to try and get undergraduate students even if they haven't had a ton of coursework to get them involved in a

lab right away. And in particular, trying to reach out to some of our underrepresented groups to make sure that our research labs here on campus are really well reflecting our student population here at San Diego State. And so, as part of this effort, I developed a mentoring group essentially called MINDSET or Maximizing Inclusion and Diversity in Science, Engineering and Technology. And so what this research program or what this program does, is it really helps to mentor San Diego State graduate students, as well as Miramar Junior College students. And so I have a counterpart, Professor Gary Smith, and the Department of Chemistry at Miramar. And what we try and do for these students is to provide near peer mentoring, but also give them network opportunities and allow them to practice leadership mentoring skills. We hold tours at different local industries and the like. And our goal is to really help with that pipeline to ensure that our students are going on in great STEM careers. For example, one of our graduate students Mario Cardenas, she's actually a former two year college students. She's currently in Jeff Gustafson's lab working on cancer drugs. But she's able to really understand what these two year college students are going through. Maybe they're unfamiliarity with research opportunities on campus. And so she's been really effective at near peer mentoring those students. But what's also been really cool is that through this program, she was able to really cement her own career goals. She wants to stay in a joint industry essentially upon obtaining her PhD. And so this has also been a great pipeline for me to, to bring in students to work on research in my lab. And so as you mentioned, I work on metabolic enzymes and understanding how they go haywire in cancer essentially.

**Dr. de la Torre:** So when you think of something like metabolic enzymes, a lot of people aren't familiar with that. How do you get the undergraduates to engage in a topic that's fairly sophisticated, so they get excited, and then, of course, become the future cancer researchers that we so desperately need to conquer this horrible disease?

**Dr. Sohl:** Absolutely. So metabolic enzymes are particularly accessible, I think, in a sense, because everybody likes to eat right? And somehow we have to turn all of this carbon you know, whether it's a burrito or pizza or salad, we have to turn that into something that the body can use for fuel to make DNA, to make proteins to make fats, you know, in order for cells to grow and divide. And so what sometimes can happen is you can have these genetic mishaps that happen randomly, right? That can cause these proteins to either do the wrong thing at the wrong time, or do the right thing, but way too much, or way too little. And so, in the metabolic world that I'm in, I'm interested in a particular enzyme that makes a really dangerous small molecule when it gets a mutation in it. And that really dangerous small molecule is kind of like a carcinogen, the body starts to make it and it causes a lot of pro tumor pathways to get launched.

**Dr. de la Torre:** Is that now just for clarification, is that from diet? Or is that something that's genetically defined?

**Dr. Sohl:** Yeah, so it's really genetically defined in a sense, but not in the way where it's necessarily passed down, you know, from parent to child. So this could be damage to your genome that can happen because you're out in the sun, because you aged because you

consumed oxygen, you know, all of these different things that can happen. And over the course of our lives, we build up these little genetic mishaps and usually it's fine; but sometimes it can help lead to cancer.

**Dr. de la Torre:** And so as you start bringing your students in the lab and the students are obviously younger than most graduate students, how do you get them engaged in your your own personal research what makes them excited about participating in this particular project?

**Dr. Sohl:** So cancer research is something that's so very accessible because I don't think I've encountered a student yet that hasn't been affected through cancer in some way. Usually, these early meetings with the students launch into: I was a caretaker for my mother, I remember vaguely my great grandmother, great grandfather dying of x, you know, so they always have some sort of cancer connection that engages them right away. Then after that, sometimes they're just excited in the magic of science that we think is kind of old and boring and routine now but you know, they can they can boss around E. coli bacteria and tell them to make a cancer protein. And I think that's pretty amazing, you know, to me now, but certainly if I was a brand new student, I think that's pretty wacky.

**Dr. de la Torre:** So when you think about the future of science and the needs to create this workforce who can really tackle these horrific diseases and issues- what do you think is really key to teach the students as are in your lab? I mean, you're exposing them to an exciting E. coli, that's pretty exciting. But what other important skills do you think are important as they go through this experience?

