N E W S L E T T E R

Australasian Society for Immunology Incorporated

PP 100000910 ISSN 1442-8725 March 2013

Striving Towards Global Health Through Better Vaccines

Michael Good

Institute for Glycomics, Griffith University, Queensland

The Laboratory of Vaccines for the Developing World was established in the Institute for Glycomics at Griffith University's Gold Coast campus in July 2010. The Laboratory comprised some who left QIMR's Molecular Immunology Laboratory and others who joined afresh at the Gold Coast. The new Lab focuses on understanding the immune responses that confer protection against malaria parasites and the bacterium, group A streptococcus (GAS), and then designing novel strategies to develop vaccines. There is thus a strategic immunologic background underpinning translational research. I am delighted to lead such an enthusiastic and hard working bunch of junior and senior scientists. Currently there are 20 individuals in the Lab of whom five are Research Fellows/Post docs, four are Research Assistants and the remainder being Honours and PhD students. Like many labs in Australia, the majority of my lab were born overseas. For many reasons, Australian students are drawn more and more to pursuits other than science, which is a great shame. However, it is a wonderful environment when most of your lab comes from all the corners of the globe.

On left (front to back): Tanya Forbes, Bibiana Rodriguez Guzman, Xue Liu, Chris Davis. Front: Michael Good. On right (back to front): Virginia McPhun, Michael Batzloff, Krystal Lianos, Manisha Pandey. Right: Tania Rivera Hernandez

I became a member of ASI as a PhD student in 1980 when I joined the Nossal Lab at WEHI. Gus has been a great mentor since those times and my many friends at WEHI and elsewhere in Melbourne have contributed greatly to my research ever since. My research branched from immunology to immunoparasitology when I undertook postdoctoral training in malaria immunology at the NIH, then returned to Australia in 1988 to establish the Molecular immunology Lab at QIMR, coming back to my hometown, Brisbane. The focus was initially on malaria but in 1990 the lab broadened to also study the immune response to group A streptococcus (GAS) with a long term goal to develop a vaccine. GAS is the causative agent of rheumatic fever and rheumatic heart disease of which Australia's Indigenous populations suffer the highest disease rates worldwide.

I left QIMR after 22 years in July 2010 when I resigned as Director to take up an Australia Fellowship. QIMR was and is a great Institute, but I always held that the example of my mentor, Gus Nossal, was the right path to follow and that it is usually best for former Directors to leave and work elsewhere. Griffith University has been very welcoming and very supportive and has a wonderful collegial atmosphere and, of

cont.p4

Contents

ASI Inc. COUNCIL

President
Professor Dale Godfrey
Dept Microbiology & Immunology
University of Melbourne
Royal Parade, Parkville Vic 3010
Ph: 61 3 8344 6831
Email: godfrey@unimelb.edu.au

Past President
Dr David Tarlinton
Walter & Eliza Hall Institute of Medical Research
1G Royal Parade, Parkville Vic 3050
Ph: 61 3 9345 2615
Email: tarlinton@wehi.edu.au

Honorary Secretary
Professor Rosemary Ffrench
Burnet Institute
GPO Box 2284
Melbourne Vic 3001
Ph: 61 3 9282 2285
Email: ffrench@burnet.edu.au

Honorary Treasurer
Dr John Stambas
AAHL, CSIRO Deakin Collaborative Lab.
Private Bag 24
Eat Geelong Vic 3220
Ph: 61 3 5227 5740
Email: John.Stambas@deakin.edu.au

State Councillors

New South Wales
Dr Marcel Batten
Ph: 61 2 9295 8412
Email: m.batten@garvan.org.au

Victoria & Tasmania
Dr Stuart Berzins
Ph: 61 3 5320 2039
Email: s.berzins@ballarat.edu.au

Queensland
Dr Ashraful Haque
Ph: 61 7 3362 0414
Email: ashraful.haque@qimr.edu.au

South Australia & Northern Territory
Dr Cara Fraser
Ph: 61 8 8222 3272
Email: Cara.Fraser@health.sa.gov.au

Western Australia
Dr Andrew Currie
Ph: 61 8 9360 7426
Email: A.Currie@murdoch.edu.au

Australian Capital Territory
Dr Anselm Enders
Ph: 61 2 6125 7605
Email: anselm.enders@anu.edu.au

New Zealand
Dr Anne LaFlamme
Ph: 64 4 463 6093
Email: anne.laflamme@vuw.ac.nz

FIMSA Councillor
Professor Alan Baxter
Ph: 61 7 4781 6265
Email: Alan.Baxter@jcu.edu.au

Non-Voting Councillors:

Newsletter Editor
Dr Simon Apte
Ph: 61 7 3362 0380
Email: Simon.Apte@qimr.edu.au

Journal Editor
Dr Gabrielle Belz
Ph: 61 3 9345 2544 Fax: 61 3 9347 0852
Email: belz@wehi.edu.au

Visiting Speakers Co-ordinator
A/Prof J. Alejandro Lopez
Ph: 61 7 3845 3794 Fax: 61 7 3845 3510
Email: alejL@qimr.edu.au

Day of Immunology Co-ordinator
Dr Claerwen Jones
Ph: 61 3 8344 9595 Fax: 61 3 9347 1540
Email: cmj@unimelb.edu.au

Meeting Co-ordinator
Dr Suzanne Heinzel
Ph: 61 3 9345 2609 Fax: 61 3 9347 0852
Email: heinzel@wehi.edu.au

Council Member of IUIS
Dr Franca Ronchese
Ph: 64 4 499 6914 ext 828
Email: fronchese@malaghan.org.nz

Honorary Archivist & Webmaster:
Dr Judith Greer
Ph: 61 7 3346 6018
Email: j.greer@uq.edu.au

Administrative Correspondence
Ms Judi Anderson
ASI Inc. Secretariat
PO Box 7108
Upper Ferntree Gully Vic 3156
Ph: 61 3 9756 0128 Fax: 61 3 9753 6372
Email: asi@21century.com.au

Website

The ASI web site (www.immunology.org.au) has been fully remodelled and updated. New services include:

- Downloadable forms for ASI awards,
- Positions vacant pages,
- Jobs wanted pages,
- Upcoming conferences listings,

as well as a plethora of links to sites of immunological interest at home and abroad. If you'd like your lab home pages linked to the site, would like to advertise a job or conference, or have a favourite immunology-related site that doesn't currently appear on the ASI site, please email Judy Greer at j.greer@uq.edu.au

Email bulletin board

To subscribe to the ASI bulletin board, send an email to majordomo@explode.unsw.edu.au with the message: subscribe anz-imm.

EDITORIAL

Welcome to this bumper edition of the Newsletter. It hasn't been my goal to specifically increase the size of the Newsletter, but I suppose it is the natural effect of trying to tell more of the story of ASI and its members. And with 1000 intelligent and active members, there's lots to tell. It's slightly ironic, however, that as the Newsletter becomes bigger (and better?), it contributes to its potential demise. You should know by now that this is the last fully printed edition of the Newsletter (you can request a hard-copy of future editions btw) as future editions will be in electronic format. Will this be the demise of the Newsletter? – probably not really, but I do believe it will lower the probability that it will be read.

So please enjoy this edition, there are so many great contributions and I really am grateful to those of you who've taken so much effort and time to put together great articles! This is a good time to remind you that we are always willing to accept submissions and there is financial incentive in the form of an annual cash prize for the best article submitted to the Newsletter.

The breadth and depth of ASI continues to amaze me and I am proud to help bring further glimpses of it to you in this edition. It is worth repeating that ASI is only as good as it is because of the incredible work of Council. I can't imagine why the Executive do what they do, but I am very glad they do!

Simon Apte

The 14th Frank & Bobbie Fenner Conference: Perspectives on Immune Recognition

29-30 April 2013

To mark World Immunology Day and as part of the Canberra Centenary Celebrations, The ASI ACT Branch and The John Curtin School of Medical Research, ANU will host the 14th Frank and Bobbie Fenner Conference: Perspectives on Immune Recognition. Commencing on World Day of Immunology, Monday 29 April.

Professor Peter Doherty and Professor Rolf Zinkernagel are the keynotes among a distinguished list of speakers.

For more information:
http://jcsmr.anu.edu.au/perspectives-immune-recognition
Dr Madelaine Nicol
T 02 6125 2577
E madelaine.nicol@anu.edu.au

ASI Secretariat
PO Box 7108,
Upper Ferntree Gully, Vic. 3156
Australia
Tel: +61 3 9756 0128
Fax: +61 3 9753 6372
Email: asi@21century.com.au

Striving Towards Global Health Through Better Vaccines (cont)

course, it is hard to beat the lifestyle of the Gold Coast. Being at a University, I have also found it much easier to attract students and the quality of students at Griffith has been outstanding.

Professor Mark von Itzstein, an internationally acclaimed chemist who led the research group responsible for the discovery of the anti-influenza drug Relenza and who shared the Australia Prize for its discovery, directs the Institute for Glycomics at Griffith. The Institute comprises about 150 individuals within three very modern and well-equipped buildings, with plans for a fourth building currently underway. The multidisciplinary research – including chemistry, computational biology, structural biology, biochemistry, cancer and infectious disease biology – undertaken in the Institute provides many new opportunities for exciting research collaborations. A key objective of the Institute is to deliver translational outcomes; bench to bedside. Across the road is the new Gold Coast University Hospital, which will open later this year. It will be the largest hospital in Queensland. Since coming to the Coast, I have been delighted by the enthusiasm of the Hospital staff to get involved in research and clinical trials. It augurs very well for the future of medical research here at the Coast and in Queensland more generally. The opening of this Hospital will strongly support the key translational objective of the Institute.

Over my time as a researcher, and with support from the CRC for Vaccine Technology, along with grant funding from NHMRC, the National Heart Foundation, The Prince Charles Hospital Foundation, The CRC for Aboriginal Health, Rotarians Against Malaria and the US National Institutes of Health, my lab at QIMR and now at Griffith has established novel strategies underpinning two vaccines which will go into Phase I clinical trials this year – a whole parasite vaccine for malaria and a synthetic peptide vaccine to prevent group A strep infection.

The malaria project in the lab has a major goal of developing a whole parasite vaccine. Unlike vaccine strategies elsewhere which largely focus on sub-unit single antigen approaches, we have found that vaccines based on whole parasites induce an immune response that can protect multiple strains of malaria. This is a major plus for the approach as every malaria parasite is essentially different from every other.

Our GAS vaccine, which is due to be tested in humans in the first quarter of this year, is based on a small synthetic peptide of 12 amino acids found on the M protein of the bacterium near the cell wall. Its structure is critical to its immunogenicity and to maintain this immunogenicity we had to initially devise a technique to maintain the alpha helical folding of this peptide. When that was achieved we simply coupled the peptide to diphtheria toxoid to broaden its immunogenicity and formulated it with Alum. The resultant vaccine can protect mice from every strain of GAS that we have tested and can protect them from bacteria delivered into the throat, the skin or intraperitoneally.

Translational research is exciting, expensive, important but unpredictable. The CRC experience taught me that, as research scientists, we have to always have our eyes open to the possibility that our basic and strategic research might have an important application. Our recent observation that a class of drugs could chemically attenuate blood stages of *Plasmodium* which could then induce immunity was neither planned nor expected and can be traced to a conversation with a friend and colleague, Terry Spithill, regarding the ability of those drugs to attenuate the sporozoite stage of *Plasmodium*. Taking that concept to a Phase I clinical trial is costing approximately $2M, half of which has been contributed by philanthropy. Similarly, serendipity played a major part in our identification of the synthetic peptide-protein conjugate vaccine for GAS, J8-DT. In my experience traveling around Australia and discussing research I have met so many people with great ideas but who lack the funding to test and develop them. It is a great shame that there are not more funds available for this. Australia is not doing itself any favours by not significantly increasing the budget for NHMRC.

While translational research can be exciting and adrenaline-pumping, basic research which underpins it all can be just joyous. Dissecting the role of memory *vs* naïve T cells in boosting a memory B cell response to GAS, for example, can give you enormous satisfaction as another little bit of nature is revealed to you and another small building block is laid in our understanding of the universe. Another example from our Lab is the observation that extremely low doses of attenuated malaria parasites can induce profound immunity whereas a large uncontrolled infection leads to apoptosis of the T cell response that was trying to kill the parasites. This basic observation ultimately led us to our vaccine strategy. Studying immune evasion has been a major and very enjoyable focus of my Lab's research for many years.

I feel very blessed to have a career in scientific research. My staff and students have been inspirational and I have benefitted greatly from some wonderful mentors. As a group, we have benefited enormously from the NHMRC and other funding bodies referred to above and I have been honoured to have had the opportunity to Chair the NHMRC for six years. While it certainly deserves more funding, it and its staff and volunteers who undertake the peer review processes are doing a magnificent job.

Finally, before some of my research staff introduce themselves, let me say that it is a very exciting time to be in the LVDW!

Danielle Stanisic, Research Fellow

My introduction to malaria research was in the form of a 3rd year undergraduate research project in Michael's lab at QIMR which was followed soon after by a PhD. Following this, I spent time at NYU, the Papua New Guinea Institute of Medical Research and WEHI. My time in PNG was an amazing experience in which I was fortunate to be involved in a number of immunoepidemiological studies examining different aspects of human immunity to malaria.

I have since returned to Michael's lab as a Research Fellow where I am involved in setting up the GMP/GCP framework and key reagents for the human clinical trials for the attenuated malaria vaccine. 2013 will be an exciting year in which we will

be undertaking a first-in-man infectivity study with a cultured malaria cell bank and examining the safety and immunogenicity of the attenuated malaria vaccine in malaria naïve volunteers in collaboration with the Gold Coast Hospital. I also have a great interest in pregnancy/neonatal immunology and we are using rodent pregnancy models of malaria to examine the effect of maternal malaria-specific immunity on the efficacy of the attenuated malaria vaccine in neonatal mice.

Manisha Pandey, Research Fellow

I completed a Master's degree in Biotechnology from Griffith University. My research career started with a PhD at the Central Drug Research Institute in India on investigation of excretory-secretory products of filarial parasite as a potential vaccine candidate for human filariasis. The studies resulted in identification of two potential vaccine candidates that are being explored further. Pursuing my research interest in vaccine development, I then joined Michael's laboratory at QIMR in Brisbane where the studies on a vaccine candidate for group A streptococcal (GAS) infections were well underway. The main focus of my research project was to investigate the protection mechanisms, including memory responses, employed by the most advanced vaccine candidate, J8-DT/alum. These preclinical studies have helped us to understand the immune correlates of vaccine-mediated protection against GAS infection. I then moved to Griffith University with Michael in 2011 and expanded my research area into development of animal models to study skin infection caused by GAS and also to use them as a tool to test the efficacy of the vaccine candidate that we have developed. I have also developed interest in understanding the roles of various effector cells in natural and vaccine mediated immunity against GAS. Immune correlates of tissue-tropism of GAS and its implications for post streptococcal squeal of rheumatic fever/rheumatic heart disease is also an area of my current interest. With the upcoming human vaccine trials I am very excited to see these preclinical studies being translated to the real human situation.

Jennifer Reiman, Research Fellow

After growing up on a hog farm in rural Princeton, Minnesota , USA, I completed my undergraduate degree at the College of St Catherine in St Paul, Minnesota, and PhD in Immunology at the Mayo Clinic in Rochester, Minnesota. During my PhD,

under the mentorship of Keith Knutson, I studied immunoediting and immune-tumour interactions in a mouse model of breast cancer relapse. Though fascinating research, I became interested in applying my immunology training to malaria and malaria vaccine research. After deciding to switch fields to malaria and meeting with a variety of malaria researchers, I decided to join Michael's group at Griffith University's Institute for Glycomics on the Gold Coast. Prior to moving to Australia in September 2010, I had lived my entire life in the "frozen North" of Minnesota with snowy and cold winters where temperatures can get to -20°C or colder and where there is a week or more in late January where the high temperature doesn't reach O°C. The move to "tropical" SE Queensland has been quite the change in climate and geography.

My research interests are in blood stage malaria vaccines and understanding the immune response to laboratory developed vaccines as well as infection and drug cure regimens utilising mouse models. I am currently investigating peripheral blood correlates of protection via longitudinal monitoring of antigen experienced and memory T cells using multi-parameter flow cytometry. Additionally, in collaboration with Griffith University researchers at Eskitis, I have developed a high throughput-screening assay to identify novel vaccine adjuvants that activate murine DCs to produce IL-12. So far I have screened over 20,000 fractions from the natural product library, Nature Bank, and have some very promising fractions that I am currently investigating.

Michael Batzloff, Research Faculty

I'm a Research Leader and Laboratory Manager for the new Laboratory (Vaccines for the Developing World) at the Institute for Glycomics at Griffith University. I have had a long association with the Laboratory Head, Professor Michael Good. This association dates back to 1998 when I joined his laboratory then located at the Queensland Institute of Medical Research. I had a passion for bacterial pathogenesis originating from my PhD. I have developed and focused this interest and ultimately my research career on vaccine development for bacterial pathogens and in particular groups A streptococcus. The laboratory and its team members provide an excellent work environment and Michael's positive attitude provides additional motivation in a career like most that has its highs and lows.

Silvana Sekuloski, Regulatory Affairs Project Management

I have been part of Michael's group since 2005. My involvement included project management of the group A streptococcus vaccine project, designing strategies for vaccine product development and manufacture, preparing budget, and project timelines. I have also been actively involved in development of three pre-IND packages that were submitted and reviewed by FDA. When the project core activities moved to Griffith University, I was given the challenge and a great responsibility to set up a GMP facility for manufacture of investigational products, as well as to provide a regulatory support in the development and manufacture of novel malaria vaccine.

I have also played a major role in development of the protocols for pre-clinical and clinical evaluation of the group A streptococcus vaccine candidate MJ8VAX, including Toxicity studies, preparing the Clinical study protocol and Investigational Brochure as well as preparation and submission of all documents required for ethics review. Initiation of the phase I clinical trial of the

strep vaccine candidate (MJ8VAX) this year is a very exciting milestone. It has been a privilege to be a part of this exciting project that has great potential for the future.

Tanya Forbes, Quality Manager
I completed a Bachelor of Science at the University of NSW with a double major in Chemistry. I then completed a Graduate Diploma in Education and had a very rewarding career as a Secondary Science teacher for eight years. I was then appointed as Quality Assurance Officer at Centre for Studies in Drug Disposition (now known as QPharm) where I had experience in GLP and GCP for early phase clinical trials. I am now extending my knowledge into GMP as the Quality Manager for the Laboratory of Vaccines for the Developing World at the Institute for Glycomics. I immensely enjoy working with a very dedicated and cohesive research team.

Chris Davis, Project Manager – Malaria vaccine
After completing a PhD in Medicinal Chemistry at Griffith University I began working for Gold Coast start-up company Glykoz Pty Ltd developing broad-spectrum antibacterial agents. Pursuing my passion for commercialisation I later joined the Technology Commercialisation division of Uniquest Pty Ltd. As Manager of Innovation and Commercial Development for Biological and Chemical Sciences at Uniquest and the University of Queensland, I was responsible for packaging and pitching technologies for out-licensing and venture capital investment.

In 2009 I returned to Griffith University to take the position of General and Business Manager at the Institute for Glycomics. This role incorporates all aspects of business development and commercialization, and also the strategic development of the Institute through both the Institute's Executive Group and the Institute's Board of Advice.

In late 2011 I began working 50% time as project manager for Michael's malaria vaccine program, while maintaining a 50% position as General and Business Manager of the Institute. Project management of the preclinical and clinical development of Michael's vaccine candidate is a truly exciting role. The role incorporates management of the program's various commercial aspects including for example technology in-licensing and investor engagement, together with building and managing clinical trial joint capabilities between Griffith University, Queensland Health and local clinical service providers.

ASI is now on Facebook and Twitter

For up-to-date information on all things ASI, including conferences, travel scholarships, prizes, visiting speakers and general immunology news.

To celebrate the unveiling of the new twitter and facebook accounts, ASI will be giving away a prize to one of its lucky members: a special autographed copy of Peter Doherty's latest book "Sentinel Chickens – what birds tell us about our health and the world". Stay tuned on twitter or facebook for details – prize awarded on 15th April. Sign up to ASI on twitter and/or facebook to be a contender.

Follow at:
https://twitter.com/ASImmunology
https://www.facebook.com/ASImmunology
And for even more immunology news,
https://twitter.com/DayofImmunology

Accounts managed by ASI member, Gabriela Khoury

President's Column

It doesn't seem that long ago to me that I attended my first ASI conference, in Canberra 1987, as a PhD student. I can say with certainty that it never occurred to me then that I would ultimately have the honour of being President of this Society. At that particular time I was too worried about presenting my 7-minute workshop presentation on the ontogeny of thymic stromal cells (which went overtime and resulted in an intervention by the chair of the next session). The Society has continued to grow and flourish in the years between then and now, much credit to the time and effort put in by the Councils, Executive Committees and Presidents that have spanned the years between. I have noticed that much of what is achieved is part of a continuum where one President/Executive/Council builds on the good work and new initiatives that came before them. I hope that I will be able to continue with this good tradition, at the very least, I will do my best not to mess it up!

I will begin by introducing myself with a brief background. I was awarded a PhD from Monash University in 1990, having worked on thymic stromal cells under the supervision of Richard Boyd. I then travelled to the US where I worked in two postdoctoral appointments, the first at Hoffmann-La Roche in New Jersey, the second at DNAX Research Institute, in California. In both positions, I studied early T cell development in the thymus. I returned to Australia in 1994 to a postdoc position at Centenary Institute in Sydney, working with an ASI Past President, Roland Scollay, where I was focussed on NKT cells. I moved from Centenary Institute in 1997 to Monash University, and from Monash to Melbourne University in 2003 where I am now. My interests have remained primarily on the NKT cell work, but with increasing interest in other innate-like T cells such as γδ T cells, CD1a, b and c restricted T cells, and MAIT cells.

I have always been a keen participant in the activities of ASI as I think it is a terrific society with a great history and provides a very important service (and opportunities) to its members. For this reason, I have tried to contribute to the way the Society runs, and have been involved in ASI at state or national council level in one way or another since I returned to Australia. I was NSW State Councillor and then committee member from 1995-1997. In 1998, after returning to Melbourne, I joined the Vic branch committee (IgV), and became IgV Vice President (2000-03), then IgV President (2004-06). I remained on the IgV committee until I was voted in as ASI Vice President in 2011 and now, here I am as ASI President (2013-14).

I would like to talk about some of the important contributions made by the immediate Past President, David Tarlinton. In the last two years under David's leadership, ASI has acquired ownership of a second journal (*Clinical and Translational Immunology*) – a spin off of *Immunology and Cell Biology*. This is an online only, open access journal that is managed by the Nature Publishing Group and edited by Gabrielle Belz. We hope that this will nicely complement ICB and represent another valuable string to the Society's bow. David also recognised the importance of ASI developing its online presence and one of the areas that he has been very busy with is the commissioning of a new web host for the ASI website and membership database. This has been a critical step towards us having a much more interactive website that will greatly facilitate communication with the membership including, for example, online membership renewals, meeting registration and credit card payment facilities, Society news and possibly sponsorship opportunities. Another of David's initiatives associated with this venture will be the appointment of a part time 'Development Officer' to our increased online presence with regular updates and enhancements, as well as to provide general support for the interactions and communication between Council and the membership. As keen and enthusiastic as ASI Exec/Council might be to drive things along, we all have many demands on our time so this new appointment should help immensely in making our vision for the Society a reality.

A very exciting event on the horizon for ASI is the upcoming International Congress of Immunologists, Melbourne, 2016. This has been a long time in the planning, with Melbourne winning the bid in 2010 while ASI was under the presidency of Miles Davenport. Even back then, the success of this bid was the result of much work was initiated under the 2007-08 presidency of Alan Baxter. Much of the credit for the success of this bid is due to Jose Villadangos who had worked extremely hard leading up to that bid, in conjunction with the ICI2016 local organising committee and ASI Councillors. Hosting the ICI meeting is a very big deal for ASI as it is a great opportunity for us to promote the Society and Australasian Immunology to the world. We all hope that this will be as successful as the Sydney 2000 Olympic Games, and over the past two years David has worked with Jose and the LOC with this goal in mind. So far all is on track and we hope this will ultimately be a great highlight in the history of the Society.

