European Congress of Immunology, Vienna 2015: Home to Mozart & Discovery of the ABO Blood Groups

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Recently, I was awarded the 2015 ANZSBT CSL Behring Overseas Travel Grant to travel to Austria and The Netherlands. From 4th - 9th September, I attended the 4th European Congress of Immunology (ECI) conference in Vienna and then visited two dendritic cell (DC) laboratories in Amsterdam and Nijmegen.

ECI is held triennially, bringing together immunology experts from around the globe and attracting more than 5000 delegates. The scientific program of the congress included a large range of symposia, workshops and poster sessions covering four major tracks: A) adaptive immunity, B) diseases, C) innate immunity and, D) disease interventions. The oral and poster presentations in innate immunity (Track C) were the most relevant to my PhD research and I was very excited to learn more about DC biology. Two oral presentations were of particular interest in the "Antigen Uptake and Presentation" session. Prof. Christian Kurts (Friedrich-Wilhelms-Universität Bonn, Germany) presented on cross presentation and Prof. Yvette von Kooyk (VU University Medical Centre, Amsterdam) discussed antigen presentation via lectins, and both topics are central to my PhD research. An interesting part of this session was the description of murine Red Pulp Macrophages (RPM). While not DC, these cells have a similar phenotype ($CD11c^+$, $CD3^-$, $CD19^-$) and can contaminate DC preparations in methods utilising positive magnetic selection due to the paramagnetic nature of the RPM as a result of iron uptake following phagocytosis of damaged RBC. On the same day, the keynote session was presented by Prof. Luke O'Neil, director of the Trinity Biomedical Sciences Institute at Trinity College Dublin, and pioneer of several major discoveries in the field of toll-like receptors and inflammasomes. His talk was both inspirational and interesting. He provided insight into his early career, described how he became involved in the study of inflammasomes and presented an overview of current inflammasome research.

In addition to the oral presentations, I learnt a great deal from the poster sessions and workshops. During the poster sessions, I was able to meet other PhD students and early career scientists who are researching DC. At the conference, I presented my poster entitled *"Differential modulation of inflammatory mediator production by dendritic cell (DC) subsets in an in-vitro model of red blood cell transfusion"* and I gained a wealth of knowledge and experience through presenting my work and discussing my results with other researchers. My PhD project studies the underlying mechanisms mediating transfusion-related immune modulation (TRIM), with the focus on the function of myeloid DC (mDC) and the mDC subset specialised in cross presentation ($BDCA3^+$ DC). To date, my research has demonstrated that mDC and the specialised $BDCA3^+$ DC subset exhibit a differential profile of cytokine and chemokine modulation following exposure to fresh and stored packed red blood cells. These results provide an insight into mechanism(s) of TRIM and may be useful biomarkers for prediction of poor patient outcomes post-transfusion. In addition, I learnt about a different DC subset which I was not previously aware of, the 6-sulfo LacNAc DC (slanDC). Interestingly, relevant to my study of TRIM, slanDC production of the cytokine IL-12p70 was inhibited by the presence of red blood cells. This suppression was found to be associated with RBC marker CD47 binding to SIRPα on DC. These results suggest CD47 play a central role in altering the chemokine and cytokine production in TRIM.

While at ECI, I also attended an advanced flow cytometry workshop. Flow cytometry is a core methodology employed in immunology and is central to my skill set for studying mechanisms associated with TRIM. During the workshop I learnt a range of new applications and I was particularly interested in Single Cell Imaging. This technique combines principals of flow cytometry and microscopy to capture and record an image of each and every cell.

Aside from the scientific content, there were a number of other conference highlights. Delegates were welcomed at the opening ceremony by the Viennese orchestra performing several classical numbers by composers Schubret, Mozart and Strauss, getting the conference off on a positive note. Also at the congress, there was an historic exhibition highlighting significant outcomes of immunology research in Austria. The most relevant to us at the Blood Service was the display highlighting the discovery of ABO blood groups by Austrian

immunologist Karl Landsteiner. While in Vienna I also took the opportunity to visit two of Vienna's famous attractions the Schönbrunn Palace and Hofburg Imperial Palace.

Following the congress in Vienna, I travelled to The Netherlands to visit the Academic Medical Center (AMC, Department of Experimental Immunology, Host Defense Group) and Radboud University Nijmegen Medical Centre (RUNMC, Department of Tumour Immunology). I found both visits inspirational, and not only did I learn about their DC research, I was able to observe laboratory techniques that I had not previously been exposed to. The Department of Tumour Immunology at RUNMC lead by Prof. dr. Jolanda De Vries published a paper entitled *"The C-type lectin receptor Clec9A mediates antigen uptake and (cross-)presentation by human blood BDCA3$^+$ myeloid dendritic cells"* which is highly relevant and useful to my research. I was able to discuss the challenges I have encountered in preparation and isolation of this rare DC subset, and they were very generous in sharing their knowledge and protocols with me. Currently, I am trailing some of the techniques and procedures that were discussed on my visit and the results look promising!

Overall, attending the conference and visiting the specialised DC laboratories provided an excellent opportunity to share my research with the international immunology community and in return I had obtained valuable feedback and knowledge to help enhance the quality of my PhD research!!

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