



# 20 Questions with... Michael Rudnicki

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## 1. Where were you born? Where did you grow up?

*I was born in Ottawa – delivered at the Grace Hospital.*

*I lived in Pine Glen until I was about 8 years old, and then my parents bought a house in the Glebe. We moved to Queen Elizabeth Driveway in 1968. I grew up in the Glebe, attended Mutchmor Public School, then Glashan Middle School, and eventually Glebe Collegiate for high school.*

## 2. Where did you go to school?

*I attended the University of Ottawa for a degree in Molecular Biology. I did a fourth-year honors project and really enjoyed working at the (lab) bench, so I decided I would do a Master's degree and see how that went. I did that at the University of Ottawa with [Michael McBurney](#) in the Faculty of Medicine. It was there I was exposed to embryonal carcinoma cells and more of molecular biology. After two years as a grad student, [Tony Pawson](#) offered me a position to work with him at the University of British Columbia.*

*But then I realized, it would be a three-year Master's degree and then another five years for a PhD. It made more sense to me to just hunker down and get my PhD here in Ottawa. And then go explore the world as a postdoc. So that's what I did.*

*I did well as a graduate student, I had nine first author papers, or something like that. After my PhD, I joined the [Whitehead Institute at MIT in Cambridge MA](#), where I trained for about four years with [Rudolf Jaenisch](#). This was a very exciting time where a small group of us in the lab established the techniques for generating knock out mice. I introduced PGK-neo a strong selectable marker developed in the McBurney lab, to the worldwide community for use in gene targeting. We were the first group to really make this work efficiently and off we went!*



Postdoctoral 1990

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

*When I was young I wanted to be an astronaut. I was really excited about all of the Apollo missions and my brother and I collected all of this free material – maps and schematics of the lunar module, photographs and that kind of thing that NASA would send out to kids.*

*Later, I really wanted to be a marine biologist. My brother and I loved Jacques Cousteau – we read all his books. However, there was no marine biology degrees offered at the universities nearby, so I did biology and I really became quickly attracted to molecular biology.*

### 4. What are you researching right now?

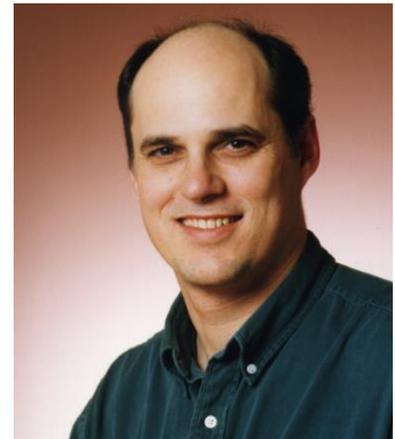
*We work in trying to understand mechanisms that control function of muscle stem cells and the growth and repair of skeletal muscle. We are really focused on the molecular mechanisms in particular – what makes cells tick? We are doing this at multiple levels, using a variety of different approaches, from genomics to proteomics, cell biology to animal work, working with human cells, iPSCs and so on.*

*This is of course relevant to understanding how we can exploit these cells to treat devastating disease like muscular dystrophy, and Duchenne muscular dystrophy, in particular.*

### 5. What attracted you to stem cells?

*I've been a stem cell biologist my entire career. I trained with Michael McBurney who was who was a trained at the knee of Till and McCulloch at the Ontario Cancer Institute in Toronto, as it was called in those days. He was a physicist and I worked in his lab using embryonal carcinoma cells and explored mechanisms to regulate their differentiation and also regulation of gene expression through differentiation. Embryonal carcinoma cells were the cell type that was used before embryonic stem cells had been derived.*

*This training opened a lot of doors for me moving forward. So I've always been a stem cell biologist, originally with more of a cancer emphasis, but now, with a regenerative medicine emphasis.*



McMaster 1998

## 6. Who in your opinion, are the top three Canadian stem cell researchers in history?

*There are so many. Of course, I would include Till & McCulloch – one really has to admire and acknowledge their contributions.*

*Janet Rossant. Her career has been very impressive. In addition to her science, I consider her leadership contributions to be particularly important. She is a true thought leader for her work on early specification in the embryo, but she has been an important scientific leader in multiple ways and a role model for many.*

*I also really like the work of John Dick. I think he is a fabulous scientist.*

*But there are so many more that come to mind.*

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

*Well, working backwards for 20 years, I would say it is the derivation of induced pluripotent stem cell by Yamanaka.*

*And before that, probably, Martin Evans' derivation of mice from embryonic stem cells, which really led to the whole gene targeting enterprise, the genetic engineering of mice to ask really sophisticated questions and making the mouse a true genetic experimental platform.*

*Of course, Till and McCulloch – their body of work is truly exceptional.*

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

*Gazing in the crystal ball is always dangerous. Whenever you read these predictions from a long time ago for what 2020 would have been like, they are far off the mark, but I'll give it a whack.*

*I would think that in the next five years we're going to have a very good and improved understanding of stem cell heterogeneity, and the mechanisms that control self renewal and the decisions to regulate their differentiation. Really, the advancements in the single cell technology, both RNA-Seq and proteomics are accelerating and accumulating in such a way that these techniques are now available to any lab and those really are allowing us to ask some very sophisticated questions.*

*In 10 years, I think we're going to have a good understanding of the regulatory networks, from a systems biology perspective, about how cells function - how stem cells in particular function. And how they go bad in situations like cancer, which is the other side of the coin.*

