

# Ismail Sebina



I am a Ugandan-born cellular immunologist based in Australia. In 2010, I completed my Bachelor's degree in Biomedical Science at Makerere University, Uganda's premier centre of higher learning. Thereafter, I obtained a short-term contract as a research assistant at the [MRC/UVRI and LSHTM Uganda Research Unit](#). I worked on two large studies funded by the Wellcome Trust and NIH/NCI under the guidance of Prof. Alison Elliott, Dr Stephen Cose and Dr Katie Wakeham. This unique opportunity introduced me to the world of immunology. I was also able to identify some of my longstanding mentors. In 2011, I was awarded a prestigious Wellcome Trust Masters Fellowship, which supported my Masters training in immunology of infectious diseases at the London School of Hygiene and Tropical Medicine (LSHTM). During this period, I actively trained in Prof. Eleanor Riley and Hazel Dockrell's groups, with direct supervision from Dr Julius Haffalla and Dr Jackie Cliff. At the end of my masters training in London, I returned to the MRC Unit in Uganda to complete the research component of my Fellowship. In 2013, I left Uganda for Australia, to undertake my doctoral training at the University of Queensland, in the laboratory of Dr Ashraf Haque. This period was very rewarding. I consolidated my background in immunology, and gained experience in



performing the latest immunological techniques to study various immune cells in experimental animal models and humans. More importantly, my doctoral studies led to crucial discoveries on key molecular pathways impeding the development and maintenance of protective humoral immunity to malaria.

In 2017, I was awarded my PhD, and left Australia for The University of Washington, USA, to undertake my first Postdoctoral training in Dr Marion Pepper's laboratory. Here, I developed technical skills in analysing antigen-specific B cell responses to infection. At the end of my training in Seattle, I secured a second Postdoctoral position in the laboratory of Dr Simon Phipps at QIMR Berghofer Medical Research Institute in Australia. Here, I am actively investigating the influence of genetic and environmental factors on immune development in early-life.

**If there's one thing that Immunologists love, it is classifications. Do you identify as B-cell or T-cell Immunologist and why?**

I identify myself as a T- and B-cell immunologist. From a very early stage of my career, I was inspired to understand mechanisms that underlie long-lived immune responses to infections and vaccines. Since B lymphocytes are essential to such long-lived protection, my first studies focused on understanding the biology of B cells in the context of *Mycobacterium tuberculosis* (*Mtb*) infection. However, it was extremely hard to convince many fellow tuberculosis (TB) immunologists that B cells played any crucial role in immunity to *Mtb*. Nonetheless, I added two important observations to the literature; demonstrating that (1) BCG vaccination induces long-lived memory B cells, and (2) circulating B lymphocytes are potential biomarkers of *Mtb* infection status. During my doctoral studies, I learnt that T-follicular helper CD4<sup>+</sup> T (Tfh) cells are required for inducing potent and long-lasting

humoral immunity to malaria. I therefore sought to identify new strategies to boost the function of Tfh cells and improve B cell-mediated immunity to infections. In future, some of my discoveries may lead to new vaccines/therapies for some of the world's most devastating diseases.

**You have had the opportunity to receive training across 4 different continents. Congratulations and well done on that achievement. What has the decision-making process been like for you so far when choosing where to receive training from?**

My career decisions depended largely on fulfilling my childhood dreams and envisioning the best research outcomes from my training/stay in any given place. For instance, as a young biomedical science student in Uganda, I always admired the quality of research conducted by the MRC/UVRI and LSHTM Uganda Research Unit. I was confident that training and working at this Unit would give me a solid foundation in clinical research. Through their capacity building programmes, I was lucky to join LSHTM and continued with my training. I was also keen to join the next generation of highly skilled/trained young African scientists, urgently needed to solve some of the most devastating health problems in Africa, so I could not resist the opportunity to develop skills in studying infectious disease immunology as part of my doctoral training in Australia. I continued with a similar thought process in choosing my Postdoc supervisors in USA and Australia. In long term, I would like to return to Sub-Saharan Africa, and (1) build a competitive research group, (2) participate in building capacity in immunological research, and (3) be part of the joint force aiming to solve some of the most devastating health problems on that continent.

**What advice do you have for other researchers that may grapple with furthering their career away from home.**

Depending on the career stage of the researchers in question; my advice will be directed to the very early career

researchers (prospective post-graduate students, doctoral students and junior post-docs). I would strongly advise them to continue building their CVs, while in positions. Strong CVs are crucial for securing better opportunities, especially those away from their home countries. Such opportunities are usually very competitive. Such researchers should also identify a research area of their interest. This will lead them to identifying potential mentors and supervisors, whose support is critical for writing strong applications and research guidance. More importantly, they should continuously look for and submit applications for multiple opportunities within their area of interest.

**As a senior member in your field, I am sure you have enough publications to fill an ocean. We would love for you to share some of your papers that make you the happiest and really speak to the amazing work you have done.**

My academic journey is just beginning, hopefully, it will be lead me to many significant contributions to my field. So far, my work has led to 26 publications (<https://pubmed.ncbi.nlm.nih.gov/?term=Sebina+I&sort=date&size=200>) in high ranking journals, including Science Immunology, JCI, PNAS and Plos Pathogens. Let me highlight two studies that I cherish so much, one published in Plos Pathogens and another in Plos One. In the Plos Pathogens paper (PMID:27812214), we used mouse models of malaria to investigate why immunity to malaria in highly endemic settings takes long to develop and wanes quickly. We found that *Plasmodium* (the parasite that causes malaria), hijacks pro-inflammatory innate cytokine signalling pathways, impairing downstream dendritic cell function, and subsequently obstructing the development and maintenance of potent antibody responses to malaria. I cherish this work because we demonstrated the therapeutic potential of targeting host-immune responses to overcome resistance to severe *Plasmodium* infections.

