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A Q&A with U of T's 2015, 3 Minute Thesis Winner

INTERVIEW

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You are most known for your high ranking placement in last year's 3MT competition. Do you feel the 3MT competition has been an effective way to disseminate your research findings?

Yes it has. During the U of T competition I enjoyed getting to share my work with students across all four divisions of graduate studies. People were genuinely interested in my work, approaching me after my talk. Also in the national contest there's an online link to each 3MT entry, which definitely helped me share the key concepts of my research with friends and family over social media.

If you could sum up your experience in the 3MT competition in one sentence, what would it be?

The 3MT helped me focus on communication skills, and I was surprised

how useful this was at future research conferences, oral talks, and committee meetings.

If you could sum up your advice for other students in the 3MT competition in one sentence, what would it be?

It's the hunger games and there can only be one winner; so enjoy the experience, see it as a chance to grow, and learn about exciting research happening all across Canada.

Tell us a little more about your research work. I know you extended your Ph.D. for a year after the Ebola virus resurfaced.

As basic scientists in HIV research, my supervisor (Dr. Branch) and I saw an opportunity to answer some fundamental questions during the 2013-15 Ebola outbreak in West Africa. With no proven treatment or vaccine that had passed rigorous clinical trials, we sought to address whether

common antivirals, used to treat viruses such as Hepatitis C or HIV, could be quickly repositioned to treat Ebola patients during the crisis. This required close examination of 8 antivirals on the *in vitro* replication cycle of Ebola, before they could be further tested in animal models to prevent Ebola disease progression. Our work identified unique combinations of accessible drugs that inhibited Ebola, and we hope these drug combinations will be followed-up in more animal studies.

What are your thoughts about the resurgence of these relatively rare viruses (i.e. Ebola, Zika)? Should we be worried? What course of action should be taken to prevent this from happening time and time again? Or, is there anything that we *can* do?

These are excellent questions that are better answered by expert epidemiologists who track the natural reservoirs of these viruses in the wild. But from what I've learned at the Ebola 2015 conference in Paris, with an increasing global population, greater urbanization, more roads in developing nations, increased interconnected flights around the world, and climate change altering the expected niches of viral reservoir animals, it is very likely we will continue to see large-scale epidemics that affect multiple nations.

There are things we can do; invest in the healthcare systems of countries with low doctor-to-patient ratios, increase international funding and support for early surveillance so that the WHO can detect outbreaks as soon as they happen, and ask more of our politicians to respond to outbreaks with resources, volunteers and

compassion, not closing borders/travel, reduce economic trade or stigmatize those from affected nations. Countries also need an economic incentive to declare an outbreak, as we've seen the Ebola crisis in Liberia, Guinea and Sierra Leone devastated their economies, further hampering their ability to rebuild their healthcare systems. This will take years. Moreover we also need government funding into the basic science of these rare but deadly viruses, so that we are prepared with potential therapies and vaccines for phase I clinical trials, and that the world is not caught off-guard by the next big outbreak.

We didn't learn that Ebola could exist in semen of infected male survivors for months after exposure, the best supportive care for Ebola infection, or whether Zika causes microcephaly prior to the most recent outbreaks. Painfully, these are being learned during epidemics, when they should have been found prior with funded basic research, which would have led to better public health practices and reduced spread of misinformation.

What do you think about the World Health Organization declaring the Zika virus as an international public health emergency? Was this the case for Ebola (that you know of)?

The WHO had a tough decision of when to declare the Ebola outbreak in West Africa an international public health emergency in August of 2014; on the one hand, aid organizations such as Doctors without Borders (MSF) were overwhelmed and couldn't treat all the patients they received, the amount of people infected and dying were likely to be severely underreported, and local governments were desperately

seeking international assistance. This led to an emergency meeting of the United Nations Security Council. Shortly after WHO declared the international public health emergency resources and doctors started to come from many nations such as Cuba, China, France, the UK, USA and Canada. Ebola treatment centers were created, mobile testing labs were set up and contact tracing led to quarantining large groups of suspected Ebola cases. On the other hand, declaring an international public health emergency made it very challenging for commercial flights to bring in volunteers to the three affected countries, devastated local economies, and led some countries (including Canada) to stop processing visas of perfectly healthy students, workers and foreign nationals from the three affected countries. The WHO declaration of public health emergencies should promote international action, yes, but minimize the unwanted effects on economies, travel and delivery of aid.

In Canada, we are relatively safe from outbreaks like this. Do you think Canada is prepared in the case of some sort of health crisis (e.g. think back to SARS)?

The Public Health Agency of Canada is very well prepared for any health crisis, if there was ever an international epidemic that shows up here. In the wake of the 2003 SARS outbreak, Toronto Western Hospital has a state-of-the-art facility to isolate patients suffering from a viral infection, preventing any potential transmission in the air or by bodily fluids. We also have the world renowned National Microbiology Laboratory (NML) in Winnipeg that works closely with the US Center for Disease Control, keeping us at the forefront of disease detection and treatment. For instance, the NML has done great work in

Ebola vaccine and treatment development during the 2013-15 West African outbreak.

So what's next for you after you graduate? Where do you see yourself going next?

The desire to do medical research that directly affects the lives of patients has given me pause to consider doing an M.D. after I graduate from Laboratory Medicine and Pathobiology. I am interested in doing further viral research internal medicine as a hybrid M.D./Ph.D.

What advice do you have for graduate students (either M.Sc. or Ph.D.) who will be looking for a job in the next few months?

Don't depend on your PI or committee to help you job hunt, they keep you on task for completing your degree but selling yourself is your job! Explore the U of T Career Learning Centre, they have excellent workshops for graduate students close to graduation who want to discover relevant career opportunities and how to translate skills to be successful in job interviews. If you are earlier in your degree, try to develop unique skills outside of your research that will make you stand out to a prospective employer.

Lastly, is there anything that I didn't ask that you would like our readers to know?

I am very thankful and honoured to be invited both to share my 3MT experience with your department in person and with this interview.

My last thought is that I think that as graduate students, we need to career plan in parallel to our research. We shouldn't put it off to the end. We should also give more serious consideration to "alternative" careers outside of the academic job market, as these hold the majority of jobs for Canadians graduating with M.Sc. and Ph.D. degrees. And it's ok if your interests and skills evolve during graduate school, because it's very common for those in our 20's and early 30's to reflect on our life experiences, and change our career goals accordingly.

Interview by: Tian Renton