NEWSLETTER

Australasian Society for Immunology Incorporated

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Immune Imaging Laboratory, Centenary Institute

Wolfgang Weninger

As a trained dermatologist, I have a vested interest in the skin and its diseases. Ever since medical school I have been fascinated by this organ where in daily practice we can observe such a vast spectrum of clinical symptoms. The reason for cutaneous disease variability probably relates to the multiple functions of the skin. It forms a physical barrier against invading microbes and protects us against UV irradiation and other potentially harmful agents, serves as a communication organ with the environment, participates in temperature regulation and prevents water loss, and acts as an immune organ. We still only have rudimentary understanding of cutaneous pathogenesis, and the ever-increasing incidence of skin diseases demands the development of novel concepts that may help explain underlying pathogenetic pathways. Arguably, the immune system contributes to nearly all skin diseases, for example as our primary weapon against infections or causing autoimmunity and allergy when it overreacts. The combination of convenient accessibility for sample collection and live imaging purposes and the in-depth characterization of its immune inhabitants in both mouse and man make the skin an ideal model system for studying the role of innate and adaptive immune cells in infections, tumours and autoimmunity. My group makes use of state-of-the-art imaging technology to unravel the mysteries of cutaneous disease.

From Austria to Australia

I received my MD from the University of Vienna Medical School, Vienna, Austria. I then trained in clinical dermatology in the AKH Wien (Vienna General Hospital/Medical School Vienna). During this time, I had the privilege to be mentored by Erwin Tschachler and Georg Stingl, who are amongst Europe's most eminent dermatologists working in basic science. They ignited my passion for "bench work" aiming to generate insight into the mechanisms of skin diseases. My research career started in the field of vascular biology, where I investigated the role of vascular endothelial growth factor in cutaneous pathology. I also had a particular interest in the pathogenesis of Kaposi's sarcoma (KS), since the AIDS pandemic in the nineties led to an explosion of cases that were under the care of dermatologists. Amongst other findings, this work resulted in the description of podoplanin as a lymphatic marker and the discovery of lymphatic endothelial cell marker expression on KS tumour cells, which is important for our understanding of the histogenesis of this tumour. In 2000, I received my "Habilitation" in dermatology for this work from the University of Vienna.

cont.p4

The Immune Imaging Lab at the Centenary Institute

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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 Sarah Jones at jones.s@wehi.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

To misquote one of our most colourful politicians, "If you are reading this, I am not dead" – and so welcome to the new digital version of the Newsletter!

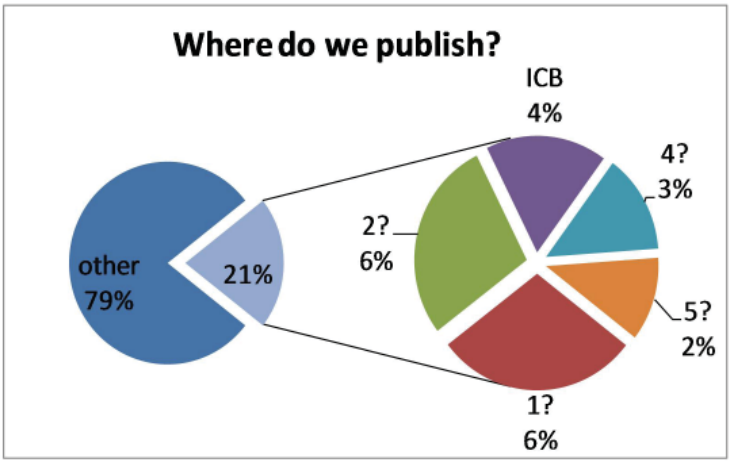
We have another bumper edition; I hope you enjoy the fascinating insight into Wolfgang Weninger's Lab. Thanks to the new digital format, we can enjoy the images (and people) from Wolfgang's Lab in colour and I think this is a real benefit of the new format. As always, thank you to those who have taken the time to write for the Newsletter, I know it can be difficult to find the time but I reckon it's worth it.

In breaking news, congratulations to my QIMR colleague, Michelle Neller from the Cellular Immunology laboratory, for winning the Post-graduate Student Award at the Australian Society for Medical Research's (ASMR) Health and Medical Research Awards – well done!

Please take the time to read the travel reports, they are often interesting and humorous and are a good insight into how ASI returns benefits to its members.

I've had a chance to look at our (ASI's) publishing record over the last two years. Based on 900 articles submitted for publication in the Newsletter, 21% are published in just five journals. ICB is the third most popular with 4% of our publications going to our own journal. Can you guess the other four journals? I could tell you, but in an effort to encourage debate and find out if anyone is actually reading this, I urge you to submit your answer in the form of an article. This could earn you $200!

Simon Apte



Anselm Enders wins award

Congratulations to Dr Anselm Enders who has been awarded the inaugural Gordon Ada Early Career Researcher Award by the John Curtin School of Medical Research. The Award is to early career researchers at the JCSMR who have made major contributions to biomedical research. Awardees receive $1,000 and are invited to present their work as the annual Gordon Ada Oration.

The 2013 Gordon Ada Oration was presented by Dr Anselm Enders, Leader of the Ramaciotti Immunization Genomics Laboratory in the Department of Immunology, JCSMR. The afternoon, held on 8 March, was a celebration of Gordon Ada's contributions to science, with Professor Peter Doherty and Professor Chris Parish speaking, followed by the award presentation and Dr Enders delivering the Oration which was titled 'Investigating B cell immunodeficiency using ENU mutagenesis'.

Pictured with Dr Anselm Enders is Louise Ada who presented the award.

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Immune Imaging Laboratory, Centenary Institute, cont.

Wolfgang Weninger

After finishing my clinical training followed by some time as a dermatologist in the hospital, I joined Uli von Andrian's group at Harvard Medical School as a postdoctoral fellow. When I saw Uli's intravital imaging work I was immediately hooked, and the awe inspired by watching leukocyte migration in real time *in vivo* sticks with me until today. In Uli's laboratory, I learned my basic immunology and imaging handicraft as well as paper and grant writing. I focused on investigating the trafficking pathways of T cells in the steady-state and in inflammation using live imaging in animal models. I was also exposed to the extraordinarily stimulating academic environment in Boston, which enforced my desire to continue working in basic science.

After four productive years in Harvard, in 2003 I received an offer to start my own independent group at the Wistar Institute, Philadelphia, which is affiliated with the University of Pennsylvania. Wistar, the oldest independent biomedical research institute in the US, has a long tradition in immunology research, including hosting prominent Australian immunologists such as Peter Doherty and Jonathan Sprent in the past. I was fortunate enough to hire some outstanding postdocs, including Paulus Mrass and Lai Guan Ng who later also followed me to Sydney, and together we set up an intravital multi-photon system that allowed us for the first time to visualize cutaneous immune responses *in situ* in real time. Highlights of this work included the first visualization of T cell behaviour within tumours and the first visualization of parasite (*L. major*) uptake by dermal dendritic cells. In collaboration with Steve Reiner at Penn we further described asymmetric T cell division during the initiation of T cell responses, and characterized the behaviour of T cells during *T. gondii* encephalitis (in collaboration with Chris Hunter at Penn).

In 2007, I was offered the position of Chair of Dermatology at The University of Sydney and the Royal Prince Alfred Hospital together with the opportunity to set up a research group at the Centenary Institute. Although the decision to leave behind a prospering laboratory in the US was not an easy one, the prospect of combining clinical and basic research work as well as my wife's family ties in Australia led us to take on this adventure. Six years on, I have no doubt that this was the right decision, as I have a superb clinical and research team here in Sydney and terrific collaborations all over Australia.

The Immune Imaging Laboratory at Centenary

Upon my arrival at Centenary, we set up one of Australia's first dedicated intravital multi-photon imaging systems that, together with our transgenic mouse colony, has proven to be a powerful tool for the dissection of basic immunologic principles in skin biology. To better reflect the fact that our research interests now extend beyond the skin, we coined the term "Immune Imaging Laboratory". The vision of our group is to uncover regulatory mechanisms underlying inflammation and tumorigenesis using high-end *in vivo* microscopy approaches, including confocal and multi-photon microscopy. Our passion lies in visualizing and tracking the migratory and interactive behaviour of immune cells within their native environments. Over the years, we have been able to collect a large panel of transgenic mice with reporter gene expression in essentially all possible immune cell subsets alone or in combination. We have set up a variety of disease models that facilitate the investigation of immune cell functions during the various checkpoints of an immune response, namely the early innate phase during pathogen entry into the skin, the priming phase in skin draining lymph nodes, and the effector phase, when T cells enter the skin to destroy infected or cancerous cells. In addition, we now also compare our findings in the skin with other organs, primarily the CNS.

Skin homeostasis

In order to understand the changes occurring during pathology, it is essential to have an in-depth understanding of homeostatic conditions such as the immune cell composition of the skin. Traditionally, many skin researchers focused their efforts on the epidermis, which is home to Langerhans cells and dendritic epidermal T cells. However, more recently it has become clear that the dermis is equally if not more important for the initiation of immune responses against pathogens. We therefore set out to characterize the immune cell population in the dermis. The advent of multi-colour flow cytometry in combination with three-dimensional *in vivo* imaging enabled us to define the dermal immune inhabitants in great detail. Surprisingly, we discovered two new cell populations, dermal gamma-delta T cells and dermal group 2 innate lymphoid cells (dILC2; in collaboration with Graham Le Gros at the Malaghan Institute).