I also have fond memories the Plos One study (PMID:2324001) because it was my very first 1<sup>st</sup> authored publication. This work was conducted as part of my 3-month research project for a Masters thesis. I had a very short period to recruit over 90 participants for my study, run all the required assays, analyse the data and write the thesis. Due to a very fruitful collaboration between colleagues at LSHTM and the MRC unit in Uganda, I was able to accomplish all my objectives within the 3-month period. The most significant finding of this study was that BCG vaccination induces long-lived memory B cells. The most effective vaccines currently available work on the principle of inducing long-lived antibody responses. This finding challenged current paradigms that relegate B cells to an afterthought in new approaches to develop effective vaccines for TB.

**With all this travelling you have done, I am sure there are still some places you have not been too. What would be the one country you would love to live in and why.**

Japan. Apart from what I have seen on TV or watched in movies, my knowledge on this country is very limited. Nonetheless, I am told that Japan is a very beautiful and peaceful country, with very many humble people and amazing scientists. I would love to learn more about Japanese history, culture, its people and work ethic.

**The scientific space has become quite competitive, and researchers are not sure if they can cope with what the demands of academia. What do you think young researchers should do and keep in mind as they try to stand out in this competitive space?**

It is true, the field is very competitive. However, many of my mentors have reiterated to me that it has always been difficult/competitive. The quality of science and pool of scientists has significantly increased in recent years, but most research budgets have not changed. My PhD supervisor

always advised me to “Enjoy the process”. My first Postdoc supervisor advised me to stay true to myself and never to forget what got me into an academic research career. My current supervisor has always reminded me that patience is a key virtue for success in academia. These pieces of advice give me a lot of hope for a better future in research. In part, I extend this advice to my fellow young researchers. We should remain ambitious, be very creative/innovative, take risks, stay humble and be patient throughout our research aspirations. More importantly, I think we should not be afraid of the competition. My time in Australia has taught me that competing with the best only improves the quality of one’s scientific outcomes (e.g., publications, grant applications, mentorship, community service, networking etc).

**What do you wish people told you at the start of your career that could have made a difference or an entirely different impact to where you are now?**

An academic research career is filled with endless disappointments and failures. I wish I had received advice on the importance of embracing these failures. In my earlier scientific years, I always operated under a lot of pressure, thinking that this was the only way to success. I hardly coped well with failure e.g., unsuccessful grant applications and job interviews, failed experiments, lack of progress on my projects, or poor feedback from a supervisor etc. This affected my confidence professionally and socially; I was always anxious, extremely stressed and at times depressed. It was not until my first Postdoc supervisor (Dr Marion Pepper) identified my weakness and told me about the critical importance of embracing failure in academia, and life in general. This is still some of the best advice I have ever received and I have learnt a lot from my experiences. I wish I had received this advice at the start of my career.

**I would like you to name one thing in each of these places; Australia, USA, UK and Uganda that stood out for you that you**

**think other people should make sure they enjoy while they are there.**

Australia: The beautiful white sandy beaches; the beauty of this country is unbelievable.

USA: Advanced technology. One just needs to experience it to believe it.

UK: London and its numerous tourist attractions/activities. I still marvel at how fast everything changes in London. I could go on tours in this city for years and still not exhaust all the attractions on my bucket list.

Uganda: The Ugandan avocado and the great lakes fish (Tilapia/Nile perch). In my opinion, these are some of the best food products in the world.

**You have been involved in quite diverse projects over the course of your post-graduate and post-doctoral training. Feel free to tell us about your “favourite” or most exciting project to date?**

I must confess that I find all my projects exciting. This is largely due to my research themes, focused on (1) defining new strategies for improving humoral immunity to infections, (2). identifying avenues for regulating excessive immune function associated with autoimmune disorders, and (3) improving immunity in the mother and her baby.

**What impact do you feel this research work has made in the field of Immunology so far?**

My work has generated new knowledge in my field. It has been cited >1000 times (~800 citations in the past five years). Majority of these citations are in top ranking peer reviewed journals. I have been invited to participate in peer review for various journals in my field, including, Immunology, Viruses, Parasite Immunology, Frontiers in Immunology etc. I

have also been invited to present my work at international conferences e.g. the Keystone Symposium, International conference on mucosal immunology (ICMI) and annual meetings of The Australian and New Zealand society for Immunology (ASI). In part, my findings contributed to an on-going clinical trial aiming to repurpose an existing drug to boost host immunity to malaria parasites.

**Where do you see your research work going after this? Are you keen to continue with the same line of work or branch out in order to further diversify your portfolio and tackle a different set of problems?**

I should be able to continue making new discoveries in my current and future research areas. At the moment, I completing a few short-term projects. As part of my long-term research goal, I will integrate my knowledge, skills, and experience to define novel strategies for improving maternal, new-born and child health.

*Interview by Vanessa Mwebaza Muwanga*