

Interview with Dr. Bhargavi Duvvuri - a Postdoctoral Fellow working on Rheumatoid Arthritis and Peptide- based immunotherapy at McMaster University

By Effie Vigiouliouk



“Dr. Duvvuri is a Michael G. DeGroot Postdoctoral Fellow (basic biomedical sciences) at Dr. Larché’s laboratory, Department of Medicine, McMaster University, Hamilton, Canada. Dr. Duvvuri works in the field of peptide-based immunotherapeutics for the treatment of autoimmune (rheumatoid arthritis) and allergic diseases including the investigation of underlying molecular mechanisms. Dr. Duvvuri has also been responsible for designing in-silico pipelines, immunological protocols and executing clinical trials related to allergen-related immune products. In addition, Dr. Duvvuri is a project management liaison between a laboratory at McMaster University and the industrial sponsor Adiga Life Sciences.

Previously, Dr. Duvvuri worked as the Arthritis Society and the Canadian Arthritis Network Postdoctoral fellow at the Hospital for Sick Children Research Institute, Toronto, Canada. Her research studies on childhood Arthritis were focused on the development of molecular screening methods for the categorization of patients based on their clinical, phenotypic and epidemiological data. Dr. Duvvuri did an MSc in Biotechnology from Osmania University, India and a PhD in Health Sciences from York University, Canada. Her PhD research demonstrated molecular basis for different aspects of immune diversity that have broader implications in understanding immune surveillance, autoimmunity and antibody related cancers. She also conducted collaborative research on infectious diseases to investigate the interplay of host cellular immunity and pathogen evolution – particularly on avian and human influenza viruses. For her PhD studies, along with various fellowships and awards, Dr. Duvvuri was honoured with The Canada’s Governor General Academic Gold Medal (2013), the most prestigious award that students in Canadian schools can receive for outstanding academic excellence at the graduate level. In addition to

research, she is passionate about teaching and mentoring students.”

More info: <https://ca.linkedin.com/in/dr-bhargavi-duvvuri-0079b24b>

1) Can you briefly describe one of the projects you are currently working on?

My current and long-term research focus is to explore mechanisms underlying pathophysiology of autoimmune diseases (ADs) and apply that knowledge towards the development of disease-modifying and possibly preventive therapies for ADs.

In continuation of my research experience in autoimmunity and arthritis, I came to McMaster University to work on Rheumatoid arthritis (RA). RA is an autoimmune disorder in which the immune system mistakenly attacks its own body’s tissues. It is not clear how the disease starts. Existing research suggests that, on top of genetic factors, one of the triggers for RA may be a change in one amino acid called arginine. An enzyme in the body called Peptidylarginine Deiminase (PAD) can change arginine amino acids into an unnatural amino acid called citrulline. As a consequence, natural proteins in the body that contain the amino acid arginine are changed into proteins with citrulline in them. Because the immune system has never seen these novel proteins before, it attacks them, causing inflammation, especially in the joints. A type of white blood cell called “CD4+ T cells” can detect the changed amino acids in small fragments of the new proteins. The fragments are called “peptides” or “epitopes”. These peptides trigger the T cells to make and release signals (called “cytokines”) that drive inflammation in the joints. My proposed study aims to identify the citrullinated epitopes responsible for driving RA. These identified epitopes can potentially be used to

develop a therapeutic vaccine for RA in a form of peptide-immunotherapy.

2) What steps did you take to find or acquire this position? In particular, what educational background and extracurricular involvement helped prepare you for this position?

My current post-doc position is mainly focused on RA. Hence, having a PhD in immunology with experience in *in silico* epitope discovery, along with laboratory research experience in arthritis that included a prestigious fellowship from the Arthritis Society of Canada helped me to acquire this position. Interdisciplinary research skills were also very important. I worked on various projects that required bioinformatics, as well as basic and clinical immunology skills. I have utilized every opportunity to continue in a research and academic career such as lab experience, delivering research talks and lectures, presenting my research findings in conferences, supervising students, serving as a judge in science fairs, etc.

3) What unique non-academic skills do you believe are most valuable in your current position?

Perseverance, good work ethic, ability to work in a team, being able to quickly adapt to projects, emotional stability, openness to challenges, and being goal-oriented.

4) What are some of the benefits and drawbacks of your current position investigating allergy and autoimmunity?

My current position is unique in the way that I work in an academic setting, but in the scope of an industrial background. Hence, apart from working on basic research questions, my project has a huge translational potential to bring our research findings from clinical development to the clinic.

Benefits: Availability of resources, access to cutting-edge technologies and real-time knowledge/experience on how a research finding is brought to the level of a clinical product.

Drawbacks: There are not many, if a person has the non-academic skills as mentioned above.

5) Can you describe the landscape and scope of opportunity within your field for Master's and PhD-trained students?

There is a great scope of opportunity for students in the field of ADs. Tremendous progress has been made over the years in the understanding of pathophysiological mechanisms

underlying ADs. Hence, numerous opportunities at both the theoretical and technical levels exist to further our understanding of ADs in the areas of biomarkers development, etiology, immunology, epidemiology, and clinical therapeutics with the ultimate goal to develop novel approaches for the prevention and treatment of ADs.

6) Can you give any advice to graduate students looking to pursue a career within your field?

As I said before, there is huge potential in this area of research. The key is to start early and gain experience in research at basic and clinical levels. Maybe work as a volunteer, or as a summer, thesis or co-op student. It is very important to gain as much experience as you can. Do not limit yourself to just wet lab research. With a wealth of genetic data accumulating from research, there is also a greater need for computational approaches to analyse data. Having basic knowledge on programming skills and computational tools will help in the long run. Hence, starting early will allow you to explore opportunities in as many areas as possible. Contact supervisors and apply for independent funding where ever possible; having your own fellowship bolsters your research career and your chances of getting into prestigious laboratories. Make a routine habit of reading scientific literature of interest that will expand your perspective on your field of interest.

7) What are some resources (websites, readings, listings) that you can recommend for graduated students interested in this field?

I update myself on ADs by reading peer-reviewed journals related to immunology and medicine, and by attending research talks and seminars/webinars in hospitals and universities. I also sign up for e-alert services of leading journals, and organizations/societies in this field. ■