

we can protect against different flus, even when they mutate.

■ **YOUR RECENT PUBLICATIONS OFTEN ADDRESS FC-DEPENDANT MECHANISMS. WHAT BIOLOGICAL CHARACTERISTICS OF THE FC RECEPTOR MAKE IT A POTENTIAL TARGET FOR VACCINE DEVELOPMENT?**

I'd love to talk about that. Antibodies can be divided into two sections: a section that is specific to a pathogen, or the variable region, and a constant region that basically never changes, or the Fc region. The variable region is what we've always considered important because upon binding to the virus, it can prevent it from infecting the host cell. But, it turns out the constant region can also protect you. When viruses replicate, they put viral proteins onto the surfaces of the cells that they've infected. Antibodies that are specific to the virus will bind to the pieces of the virus on the surface of the cell, and the Fc region is then sitting out waving like a flag. That flag will get recognized by receptors of an immune cell, which will kill that infected cell before the infection can spread. These mechanisms don't protect you from initially getting infected, but they protect you from what matters, which is clinical symptoms. This has taught us that we can also make antibodies that are really good at flagging the immune system to eliminate infected cells before the virus replicates. The antibodies our bodies prefer to make against flu and current seasonal flu vaccines are very good at neutralizing the virus, but the types of antibodies that a universal vaccine generates are really good at flagging immune cells to come and kill virally infected cells. This is a new and exciting field for universal flu vaccine development.

■ **WE KNOW YOU HAVE WON NUMEROUS AWARDS EVEN IN THE EARLY STAGES OF YOUR CAREER, BUT WHAT DO YOU FEEL IS YOUR PROUDEST ACHIEVEMENT?**

You know, I think that as a scientist who is also a professor at a university, what really makes you the proudest is your ability to impact students. I mean, maybe other people will say my Nature paper or this big award, but to me, at the end of the day, those things tend to be very passing. They have their little moment of glory when you're at a ceremony or when you publish, but it's not lasting. Graduating a PhD student or seeing my fourth year thesis students convocate— that makes me really proud. Because here is someone who hopefully you've had a really life changing influence on, whose experience with you is something that is going to be meaningful and hopefully play a role in their future, even if they're not going into the field you are in. Even if those people do not go on to become flu experts, hopefully what they learned about thinking critically and logically and the importance of using the scientific method to evaluate the validity of anything they encounter in life causes them to be a much better person in society. Awards are nice when they happen, but they are pretty acute, have short half-lives, and are passing in nature. Maybe it looks great on paper, but at the end of

the day what is it really, beyond a plaque on the wall or letters after your name? The impact we have on trainees and seeing them succeed is what makes me most proud. Here is an actual life that I've been able to make a difference in as opposed to an award I can stick in a trophy case or on a wall as inanimate objects.

■ **THAT'S VERY INSPIRING— THERE ARE MANY NERVE-WRACKING EXPERIENCES WHERE YOU ARE NOT SURE WHETHER THE EFFORT YOU PUT IN TODAY WILL EVER COME TO FRUITION. WHAT ADVICE DO YOU HAVE FOR STUDENTS INTERESTED IN RESEARCH?**

There is one enlightening piece of advice that I did not appreciate until I figured it out myself. When you are following your tracks, you tend to be a highly motivated person who measures your success by achieving goals. But, eventually you reach a stage where all of a sudden, it hits you: do I also want to have a life outside of academic goals? Until the end of my postdoc, my identity revolved around doing well academically and professionally. I do not believe in reincarnation so around the time I was looking for jobs, I realized that I only get to live life once. Like wow, I better make sure I don't miss out on all the things I want to do just because I'm so singularly focused on these academic goals. It was the first time in my life where I started to make decisions that weren't simply based on external or superficial expectations of what success looks like. It's still important to work hard and be focused, but also remember that life exists beyond these goal-driven ideals.

The biggest piece of advice I would give specifically to undergraduate students in their later years is to really endeavour not to define your own success by the external expectations society has set. I am a scientist so I care about data-driven evidence. There is unequivocal data out there that if you make \$70,000 a year, then no amount of money beyond that changes your self-identified level of happiness. Obviously \$70,000 depends on where you live, but it's basically an average, comfortable, middle-class salary. A lot of times, people want a job that will make them a lot of money or want a job that is associated with a title that people really revere. But, what I tell people is: at the end of the day, you work the vast majority of your life and there is no amount of money that can buy you happiness in your job. If you work every day at some soulless job that pays you \$250,000 a year, and you're working twelve hour days and you hate every minute of it, then what good is all of that? Other people are like, "That's so great, you have a sweet Mercedes in the garage" and you're like, "Yeah I drive it to my soulless job every day, sitting in traffic on the Don Valley, it's really great". That is something I have always been introspective about in a way that has been good for me. As the few people who have the privilege or benefit of a good university education, we can largely make decisions about our career that are in line with what makes us happy. ■