Lastly, I must say that my experience thus far as Vice-President and now as the new President has been streamlined by David's easy going and good-natured approach. He has been generous with his time, showing me the ropes of how to do this job, ensuring as smooth a transition as possible. Indeed, I continue to rely on his advice and suggestions, with frequent telephone calls, emails and meetings. He continues to happily provide advice, along with the famous Tarlinton one-liners that put all the crises back into perspective, but I expect he is looking forward to the end of 2013 when he can hang up his Past President hat and get some peace and quiet.

What lies ahead for ASI and what can I do, working with executive (David Tarlinton – Past President, Rose Ffrench – Secretary and John Stambas – Treasurer) and Council, to enhance the experience and benefits for members of the Society? Working in the continuum mentioned earlier, there are

plenty of exciting things in development that I am doing my best to push ahead with. The most important next big step is to make the new website a reality. We are currently assessing quotes for this and our goal is to have it live by mid-year. I am proud to say that my first new initiatives went live in the last month – ASI now has both twitter and facebook accounts https://twitter.com/ASImmunology and https://www.facebook.com/ASImmunology. These are managed by one of our members, Gabriela Khoury, who has previously been doing a great job managing the Day of Immunology twitter account https://twitter.com/DayofImmunology for the last couple of years. These sites will help ASI convey up-to-date news, funding opportunities, meeting announcements and important reminders to the membership and anybody interested in the field of immunology. Based on the twitter followers so far, I think this will also help ASI reach out to the broader community including people from other disciplines, and even members of the general public where there is great interest in the field of Immunology. This will ultimately represent one arm of the enhanced online presence that we are working towards this year.

I am very keen to explore new ways in which the Society can use its funds to benefit its members. In this regard, travel awards always come to mind, and indeed, we have several different travel award schemes already, including 15 new awards to support postgrads and postdocs to attend ICI 2013 in Milan. As travel support is increasingly hard to come by, I see ASI as having a major role in supporting its members to attend local, national and international conferences. That said, it is sometimes surprising how few applications we receive for these awards and I hope that the enhanced online communication will help with this with greater visibility and more reminders. However, directing more funds to more travel awards may not be what is most needed. With this in mind, I will be contacting the membership shortly with a survey in order to seek feedback on what is important to you, what are the activities and initiatives that you would like to see introduced, and what you want from the annual scientific meetings. Please stay tuned and please contribute. It is my hope that in two years' time, we will all be benefitting from my small contribution to the continuum that propels ASI onward and upward, and that the next president will be writing to you about progressing some of my initiatives and developing their own, and so on and so on.

Dale Godfrey

Past President David Tarlinton (left) is presented with the traditional pewter mug from the new President, Dale Godfrey.

ICB Online Manuscript Submission

Online manuscript submission for Immunology and Cell Biology now available via:
http://mc.manuscriptcentral.com/icb

All manuscript submissions to ICB should in future be made online via this web site to speed up the reviewing and acceptance of manuscripts.

Gabrielle Belz, Editor-in-Chief
Immunology and Cell Biology

Sustaining Membership

ASI Inc acknowledges the support of the following sustaining member:

• Jomar Bioscience

HONORARY SECRETARY'S NEWS

Incoming Council members

A/Prof Dale Godfrey took over as ASI President as of the AGM in December, and A/Prof David Tarlinton became Past President. Dr John Stambas is now ASI Treasurer, taking over from Dr Pablo Silveira. New State/regional Councillors include Dr Cara Fraser from SA/NT, Dr Anselm Enders from ACT and Dr Andrew Currie from WA. Welcome also to Prof Alan Baxter who is now the FIMSA representative, Dr Claerwen Jones as the National Day of Immunology Co-ordinator, and Dr Su Heinzel as Meeting Co-ordinator. As you can see we have a strong and dedicated team working for ASI on council (see photo below).

Professor Phil Hodgkin giving the Burnet Oration

ASI symposium at AAI meeting in Hawaii, May 2013

Five outstanding early to mid career immunology researchers have been selected to represent ASI at a special symposium at the Centenary meeting of the American Association for Immunology in Hawaii in May 2013. These include Dr Scott Mueller, University of Melbourne; Dr Kim Good-Jacobsen, WEHI; Dr Jonathan Coquet, Flanders Institute, Belgium; Dr Susan Johnson, University of Geneva, Switzerland; and Dr Stephanie Gras, Monash University. The session will be chaired by Dr John Stambas, Deakin University and Dr Meredith O'Keeffe, Burnet Institute. If you are planning to attend the AAI conference please go along to the ASI symposium and support your fellow researchers.

ASI 2012 conference in Melbourne, 2-6 December

The ASI conference in Melbourne was a great success, attracting a whopping 790 participants, and with a record 590 abstracts. The quality of the local and international presentations was excellent, and sincere thanks must go to Prof Steve Turner of the University of Melbourne who chaired the scientific programming committee for the outstanding program. The conference venue, the new Melbourne Convention and Exhibition Centre, was also excellent for a meeting of this size. The delegates also told me how much they enjoyed the social events, particularly the student dinner organised by student reps Julia Marchingo and Maria Demaria and their committee, and also the main conference dinner at the MCG, which attracted over 350 attendees. Thanks also to Dr Meredith O'Keeffe and Ben Fancke of the Burnet Institute for help with organising the conference dinner, theming and music.

The large number of abstracts at the conference led to higher numbers of concurrent sessions, and also the introduction of the mini-oral poster presentations which worked well, giving more of our postgraduate students and early career researchers an opportunity for an oral presentation. Thanks also to Dr Daniel Layton of Monash University for organising the ASI smart phone app to view the abstracts, program and conference news. For many, the highlight of the meeting was the outstanding Burnet Oration given by Prof Phil Hodgkin, an inspiring overview of a life in immunological research.

Rose Ffrench

L to R: Cara Fraser (incoming SA/NT Councillor), Alejandro Lopez (VSP Co-ordinator), Claerwen Jones (Day of Immunology Co-ordinator), Marcel Batten (NSW Councillor), Stuart Berzins (Vic/Tas Councillor), Pablo Silveira (outgoing Treasurer), David Tarlinton (Past President), Dale Godfrey (incoming President), Rose Ffrench (Honorary Secretary), Anne La Flamme (NZ Councillor), Michele Grimbaldeston (outgoing SA/NT Councillor), Ash Haque (Qld Councillor)

ASI ANNUAL GENERAL MEETING MINUTES

Date: Tuesday 4th December 2012
Time: 12.45 to 2pm
Location: Melbourne Convention and Exhibition Centre

1. WELCOME AND APOLOGIES

Apologies: Graham Mitchell, Stephen Daley, Alec Redwood

2. CONFIRMATION OF MINUTES AGM 2011

Resolution: That the AGM approves as correct the Minutes of the 2011 Annual General Meeting on 13th December 2011 in Adelaide, published in the March 2012 ASI Newsletter.
Moved Susanne Heinzel, seconded Andrew Lew. *All in favour, resolution carried.*

3. RECEIPT AND APPROVAL OF REPORT FROM COUNCIL

President's Report

David Tarlinton reported that ASI had another excellent year. He thanked the outgoing Council members, in particular Pablo Silveira who was finishing his term as Treasurer. He presented Pablo with an engraved pen as a token of thanks from ASI and Council. DT gave an overview of some of the issues discussed at the recent annual Council meeting, including preparation for the ICI 2016, with Council voting to sign a contract with Arinex as PCO. Jose Villadangos, as ICI convenor, has a voting position on ASI Council until the AGM in 2016. DT also reported on changes to the Victorian State Government Incorporations Act, which will require ASI to amend its rules to incorporate the position of Secretary. This may require changes to be approved at a special general meeting. He reported that the changes would result in lessening of the rules of reporting in regards to finances, in that we will no longer be required to be audited but that Council may still choose to do so.

DT also reported on the imminent launch of the ASI/NPG journal *Clinical and Translational Immunology*, an open access journal, which will include a revenue split for ASI similar to that for ICB.

DT updated the members on the progress of the contract with Mooball to move the membership database to a web-based format. He discussed holding a poll of members re the structure of the scientific meeting, and the range and scope of prizes and awards from ASI. DT outlined that the newsletter was going to an electronic form in 2013 unless members specifically opted in to continue to receive a printed version.

DT also discussed paying for the cost of Councillors to attend the annual Council meeting, including approval for spending up to $150 for the cost of an additional night's accommodation if that is required.

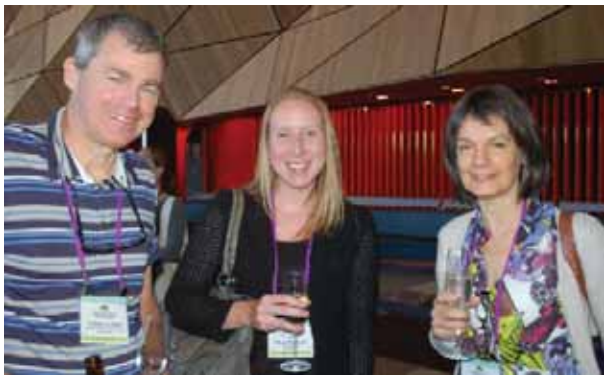
DT also discussed the approval by Council of the appointment of a Development Officer, due to the large workload required, particularly for the Secretary and Treasurer in running such a large society. He discussed the proposal to employ someone to look after the website, the transfer of information into the web-based database, co-ordinating branch activities and general communication with members. Andrew Lew asked if this was to be in addition to the current Secretariat position? DT expected that workload for the Secretariat would fall with the changes to the database, with total number of hours paid to Judi Anderson declining over the next years. The finances were in a very healthy state, so he proposed a 20-25% position with a one year contract. Andrew Lew asked how this would be assessed to determine if it was a success (KPIs?). Mark Chong expressed that 20% was not enough time to achieve anything and noted that other societies, e.g. BSI, had a full time secretariat. Alan Baxter and others supported increasing the time commitment to at least two days per week. Rose Ffrench noted that the Council had approved up to 0.4FTE.

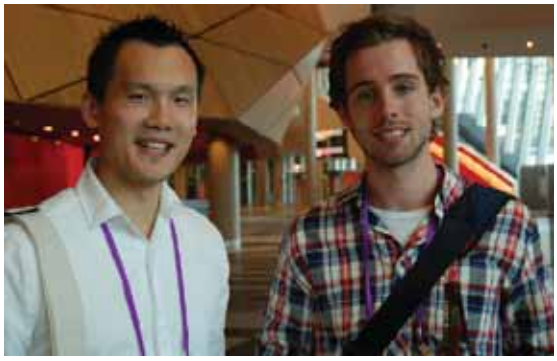
***Motion**:* That ASI employ a 'Development Officer' at up to 2 days per week for one year. Moved David Tarlinton, seconded Steve Turner, all in favour. *Motion carried.*

Senga Whittingham commented that she was very appreciative of receiving a complimentary copy of ICB and newsletter and being able to come to the conference.

Secretary's Report

Rose Ffrench presented an update on the members of ASI Council (see tables below), thanking outgoing members Pablo Silveira, Stephen Daley, Michele Grimbaldeston and Alec Redwood for their service to Council, and welcoming new members





John Stambas, Cara Fraser, Anselm Enders and Andrew Currie. Dale Godfrey takes over as President as of the end of the AGM from David Tarlinton.

Change in composition of Council

	Position	Outgoing	Incoming
Voting Council	Past President		David Tarlinton
	President	David Tarlinton	Dale Godfrey
	Treasurer	Pablo Silveira	John Stambas
	ACT Councillor	Stephen Daley	Anselm Enders
	SA/NT councillor	Michele Grimbaldeston	Cara Fraser
	WA Councillor	Alec Redwood	Andrew Currie
Non-voting council			
	FIMSA Councillor	Guna Karupiah	Alan Baxter
	Meeting Co-ordinator	Bernadette Saunders	Susanne Heinzel
	DOI Co-ordinator	Delia Nelson	Claerwen Jones

Composition of Council in 2013

	Position	
Executive	President	Dale Godfrey
	Past President	David Tarlinton
	Secretary	Rosemary Ffrench
	Treasurer	John Stambas
Voting Council	NSW Councillor	Marcel Batten
	SA/NT Councillor	Cara Fraser
	Qld Councillor	Ashraful Haque
	Vic/Tas Councillor	Stuart Berzins
	ACT Councillor	Anselm Enders
	NZ Councillor	Anne La Flamme
	WA Councillor	Andrew Currie
Non-voting council	Newsletter Editor	Simon Apte
	IUIS Representative	TBA
	ICB Editor in Chief	Gabrielle Belz
	FIMSA Representatives	Guna Karupiah/Alan Baxter
	Invited Speaker Program	Jose Alejandro Lopez
	Meeting Co-ordinator	Susanne Heinzel
	DoI Co-ordinator	Claerwen Jones
	Honorary Archivist and Webmaster	Judith Greer
	ICI2016 Rep	Jose Villadangos
	Student representatives	Julia Marchingo/ Maria Demari

RF also gave an update on membership, which again sits above 1000 (see breakdown in table next page).

2012
42ND ANNUAL SCIENTIFIC MEETING OF THE
AUSTRALASIAN SOCIETY
FOR IMMUNOLOGY

2012 FINANCIAL MEMBERS - at 16/11/12

	Full	Stud	Ret	Sust	Hon	Comp	Int Full	Int Stud	TOTAL
ACT	25	24	3	-	1	5	1	2	61
NSW	110	59	7	-	2	10	-	1	189
QLD	85	54	-	-	-	11	1	-	151
SA/NT	40	17	-	1	2	7	2	18	87
TAS	7	3	1	-	-	1	-	-	12
VIC	240	96	3	-	7	11	9	9	375
WA	42	9	1	-	2	4	1	1	60
NZ	54	43	-	-	1	5	-	1	104
USA	8	2	-	-	-	-	-	-	10
UK	7	2	-	-	-	1	-	-	10
SWITZ	3	-	-	-	1	-	-	-	4
H/KONG	3	-	-	-	-	-	-	-	3
N'LANDS	-	-	-	-	-	-	-	1	1
PNG	-	-	-	-	-	1	-	-	1
GERMANY	3		-	-	-	-		-	3
SINGAPOR E	4	3	-	-	-	-	-	-	7
THAILAND	1	-	-	-	-	-	-	-	1
JAPAN	1	-	-	-	-	-	-	-	1
KOREA	-	-	-	-	-	-	1	-	1
IRAN	1	-	-	-	-	-	-	-	1
FRANCE	2	-	-	-	-	-	-	-	2
BELGIUM	1	-	-	-	-	-	-	-	1
MALAYSIA	1	-	-	-	-	-	-	-	1
SWEDEN	1	-	-	-	-	-	-	-	1
S/ARABIA	1	-	-	-	-	-	-	-	1

2012: 1016 FINANCIAL MEMBERS
HON/COMP: 72 MEMBERS
TOTAL: 1088 MEMBERS

Awards / Honours

Honorary Life Member

Prof Geoff Shellam was awarded Honorary Life Membership of ASI in 2012 for his outstanding contribution to Australian Immunology and ASI, and a special presentation will be made in the closing ceremony.

ASI Jacques Miller Senior Travel Award

Not awarded in 2012

ASI Gordon Ada Senior Travel Award (CDA level)

Dr Kate Schroder, QIMR
Dr John Stambas, Deakin University/AAHL

International Travel Awards (Oct round)

Postgraduate Students

Mr Owen Siggs (University of Oxford); IgN Winter School, Singapore
Mr Mehmet Yabas (ANU); Keystone Symposia “B cell Development and Function”, Colorado, USA
Ms Erika Duan (Monash University); American Association of Immunology Centennial meeting, Honolulu, USA
Ms Connie Duong (Peter Mac); Keystone Symposium: Cancer Immunology and Immunotherapy, Vancouver, Canada

Post-doctoral scientists

Dr Stephen Mattarollo (University of Queensland); Keystone Symposium: Cancer Immunology and Immunotherapy, Vancouver, Canada
Dr Jason Waithman (Telethon Institute for Child Health/UWA); Keystone Symposium: Understanding Dendritic Cell Biology to Advance Disease Therapies, Colorado


GENESEARCH


RESOLVINGIMA

Bursaries to attend ASI 2012

Dino Tan (UWA)

Malcolm Starkey (Newcastle University)

Dr Sumaira Hasnain (Mater Institute)

Dr Alison Carey (Griffith University)

Michelle Vo (Centenary Institute)

Alvin Pratama (ANU)

Md Ashik Ullah (University of Sydney)

Sally Mujaj (QIMR)

Zahra Sabouri (ANU)

Brooke Dobson (University of Otago, NZ)

James Q. Wang (ANU)

Roy Ramiscal (ANU)

Fatima El-Assaad (University of Sydney)

Dr Meru Sheel (QIMR)

Cameron S Field (Malaghan Institute, NZ)

Tessa Gargett (University of Adelaide)

Megan Ives (Garvan Institute)

Aline Nocon (University of Sydney)

Michael Wong (ANU)

Dr Pallave Dasari (University of Adelaide)

Jason Lynch (University of Queensland)

Laura Cook (UNSW)

Roland Ruscher (University of Queensland)

Connor O'Meara (QUT)

Resolution: That the AGM approves the 2012 reports from Council.
Moved Andrew Lew, seconded Alan Baxter. *All in favour, resolution carried.*

4. RECEIPT AND APPROVAL OF FINANCIAL STATEMENTS

Treasurer's Report

Pablo Silveira presented the audited financial statements for ASI 2012 (copied below). There was an increase in total assets due to increases in conference income, predominantly from state branch meetings and sponsorship. He noted the Society has achieved approx $57K profit in 2012. Conference income had increased $8K, membership income approx $26K, ICB royalties $19K and branch sponsorship approx $14K. Changes in expenses included a $21K increase in visiting speaker costs, usually because of a visit postponed from the previous year. Other expenses included the FIMSA training course. Travel awards amounted to nearly $66,000, about 25% of total expenses. Andrew Lew commented that the VSP is preferred to the ITA as all members benefitted. Jose Villadangos asked about seed money for local meetings. DT endorsed the VSP and said it could be expanded. Total cash on hand $770,558. PS also presented the projected budget for 2013 which included additional costs for the website development and ASI smart phone app. There was allowance for $30K for additional travel awards for ICI 2013 in Milan. PS thanked Council for the opportunity to be Treasurer and said he had learned a lot from the experience, and encouraged other members to get involved in Council.

PROFIT AND LOSS STATEMENT

INCOME	2012	2011	2010
Conference Income	59,603	51,413	55,580
ICB Royalties	93,761	74,328	77,579
Investment & Savings Interest	19,945	20,175	13,992
Memberships	109,516	82,985	101,052
Newsletter Advertising	1,404	1,020	2,252
Seed Loan Repayments	0	20,000	0
Sponsorship (Branches)	35,501	21,530	3,636
Other Branch Income	1,693	0	82
TOTAL INCOME	321,523	272,251	254,153

EXPENSES			
Accounting	3431	4900	10030
Bookkeeping	1707	1492.53	1070
Bank Fees & Charges	4,531	3,929	4,475
Branch Conference	73,668	42,948	22,486
Burnet Oration/Speakers Dinner	7284.95*	12,670	8,482
Bursary Awards	21,959	19,270	24,111
Conference & Travel Support	11,747	11,521	3,969
Corporate Affairs	176	40	111
Council Meetings	5,511	3,173	8,701
Day of Immunology	1,024	3,720	1,894
Exchange Rate Difference	213	761	156
FIMSA Training Course Awards	8,168	0	17,710
ICB Subscriptions	-275	1,313	7,113
ICI 2015	0	1,417	4,071
Legal Fees	0	2,058	0
Medallions/Gifts	51	412	2,144
Meeting Seed Loans	0	0	4,000
Newsletter Prize	200	0	200
Postage	8,600	7,388	10,045
Printing and Stationary	19,286	20,424	10,850
Publication of the Year	1,000	0	1,000
Society Memberships	4,663	9,023	9,406
Secretariat	24,306	20,105	22,222
Student Prizes	3,194	2,415	6,563
Travel Awards	35,674	43,650	37,538
Website	1,030	0	0
Visiting Speakers Program	33,561	12,044	25,431
Young Investigator Award	1,000	1,000	1,000
TOTAL EXPENSES	264,526	225,774	244,758
PROFIT/(LOSS)	56,997	46,477	9,395

*Subtracted from conference income by auditors

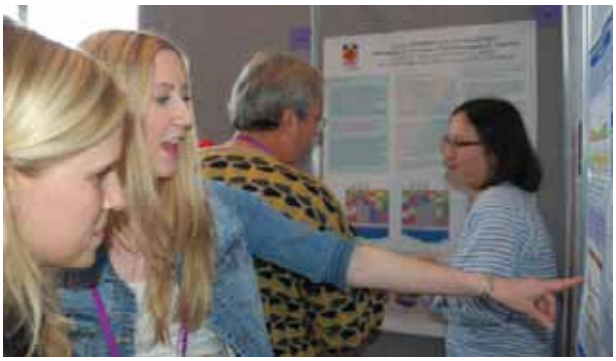
BUDGET 2012-2013

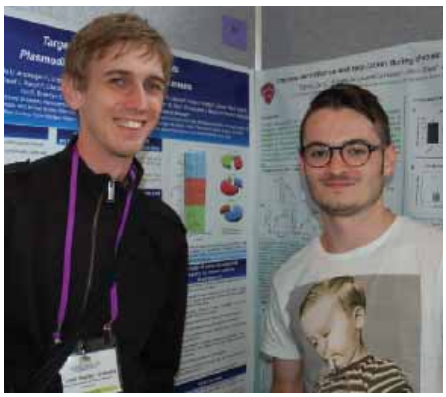
		Spending Aug to Oct 2012	2012-2013 Budget	2011-2012
INCOME				
	Conference Income	14,388	60,000	61,925
	ICB Royalties	17,622	94,000	93,761
	Investment & Savings Interest	683	20,000	20,083
	Memberships	9,400	110,000	109,616
	Newsletter Advertising	546	1,400	1,404
	Sponsorship (Branch)	5,371	35,000	35,501
	Other Branch Income	0	1,700	1,693
	TOTAL INCOME	**48,010**	**322,100**	**323,983**
EXPENSES				
	Accounting	0	5,000	3431
	Bookeeping	743	1,800	1707
	Bank Fees & Charges	611	4,700	4,631
	Branch Conference	18,669	75,000	73,668
	Burnet Orator/Speakers Dinner	0	5,000	7284.95*
	Bursary Awards	18,990	22,000	21,959
	Conference and Travel Support	4,100	12,000	11,747
	Corporate Affairs	0	180	176
	Council Meetings	1,084	6,000	5,511
	Day of Immunology	0	7,000	1,024
	Exchange Rate Difference	0	250	213
	FIMSA Training Course	0	0	8,168
	ICB Subscriptions	0	1,000	-275
	ICI 2016	0	0	0
	Legal Fees	0	2,000	0
	Medallions/Gifts	95	1,000	51
	Meeting Seed Loans	8,238	20,000	0
	Newsletter Prize	0	200	200
	Postage	3,094	8,600	8,600
	Printing and Stationary	6,105	200	19,286
	Publication of the Year	0	1,000	1,000
	Society Memberships	1,544	4,700	4,663
	Secretariat	7,521	25,000	24,306
	Student Prizes	2,390	3,200	3,194
	Travel Awards	11,001	65,000	35,674
	Website	0	15,000	1,030
	Visiting Speakers Program	8,242	30,000	33,561
	Young Investigator Award	0	1,000	1,000
	TOTAL EXPENSES	**92,425**	**316,830**	**264,526**
	PROFIT/(LOSS)	**(44,415)**	**5,270**	**59,457**

*Has yet to be incorporated to P + L by auditors

Resolution: That the AGM approves the Financial Statement of the 2012 financial year. Moved David Tarlinton, seconded Susanne Heinzel. *All in favour, resolution carried.*

2012
42ND ANNUAL SCIENTIFIC MEETING OF THE
AUSTRALASIAN SOCIETY
FOR IMMUNOLOGY





5. RECEIPT AND APPROVAL FROM ICB

ICB Report

Gabrielle Belz was not present so DT gave a verbal report. Total submissions were down, Impact Factor ICB is now 3.6. Subscriptions were up. NPG was happy with progress. CTI launch, 5 year trial, no cost to Society.