We found that dermal gamma delta T cells produce a key pro-inflammatory cytokine, interleukin-17, in response to infection with mycobacteria and regulate downstream antigen-specific CD4 T cell activation. IL-17 has also been linked to psoriasis, which affects 2-3 percent of the Australian population, and recent evidence from several other groups indeed suggests that these cells regulate inflammation in mouse models of psoriasis. dILC2 on the other hand produce interleukin-13, a cytokine implicated in atopic dermatitis, which now affects 30 percent of children in the Western world. We showed that dILC2 respond to IL-2, a T cell-produced cytokine, and induce dermatitis in a mouse model. Currently, we have initiated a broad-scope study to examine skin samples from patients with inflammatory skin diseases, including psoriasis and atopic dermatitis, to address the role of dermal gamma-delta T cells and dILC2 in human skin diseases. In addition, in collaboration with Barbara Fazekas at Centenary, we are studying the involvement of IL-2 responsive ILC2 in lung diseases such as asthma.

Skin inflammation and infection

Critical to the proper response of cutaneous immune cells following pathogen intrusion is their co-ordinated migration as well as precisely tuned interactions within tissues. We use functional imaging to decipher the cellular and molecular cues

that regulate dendritic cell, macrophage, T cells, ILC and neutrophil behaviour in response to pathogens. We primarily exploit the mouse ear skin model for imaging, which was originally established by Lai Guan Ng (who now heads his own group in Singapore). Using a combination of genetically engineered mice and infectious agents, including parasites (*Leishmania major, Nippostrongylus brasiliensis)* and bacteria *(Staphylococcus aureus, group A streptococcus,* mycobacteria), we are dissecting innate immune cell behaviour during the early phase of immune responses. We have recently described a novel pattern of neutrophil migration towards a site of tissue damage, characterized by scouting, amplification and stabilization phases. This interstitial tissue multi-step migration paradigm further advanced our understanding of the response of neutrophils during tissue repair. We are also particularly interested how microbial virulence factors, such as *S. aureus* alpha-hemolysin, thwart innate immune responses. In addition, we are studying how pathogens are recognised and transported from the skin to draining lymph nodes. For example, we have observed that neutrophils pick up *Leishmania major* and mycobacteria parasites in infected skin and that parasite-carrying neutrophils enter lymphatic vessels. We are now studying the mechanisms of pathogen transport to draining lymph nodes. These studies have implications for the development of vaccines against infections.

Kinetics and mechanisms of T cell activation in lymph nodes

A key determinant of the adaptive immune response is the interaction between antigen-specific T cells and antigen presenting cells within the lymph node environment. We use multi-photon imaging in intact lymph nodes, whether draining the skin or infected lungs, to visualize T cell-dendritic cell interactions, immunologic synapse formation as well as cell cycle dynamics of T cells. In particular, we exploit transgenic mice with cell cycle phase-specific expression of fluorescent markers (FUCCI; in collaboration with Osami Kanagawa, Japan) to investigate where and how T cells proliferate after activation. We are further studying the effects of T cell receptor affinity on T cell priming as well as the influence of ageing on these parameters. These experiments provide fundamental insight into the generation and functioning of T cell immunity.

Effector T cell responses in skin tumours

Cytotoxic effector T lymphocytes (CTL) are important contributors in the destruction of pathogens and tumour cells. Little is known about the dynamics and anatomical context of target cell destruction by CTL *in vivo*. We make use of transplantable skin tumour models in combination with intravital multi-photon imaging to determine how CTL find and destroy target cells. This approach is complemented by a three-dimensional fibrillar collagen-based matrix culture model where we can simultaneously track the actions of CTL and tumour cells at the cellular and subcellular level using confocal microscopy. Together, this allows us to precisely interrogate the interactions between CTL and tumour cells at high resolution in real time. We have demonstrated that CTL require signalling through the TCR in the tumour bed for optimal migration and that CD44 mediates interstitial CTL migration via regulating cell shape. In ongoing studies, we have tagged cytotoxic granules as well as components of the lytic synapse to directly visualize the "kiss-of-death" exerted by CTL (in collaboration with Phil Bird at Monash). This will allow us to analyse how exactly cancer cell death is elicited in space and time. These studies will contribute to our understanding of the mechanisms underpinning an efficient CTL-driven anti-tumour response and will point us towards optimizing immuno-therapeutic strategies.

Mechanisms of melanoma growth and metastasis

Australia has the highest incidence of malignant melanoma worldwide. As a dermatologist in Australia it is thus impossible to not work in melanoma. We are using our expertise in intravital imaging to ask how the melanoma cells migrate and invade, and to study factors that regulate melanoma cell proliferation. This work was spear-headed by Nikolas Haass, who joined the group in 2007 after working with Meenhard Herlyn at the Wistar (Nikolas just moved to the Diamantina in Brisbane to start his own independent group but maintains a Centenary affiliation). We are making use of both three-dimensional cell culture models and preclinical mouse models that allow us to follow the behaviour of melanoma cells in space and time. This enables us to study the effects of targeted chemo-therapeutics, such as the BRAF inhibitors, on melanoma cells in their native environment. In the future, we also plan to transfer promising protocols directly into clinics for the therapy of melanoma patients.

Immunity beyond the skin

While cutaneous immuno-biology is clearly the focus of our group, it is important to keep an open mind about other organ systems as well. Thus, a few years ago we decided to branch out and study the behaviour of leukocytes within infections of the brain. Initially, we focused on T cells during *T. gondii* infection (with Chris Hunter). We have now set up a model of cerebral malaria (in collaboration with Georges Grau in Sydney), which allows us to compare immunological events in two different vascular beds (skin and brain) under distinct disease conditions. We also use the influenza virus infection model in the mouse to study the interactions of T cells with antigen presenting cells, and the pathways leading to memory T cell generation.

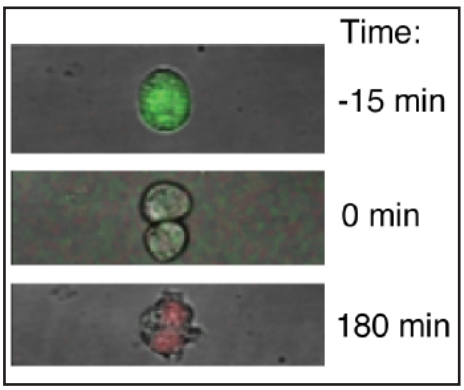
Finally, over the past few years we also have invested significant effort in the development of custom-tailored image analysis software and mathematical modeling to better describe the behaviour of cells in a three dimensional space (together with Miles Davenport at UNSW and Phil Hodgkin at WEHI). This is necessary, as commercial software packages have several limitations when it comes to automated high-throughput analysis of large datasets generated by time lapse imaging.

Having worked on three different continents allows me to note that Australian science, in particular immunology, is second to none. The quality of postdoctoral fellows, students, and research assistants in terms of motivation, enthusiasm, originality, and integrity is outstanding, and I feel blessed to have such fantastic co-workers in my group. I am grateful to the many colleagues in Sydney and around the country who have always been very generous with sharing ideas, reagents and mouse strains and made my stay in Australia a very pleasant one.

I will now let my group members describe their individual projects in more detail.

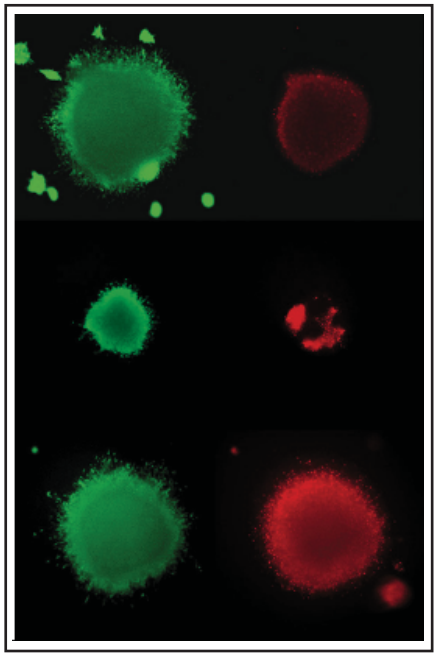
Dr Chris Jolly
Associate Faculty Member

I joined the Immune Imaging Laboratory in 2010, and head the "DNA repair" subgroup within the program. My main interests relate to the generation of antibodies during immune responses. The activation of B cells during immune responses induces antibody affinity maturation and the switching of antibody isotypes. These processes lead to the production of high affinity antibodies able to penetrate tissues from which IgM (the starting isotype) is excluded. Both processes depend on the enzyme activation-induced cytidine deaminase (AID), which damages *Ig* target DNA, recruiting mutagenic DNA repair. Antibody gene mutation is essential for optimal humoral immunity, but comes at a cost: AID-induced damage in "off-target" genes induces the *Ig*-translocations that typify most, if not all, adult B cell cancers. The DNA repair group in the Immune Imaging Program seeks to understand why AID-induced DNA damage is repaired with low fidelity, when spontaneous forms of the same damage in other tissues are generally repaired with high fidelity. We have developed a unique approach: by fusing cell-cycle regulated motifs ("degrons") to recombinant DNA repair enzymes (or enzyme agonists) expressed retrovirally in mouse B cells *in vivo,* we have shown that the cell cycle timing of AID-induced DNA repair determines whether repair is mutagenic or faithful.



Cell cycle regulated expression of green- or red-fluorescent proteins fused to S- or G1-phase restricting degrons, respectively, in a single cell 15 min prior to or 180 min after cytokinesis.