*I think in 20 years, we'll really see regenerative medicine beginning to change clinical practice. These changes will be underway with major advancements within our lifetimes. It takes a long time for these sorts of things to get into the clinic, but I think there will be lots of activity in that area, making regenerative medicine a reality.*

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

*There are a series of things. In terms of discovery, I would say the discovery of Pax7 was a very exciting nexus point. I think it pivoted the entire field to the study of adult myogenesis and regenerative myogenesis.*

*In terms of significant personal development, I recall a moment in my training. I was a postdoctoral fellow giving my first seminar in front of the faculty at the Whitehead Institute. I was standing in front of a crowd which included four Nobel laureates and many high-powered, influential scientists – the best in the world. I had this epiphany and I told myself, ‘yes, I can do this. I am as good as any of these other postdocs.’*

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

*I enjoy reading history or sometimes science fiction, or even historical fiction. I just finished Ian Toll’s War in the Pacific trilogy. It is not so much about the action of war, but covers the political and social events going on in Japan and the U.S. that shaped the war.*

*One of the more influential books I read in high school was The Selfish Gene by Richard Dawkins. It really got me started in terms of thinking about molecular biology. I think that's part of the reason why I headed off to University and enrolled in a molecular biology program. It was a very influential book for me.*

## 11. Who is your favourite scientist?

*Charles Darwin is definitely a hero. He bucked the trend, went in his own direction and stood by his ideas.*

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

*Certainly the discovery of DNA is like the single most important biological discovery of all time. The discovery of stem cells is probably the second most important.*

*In terms of health science, I would say the discovery of insulin. That was really early - before anything was sophisticated in biology labs. It is a very impressive feat by Banting and Best and their co-workers, considering they were working under such primitive conditions*

## 13. What are your hobbies outside the lab?

*I paint. I haven’t had the time in the last couple of years but usually in my summer vacation, I’ll get my easel and go out into the woods and paint plein air. I like working with oils. Acrylics dry too fast for me. I like oils because I like working and modeling and redoing and worrying the canvas.*

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

*I like to cook. Cooking is kind of like working the lab without boundaries. I am an intuitive chef and I don't necessarily follow a recipe. Which doesn't make me a very good baker. For a go-to meal I would say it would be something on the BBQ. In the summer I like to barbecue on a Weber barbecue with charcoal, not gas. You should never cook on gas – it is a good way to ruin food. Charcoal is about 100 degrees cooler than gas, so it gives you this wonderful flavor. So anything on the Weber is outstanding and I do that all summer long.*

*For special occasions I do an Asian-style peanut butter stir fry with chicken.*

#### 15. What are the top three songs in your personal playlist?

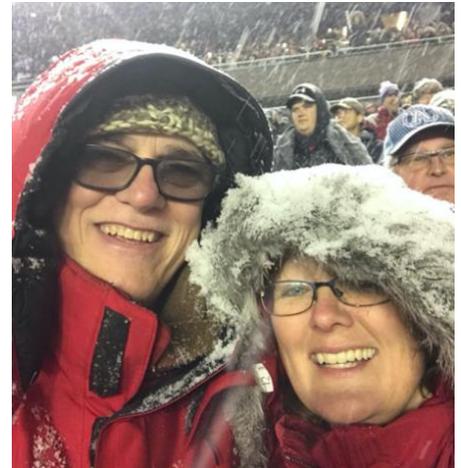
*The River – Bruce Springsteen*

*Running on Empty – Jackson Browne*

*Beast of Burden – Rolling Stones*

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

*I think I would like to be an artist, a painter. I missed the boat on that one. I would have had to work hard at it as a young man. It's difficult to make a living. My brother Richard was an artist, a painter in Nova Scotia. He was quite accomplished.*



NHL100 Classic 2017

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

*Pursue your dreams! I guess for leadership my advice is not to micromanage. I remember my mentors saying to me, make sure you give your people enough rope to hang themselves. Books like the One-minute Manager have that same kind of advice - for leadership you need to delegate responsibility and authority, but you still keep people accountable, of course, if you're the boss. People thrive on having ownership of their work and they'll work way harder and get way more accomplished than if you micromanage them. A good boss does not do that. You have to give people the freedom and space to excel and to make the occasional mistake.*

#### 18. What website do you visit most often?

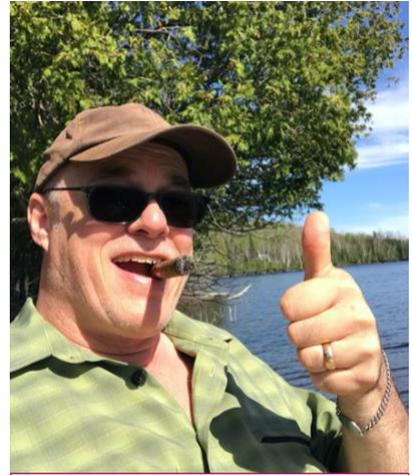
*Probably Google News. Followed by PubMed.*

**19. Who is your favourite Canadian?**

*Leonard Cohen. In terms of music and his poetry, of course.*

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

*Quantum mechanics and the idea of the multiverse or the nature of matter, space, time. It is a real conundrum. The arrow of time for example. According to the physical explanation of the universe, there is no past, no present, no future. It's all one and they all coexist in the same dimension. So, what does that mean? Are we living out a script that's preordained? Or do we have free choice? There's some really interesting ideas that come out of theoretical physics.*



Cottage 2020