Editor	Gabrielle Belz
Deputy Editors	Adrian Liston, Stuart Tangye and Chris Parish
News and Commentary Editors	Elissa Deenick, Stephen Daley
Impact factor	3.6

6. OTHER REPORTS

Meeting Reports

2012 Melbourne Meeting in progress with great venue, speakers, lots of registrants and abstracts, and should break even or better.

DT proposed resolution thanking the organising committee for an outstanding job.

2013 NZ Wellington Convention Centre, 1-5 December. Anne La Flamme invited everyone to Wellington meeting and gave an overview of progress. Will be held jointly with the Australasian Flow Cytometry Group meeting in Civic Square, with dinner at the National Museum. Website is up and running and lists accepted international plenary speakers including Bill Paul. You can pre-register interest. Meeting will run from Monday-Thursday.

2014 NSW meeting will be held in Wollongong with Marcel Batten and Bernadette Saunders as organisers. ASNEvents are PCO.

7. MEETING CLOSED AT 2.00PM


IDS Immunology Of Diabetes Society
13th International Congress of the Immunology of Diabetes Society
7 – 11 December, 2013
Mantra Lorne, Victoria
Please join us for a highly focused international meeting on the prevention and reversal of type 1 diabetes based on mechanistic insights into the disease. This is the main international meeting focused on immunological aspects of prevention and treatment of type 1 diabetes.
For more details visit www.ids2013.com.au

ASI Councillors' News

N.Z. News

ASI Annual Meeting 2013

Please visit our website (www.asi2013.org) and read about the upcoming annual meeting to be held in Wellington from 2-5 December 2013. We have 13 international speakers confirmed (their bios are available on the ASI2013 website). The workshops will be run on 1 December and will be jointly run with the Australasian Flow Cytometry Group. Our website will be updated regularly as the programme and events are finalized. Online registration and abstract submission open on 2 April – only two short months away!

Additionally the Australasian Virology Group will hold its annual meeting from 8-11 December 2013 in the lovely Queenstown.

Day of Immunology, April 29 2013

The work is underway organizing this year's Day of Immunology celebrations. As in previous years, we are hoping to hold events in both Wellington and Dunedin that will include public lectures as well as our wildly popular Quiz night. Volunteers interested in becoming involved in the Day of Immunology celebrations are welcome. Please contact Anne (anne.laflamme@vuw.ac.nz) or Jo (jo.kirman@otago.ac.nz).

Other Concurrent New Zealand Meetings

December 2013 is the month for meetings in New Zealand! In addition to ASI2013 (2-5 December in Wellington), the Australasian Flow Cytometry Group (29-30 November 2013) and the New Zealand Institute of Chemistry (2-5 December 2013) will also hold their annual meetings in Wellington.

ASI Visiting Speakers 2013

In the next few months we will be preparing to host two ASI Visiting Speakers: John Wherry in Auckland and Branch Moody in Wellington. Dr Wherry will have visited Auckland from 10-12 February 2013, and his seminar will have been held on Tuesday 12 February at 3pm at the Faculty of Medical and Health Sciences. Dr Branch Moody will be visiting Wellington from 25-26 March and will deliver his seminar on Monday, 25 March at 12pm at Victoria University. Anyone interested in attending this seminar or meeting with Dr Moody, please contact Anne (anne.laflamme@vuw.ac.nz) for further information, directions or other queries.

New Zealand Immunology Initiatives

On a very different note, in 2010 the Ministry of Research, Science, and Technology sponsored a delegation of NZ immunologists to visit leading immunologists in Japan. The purpose of this visit was to promote collaborative research between NZ and Japan, and immunology was viewed as a research area of significant interest and potential. Stemming from this event, a reciprocal visit has been planned for Japanese Immunologists this February. The Japanese delegation will visit Auckland from 25-28 February with a joint workshop on 26-27 February. This meeting is designed to solidify the strong links that have been developed between NZ and Japanese immunologists.

Anne LaFlamme
Councillor

N.S.W. News

Happy New Year to all! 2013 is shaping up to be another great year in NSW Immunology.

ASI NSW ACT Branch Retreat

Organisation is underway for this year's NSW/ACT Branch Retreat. Following on from the success of recent years, it will again be held at Peppers' Craigieburn in Bowral. The dates for this year will be Thursday and Friday, 12 & 13 September and it will take a similar format to that of previous meetings. This is always a fun and collegial meeting and I look forward to seeing as many of you as possible there this year. Further communication will, of course, follow. We thank BD for agreeing to be the major sponsor for the event this year.

ASI Visiting Speakers 2013

On 31 January/1 February we were fortunate to host A/Prof. John Wherry, who gave seminars at both the Centenary Institute as well as at the Garvan Institute. A/Prof Wherry gave fantastic presentations on his recent discoveries related to "exhausted" CD8+ T cells in viral infections and the transcriptional events governing their maintenance. During the course of his visit many people were able to engage with him in very enjoyable and stimulating discussions.

The next visiting speaker to come to NSW will be A/Prof. Branch Moody from Brigham and Women's Hospital, Boston on 22 March. A/Prof. Moody is a world leader in the field of CD1a, b and c restricted T cells. The seminar will take place at the Garvan Institute at 11am on Friday 22 March, hosted by me. Please contact me if you would like to arrange a meeting time.

Day of Immunology
In the past, NSW has not really run events associated with the Day of Immunology (DOI: April 29, 2013). DOI events in other states involved public education seminars, activities for school aged children and informative webpages. If anyone is interested in spearheading DOI efforts in NSW, please contact me. Victorian and Queensland DOI committees are generous in sharing their experiences and some resources (such as educational leaflets) to get us started.

All the best until next time,

Marcel Batten
Councillor

S.A./N.T. News

I would like to introduce myself as the new SA/NT Councillor; I have been an active member of the Society for the past seven years and have enjoyed participating in the organisation of many ASI events during this time. I am greatly looking forward to fulfilling my new role as State Councillor for SA/NT and hope that I can maintain the wonderful example set by our previous Councillors, most recently Michele Grimbaldeston. On behalf of SA and the NT, I would like to thank Michele for the dedication and effort she has invested into the Society over her 3-year term as State Councillor. Michele was a major contributor to the success of the 2011 ASI annual meeting, working tirelessly as Program Chair. Michele has always worked hard to be inclusive of all local members and particularly young immunologists when organising our local Adelaide Immunology Retreat, ensuring the event is widely promoted, and giving everyone the opportunity to gain experience on the organising committee. This has seen the event grow tremendously over the past three years with over 40 attendees in 2012 and is a tradition I hope to maintain.

We would like to wish a big congratulations to our local SA prize winners at the 2012 Annual Meeting in Melbourne: Nicole Christie, winner of the Best Poster prize, and Tessa Gargett, winner of a Mini Oral Presentation prize. This is a fantastic achievement, given that over 500 abstracts were submitted to the meeting making these prizes highly competitive.

The World Day of Immunology will be coming up on April 29 and I am keen to organise a local event to promote the great importance of our research to the wider community. I will soon be calling for volunteers interested in participating in the event, so keep an eye out for my email as I am keen to hear any ideas.

Please don't hesitate to contact me at cara.fraser@health.sa.gov.au if you have any questions or suggestions about ASI events.

Cara Fraser
Councillor

Queensland News

It has been a busy start to 2013, with two events in particular keeping us occupied:

Visiting Speaker Program: John Wherry
A/Prof. John Wherry, the new director of the Institute of Immunology at University of Pennsylvania, USA, visited several institutes in Queensland on his multi-centre Australasian tour. He enjoyed the Brisbane atmosphere and was taken aback by the beautiful river views from his hotel! He spent a morning at QIMR before giving a well attended seminar at the Institute for Glycomics, Griffith University (hosted by Prof Michael Good and including a drive-by viewing of the spectacular beaches at Southport!). The following day John was the inaugural speaker at the magnificent, newly opened Translational Research Institute in Brisbane. John also dined at a popular South Bank restaurant, where he met Queensland luminaries including Professors Geoff Hill, Rajiv Khanna, Ranjeny Thomas, Don McManus and Dr Kelli MacDonald. Of course, prior to his visit, we knew from his publications that John Wherry has been fundamental in defining the process and role of T cell 'exhaustion' during chronic viral infection. One of the benefits of the Visiting Speakers' Program, however, is that we can now put a face to a name, and know that John was a gracious and engaging visitor to our State. The Queensland leg of Prof Wherry's trip was managed by Dr Sumaira Hasnain, ably assisted by Dr Danielle Stanisic.

Immunology Speed Dating for Students
With St Valentine's Day approaching, and as romantic cherubs sharpened their arrows, iQ organised a student networking event on the evening of Friday, February 8 called "Immunology Speed Dating". But NO, this was not intended to be an amorous venture. It was designed to be a State-wide initiative where Immunology students at any stage

Immunology Speed Dating

of their studies, in any part of Queensland, could learn to communicate their research to their peers in an informal, one-to-one, 5-minute "Speed-date". The aim was to develop an essential "elevator" sales pitch that is essential for letting others know the What, How and Why of our research. Thirty students from around Brisbane, Gold Coast, Townsville and Cairns, speaking either in the real world (at the Queensland Institute of Medical Research Bar), or in the virtual world via Skype, honed their skills with some vociferous vocal jousting, fuelled by the QIMR bar and catering facilities! Once the students had (mathematically) scored each other, the winners – Mamdouh Sedhom (UQ Diamantina), Rebecca Jacobsen (Mater), Hongyou Yu (JCU), and Roland Ruscher (UQ Diamantina) – were held aloft and showered with gifts; as they drifted off into the night, promises of future liaisons, and whispers of possible collaboration hung in the sub-tropical air.

Many thanks, in particular, go to Tammy Dougan (JCU), Margaret Jordan (JCU), Connor O'Meara (QUT), Ken Loh (UQ), Tara Roberts (QIMR), Meru Sheel (QIMR), Jennifer Reiman (Griffith Uni), Danielle Stanisic (Griffith Uni), Mimi Flynn (QIMR Audio/Visual), Peter Kaim (QIMR, IT), Ben Crowley (JCU, IT) and Patrick Dwyer (QIMR bar manager).

Ashraful Haque
Councillor

Victorian News

This is the first report after the 42nd Annual Meeting held at the Melbourne Convention and Exhibition Centre. The conference was a great success and credit must go to the local organizing committee headed by Stephen Turner and Rose Ffrench. The International Congress of Immunology is also coming to Melbourne in 2016, and the Annual Meeting will serve as a good practice run for that event, which is likely to draw upwards of 3000 registrants. Before that though, IgV will be resuming its normal schedule of meetings after putting the annual meeting on hold for last year because of the local ASI meeting. A new Immunology Masterclass is planned and the annual meeting will also be on so I will let you know more about these events when the details are finalized.

These meetings are just two of the events that IgV (and ASI) supports, so please remind new lab members of the benefits of joining ASI, including reduced registration for these great events and an array of prizes and travel awards for students, post docs and senior researchers.

We have two early visitors to Melbourne in 2013 through the ASI Visiting Speaker Program. John Wherry has already been and gone, having delivered seminars at the University of Melbourne and at AMREP. Branch Moody is next on the agenda and I will be soon letting everyone know about where and when to see that seminar. If you have ideas about other researchers ASI could invite under the ASI Visiting Speaker Program, please let me know. Sponsored visiting speakers need to visit at least three States (or two plus NZ) so if you are nominating someone, please include a brief letter and CV that provides an idea about the person and their research so I can circulate it to other States.

Lastly, the IgV committee has undergone some changes this year. Retiring from the committee are Rose Ffrench, Stephen Turner, Frank Alderuccio, Adam Karpala, John Stambas, Stuart Mannering, Weisan Chen and Robyn Sutherland. Coming onto the committee are Seth Masters, Sarah Londrigan, Charles Hardy, Mireille Lahoud, Clare Slaney and Melissa Call. Congratulations to the new committee members and thank you to Rose, Steve, Adam, John, Frank, Stuart, Weisan and Robyn for their great service over many years. The new President of IgV is Daniel Layton and the Vice-President is Phil Darcy.

If you would like more information about ASI/IgV activities, or have a question or suggestion, please contact me at sberzins@ballarat.edu.au.

Stuart Berzins
Councillor

W.A. News

Firstly, a big thank you to our outgoing State Councillor, Alec Redwood, and the previous organizing committee, for all their efforts in promoting WA immunology so effectively over the last three years. I think most WA members have benefited at some point during this time from the ongoing activities of the committee, such as the PIG meetings, seminar programs and Day of Immunology functions. This is particularly true for local ASI student and ECR members, and Alec's initiative in 2012 to partner with the larger Combined Biological Sciences Meeting (now a Perth institution) was a big success in showcasing the immunology talent in WA to the wider scientific community.

I am very excited to be following on from this success as the next ASI Councillor for WA. I believe we are in for an interesting time in immunology research in WA. With two new hospitals and new research institutes on the way, this should be a time for greater exposure of the importance of immunology research and teaching in general, and hopefully an opportunity for growth within our research community.

Our current committee in 2013 consists so far of: Scott Fisher (UWA, Secretary), Alec Redwood (UWA, brains trust – he knows the moves to Locomotion), Niamh Keane (Murdoch), and Demelza Ireland (UWA), along with student representatives Stephanie Trend and Emma de Jong. But the committee is not complete, as it is missing you! If you are passionate about immunology and WA, then we would love to have you help out on this committee. Likewise, if you have any ideas, suggestions or feedback on ways to improve what ASI offers its local members, please contact either myself (a.currie@murdoch.edu.au) or one of the committee members.

I look forward to meeting and hearing from many of you over the next few years.

Andrew Currie
Councillor

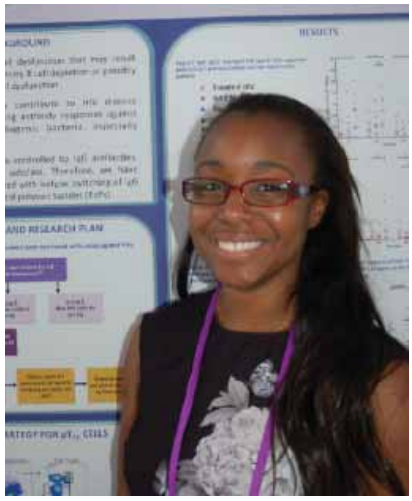
A.C.T. News

I am happy to introduce myself as the new ASI State Councillor for the ACT. As the incoming Councillor I first want to acknowledge the great work of Steve Daley as the ACT Councillor over the past three years. Steve will continue his contribution to ASI as the ACT Treasurer. We will have a busy year ahead with a number of events already planned.

The first event will be the 14th Fenner Conference –"Perspectives on Immune Recognition" which will take place at JCSMR on 29th & 30th April to coincide with World Day of Immunology. We have a fantastic line-up of speakers, including Nobel Laureates Rolf Zinkernagel and Peter Doherty as keynote speakers. Registration for the conference will open soon and I encourage all to come to this event. More information about the conference can be found in the flyer at the beginning of the Newsletter and on the website (http://jcsmr.anu.edu.au/perspectives-immune-recognition).

Other events planned for this year include the visit of Marc Jenkins in May as part of the ASI Visiting Speaker program and the ACT/NSW Branch Retreat in September.

Anselm Enders
Councillor



Upcoming Conferences

15th International Congress of Immunology
August 22–27, 2013
Rome, Italy
ici2013@triumphgroup.it
www.ici2013.org

VIII World Congress on Immunopathology, Respiratory Allergy & Asthma
October 12–15, 2013
Dubai, UAE
info@wipocis.org
www.wipocis.org

ACA 2013
6th Asian Congress of Autoimmunity
November 21–23, 2013
Hong Kong
http://www2.kenes.com/autoimmunity2013
Email: aca@kenes.com

The Walter and Eliza Hall Institute of Medical Research
WEHI Seminars on the Web:
www.wehi.edu/seminars/

THE ASI VISITING SPEAKER PROGRAM 2013

This year sees a very healthy growth in the number of speakers visiting Australia. Following a decision by the Council to further enhance the capacity of the program, we would continue to encourage all members to profit from the benefits the VSP has to offer. Inviting those brilliant immunologists you read papers of or listen to in international meetings would help you strengthen your research capabilities by nurturing collaborations and scientific exchange.

For details on the process visit the ASI website.

February 2013
A/Prof. E. John Wherry, University of Pennsylvania, Department of Microbiology, Philadelphia, PA, USA
Hosted by Scott Mueller, University of Melbourne

Sydney, 1
Brisbane. 4-5
Melbourne, 6-8
Auckland, 11

March 2013
Dr Branch Moody. Brigham and Women's Hospital, Harvard University, Boston, USA
Hosted by Dale Godfrey, University of Melbourne

Melbourne, 18-22
Sydney. 22-24
Wellington, 25-26

May 2013
Professor Marc Jenkins, Distinguished McKnight University Professor, Department of Microbiology, University of Minnesota, Minneapolis, MN. USA
Hosted by David Tarlinton, WEHI

Sydney. 19-21
Canberra, 22
Melbourne, 23-26

November 2013
Professor Ed Palmer, University Hospital, Basel, Switzerland
Hosted by Su Heinzel, WEHI

Ed Palmer has studied T cell tolerance throughout his career. After earning his PhD and MD in the US, he was an Assistant, and later, an Associate Professor of Immunology at the University of Colorado Health Sciences Center in Denver, CO. In 1993, he was named a Permanent Member of the Basel Institute for Immunology, where he led a research laboratory until 2001 when the Institute was closed. Since that time, he has been a Professor of Experimental Transplantation Immunology at the University Hospital in Basel. His major interest is to understand the molecular principles behind T cell tolerance.

Selected publications

1. Zehn, D., C. King, M.J. Bevan, and E. Palmer. 2012. TCR signaling requirements for activating T cells and for generating memory. Cell Mol Life Sci 69:1565-1575.
2. Schrum, A.G., D. Gil, L.A. Turka, and E. Palmer. 2011. Physical and functional bivalency observed among TCR/CD3 complexes isolated from primary T cells. J Immunol 187:870-878.
3. Gascoigne, N.R., and E. Palmer. 2011. Signaling in thymic selection. Curr Opin Immunol 23:207-212.
5. Mallaun, M., G. Zenke, and E. Palmer. 2010. A discrete affinity-driven elevation of ZAP-70 kinase activity initiates negative selection. J Recept Signal Transduct Res 30:430-443.
6. Palmer, E.M., B.C. Holbrook, S. Arimilli, G.D. Parks, and M.A. Alexander-Miller. 2010. IFNgamma-producing, virus-specific CD8+ effector cells acquire the ability to produce IL-10 as a result of entry into the infected lung environment. Virology 404:225-230.
7. Palmer, E., and D. Naeher. 2009. Affinity threshold for thymic selection through a T-cell receptor-co-receptor zipper. Nat Rev Immunol 9:207-213.
8. Teixeiro, E., M.A. Daniels, S.E. Hamilton, A.G. Schrum, R. Bragado, S.C. Jameson, and E. Palmer. 2009. Different T cell receptor signals determine CD8+ memory versus effector development. Science 323:502-505.
9. Mallaun, M., D. Naeher, M.A. Daniels, P.P. Yachi, B. Hausmann, I.F. Luescher, N.R. Gascoigne, and E. Palmer. 2008. The T cell receptor's alpha-chain connecting peptide motif promotes close approximation of the CD8 coreceptor allowing efficient signal initiation. J Immunol 180:8211-8221.
10. Gil, D., A.G. Schrum, M.A. Daniels, and E. Palmer. 2008. A role for CD8 in the developmental tuning of antigen recognition and CD3 conformational change. J Immunol 180:3900-3909.
11. Naeher, D., M.A. Daniels, B. Hausmann, P. Guillaume, I. Luescher, and E. Palmer. 2007. A constant affinity threshold for T cell tolerance. J Exp Med 204:2553-2559.
12. Daniels, M.A., E. Teixeiro, J. Gill, B. Hausmann, D. Roubaty, K. Holmberg, G. Werlen, G.A. Hollander, N.R. Gascoigne, and E. Palmer. 2006. Thymic selection threshold defined by compartmentalization of Ras/MAPK signalling. Nature 444:724-729.
13. Gil, D., A.G. Schrum, B. Alarcon, and E. Palmer. 2005. T cell receptor engagement by peptide-MHC ligands induces a conformational change in the CD3 complex of thymocytes. J Exp Med 201:517-522.
14. Schrum, A.G., E. Palmer, and L.A. Turka. 2005. Distinct temporal programming of naive CD4+ T cells for cell division versus TCR-dependent death susceptibility by antigen-presenting macrophages. Eur J Immunol 35:449-459.
15. Teixeiro, E., M.A. Daniels, B. Hausmann, A.G. Schrum, D. Naeher, I. Luescher, M. Thome, R. Bragado, and E. Palmer. 2004. T cell division and death are segregated by mutation of TCRbeta chain constant domains. Immunity 21:515-526.

2012 ASI Postgraduate Workshop

Emma Grant
PhD Student, The University of Melbourne

Where is that antibody? What time is my microscope booking? And maybe more importantly, where is the coffee? These are many of the important questions scientists face on a daily basis; however one of the biggest and perhaps most scary questions a PhD student can face is, What am I going to do when I eventually graduate? The 2012 Postgraduate Workshop gave PhD students and those early in their postdoctoral careers a chance to reflect on this question. The workshop focused heavily on professional development, with skills sessions that will help in the completion of a PhD, and a chance to hear from many PhD graduates who have taken their degree into many different areas.

The day started with delightful talks from two of the world's scientific greats. Laureate Professor Peter Doherty gave us a brief albeit comprehensive look into the history of science, including many accidental, yet pivotal discoveries which have shaped immunology as we know it today. He kindly shared with us a brief history of his work including the discoveries which led to his Nobel Prize winning research. Professor Philippa Marrack then shared with us many of the characteristics she believes are vital to pursue a career in science, some of which she looks for when hiring new staff. Some of her most memorable suggestions to young and aspiring scientists were to "Use what you have got" and "Never stand with your legs crossed as it makes you look uncomfortable".

After morning tea, which included quite possibly the world's largest strawberries, we were given a crash course into statistics by Professor Dale Godfrey. Dale gave a very simple overview on the different categories of statistics and how each should be applied to scientific data. Next up we heard from a panel of science PhD graduates who have taken their degrees into many different fields. Each panel member gave a brief introduction on what they did and how they got there and then students were encouraged to ask questions. This session worked really well and when we broke for lunch many of the panellists stuck around and had small focus groups with interested students.

The last session of the day focused on professional development. David Vaux gave an entertaining talk about the importance of scientific integrity and showed us many real published examples of "dodgy" science, including many Photoshopped western blots. Scott Mueller and Kaylene Simpson then gave talks about novel cutting edge technology which is revolutionising the way we study immunology.

Overall the day went well; all students appeared to have had not only a good time but to have taken away something to help them in their scientific career. One key thing I personally learnt was that you do not have to do an overseas postdoctoral position to be successful in immunology, something I had never really realised before. I was lucky enough to be a part of the organising committee as well as a delegate and I would like to thank: the rest of the organising committee, all of the students for signing up and attending, Eleanor Jones and Aislin Meehan for the photos and, most importantly, the speakers for taking time out of their incredibly busy schedules to help the next wave of budding scientists.

Prof. Peter Doherty giving a brief history of science

Students participating in the 2012 ASI Postgraduate Workshop

Tumour Immunology Workshop

Immunotherapy making headway into clinical applications

J Alejandro Lopez

Organised by A group chaired by Phil Darcy from the Peter McCallum Institute (Melbourne), the program of the workshop was enticingly clinical. Coinciding with the fast development in the use of monoclonal antibodies for cancer therapy, the central theme for the workshop highlighted clinical reports and basic-science questions on the implementation of this approach.

Keynote speaker Jedd Wolchok from the Memorial Sloan-Kettering Cancer Center in New York has been at the front of the clinical use of CTLA-4 blocking antibodies for the treatment of melanoma, which received FDA approval in March 2011 as the only treatment for the metastatic (IV) stage. He reviewed the data of clinical trials showing an improvement in overall survival in 20-30% patients where it appears that the number of circulating CD8 may be an accurate biomarker for clinical responses. He also discussed the use of OX-40 and PD1 specific antibodies in various animal models where the tumouricidal role CD4 appears to take centre stage as a result of combined treatments. New combination therapies including the use of BRAF kinase inhibitors together with monoclonal antibodies and radiotherapy are now being tested clinically and showing encouraging synergisms; their appropriate timing and dosage may provide further therapeutic benefit. Other combination approaches discussed include the use of histone deacetylase inhibitors and HER-2 specific antibodies as discussed by Nicole Haynes and Ali West (Peter Mac).