A/Prof Nikolas Haass
Affiliate Associate Faculty Member



This image demonstrates the effects of early vs. late treatment with the BH3-mimetic ABT-737 on growth of 3D melanoma spheroids derived from MM200 cells overexpressing NOXA. Early and continuous treatment with 16 µM ABT-737 for 10 days (middle row, versus vehicle control in upper row) inhibits proliferation and invasion, decreases the number of viable cells (calcein-AM, green) and increases the number of dead cells (ethidium bromide) while late treatment (bottom row) only results in cell death in the periphery of the tumour (brighter ethidium bromide staining).

I am a clinician scientist. After receiving my degree in medicine (MD) and graduating with a PhD in Cell Biology from the University of Heidelberg, Germany (1999), I trained in clinical dermatology at the Department of Dermatology, University-Hospital Hamburg-Eppendorf, Germany (1999-2003). From 2003 to 2007 I worked as a German Research Foundation post-doctoral fellow in Meenhard Herlyn's laboratory at the Wistar Institute, Philadelphia, USA, where I made numerous important contributions to the understanding of signalling pathways in melanoma, particularly with regards to identifying novel melanoma therapies. From October 2007 to February 2013, I was a Cameron Melanoma Research Fellow, Senior Lecturer at University of Sydney and Associate Faculty at the Centenary Institute, where I led the "Experimental Melanoma Therapy" group. During this time we established cutting-edge tools to study the cell cycle of individual melanoma cells within the tumour microenvironment in real-time. I recently moved to the University of Queensland Diamantina Institute, Brisbane, to set up my independent research group, but will be affiliated with the Centenary Institute for the next years.

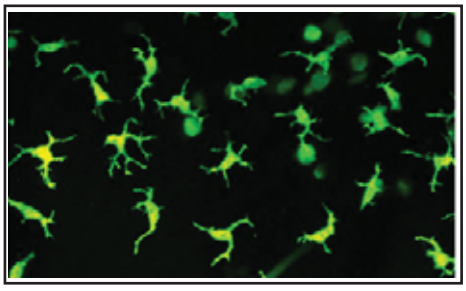
Dr Lois Cavanagh
Senior Research Officer

I have long been interested in the skin, in particular in the role of dendritic cells. This began with my Honours project, in which I examined the function of epidermal Langerhans cells during tumourigenesis, and persisted with my PhD with Gary Halliday in the Department of Dermatology at University of Sydney into the effect of UV light on the function of Langerhans cells and dendritic epidermal T cells. After my first postdoc in Ranjeny Thomas' group at the Diamantina in Brisbane, I joined Uli von Andrian's laboratory at Harvard Medical School, where I worked on the trafficking pathways of dendritic cells. This work identified the bone marrow as a site of memory T cell and dendritic cell interactions during recall responses. In 2006, I joined Wolfgang Weninger's laboratory at the Wistar Institute, and then the Immune Imaging Laboratory at

Centenary in 2007. I continue to be fascinated by the intricate migratory and interactive pathways that immune cells pursue during the course of immune responses. My work currently focuses on understanding the role of dendritic cell subsets in the priming of flu-specific T cells in lung draining lymph nodes. I am exploiting a number of unique transgenic mouse strains that harbour fluorescent tags in various dendritic cell subsets, using multi-photon imaging to track the individual cell populations during influenza infection in vivo.

Dr Ben Roediger
Postdoctoral Fellow

I undertook my PhD training with Barbara Fazekas de St. Groth at the Centenary Institute, where I investigated the development of dendritic cells and their influence on $CD4^+$ T cell responses in vivo. In 2007, I joined the Immune Imaging Laboratory, taking advantage of the cutting-edge technology and sophisticated mouse models available to characterise immune cell behaviour and function. In the last six years, I have worked in the development and functional characterisation of Langerhans cells, dermal dendritic cells, gamma delta T cells, macrophages and neutrophils in the skin, both during the steady-state and in response to injury and infection. Using a combination of intravital multiphoton microscopy and flow cytometry, together with over 30 unique strains of knockout and reporter mice, I have recently identified, characterised and visualised a novel population of group 2 innate lymphoid cells within the dermis. These cells interacted with mast cells, produced IL-5 and IL-13 and responded to IL-2 to induce inflammation of the skin. I am currently extending these studies to investigate the potential role of ILC2 in the skin and lungs of atopic individuals and have initiated a number of collaborative clinical investigations with researchers at the Woolcock Institute and Royal Prince Alfred Hospital.



Dendritic epidermal T cells (DETC) and dermal T cells (in vivo imaging in the skin of $Cxcr6^{GFP}$ mice). DETC are unique to mice, with no known human equivalent. They live in the uppermost layer of the skin, the epidermis. It still isn't clear what the function of these cells is, but they are believed to play a role in wound repair. The deeper, amoeboid T cells comprise both TCRαβ and TCRγδ T cells. The dermal gamma-delta T cells, which make up approximately half of all the T cells in the dermis, produce IL-17 in response to bacterial challenge, which augments neutrophil recruitment.

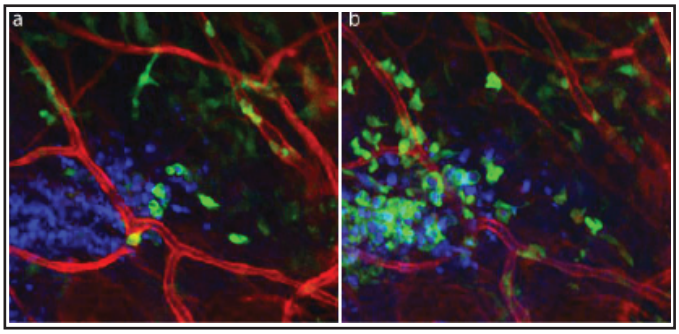
Dr Andrew Mitchell
Postdoctoral Fellow

Since completing undergraduate study, and then a PhD in microbiology and immunology, at the University of New South Wales (in 2002), I have worked in both academia and industry. The main theme of my research has been to understand how the innate immune system, in particular myeloid cells, responds to pathogen challenge. I am intrigued by the concept that the immune system can be viewed as a sensory organ and that multiple microbial inputs can be integrated, thereby leading to an effective immune response. My current research focuses on understanding innate immune functions of macrophages in the skin, and how bacterial pathogens subvert these pathways to cause disease.

Dr Rohit Jain
Postdoctoral Fellow

During my graduate training as a pharmaceutical biotechnologist, I realized the importance of identifying novel drug targets for treatment of various diseases. The lack of potential drug targets and the lack of complete understanding of the mechanisms (to avoid off target effects) becomes the rate-limiting step in drug discovery. This realization fuelled my desire to understand the molecular mechanisms underlying various diseases. My main objective was to focus on transmissible human pathogens and how they disseminate globally with serious consequences. During my doctoral program I worked on *Leishmania donovani*, the causative agent for visceral leishmaniasis. The study involved characterization and understanding the role of parasite Prohibitin during infection. I joined the Immune Imaging Laboratory in 2010, to understand how pathogens can evade a fully functional immune system. Using state of the art multi-photon microscopy and 10 laser flow cytometry, I am addressing the question of how unicellular pathogens like *Staphylococcus aureus* and *Leishmania major* can evade immune responses not only in real time at single cell resolution but also with respect to population dynamics of immune cells. My studies uncovered a novel mechanism that controls the recruitment of appropriate immune subsets during bacterial infections. With colleagues at the Malaghan Institute in Wellington, we are also trying to understand the mechanisms employed by multicellular parasites like *Nippostrongylus brasiliensis* to evade the host immune responses. The Immune Imaging program under the guidance of Wolfgang Weninger with the diverse expertise as well as the broad range of scientific questions asked about clinically relevant diseases provides a congenial environment for not only professional growth but also for developing life long collaborations.

Dr Sioh-Yang Tan
Postdoctoral Fellow



Neutrophil influx following intradermal L. major injection. Multiphoton imaging reveals the rapid migration of neutrophils (green) towards a focus of L. major (blue) in the dermis. Vessels are labeled red.

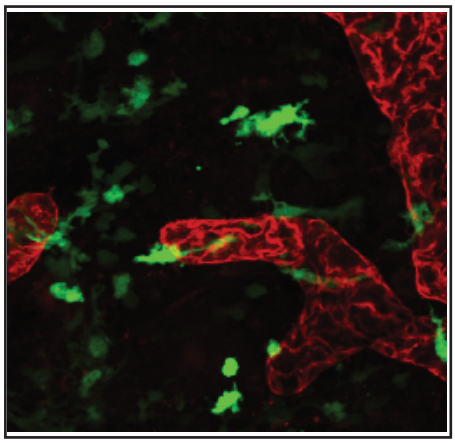
After completing a PhD in Barbara Fazekas' laboratory looking at regulatory T cell biology, I joined the Immune Imaging Laboratory in 2008. The laboratory has grown in numbers and diversity of expertise over the years, making it a great place to pursue many different questions in innate and adaptive immunity. One of these questions is how does aging affect the many arms of the immune system. Having found that dendritic cells are surprisingly robust in aged animals, we are now moving on to elucidate the effects of aging on CD8 T cell migration in the context of influenza virus infection. How does T cell migration change with age and what are the cell-intrinsic and microenvironmental factors involved? These questions will be addressed using cutting-edge multi-photon imaging and flow cytometry techniques in the lab.