**Dr. Sohl:** Yeah, absolutely. You know, so there's a lot of a lot of things that a scientist needs to be successful, right. And some of these things are communicating effectively. And that can include to people with all different types of backgrounds with all types of knowledge bases from all different types of fields, right. So that's such a critical thing to encourage. And then also sort of valuing, I guess the perspectives, you know, from a lot of your different colleagues, that kind of goes with that same sort of idea and staying creative and open minded, you know, sometimes some of our best ideas come in from someone that doesn't know how things are supposed to be done or how they're supposed to work. So if you have somebody that's, you know, not familiar with the normal routine, they can bring in some really great ideas and new places to go. So staying open minded and creative is a really important aspect, I think of any scientist. And then just maintaining that curiosity and asking questions. And then at sort of the less fun part of being really tenacious, you know, research is hard, things mostly don't work. You know, in a research lab, you follow your 10 step protocol, right? And poof, everything works. But in a research lab, you know, not only do you not have that protocol from the start, but it probably won't work the few for several times anyway. So really not being afraid of failure and embracing that as a new new way to learn things is really critical.

**Dr. de la Torre:** So it sounds like they need to understand the mindset pretty well here, and you learn a lot more from failure than success.

**Dr. Sohl:** Absolutely.

**Dr. de la Torre:** So, in the context of the future work in this area, and what you'd like to see with those students, what do you see in the next 5 to 10 years?

**Dr. Sohl:** Yeah, so the next 5 to 10 years, students in my lab, you know, kind of depending on where they are, they're going to be hopefully going off to graduate programs going directly into the biotech industry. They may be going on to PhD programs, they may be going on to post-docs, or at the PhD level. They may be going on to academic positions or different levels of industry. But at the end of the day, you know, I think our students are really interested in trying to understand the information that's contained within the genome, and then of course, the environment around them and understanding how those can serve as footholds to try to combat cancer in the realm of precision medicine and personalized medicine.

**Dr. de la Torre:** So you mentioned both precision and personal medicine and technology changing quickly. When you look at the research in science today- how quickly do you think we'll be able to become even more precise and effective in the treatment of cancer? I mean, you're the scientist here of doing the basic research. I gotta ask the question.

**Dr. Sohl:** Yeah, you know, and I think, maybe, maybe not the hardest part is identifying the footholds, you know, that we need to go after, right? So maybe we can identify those mishaps that we find in the genome. In my area, we identify those and we test whether or not that's the problem. So that's kind of where I reside. But a bigger challenge, in addition to those really big challenges, is developing an intervention that is selective for that genetic mishap and then out, out evolving basically, clever cancer, right, who was constantly trying to develop mechanisms of resistance. So I think we have challenges both at starting at finding what the problem is, confirming that those are indeed problems, developing targeted therapy, and then making sure those therapies are durable. That being said, we've had tremendous success so far. So I'm actually for many, many types of cancer. I'm rather optimistic. There have been some that have been really tough, like pancreatic cancer, right. But we often know what's wrong, and pancreatic cancer, we just don't have necessarily all the tools that we need to stop those problems that we're aware of.

**Dr. de la Torre:** So now, I'm convinced we need to have even more scientists because the future is very optimistic if we can get to using the types of research and get the kind of creative minds and the people the mindset to do the work. So thank you so much. I want to now turn to Dr. Elva Arredondo, who is a professor in Public Health and I wanted to hear about your story and your interest in cancer. And I know it's been focused primarily on disparities across different groups. So I would love to hear what you're doing and what motivates you in this area?

**Dr. Arredondo:** Absolutely. So right after college, I was given an opportunity to work on a community based program to promote breast cancer screening among black women. And I took

this position, because it was a social justice issue for me. I was well aware that black women were 40% more likely to die from breast cancer than other women. So I really wanted to understand what were some of the causes in how can what can we do about it. And I've been able to translate some of that work and that research experience into my current research with Latinos. So, we know that cancer is a leading cause of death among Hispanics or Latinos. And compared to non Hispanic whites, Latinos are more likely to be diagnosed with advanced stages of disease and experience poor quality of care than any other groups. So my work is targeting some of these disparities from my multi level approach. So I want to address what are some of the knowledge, what are some of the myths? What are some of the organizational factors that influence access to care? What are some of the biases that we see present in health care systems? And then what are some of the community access? What are some of the resources that are available for for prevention and treatment for these communities?

**Dr. de la Torre:** So when you talk about some of these issues like biases and myths, they referred to that obviously affect willingness to seek care, use preventative measures, what do you think that the big issues are surrounding those issues of myths and access?

**Dr. Arredondo:** Some of the cultural issues? So we know that there's definitely a lot of misconceptions about what causes cancer, how to treat cancer. So we've been we understand some of the biases or an under- lack of knowledge, you know, in the community about what causes cancer. So we've been working closely with promotores or community health workers, to address some of these myths, and this is a culturally appropriate and effective mode of intervening in the community. So these promotores go in the community and are able to increase knowledge about what causes cancer and also link participants to medical services.