Antibody therapies also appear to be beneficial when targeting cells NK cells as presented by Eric Vivier from Marseille (France), who showed data on the application KIR specific antibodies resulting in clinical benefit in various cancers. Other topics covered in the workshop included the dissection of the complex interactions in the tumour niche, particularly in relation to tumour metastasis and Irf7 (Belinda Parker, Peter Mac) and the precarious balance of cytokines (IL-23/IL-12) in maintaining tumours at bay (Michelle Teng, Peter Mac); effective immune modulation of dendritic cells function in tumours was discussed by Franca Ronchese (Malaghan Institute, Wellington, NZ) and Jason Waithman (Telethon Institute, WA).

One traditional highlight of the workshop, the Gordon Ada Oration, was marked by the sad passing of Gordon earlier in the year. The lecture was delivered by Geoff Hill (QIMR, Brisbane) who elegantly showed the path his team has followed from animal models used for the study of GVHD to the implementation of new therapeutic approaches in the clinic.

Overall the workshop once more provided a very friendly atmosphere for scientific discussions and the renewed encouragement that immunotherapy is rapidly progressing in its promising role against cancer.

Jedd Wolchok

2012 Infection and Immunity Special Interest Group Meeting

Depth and Diversity

Zahrah Al Rumaih, JCSMR, ANU

The 2012 pre-conference Infection and Immunity Special Interest Group Meeting took place at Melbourne Convention and Exhibition Centre. The meeting was a great opportunity for national and international delegates to present their work and exchange experiences. Throughout the meeting the attendees were introduced to various aspects of infection and immunity. To explore topics in depth, the meeting was divided into four sessions, which create a flow from the beginning to the end of the meeting.

The theme of the first session was Host-pathogen interaction. A range of topics was discussed in this session including poxvirus infection, HIV, malaria vaccination, chronic cutaneous Leishmaniasis and staphylococcal super antigen. Preethi Eldi from The Australian National University started this session with an interesting presentation about poxvirus infection. She discussed the role of CD4 T cell in secondary poxvirus infections. Thomas Angelovich from Burnet Institute showed that monocytes from young HIV-positive individuals presented similar phenotype and function to elderly after LPS challenge.

The second session, designated as innate response, started with a great talk by Eicke Latz from University of Massachusetts (USA). He discussed the role of inflammasomes in atherosclerosis and strategies to reduce inflammation using anti IL-1β treatment that involved solubilisation of cholesterol crystals and reconstituted HDL. Bindu Sukumaran from National University of Singapore gave an interesting talk about NOD2 regulation in bacterial infection identifying NSR-1 as a novel regulator of NOD2-mediated inflammatory response

The third and fourth sessions post-lunch were combined with the Mucosal Immunity Special Interest Group. Gabrielle Belz from the Walter and Eliza Hall Institute of Medical Research discussed the inflammatory response at mucosal surface session with an insightful presentation on innate lymphoid cells and their role on protecting the mucosal surface. She defined four subsets of innate lymphocytes into ILC1, ILC2, ILC17 and ILC22. The session concluded with Robert Shepherd of Monash University's interesting presentation about oral immunization using plant cells as a vaccine delivery system He discussed his results about antigen localisations on different regions of plants cells influencing the immune response to oral vaccine.

The meeting ended with the final session on gut immunity. Ian van Driel from the University of Melbourne gave a comprehensive overview of gastric autoimmunity. Ian discussed the role of migratory DC in autoimmune disease in particular severe autoimmune gastritis and highlighted the optional use of Treg cells to treat inflammatory diseases. Ros Kemp from University of Otago presented Chitosan gel vaccination that induces long lasting functional CD8 T cell response in peripheral and gut associated lymphoid tissues. Macia Laurence from Monash University presented another interesting talk about necessity of dietary fibre with GPR43 for appropriate activation of the inflammasome and gut homeostasis.

Overall, it was a very well organized meeting by Seth Masters. The talks were well attended and catered to the session theme. Thomas Angelovich, Jessica King and Robert Shepherd were awarded the students prize for best presentation in the meeting.

Robert Shepherd and Hamish McWilliam (Monash University)

Preethi Eldi (The Australian National University, JCSMR)

Gabrielle Belz (Walter and Eliza Hall Institute of Medical Research)

Ian van Driel (University of Melbourne)

Anthony Jaworowski & Thomas Angelovich (Burnet Institute)

Prize Winners from the 42nd ASI Annual Meeting, Melbourne 2012

BD Science Communcation Award: Ben Fancke
Dendritic Cells of the Bone Marrow

Ben Fancke[1,2], Jo Pooley[1], Meredith O'Keeffe[1,2]
[1]Centre for Immunology, Burnet Institute, Melbourne, Australia, [2]Department of Immunology, Monash University, Alfred Medical Research and Education Precinct (AMREP), Melbourne, Australia

In the O'Keeffe lab here at The Burnet Institute in Melbourne we focus our efforts on understanding the functions of the many dendritic cell (DC) subsets of mice and humans to see how they recognise pathogens and drive immune responses. As a PhD student coming into my third year, I'm focusing particularly on DCs that are found within the bone marrow (BM). Little is known of the BM DC so I'm attempting to figure out just what kinds are present and how they function. With this knowledge perhaps one day we might promote or suppress a DC function in order to fight pathogens and cancers of the BM or to prevent graft-versus-host disease after a BM transplant. As basic researchers know, *Scientia potential est* (knowledge is power).

DCs are antigen presenting cells (APC) that are vital for initiating immune responses. They are found throughout the body but you find different types of DC that are specialised at launching different immune responses depending on where you look. DCs capture pathogens, or parts of pathogens, like viruses, and present them to T cells to start the immune response rolling.

Broadly DCs can be separated into two groups; conventional (c)DC and plasmacytoid (p)DC. Until recently pDC, the type-I interferon (IFN-I) producers, were the only DC subset to be characterised in the BM. In late 2011 a second, and novel, IFN-I producing BM DC subset was identified[1,2]. This new subset, which we have termed myelos (meaning "marrow" in Greek) interferon (mi)DC, is found primarily in the BM and produces huge amounts of IFN-I, much like pDC, but also maintains some features commonly related to cDC. It was this discovery of the miDC in the BM several years ago by my PhD supervisor and lab head Meredith O'Keeffe that sparked my interest in the DC of the BM. Why would a mature subset with such potent but varied functions be found only in the BM?

The BM is from where all of our haematopoietic cells develop. It contains specialized microenvironments that are involved in the survival and development of precursor cells and the guidance of haematopoiesis. These BM microenvironments also act as cell storage sites where certain niches provide survival signals for a range of immune cell types including B cells, NK cells and naïve and long lived memory T cells. These days the BM is beginning to be viewed as not only a primary lymphoid organ, as the major site of haematopoiesis, but also a secondary lymphoid organ where immune responses can be initiated independently of the spleen or lymph nodes[3,4]. A recent finding that Modified Vaccinia Ankara (MVA) infected neutrophils can transport antigen from the dermis to the BM where, with the assistance of a crudely defined "myeloid APC", they promote cytotoxic T cell division, has further implicated the BM as a secondary lymphoid organ and the APC therein as immune regulators[5].

So far we have established that including the pDC and miDC there are at least five distinct subsets of DC within the BM. The other three subsets have more cDC-like features and all

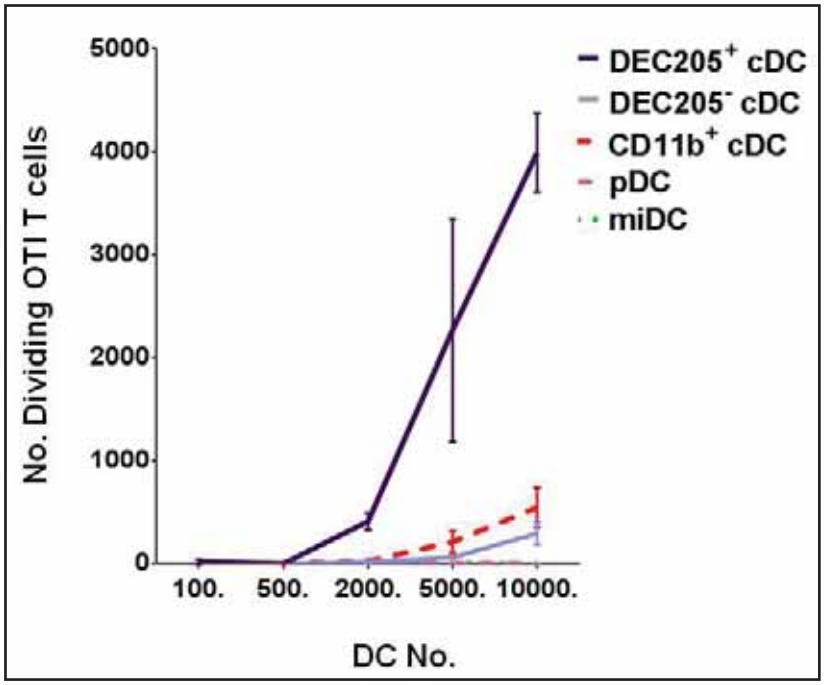


Fig. 1 – DEC205⁺ BM cDC Cross-Present Ag to T Cells
BM DC subsets incubated with OVA protein 2hrs, 37°C then washed. OVA loaded DC incubated with 5 x 10^4 CFSE-labelled OTI T cells, 60hrs, 37°C. Proliferating OTI cells quantitated by FACS and represented as mean +/- SEM of triplicate wells from one experiment

of these subsets show unique functions in the pathogens they recognise, the type of T cell they best activate, and the proinflammatory cytokines and chemokines they produce upon activation.

One of these subsets, which expresses the surface marker CD11b, is able to produce large amounts of the neutrophil chemoattractant CXCL1. We don't see the splenic DC producing this chemokine so why would those in the BM do so? Could the BM DC themselves be involved with the recruitment of cells from the periphery to the BM? Perhaps even antigen loaded neutrophils? Another BM DC subset which we currently refer to as the DEC205$^+$ cDC is the only subset capable of cross-presenting OVA-antigen to OTI CD8$^+$ T cells (Fig 1). Here we may well have identified the cell subset responsible for generating the MHCI restricted T cell responses in the BM as described by *Feuerer et al*[4].

As the DC biology team at The Burnet increases in strength with stellar scientists such as Dr Amanda Gavin, Dr Irene Caminschi, Dr Mireille Lahoud, Dr Rachel Lundie and the eminent Prof. Ken Shortman walking the corridors, it's a great time to be here and gives me the chance to leech as much as I can from the minds, innovations and hard work of those that have paved the way thus far.

1. O'Keeffe, M., *et al.* Nonplasmacytoid, High IFN-alpha-Producing, Bone Marrow Dendritic Cells. *J Immunol* (2012).
2. Schlitzer, A., *et al.* Identification of CCR9-murine plasmacytoid DC precursors with plasticity to differentiate into conventional DCs. *Blood* **117**, 6562-6570 (2011).
3. Tripp, R.A., Topham, D.J., Watson, S.R. & Doherty, P.C. Bone marrow can function as a lymphoid organ during a primary immune response under conditions of disrupted lymphocyte trafficking. *J. Immunol.* **158**, 3716-3720 (1997).
4. Feuerer, M., *et al.* Bone marrow as a priming site for T-cell responses to blood-borne antigen. *Nat Med* **9**, 1151-1157 (2003).
5. Duffy, D., *et al.* Neutrophils transport antigen from the dermis to the bone marrow, initiating a source of memory CD8(+) T cells. *Immunity* **37**, 917-929 (2012).

Best Postdoc Presentation: Alison Thorburn
Fibre, Short-chain Fatty Acids and Microbiota Combat the Development of Asthma

Alison Thorburn, Laurence Macia and Charles Mackay
Monash University, Clayton, Vic., Australia

First of all, I would like to thank the Mucosal Immunology SIG for the opportunity to present my work during the workshop at the ASI conference, December 2012. The workshop provided a great forum to present and discuss my results with experts in the field. I am very thankful to be the recipient of the "Best Postdoctoral Presentation" award.

I have always had a strong interest in understanding the reasons behind the development of asthma. A major focus of the Mackay lab is to understand the role of diet and the microbiota in the development of inflammatory diseases. Joining the Mackay lab has enabled me to investigate the role of diet and the microbiota in the development of asthma.

The prevalence of asthma is very high in the western world. For a long time, the hygiene hypothesis has been thought to explain this high prevalence. Indeed, increased cleanliness, vaccinations and antibiotic use have led to reduced exposure to infectious agents, and in most cases this correlates with the increased incidence of asthma. However, this does not hold true for Japan, where high levels of "cleanliness" are associated with a low prevalence of asthma. We believe that a more solid argument for the high prevalence of asthma in the western world can be

made by a "diet/microbiota hypothesis". A western world diet is high in processed foods, saturated fat and, as a result, low in fibre. Of course many other lifestyle factors have been associated with asthma prevalence, interestingly the majority are linked to diet and the gut microbiota. Diet has a profound effect on the composition of the microbiota and, as a result, the metabolites produced are altered. In this project I investigated the role of fibre and the bacterial metabolite acetate (a short-chain fatty acid (SCFA)) in the development of asthma.

Using a series of experiments, we investigated the effect of fibre and acetate on the development of hallmark features of asthma. We used the well-established house-dust mite-mouse model of allergic airways disease (AAD). Characteristics of AAD that were assessed included bronchoalveolar lavage and lung eosinophil numbers, Th2 cytokine release from mediastinal lymph node T cells, serum IgE, mucus hypersecretion and airways hyperresponsiveness.

In brief, we found that a high fibre diet suppressed the development of AAD in adult mice. We then questioned whether a high fibre diet could modulate the development of asthma in the offspring, when only fed to the mother. Indeed, when pregnant mice were given a high fibre diet, this suppressed the development of AAD in their offspring.

The SCFA acetate is a by-product of the fermentation of fibre and when mice are administered a high fibre diet, acetate levels in the serum are increased. Therefore we provided mice with acetate in their drinking water. We found that acetate in the drinking water suppressed the development of AAD in adult mice and also in the offspring of pregnant mice.

In other experiments, we also showed that the lack of a microbiota (i.e. in germ-free mice) exacerbates the development of AAD. However, colonisation with the acetate-producing Bifidobacterium longum regulates the development of AAD. Furthermore, we showed that intranasal administration of acetate or acetate-producing B. longum suppresses the development of AAD.

The mechanism underlying the effects of fibre and acetate were not solely dependent on GPR43 (one of the receptors for acetate). We found that acetate increased regulatory T cell (Treg) numbers and anti-CD25 depletion of Tregs showed that they were required for acetate-mediated suppression of AAD. Future investigation will aim to fully elucidate the mechanism underlying these observations (see Figure 1). This collection of studies highlights an important role for fibre, acetate and the microbiota in regulating the development of asthma.

The Mackay lab has really begun to cement their expertise in this field. Further work by Craig McKenzie has shown that the SCFAs acetate, propionate and butyrate have differential effects on the development of asthma. Jian Tan has also shown that dietary fibre is critical for protection against food allergy. Dr Laurence Macia and Suzanne Luong have shown that fibre, SCFAs and GPR43 are key components modulating the inflammasome and involved in maintaining gut homeostasis. Dr Eliana Marino and James Richards have also shown that these components are important regulators of diabetes. Further studies will elucidate the signaling pathways underlying the effects that different diets and microbial metabolites have on inflammatory disease.

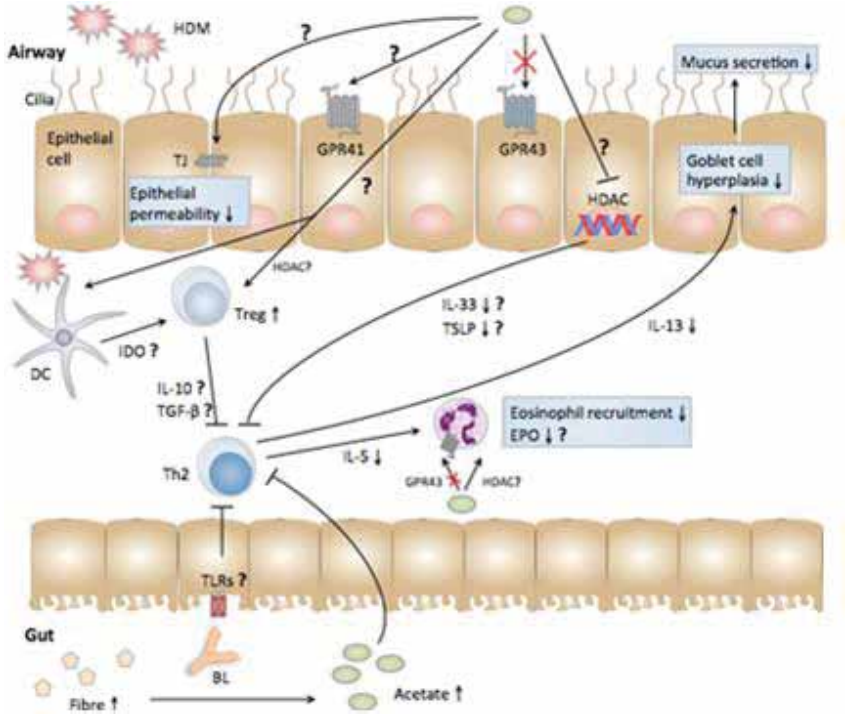


Figure 1

The effects of acetate (green) on gut epithelial biology and immune cells. SCFAs may exert their effects through multiple mechanisms including those illustrated above.

Together, these studies are providing insight into the important molecular pathways that connect diet, gut homeostasis, microbial exposure and the development of inflammatory diseases. This is an exciting time to be involved in this line of research. The field is fast moving so stay tuned and, in the meantime, include some more fibre (or vinegar) in your diet!

An invitation and a request to all ASI members

to contribute copy that they think might be interesting, useful, historical, humorous or thought provoking.

- We invite our student membership to voice their views on issues that interest or directly concern them.
- It's our newsletter, so let's support it and strive to make it even better.
- The ASI newsletter comes out 4 times a year and we welcome your contributions.
- **AND NOW YOU COULD WIN $200 FOR THE BEST ARTICLE PUBLISHED IN THE NEWSLETTER!**

Jomar – Eboscience Poster Prize Winner: Richard Sequeira
Entry of Staphylococcal Superantigen Like Protein 11 into Neutrophils, Attenuating their Recruitment

Richard Sequeira, Thomas Proft, Ries Langley, John Fraser
Department of Molecular Medicine and Pathology, University of Auckland, New Zealand

Firstly I would like to thank the ASI 2012 Council and sponsors for awarding me a poster prize. It was a fantastic surprise especially being amongst so many amazing posters! It was an exceptional conference and I am grateful for the opportunity to write about my work.

I am doing my PhD in the Fraser lab which focusses on the interaction between the immune system and a family of virulence factors secreted by the bacterium *Staphylococcus aureus*. I have always been fascinated by the evolutionary arms race between pathogenic organisms and their host's defences. So to be working in this field really appeals to me and for that I am grateful to my supervisor Professor John Fraser for giving me this opportunity!

S. aureus is a commensal of the moist squamous epithelium of the nose in approximately 20% of the population[1]. But what makes this pathogen remarkable is its versatility. It is able to colonise and infect almost any site within the human body given the opportunity. Such a feat is achieved utilising the vast array of virulence factors that *S. aureus* produces[1]. A large complement of these factors are involved in disrupting immune surveillance and responses[1]. This includes the family known as Staphylococcal Superantigen-Like (SSL) exotoxins that our group works on. I focus on SSL11 which belongs to a clade within the family that are able to bind the trisaccharide carbohydrate: sialyllactosamine[2]. This moiety is found in sialyl Lewis X (sLe^x) the ubiquitous blood antigen found on many immune receptors.

Sialylated lipids and proteins are important in immune recognition (e.g. Selectins) and functions (e.g. Siglecs) and are often mimicked by pathogens to mask them as 'self'[3]. SSL11 is capable of interacting with these glycoconjugates on myeloid cells, and following binding, is rapidly internalised into the cell[2]. Interestingly, despite being in a clade of five other SSLs that can also bind the carbohydrate moiety, SSL11 is found

in all sequenced strains indicating some selective pressure on the bacterium to retain the *ssl11* gene. This is a fascinating feature of an incredibly adept pathogen and why we are trying to understand its capabilities.

We hypothesise that SSL11 binds a receptor which mediates its internalisation. It has been difficult to identify this receptor as competition assays are ineffective due to the promiscuous binding of SSL11 to any correctly sialylated glycoconjugates. Similarly, any receptors in isolation will be bound by SSL11 if they are sialylated. It is likely that steric obstructions will provide some specificity. So to determine if SSL11 is indeed internalised with a receptor, I used some chemical inhibitors of clathrin (concentrated sucrose, phenylarsine oxide, chlorpromazine and PitStop) and caveolin (filipin) which are required for receptor-mediated endocytosis. The clathrin inhibitors, but not the caveolin inhibitor, prevented the internalisation of SSL11 into neutrophils indicating that SSL11 does indeed enter cells via clathrin-dependent receptor endocytosis.

SSL11 forms a dimer in solution which has also been observed in the crystal structure[2]. I hypothesise that SSL11 gets concentrated on the cell surface in receptor pits allowing its dimerization. This would aggregate receptors and possibly induce the endocytosis of these receptors. Using surface plasmon resonance, a very clear difference between the monomer and dimer of SSL11 binding to sLe^x can be observed (fig. 1). The increase in affinity of the dimer is only slight considering there are two molecules of SSL11 present. What is most striking is the dissociation curve of the dimer, which does not return to baseline like the monomer. This indicates the dimer has the potential to remain attached on the cell affording SSL11 ample time to internalise. Dimerization of SSL11 on the cell surface also crosslinks cells resulting in neutrophils aggregating into dense structures. The aggregated neutrophils are very compact with tight adhesion between the cells. When

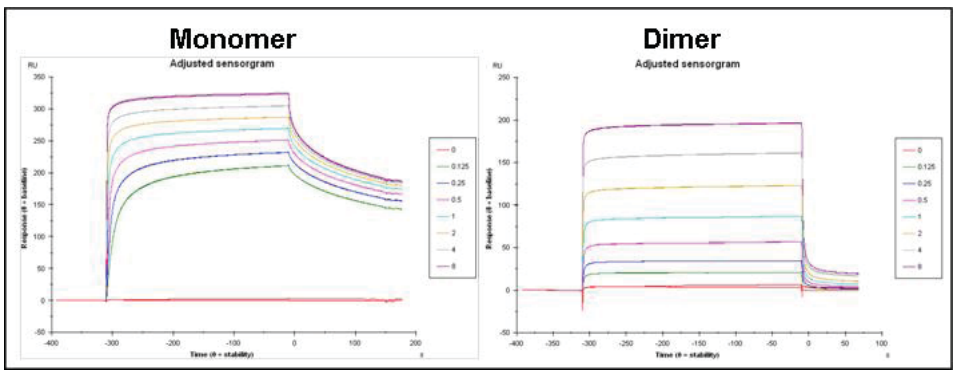


Figure 1
Surface plasmon resonance of SSL11 dimer or monomer binding sialyl Lewis X. The dissociation constant of the dimer is 0.83 ± 0.02μM compared to 2.32 ± 0.2μM of the monomer. The dimer does not fully dissociate returning to baseline indicating it would remain attached to the cell for much longer.

the clathrin (but not caveolin) endocytosis inhibitors are added, preventing the internalisation of SSL11, the neutrophils are still aggregated but are not as compact. This suggests that following the internalisation of SSL11, there is some cellular response that promotes the close proximity of the cells.

As SSL11 aggregates neutrophils, the conventional methods to examine neutrophil activity such as chemotaxis and phagocytosis, are not suitable due to the aggregates blocking flow during cytometry and being prevented from passing through pores in chemotactic assays. For this reason confocal microscopy was used to time-lapse image neutrophils migrating to, and phagocytosing, serum-opsonised heat-killed *S. aureus* (fig. 2). In the absence of SSL11, the neutrophils behaved as expected and migrated while phagocytosing bacteria. When SSL11 was added to the neutrophils, they were unable to mobilise to the surrounding bacteria. The exact mechanism behind this is still unknown.

