

Insights from the Network

Stem Cells on the Rock(s): Successes, challenges and opportunities for stem cell research in Newfoundland and Labrador



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I stumbled upon stem cells quite late in my training. I was well into my second postdoctoral fellowship at Western University in London, Ontario, when my supervisor asked me if I was interested in creating induced pluripotent stem cells (iPSCs) to model a rare genetic disorder. “Sure”, I said, not really knowing what an iPSC was, or how I was supposed to use it to model our disease of interest.

I was fortunate that one floor up from our lab was the [Séguin Lab](#). Courtney, a technician from the Séguin Lab taught me everything I needed to know about iPSC culture. The biggest takeaway from this training was that these ugly little cells were a pain to culture—no antibiotics? Feed everyday? Clump passage? Ugh!

Then I started my first iPSC differentiation experiment. I literally watched the cells change size and shape before my eyes. It felt like a miracle, and I knew that this is what I wanted to do for the rest of my career.

When I was searching for a faculty position, I was confident I would end up at one of the U15—the fifteen leading research universities in Canada. When the offer came from the Memorial University of Newfoundland and Labrador (MUNL), I hesitated—I was worried that my career would flounder at a small institution with fewer resources. However, my husband convinced me to accept the job, saying that this could be a great adventure for our family. Really, I think he just wanted to fish for cod and hunt moose!

He was right.

I have discovered three things since moving to Newfoundland and Labrador (NL). The first is that NL is stunningly beautiful—I am talking ‘Land-Before-Time’, ‘steals-your-breath-and-brings-tears-to-your-eyes’ beautiful. The second thing I learned is that I understood nothing about the wind. I know you’re sitting there, thinking you understand wind, but I promise you—until you live in NL, you will never know the wind. The final thing I discovered is that NL is a great place to study rare genetic diseases.





Why is this province a great place to study rare genetic diseases? The short answer is that NL is a genetic isolate. Early English and Irish settlers in the outport communities were isolated by geography and religion, giving rise to several distinct founder populations. This has resulted in a high incidence of several rare genetic disorders including congenital deafness, heritable cancer syndromes, inherited heart diseases and others.

What a perfect place to model rare genetic diseases using patient-derived stem cells! An immediate problem to overcome was that I was (and am) the only human stem cell biologist in the province, and a “come from away” to boot. I had no connections to clinicians, no understanding of the history of genetic research ethics in the province and no clue where to start.

I was in one of my very first meetings as an Assistant Professor at MUNL when I heard two people in the room discussing potential collaborations to make iPSCs from NL heart disease patients. “I can do that,” I said. They didn’t hear me the first time, so I repeated myself with a bit of a shout. This startled them out of their conversation and one of them, a fabulous-looking British woman with pink and purple bangs, looked over at me and said, “I’m sorry, but who are you?” This is how I joined the Sudden Cardiac Death Research Team and began studying Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC).

By this time, you have probably noted that I am not very strategically minded. I mostly bump blindly from place to place and somehow find my way.

ARVC is a heart disease where the heart muscle is replaced by fat and fibre. It has two main features: ventricular arrhythmias causing sudden cardiac death; and cardiomyopathy resulting in heart failure. In the rest of the world, ARVC is a rare genetic disease. However, due to a founder mutation in a previously unknown gene discovered in NL, ARVC is called “The Newfoundland Curse”. I am not exaggerating when I say that every single person I have spoken to on the island knows someone who has, or has died of, ARVC.

ARVC families are engaged and well informed about their disease, and very motivated to move the research forward. They each have stories of profound loss, but somehow, they still find hope. What has surprised and touched me most is the support I have received from ARVC patients and their families. They come to my research talks, tour my lab, send me supportive messages and sometimes even flowers.

I have also been extremely fortunate to have the support of the Stem Cell Network (SCN). SCN not only gave me much needed seed funding to begin the ARVC project with their “Jumpstart” award, SCN also invited me to participate in amazing career development opportunities. As the only human stem cell researcher in Newfoundland and Labrador, SCN provided me with a broad network of outstanding stem cell researchers across the country and connected me with the PSC-cardiomyocyte experts at the University of Toronto. It was through these supports that I was able to create a panel of ARVC patient iPSCs and generate the preliminary data necessary to be awarded my first Canadian Institutes of Health Research (CIHR) project grant. I am especially proud of this accomplishment as I submitted the CIHR application as the Primary Nominated Applicant when my son was only six months old. He is now 18 months old and is helping me write this blog post by climbing me like a tree, screaming in my ear and smashing the laptop keyboard.

Moving to NL and building my research program has been one of the hardest and most rewarding challenges of my life. In the past four years, I have faced personal tragedy, snowmageddon (wow, that was wild!), a global pandemic, pregnancy and maternity leave, and now my faculty association is on strike. Through all of that I have been privileged to do meaningful work that I love, in one of the most incredible places on earth, with the best collaborators and friends anyone could ask for.

