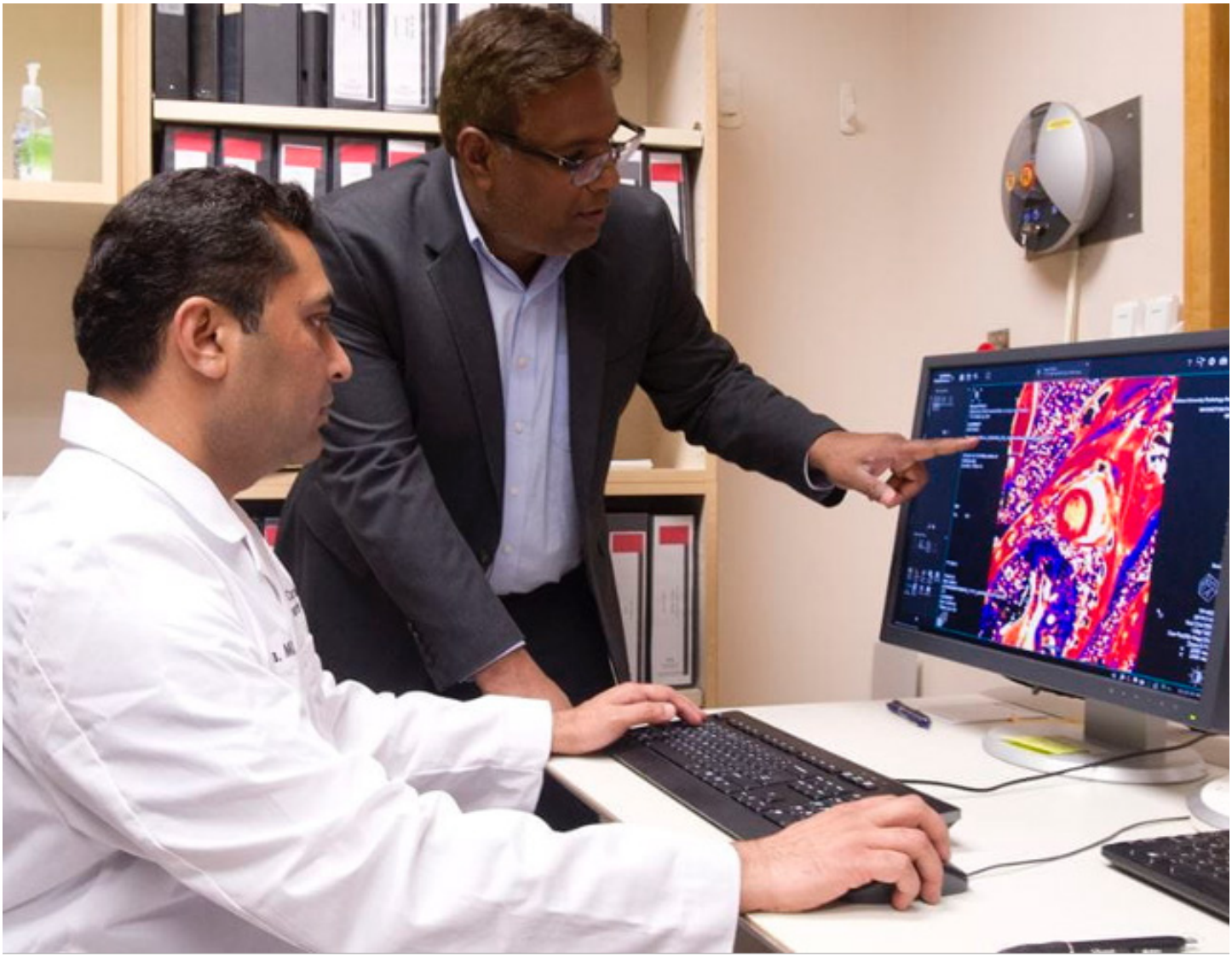
Heart to Heart: A Journey in

Interview with Rohan Dharmakumar, PhD

by Maryam Sabir, MS4



Cardiovascular Research

Maryam Sabir: *Can you tell me about your background and what brought you to IU?*

