

Muzlifah Haniffa—a new era for collaborative and supportive medical research

Muzlifah Haniffa is a dermatologist working at Newcastle University and Wellcome Sanger Institute. Her achievements were recognized by the 2019 Foulkes Foundation Medal awarded by the Academy of Medical Sciences. She also plays a pioneering role in the Human Cell Atlas initiative.

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I remember the first-ever meeting of the Human Cell Atlas initiative, in 2016. I was excited and, perhaps, a little uncertain. But I knew I wanted to contribute to this ambitious initiative. The Wellcome Trust had provided funds for people from around the world with various expertise to contribute to this kick-off meeting. From the start, it was going to be a global and equitable effort. There was a sort of fascination and disbelief that we would map all the cells in the human body—and we could be part of it.

Before this meeting, I thought perhaps I was a dreamer on my own. But we all came to realize that, there are a lot of like-minded people. This was going to be a radical change in how we would think about the human body.

I could say that my whole life as a physician scientist had led to me being in this room. I came from Penang, Malaysia, to be a medical student in Cardiff. I knew I wanted to do a substantive piece of research toward a PhD. There are several points at which a clinician can go out of clinical training to do research in the UK; I did this during my specialty training so I could align my research and clinical fields. I secured a research training fellowship from the charity Action Medical Research while undertaking dermatology training in Newcastle, studying antigen-presenting cells in the skin. I want to emphasize the importance of fellowships for my clinical research, to weather the highs and lows of academia. Clinicians have to be freed up from their clinical workload to do their research.

I worked under the joint supervision of the hematology, rheumatology and dermatology departments. This was a stroke of luck! I learned that understanding how people think and approach problems from another field drives innovation of thinking in your own field.

After I completed my dermatology training, a Wellcome Clinical Intermediate Fellowship on the origin and function of



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antigen-presenting cells in the skin took me to Singapore for a year; this culminated in a cross-species homology framework, based on transcriptome analysis, for antigen-presenting cells in human and mouse.

I became involved in the creation of an atlas of human blood dendritic cells and monocytes with researchers at the Broad Institute of MIT and Harvard. There I realized the power of such a newly emerging field of research: single cell genomics. I also learned about the importance of true collaboration. You could not achieve this project with the capabilities of genomics, computational expertise, or a biomedical approach alone.

Historically, medicine has gone down the route of specialization. But give a problem to people who have been taught the same way and they will approach it in

a singular fashion. For better innovation in research, you need collaboration, equality and diversity. The Human Cell Atlas initiative (<https://www.humancellatlas.org>) provided the precise platform for multi-disciplinary team science to map the 37 trillion cells in the human body by single-cell genomics. A new culture of researchers working together around the world in a complementary fashion and sharing their findings rapidly and openly quickly emerged.

The Human Cell Atlas initiative provided me with the opportunity to decode the human immune system during development, an area that had been a 'black box' hitherto. This research is in partnership with groups at the Wellcome Sanger Institute (the Teichmann, Behjati and Clatworthy groups and others), the Human Developmental Biology Resource (based in Newcastle and London) and collaborators in the UK and worldwide. So far, we have published our findings on the maternal–fetal interface that sustains pregnancies, the development of blood and immune cells in the fetal liver, skin and kidney and the differentiation of T cells in the thymus.

The data are freely available (<https://developmentcellatlas.ncl.ac.uk>). My research group and collaboration network comprise an eclectic and happy mix of researchers with immunology, genomics, computational and software-development expertise. □

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