While the specifics of SSL11's activity remain elusive, it is clear that SSL11 would aid the survival of the bacterium by disrupting neutrophil recruitment. Further characterisation of SSL11s function and effect on host immunity are my ultimate goals.

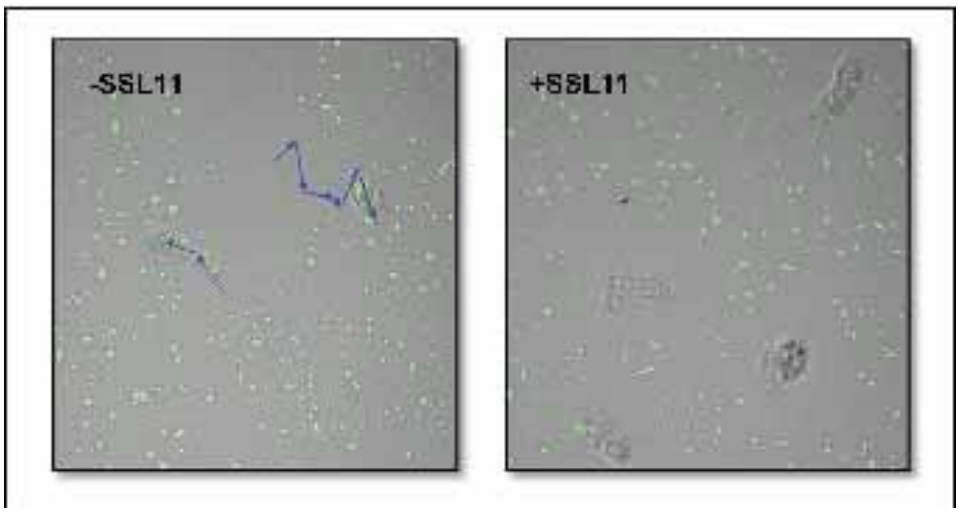


Figure 2
Confocal time-lapse of neutrophils migrating and phagocytosing S. aureus expressing GFP. Arrows indicate the movement of the neutrophils over a course of 30 min. When SSL11 is present the cells are still capable of phagocytosing the bacterium but are unable to mobilise and migrate.

Acknowledgements
I would like to thank all members of the Fraser Lab, our phlebotomists and the University of Auckland, Maurice Wilkins Centre and Health Research Council for funding.

References

1. Foster, T.J. (2005). *Nat. Rev. in Microbiol.* 3: 948-958.
2. Chung, M.C. *et al.* (2007). *Mol. Microbiol.* 66: 1342-1355.
3. Varki, A., Gagneux, P. (2012). *Ann. N.Y. Acad. Sci.* 1253:16-36.

Mini Oral Presentation Winner: Inken Kelch
The Lymph Node Labyrinth – Comprehensive 3D Imaging and Computational Analysis of LN Blood Microvasculature

Inken Kelch [1,5], Gib Bogle [2,5], Anthony Phillips [1,3,5], Ian LeGrice [2,4], Greg Sands [2], Dane Gerneke [2], and Rod Dunbar [1,5]
[1] School of Biological Sciences, University of Auckland, Auckland, New Zealand; [2] Auckland Bioengineering Institute, University of Auckland, Auckland, New Zealand; [3] Department of Surgery, University of Auckland, Auckland, New Zealand; [4] Department of Physiology, University of Auckland, Auckland, New Zealand; [5] Maurice Wilkins Centre for Molecular Biodiscovery, Auckland, New Zealand.

First, I would like to thank the organisers of the ASI meeting in Melbourne for providing me with the opportunity to present my work, and the editor of this newsletter for allowing me to tell you more about my project.

What happens if you mix together an immunologist, a surgeon, a physiologist, a bioengineer, a computer modeller, a student, and incubate them for three years? In my case the answer is a detailed computer model of one of the body's most abundant organs and the academic paella that I call my PhD.

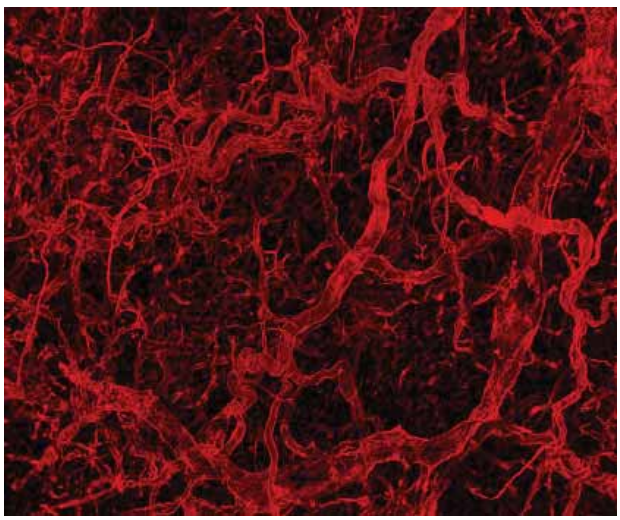
In our lab led by Professor Rod Dunbar at the University of Auckland, we are interested in the anatomy of lymph nodes (LNs) and how it enables the organ's crucial function in immunity. Placed at the crossroads of the blood and the lymphatic system, lymph nodes are critical meeting places for lymphocytes and antigens, and stromal cell components are known to play an important role in controlling LN homeostasis and supporting the efficient establishment of immune responses.[1-6] How LN anatomy adapts to rapid changes of LN size due to increased cell trafficking during activation on the other hand is still poorly understood. Thus, the aim of my multidisciplinary project is to investigate the microanatomy of entire murine lymph nodes, before and during immune activation, and make morphological changes measurable through computer analysis. We therefore focus on the structure and dynamism of the blood vessel system, the main entry site for naive lymphocytes accessing their homing regions in LNs.[7-9]

Key to my project is a special imaging system developed at the University of Auckland that allows tissues of several millimetres (or the size of a mouse lymph node) to be imaged in total at confocal resolution.[10] One of the main achievements of the engineers was to seamlessly merge serial image stacks into an accurate 3D volume image of the sample, which makes it accessible for computer-aided measurements in 3D. The system consists of a conventional confocal microscope,

an ultramill, and a unit holding the resin-embedded sample, fixed all together on a computer-controlled stage.[11] Instead of cutting the sample into slices and imaging individual segments, the setup here allows large overlapping image stacks to be taken from the surface of the sample, simply by combining each round of imaging with a milling step that removes most of the just-imaged top layer of the sample. Sophisticated software tools developed by Dr Greg Sands later remove optical noise and distortion, and enable the 3D integration into high quality volume images.[10]

Inspired by the opportunity to use this innovative piece of equipment, we first had to develop a technique to identify, label and embed murine LNs. With the help of experts from the fields of surgery and physiology we established a perfusion protocol to fluorescently label the entire blood vessel system of mesenteric LNs. The first specimen that we were able to capture at the specialised imaging system was a LN of 8 mm^3 volume, which took about two weeks to image and resulted in a dataset with approximately 1 billion voxels (1GB). We were stunned by the complexity of the vessel network and the detailed insight into the organisation of subcompartments like the follicles, which appear almost avascular. Even though the overall organisation of the blood vessel network could easily be captured by the human eye, to make the computer see those structures and facilitate sophisticated analysis, we had to go a long way. Custom-designed tools developed by Dr Gib Bogle involving more than eight individual processing steps finally enabled us to extract the vessel network and turn it into a computer representation allowing calculations of the network's volume and individual vessel parameters such as length and diameter. We found the majority of arterioles processing an inner diameter of 10-50 µm and were able to re-visualize this distribution as a colour spectrum, which made it easy to identify the feed arteriole and the topology of the smallest vessels. As a next step, experiments are underway to investigate the changes that occur to the blood vessel topology in the course of immune activation and quantify those transformations using our tools.

Another direction that our research has been taken, as a result of the interest in large-scale blood vessel imaging and modelling, is the blood supply of tumours. In collaboration with researchers from the Auckland Cancer



Society Research Centre we are currently exploring ways to label the blood vessel networks in human xenografts to assist in the modelling of hypoxia and drug transport.[12] In addition, our interest in the various channels and pathways of LNs has motivated us to stain the lymphatic system in LNs and image them together with the blood network. In doing so, we are taking advantage of the specialised confocal imaging system's ability to not only image single features at sub-cellular resolution, but also incorporate different channels across large tissue areas, which enables a comprehensive analysis that is not easily achieved using conventional methods. First promising experiments gave insights into the intricate architecture of both vascular systems and we soon hope to be able to analyse those labyrinthine networks in reactive and resting LNs. Ultimately, we want to utilise our data to draw a conclusive map of LN anatomy and quantify the topological relationship between functional structures. We thereby hope to improve our understanding of the structural framework that supports cell travel in LNs and how it shapes immune function.

References

1. Bajénoff, M., *et al.* Stromal Cell Networks Regulate Lymphocyte Entry, Migration, and Territoriality in Lymph Nodes. *Immunity* **25**, 989-1001 (2006).
2. Gretz, J.E., Anderson, A.O. & Shaw, S. Cords, channels, corridors and conduits: critical architectural elements facilitating cell interactions in the lymph node cortex. *Immunol Rev* **156**, 11-24 (1997).
3. Lukacs-Kornek, V., *et al.* Regulated release of nitric oxide by nonhematopoietic stroma controls expansion of the activated T cell pool in lymph nodes. *Nat Immunol* **12**, 1096-1104 (2011).
4. Mionnet, C., *et al.* High endothelial venules as traffic control points maintaining lymphocyte population homeostasis in lymph nodes. *Blood* **118**, 6115-6122 (2011).
5. Mueller, S.N. & Germain, R.N. Stromal cell contributions to the homeostasis and functionality of the immune system. *Nat Rev Immunol* **9**, 618-629 (2009).
6. Soderberg, K.A., *et al.* Innate control of adaptive immunity via remodeling of lymph node feed arteriole. *Proc Natl Acad Sci USA* **102**, 16315-16320 (2005).
7. Anderson, A.O. & Anderson, N.D. Studies on the structure and permeability of the microvasculature in normal rat lymph nodes. *Am J Pathol* **80**, 387-418 (1975).
8. Girard, J.P., Moussion, C. & Forster, R. HEVs, lymphatics and homeostatic immune cell trafficking in lymph nodes. *Nat Rev Immunol* **12**, 762-773 (2012).
9. von Andrian, U.H. & Mempel, T.R. Homing and cellular traffic in lymph nodes. *Nat Rev Immunol* **3**, 867-878 (2003).
10. Sands, G.B., *et al.* Automated imaging of extended tissue volumes using confocal microscopy. *Microsc Res Tech* **67**, 227-239 (2005).
11. Trew, M.L., *et al.* Cardiac electrophysiology and tissue structure: bridging the scale gap with a joint measurement and modelling paradigm. *Exp Physiol* **91**, 355-370 (2006).
12. Hicks, K.O., *et al.* Use of three-dimensional tissue cultures to model extravascular transport and predict in vivo activity of hypoxia-targeted anticancer drugs. *J Natl Cancer Inst* **98**, 1118-1128 (2006).

New Investigator Award: Victor Peperzak
Mcl-1 is Essential for Plasma Cell Survival

Victor Peperzak[1,2*], Ingela Vikström[1,2*], Jennifer Walker[1,2], Stefan P. Glaser[1,2], Melanie LePage[3], Christine M. Coquery[4], Loren D. Erickson[4], Kirsten Fairfax[3], Fabienne Mackay[3], Andreas Strasser[1,2], Stephen L. Nutt[1,2] and David M. Tarlinton[1,2]

[1]The Walter and Eliza Hall Institute of Medical Research, 1G Royal Parade, Parkville, Victoria, Australia. [2]Department of Medical Biology, University of Melbourne, Parkville, Victoria, Australia. [3]Department of Immunology, Monash University, Melbourne, Victoria, Australia. [4]Department of Microbiology, University of Virginia, Charlottesville, Virginia, USA.

*These authors contributed equally to this work.

The work that resulted in me winning the New Investigator Award was initiated early in 2010 when I started my postdoctoral research in the lab of David Tarlinton at the WEHI and it deals with a millennia old question, namely that of the mechanism of long-lasting protective immunity. It has been shown that plasma cells have a remarkably long lifespan and, in some cases, provide antibody-mediated protection from pathogens for a lifetime. The aim of this research was to address how existing plasma cells manage to survive in certain niches in the bone marrow.

Over the years, many extrinsic factors have been identified that promote the survival of plasma cells and these include the BCMA ligands, a proliferation-inducing ligand (APRIL) and B cell-activating factor of the TNF family (BAFF), the cytokines IL-4, IL-5, IL-6, tumor necrosis factor (TNF), CD44 ligands, CD80, CD86 and CXCL12. Of these, only the BCMA ligands, CD28 ligands (CD80 and CD86) and IL-6 have been shown to contribute to plasma cell survival in the bone marrow *in vivo*[(1)]. In addition, it has been revealed that multiple cell types that occupy plasma cell niches could produce these factors and that deletion of some of these cell types, such as eosinophils, impact on plasma cell survival[(2)]. However, the impact of these extrinsic factors individually is limited and it was currently unknown which internal survival molecules were regulated by these extrinsic stimuli.

To identify the pro-survival molecules that underpin the maintenance of plasma cells we examined the expression of the pro-survival members of the Bcl-2 family. We found high protein expression of both Bcl-2 and Mcl-1 in plasma cells. Since inhibition of Bcl-2 using the BH3-mimetic ABT-737 *in vivo* did not affect the maintenance of existing plasma cells[3], we focused on the role of Mcl-1 in these cells. Previously, we found that germinal center B cells critically rely on Mcl-1 for their persistence and deletion of the *Mcl1* gene in these cells results in the absence of humoral memory[4]. However, these studies did not examine the role of Mcl-1 in existing plasma cells residing in protective bone marrow niches. In collaboration with Stefan Glaser and Andreas Strasser we created bone marrow chimeric mice in which we could induce deletion of *Mcl1* in existing plasma cells. Our experiments using this mouse model showed that the high-level expression of Mcl-1 was absolutely essential for the survival of plasma cells (Figure 1 A+B)[5].

Next we examined which extrinsic factors could regulate the expression of Mcl-1. We found that signaling via the receptor BCMA, but not via CD28 or IL6R, significantly promoted transcription of *Mcl1 in vivo*. This finding proves indeed that signals from the microenvironment provide survival signals to plasma cells that are essential for their long-term survival (Figure 1 C+D)[5].

Combined, these discoveries could lead to better treatments for diseases where plasma cells are out of control, such as multiple myeloma and chronic immune disorders. Future research will focus on the exact molecular regulation of Mcl-1 in plasma cells and may reveal novel therapeutic targets for treatment of these diseases.

This work was not possible without the expert help of Ingela Vikstrom, who worked together with me, the outstanding supervision of David Tarlinton, and support from lab members. Moreover, I have been very lucky to be able to perform my research at the WEHI combining both high-quality immunology as well as apoptosis research.

Winning the award is one of the highlights of my postdoctoral period in David's lab, which will be concluded in March of this year, after which I will continue my scientific career in the Netherlands.

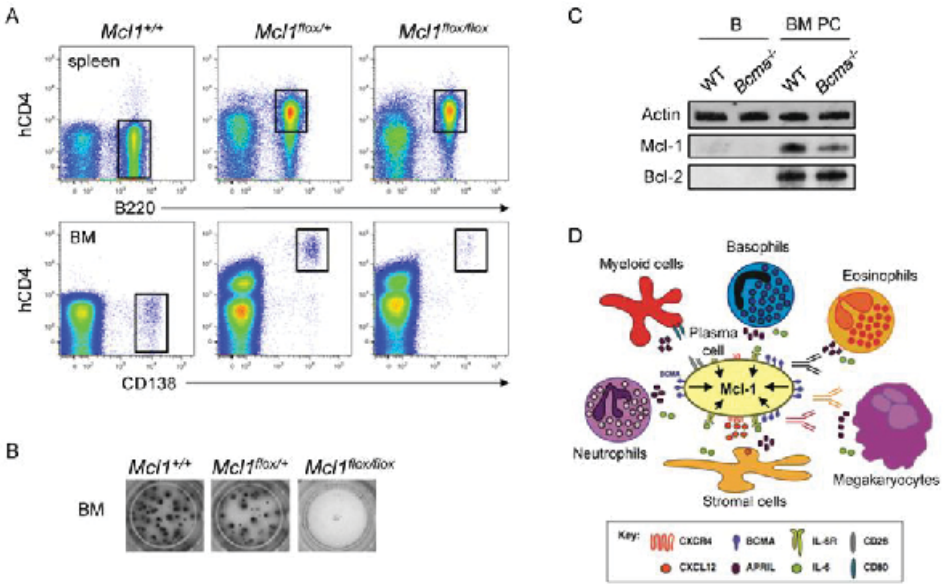


Figure 1

(A) Flow cytometric analysis of B-cells (B220+) and plasma cells (CD138+) in the spleen or bone marrow (BM) of mixed bone marrow chimeric mice 48 hours after tamoxifen-induced deletion of Mcl1. Expression of hCD4 is a marker of Mcl1 deletion as well as a measure for Mcl1 transcription.

(B) ELISpot analysis 28 days after immunization with NP-KLH 48 hours after tamoxifen-induced deletion of Mcl1 as in (A).

(C) Western blot showing the expression of Bcl-2 and Mcl-1 protein in plasma cells in the BM of WT and Bcma$^{-/-}$ mice.

(D) Extrinsic signals induce transcription of Mcl1 in plasma cells when located in bone marrow niches.

References

1. Tangye SG. Staying alive: regulation of plasma cell survival. *Trends in Immunology* 2011; 32(12): 595-602.
2. Chu VT, Frohlich A, Steinhauser G, Scheel T, Roch T, Fillatreau S, Lee JJ, Lohning M and Berek C. Eosinophils are required for the maintenance of plasma cells in the bone marrow. *Nature Immunology* 2011; 12(2): 151-159.
3. Carrington EM, Vikstrom IB, Light A, Sutherland RM, Londrigan SL, Mason KD, Huang DC, Lew AM and Tarlinton DM. BH3 mimetcs antagonizing restricted prosurvival Bcl-2 proteins represent another class of selective immune modulatory drugs. *PNAS* 2010; 107(24): 10967-10971.
4. Vikstrom I, Carotta S, Luthje K, Peperzak V, Jost PJ, Glaser S, Busslinger M, Bouillet P, Strasser A, Nutt SL and Tarlinton DM. Mcl-1 is essential for germinal center formation and B cell memory. *Science* 2010; 330(6007): 1095-1099.
5. Peperzak V, Vikstrom I, Walker J, Glaser SP, LePage M, Coquery CM, Erickson LD, Fairfax K, Mackay F, Strasser A, Nutt SL, Tarlinton DM. Mcl-1 is essential for plasma cell survival. *Nature Immunology* 2013 *–in press.*

Contributions sought for the ASI online immunology quiz

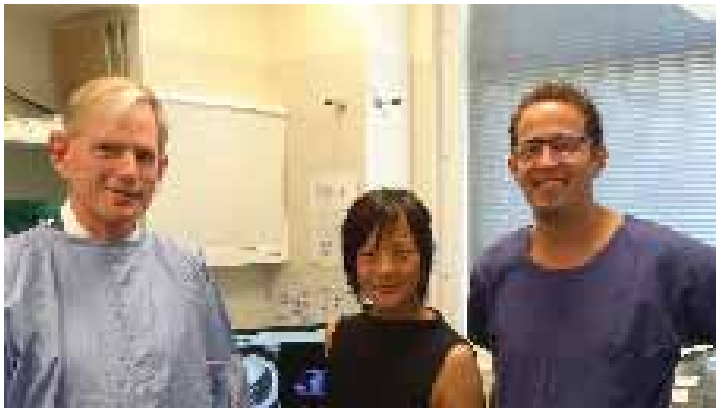
As part of World Day of Immunology events, we have developed an online immunology quiz (see http://www.immunology.org.au/immquiz1.html) on the ASI website. This quiz is targeted at the general public, but it would be good to add a few more questions (especially some with an Australian flavour), and maybe even add an "Advanced Level", with questions that undergrad students might find useful for revising for exams. All that's needed now are the questions and answers.

If you would like to contribute any multiple choice questions for either the general quiz or an advanced version, please send them to Judith Greer at j.greer@uq.edu.au.

Mini Oral Presentation Prize: Erika Duan

PhD student, Leukocyte signalling laboratory, Monash University
Principle Supervisor: Assoc. Prof. Margaret Hibbs; Department of Immunology, Monash University.
Co-supervisor: Professor Gary Anderson; Department of Pharmacology, University of Melbourne.

What would you like your lung macrophages to look like? This innocently simple question has been driving our collaborative research efforts with respiratory physicians at the Royal Melbourne Hospital. For whilst it hopefully needs not to be said that our days of untangling the facets of basic immunology are far from over, for some of us, questioning which biological observations may be endemic to only our study system (i.e. model organism used) does merit some brain wracking. Cascades of biological observation may reshuffle in importance (sometimes frustratingly) when we translate back into a human population, yet what this informs us about immunological pathways is fundamentally important.



From left to right: Assoc. Prof. Louis Irving, Ms Erika Duan, Dr Daniel Steinfort (Dr Steinfort and Prof Irving are our lab's clinical collaborators)

But back to those lung macrophages – or more specifically, the alveolar ones. Our research focuses on the characterisation of alveolar macrophages, the predominant immune cells occupying our lung airspaces (the vast grape-like lattices critical for our body's gas exchange and blood oxygenation). Under homeostatic conditions, alveolar macrophages are immunosuppressive and indirectly suppress aberrant T cell responses against innocuous foreign antigens. They are capable phagocytes and critical for airspace surfactant maintenance. Having too many is portentously linked with the development of many chronic lung diseases and too few predisposes towards infection-induced mortality. Yet how much this is a numbers game or the critical influence of a few functional subsets remains a pivotal and unanswered question.

But the clues are being pieced together – or at least in mice, where alveolar macrophages are homogenously CD11c^{high} Mac-1$^{neg/low}$ in healthy lungs. Our research has found that a distinct subset of residential alveolar macrophages is intrinsically capable of spontaneously upregulating Mac-1 (an integrin predominantly involved in leukocyte adhesion). Preceding lung monocyte recruitment, this event marks the first alteration in myeloid cell homeostasis during acute lung inflammation following infection [(1)]. More importantly, resolution of lung inflammation is characterised by a restoration to CD11c^{high} Mac-1$^{neg/low}$ alveolar macrophage homogeneity and its deregulation (i.e. the presence of constitutively Mac-1^{pos} residential macrophages) is a hallmark of SHIP-1$^{-/-}$ mice which spontaneously develop features of human chronic obstructive pulmonary disease (COPD). Elucidating the functional significance of this phenomenon is our next goal, which will be especially exciting in line with recent findings of a separate developmental lineage for residential tissue macrophages compared to other myeloid cell subsets [(2)], and indications of their distinct roles in the tissue microenvironment [(3, 4)].

But the true importance of residential alveolar heterogeneity may be directly determined by looking into the human lung. Unlike specific pathogen-free mice, human beings exist in an open and heterogeneous environment where we are sporadically exposed to infectious microorganisms. Finding a distinct and heterogeneous alveolar macrophage phenotype during human lung infection would further indicate an immunological phenomenon worth studying whereas the presence of homogenous background noise between lung disease patient cohorts would suggest the contrary. Here, teaming with Assoc. Prof. Louis Irving and Dr Daniel Steinfort at the Royal Melbourne Hospital, we are simultaneously characterising translatable alveolar macrophage changes in mice and men – with particular focus on identifying lung inflammation persistent cohorts of COPD patients whose disease symptoms may be more alveolar macrophage phenotype dependent. So that how we would prefer our lung macrophages to look like (homogenously CD11c^{high}Mac-1$^{neg/low}$ if we were mice) may one day become a simple question with a simple answer.

References:

1. Duan et al, Distinct Macrophage Subpopulations Characterize Acute Infection and Chronic Inflammatory Lung Disease. *JI*, 2012.
2. Schulz et al, A Lineage of Myeloid Cells Independent of Myb and Hematopoietic Stem Cells. *Science*, 2012.
3. Rivollier et al, Inflammation switches the differentiation program of Ly6C^{hi} monocytes from anti-inflammatory macrophages to inflammatory dendritic cells in the colon. *J Ex Med*, 2012.
4. Gautier et al, Gene-expression profiles and transcriptional regulatory pathways that underlie the identity and diversity of mouse tissue macrophages. *Nat Immunol*, 2012.