Dr Szun Tay
Postdoctoral Fellow

I completed my PhD studies at Imperial College London and spent some time in clinical research in the UK before migrating to Sydney in 2007, where I worked on rodent models of liver-induced T cell tolerance. In November 2012, I joined the Immune Imaging Laboratory to pursue my original interests in infectious diseases. I am excited about my project investigating how the myriad of virulence factors expressed by *Streptococcus pyogenes* target separate facets of the innate immune system to evade clearance. More than 600 million cases of *S. pyogenes* infections are documented per year worldwide. Whilst most are self-limiting superficial skin or throat infections, deep tissue infection and necrotizing fascitis ("flesh-eating disease") can occur, with 1/1000 infections rapidly progressing to life-threatening systemic disease. There has been a global resurgence of *S. pyogenes* invasive disease in developed countries, whilst in developing countries and indigenous communities, persisting infections and the post-infection syndrome of rheumatic fever and rheumatic heart disease pose major healthcare challenges. In collaboration with researchers at University of Wollongong, who have accumulated an extensive library of *S. pyogenes* strains, including strains isolated from the Northern Territory, I will use live-imaging and flow cytometry combined with unique mouse strains to dissect the early events following *S. pyogenes* skin infection. I will also be collaborating with researchers at Griffith University, who have recently developed a *S. pyogenes* vaccine, to help define the immunological mechanisms underlying protection from this important pathogen.

Dr Radjesh Bisoendial
Postdoctoral Fellow

I am a visiting researcher and trained rheumatologist from the Academic Medical Centre (AMC) university hospital (Amsterdam, Netherlands). During my medical training, I finished my PhD thesis, studying the vascular effects of high-density lipoproteins (HDL) and C-reactive protein in patient populations prone to cardiovascular disease at the Vascular Medicine department, AMC (headed by professor John Kastelein). After working for a year as a rheumatologist at the Rheumatology department, AMC (headed by professor Paul Peter Tak), I received an overseas postdoc fellowship from the Dutch Arthritis Association. I am now installed as research fellow in the Lipid Group at the University of New South Wales, Sydney (headed by Professor Kerry Ann Rye) to work on the vasculo-protective functions of HDLs towards the lymphatic vasculature. Recently, I also joined the Immune Imaging Laboratory, where I use state-of-the-art imaging tools to study the capacity of HDLs to preserve lymphatic function in mouse models of acute and chronic, tumor necrosis factor-driven inflammation. The data generated will be instrumental for the development of HDL-based therapeutic approaches to improve lymphatic function, reverse the chronic inflammatory state, and lower cardiovascular risk in patients with rheumatoid arthritis and diseases with similar immunopathology.

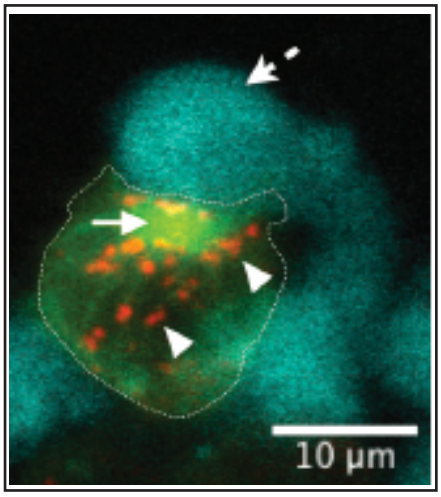


Dendritic cells (green) and lymphatic vessels (red) in a dermal whole mount stain visualized by confocal microscopy.

Dr Marcia Munoz
Postdoctoral Fellow

I was born in Caracas, Venezuela, so it is not surprising that my first real job as a scientist was in a disease like gastroenteritis, investigating the mechanisms of rotavirus infection at the Venezuelan Institute of Scientific Investigations (I.V.I.C). I then moved to Sydney to work as research assistant in the Cancer Program at the Garvan Institute of Medical Research. Shortly after, I started my PhD under the Supervision of Charlie Watts on a newly discovered 330kD ubiquitin ligase named EDD and its role in the DNA damage response. After finishing my PhD I took a position as a research officer with Professor Michelle Haber at the Children's Cancer Institute Australia to work on Multidrug Resistance Proteins and Neuroblastoma. During my time in the "Experimental Therapeutics" group, I experienced the realities of translational research and Childhood Cancer, and discovered that I had to study the tumour microenvironment, the hijacking of the stroma to favor tumour growth: nothing

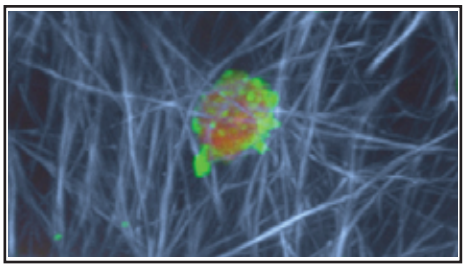
else would do. And so I joined the Immune Imaging Laboratory working to study the interactions of cytotoxic lymphocytes with tumour and stroma. I have changed directions a few times since I started my life as a scientist, but now I am sure I have found my true vocation.



Confocal image of a CTL (outlined) engaged in a cytotoxic interaction with a target tumour cell (cyan, dashed arrow). The MTOC (arrow, green: tubulin-GFP) and granzyme B (arrowheads, red: granzyme B-mCherry) are closely associated with the interaction site.

Dr Maté Biro
Postdoctoral Fellow

I initially studied physics as an undergraduate at the Imperial College in London, then undertook Masters research at MIT in the USA and later worked in the Imaging Informatics division at the Bioinformatics Institute in Singapore. In 2011 I obtained my PhD at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden, Germany. My interests are centered on the biomechanics of the actomyosin cytoskeleton in key cellular processes, and I use a highly multi-disciplinary approach, encompassing cell biology, biophysics, bioimage informatics and advanced light microscopy, in my research. Since my move to Sydney and the Immune Imaging Laboratory in 2012, I can make use of physiologically relevant cancer models and novel imaging techniques to study the migration of both tumour cells and cytotoxic T lymphocytes.



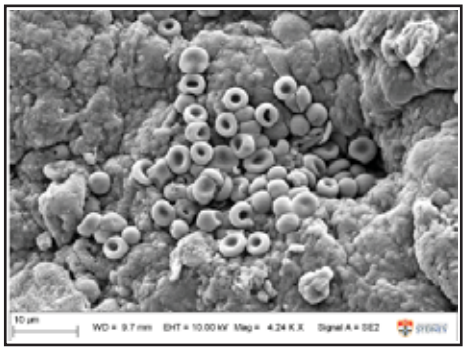
Macrophage migrating in collagen matrix. In vitro systems enable us to study cell migration in great detail. Here, an IC-21 macrophage is captured migrating through a 3-dimensional collagen matrix (red: cytoplasm, green: F-actin)

Dr Shweta Tikoo
Postdoctoral Fellow

I received my PhD from National Institute of Immunology, New Delhi, India. During my doctoral program I studied Bloom Syndrome where impaired function of a single protein (Bloom) leads to increased susceptibility to almost all kinds of cancers including but not limited to leukemias, lymphomas and carcinomas. My doctorate work focused on the role of post-translational modifications like ubiquitylation on the recruitment and stabilisation of DNA repair proteins like Bloom helicase for efficient DNA damage repair. The study provided novel insights into the role of these modifications. After getting acquainted with the molecular mechanisms that go haywire in human cancers, I was interested in studying the process of metastasis. I have recently joined the Immune Imaging Laboratory as a research officer, where I am looking at the process of development of breast tumours and the mechanisms for dissemination (metastasis) of tumour cells into other organ systems. This is a crucial problem as the reason for morbidity in cancers patients is mainly metastasis in other essential organs. Using the multi-photon microscope, I am planning to study tumour development in mouse models and tumor cell dissemination. I will also be correlating our findings with presence or absence of various immune subsets in the tumour microenvironment which may assist immune evasion as well as dissemination of these cells. Collectively these studies should provide a deeper understanding in the field of tumour biology.

Dr Saparna Pai
Postdoctoral Fellow

I joined the Centenary in the year 2009 to work as a senior post-doctoral research fellow within the Immune Imaging Laboratory. The central theme of my research work is focused on the study of antigen presenting cell function and T cell activation during murine cerebral malaria (with Georges Grau, USyD). Towards this I have established a brain-imaging model that is providing novel insight into how the immune response unfolds within the brain in response to *Plasmodium* in real time. My skills in performing the highly specialised surgical procedures and intravital imaging have been crucial to this project. I was awarded an Australian Academy of Science ECR fellowship in 2012 to study the role of new therapeutic drugs in the treatment of cerebral malaria (with V. S. Chauhan, New Delhi). Recent interests include designing a new Neptune-tagged Plasmodium (with Tania

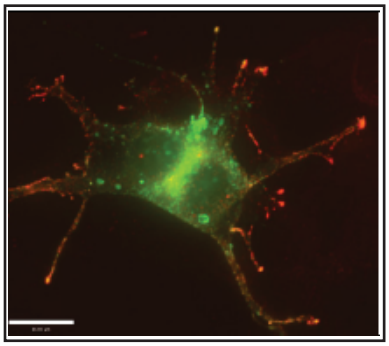


Scanning Electron Microscopy (SEM) of fixed brain tissue from a Plasmodium berghei ANKA-infected mouse shows donut-shaped intact erythrocytes scattered in the cerebral cortex.

De Koning-Ward, Deakin) to simultaneously visualize 5 different fluorescently-labeled components within the brain in real time and a collaboration (accompanying image) with the Australian Centre for Microscopy and Microanalysis (ACMM, USyD) for SEM ultrastructural studies of the brain.