Rohan Dharmakumar: What brought me to IU was the start of a new cardiovascular research center, Krannert Cardiovascular Research Center (KCVRC), as it is known now. As an undergraduate, I specialized in physics and physiology. In graduate school, I completed a Master's in Mathematics and a PhD in Medical Physics with a focus on cardiovascular physiology. After my doctoral work, I went on to do a postdoctoral fellowship in the Department of Radiology at Northwestern University and became faculty there. I was at Northwestern for about 6 to 7 years before I was recruited to Cedars-Sinai Medical Center and UCLA in 2011, and there I grew through the academic ranks to become full professor in 11 years. At Cedars-Sinai, I served as director of the Translational Cardiac Imaging Research Program and associate director of the Biomedical Imaging Research Institute. I also served as co-director of the PET/MRI Research Program. I was then recruited to Indiana University School of Medicine as the inaugural director of KCVRC, which comprises many different research areas and faculty that work in cardiovascular research. KCVRC is really an enterprise with the goal of translating new discoveries into improved cardiovascular care. In that sense, we're a little bit unique in that our major focus is translational research. It's not just about discoveries. It's about going from discoveries to the detection of pathophysiology through imaging, biomarker technology, genomics or proteomics and then designing therapies based on the understanding we have developed of the disease process to then ultimately deploy it to patients. A lot of our translation is run through IU Health, but that's not where we stop. We run basic and clinical trials with the support of our collaborators worldwide. A lot of our partners are in Canada, India, China, South Korea, the UK and other parts of the world, which allows us to be connected to the rest of the world in the research sphere of cardiovascular research.

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MS: *At what point in your career did you develop an interest in cardiology and what experiences led you to focus specifically on myocardial infarction (MI) and mortality post-MI?*

RD: Studying the heart is something that I've always been interested in. Instead of pursuing a clinical career, I chose to focus more on basic scientific research because that's what I'm passionate about. So, this fixation with the heart, I can't remember exactly when

it started, but I can tell you that excitement began in elementary school and continued to grow over the years. So, this has always been something that I'm very excited about and interested in. My early exposure to running clinical trials was driven by technology development. My team has run trials that are more imaging-driven, sort of developing the technology, testing in patients and asking, "Is this good diagnostic technology?". But because of my blended background in both in physics and physiology, in the later years of my career, I have been gravitating more towards the development of drugs and therapies. Iron chelation therapy is one that we're testing out right now, but we are exploring and investing in many other trials. Some of them are diagnostic trials, while others are outcome trials. Many are first in-human trials that are FDA-approved. So even with trials, there are so many different kinds. We might develop a technology to see how it works and whether it's better than previous techniques. Or we might have a novel drug that we need to get through, and those are the first in-human trials that I referred to. Or we have diagnostic strategies where we go back into large registry databases and look at how some patients fair after myocardial infarction, and those are some of the outcome trials. And most recently, we released a novel classification scheme, the Canadian Cardiovascular Society (CCS) Classification for Acute MI that identifies MI into four stages. It's a landmark publication and classification that allows us to now stage the level of tissue injury for MI which did not exist previously. So, before the CCS Classification, clinicians would consider therapies that were not specific to any level of tissue injury. Now, we are able to develop therapies that are far more targeted. For example, an aborted MI could receive a more appropriate level therapy.

