Background

Dr. Susanne Kohalmi is an Associate Professor in the Department of Biology at the Western University in London, Ontario. Her research is in molecular genetics, with focus on the regulation of gene expression and protein interactions. Currently her research is investigating the arogenate dehydratase enzyme family (ADTs) in the plant model organism Arabidopsis thaliana.

In addition to research, she teaches undergraduate courses in genetics as well as supervising both undergraduate and graduate students. Anthony Wong, member of the Academic Affairs Committee at WURJHNS, interviewed Dr. Kohalmi to learn more about her research, her path to Western, and her advice to students.

“For genetics, the way with which we approach things is interesting. Sometimes it doesn’t matter what organism you work with. DNA in a test tube is DNA. Proteins in a test tube are proteins. Sometimes how you obtain these materials is different and the questions we ask are different. They’re important questions though; I think we need to understand not just ourselves but we need to understand other organisms we live with. We’re part of an ecosystem and part of the world.” explains Dr. Kohalmi in response to why she chose to study biology. “We don’t live alone and we won’t survive alone so we have to understand how other things work. And we have to understand how they interact with each other. We often don’t look at it this way, but I think it’s part of our own survival.”

Dr. Kohalmi grew up in Germany and completed her Diploma (Bachelor’s) at J.W. Goethe University in Frankfurt. She received a scholarship after her Diploma that allowed her to go to Canada. “I went first to Toronto and started my Master’s but my supervisor offered me a PhD position in Winnipeg. I decided to transfer into a PhD program and finished my PhD at the University of Manitoba. In Germany the Diploma is composed of 4 years of undergraduate studies followed by a one year thesis. So there I would have entered directly into a doctoral program.” Following her PhD in microbiology, she completed two post-doctoral fellowships, one at the University of Saskatchewan and the other at the Plant Biotechnology Institute in Saskatoon.

Today, Dr. Kohalmi’s lab at Western studies the arogenate dehydratase family of enzymes, which catalyze a key step in the production of phenylalanine in the plant model organism Arabidopsis.
thaliana. When she started her studies however, she didn’t know her research would later develop into its current focus. “In Germany I did work in yeast mutagenesis and I continued along those lines in Canada with my PhD. But nearing the end I wasn’t sure what I wanted to do - not because it wasn’t interesting, but I wanted to broaden my horizons.” At the time there was a significant advance into molecular biology involving plant genetics. “During an international genetics conference, I went to as many talks as I could and with some serendipity I ended up looking at the plants genetics section. In hindsight this is funny because as an undergraduate, I had always thought that plants were very boring.” However, she pursued her interest and completed her first post-doctoral fellowship at the University of Saskatoon studying flower development mutants.

“So I very much switched my research focus. From one organism to another, timing was completely different, and from mutagenesis to development.” Her second post-doctoral fellowship combined her two research foci – involving yeast as well as plant genes and proteins. In her second fellowship, she conducted a lot of two-hybrid analyses leading her into studying plant developmental protein interactions and her current research. “Working with enzymes is kind of funny, I’m not a biochemist. But it’s an interesting problem. It’s interesting to see how seemingly similar enzymes are needed in a single plant so I tried to figure out what the similarities and differences are. There are very few steps in this pathway that have that many isoforms which points to me that there is something very important about regulating this particular step.”

Finding a research focus is often a long process and Dr. Kohalmi can attest to this. “You can see that some decisions you make involve some purpose, some involve some serendipity. You start at some point, you switch, you adjust, you change but oddly enough most of the things you’ve done at some point come again and you encounter them again in a different context.”

Dr. Kohalmi’s career has taken her to several institutions, but she finally chose Western where she has been since 1996. “Western is a big university, with a large research background and a good community within the department. It’s renowned, that’s important. They offered me lab facilities which were suitable. So it was a combination of different things. I had a feeling that the department was somewhere I wanted to be and I had opportunities to do what I wanted to do.”

Being a researcher and a lecturer can be incredibly rewarding. For Dr. Kohalmi, the best part of being a researcher is the independence to ask your own questions. “It’s an independent and self-directed job - which I really like. And you’re thinking about it all the time. It’s not a 9 - 5 job; you take it home, you puzzle about it, you dream about it, you come back and you have a new idea. It is fascinating to work on something you have to figure out. I was always interested in how things work in minute detail - it’s no accident that I ended up in molecular genetics.” Dr. Kohalmi also emphasizes the link between teaching and research. “Whatever I learn, I can pass on. Whatever I pass on, I have to know. I cannot teach without understanding what I’m teaching. I always saw myself at the university - it is important to intrigue people with the things you’re thinking about and to show them how interesting research can be even with all its frustrations sometimes. But you have to set them up. You have to teach them building blocks. “

While rewarding, many difficulties remain for researchers to face. Dr. Kohalmi says that the hardest part of research is uncertainty. “You seem to ask all the right questions, do all the right experiments but nothing clicks - and it can be very frustrating. It can be very frustrating in today’s times because if you’re not successful it is difficult to obtain research grants. You cannot fund the experiments you would like to perform. There’s a cycle in that, and it can get very stressful. Every question you solve
leads you to five new questions. You are never really at the end of something, you’re always towards something - your target gets moved all the time”.

Overcoming these difficulties, Dr. Kohalmi spoke about the future outlook of research in her field. “We’re finding that the answers are much more subtle and much more complicated than we anticipated” - and that’s why Dr. Kohalmi says that we have just hit the tip of the iceberg. “When I started my post-doc in Saskatoon, my supervisor had every paper ever published on Arabidopsis in his filing cabinet. Nowadays you can’t even keep track of all the papers that are published in a single year. Now rather than analyzing individual things, we have to understand networks. It is not a yes or no answer. It’s not only the question of whether it interacts. The question is under what circumstances, in which part of the organism, which part of the cell, and when.”

For undergraduate students who are considering a career in research, Dr. Kohalmi advises to take every opportunity to work in a lab. “It doesn’t matter at what level – if you can do work study, do work study. If not, volunteer. You might just be washing dishes, but you’ll see how a lab works. You’ll get to meet people. If you can integrate into that research team, you’re more likely to be able to go back again.”

She also emphasizes the significance of finding something you’re interested in. “The other thing I did was always to do something that was interesting to me. I always had the opinion that if I was interested, then I probably will work at that much more. Then it’s not work; it’s something I want to know. “

But her principle message to undergraduates is to keep an open mind. “Often when you get to university, you know relatively little about what research is done and what opportunities or projects might be there. A lot of people are interested in going into medicine which is a very good goal. However, there is so much more to biology and understanding living organisms than being a medical doctor. There are a lot of things to do, questions being asked which you had no idea about. So you have to figure out yourself to some extent but give yourself some room to experience diversity and don’t be too fixated on a particular preset goal.”

To read more on Dr. Kohalmi’s lab and research, please visit her website at: http://www.uwo.ca/biology/directory/faculty/kohalmi.html