Dr Kimberley Beaumont
Postdoctoral Fellow

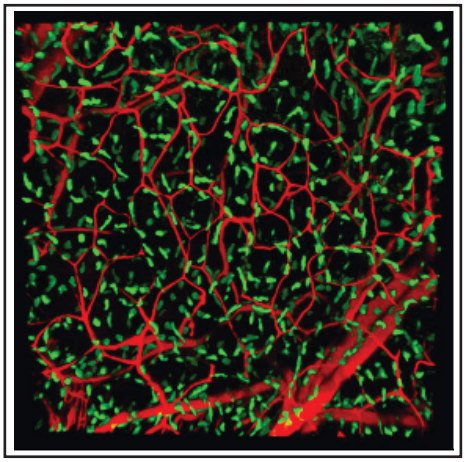
I received my PhD in Molecular Cell Biology from the University of Queensland in 2009 in Rick Sturm's laboratory. During my PhD I studied the function of Melanocortin-1 Receptor variants, which are associated with red hair, fair skin and skin cancer risk. I then completed a short post-doctoral project in collaboration with Jennifer Stow at the Institute for Molecular Bioscience on the role of Rab GTPase (intracellular trafficking proteins) in the regulation of melanin pigment granule trafficking in melanocytes. I am currently (as of 2011) working together with Nikolas Haass in the Experimental Melanoma Therapies group within the Immune Imaging Laboratory. I am investigating the role of Rab GTPases in melanoma cell biology (together with Jenny Stow) – with the aim of discovering new therapeutic targets. In my studies I utilize an *in vitro* 3D melanoma model as well as xenograft mouse models. I am also investigating cell cycle dynamics in melanoma growth and invasion using a novel cell cycle indicator and real-time imaging methods.



DeltaVision deconvolution image of a melanoma cell showing the intra-cellular localisation of different Rab proteins. Localisation of Rabs to the dendrites and filopodia may indicate a role in melanoma cell morphology and/or migration.

Philip Tong
PhD Student

I am a PhD student in the Weningers laboratory and current Dean's Fellow in Dermatology, a competitive and rigorous PhD-Fellowship training programme developed by Sydney Medical School and the Australasian College of Dermatologists. My research goal has been to dissect the skin immune system using multi-parameter flow cytometry and multiphoton microscopy to study the precise three-dimensional distribution of distinct leukocytes at different body locations in fluorescent reporter mice. We detail for the first time the anatomical location of T cells, mast cells, macrophages and dendritic cells and that site variation with these populations do exist. Moreover, as a side project, I have also utilised multiphoton microscopy to study and quantify elastin in sun-damaged skin and in a range of elastin-related disorders. I have also been working on other projects in the lab including the discovery of dermal group 2 innate lymphoid cells and on projects with interstate collaborators. More recently, I have become interested and involved in some translational work looking at human PBMCs and sera in atopic patients. I have presented nationally and most recently at the International Investigative Dermatology meeting in Edinburgh and have been recipient of poster and oral speaker awards in the past. Immune Imaging is an extremely diverse and dynamic laboratory with many exciting projects and great people to work with.



3D representation of mast cells (green) distributed evenly throughout the skin, with blood vessels shown in red taken with the multiphoton microscope.

Ichiko Kinjyo
Postdoctoral Fellow

After graduation from medical school and following residency, I joined the Yoshimura laboratory at Kyushu University in Japan. I worked on the identification and functional analysis of cytokine feedback regulator (SOCS) family proteins. I received a PhD on the crosstalk between cytokine and Toll-like receptor signaling pathways involved in the regulation of macrophage activation and tolerance. In 2005, I joined Steven Reiner at the University of Pennsylvania as a postdoc and studied Eomes-dependent aberrant expansion of CD8-CD4- T cells in autoimmune lymphoproliferative syndrome. Through the exciting project about T cell fate determination by asymmetric cell division, I started collaboration with the Weninger laboratory, which brought me to the Centenary Institute in Sydney. I am currently addressing dynamic cell cycle progression of $CD8^+$ T cells in the course of memory induction during influenza virus infection.

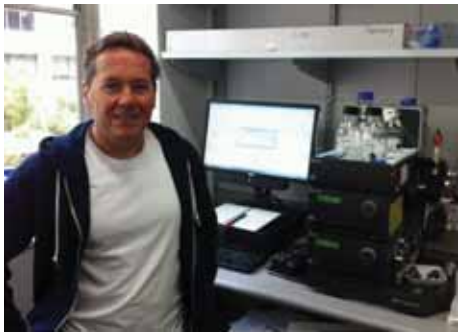
Ms Mary Rizk
Research Assistant

I graduated from the University of Sydney in 2008. In my Honours project, I looked at the transfer of antigen between dendritic cells using flow cytometry and T cell proliferation assays as the main readouts. After completing my Honours project, I joined the Immune Imaging Laboratory and have since been working on Influenza A virus infection using a mouse model. My main focus is on T cell receptor affinity/specificity and how this affects the generation of anti-viral effector memory T cells. I'm particularly interested in the dynamics of CD8 T cell interactions with dendritic cells during early influenza A virus infection using the multi-photon microscope.

Ms Danae Sharp
Research Assistant

I graduated from the University of Sydney in 2003 with a Bachelor of Science majoring in Biochemistry and Biology. The following year I was awarded a scholarship to complete a Masters of Science in Medicine degree whilst based at the Heart Research Institute. My research involved investigating the role of androgens on atherosclerosis in vitro and in vivo studies. From 2006 to 2008, I was employed as a research assistant at the Victor Chang Cardiac Research Institute, testing Ace inhibitors in hypertensive animal models. The last four years have seen me working in the field of cancer research at the University of Sydney. In this role I carried out maximum tolerated dose studies with second-generation chelators in nude mouse tumour models. I am excited to be now working as a Research Assistant with Kimberly Beaumont, Nikolas Haass and Wolfgang Weninger. I am working on several projects investigating melanoma cell biology and the testing of various melanoma drug therapies. These studies use a number of different techniques such as in vitro 3D melanoma model as well as xenograft mouse models.

President's Column



Dear ASI members,
As I find myself hurtling through this presidency, I recently realised, with some surprise, that it is already time to start calling for nominations for the next President (Vice President next year); I need to stop and reflect on what has been achieved so far this year.

Firstly, I would like to welcome Sarah Jones as the new ASI Development Officer. Sarah's role is to help develop, enhance and maintain ASI's online presence, communications with the membership, and various other initiatives that we hope will enhance the way we work as a society. Our promised, new website is now under development – we hope to have this in place by the time you read the next newsletter. Also with Sarah's help, we have prepared a member survey that you will hopefully have completed by now. We will do our best to take the survey results on board as we plan future activities and events.

Sarah Jones

Our twitter (https://twitter.com/ASImmunology) and facebook (https://www.facebook.com/ASImmunology) accounts are growing in popularity – our twitter account hit the 100 follower mark this week (w/c 13/5) and is increasing almost daily. Tune in to these accounts for up to date information on all things ASI, including jobs, awards and general immunology news. You can also use this platform to post information of potential interest to the Society, such as job advertisements, conferences and other interesting immunology related news, via the account manager Gabi Khoury (email: gabriela.khoury@monash.edu.au). Thanks to Gabi for her regular input and hard work in managing these accounts as well as the Day of Immunology twitter account.

Gabrielle Khoury

Also, congratulations to ASI member Fatima El Assaad who correctly answered the twitter challenge question, 'What year was ASI founded'. This was a slightly tricky question, and Fatima's answer – "Australasian Society for Immunology, formed in 1991. Australian Society for Immunology, formed in 1970" – was both thorough and correct on two counts. Fatima won an autographed copy of Peter Doherty's latest popular science book, *Sentinel Chickens – what birds tell us about our health and the world*.

Stay tuned when the new website opens in a couple of months, we will hold another competition and will award another signed copy of Peter's book to a lucky member. Incidentally, rumours that Peter is now working on a new book, *NKT cells – why I wish I had discovered them earlier*, are currently unsubstantiated but it's probably only a matter of time …

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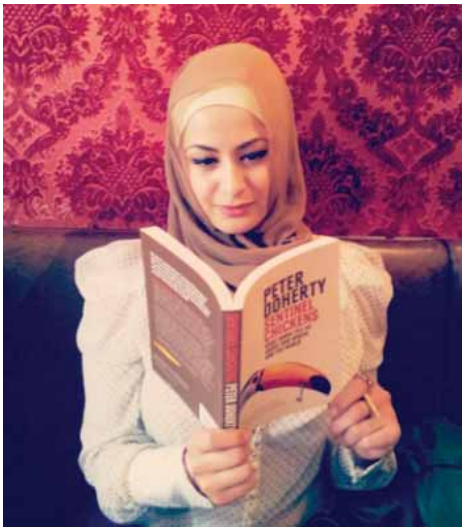

Fatima-El Assaad –
winner of the ASI twitter prize

I am pleased to say our membership numbers are very healthy and hitting new records, which is great to see. This year so far, we have 928 members. Middle of last year we were at 870 members and middle of the previous year (2011) it was 786 members. At this rate, my crystal ball tells me that our end of year membership numbers will surpass the 1100 mark.