**Dr. de la Torre:** So have you seen gender differences in terms of access to treatment? In other words, within the context of Latino culture, there's issues of machismo, oftentimes there's a concern that a health issue is really more gender specific or the need to go to see a doctor would have been your observations here.

**Dr. Arredondo:** So I've been working in the area of cervical cancer as well as colorectal cancer screening, and I've been able to see gender issues come up in both cancer areas. So in cervical cancer what we saw is when a woman would go to the doctor, the male partner would have a lot of negative feelings towards another male doctor doing a pap smear towards their female partner. So, we talked to participants and how to communicate the importance of cancer screening, we've worked with also male partners on the importance of cancer screening. And we've also seen similar gender barriers or cultural barriers in when we're working with call to cancer screening, we see some of our Latino participants, male Latino participants, note that they've had a lot of reservations and getting colorectal cancer screening because they're concerned that this is going to that others are going to question their masculinity. So obviously, these are real issues that we have to address in a sensitive manner in the community.

**Dr. de la Torre:** So when you say addressing in sensitive matter of taking the example, how do you do that in a sensitive matter? Because people have strong perspectives or belief structures. How do you begin to start the process by which they begin to listen to what you have to say?

**Dr. Arredondo:** Absolutely. So, in the latest intervention program that we implemented with Who Does, we had we hired male promotores to go out in the community and implement these workshops in the larger community and invite Latinos to come in and listen to some of the information that they have to share about the causes of cancer, but it also gave an opportunity for Latinos to really talk about their concerns and also for the promotor to address those concerns, and it was important for us to hire male promotores to talk about these concerns, because hearing it from a male promotor would be different than hearing it from a female promotora. So we are, we knew that these were important ways of intervening in the community based on formative research, and by using strategies that are going to be a little bit more effective with Latinos, is a way in which we address some of these cultural concerns.

**Dr. de la Torre:** So you have you seen some promising results in research?

**Dr. Arredondo:** We have actually, I'm glad you asked. We, in this study that I just mentioned, we saw a 67% increase in cancer screening, both male and females. So we were really excited about this. And we're going to build on these findings by rolling it out with other community health centers.

**Dr. de la Torre:** Well, congratulations. That's a wonderful accomplishment. 67% is nothing to sneeze about. That's great to see that kind of engagement with the community. So now I'm going to turn to Dr. Wayne Beach, professor of Communications. Now Dr. Beach, your interest is in cancer research as well, but you have a slightly different approach. You're more interested in the emotional and personal connection, am I correct on that?

**Dr. Beach:** You are. It began with a family in San Diego that donated to me, a collection of audio recorded phone calls and requested that I study them so that families could cope with cancer better, and also make that information available to providers and healthcare so that they could communicate better with those that were dealing with cancer. I didn't work on those materials for eight years, which basically included a son in the first phone call hearing from his dad that his mother had been diagnosed with cancer and she died 13 months later. 61 phone calls.

But I received a phone call one day from my mother in Iowa, she had been diagnosed with lung cancer. And she died four months later. And during that four months, I couldn't help but reflect on what might be back in my office on the shelf in that shoe box of audio recorded cassettes at that time. And so I came home with a new sensitivity about what family members go through dealing with cancer diagnosis and treatment, and in this case of prognosis that was terminal and dug into them. Got a grant from the American Cancer Society, and began a decade long research inquiry into how family members talk through cancer on the telephone. And that's how I got started in my work on cancer.

**Dr. de la Torre:** So that must have been a very difficult process of living listening to those tapes during a conversation. What are some of the things that you've learned in terms of listening to the tapes and the importance of communication that family members need to have with one another during those difficult times?

**Dr. Beach:** The stereotype that we have about cancer and communication is that it's primarily about death and despair. I found in all my research in families and in the clinic, and patient provider interactions, that it's really about hope and survival versus death and despair. And so when I started listening to those phone recordings, it was amazingly, strikingly familiar to me. I'd been through that journey. I myself was a family cancer survivor. I'd never been diagnosed with cancer, but I had gone through it with my mother and, and my brothers and my sister and friends and health care providers. So here are some of the findings. We realized that primary is updating and receiving news and determining whether the news about the evolution of cancer was good or bad. So there's this very tenuous complex relationship between good and bad news. And there are practices for delivering and receiving that good and bad news. There's a lot of time spent on trying to figure out uncertain futures. And so uncertainty can be analyzed as something we do and talk and interaction rather than just something in the head or the heart. And that's true with all social emotions. We've been looking a lot at how do people talk through fears? How do they state their uncertainties? How do they deal with hope in human communication. And so, it turns out that the audio recorded phone phone calls, when I wrote a grant to the American Cancer Society, they didn't even have to have a category to fund it, because such a collection never existed. But it turned out that it was the first Natural History of a family talking through cancer in the telephone from diagnosis through a death of a loved one in the history of the social and medical sciences. And it created, I found out in due time, an amazing bedrock to be able to open up communication as an ordinary routine activity that we rely on so much and dealing with illness and disease.