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MS: *What advice do you have for medical students interested in getting involved with basic or clinical research?*

RD: If you want to get into research, I think it's good to start early and have a curiosity to broadly explore a variety of specialties.. Then, go into a lab that cares about your development. It's not always the case, just that some labs don't have the resources. When I say resources, I'm not only talking about money, but time with senior investigators. If you're able to get into a lab that has that and asks very interesting questions, probing questions, those are places where medical students can get early exposure to research. So that's what I would recommend, and it gives you the freedom to operate, get involved and start thinking about what it is that's going on and start contributing. Research is very different from clinical practice. I find that some medical students are trying to get a line on their CV, that they did "x" amount of research, and that should not be the goal. The goal should be to learn and then use that experience to build other goals that are greater, and maybe more challenging. That's how you grow in research. The process is more important than a line on the CV. There are a lot of things that you learn that may not be on the CV but are going to be helpful for expanding your career and going into research if that's what you want to do. But you need to learn the process, and I think getting experience early-on in medical school and working with people that are excited about research can really give you great exposure to that.

MS: *In your career as a researcher, with clinical trials or academia in general, have you faced any challenges, and if so, what lessons have you learned from them?*

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RD: Clinical trials are always challenging, and it depends on the trial that you're running. If you're trying

to run a drug trial, there's all sorts of challenges. The observational trials are less challenging, but when you're trying to run a first in-human trial, there are a lot more considerations. You can have adverse effects that you have to deal with and there are a lot of things in the system that make it very difficult to run trials. I'm not saying that it's bad necessarily, because you want to be very careful when you're running these trials. To excel in research, the key is to be persistent and resilient; there are no two other words that can describe research. So, if you really want to do research, it's going to take a lot out of you to do it. The roads are not always paved with gold, but you have to travel through them. There are challenges that arise with running clinical trials that can vary from one trial to the next. For instance, study participant recruitment can be a challenge in both building awareness among referring physicians for eligible patients and creating awareness in general to a patient population. If you recruit 10 patients, that's 10 patients, right? But you see some of these trials have thousands of patients. How do you build that, how do you expand that? You might want to do that, but really you need the money, so then you need people to fund that. So, there are a lot of those sort of thoughts that you need to consider prior to taking on clinical trials. You might see a 10,000 patient study, but you don't know that there's $50 million behind that trial that's taking place. So, you need to have resources set up to be able to run those trials. These are things that you learn, and if you want to do it, then you go and get the money and you do the study. But one important thing is also being a good communicator, bringing people together, having a common purpose or identifying a common purpose. These are all very important because a lot of this is not how smart you are; it's really about inspiring those around you and being able to bring people together to get things done. I mean you're not going to run a 10,000 patient study when you're starting out. You're going to help somebody run a 100 patient trial and learn about all the mechanics involved. But then as you grow, as you go through the process and you learn, you fail, you get up, you fail again, you get up and you keep moving, you start to make progress, and that's where you start to learn. I think the most important message here is to allow failures to happen and learn from them. There's no substitute for that. Nobody can teach you anything better than your own failures and your desire and resilience to get up and try again. It will happen. If you want to go through things and make progress, you're going to have to learn to live with failures and make use of them in how you might approach a study the next time. I think you learn more from failure than success.

MS: *As Executive Director of KCVRC, what are you looking forward to most in the coming years?*

RD: Well, there are a lot of exciting things going on at KCVRC. As executive director, my goal is to make sure that the faculty and other researchers are well supported even in the midst of challenges. Despite challenges such as economic decline, competitive funding etc., we need to keep things moving. But what I'm excited about is that there is a

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lot of very, very interesting and diverse research that is going on at KCVRC. I think you will see probably in a year or two that the work we are doing is highly impactful and it will really change how we manage heart disease in patients. And not just managing patients, but allowing them to live free of pain and suffering and live for a longer period of time. And so, that's what I'm excited about and it's happening in my own Ischemic Research Program team and also outside of my research team within the KCVRC. One of the things that I'm trying to do is make this place the hub for innovations in cardiology, not just operating run of the mill clinical trials, but really starting with organic ideas and then moving things forward. So, there are a lot of exciting things happening and I'm really looking forward to seeing how all of this is going to make a difference in patients' lives.

To learn more about Dr. Dharmakumar's work and KCVRC, you can visit https://medicine.iu.edu/krannert-heart and follow @KrannertHeart on X.