We have recently seen another very successful series of Day of Immunology events. Co-ordinated by Claerwen Jones, several ASI branches held events on the day that were well attended and captured the interest of students and general public around Australia and New Zealand. A big thanks to all the people who selflessly give their time and energy to make these events work – please see article in this newsletter from Claerwen for a full account of the day's events and contributors. The Day of Immunology is an international effort organised by the International Union of Immunological Societies (IUIS) and the European Federation of Immunological Societies (EFIS) to promote the benefits of immunology research. It is worth mentioning that ASI's DoI activities have captured the attention of the international organisers. Claerwen recently received an email from the Program Director of the IUIS, Jean-Loup Romet-Lemonne (New York Office), stating that they find our DoI activities 'really remarkable'. IUIS sends examples of previous Day of Immunology activities to each society, and seven out of ten links were to ASI past DOI activities. Well done folks!

We have the upcoming International Congress of Immunology meeting in Milan this August, and ASI was pleased to award 15 international travel awards to help some of its members attend this great conference. Congratulations to those recipients, enjoy the meeting. It is also an exciting reminder that the next ICI meeting will be held in Melbourne in 2016. This will be a major event in the history of ASI and much of the planning and preparation for this event is already well underway, with Jose Villadangos heading the charge, with the support of Andrew Lew, Jenny Rolland and Ian Barr.

In closing, I am enjoying my time as ASI President (so far). It can be quite demanding at times but it is made that much easier and more enjoyable by having a great team of dedicated Councillors to work with. And a reminder to all members – if you would like to get more involved in the activities of your Society, please talk to your local branch member to see what you can do. There are always opportunities to contribute to the Society for people who are keen to do so.

Dale Godfrey

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.

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!**

16th INTERNATIONAL SYMPOSIUM ON EBV and associated diseases

16-19 JULY 2014

Brisbane Convention and Exhibition Centre
Brisbane, Australia

This conference will be a major evoluationary step for the EBV meeting as the main focus will be on translation of basic research to the clinic. A number of sessions focusing on clinical management and novel treatment strategies for EBV-associated diseases are planned. In addition, information sessions for the public on these diseases will also be held during the EBV conference. We look forward to strong interaction between basic scientists and clinical experts.

conference.qimr.edu.au/ebv

Queensland Institute of Medical Research

Invited speakers

Professor Emeritus Harald zur Hausen (Nobel Laureate)
German Cancer Research Center

Professor Peter Doherty (Nobel Laureate)
Peter Doherty Institute, University of Melbourne

Professor Suzanne Cory
Walter and Eliza Hall Institute of Medical Research

Professor Klaus Rajewsky
Max Delbruck Center for Molecular Medicine Berlin

Professor Ralf Kuppers
Institute of Cell Biology (Cancer Research), University of Duisburg-Essen

Professor Helen Heslop
Department of Medicine Baylor College of Medicine

Professor Louis Staudt
National Institute of Health

Henle Lecture

Professor Cliona Rooney
Center for Cell and Gene Therapy, Baylor college of Medicine

50 YEARS OF DISCOVERY

HONORARY SECRETARY'S NEWS

ASI Special travel awards to attend ICI Milan 2013

We received over seventy applications from eligible ASI post-doctoral and postgraduate student members for support to attend the ICI meeting in Milan in August, which was a great response. Thanks to all the judges who did an excellent job of scoring and ranking the applications. In the end a total of 18 applications were awarded a $2000 'grant in aid' to attend the ICI 2013 as below:

Postgraduate students

Priscilla Auyeung	WEHI
Julie Burel	QIMR
Garth Cameron	University of Melbourne
Kok Fei (Jimmy) Chan	Ludwig Institute
Susan Christo	University of South Australia
Ben Fancke	Burnet Institute
Shin Foong Ngiow	Peter Mac
Lucille Rankin	WEHI
Maryam Rashidi	WEHI
Jaclyn Sceneay	Peter Mac
Jenni Williams	Victoria University, NZ
Md. Ashik Ullah	University of Sydney

Post-doctoral scientists

Christel Devaud	Peter Mac
Magdalena Hagn	Peter Mac
Edwin Hawkins	Imperial College London
Frederick Masson	WEHI
Alison Thornburn	Monash University
Sophie Valkenburg	University of Hong Kong

ASI 2013 conference

Preparations are nearly complete for the 43rd annual scientific meeting ASI 2013 which will be held in Wellington, New Zealand from 2-5 December. There are some fantastic international speakers invited and you can get more information on registration and abstract submission on the website at www.asi2013.org. There are also consecutive meetings with the Australasian Flow Cytometry Group also holding its annual meeting from 28-30 November in Wellington, and the Australasian Virology Society annual scientific meeting in Queenstown from 8-11 December. There will be a call for travel bursaries in September for students and post-docs to attend the ASI 2013 meeting in Wellington.

New ASI student representatives

Welcome to our new ASI student representatives, Cam Field (Malaghan Institute of Medical Research, Wellington), and Farah Al-Barwani (University of Otago, Dunedin). Thanks again to last year's student reps Julia Marchingo (WEHI) and Maria Demaria (Monash) who did a great job with organising student activities including the student dinner at the ASI 2012 conference.

Day of Immunology activities

It was fantastic to see how much interest there was from the public in the various Day of Immunology activities held throughout Australia on 29th April. Here in Melbourne I was involved in several different events, and all were extremely well organised and attended. The Discovery Tours held at several locations, including WEHI, Peter Mac, AAHL and here at the Burnet Institute, attracted school children, their parents, university students and other interested adults, to hear our young researchers talk about their passion for immunology research (see photo below of PhD student Kerry Ko), and also to show the public through the labs and be involved in activities like looking at dendritic cells under the microscope.

The highlight was the public lecture held at Melbourne University, where a sold out crowd of more than 250 people attended to hear outstanding speakers on the theme of 'When immune cells go bad' including Dr Jason Tye-Din from WEHI on coeliac disease, Prof Robyn O'Hehir from the Alfred Hospital/Monash University on immunotherapy for allergy, A/Prof David Ritchie from RMH/Peter Mac on immunity to blood cancers, and Prof Trevor Kilpatrick from Florey Neuroscience Institutes who spoke on multiple sclerosis

There is more information on the events at www.dayofimmunology.org.au where you can also find links to further information and download the very useful teaching aide, 'Your amazing immune system'.

Special thanks go to Dr Claerwen Jones of the University of Melbourne, who is the chair of the Victorian Day of Immunology committee and also the national ASI Day of Immunology Co-ordinator, who did such a fantastic job of organising and co-ordinating a wide range of events.

Day of Immunology Committee

Julianne Bayliss (Melbourne Health), Mark Chong (SVI), Ann Cornish (UoM), Connie Duong (Peter Mac), Sarah Fardy (CSIRO), Charles Hardy (Monash), Andy Hsu (Peter Mac), Claerwen Jones (UoM), Gabriela Khoury (Monash), Mireille Lahoud (Burnet), Aislin Meehan (Monash), Nicole Messina (Peter Mac), Jessica Moffat (UoM), Wy Ching Ng (UoM), Louise Rowntree (Monash), Robyn Sutherland (WEHI), Wendy Winnall (UoM), Dimitra Zotos (WEHI)

Rose Ffrench

DAY OF IMMUNOLOGY 2013, MELBOURNE

Day of Immunology was celebrated in Melbourne on 29th and 30th April with a great variety of activities that attracted over 480 members of the general public, school students and teachers.

During the day in Melbourne and Geelong, members of the general public aged from 6 to 85 attended Public Discovery Tours of medical research institutes – the Walter and Eliza Hall Institute of Medical Research, the Burnet Institute, the Peter MacCallum Cancer Centre and the CSIRO Australian Animal Health Laboratory. Here, participants met scientists, 'went behind the scenes' to visit some labs, and learnt about immunological research discoveries through presentations by students and scientists who generously provided their time and enthusiasm. At AAHL, participants even had a chance to try on a BSL4 high containment suit! A teacher accompanying a school group at WEHI said: *"The students thought the excursion was fantastic. They really enjoyed seeing the labs and listening to researchers."* A participant at the Peter Mac tour wrote: *"I lay awake last night thinking of the difference your research will make in so many lives!"*

In Parkville, 189 VCE Biology students from 19 schools across Victoria attended two full day immunology workshops at the Gene Technology Access Centre. The workshop began with talks by Immunology "greats" – Sir Gustav Nossal and A/Prof Andrew Lew – and was followed by various activities (microscopy, ELISA, 3D modelling) to give the students a strong foundation in preparation for the Immunology component of their Biology course. At the end of the day, students listened to inspiring career talks by early career researchers Dimitra Zotos (WEHI), Julianne Bayliss (Monash) and Gabriela Khoury (Monash), Industry scientist Brent McKenzie (CSL), and WEHI Strategic Communications & Marketing Officer, Liz Williams. Feedback comments from students included *"Gustav is awesome"; "I didn't know Australians had so much to do with Immunology so it was good to know"; "Loved this! Was amazing and very well set up. Our scientist was very clear in educating us"; "The significance of immunology was really shown to me"*. This fabulous program is being trialed at the University of Ballarat in June with the help of A/Prof Stuart Berzins prior to it being offered to other regions of Australia in the future.

Speakers at the DoI public lecture (L-R) David Ritchie, Robyn O'Hehir, Trevor Kilpatrick, Rose Ffrench, and Jason Tye-Din.

Dr Meredith O'Keeffe demonstrates proper use of a pipette to some budding immunologists during the Public Discovery Tour of the Burnet Institute.

