

Medical student shares her \$10,000 prize-winning research

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Featured topic and speakers

In today's episode of Moving Medicine, AMA Chief Experience Officer Todd Unger talks with Marielisa Cabrera-Sánchez, a second-year medical student at the University of Puerto Rico School of Medicine and this year's AMA Research Challenge winner, about her \$10,000 prize-winning research on COPD and her advice to other student researchers.

Watch the AMA Research Challenge.

Speaker

- Marielisa Cabrera-Sánchez, a second-year medical student, University of Puerto Rico School of Medicine

Transcript

Unger: Hello. This is the American Medical Association's Moving Medicine video and podcast. Today we're joined by Marielisa Cabrera-Sánchez, a second-year medical student at the University of Puerto Rico School of Medicine and this year's AMA Research Challenge winner. She's calling in from San Juan, Puerto Rico, and she's going to discuss her research and her big win. I'm Todd Unger, AMA's chief experience officer in Chicago. Marielisa, thanks so much for joining us. It's nice to see you again. Last time I saw you, I was telling you that you were the winner of the AMA Research Challenge with a grand prize of \$10,000, thanks to our AMA member benefits provider, Laurel Road. Winning that is no small feat. You emerge from over 1,100 submissions and then 5 finalists that we got to hear from on the show. And on December 8, you were selected by an elite panel of judges to win the challenge. Now that you've had a little bit of time to think about it, how are you feeling about this big accomplishment?

Cabrera-Sánchez: I am still excited like if it were last week. Yeah. I'm still digesting the news.

Unger: So many people that worked on this with you, were they equally excited? That's a big win.

Cabrera-Sánchez: Yeah, they were very excited. So I had a few people watching the competition and two of them were my mentors, Dr. Timothy Murphy and Dr. Hervé Tettelin. And after watching the finals, we had to do a Zoom call. So we made a Zoom meeting and we all started saying congratulations to each other because this was a trying institutional effort. I was the presenter and I was the one competing but they helped me a lot. And so we were exchanging how happy we were.

Unger: That's excellent. Well, congratulations again to you and the entire team, all the folks that worked and supported you in that. Why don't you, just in the briefest of kind of descriptions, tell us a little bit about what your research was?

Cabrera-Sánchez: Yes. So my research was looking into *Moraxella catarrhalis*, which is a bacteria that can persist in the airways of COPD patients. And while it is living there, it can cause inflammation and progressive decline in lung function. And so we were asking, "Okay, how is this bacteria persisting? How is it adapting?" And we hypothesized that it was changing its genome. And so using a variety of bioinformatic tools, we decided to look at the genomes of more than 150 isolates of *M.cat*, which is a lot of data if you think about it. And we were seeing what were the alterations that were occurring. And we were able to identify specifically which genes and which mutations were occurring. And this is super important when developing vaccines and trying to look for a way to help patients with COPD.

Unger: So what do you see as the kind of implications and how will that research influence medicine in the future?

Cabrera-Sánchez: Yeah, so it definitely is important because, when we are looking for ways of designing therapeutics and also vaccines, you need to know what is happening with these pathogens that you are designing a vaccine to combat. You need to know what is happening at a molecular level, and so that is where my project comes in. It shows a light as to what is happening and which antigens should we take into consideration with designing a vaccine and therefore helping COPD patients.

Unger: One of the things that I thought was very interesting, as you said in your presentation, that you hadn't done this kind of research before, at least in the methodology. Who taught you how to do it?

Cabrera-Sánchez: Dr. Hervé Tettelin was the one to help me with that. Yeah. So initially, I started this project as part of a summer internship with Dr. Timothy Murphy, who is the person that does a lot of COPD research and works with several bacteria, including *Moraxella catarrhalis*. But Dr. Hervé Tettelin comes in because he is the expert in bacterial genomics. He is the one that works with bioinformatics and so I collaborated with him on a daily basis. He is the one that showed me how to

use all of the programs that I was using with bioinformatics. And I got to tell you, I had to jump through several hoops in order to get to the findings that I discovered. But thanks to the amazing mentorship that I had and for his patience, we were able to make these discoveries.

Unger: What was the biggest hoop you had to jump through? What was the big challenge of this research?

Cabrera-Sánchez: I would say the technicality, and also I knew in my head what I wanted to do. I wanted to take these genomes. I wanted to do X, Y and Z. It's just that, because I was new to bioinformatics, maybe I didn't know exactly which tools to use in order to get to X, Y and Z. And also for each of the programs, the way that you construct a code, the way that you construct a sentence, you need to follow a certain order. So you need to, for example, call a file. That would be your input. And then you want to do this and that would be your output. And all of those things happen at specific order. And for each of those programs, it is different. So those specifics and that technicality was my main challenge.

Unger: How about the pandemic? Did that throw any wrenches into the process? Did you have to be in-person to do some of this stuff? In a lab? How do you do this virtually?

Cabrera-Sánchez: The pandemic changed the project completely. This was not going to be initially the project. I was going to go to the University at Buffalo in person. I was going to be in lab, touching test tubes, mixing solutions, counting bacteria, all of that basic science that we know about. But then Delta started having a huge impact in the cases in the United States and also Puerto Rico. The program was already moving to a program that was virtual. And so I said, "You know what? Can we make the program completely virtual?" It wasn't what I wanted to do. It wasn't what they wanted to do. But given the pandemic, I think that this is the best way to move forward. And we did that and that's where the bioinformatic comes in because it is something that I can do in my computer. So I was basically working full time.

Unger: Do you think this experience, kind of winning out of the gate like this, is going to change your direction as a physician or as a researcher in the future?

Cabrera-Sánchez: I think that if it does something, it's to stay on my own track. Infectious diseases is something that had already interest me. I've had that interest for a few years now. And given the pandemic, given this research and a lot of real life scenarios and experiences, I feel that infectious diseases is still my calling. So it might not be specifically working with *Moraxella catarrhalis* and COPD patients but it is going to be infectious diseases or some other associated condition.

Unger: Well, when we look ahead to the coming year and just for pretend, let's say you're talking to a group of another 1,100 students out there that are interested in doing this kind of research and competing in the challenge. What would you advise them to do based on your experience and winning

here?

Cabrera-Sánchez: I would say that for medical students specifically, if you want to do a type of research that is not so much clinical, for example, bioinformatics in my case, don't be afraid to do it if it is something that interests you. We are living in a world that is getting more globalized by the days. And we see a lot of collaboration between different experts in different fields. Therefore, if there is something out of the clinical stuff that we know about that interests you, don't be afraid to do something about it. And do it as long as it is something that is going to have an impact on patient care and make you a better professional.

Unger: That's excellent. Well, it was so exciting to be able to tell you the good news a week or so ago and it's really great to be able to talk to you here today. We expect big things out of you. We're giving you the AMA Research Challenge bump here and we'll look forward to seeing what you do in your future career. Thanks again for being here today. Congratulations on your big accomplishment. And again, thanks to Laurel Road for sponsoring this year's \$10,000 grand prize. If you missed the AMA Research Challenge, you can catch that on AMA's YouTube channel. So watch it. It's really fun to see the future of medical research in action. Thanks for joining us today. That's it for today's Moving Medicine video and podcast. Just remember to click subscribe on our YouTube channel or wherever you listen to your favorite podcasts, Apple, Spotify, wherever that might be. You can find all our videos and podcasts at ama-assn.org/podcasts. Thanks for joining us. Please, take care.

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