Rose Nabatanzi

I am an immunologist and post-doctoral scientist at Makerere University College of Health Sciences (MakCHS) under the Infectious Diseases Institute (IDI) within the NIH-Fogarty capacity building grant. I manage the Immunology Laboratory, directly supervising ten scientists. I have a Bachelor's in Biomedical Laboratory Technology, a Master's of Science in immunology and clinical microbiology and a Ph.D. in Immunology all from Makerere University. I have 17 years of experience in biomedical HIV research and academia. I am interested in conducting translational research in Immunology of infectious diseases particularly HIV and its co-infections. Currently I am looking at the characteristics of the HIV latent reservoir among HIV infected individuals within the IDI HIV treatment Cohort. I would like to explore potential drivers of immune activation and inflammation including low level viral replication among long term antiretroviral therapy (ART) treated people. I am focusing on utilizing my research experience to answer questions relevant to the improvement of HIV treatment

outcomes, remission, and cure.

What drew you to the field of Immunology?

I first learnt about the immunology discipline during my undergraduate lectures. It fascinated me because I got to learn in more detail how the body fights infection and disease. I realised that to find effective treatments and vaccines for diseases such as HIV, that are a big burden to our population, a thorough understanding of the mechanisms required for protection is required.

How has your research contributed to a better understanding of HIV/AIDS so far?

My PhD research investigated the restoration of the innate immune system (circulating monocytes, natural killer (NK) and innate lymphoid cell compartments) after long term ART in HIV infected adults within the Infectious Diseases Institute (IDI) treatment cohort. My results showed that there are persistent perturbations within these innate cell compartments even with successful long term viral suppression. These findings implied that ART treated adults remain at risk of acquiring opportunistic infections in the absence of prophylaxis which calls for a review of the current HIV treatment guidelines particularly the discontinuation of prophylaxis for prevention of opportunistic infections. This data also suggested that there may be need to review effectiveness of vaccines among ART treated HIV infected individuals in African cohorts.

As part of my **masters' research**, I looked at CD4 T cells immune responses in HIV infected people who had been on ART for seven years. I was able to demonstrate that antigen-specific CD4 T-cell immune responses are not fully restored after long-term ART despite normal absolute CD4 counts.

I worked with different collaborators on projects that assessed immune responses in people whose CD4 T cells remained suboptimal even with highly active antiretroviral therapy

(HAART). We measured Immune activation and exhaustion status of the CD4 T cells and looked at the ability of the CD4 T cells to proliferate in comparison with those whose CD4 T cells had been restored. We also looked at the NK cell subsets in the two groups of people. We found a lot of abnormalities in the group whose CD4 T cells had remained suboptimal compared to those who had recovered their CD4 T cells. They highly expressed markers of immune activation, immune exhaustion and possessed low proliferation capabilities. So, with these results we set out to find a solution to the high immune activation/exhaustion and looked at the effect of statin adjuvant therapy on immune activation of the CD4 T cells. Atorvastatin reduced immune activation and exhaustion among HIV positive people with sub optimal CD4 T cell recovery and there was an increase in the CD4 T cell numbers in this group of people.

You have been a long-standing member of the Makerere University community. What are the major research projects that go on in the Immunology laboratory that you oversee?

Makerere University College of Health Sciences (MakCHS) is an academic institution whose mandate is to provide quality education, research, and health services to Ugandans and beyond. So as the Immunology laboratory of MakCHS, we pride ourselves in training and producing great scientists that are serving Uganda, Africa, and the world at large.

We also work on research projects geared towards characterizing persons with COVID-19 and establishment of a quality assured COVID-19 specimen repository to support research in diagnosis, prevention, and management of SARS-CoV-2 in Uganda. We are also working on several clinical trials targeting new drug combinations for TB prevention and treatment both in adults and children. We also work with projects that are doing research geared towards finding better treatment outcomes for HIV infected individuals such as those looking at different ways of eliminating the HIV latent

reservoir.

