Western Faculty Profile:

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No conflicts of interest declared

Can you give me a brief overview of your educational background?

I completed my undergraduate studies in the Department of Physiology (now Physiology and Pharmacology) here at Western University. My fourth-year thesis project was supervised by Tuti Vilis (professor emeritus). I stayed at Western to do my Ph.D in the Department of Anatomy and Cell Biology under the supervision of David Cechetto. While many recommended that I do my fellowship in the States, I saw an opportunity in an up-and-coming lab, and I wanted to be a part of something exciting in development. This led me to complete a postdoctoral fellowship at the University of Ottawa, working with Steffany Bennett for three years, and a second fellowship at the National Research Council of Canada. It worked out well since I was able to do some exciting work and produce several publications.

What made you choose Western over other academic institutions?

There's a lot to consider when you're taking a faculty position. The teaching that I do is a very small component, compared to 95% of my day which is research and administration. Therefore, it's important that I am in an environment where I can integrate and collaborate with my colleagues on fascinating projects that would require different areas of expertise: chemistry to biochemistry to physiology and neuroscience, combined with clinical medicine. It also makes a huge difference that the students here are strong and incredibly motivated to do well. I work with many clinicians, primarily neurologists, on rich, long collaborations where students are co-trained in both clinical and basic research.

Overall, the infrastructure at Western is more supportive in establishing a research program that is highly integrative and highly translational. I don't think we do research in segregated departments anymore. You must pull from different areas of expertise and find the right combination to answer a specific question.

Since we're on the topic of your research, could you tell me a bit about it?

My research focuses on understanding the co-morbidity between Alzheimer's and stroke. It has two main components. The first part is trying to understand how vascular stress can change the white matter in the brain to influence the probability of cognitive impairment, which has obvious implications for Alzheimer's

patients. We know that cardiovascular risk factors like hypertension, diabetes, and high cholesterol can increase your risk for a spectrum of cognitive impairments. We're interested in understanding how different risk factors such as age can interact with cerebrovascular risk factors to increase the risk of cognitive impairment. It's a translational program where we combine basic science and clinical work to tackle these issues by understanding the molecular mechanisms that occur in midlife that would increase the risk for protecting the brain.

The second part of my research is more focused on the biochemistry side. We're trying to understand how membrane lipids can change the level of vulnerability and distress. The plasma membrane is the first area of contact the cell has with the external environment and often exhibits the first sign of cellular response to stress. Lipids can change and shapeshift during aging, and this may lead to different vulnerabilities depending on the area of the brain. For example, in Alzheimer's disease, we know it affects a specific part of the brain that is distinct from Parkinson's. The question is if the actual area in which the cell is located would play a role in mediating disease vulnerability.

How do you handle a bad research day?

Research is hard. You're going to have terrible days interlaced with good days and you're going to have to learn to be okay with it. Make sure you're in a positive environment where you can feel supported and that there is an endgame to all your effort, kind of like the light at the end of the tunnel. Try to maintain a healthy perspective. All in all, I believe that if you're really intrigued by the question, then it makes up for all your effort.

What advice would you give undergraduates looking to get into research?

I have three pieces of advice. First, be brave and talk to your professors. While I understand there is a big barrier in which students feel intimidated, it is important to remember that professors are real people. Most professors love talking about what they do, so try to engage them on that level.

Second, try to figure out how you learn and what you like. Are you a detail-oriented person or do you like focusing on the big picture? That's going to dictate what kind of research you're into. Think about what you learn in class and what stood out the most to you. Are you interested in figuring out molecule X and the pathway of a billion, or are you more interested in figuring out how things work together? Every lab is unique in terms of how they approach science and what they do, so as a student, try to figure out your learning style and what gets you excited about research.

Third, if you meet with the professor, make sure to talk with the people in the lab. Find out what it's like to work there. Are you okay with someone looking over your shoulder and constantly asking questions, or would you rather be in a lab where you're given a project, and told to go figure it out? Maybe something in between? It's also very important to find out where the students go following graduation, if they're publishing, and if they're having fun. Don't underestimate the element of being able to have fun in the lab! If you hate going to the lab, then you're going to do a poor job and waste everyone's time, including your own.

Overall, get into research as early as you can. I love having students who volunteer, do work study, or have a scholarship as undergraduates.

What do you think of students who's end goal is getting into medical school?

You never know where life is going to take you. You may think you want something at one point but you're still in your twenties, your life isn't figured out yet, so why would anyone force a student to make a commitment based on something they may or may not be doing two or three years down the line? That's totally unreasonable. In fact, some of my strongest undergraduate students went to professional school, so it shouldn't matter what their ultimate goal is. If a student is committed and does what they say they are going to do, then that individual is a valuable addition to the program.

What is one of the toughest challenges you had to overcome?

Finding a faculty position after my post-doctoral studies. My experiences have ultimately shaped what I look for in potential students and how I train them.

How do you recruit and mentor your students?

Are you a decent person? I think there's something to be said about being a good person and that's one of the things I look for when I recruit. It's not necessarily how smart you are or how much training you have, but whether you did something on an elite level, either as a musician or an athlete, for instance. This tells me you learned dedication and self-discipline to be able to excel at something you chose to do.

In terms of mentoring, I always train my students to develop soft skills because being good in research is not good enough. Regardless of whether you stay in academia and decide to pursue a faculty position, or go elsewhere in industry, teaching, or an entirely unrelated field, the challenge of graduate school makes it a perfect opportunity to develop these soft skills. The ability to lead, communicate effectively, and demonstrate kindness and empathy to the people you work with are all critical skills that can translate to many different domains.

Speaking of things you excel at, what are some of your hobbies that you like to pursue in your free time?

I have four kids, so their hobbies are my hobbies. My three boys play hockey and my daughter loves drama and acting. If I'm not in the office, I'm at a hockey rink or the theatre or music

lessons. My wife and I are also fitness instructors. It's a way we can give back to the community and stay in good physical health. I'm a big believer in practicing what you preach, so if I'm going to advise you to control your vascular health, then I want to make sure it's an important part of my life as well.

What's your take on the struggles of being a student these days?

There's so much pressure on students right now, whether it's from parents or from within, and I think it eats away at people. It doesn't necessarily make someone the best version of themselves. This is where it is important to have perspective and find a good work-life balance. Remember the reason you're doing this degree but also remember that your work doesn't have to be everything and there is life beyond your studies or your research. Schedule in something you can do that is giving back to yourself. I stress this to my graduate students all the time. If you don't develop a life outside of the lab, you are going to resent your work, and you are going to burn out. Life is too short to live like this.

Sometimes, even when you work hard as a committed individual, your original goal may not come true. That's okay. Remember that all the skills you gained and lessons you learned along the way are going to make you a more resilient person. Keep an open mind and be flexible to where life takes you. You'll be ready for when another opportunity arises.

To learn more about Dr. Whitehead's lab and research, please visit their website:

www.vulnerablebrain.com