In the evening of 29th April, a capacity crowd at the Melbourne Brain Centre listened to five wonderful talks on the theme "When immune cells go bad!" A/Prof Rosemary Ffrench (Burnet Institute) chaired the evening and introduced the theme, which was then explored more fully by Dr Jason Tye-Din (WEHI) talking about the toxicity of gluten in coeliac disease; Prof Robyn O'Hehir (Monash University) describing how advancements in allergy treatments move from the clinic to the lab and back to the community; A/Prof David Ritchie (Peter MacCallum Cancer Centre) using a film noir theme to speak on clandestine relationships between cancer and the immune system; and Prof Trevor Kilpatrick (University of Melbourne) describing the immunopathogenesis of multiple sclerosis. A highlight was David Ritchie's description of dendritic cells and cytotoxic T cells as sirens and heroes respectively using photos of Lauren Bacall and Humphrey Bogart to illustrate the point! Audience members then

AAHL Discovery Tour: A participant at the DoI Discovery tour of the CSIRO Australian Animal Health Laboratories tries on a BSC4 high containment suit

had a chance to talk further with the speakers over supper and very positive feedback was given on all the talks, plus the food!

In the lead up to Day of Immunology, activities were promoted through our website (www.dayofimmunology.org.au), Facebook (www.facebook.com/DayofImmunologyVic) and Twitter (twitter.com/#!/DayofImmunology) which now has over 570 followers thanks to the wonderful management of Dr Gabriela Khoury (Burnet Institute). A front-page article appeared in the April edition of the *Voice* supplement of *The Age*, and Dr Jason Tye-Din was interviewed on the 3RRR radio program *Einstein A Go-Go*.

A/Prof David Tarlinton talks about Sir MacFarlane Burnet at the DoI Discovery tour of WEHI

This year's Day of Immunology has once again been an outstanding success thanks to the generous support of our speakers and our sponsors and the wonderful efforts of DoI Committee members and of GTAC staff (particularly Tony Chiovitti), staff in the Communications departments of WEHI and Monash University, and all the staff and students involved in the Discovery Tours (including Misty Jenkins, Nicole Messina, Imran House, Missy Henderson, Kim Pham, Alex Davenport, Connie Duong and Caroline Owen at Peter Mac; David Tarlinton, Erika Cretney, Rhys Allan, Jamie Brady, Julia Marchingo, Melinda Hardy, Kate Lawlor, Tommy Liu, Robyn Sutherland and Dimitra Zotos at WEHI; Andrew Bean, Cameron Stewart, Ben Wade and Sarah Fardy at AAHL; and Rose Ffrench, Meredith O'Keeffe, Nitasha Kumar, Sarah Charnaud, Kerry Ko, Ben Fancke and Gabriela Khoury at the Burnet). The Committee would like to gratefully acknowledge the support from the following organizations: Australasian Society for Immunology, BD, Bio-Rad, Burnet Institute, CSIRO, CSL, Gene Technology Access Centre, Immunology Group of Victoria, Monash University, Peter MacCallum Cancer Centre, Sigma-Aldrich, The University of Melbourne, the University of Ballarat, and the Walter and Eliza Hall Institute of Medical Research.

Claerwen Jones
Chair, Day of Immunology Melbourne Organising Committee

Photos from Monash University DoI activities

(Photos: Monash University)

Sir Gus Nossal responds to an audience question about vaccination during his opening address for the student program, "Your Body at War"

Assoc. Prof. Andrew Lew of the WEHI discusses key discoveries in the field of immunology during his opening address

Photos from Monash University DoI activities

(Photos: Monash University)

LtoR: Tony Chiovitti (GTAC) with career speakers, Liz Williams (science communicator, WEHI), Julianne Bayliss (research scientist, Monash University), & Brent McKenzie (industrial immunologist, CSL)

Students from Rosehill Secondary College contemplate the structure of DNA

Sir Gus Nossal mingles with students from Berwick Secondary College during the morning refreshment break

GTAC scientist mentor, Jenny Cuxon (centre) discusses DNA structure with students from Berwick Secondary College

Photos from WEHI DoI Discovery Tour

(Photos: Dimitra Zotos, WEHI)

Professor David Tarlinton telling participants of the Discovery Tour at WEHI about Mac Burnet and his Clonal Selection theory

Julia Marchingo, Hodgkin Laboratory WEHI, describing to students from Mullauna Secondary College how researchers are able to track cell proliferation using flow cytometry

Dimitra Zotos, Tarlinton Laboratory WEHI, leading a tour group through the WEHI Galleria featuring the interactive immune system animation

Julia Marchingo demonstrating how a flow cytometer works to students from Mullauna Secondary College

ASI 2013 WELLINGTON

43rd Annual Meeting of the Australasian Society for Immunology

2-5 December 2013
Wellington
New Zealand

Keynote Speakers

Prof Olivera Finn
University of Pittsburgh, USA

Prof Richard Locksley
University of California, San Francisco, USA

Prof Kristen Hogquist
University of Minnesota, USA

Prof Gunilla Hedestam
Karolinska Institutet, Sweden

Prof Lawrence Steinman
Stanford University, USA

Dr Alan Sher
National Institutes of Health, USA

Prof Takashi Saito
Riken Research Center for Allergy and Immunology, Japan

Prof Rick Maizels
University of Edinburgh, UK

Dr W. Ray Waters
USDA National Animal Disease Center, USA

Prof Cornelis Melief
Leiden University, Netherlands

Prof Britta Engelhardt
Universität Bern, Switzerland

Prof Helen Heslop
Baylor College of Medicine, USA

Important Dates

13 May 2013
Registration opens

1 September 2013
Early Bird Registration Closes
Abstract Submission Closes

1 December 2013
Workshop Programme

2-5 December 2013
Scientific Meeting

www.asi2013.org

For more information about Corporate Sponsorship, Exhibition, or Travel Awards, please visit our website.

THE ASI VISITING SPEAKER PROGRAM

We have already enjoyed a number of visits by international speakers and look forward to some to other planned visits. However, we are still on the lookout for more candidates that members wish to propose. The success of prior visits includes the establishment of long-lasting collaborations with overseas visitors who, being hooked by their positive experience 'downunder', continue to come back to our shores. Others have made Australia home and are now strengthening our immunologist community. In all cases, local members are enriched by the interactions and benefit from developing new strengths derived from the interactions with visitors. Every member could profit from the opportunity to bring along their preferred immunologist to visit us. For details on how to propose your candidates, please visit the ASI website.

May 2013

By the time this newsletter is published we would have had the visit by **Professor Marc Jenkins,** Distinguished McKnight University Professor, Department of Microbiology, University of Minnesota, USA (*Hosted by David Tarlinton, WEHI).* Prof. Jenkins was scheduled to visit JCSMR, ANU, Canberra on May 21, the Garvan Institute, Sydney on May 22, and to be in Melbourne, May 23–26.

November 2013

Professor Ed Palmer, University Hospital, Basel, Switzerland.
Provisional itinerary:
Brisbane, Monday 11th
Sydney, Thursday 14th
Melbourne, Monday 25th
Hosted by Su Heinzel, WEHI

Late 2013/2014

Chris Benedict PhD, La Joya Institute of Allergy and Immunology (LIAI)
California, USA
Hosted by Alec Redwood, The University of Western Australia
Details of the visit to be provided closer to the date.

Chris Benedict is an associate professor at the La Jolla Institute for Allergy and Immunology in the Department of Immune Regulation. Dr Benedict's research is focused on the role that signaling by TNF-related cytokines play in antiviral defense and what viruses do in turn to counteract these cytokines.

Dr Chris Benedict

Dr Benedict received his BSc in chemistry from the University of Minnesota in 1992 and his PhD in 1997 from the University of Southern California in the department of biochemistry and molecular biology. Dr Benedict did his postdoctoral training at LIAI from 1998-2001, was a research scientist from 2001-2005 and was appointed to the faculty as an Associate Professor in 2005.

His research spans the scope of both the innate and adaptive immune response. His laboratory was the first to map the mouse CD4 T cell epitopes to murine cytomegalovirus (MCMV). His laboratory went on to show how cosignaling by the B7-CD28, PDL1-PD1, OX40-OX40L, 41BB-41BBL regulates the development and function of MCMV-specific T cells. In turn that viral inhibition of B7-CD28 signalling is critical for the success of the virus to establish persistent infection and blunt the antiviral CD4 T cell response

More recently his work has focused on the mechanisms that viruses use to subvert the cytokine signalling pathways. Specifically he has focused his work on the interaction of viruses with type I interferons and the TNF superfamily. Contributions to the literature include identifying that LT signalling is required for early IFN-I response to MCMV. More recently he has identified that marginal zone splenic stromal cells are the source of this early IFN-I, which precedes the later plasmacytoid DC IFN-I response. This early IFN-I responses establishes the basal level of CMV replication in mice.

His laboratory also identified that cytomegalovirus encoded ul144 is an orthologue of the herpes virus entry mediator (HVEM), a member of the TNF receptor superfamily. His laboratory identified that UL144 is an interaction partner with host B and T lymphocyte attenuator (BTLA) and may play a role in viral latency and persistence. Recently he discovered that HCMV also inhibits expression of the TRAIL Death Receptors and solved the three dimensional structure of the UL141/TRAIL-R2 complex by X-ray crystallography in collaboration with the Dr Zajonc.

Selected recent publications

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Verma, S., Wang, Q., Chodaczek, G and **Benedict, C.A.** (2013) Lymphoid tissue stromal cells coordinate innate defense to cytomegalovirus. J. Virol. (ePub March 27).