Poster Prize: Jonathan Chee
Increased Autoreactive T cells in the Peripheral Lymphoid Tissue of NOD Mice Follows their Differentiation to Memory T cells in Pancreatic Islets

Jonathan Chee[1], Hyun-Ja Ko[2], Robyn Sutherland[2], Gaurang Jhala[1], Tara Cattarell[1], Kate Graham[1], Helen Thomas[1], Balasubramanian Krishnamurthy[1], Andrew Lew[2], Thomas Kay[1]

[1]*St Vincent's Institute of Medical Research, Fitzroy, Victoria, Australia*

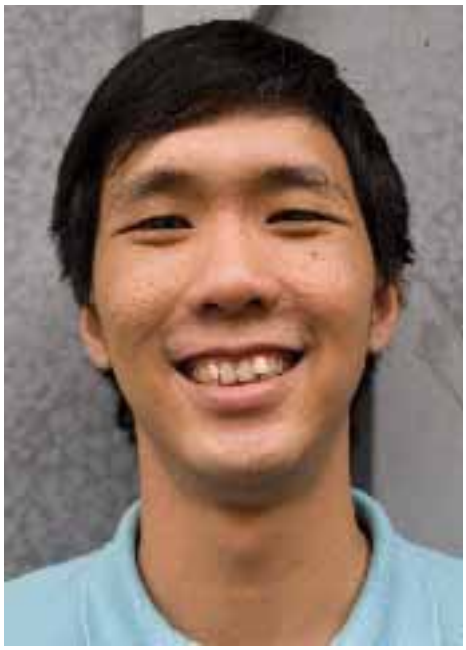
[2]*Walter & Eliza Hall Institute of Medical Research, Parkville, Victoria, Australia*

The poster I presented at the ASI 2012 meeting relates to my PhD project, which aims to determine whether autoreactive T cells in the peripheral lymphoid tissue accurately reflect the islet pathology in type 1 diabetes (T1D).

The pancreas is inaccessible for study in humans; therefore it is important to determine whether parameters such as autoreactive T cells in the blood can be used to study the natural history of islet immunopathology. We have used the NOD mouse model in this study, which enables us to compare peripheral blood autoreactive T cells and islet pathology.

Autoreactive T cells are low in frequency and affinity, and are normally difficult to detect. Using a peptide MHC-tetramer enrichment technology(1), we were able to track and enumerate low frequency autoreactive T cells in the NOD mouse. With this method, we studied the natural history of islet-specific glucose-6-phosphatase catalytic subunit-related protein (IGRP)-specific T cells, an important antigen in the development of T1D.

We discovered that the frequency of IGRP specific T cells in the peripheral lymphoid tissue and blood of the NOD mouse increases as the disease progresses, and it correlates with the severity of insulitis (Figure 1A – next page). We characterised these IGRP



specific T cells found that they have an antigen-experienced, effector memory phenotype. More importantly, we found that they developed memory function in the islet itself, rather than the draining lymph node (Figure 1B – next page).

These findings raise the possibility that effector memory T cells in the peripheral blood are not on their way to the islet but have exited from the islet. Therefore, their numbers reflect proliferation and expansion in the islet rather than cells generated in the peripheral lymphoid tissue or elsewhere. This further supports our contention that islet specific CD8 T cells initially become activated in the draining lymph nodes, but they receive additional signals only when they are in the islets, and they acquire full cytotoxic(2) and memory function there (Figure 1C – next page).

The findings also have implications for diagnostic testing of the disease. For example, if antigen-specific effector-memory T cells in the blood were causally linked to insulitis, they may be a better distinguishing biomarker for type 1 diabetic subjects than just antigen-specific T cells.

I would like to thank the ASI editor for the chance to contribute to the newsletter. I would also like to thank Professor Tom Kay, Dr Bala Murthy and A/Prof Helen Thomas for their excellent supervision.

References:

1. Moon, J. J., H. H. Chu, J. Hataye, A. J. Pagan, M. Pepper, J. B. McLachlan, T. Zell, and M. K. Jenkins. 2009. Tracking epitope-specific T cells. *Nat Protoc* 4:565-581.
2. Graham, K. L., B. Krishnamurthy, S. Fynch, Z. U. Mollah, R. Slattery, P. Santamaria, T. W. Kay, and H. E. Thomas. Autoreactive cytotoxic T lymphocytes acquire higher expression of cytotoxic effector markers in the islets of NOD mice after priming in pancreatic lymph nodes. *Am J Pathol* 178:2716-2725.

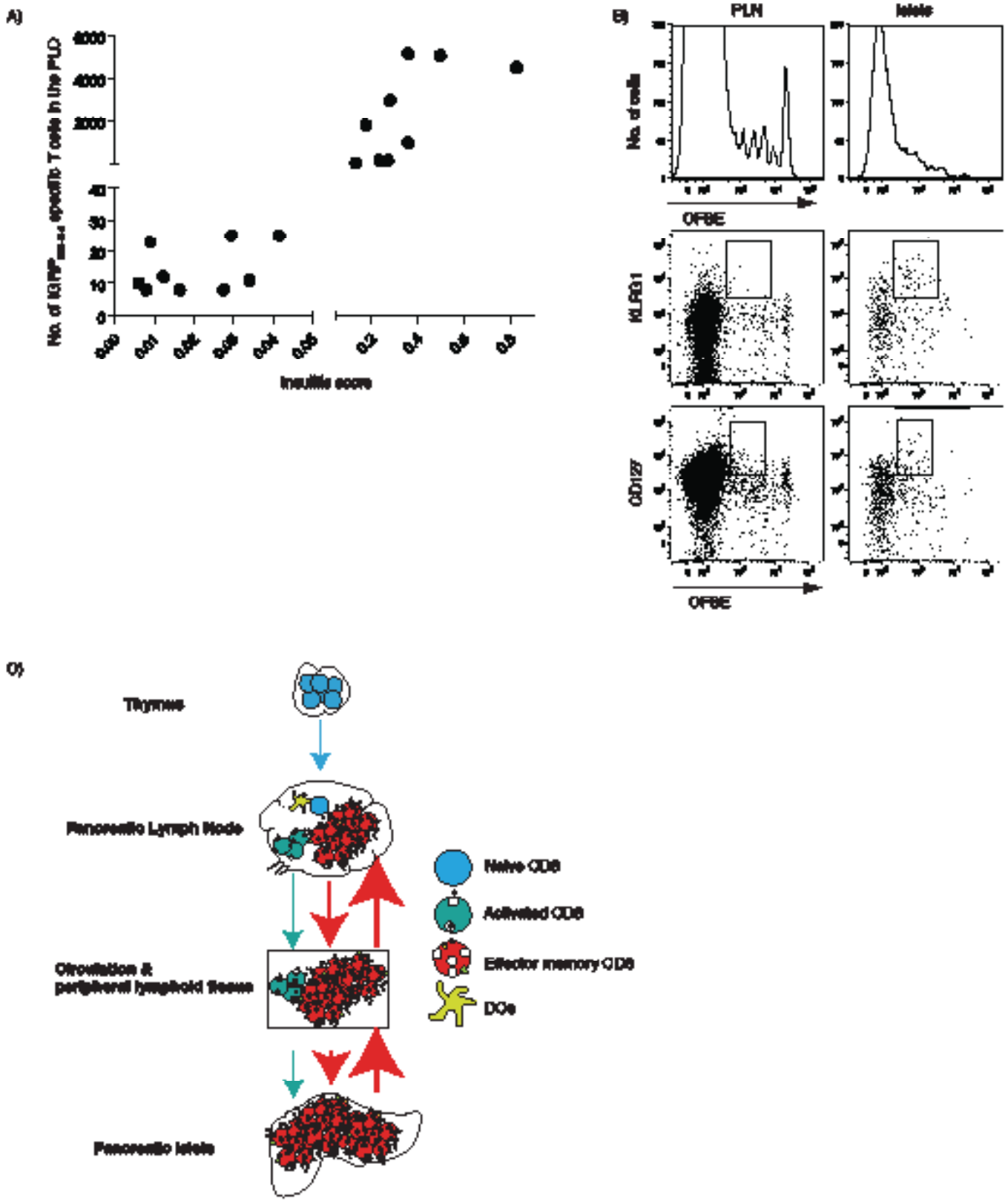


Figure 1

(A) IGRP-specific CD8$^+$ T cells in the peripheral lymphoid tissue correlates with the extend of insulitis in the pancreas. (n=18, r^2=0.6642, $p<0.0001$).

(B) CFSE labeled IGRP specific T cells were injected into 15-week-old NOD mice and memory markers were analyzed on the transferred T cells in the pancreatic lymph nodes (PLN) and islets. Together with CD127 and KLRG1 expression on transferred T cells increased only in the islets.

(C) Schematic of the development of naive islet specific T cells into CD8 memory effector T cells in the NOD mouse.

Mini Oral Presentation Prize: Jacqueline Flynn
Impaired HCV-Specific IFN-Gamma Responses in Individuals with Acute HIV/HCV Co-infection Correlate with CD4$^+$ T Cell Counts in the ATAHC Study

Jacqueline Flynn[1,2], Gregory Dore[3], Gail Matthews[3], Margaret Hellard[1], Barbara Yeung[3], William Rawlinson[4], Peter White[5], John Kaldor[3], Andrew Lloyd[5] and Rosemary Ffrench[1,2]

1 Burnet Institute, Melbourne, Vic, Australia; 2 Monash University, Melbourne, Vic, Australia; 3 Kirby Institute for Infection and Immunity in Society, Sydney, NSW, Australia; 4 Southern Eastern Area Laboratory Services, Sydney, NSW, Australia; 5 University of New South Wales, Sydney, NSW, Australia

I was very excited to have my abstract chosen for an oral presentation at the ASI conference and I was delighted to receive an oral presentation award. It was a challenge to summarize the work in 3 minutes with 3 slides. Although perhaps what was more challenging was presenting next to the lively bar.

The research I presented was a collaborative study within the Australian Trial in Acute Hepatitis C (ATAHC). During my PhD I investigated T cell responses from participants with acute hepatitis C (enrolled in ATAHC) to examine key requirements for the stimulation and maintenance of an effective HCV T cell response. The study I presented at ASI involved a comparison between participants with acute HCV mono-infection and HCV/HIV co-infection.

The significant findings of the study was the impairment in HCV-specific cytokines produced in those with HIV/HCV co-infection compared to those with acute HCV mono-infection, in particular the impairment in IFN-gamma production. IFN-gamma is a key anti-viral cytokine, of particular importance is its ability to inhibit viral replication.

Of further interest was that this study was the first demonstration of a positive correlation between HCV-specific IFN-gamma production and CD4$^+$ T cell counts in acute HIV/HCV co-infection. This, in combination with the knowledge that the CD4$^+$ T cell counts in the HIV/HCV co-infected individuals were within the normal range suggested a potential impairment in CD4$^+$ T cell function in participants with HIV/HCV co-infection compared to HCV mono-infection. Whereby a loss of CD4$^+$ T cell help can have detrimental effects on the generation of effector and memory CD8$^+$ T cell response and the production of HCV-specific cytokines, particularly IFN-gamma.

This study highlighted the importance of functional HCV-specific CD4$^+$ and CD8$^+$ T cells early in HIV/HCV infection. An increased the knowledge of the cytokine environment in acute HIV/HCV co-infection is required to better our understanding of disease pathogenesis, which is important for timing treatment aimed at HCV clearance.

For more information this study has been published in the Journal of Infectious Diseases (Flynn et al. J Infect Dis. (2012) 206 (10): 1568-1576. doi: 10.1093/infdis/jis544).

I really treasure my PhD studies and thank my friends in the Ffrench Laboratory and the Burnet Institute for their support. Currently I am thoroughly enjoying my postdoctoral position in Professor Paul Gorry's HIV Molecular Pathogenesis Laboratory (Burnet Institute) investigating the pathogenesis of Clade C HIV and developing T cell assays to detect infectivity of different T cell subsets.

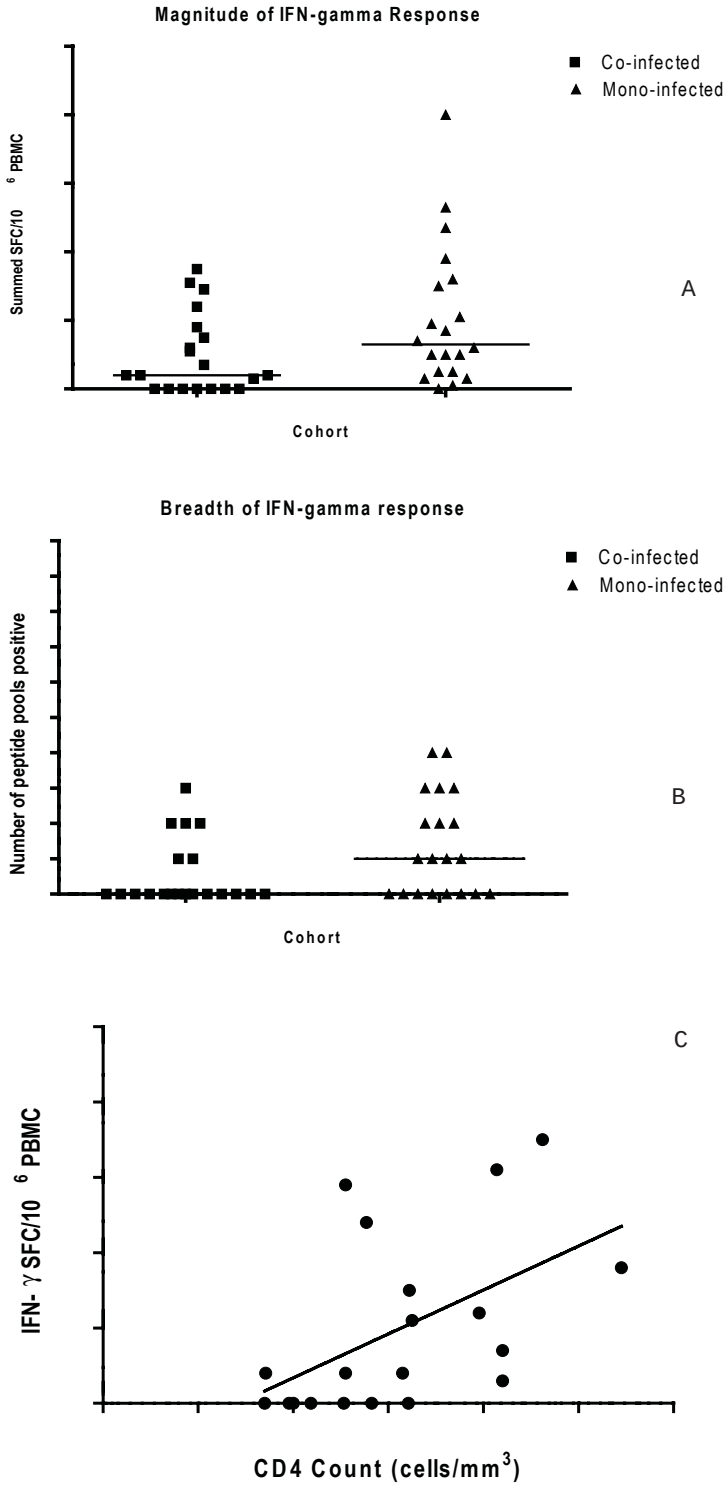


Figure 1

Magnitude and breadth of HCV-specific IFN-γ and IL-2 ELISpot responses to HCV peptide pools from the screening timepoint in HIV/HCV co-infected subjects (n=20) and HCV mono-infected subjects (n=20).

(A) HIV/HCV co-infected subjects have a significantly lower number of HCV-specific IFN-γ producing cells at screening (black squares, range 0-350 summed SFC/106 PBMC) compared to HCV mono-infected subjects (black triangles, range 0-800 summed SFC/106 PBMC, p=0.042, Mann-Whitney).

(B) HIV/HCV co-infected subjects also have a significantly lower breadth of HCV-specific IFN-γ responses at screen (median zero pools positive) compared to HCV mono-infected subjects (median one pool positive, p=0.046).

For Figure 1 A-B Each square/triangle represents an individual subject's response and the horizontal black solid lines represent the median response. One asterisk represents p<0.05.

(C) Correlation of HCV-specific IFN-γ cytokine production with CD4 counts in HIV/HCV co-infected subjects from the ELISpot assay at screening. High magnitude IFN-γ production was significantly correlated with CD4 counts (Spearman correlation IFN-γ magnitude rho=0.61 p=0.005).

Poster Prize: Nicole Christie
Critical proline residues in the interleukin-3 receptor α chain (CD123) for the activation of PI3-Kinase and biological activity

Nicole Christie[1,2], Paul Ekert[3], Angel Lopez[1], Hayley Ramshaw[1,2]

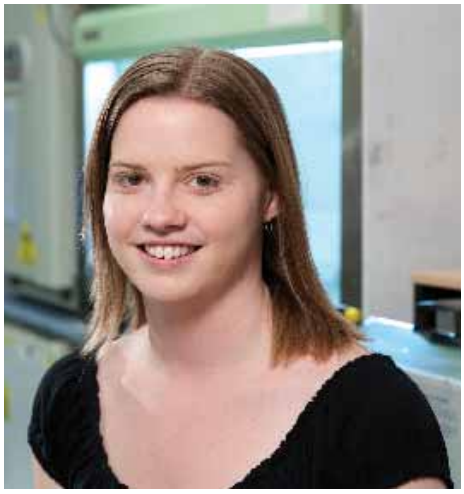
1. Centre for Cancer Biology, SA Pathology, Adelaide SA

2. School of Pharmacy and Medical Sciences, University of South Australia, Adelaide SA

3. Walter & Eliza Hall Institute of Medical Research, Parkville Victoria

My PhD project focuses on the interleukin-3 (IL-3) receptor and its role in the pathogenesis of acute myeloid leukaemia (AML). IL-3 is one of the key cytokines involved in the regulation of survival, proliferation and differentiation of hematopoietic cells and the signal transduction of the IL-3 signalling pathway is vital to cell activation[1]. The IL-3 receptor is composed of a ligand-specific α chain also known as the CD123 antigen and a common β subunit shared with IL-5 and GM-CSF. While receptor activation is dependent on the binding of IL-3 to IL-3Rα, the beta chain is the major signalling component of the IL-3 receptor. It has been shown however, on the surface of malignant stem cells derived from AML patients, that the alpha subunit is over-expressed and the levels of beta chain remain normal[2,3]. This over-expression of IL-3Rα on AML stem cells compared to normal stem cells provides a unique opportunity to selectively target the leukaemic stem cell (LSC)[3]. This therapeutic opportunity is being pursued in our laboratory, the Cytokine Receptor Laboratory, at the Centre for Cancer Biology in Adelaide in collaboration with CSL Ltd.

While the IL-3Rα provides an attractive target for therapy it is still unclear if the over-expressed IL-3Rα itself has a functional role in the pathogenesis of leukaemia. Since IL-3Rα is over-expressed on almost all of AML LSC regardless of morphological, cytogenetic or molecular sub-typing it is possible that IL-3Rα offers a biological advantage to AML cells. Currently, the consequences of IL-3Rα over-expression remain unknown. We hypothesise that the increased expression of the alpha chain enhances IL-3 signalling within these cells, providing a biological advantage to the AML LSC. The purpose of my project is to investigate the molecular basis behind this enhanced expression to increase our understanding of IL-3Rα. The ultimate aim of my work is to understand the molecular basis and biological significance of IL-3Rα over-expression in AML cells. The poster I presented at the ASI2012 Annual Scientific Meeting focused on the mechanisms by



which IL-3Rα promotes proliferation and survival.

The intracellular domain of IL-3Rα contains a proline rich motif that presents as a potential SH3 domain binding motif (aa336-339 PRIP) (Figure 1A). This motif is similar in sequence to the previously characterised membrane proximal proline rich motifs in the IL-5 and GM-CSF receptor α chains. In these receptors this region has been shown to be essential in the activation of IL-5 and GM-CSF dependent JAK/STAT and phosphatidylinositol 3-kinase (PI3K) pathways[4,5]. Given the importance of PI3-kinase in haematopoietic cell signalling and it's deregulation in AML[6], we proposed that the SH3 domain of PI3-kinase would interact with the IL-3 receptor alpha chain. Using co-immunoprecipitation experiments we demonstrated a novel interaction between IL-3Rα and p85, the regulatory subunit of PI3K. Furthermore, by generating proline to alanine substitutions (PRIP→ARIA) within the proline rich motif, we found a 12-fold reduction in association between the two

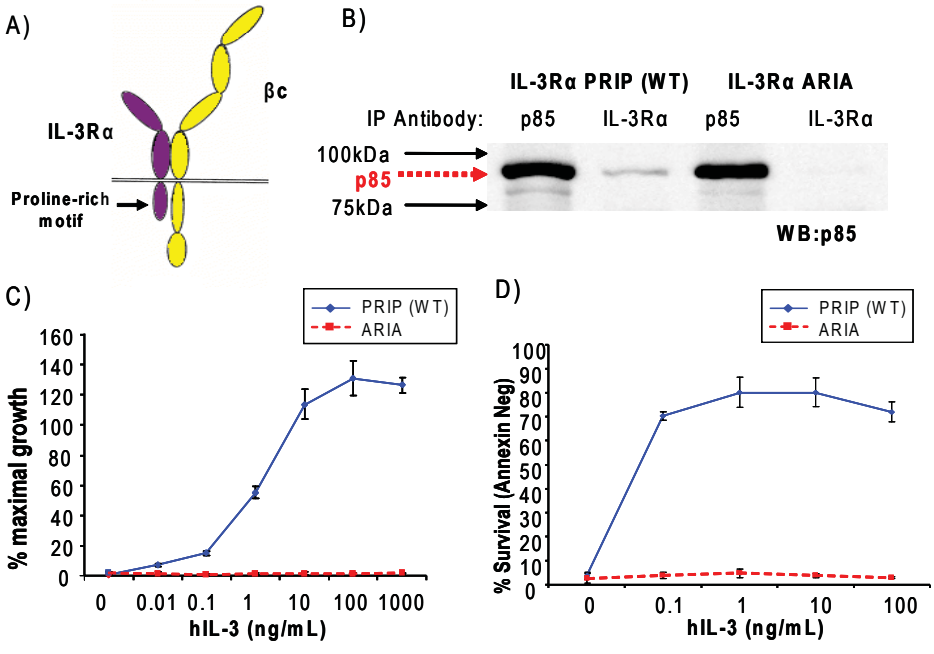


Figure 1

(A) The membrane proximal proline-rich motif is located within the intracellular portion of IL-3Rα. (B) p85 (positive control) or IL-3Rα (9F5 MAb) was immunoprecipitated from transfected HEK cells. Immunoprecipitates were run on SDS-PAGE and western blotted for p85 protein. Mutation of the 2 proline residues abrogates p85 binding to IL-3Rα. (C) ^{3}H-Thymidine incorporation demonstrates that murine foetal liver cells expressing human IL-3Rα WT proliferate in response to human IL-3, while those with the mutated receptor do not. (D) Cells expressing human IL-3Rα WT demonstrate a dose response of survival following human IL-3 stimulation, whereas in the cells expressing the ARIA mutation this survival was greatly reduced.

proteins (Figure 1B).

By expressing the human IL-3 receptor containing the ARIA mutation in a murine cell line, we identified the functional significance of this proline rich motif. ^{3}H-Thymidine incorporation proliferation assays demonstrated that the presence of a mutated IL-3Rα abolished proliferation in response to IL-3 (Figure 1C). Annexin V survival assays showed that cells expressing the ARIA-mutant receptor underwent apoptosis despite the presence of IL-3, showing that the mutant receptor could no longer transduce a survival signal (Figure 1D).

Our functional data was supported by biochemical analysis of signal transduction, in which we established that the ARIA mutant blocked activation of key proliferative and survival pathways following IL-3 stimulation. Cells expressing the human IL-3 receptor, either WT or ARIA IL-3Rα, were stimulated with IL-3 for ten minutes and whole cell lysates analysed by Western blotting. We used antibodies to detect phosphorylation of AKT1, JAK2 and STAT-5, which revealed blocks in the activation of PI3K/AKT and JAK/STAT pathways providing biochemical insight (or mechanism) that explained why the ARIA mutant expressing cells failed to proliferate and underwent apoptosis.