Congratulations on being awarded a Career Development Fellowship with EDCTP. Tell us more about this award and how it is contributing to the work you do now.

The European & Developing Countries Clinical Trials Partnership (EDCTP) awarded me an early career development award to characterise the latent reservoir among HIV infected individuals on long term ART. With this award I was able to undertake training on different ways of measuring the HIV latent reservoir. The additional knowledge and skills that I have acquired have put me in a better position to share and train other scientists at Makerere University. Currently I am supervising a student who is utilising this knowledge to measure the size of the HIV latent reservoir among long-term ART infected individuals. The student has been partly sponsored by the same grant.

Which direction do you see your research work going in after this?

I would like to go deeper in the field of HIV cure to contribute to the HIV cure agenda to lessen the lifelong burden of antiretroviral therapy and its side effects faced by HIV patients. Not a lot of research has been done in this field in Africa and yet this continent suffers the greatest burden of this disease. There is a great need to develop assays that can help our people. In Uganda, for example, we have HIV subtypes A and D, but many assays out there are based on subtype B, which may not translate to what our people need. I hope to build collaborations with other African scientists conducting research in HIV cure and training more scientists who are passionate about finding solutions to Africa's problems.

A lot of has been said about the hurdles of being involved in research and academia as women in science. What has helped you

manage to continue making the career progress you have attained so far?

I have been lucky to have a supportive research environment from when I started my career 17 years ago up to today. My supervisors have been cognisant of the fact that I needed to balance both my work and family responsibilities and have supported me to do so. In this regard I would like to give credit to Prof. Damalie Nakanjako my supervisor and mentor whose support has tremendously helped me achieve career growth without suffocating my family responsibilities. I also have been blessed with a supportive husband who has always encouraged me and stood by me through thick and thin. We have shared the roles of taking care of our children enabling me to dedicate enough time to my research. I cannot over emphasise the importance of hard work and persistence that are essential to achieve success.

What do you feel should be done to see more female scientists contribute to academic research and remain a part of it?

It is important to capture their interest in science as early as possible when they are still in primary and secondary school. Many women lose interest in science as some sections of the society still believe that males are better suited to doing science subjects. This mentality must be completely changed to attract more female scientists.

We should also prioritise funding for women scientists in scholarship and grant applications. Whereas these must be awarded on merit regardless of sex, affirmative action is needed to attract more women into research considering the fact that they face unique challenges such as long maternity leaves that affect their career growth.

It is also important that workplaces are made conducive for women research scientists for example by providing breast feeding hours and day care services at the workplace. Women

should never have to make a choice between career and family growth but rather both should go hand in hand.

As more researchers look at establishing careers away from Africa, you have managed to grow and thrive in Uganda. What advice do you have for postgraduate students and upcoming researchers that would like to contribute to work on the African continent and in their home countries?

It is important for postgraduate students and upcoming researchers to appreciate the fact that there is a lot of unexploited potential when it comes to scientific research in Africa. Many of the challenges previously faced by African researchers such as lack of funding, lack of well-trained scientists and lack of properly equipped laboratories have been addressed. There are several examples of African scientist that are excelling on the world stage courtesy of taking advantage of the numerous funding opportunities and establishing north to south research collaborations. With the likelihood of the infectious disease burden becoming even greater in Africa, it is only logical that upcoming researchers focus their attention on doing research in their home countries for it to have greater impact.

Carrying out research in what would be classified as low-middle income settings is not without its challenges. What do you feel can be done to see more African scientists thrive on the continent?

- Have industries that manufacture reagents and supplies in Africa. This will help reduce the cost and waiting times.
- Manufacturers doing away with using third party reagent distributors. From experience this makes research even more expensive.
- Having government support as we do research. This will help us answer research questions that are relevant to our challenges as Africans.

- Infrastructure and personnel development so that we do not need to ship all samples oversees but can be able to carry out research that is relevant for Africa, within Africa

We would love our readers to get more acquainted with your work. Care to share some publications that speak most to the amazing work you have done so far?

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Interview by Vanessa Muwanga