Onur Kanisicak

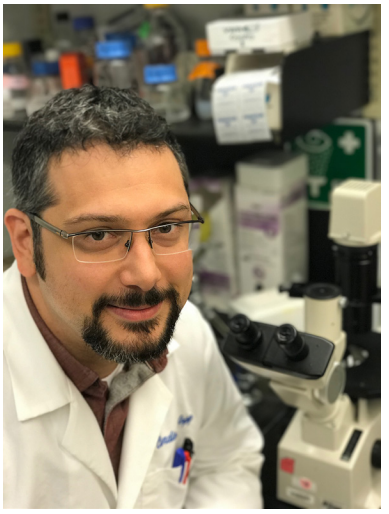
From Toy Tinkerer to Scientific Innovator

Pam Goldberg-Smith

Hoping to leave a legacy of scientists who work smart as much as they work hard, Onur Kanisicak is well on his way to changing the world. Onur earned his BS in Biomedical Sciences at Istanbul University in his home country of Turkey. He then achieved both his MS in Genetics and PhD in Genetics and Genomics at the University of Connecticut. Onur is currently a postdoctoral research fellow for the Molkentin Laboratory at the Children's Hospital Medical Center in Cincinnati, OH. He is proud of being a collaborative scientist and the recognitions of his research, such as his published work, and the Postdoctoral fellowship award from the American Heart Association.

Tell Us About Your Background in Turkey, and What Brought You to the United States?

If you ask my mom, she would say I was always curious about science. She has plenty of stories where I disassembled my toys to figure out how they work; when I wanted to do the same with insects, she patiently showed me how and where to keep them. My family lived in the city, but we would often visit parks and the country where I could roam freely for hours to explore what nature had to offer. As early as I can remember, I wanted to be a medical doctor—that is the normal path in Turkey if you were interested in biology. Eventually, my interest grew more toward understanding how the human body works rather than just seeing patients. For college, I was able to get into a unique program at the Istanbul University Cerrahpasa School of Medicine in the Department of Biomedical Sciences. This program aimed to generate scientists within the human medicine field. While taking classes, I volunteered in various laboratories to be exposed to research as much as possible, which inspired me to establish my own research group one day. Unfortunately, the scope of projects, such as cancer drug efficacy studies in rats, does not have much international recognition. Therefore, it was a no-brainer for me to continue pursuing my science career in the United States where funding, technology, and the scientific community is unmatched, and so I found myself at the University of Connecticut.



Onur Kanisicak

What Led You to Study Cardiovascular Science in Particular?

I have to thank my PhD mentor David Goldhamer for that. During my PhD studies in his laboratory, I studied and published on the developmental origin and potential of skeletal muscle stem cells[1] and received rigorous training in mouse embryology and skeletal muscle physiology with the emphasis of discovering new biomedical avenues to aid all muscle diseases. When I started questioning the vast difference in the regenerative capacity between skeletal muscle and the heart, I delved into the literature and became more fascinated with studying cardiac biology. Even though it was not his expertise, David fully encouraged me down this path and confirmed that Jeff Molkentin's laboratory is the place that I should go to. When I met Jeff, I knew this was my home. I believe there is a path for everyone, and I think I was destined to be here.

What Excites You About Your Current Project?

My current project in Jeff's laboratory is to determine the role of resident cardiac fibroblast in homeostasis, repair, and disease.[2,3] Recently, we generated and described a new genetic tool to specifically interrogate and manipulate the fibroblasts involved in fibrosis,[2] which opened up a whole new avenue of cardiac research. We are currently identifying novel targets to both prevent and reverse fibrotic remodeling, which I hope will translate to new antifibrotic therapies. I believe the future of cardiac reparative therapies will require a multicellular approach, and previously unappreciated cardiac fibroblasts will be equally important as the cardiomyocytes.

How Do You Spend Your Time Outside of the Laboratory?

I have an amazing family; I have been blessed with a very understanding wife who gave me 3 beautiful kids. Whenever I have free time, I spend it with them. They keep me sane and happy outside of the laboratory. When I come home, I love their little hugs. Helping them with homework and having family game nights take my stress away. We are Mediterranean people, so we love food, nature, and the outdoors. Some say that there is no such thing as a work–life balance—I might be an anomaly.

(*Circ Res*. 2017;121:1219-1220. DOI: 10.1161/CIRCRESAHA.117.312179.)

What Has Been the Most Exciting Moment in Your Career?

There are so many exciting moments: my first discovery, my first paper, graduation, and my first grant. The one that stands out the most is the publication and the recognition of the work regarding the potential of c-kit–positive stem cells in cardiac regeneration.[4] The progress of the paper was a crazy ride for me. My wife would prepare me a box of food and a little pillow so that I could camp in the laboratory and work for a whole week. It was a race to the finish. I was so excited when I heard that it was accepted, but the outcome, the recognition of my work, was even more exciting. It created such a discussion that I finally felt I reached a stage in my career where I am making a difference in science.

Alternatively, What Has Been Your Main Challenge, and What Steps Did You Take to Overcome It?

