



20 Questions with... **Marissa Lithopoulos**

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20 Questions with 20 Stem Cell Scientists from Across Canada

1. Where were you born?

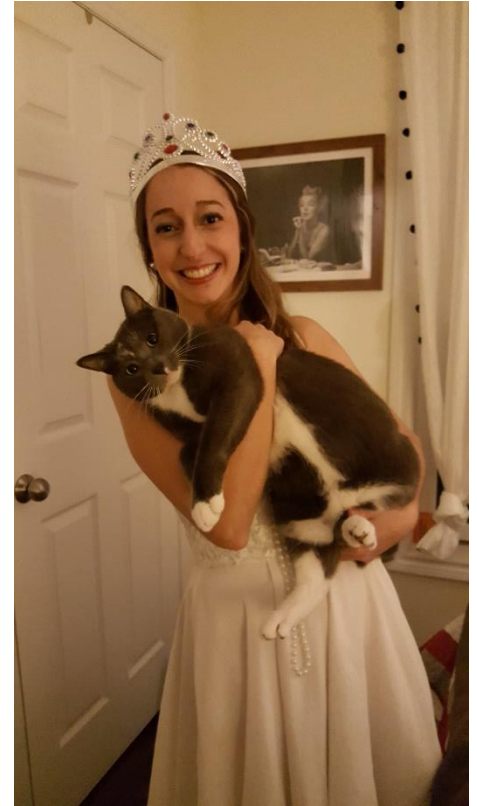
I was born and raised in Ottawa. I absolutely love the city and have spent many years living in Kanata with my family. Kanata has great access to the Greenbelt nature trails.

2. Where did you go to school?

I completed my undergrad in biomedical sciences at the University of Ottawa with a minor in philosophy.

For my graduate studies I stayed within the University of Ottawa but transferred to the Faculty of Medicine, where I completed my PhD in cellular and molecular medicine under the supervision of [Dr. Bernard Thébaud](#).

I remained at the University of Ottawa for my entire degree. I had a really cool opportunity to take a regenerative medicine course at the University of Toronto during my graduate studies. I also had an amazing opportunity to conduct research in San Antonio, Texas for three months during my PhD. Even though I stayed at one university, I had great exposure to a diverse group of researchers within the stem cell field and numerous opportunities to collaborate with other universities.



Marissa and Finnegan

3. What did you want to be when you grew up?

I'm extremely passionate about animal rights and love being with animals, so I wanted to be a vet when I was young. Although I did stray away from that, I definitely think that when you're within the science and medical fields it's not far removed from the veterinary experience as you do handle animals and must have compassion for them to do the kind of research we do as stem cell scientists.

I have animal patients that I am trying to help and hopefully that will translate to humans in the future.

4. What are you researching right now?

Right now, I'm looking at brain stem cells which is a new field within stem cell research. Because brain stem cells within mammals were discovered in the 90s, there are still many research questions to address. What are these cells? What are they really contributing to within our brains? Can they help regenerate brain tissue after an injury?

I also focus specifically on the relationship between brain stem cells and their surrounding blood vessels. I think a lot of new developments have been focusing on what's going wrong with blood vessels and how that contributes to disease. It's really interesting to see the interplay between brain stem cells and the vessels, and hopefully we can find solutions to help repair both.

5. Why stem cells?

Growing up, I heard about stem cells being used in the context of cancer, which I always found really interesting. It's very important that we have alternatives to the traditional chemotherapy and radiation treatments.

But I became really interested in stem cells when I heard that Dr. Bernard Thébaud was coming to Ottawa. He was using stem cells to try to treat preterm infant complications, which is a very personal story for me. My brother was born prematurely and unfortunately, he passed away. His lungs were very underdeveloped, and Bernard's research uses stem cells to repair lung development. Once I heard the news about Bernard, I instantly knew that's what I wanted to do. So I contacted him, indicating my strong interest to be involved in research that can help preterm babies.



At the StemCellTalks pub night

Bernard is a clinician and a scientist, so I had the opportunity to job shadow him and see preterm babies in the clinic. I was able to see the impact of our research on the babies and their families. It was such an important experience.

6. What is the most significant stem cell discovery or advancement over the last 20 years? The last 60?

Over the last 20 years, induced pluripotent stem cells have made an incredible difference to stem cell research. Previously, scientists were convinced that a cell must start as a stem cell and become more specialized, and that there was no way of "going backwards". This discovery kind of blew that out of the water and now cells can "go backwards". We can take a specialized cell, such as a skin cell and make it into a stem cell. It's a mind-blowing discovery which was recently awarded a Nobel Prize. It's also very important because it means that we can use patient specific cells to discover treatments, so medicine can become more personalized. This can make a huge difference for the medical field moving forward.

Over the last 60 years, the advancements in the hematopoietic stem cell, or blood stem cell field, have been very significant. This is the field that Drs. Till & McCulloch established with their research. This field has been very helpful in treating patients who have been diagnosed with multiple sclerosis and leukemia. Patients have seen a significant reduction in their symptoms. For those patients and their families, it's made a huge difference in their lives. The pioneering research from Drs. Till & McCulloch set the foundation to moving the field forward.

7. What are your predictions for stem cell advances in the next 5, 10, 20 years?

This is difficult to predict, so I will state what I hope will happen.

In the next five years, there will be a better understanding of stem cells at the single cell resolution. This is the general trend that we're seeing now and it is a powerful tool to improve our understanding of different stem cell populations. So I think we will see an expansion of this trend.

In the next ten years, computational biology will play a huge part in stem cell research as we're obtaining huge data sets now. We need a way to analyze the data with powerful computers and potentially artificial intelligence.

In the next 20 years, I hope that we're further along in the clinical translation of stem cell therapies and that we have more options for patients for treatment.