These results have identified an important and conserved region of IL-3Rα required for normal responses to the cytokine. We have also demonstrated a novel interaction between IL-3Rα and PI3-Kinase. This information suggests a previously undefined role for IL-3Rα in eliciting a signal from IL-3 stimulation. The significance of this lies with the over-expression of this molecule on AML LSC, cells which are known to out-compete non-malignant haematopoietic cells leading to aggressive disease in AML patients.

Acknowledgments: I would like to thank the editor for inviting me to contribute my work to this newsletter. This work is carried out under the supervision of Dr Hayley Ramshaw at the Centre for Cancer Biology, Adelaide and is generously supported by the Leukaemia Foundation Australia.

References:

1 Broughton, S. E. *et al.* The GM-CSF/IL-3/IL-5 cytokine receptor family: from ligand recognition to initiation of signaling. *Immunol. Rev.* **250**, 277-302,(2012).

2 Jordan, C. T. *et al.* The interleukin-3 receptor alpha chain is a unique marker for human acute myelogenous leukemia stem cells. *Leukemia* **14**, 1777-1784 (2000).

3 Jin, L. *et al.* Monoclonal antibody-mediated targeting of CD123, IL-3 receptor alpha chain, eliminates human acute myeloid leukemic stem cells. *Cell Stem Cell* **5**, 31-42 (2009).

4 Kouro, T. *et al.* Critical proline residues of the cytoplasmic domain of the IL-5 receptor alpha chain and its function in IL-5-mediated activation of JAK kinase and STAT5. *Int. Immunol.* **8**, 237-245 (1996).

5 Perugini, M. *et al.* Alternative modes of GM-CSF receptor activation revealed using activated mutants of the common β-subunit. *Blood* **115**, 3346-3353, (2010).

6 Xu, Q., Simpson, S. E., Scialla, T. J., Bagg, A. & Carroll, M. Survival of acute myeloid leukemia cells requires PI3 kinase activation. *Blood* **102**, 972-980, (2003).

Jacques Miller Senior Travel Award

No Escape for Academics

*Nattkunam Ketheesan**
James Cook University, Townsville, Queensland

I was awarded the ASI Jacques Miller Senior Travel Award which enabled me to travel to the University of Jaffna in Sri Lanka in 2012 to conduct an intensive course in medical immunology and on my way back to Australia to visit the labs of collaborators in Singapore.

Sri Lanka currently is a country in transition following a generation of civil strife which had left around 100,000 dead, tens of thousands displaced and dispersed. Following cessation of major hostilities in 2009, the University of Jaffna which is situated in the north of the island, has been able to recruit more staff and academics. However, they have not yet been able to successfully recruit an immunologist. Therefore, on the request of the Head of the Department of Pathology at the University of Jaffna, I conducted a six day intensive course in medical immunobiology for 80 students in their third year of an undergraduate medical programme. An international grant in aid programme provided financial support to purchase a few copies of Janeway's Immunobiology for the library, for purchase of diagnostic reagents for practical classes and to generate a complete set of lecture notes for all participants.

The intensive course involved three formal lectures a day, workshops on research method and writing skills and practical sessions. After having lived and worked in tropical Australia for several years, one would have expected that I could have coped with the tropical weather. However, teaching for nine hours without air-conditioning in the lecture theatres and labs was a challenge. Although the students were initially reluctant to participate in discussions during lecture sessions, they became accustomed to an interactive style of delivery of content material. It soon became quite apparent to me that students were in many ways very similar to those I teach in Australia. Mobile technology enabled them to consult the web during lectures (Google and not PubMed!) to look up answers to general questions. It also provided them the opportunity to keep sending and receiving text messages during lectures!

Laboratory diagnostic kits are not made available through the university system for students to test clinical samples and carry out practical work. This is understandable, as some of the common diagnostic kits to investigate febrile illnesses are not available even in the diagnostic laboratories of the local teaching hospital. Therefore, for the students enrolled in the course, we purchased and transported diagnostic kits from Australia that could be used to detect antibodies to dengue virus and scrub typhus. Students were able to observe the basic aspects of a standard ELISA. Staff members at the university and Jaffna Teaching Hospital were interested in conducting seroprevalence studies on these diseases and had collected and stored serum samples from patients clinically suspected of having these infections. These samples were used during the practical sessions. The Dengue NS1, IgM and IgG ELISA kits and the Scrub Typhus IgM and IgG Rapid Test were used. Overall more than 300 samples from suspected cases of dengue were screened with around 22% being positive for NS1. Clinicians at the hospital had stored 35 samples from patients who they had suspected of having scrub typhus. These patients had been clinically diagnosed and successfully undergone treatment. Of these patients, 83% and 51% were found to be positive for scrub typhus IgM and IgG respectively. These findings helped students and staff to prepare scientific reports. Although the purchase and transportation of the reagents for the practical session involved overcoming substantial logistical difficulties, the practical sessions were rated by students as being one of the best aspects of the course.

Students attending the course at University of Jaffna were very appreciative that I was able to deliver the subject material. In feedback provided regarding the course, several students suggested that a similar course should be continued for the foreseeable future until a suitable local staff member could take over the teaching. Some of the aspects provided as feedback was unexpected, including comments such as "just give us the important sections required for the exam", "why do medical students have to know about the structure and the complexities of the antibody molecule" and "the clinical aspects are more interesting". Such comments have ceased to trouble me as I am used to such views expressed by third year medical students in Australia.

I started my career as an academic in Australia over twelve years ago. At the beginning, a few first year students at JCU would comment that it was hard for them to understand the immunology I taught due to my "strange accent". I have put an end to such comments by mentioning at the beginning of the lectures to first year students that, as school leavers living in northern Queensland, they have never been exposed to "English as she is spoke" in different parts of the globe. However, I was certainly amused to receive written feedback from students in the University of Jaffna suggesting that I should speak in "Sri Lankan English" as it was hard for them to understand the material I taught due to my "Australian accent"!

On my return journey, I also spent a few days visiting collaborators in Singapore to work on joint grant proposals. I collaborate with researchers from the National University of Singapore, Duke-NUS and the Defence Science Organisation on projects relating to host-pathogen interactions in melioidosis, a tropical bacterial infection which is associated with significant mortality. Although the bacteria causing melioidosis kill more patients in Australia every year than the total number of deaths due to close human encounters with venomous snakes,

spiders, box jelly fish, sharks and crocodiles, most researchers (and granting bodies) in Australia have "never heard of melioidosis"[1]. During my visit, the universities in Singapore were involved in an exercise to increase their research profile and further advance their positions in the various international league tables. Another familiar exercise that takes away valuable time from academics in Australia and the world over!

I would like to thank the ASI for the travel grant which certainly provided me the opportunity to realise that in today's environment there are no greener pastures to move to for university academics who are involved in T&R; therefore maybe we should get the best of what we are left with!

---

*NK is a research active academic staff member at James Cook University and holds a Personal Chair in Infection and Immunity. He teaches immunology to both science and medical students.

[1]Aldhous P (2005) Melioidosis? Never heard of it. Nature; 434 (7034): 692-3

Transportation of the reagents for the practical session was the most logistically complex operation

Initial tests were carried out by staff and demonstrated to groups of students

It is always exciting to get positive results regardless of the consistency of duplicates!

Every student got a turn to test out the patient samples

TRAVEL AWARD CONFERENCE REPORTS

Cell Symposium on Human Immunity, Lisbon, Portugal

Kate Schroder
Institute for Molecular Bioscience, University of Queensland

I was very honoured to receive an ASI Gordon Ada Career Development Award, which allowed me to attend the recent Human Immunity Symposium, organised by Cell Press. This three-day conference was held in the beautiful city of Lisbon, and had a stellar line up of international speakers.

A key focus of the meeting was the use of systems biology techniques to gain a holistic understanding of human immune responses, in the context of vaccination or natural infection. For me, conference highlights on this topic were from Adrian Hayday and Bali Palendran, who have systematically profiled human immune responses to the influenza and yellow fever vaccines, and obtained elegant systems biology signatures of immune protection. Rino Rappuoli from Novartis gave an insightful talk about the new challenges infectious diseases present to modern-day society, amongst an aging population and increasingly prevalent antibiotic resistance. A recurring theme of the meeting was how best to integrate data from mouse models into human immune research; Bali Palendran gave an excellent summary of how this might be achieved effectively (also discussed in several of his recent reviews, which are well worth reading).

As an innate immunologist who works with myeloid cells, I was very excited to hear a talk from Frederic Geissmann, a pioneer in myeloid cell development. He gave an outstanding presentation exploring the development and function of myeloid cells in drosophila, mice and humans.

Cell Symposia are a relatively new conference series, I found the format wonderful – it was a very focused meeting with speakers of outstanding quality, and registrations capped to around 250 delegates, which creates a lot of opportunity to interact with speakers, journal editors and other conference delegates during breaks, meals and poster sessions. I presented our recent work comparing innate immune responses in human versus mouse, which met with a lot of interest and a deluge of questions that left me without a voice for the rest of the evening (somewhat ironically for a human immunity conference, I came down with a terrible bout of bronchitis prior to my presentation).

After the conference, I travelled to Switzerland to visit the Biochemistry Department of the University of Lausanne, where I was a postdoc in Jurg Tschopp's group until early last year. The Biochemistry Department has changed a lot since I left, but it was a great opportunity to visit my Swiss colleagues and discuss our new and continuing collaborative projects, as well give a seminar to update them on my research since returning to Australia.

In all, it was a very productive trip, and my sincere thanks to the ASI for the fantastic opportunities this travel award gave me!

The view of Lake Geneva from the Biochemistry Department at the University of Lausanne, Switzerland.

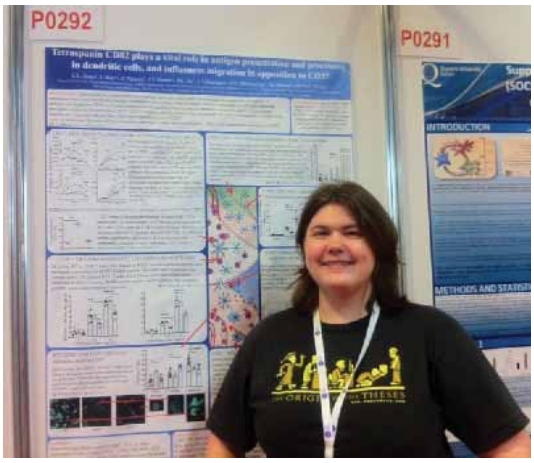
European Congress of Immunology, Glasgow, UK and European Tetraspanin Conference, Nijmegen, The Netherlands

Eleanor Jones
Monash University, Melbourne

On September 1st, I embarked on an exciting and amazing adventure, funded by an ASI post graduate award. I was not alone, in fact, I was traveling with a figure who may be familiar to those who study these pages each issue in detail: Maria Demaria, also known as one of the student representatives in charge of the student function at the 2012 annual meeting. Our first stop was the surprisingly sunny London (they were suffering through a beautiful 20 degree heat wave).

We gathered our nerves after the gruelling trip to head even further north to Glasgow, and one of the largest Immunology conferences in the world, the European Congress of Immunology (ECI) with approximately 5000 attendees, around 1500 of which were students. After a conference opening which of course included bagpipes and the highland fling (this is Scotland after all!), we got our first good look at the hall. The massive space was half filled just with posters, which at about one metre across each would provide exercise between sessions, as we gradually worked out way through all 2km of them. The sheer number of attendees was hard to grasp, but did mean a diverse range of techniques were presented, a veritable dictionary of new acronyms, including the particularly popular n- and d-STORM (both super resolution microscopy techniques). There was also a big push for clinical applications for research, perhaps a reflection of the funding situation in Europe. Presenting a poster, I received a number of critiques by immunologists from around the world and a range of specificity. I was lucky enough to catch up with Dr Marion Brown from Oxford University, a well known immunologist, and discuss my project and possible future directions. On the last day we were treated to ECI cupcakes, definitely a highlight, which softened the sadness for seeing posters coming down like it was the middle of autumn in the hall.

After a quick stop to Glasgow's shopping district, "the largest and best retail centre in the UK outside of London", we headed back south to The University of Birmingham to visit the labs of Dr Michael Tomlinson and Dr Fedor Berdichevski. Michael and



Eleanor presenting her poster at ECI

Fedor are two outstanding researchers in the tetraspanin field and by visiting their labs I gained insight into their research as well as laying the groundwork for future collaboration. I presented my own work to members of staff from both of their labs in a formal talk, before we headed to the bar for a much more casual setting. A must for those visiting Birmingham is the Balti Triangle, packed full of delicious Indian food. Over dinner we heard that the trials and triumphs of PhD students are the same the world over, and that fellow students are just a Facebook message away!

Maria and I took time to make a whirlwind tour of Italy; for travel advice, contact me directly as no science was involved in the making of those experiences!

We arrived in The Netherlands to attend the European Tetraspanin Conference in Nijmegen, a university town located in the south, close to the German border. The European Tetraspanin Conference is held only bi-annually, and is much smaller with approximately 100 attendees. It gave me the great opportunity to present my work to my field and also gain understanding of new exciting research occurring currently in the field. It is the one of the few chances I will have during my PhD to meet and talk to possible post graduate employers from as far afield as Nashville to Tokyo to the UK. Hopefully, despite going slightly over time, I made a good impression during my presentation. At least two leaders made the effort to find my poster and discuss my research in further detail (indicating either terrible or excellent, not average, impressions had been made…). Some of the most important moments at conferences aren't listening to talks, but the few quiet (and sometimes not so quiet) conversations had at dinners and drinks. The chance to meet those who, in the very near future, might become employers is highly valuable, and I certainly encourage fellow students to get out there (especially if you can get ASI to fund you!). In actual conference hours, talks on super resolution imaging again were fantastic; next $200,000 I find lying around is certainly going to buy one!

While in Nijmegen we visited a long term collaborator at the Nijmegen Centre for Molecular Life Sciences, Dr Annemiek van Spriel. Annemiek is not only a close collaborator but has recently been awarded a large grant to study a number of tetraspanins which we also have and use. The visit allowed for meeting about the future of my own (and Maria's!) projects and the direction of research in both labs, as well as being an excellent chance to network.

Informal meeting between collaborators from three different countries during the tetraspanin conference

Publications List

Congratulations to ASI members who have published their following work in the last three months (articles with an ePub date between October and December 2012)

Lee I, Harrison LC, Colman PG. **Fulminant type 1 diabetes in Australia in the absence of humoral and cellular immune responses to pancreatic islet autoantigens**. *Diabetes Res Clin Pract* 2012; **95**(1)**:** e4.

Stein MS, Liu Y, Gray OM, Baker JE, Kolbe SC, Ditchfield MR, Egan GF *et al.* **A randomized trial of high-dose vitamin D2 in relapsing-remitting multiple sclerosis**. *Neurology* 2011; **77**(17)**:** 1611.

de Kretser DM, O'Hehir RE, Hardy CL, Hedger MP. **The roles of activin A and its binding protein, follistatin, in inflammation and tissue repair**. *Mol Cell Endocrinol* 2012; **359**(1-2)**:** 101.

Denton AE, Wesselingh R, Gras S, Guillonneau C, Olson MR, Mintern JD, Zeng W *et al.* **Affinity thresholds for naive CD8+ CTL activation by peptides and engineered influenza A viruses**. *J Immunol* 2011; **187**(11)**:** 5733.

Sutherland RM, Londrigan SL, Brady JL, Azher H, Carrington EM, Zhan Y, Vega-Ramos J *et al.* **Shutdown of immunological priming and presentation after in vivo administration of adenovirus**. *Gene Ther* 2012; **19**(11)**:** 1095.

Micallef SJ, Li X, Schiesser JV, Hirst CE, Yu QC, Lim SM, Nostro MC *et al.* **INS(GFP/w) human embryonic stem cells facilitate isolation of in vitro derived insulin-producing cells**. *Diabetologia* 2012; **55**(3)**:** 694.

Macia L, Thorburn AN, Binge LC, Marino E, Rogers KE, Maslowski KM, Vieira AT *et al.* **Microbial influences on epithelial integrity and immune function as a basis for inflammatory diseases**. *Immunol Rev* 2012; **245**(1)**:** 164.

Hardy CL, LeMasurier JS, Belz GT, Scalzo-Inguanti K, Yao J, Xiang SD, Kanellakis P *et al.* **Inert 50-nm polystyrene nanoparticles that modify pulmonary dendritic cell function and inhibit allergic airway inflammation**. *J Immunol* 2012; **188**(3)**:** 1431.

Price P, Haddow LJ, Affandi J, Agarwal U, Easterbrook PJ, Elliott J, French M *et al.* **Short communication: Plasma levels of vitamin D in HIV patients initiating antiretroviral therapy do not predict immune restoration disease associated with Mycobacterium tuberculosis**. *AIDS Res Hum Retroviruses* 2012; **28**(10)**:** 1216.

Marino E, Grey ST. **B cells as effectors and regulators of autoimmunity**. *Autoimmunity* 2012; **45**(5)**:** 377.

Yu L, Boulware DC, Beam CA, Hutton JC, Wenzlau JM, Greenbaum CJ, Bingley PJ *et al.* **Zinc transporter-8 autoantibodies improve prediction of type 1 diabetes in relatives positive for the standard biochemical autoantibodies**. *Diabetes Care* 2012; **35**(6)**:** 1213.

Xue M, Dervish S, Harrison LC, Fulcher G, Jackson CJ. **Activated protein C inhibits pancreatic islet inflammation, stimulates T regulatory cells, and prevents diabetes in non-obese diabetic (NOD) mice**. *J Biol Chem* 2012; **287**(20)**:** 16356.

Zhang JG, Czabotar PE, Policheni AN, Caminschi I, Wan SS, Kitsoulis S, Tullett KM *et al.* **The dendritic cell receptor Clec9A binds damaged cells via exposed actin filaments**. *Immunity* 2012; **36**(4)**:** 646.

Harrison LC. **Insulin-specific vaccination for type 1 diabetes: a step closer?** *Hum Vaccin Immunother* 2012; **8**(6)**:** 834.

Mintern JD, Villadangos JA. **Autophagy and mechanisms of effective immunity**. *Front Immunol* 2012; **3:** 60.

Huynh J, Kwa MQ, Cook AD, Hamilton JA, Scholz GM. **CSF-1 receptor signalling from endosomes mediates the sustained activation of Erk1/2 and Akt in macrophages**. *Cell Signal* 2012; **24**(9)**:** 1753.

Gibson MS, Salmon N, Bird S, Kaiser P, Fife M. **Identification, cloning and characterisation of interleukin-1F5 (IL-36RN) in the chicken**. *Dev Comp Immunol* 2012; **38**(1)**:** 136.

Holz LE, Benseler V, Vo M, McGuffog C, Van Rooijen N, McCaughan GW, Bowen DG *et al.* **Naive CD8 T cell activation by liver bone marrow-derived cells leads to a "neglected" IL-2low Bimhigh phenotype, poor CTL function and cell death**. *J Hepatol* 2012; **57**(4)**:** 830.

Gibson MS, Fife M, Bird S, Salmon N, Kaiser P. **Identification, cloning, and functional characterization of the IL-1 receptor antagonist in the chicken reveal important differences between the chicken and mammals**. *J Immunol* 2012; **189**(2)**:** 539.

Jackaman C, Majewski D, Fox SA, Nowak AK, Nelson DJ. **Chemotherapy broadens the range of tumor antigens seen by cytotoxic CD8(+) T cells in vivo**. *Cancer Immunol Immunother* 2012; **61**(12)**:** 2343.

Zhang Y, Bandala-Sanchez E, Harrison LC. **Revisiting regulatory T cells in type 1 diabetes**. *Curr Opin Endocrinol Diabetes Obes* 2012; **19**(4)**:** 271.

Oliver BG, Elliott JH, Price P, Phillips M, Cooper DA, French MA. **Tuberculosis after commencing antiretroviral therapy for HIV infection is associated with elevated CXCL9 and CXCL10 responses to Mycobacterium tuberculosis antigens**. *J Acquir Immune Defic Syndr* 2012; **61**(3)**:** 287.

Tan CK, Carey AJ, Cui X, Webb RI, Ipe D, Crowley M, Cripps AW *et al.* **Genome-wide mapping of cystitis due to Streptococcus agalactiae and Escherichia coli in mice identifies a unique bladder transcriptome that signifies pathogen-specific antimicrobial defense against urinary tract infection**. *Infect Immun* 2012; **80**(9)**:** 3145.

Rizzitelli A, Meuter S, Ramos JV, Bird CH, Mintern JD, Mangan MS, Villadangos J *et al.* **Serpinb9 (Spi6)-deficient mice are impaired in dendritic cell-mediated antigen cross-presentation**. *Immunol Cell Biol* 2012; **90**(9)**:** 841.

Zhan Y, Vega-Ramos J, Carrington EM, Villadangos JA, Lew AM, Xu Y. **The inflammatory cytokine, GM-CSF, alters the developmental outcome of murine dendritic cells**. *Eur J Immunol* 2012; **42**(11)**:** 2889.

Sparrow RL, Chan KS. **Microparticle content of plasma for transfusion is influenced by the whole blood hold conditions: pre-analytical considerations for proteomic investigations**. *J Proteomics* 2012; **76 Spec No.:** 211.

Sterjovski J, Churchill MJ, Ellett A, Wesselingh SL, Ramsland PA, Gorry PR. **Structural elements of primary CCR5-using HIV-1 gp120 proteins influencing sensitivity and resistance to the broadly neutralizing monoclonal antibody b12**. *Virology* 2012; **432**(2)**:** 394.

Marino E, Tan B, Binge L, Mackay CR, Grey ST. **B-cell cross-presentation of autologous antigen precipitates diabetes**. *Diabetes* 2012; **61**(11)**:** 2893.

Cook AD, Pobjoy J, Sarros S, Steidl S, Durr M, Lacey DC, Hamilton JA. **Granulocyte-macrophage colony-stimulating factor is a key mediator in inflammatory and arthritic pain**. *Ann Rheum Dis* 2013; **72**(2)**:** 265.

Kramski M, Schorcht A, Johnston AP, Lichtfuss GF, Jegaskanda S, De Rose R, Stratov I *et al.* **Role of monocytes in mediating HIV-specific antibody-dependent cellular cytotoxicity**. *J Immunol Methods* 2012; **384**(1-2)**:** 51.

Patin E, Kutalik Z, Guergnon J, Bibert S, Nalpas B, Jouanguy E, Munteanu M *et al.* **Genome-wide association study identifies variants associated with progression of liver fibrosis from HCV infection**. *Gastroenterology* 2012; **143**(5)**:** 1244.

Dudek NL, Tan CT, Gorasia DG, Croft NP, Illing PT, Purcell AW. **Constitutive and inflammatory immunopeptidome of pancreatic beta-cells**. *Diabetes* 2012; **61**(11)**:** 3018.

Husain M, Bird S, van Zwieten R, Secombes CJ, Wang T. **Cloning of the IL-1beta3 gene and IL-1beta4 pseudogene in salmonids uncovers a second type of IL-1beta gene in teleost fish**. *Dev Comp Immunol* 2012; **38**(3)**:** 431.

Safavi-Hemami H, Gorasia DG, Steiner AM, Williamson NA, Karas JA, Gajewiak J, Olivera BM *et al.* **Modulation of conotoxin structure and function is achieved through a multienzyme complex in the venom glands of cone snails**. *J Biol Chem* 2012; **287**(41)**:** 34288.

Short KR, Brooks AG, Reading PC, Londrigan SL. **The fate of influenza A virus after infection of human macrophages and dendritic cells**. *J Gen Virol* 2012; **93**(Pt 11)**:** 2315.

Schroder K, Sagulenko V, Zamoshnikova A, Richards AA, Cridland JA, Irvine KM, Stacey KJ *et al.* **Acute lipopolysaccharide priming boosts inflammasome activation independently of inflammasome sensor induction**. *Immunobiology* 2012; **217**(12)**:** 1325.

Jeebhay MF, Lopata AL. **Occupational allergies in seafood-processing workers**. *Adv Food Nutr Res* 2012; **66:** 47.