I have to say it is the grantsmanship, which is a special skill I did not have. You can be the best hands in the business, but if you do not know how to sell your work, you will not get a dime. I have been blessed with 2 great mentors who trained me along the way. Both David and Jeff are especially gifted writers as much as scientists. Writing is a learned skill, and I have struggled with this in the past, not being a native speaker of English. I have taken classes, practiced as often as I can, and got better, which resulted in the Postdoctoral Fellowship Award from the American Heart Association. I look forward to utilizing this skill for many years to come.

What Is the Main Obstacle, or Worry, That You Foresee in Pursuing an Academic Career?

Having an independent laboratory is a risky undertaking; essentially it is your own enterprise. I worry about the financial aspect, in acquiring funding for it in this competitive environment. Moreover, I want to start a laboratory not just to have a laboratory but to generate one that promotes significant contributions that make a difference. When I served as a teaching assistant during my PhD, I also discovered that I love teaching. Whatever I create, I love to pass on rather than claiming expertise on it. I would love to have a legacy where my trainees and students carry on the torch, contributing and achieving their dreams in science. I hope to leave behind an army of great scientists.

What Do You Like and Dislike About Research?

I still have a childlike enthusiasm for science so clearly, I do not dislike much. I wish people were more collaborative and a little less paranoid of being scooped, though it seems to be the nature of the current competitive environment. I love discovering an unknown and the feeling when you look through a microscope and see something unique and think wow, no one knows this. It is a thrill and a privilege to design and innovate techniques or new experiments and to test your wild theories. I think this joy comes from my early childhood years, disassembling toys to find new ways to put them back together, which failed most of the time, but I kept trying.

What Would You Do to Improve Training in Research?

The most important thing to me is mentorship. Not every laboratory is blessed with this. PIs are indispensable—they guide you and lend you ideas that you build on—but I benefitted equally, if not more, from other mentors such as laboratory techs, friends, and senior scientists who were not academic. A constructive and honest mentorship is essential to generate humble yet driven scientists. I think both sides benefit; the mentors grow in management skills as well, so it is a win–win situation. I would love to have such a structure in my laboratory where senior members take upon themselves the responsibility of juniors. What I call candid guidance is the key that can mean the difference in failing or overcoming difficulties.

What Traits Would You Tell Your Students Are Important for Success in Research?

The first trait starts with being as open minded and creative as possible, as most innovative science comes from being ahead of the current dogma and trying new ideas. I have seen so many people fail when they get stuck in one way of thinking. The second trait has to do with the collaborative aspect; science is done by collaborative efforts though it certainly looks competitive. You must be competitive in yourself and your work but not to the point where you are just competing with others. Lastly, have a positive attitude. You will fail so many times and it is hard. Try something new—a new motivation or new idea—and it will pay off.

How Hard Do You Work?

If you choose to be scientist, by default, you choose to work hard. I usually put in 10 to 12 hours in the laboratory aside from many sleepless nights at home catching up with the literature and writing. However, there are often times I have spent more than 24 hours straight for many days in the laboratory when I need to push. This is not easy work, but in my opinion, working mindlessly is worse than not working at all. I take hard work to mean both in the mind, as well as the hands. Critical planning is as important as working on the bench where you have a mission to test a hypothesis and get an answer. It is essential to take the time and think about what, how, and why you are going to do an experiment. I constantly think about work and discuss it with colleagues, as you cannot solve every puzzle by yourself. In this crazy, competitive climate, you must have clever work. Everyone works hard, but working smart makes the difference.

Disclosures

None.

References

1. Kanisicak O, Mendez JJ, Yamamoto S, Yamamoto M, Goldhamer DJ. Progenitors of skeletal muscle satellite cells express the muscle determination gene, MyoD. *Dev Biol*. 2009;332:131–141. doi: 10.1016/j.ydbio.2009.05.554.
2. Kanisicak O, Khalil H, Ivey MJ, Karch J, Maliken BD, Correll RN, Brody MJ, J Lin SC, Aronow BJ, Tallquist MD, Molkentin JD. Genetic lineage tracing defines myofibroblast origin and function in the injured heart. *Nat Commun*. 2016;7:12260. doi: 10.1038/ncomms12260.
3. Kanisicak O, Molkentin JD. Applying modern transcriptomics to interrogate the human cardiac fibroblast. *JACC Basic Transl Sci*. 2016;1:603–605.
4. van Berlo JH, Kanisicak O, Maillet M, Vagnozzi RJ, Karch J, Lin SC, Middleton RC, Marbán E, Molkentin JD. c-kit+ cells minimally contribute cardiomyocytes to the heart. *Nature*. 2014;509:337–341. doi: 10.1038/nature13309.

Circulation Research
JOURNAL OF THE AMERICAN HEART ASSOCIATION

Onur Kanisicak: From Toy Tinkerer to Scientific Innovator

Pam Goldberg-Smith

Circ Res. 2017;121:1219-1220
doi: 10.1161/CIRCRESAHA.117.312179
Circulation Research is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 0009-7330. Online ISSN: 1524-4571