8. What would you describe as the most significant moment in your own research career?

Finishing my thesis. I dedicated my thesis to my brother Eric, whose short life was an inspiration as to why I went into the stem cell field.

The stem cell field is really difficult and challenging at times. Science in general is difficult because you fail a lot more than you succeed. But that's part of the process and you need to persevere and be dedicated to the work. Thinking of my brother definitely helped me through the challenging periods. Seeing the final thesis was deeply meaningful, as the papers that will be published from this research will help to improve the lives of preterm patients.



At the Kennedy Space Center

9. What are you reading right now? What is the best book you ever read?

I am reading *Sapiens* by Yuval Noah Harari. It's a very interesting and provocative book because it goes over the entire history of humankind. I think the more that we understand our history the better we understand ourselves. This can ultimately lead to developing better public policies and learning how to treat others with dignity and respect. There's so much that has been brought to light during this pandemic, especially the need to continue to make progress as human societies. I think understanding our past really helps with that.

It's difficult to decide my favourite book but probably the most meaningful one is *Man's Search for Meaning* by Viktor Frankl. That really comes from my philosophy background. I've always asked big questions about the world. What's our place in it? Why are we here? The book is incredibly insightful. I recommend it to everyone because it makes you to think about life, and makes you appreciate that every day is precious. A main message of the book is that it doesn't matter what external circumstances you're put into; you can find meaning in whatever is going on in your life.

10. Who is your favourite scientist?

[Carl Sagan](#). Although I am in a stream of biology, I also find physics, astrophysics, and space really interesting. Carl Sagan was a great pioneer in the world of astrophysics and not only in space exploration for scientists, but in getting the general public interested in space as well. His series, *Cosmos* was amazing, and it really helped to educate the public. That's what I hope to do with my research as well. I want my work to reach the general population and to make people think and be curious about the world around them, so they see the importance of research and science in the world.

11. What in your opinion is the single most important health science or biomedical breakthrough?

Of course, there's so many that you can say, but based on my personal experience, the maternal and neonatal care advancements that we've made. Mothers can give birth safely and we can help save the lives of preterm babies much more effectively with today's technology. It's a huge advancement that women don't have to fear for their own lives to

give birth and that now, if a woman unfortunately has to give birth prematurely, that baby stands a much better chance of survival. We also have better treatments for helping preterm-born patients as they develop.

Of course, I think stem cell research will be a great asset to neonatal medicine moving forward and that's something that I'm really proud of, being part of the Thébaud Lab.

12. What are your hobbies outside of the lab?

I love guitar and singing. I play acoustic and electric guitar and it's something I really enjoy and find very relaxing.

I'm a trained rhythmic gymnast. I was a provincial level gymnast and I also coached gymnastics and it's something that is near and dear to my heart as well. I also enjoy yoga and acrobatics. Any sport where there's flexibility and flipping around, I absolutely love it.



Aspiring gymnast.

13. It is your night to cook – what is your go-to meal?

I really love Italian food, so I would go with a carbonara, a nice comfort food.

14. If not a scientist, what would be your dream job?

Actor, dancer, or musician.

It's interesting because I find that some of the qualities that make someone who is heavily involved in the arts very successful, translate to science. For both fields, you need to be creative and a performer in certain ways.

15. What job would you be terrible at?

Seamstress, a skill that I've never acquired but that I admire greatly.

16. What is the best piece of advice you have ever been given? What advice would you give to a trainee just starting out?

The best advice I've ever been given was from my mom. She has always instilled in me the notion that when people help you, show your gratitude and pay it forward, you should always be willing to give back. I really have tried to do that in my life. Once I get to a certain stage in my career, I always try to help those who are climbing up through the ladder no matter how busy I am. I mentor, volunteer, and am very involved in science outreach. I aim to inspire kids to go into science and to be open to general questions about science. I think it's really important for scientists who are more established to help make the field welcoming.

To the next generation, I would say that there are two things. First, it's really important that you believe in yourself no matter what other people tell you. It has to come from within. There will be hurdles and challenges along the way that make you question whether or not you're on the right path, so it's really crucial that you are focused and believe in yourself.

Second, try and seek out mentors who can help guide you because no one has all the answers themselves. You really want to surround yourself with people who you admire. Who not only are great scientists, but great mentors who care about your career and your personal growth and that will be the key to success.

17. What skill would you most like to master?

Electric guitar.

18. What website do you visit most often?

I wouldn't say that there's a specific website, but probably what I look at most outside of work is cat videos.

19. Who is your favourite Canadian?

[Terry Fox](#). When I was in high school, the Terry Fox Run was something that we did every year and I found it a really inspiring part of school. He sacrificed so much so that he could help others. The struggle he endured and to run as far as he did is amazing, not only to bring awareness about cancer, but to fund cancer research.

Terry Fox really embodies what it means to be a hero, and I'm really proud of that. He was a Canadian who essentially dedicated his life to the cause, which is really inspiring.



Cabo San Lucas, Mexico.

20. What do you wish you knew more about? What mystery do you wish you knew the answer to?

I wish I knew how life was started on Earth. We've done very interesting work in understanding evolution and how species are related to one another, but we have more work to do in understanding how that first cell came into existence and propagated life. It would be really interesting to know, and of course you can expand from that and then wonder if life can be found elsewhere in the universe as well. It comes back to *Sapiens*, the book that I'm reading because one important thing about the book is that you realize very quickly that humans are not the center of the universe. I think a common misconception that we tend to have is that we're so important, but the truth is the universe is this huge ever-expanding place and we're a very small part of it. I think it's important to understand that, similar to the way that Copernicus understood that the Earth is not the center of our solar system. Humans are not the center of everything that's happening on Earth. Gaining an understanding of how life started can give us more perspective on the matter.