**Dr. de la Torre:** So years ago, I remember I read a book by an anthropologist about some of the most important elements in health care now is really that human connection. The fact is that all the data in the world doesn't really make up for the personal relationship established with the clinician, and with the individual, but particularly the family member. And particularly, as we've talked about, Dr. Arredondo's work, you know, looking at Latino community that's very collectivistic that has large extended families. How from your research have you been able to convey the importance of this really important level of communication with diseases like cancer, how have you been able to translate it to practitioners and family members can really benefit from this important knowledge that's going to make this journey, this painful journey, even less painful? But more important, probably more important in terms of the interaction between the individual cancer patient and the family members.

**Dr. Beach:** Yeah, a great question. You know, when I was working on the original phone calls, part of the grant was to go out into the community and do what we call listening sessions. I would take recordings and transcriptions and I would do listening sessions and analyses with

people in the community and clinics and hospitals at corporate in corporate settings at the American Cancer Society itself. And I started fairly, I thought getting criticized that these were such powerful materials that we shouldn't leave them in the confines of research and scholarship publications and books. And so they challenged me with figuring out a way to translate it, to touch many people's lives in meaningful ways. And what we came up with with the family cancer materials was a professional theatrical production called "When Cancer Calls." And all the dialogue in this production is verbatim from the real transcriptions. So it's all naturally occurring. And it ended up going through two phases with NIH, across the United States in screenings to be able to determine the impact that has to improve people's orientations and communication skills when dealing with cancer. And it was a very successful, randomized controlled trial. It's still ongoing. We're now working with the cancer research group to improve compassionate care for nurses. It's being taken to intercollegiate inter collegiate athletics with Tammy Blackburn on campus, and other things. On the clinical side, we've taken research on video recorded patient provider interactions and developed a documentary film called "A Journey Through Breast Cancer", which is just recently completed and will be screened on campus, February 5, at the Aztec Student Union.

**Dr. de la Torre:** And there's no cost to attend the screening. Is that correct?

**Dr. Beach:** Pardon?

**Dr. de la Torre:** No cost associated to this screening?

**Dr. Beach:** No cost associated with the screening.

**Dr. de la Torre:** I think there'd be a lot of people who are going to be listening, be interested in going to that because again, I think the whole issue of cancer is it is ubiquitous. It's all over every family's been touched at some level. Oftentimes, the most basic issue is how do I communicate with family members and loved ones in a way that I'm supportive? And yet, recognizing that the most important thing is to create the kind of environment of hope and possibly success. I mean, one of the other things it's obvious now is with the kind of work that's been done by Dr. Sohl and Dr. Arredondo, is that we really do have I think, optimism about the future if we can prevent, if we can screen, if we can do the right research, different cancers will have better prognosis's. Wouldn't you say, Dr. Sohl?

**Dr. Sohl:** Agreed. Absolutely.

**Dr. de la Torre:** And then I think also Dr. Arredondo, I think the other piece that I wanted to tie in with what Dr. Beach was talking about is that we need to really take advantage of the opportunities here that we have to expand the messaging and understanding to different communities. Because, again, given the fact that oftentimes people see cancer as if you're not involved, you think of it as a death sentence. But from what I'm hearing Dr. Beach, it's, it's not viewed as that it's viewed as an opportunity to maybe resurrect hope for a different outcome.

**Dr. Beach:** I think hope is probably one of the most underrated social scientific points of analysis and I think we're making headway on that. And I do think that before we had real recordings and transcriptions and investigations focusing on these patterns of human interaction, we had stereotypes. And in the history of the research that showed that communication was the number one important factor, as you noted in dealing with cancer, but there hadn't been one study using naturally occurring recordings to find those patterns. And so we've made headway, we've done interventions and health campaigns, and "A Journey Through Breast Cancer" follows one woman and her husband for three and a half years. From diagnosis, through treatment options through surgery, through chemotherapy and radiation on to breast reconstruction and then remission. And it allows us in this documentary format to go backstage to talk with doctors, to see how doctors are doing pathology analyses. To see how the patient and her husband and their family would talk about what the doctor told them in their home setting. And so we followed them for three and a half years, and I think it's a very powerful testimony about the importance of communication over time.