Giam M, Mintern JD, Rautureau GJ, Hinds MG, Strasser A, Bouillet P. **Detection of Bcl-2 family member Bcl-G in mouse tissues using new monoclonal antibodies**. *Cell Death Dis* 2012; **3:** e378.

Mattarollo SR, West AC, Steegh K, Duret H, Paget C, Martin B, Matthews GM *et al.* **NKT cell adjuvant-based tumor vaccine for treatment of myc oncogene-driven mouse B-cell lymphoma**. *Blood* 2012; **120**(15)**:** 3019.

Dickgreber N, Farrand KJ, van Panhuys N, Knight DA, McKee SJ, Chong ML, Miranda-Hernandez S *et al.* **Immature murine NKT cells pass through a stage of developmentally programmed innate IL-4 secretion**. *J Leukoc Biol* 2012; **92**(5)**:** 999.

Smith C, Elhassen D, Gras S, Wynn KK, Dasari V, Tellam J, Tey SK *et al.* **Endogenous antigen presentation impacts on T-box transcription factor expression and functional maturation of CD8+ T cells**. *Blood* 2012; **120**(16)**:** 3237.

Ooi JD, Chang J, Hickey MJ, Borza DB, Fugger L, Holdsworth SR, Kitching AR. **The immunodominant myeloperoxidase T-cell epitope induces local cell-mediated injury in antimyeloperoxidase glomerulonephritis**. *Proc Natl Acad Sci U S A* 2012; **109**(39)**:** E2615.

Tan ML, Ng A, Pandher PS, Sashindranath M, Hamilton JA, Davis SM, O'Brien TJ *et al.* **Tissue plasminogen activator does not alter development of acquired epilepsy**. *Epilepsia* 2012; **53**(11)**:** 1998.

Islam MA, Shin JY, Firdous J, Park TE, Choi YJ, Cho MH, Yun CH *et al.* **The role of osmotic polysorbitol-based transporter in RNAi silencing via caveolae-mediated endocytosis and COX-2 expression**. *Biomaterials* 2012; **33**(34)**:** 8868.

Hansford JR, Pal M, Poplawski N, Haan E, Boog B, Ferrante A, Davis J *et al.* **In utero and early postnatal presentation of autoimmune lymphoproliferative syndrome in a family with a novel FAS mutation**. *Haematologica* 2012.

Chow MT, Sceneay J, Paget C, Wong CS, Duret H, Tschopp J, Moller A *et al.* **NLRP3 suppresses NK cell-mediated responses to carcinogen-induced tumors and metastases**. *Cancer Res* 2012; **72**(22)**:** 5721.

Lahoud MH, Ahmet F, Zhang JG, Meuter S, Policheni AN, Kitsoulis S, Lee CN *et al.* **DEC-205 is a cell surface receptor for CpG oligonucleotides**. *Proc Natl Acad Sci U S A* 2012; **109**(40)**:** 16270.

Hamilton JA, Achuthan A. **Colony stimulating factors and myeloid cell biology in health and disease**. *Trends Immunol* 2013; **34**(2)**:** 81.

D'Vaz N, Ma Y, Dunstan JA, Lee-Pullen TF, Hii C, Meldrum S, Zhang G *et al.* **Neonatal protein kinase C zeta expression determines the neonatal T-Cell cytokine phenotype and predicts the development and severity of infant allergic disease**. *Allergy* 2012; **67**(12)**:** 1511.

Chow MT, Tschopp J, Moller A, Smyth MJ. **NLRP3 promotes inflammation-induced skin cancer but is dispensable for asbestos-induced mesothelioma**. *Immunol Cell Biol* 2012; **90**(10)**:** 983.

Bergmann H. **Business as usual: the p35 isoform of human CD74 retains function in antigen presentation**. *Immunol Cell Biol* 2012; **90**(9)**:** 839.

Kelso A, Hurt AC. **The ongoing battle against influenza: Drug-resistant influenza viruses: why fitness matters**. *Nat Med* 2012; **18**(10)**:** 1470.

Clanchy FI, Hamilton JA. **The development of macrophages from human CD34+ haematopoietic stem cells in serum-free cultures is optimized by IL-3 and SCF**. *Cytokine* 2013; **61**(1)**:** 33.

Engwerda CR, Minigo G, Amante FH, McCarthy JS. **Experimentally induced blood stage malaria infection as a tool for clinical research**. *Trends Parasitol* 2012; **28**(11)**:** 515.

Coleman MA, Steptoe RJ. **Induction of antigen-specific tolerance through hematopoietic stem cell-mediated gene therapy: the future for therapy of autoimmune disease?** *Autoimmun Rev* 2012; **12**(2)**:** 195.

Gras S, Burrows SR, Turner SJ, Sewell AK, McCluskey J, Rossjohn J. **A structural voyage toward an understanding of the MHC-I-restricted immune response: lessons learned and much to be learned**. *Immunol Rev* 2012; **250**(1)**:** 61.

Greer JM, McCombe PA. **The role of epigenetic mechanisms and processes in autoimmune disorders**. *Biologics* 2012; **6:** 307.

Kjer-Nielsen L, Patel O, Corbett AJ, Le Nours J, Meehan B, Liu L, Bhati M *et al.* **MR1 presents microbial vitamin B metabolites to MAIT cells**. *Nature* 2012; **491**(7426)**:** 717.

Hardy CL, Nguyen HA, Mohamud R, Yao J, Oh DY, Plebanski M, Loveland KL *et al.* **The activin A antagonist follistatin inhibits asthmatic airway remodelling**. *Thorax* 2013; **68**(1)**:** 9.

Lindqvist LM, Vikstrom I, Chambers JM, McArthur K, Ann Anderson M, Henley KJ, Happo L *et al.* **Translation inhibitors induce cell death by multiple mechanisms and Mcl-1 reduction is only a minor contributor**. *Cell Death Dis* 2012; **3:** e409.

Giam M, Okamoto T, Mintern JD, Strasser A, Bouillet P. **Bcl-2 family member Bcl-G is not a proapoptotic protein**. *Cell Death Dis* 2012; **3:** e404.

Broughton SE, Petersen J, Theodossis A, Scally SW, Loh KL, Thompson A, van Bergen J *et al.* **Biased T cell receptor usage directed against human leukocyte antigen DQ8-restricted gliadin peptides is associated with celiac disease**. *Immunity* 2012; **37**(4)**:** 611.

Ooi JD, Kitching AR. **CD4+ Th1 cells are effectors in lupus nephritis--but what are their targets?** *Kidney Int* 2012; **82**(9)**:** 947.

Hasnain SZ, McGuckin MA, Grencis RK, Thornton DJ. **Serine protease(s) secreted by the nematode Trichuris muris degrade the mucus barrier**. *PLoS Negl Trop Dis* 2012; **6**(10)**:** e1856.

McCoy MJ, Nowak AK, van der Most RG, Dick IM, Lake RA. **Peripheral CD8(+) T cell proliferation is prognostic for patients with advanced thoracic malignancies**. *Cancer Immunol Immunother* 2012.

Waithman J, Mintern JD. **Dendritic cells and influenza A virus infection**. *Virulence* 2012; **3**(7).

Stent A, Every AL, Ng GZ, Chionh YT, Ong LS, Edwards SJ, Sutton P. **Helicobacter pylori thiolperoxidase as a protective antigen in single- and multi-component vaccines**. *Vaccine* 2012; **30**(50)**:** 7214.

Proietto AI, Mittag D, Roberts AW, Sprigg N, Wu L. **The equivalents of human blood and spleen dendritic cell subtypes can be generated in vitro from human CD34(+) stem cells in the presence of fms-like tyrosine kinase 3 ligand and thrombopoietin**. *Cell Mol Immunol* 2012; **9**(6)**:** 446.

Stokes L. **Rab5 regulates internalisation of P2X4 receptors and potentiation by ivermectin**. *Purinergic Signal* 2013; **9**(1)**:** 113.

Liu Y, Mitchell PJ, Kilpatrick TJ, Stein MS, Harrison LC, Baker J, Ditchfield M *et al.* **Diffusion tensor imaging of acute inflammatory lesion evolution in multiple sclerosis**. *J Clin Neurosci* 2012; **19**(12)**:** 1689.

Jalilian I, Spildrejorde M, Seavers A, Curtis BL, McArthur JD, Sluyter R. **Functional expression of the damage-associated molecular pattern receptor P2X7 on canine kidney epithelial cells**. *Vet Immunol Immunopathol* 2012; **150**(3-4)**:** 228.

Enders A, Stankovic S, Teh C, Uldrich AP, Yabas M, Juelich T, Altin JA *et al.* **ZBTB7B (Th-POK) regulates the development of IL-17-producing CD1d-restricted mouse NKT cells**. *J Immunol* 2012; **189**(11)**:** 5240.

Ebert LM, MacRaild SE, Zanker D, Davis ID, Cebon J, Chen W. **A cancer vaccine induces expansion of NY-ESO-1-specific regulatory T cells in patients with advanced melanoma**. *PLoS One* 2012; **7**(10)**:** e48424.

Gorrell RJ, Guan J, Xin Y, Tafreshi MA, Hutton ML, McGuckin MA, Ferrero RL *et al.* **A novel NOD1- and CagA-independent pathway of interleukin-8 induction mediated by the Helicobacter pylori type IV secretion system**. *Cell Microbiol* 2012.

Piedrafita DP, de Veer MJ, Sherrard J, Kraska T, Elhay M, Meeusen EN. **Field vaccination of sheep with a larval-specific antigen of the gastrointestinal nematode, Haemonchus contortus, confers significant protection against an experimental challenge infection**. *Vaccine* 2012; **30**(50)**:** 7199.

Hasnain SZ, Tauro S, Das I, Tong H, Chen AC, Jeffery PL, McDonald V *et al.* **IL-10 Promotes Production of Intestinal Mucus by Suppressing Protein Misfolding and Endoplasmic Reticulum Stress in Goblet Cells**. *Gastroenterology* 2012.

Sweet RA, Lee SK, Vinuesa CG. **Developing connections amongst key cytokines and dysregulated germinal centers in autoimmunity**. *Curr Opin Immunol* 2012; **24**(6)**:** 658.

Vuckovic D, Dagley LF, Purcell AW, Emili A. **Membrane proteomics by high performance liquid chromatography-tandem mass spectrometry: Analytical approaches and challenges**. *Proteomics* 2013; **13**(3-4)**:** 404.

Delbridge AR, Valente LJ, Strasser A. **The role of the apoptotic machinery in tumor suppression**. *Cold Spring Harb Perspect Biol* 2012; **4**(11).

Klein O, Ebert LM, Zanker D, Woods K, Tan BS, Fucikova J, Behren A *et al.* **Flt3 ligand expands CD4(+) FoxP3(+) regulatory T cells in human subjects**. *Eur J Immunol* 2013; **43**(2)**:** 533.

Hansbro PM, Scott GV, Essilfie AT, Kim RY, Starkey MR, Nguyen DH, Allen PD *et al.* **Th2 cytokine antagonists: potential treatments for severe asthma**. *Expert Opin Investig Drugs* 2013; **22**(1)**:** 49.

Starkey MR, Essilfie AT, Horvat JC, Kim RY, Nguyen DH, Beagley KW, Mattes J *et al.* **Constitutive production of IL-13 promotes early-life Chlamydia respiratory infection and allergic airway disease**. *Mucosal Immunol* 2012.

Patterson NL, Mintern JD. **Intersection of autophagy with pathways of antigen presentation**. *Protein Cell* 2012; **3**(12)**:** 911.

Gan PY, Summers SA, Ooi JD, O'Sullivan KM, Tan DS, Muljadi RC, Odobasic D *et al.* **Mast cells contribute to peripheral tolerance and attenuate autoimmune vasculitis**. *J Am Soc Nephrol* 2012; **23**(12)**:** 1955.

Inglis HR, Greer JM, McCombe PA. **Gene expression in the spinal cord in female lewis rats with experimental autoimmune encephalomyelitis induced with myelin basic protein**. *PLoS One* 2012; **7**(11)**:** e48555.

Illing PT, Vivian JP, Purcell AW, Rossjohn J, McCluskey J. **Human leukocyte antigen-associated drug hypersensitivity**. *Curr Opin Immunol* 2012.

Pihlgren M, Silva AB, Madani R, Giriens V, Waeckerle-Men Y, Fettelschoss A, Hickman DT *et al.* **TLR4- and TRIF-dependent stimulation of B lymphocytes by peptide liposomes enables T cell-independent isotype switch in mice**. *Blood* 2013; **121**(1)**:** 85.

Andrews DM, Sullivan LC, Baschuk N, Chan CJ, Berry R, Cotterell CL, Lin J *et al.* **Recognition of the nonclassical MHC class I molecule H2-M3 by the receptor Ly49A regulates the licensing and activation of NK cells**. *Nat Immunol* 2012; **13**(12)**:** 1171.

Chua CL, Brown G, Hamilton JA, Rogerson S, Boeuf P. **Monocytes and macrophages in malaria: protection or pathology?** *Trends Parasitol* 2013; **29**(1)**:** 26.

van Spriel AB, de Keijzer S, van der Schaaf A, Gartlan KH, Sofi M, Light A, Linssen PC *et al.* **The tetraspanin CD37 orchestrates the alpha(4)beta(1) integrin-Akt signaling axis and supports long-lived plasma cell survival**. *Sci Signal* 2012; **5**(250)**:** ra82.

Banakh I, Gonez LJ, Sutherland RM, Naselli G, Harrison LC. **Adult pancreas side population cells expand after beta cell injury and are a source of insulin-secreting cells**. *PLoS One* 2012; **7**(11)**:** e48977.

Lee SK, Silva DG, Martin JL, Pratama A, Hu X, Chang PP, Walters G *et al.* **Interferon-gamma excess leads to pathogenic accumulation of follicular helper T cells and germinal centers**. *Immunity* 2012; **37**(5)**:** 880.

Prendergast KA, Kirman JR. **Dendritic cell subsets in mycobacterial infection: Control of bacterial growth and T cell responses**. *Tuberculosis (Edinb)* 2012.

Thomas HE, Graham KL, Chee J, Thomas R, Kay TW, Krishnamurthy B. **Proinflammatory cytokines contribute to development and function of regulatory T cells in type 1 diabetes**. *Ann N Y Acad Sci* 2012.

Moffat JM, Mintern JD, Villadangos JA. **Control of MHC II antigen presentation by ubiquitination**. *Curr Opin Immunol* 2012.

Vincent FB, Bourke P, Morand EF, Mackay F, Bossingham D. **Focus on systemic lupus erythematosus in indigenous Australians: toward a better understanding of autoimmune diseases**. *Intern Med J* 2012.

Vincent FB, Morand EF, Murphy K, Mackay F, Mariette X, Marcelli C. **Antidrug antibodies (ADAb) to tumour necrosis factor (TNF)-specific neutralising agents in chronic inflammatory diseases: a real issue, a clinical perspective**. *Ann Rheum Dis* 2013; **72**(2)**:** 165.

Ahlenstiel G, Booth DR, George J. **Will IL28B polymorphisms remain relevant to direct-acting antiviral treatment paradigms?** *Antivir Ther* 2012; **17**(6 Pt B)**:** 1163.

Yan J, Liu J, Lin CY, Anzgene AN, Csurhes PA, Pender MP, McCombe PA *et al.* **Interleukin-6 gene promoter-572 C allele may play a role in rate of disease progression in multiple sclerosis**. *Int J Mol Sci* 2012; **13**(10)**:** 13667.

Vega-Ramos J, Villadangos JA. **Consequences of direct and indirect activation of dendritic cells on antigen presentation: Functional implications and clinical considerations**. *Mol Immunol* 2012.

Cretney E, Kallies A, Nutt SL. **Differentiation and function of Foxp3(+) effector regulatory T cells**. *Trends Immunol* 2013; **34**(2)**:** 74.

Coleman MA, Bridge JA, Lane SW, Dixon CM, Hill GR, Wells JW, Thomas R *et al.* **Tolerance induction with gene-modified stem cells and immune-preserving conditioning in primed mice: restricting antigen to differentiated antigen-presenting cells permits efficacy**. *Blood* 2013; **121**(6)**:** 1049.

Mittag D, Varese N, Scholzen A, Mansell A, Barker G, Rice G, Rolland JM *et al.* **TLR ligands of ryegrass pollen microbial contaminants enhance Th1 and Th2 responses and decrease induction of Foxp3(hi) regulatory T cells**. *Eur J Immunol* 2012.

Paget C, Duret H, Ngiow SF, Kansara M, Thomas DM, Smyth MJ. **Studying the role of the immune system on the antitumor activity of a Hedgehog inhibitor against murine osteosarcoma**. *Oncoimmunology* 2012; **1**(8)**:** 1313.

Gadd VL, Melino M, Roy S, Horsfall L, O'Rourke P, Williams MR, Irvine KM *et al.* **Portal, but not lobular, macrophages express matrix metalloproteinase-9: association with the ductular reaction and fibrosis in chronic hepatitis C**. *Liver Int* 2012.

Devi S, Li A, Westhorpe CL, Lo CY, Abeynaike LD, Snelgrove SL, Hall P *et al.* **Multiphoton imaging reveals a new leukocyte recruitment paradigm in the glomerulus**. *Nat Med* 2013; **19**(1)**:** 107.

Moore R, Kyd JM, Carzino R, Armstrong D, Grimwood K, Otczyk DC, Cripps AW. **Mucosal and systemic antibody responses to potential Pseudomonas aeruginosa vaccine protein antigens in young children with cystic fibrosis following colonization and infection**. *Hum Vaccin Immunother* 2012; **9**(3).

Molina L, Fasquelle L, Nouvian R, Salvetat N, Scott HS, Guipponi M, Molina F *et al.* **Tmprss3 loss of function impairs cochlear inner hair cell Kcnma1 channel membrane expression**. *Hum Mol Genet* 2013.

Malley RC, Muller HK, Norval M, Woods GM. **Dietary vitamin D alters the response of the skin to UVB-irradiation depending on the genetic background of the mice**. *Photochem Photobiol Sci* 2012.

Verbrugge I, Galli M, Smyth MJ, Johnstone RW, Haynes NM. **Enhancing the antitumor effects of radiotherapy with combinations of immunostimulatory antibodies**. *Oncoimmunology* 2012; **1**(9)**:** 1629.

Raphael AP, Meliga SC, Chen X, Fernando GJ, Flaim C, Kendall MA. **Depth-resolved characterization of diffusion properties within and across minimally-perturbed skin layers**. *J Control Release* 2013; **166**(2)**:** 87.

Yang YH, Song W, Deane JA, Kao W, Ooi JD, Ngo D, Kitching AR *et al.* **Deficiency of Annexin A1 in CD4+ T Cells Exacerbates T Cell-Dependent Inflammation**. *J Immunol* 2013; **190**(3)**:** 997.

Bergmann H, Yabas M, Short A, Miosge L, Barthel N, Teh CE, Roots CM *et al.* **B cell survival, surface BCR and BAFFR expression, CD74 metabolism, and CD8- dendritic cells require the intramembrane endopeptidase SPPL2A**. *J Exp Med* 2013; **210**(1)**:** 31.

Booth DR, Ahlenstiel G, George J. **Pharmacogenomics of hepatitis C infections: personalizing therapy**. *Genome Med* 2012; **4**(12)**:** 99.

Mohammad MG, Hassanpour M, Tsai VW, Li H, Ruitenberg MJ, Booth DW, Serrats J *et al.* **Dendritic cells and multiple sclerosis: disease, tolerance and therapy**. *Int J Mol Sci* 2012; **14**(1)**:** 547.

Islam MA, Firdous J, Choi YJ, Yun CH, Cho CS. **Design and application of chitosan microspheres as oral and nasal vaccine carriers: an updated review**. *Int J Nanomedicine* 2012; **7:** 6077.

Mills KH, Dungan LS, Jones SA, Harris J. **The role of inflammasome-derived IL-1 in driving IL-17 responses**. *J Leukoc Biol* 2012.

Woo SJ, Im J, Jeon JH, Kang SS, Lee MH, Yun CH, Moon EY *et al.* **Induction of BAFF expression by IFN-gamma via JAK/STAT signaling pathways in human intestinal epithelial cells**. *J Leukoc Biol* 2012.

Morrison BJ, Hastie ML, Grewal YS, Bruce ZC, Schmidt C, Reynolds BA, Gorman JJ *et al.* **Proteomic comparison of mcf-7 tumoursphere and monolayer cultures**. *PLoS One* 2012; **7**(12)**:** e52692.

Nguyen TG, Ward CM, Morris JM. **To B or not to B cells-mediate a healthy start to life**. *Clin Exp Immunol* 2013; **171**(2)**:** 124.

Kunthalert D, Novotny LA, Massa HM, Ulett GC, Bakaletz LO, Kyd JM, Cripps AW. **Epitope-specific immune recognition of the nontypeable Haemophilus influenzae outer membrane protein 26**. *Hum Vaccin Immunother* 2013; **9**(3).

Monteiro M, Almeida CF, Agua-Doce A, Graca L. **Induced IL-17-producing invariant NKT cells require activation in presence of TGF-beta and IL-1beta**. *J Immunol* 2013; **190**(2)**:** 805.

West NP, Cripps AW. **Are vaccination models suitable to determine whether probiotics have beneficial health effects in the general population?** *Hum Vaccin Immunother* 2013; **9**(3).

Hill DL, Eriksson EM, Carmagnac AB, Wilson DW, Cowman AF, Hansen DS, Schofield L. **Efficient measurement of opsonising antibodies to Plasmodium falciparum merozoites**. *PLoS One* 2012; **7**(12)**:** e51692.

Hansen DS. **Inflammatory responses associated with the induction of cerebral malaria: lessons from experimental murine models**. *PLoS Pathog* 2012; **8**(12)**:** e1003045.

Casey NP, Woods GM. **Anti-PML-RARalpha shRNA sensitises promyelocytic leukaemia cells to all-trans retinoic acid**. *J RNAi Gene Silencing* 2012; **8:** 464.

Moffat JM, Segura E, Khoury G, Caminschi I, Cameron PU, Lewin SR, Villadangos JA *et al.* **Targeting antigen to bone marrow stromal cell-2 expressed by conventional and plasmacytoid dendritic cells elicits efficient antigen presentation**. *Eur J Immunol* 2013.

Tatituri RV, Watts GF, Bhowruth V, Barton N, Rothchild A, Hsu FF, Almeida CF *et al.* **Recognition of microbial and mammalian phospholipid antigens by NKT cells with diverse TCRs**. *Proc Natl Acad Sci U S A* 2013; **110**(5)**:** 1827.

Jackson NP, Kang YH, Lapaque N, Janssen H, Trowsdale J, Kelly AP. **Salmonella polarises peptide-MHC-II presentation towards an unconventional Type B CD4(+) T-cell response**. *Eur J Immunol* 2013.

Ryg-Cornejo V, Ioannidis LJ, Hansen DS. **Isolation and Analysis of Brain-sequestered Leukocytes from Plasmodium berghei ANKA-infected Mice**. *J Vis Exp* 2013; (71).

Mintern JD, Percival C, Kamphuis MM, Chin WJ, Caruso F, Johnston AP. **Targeting Dendritic Cells: The Role of Specific Receptors in the Internalization of Polymer Capsules**. *Adv Healthc Mater* 2013.

Jabbar A, Fong RW, Kok KX, Lopata AL, Gasser RB, Beveridge I. **Molecular characterization of anisakid nematode larvae from 13 species of fish from Western Australia**. *Int J Food Microbiol* 2013; **161**(3)**:** 247.

Wakim LM, Gupta N, Mintern JD, Villadangos JA. **Enhanced survival of lung tissue-resident memory CD8(+) T cells during infection with influenza virus due to selective expression of IFITM3**. *Nat Immunol* 2013; **14**(3)**:** 238.

Osborne LC, Joyce KL, Alenghat T, Sonnenberg GF, Giacomin PR, Du Y, Bergstrom KS *et al.* **Resistin-like Molecule alpha Promotes Pathogenic Th17 Cell Responses and Bacterial-Induced Intestinal Inflammation**. *J Immunol* 2013; **190**(5)**:** 2292.

Croft NP, Smith SA, Wong YC, Tan CT, Dudek NL, Flesch IE, Lin LC *et al.* **Kinetics of Antigen Expression and Epitope Presentation during Virus Infection**. *PLoS Pathog* 2013; **9**(1)**:** e1003129.