JAMES RENNIE BEQUEST

REPORT ON EXPEDITION/PROJECT/CONFERENCE

Expedition/Project/Conference Title: 12th International Congress of Immunology and 4th Annual Conference of FOCIS.....

Travel Dates: July 18-23rd .....

Location: Montreal, Canada.....

Group Member(s): Alison Crawford .....

Aims: To be updated on current research in immunology and present my work in the form of a poster.....

OUTCOME (not less than 300 words):-

The 12th International Congress of Immunology was held in the beautiful city of Montréal, in the French-speaking part of North America. The aim of this conference was to bring delegates up to date on the latest results in immunology, covering all the major themes including immune regulation, immune intervention, host resistance to infection, immunodiagnosis and immunogenetics. Due to the wide range of topics covered, the conference was split into major symposia, mini symposia and workshops. The major symposia were held each morning with a choice of seven different sessions to attend. This gave us a chance to hear about the current research happening in the leading labs in each field. For the mini symposia, we had a choice of between 23 and 25 symposia held each afternoon. Each chair spoke for 20 minutes and the rest of the talks were selected from the abstracts submitted.

Due to the large number of symposia running and the huge number of talks given, I have chosen to focus on just two of the major symposia. The conference got off to a fantastic start with the major symposia entitled “In Vivo Cell Interactions and Trafficking”. **Mehrdad Matloubian** (UCSF, California, USA), a post-doc from Jason Cyster’s lab, gave an account of his recent research on the role of sphingosine-1-phosphate in lymphocyte recirculation. The receptor for SIP, SIP_1, is present on CD4 T cells, CD8 T cells and B cells, and is required for egress from the peripheral lymphoid tissues.

This was followed by **Marc Jenkins** (University of Minnesota, Minneapolis, USA) who showed a simulation of what happens in the first 50 hours after antigen administration. This allowed us to see the recent work completed in his lab in summary form. When he went on to discuss the movement of the T cells throughout the LNs, this was where the controversy began. Marc Jenkins concluded that he believes T cells move by way of a random walk. **Ron Germain** (NIH, Bethesda, USA) followed by discussing his work on DC-T cell interactions. They looked at 6 to 36 hours after transferring bone-marrow derived DCs s.c. and $CD4^+$ T cells i.v., and found that T cells can interact with DCs for 8 hours, and possibly up to 15 hours. Also, he raised an interesting point concerning the speed at which T cells move, a contentious point in the field. He suggested that T cells move

differently depending on the area of the LN that they are in, with T cells moving slower in the capsular region compared to the deeper areas. In addition, he saw some cells moving in a line, and therefore not a random movement, contrasting with Marc Jenkins' views. **Ulrich von Andrian** (Harvard Medical School, Boston, USA) continued the theme by discussing the time after antigen encounter that stable interactions between DCs and T cells occur. Brief encounters are present 2-8 hours after antigen administration, however, stable interactions occur 8-20 hours after Ag stimulation then the cells return to brief encounters for the remaining time examined.

Moving on from the focus of cell to cell interactions in the LN, **Christopher Contag** (Stanford, California, USA) discussed bioluminescent imaging to look at the whole mouse. This technique is being researched for it's therapeutic benefits, for example, measuring tumour growth and tumour burden *in vivo*. **Stephen Cose** (UCONN Health Centre, Connecticut, USA), a post-doc from Leo Lefrancois' lab, finished the session by telling the audience that he has found naïve T cell in peripheral tissues. Many believe that only effectors and effector memory cells are able to enter peripheral tissues. The presence of naïve T cells in peripheral tissues leaves us with interesting questions, such as, can the naïve T cells be activated in the periphery and do these naïve T cells play a role in tolerance induction?

The other major symposia I have chosen to discuss took place on Wednesday morning and was entitled "Immune memory and vaccine development". This was one of the most important sessions for me since my PhD has focussed on activation and memory of $CD4^+$ T cells. I was very impressed to see so many big names in the field of T cell memory giving talks. The session started with **Susan Swain** (Trudeau Institute, USA) discussing the regulation of memory generation using transgenic cells. Effector T cells were purified from either secondary lymphoid organs or the lungs and re-transferred into recipient mice. Effectors from the spleen and LNs only travelled to the spleen and LN of recipient mice whereas effectors from the lung could travel to the spleen and LNs as well as the lung.

This talk was followed by **Benedita Rocha** (INSERM U345, Institut Necker, France) who discussed the use of single cell multi-gene detection in the identification of effector CD8 cells. The Tg CD8s produced TGFβ and TNFα early after activation then expressed granzymes A and B at a later time after antigen exposure. **David Woodland** (Trudeau Institute, USA) discussed memory generation in response to Sendai virus as detected by MHC-I and MHC-II tetramers. By transferring memory cells from recovered mice into the trachea of recipient mice, he showed that these memory cells offered some protection to Sendai virus.

Michael Bevan (Howard Hughes Medical Institue, Seattle, USA) discussed the controversial issue of the requirement of CD4 help for CD8 cells. After being given a low dose of L. monocytogenes, wildtype mice are protected from a lethal dose of the bacteria whereas MHC-$II^{-/-}$ mice, which lack $CD4^+$ T cells are not protected. Importantly, this loss of protection is gradual. Even transferring the memory T cells from MHC-$II^{-/-}$ mice into wt mice didn't rescue the defect. Although other groups believe that the requirement for CD4s is due to an obligation for CD4s during the initial priming phase, Michael Bevan's data suggests a role for CD4s in the maintenance of CD8 memory.

Donna Farber (University of Maryland, Baltimore, USA) continued the memory theme by discussing heterogeneity of memory cells. They generated effectors by stimulating Tg cells for different lengths of time *in vitro* then transferring them into $RAG^{-/-}$ mice. Cells activated for only one day became CD62L low memory cells whereas cells activated for 2 or 3 days

were heterogeneous in CD62L expression. The last talk of the session was by **Barbara Rehermann** (NIH, Bethesda, USA) who spoke about clearance and protection from hepatitis C virus. Using an *in vitro* restimulation protocol, they demonstrated hyporesponsiveness of chronic patients compared to recovered patients.

The conference managed to encompass the whole of immunology in just five days and the mixture of major and mini symposia meant that we could hear talks from lab heads, post-docs and PhD students. I greatly appreciate the financial help the James Rennie Bequest has given me. The conference has been a great benefit to my career since I am coming to the end of my PhD and was able to use this conference to hear fantastic talks and also meet with world-leading immunologists.