**Dr. de la Torre:** I think it's critical to have these different types of conversations at different levels. I want to also take the time here to thank each of you for this wonderful conversation. But before we end, I wanted to ask each of you maybe some concluding thoughts that you'd like to leave our listeners with? So I'll start with you, Dr. Arredondo.

**Dr. Arredondo:** Sure. Um, I think we've talked a little bit about some important strategies to try to increase cancer screening or preventive prevention in the communities and I think an important area of research that we're exploring and growing is in how to translate some of these evidence based approaches to different communities. Because oftentimes, they may be tested in one, but not in, there may be key ingredients to be able to lessons learned that we can translate to other communities and I think science that translational science is really important. There's there's a lot that works. And we can certainly capitalize on that. So the research and implementation and dissemination scientists are an important area too.

**Dr. de la Torre:** Now when you say translational science, what are you exactly referring to?

**Dr. Arredondo:** So, um, I'm referring to the translational science in which once we know that something works, there's an evidence based strategy or approach, is using that approach and adapting that to a different community so that other communities benefit from that approach. So in behavioral science, you know, there's specific strategies that have been tested, and found to be evidence based, but not necessarily other communities have not benefited for that and there may be tweaking that we need to do to for these communities to benefit from those approaches.

**Dr. de la Torre:** I think it would be great to have Dr. Beach's film for different communities to have different pathways in which the films could be used. Because I think in the era of Netflix it's an opportunity to distribute that widely as well. Thank you so much. Now, Dr. Sohl, some final comments.

**Dr. Sohl:** Yeah. So one thing that I would like to note, something I'm really excited about is the type of different types of research that are going on at San Diego State. So, you know, you mentioned our cross disciplinary cancer consortium, SDSU Cancer Core. And this has been such a neat organization that we've really brought together. And it's really allowed me to become familiar with all the different types of cancer research that's going on on campus that I never would have encountered otherwise. You know, so for example, at our first meeting, I sat next to Dr. Beach and I learned, you know, that he was in the Communications department and, and thought, well, gosh, we have nothing in common, you know, and actually, just before meeting here today, he gave me an article for me to check out of some common interests. So it's really been neat to see all the different types of research that's going on and realize that we actually have a lot of ways that we can be synergistic. I have some collaborations, you know, certainly chemistry and biology, but also in engineering. And I look forward to learning more about some of these other disciplines and understanding how our research can fit together to answer a lot more interesting questions.

**Dr. de la Torre:** And I think Dr. Sohl, there's a real opportunity with the films to share those with the undergraduates in your mindset program to say,

**Dr. Sohl:** Absolutely.

**Dr. de la Torre:** you know, these are the families and these are the physicians that you're going to affect by the basic research you're doing. Again, bringing those important cross disciplinary skill sets, to future scientists, and physicians and industry leaders is a real opportunity as well. That's wonderful. And now, Dr. Beach, some final thoughts.

**Dr. Beach:** Well, I think that I would say that there's order at all points. That whether we're dealing with enzymes and proteins and cellular structure or interventions and disparities in diverse communities, where human interaction and families are clinics, that there are patterns of everyday existence that await discovery. And it's a big challenge for us to come together and to realize that there are dots that need to be connected across usually disparate disciplines and with people that are cocooned and siloed and don't typically talk with each other, and we've developed a consortium where that we're breaking down those walls and we're finding that the real excitement the real impassion, impassioned work that we can pursue together is about finding new connections at at small and larger levels of existence. To really move the bubble and to affect social change and, and promote healthy practices. And so I'm just glad that we're moving this forward, it's a big idea. And we're just I think, sitting at a spot right now where we're a little over a year into it, and I couldn't imagine what we can accomplish in the next 2, 3, 5, 10 years. Well, I'm pretty excited too. I mean, the SDSU Cancer Core group is pretty exceptional in its capacity to transform the lives not only for the patients, not only in terms of the disease in the science, but also in the treatment and communication. And we're really fortunate to have this program and I agree with all of you that there is much more to happen in the future. So I want to

thank you all, and thank all the listeners to listening to Charla today on cancer and our wonderful, wonderful faculty. Thank you.