Smith, W., Tomasec, P., Aicheler, R., Loewendorf, A., Nemčovičová, I., Wang, E.C.Y., Stanton, R.J., Macauley, M., Norris, P., Willen, L., Nomoto, A., Schneider, P., Hahn, G., Ruckova, E., Zajonc, D.M., Ware, C.F., Wilkinson, G.W.G and **Benedict, C.A.** (2013) Human cytomegalovirus glycoprotein UL141 targets the TRAIL death receptors to thwart host innate antiviral defenses. Cell Host & Microbe.**13**,324-35.

Loewendorf A., Arens, R., Purton, J., Surh, C and **Benedict, C.A.** (2011) Dissecting the requirements for maintenance of the CMV-specific memory T cell pool. Viral Immunol. **24**, 351-5.

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Eidenschenk, C., Crozat, K., Krebs, P., Arens, R., Popkin, D., Arnold, C.N., Blasius, A.L., **Benedict, C.A.,** Moresco, E.Y., Xia, Y. and Beutler, B. (2010) Flt3 permits survival during infection by rendering dendritic cells competent to activate NK cells. Proc. Natl. Acad. Sci., **107**, 9759-64.

Rebsamen, M., Heinz, L.X., Meylan, E., Michallet, M.C., Hofmann, K., Vasquez, J., **Benedict, C.A**. and Tschopp J. (2009) DAI/ZBP1 recruits RIP1 and RIP3 through RIP homotypic interaction motifs to activate NFkB. EMBO Reports, **10**, 916-22.

Tyznik, A., Tupin, E., Nagarajan, N., Her, M.F., **Benedict, C.A.** (**co-senior author**) and Kronenberg, M. (2008) Cutting Edge: The mechanism of invariant NKT cells response to viral danger signals. J. Immunol., **181**, 4452-56.

Arens, R., Wang, P., Sidney, J., Loewendorf, A., Sette, A., Schoenberger, S.P., Peters, B. and **Benedict, C.A**. (2008) Cutting Edge: Murine cytomegalovirus induces a polyfunctional CD4 T cell response. J. Immunol., 180, 6472-76.

Benedict, C.A. **(co-corresponding author)**, Loewendorf, A., Garcia, Z., Blazar, B.R., Janssen, E.M. (2008) Dendritic cel programming by cytomegalovirus stunts naïve T cell responses via the PD-L1/PD-1 pathway. J. Immunol. **180**, 4836-47.

Schneider, K., Loewendorf, A., De Trez, C., Fulton, J., Rhode, A., Shumway, H., Ha, S., Patterson, G., Pfeffer, K., Nedospasov, S., Ware, C.F. and **Benedict, C.A**. (2008) Lymphotoxin-mediated crosstalk between B-cells and stroma promotes the initial type I interferon response to cytomegalovirus. Cell Host Microbe, **3**, 67-76.

The Walter and Eliza Hall Institute of Medical Research

WEHI Seminars on the Web: www.wehi.edu/seminars/

Upcoming Conferences

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

2013 Conference on Virology & Immunology
December 3–5, 2013
Sanya, China
www.engii.org/workshop/CVI2013December
workshop_December@engii.org

3rd Network of Immunology Frontier Winter School on Advanced Immunology
January 19–23, 2014
Awaji Island, Japan
http://ifrec-sign-winterschool.org/index.html

53rd Midwinter Conference of Immunologists at Asilomar
January 25 – 28, 2014
Pacific Grove, California, USA
www.midwconfimmunol.org

16th Biennial Meeting of the European Society for Immunodeficiencies (ESID 2014)
Prague, Czech Republic
October 29–November 1, 2014
www.kenes.com/esid

ICB Online Manuscript Submission

Online manuscript submission for Immunology and Cell Biology now available via:

http://mts-icb.nature.com/

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

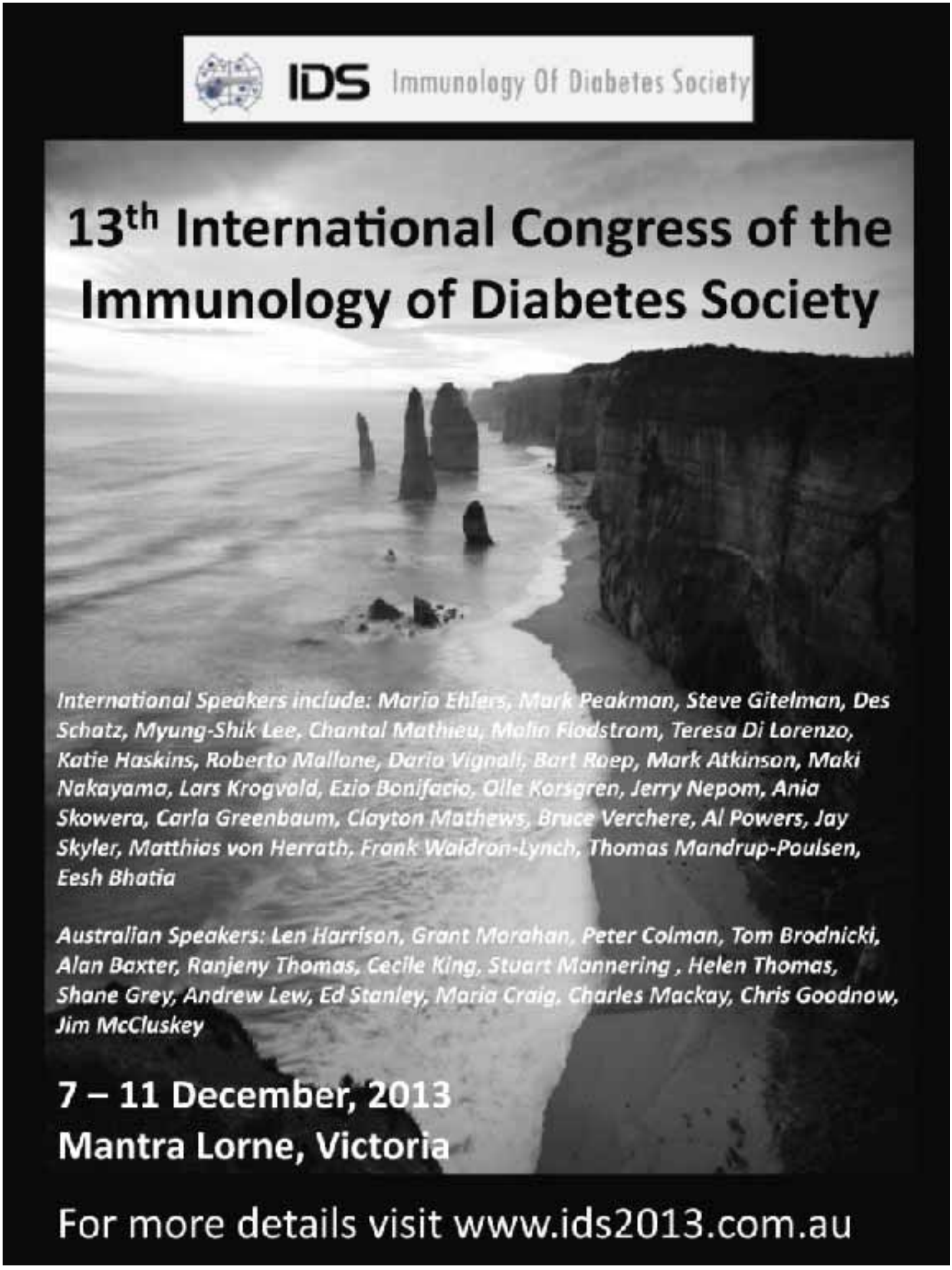
Gabrielle Belz, Editor-in-Chief
Immunology and Cell Biology

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.

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


IDS Immunology Of Diabetes Society
13th International Congress of the Immunology of Diabetes Society
International Speakers include: Mario Ehlers, Mark Peakman, Steve Gitelman, Des Schatz, Myung-Shik Lee, Chantal Mathieu, Malin Fiodstrom, Teresa Di Lorenzo, Katie Haskins, Roberto Mallone, Dario Vignali, Bart Roep, Mark Atkinson, Maki Nakayama, Lars Krogvold, Ezio Bonifacio, Olle Korsgren, Jerry Nepom, Ania Skowera, Carla Greenbaum, Clayton Mathews, Bruce Verchere, Al Powers, Jay Skyler, Matthias von Herrath, Frank Waldron-Lynch, Thomas Mandrup-Poulsen, Eesh Bhatia
Australian Speakers: Len Harrison, Grant Morahan, Peter Colman, Tom Brodnicki, Alan Baxter, Ranjeny Thomas, Cecile King, Stuart Mannering , Helen Thomas, Shane Grey, Andrew Lew, Ed Stanley, Maria Craig, Charles Mackay, Chris Goodnow, Jim McCluskey
7 – 11 December, 2013
Mantra Lorne, Victoria
For more details visit www.ids2013.com.au

ASI Councillors' News

N.S.W. News

2013 NSW/ACT Branch Meeting

I am really excited about the upcoming NSW/ACT Branch meeting – we have a fantastic lineup of plenary speakers that includes Prof. Katharina Gaus (UNSW), Dr Mireille Lahoud (Burnet Institute, Vic.), A/Prof. Stuart Tangye (Garvan) and A/Prof. Ian Cockburn (JCSMR). Of course, a major objective of this meeting is to give students and early career researchers the opportunity to speak, so there will be plenty of opportunities for those people in the program as well. The meeting will take a similar format to the previous four years and has proven to be a stimulating, fun and interactive meeting – I'm really looking forward to it! Thank you very much to Gold Sponsors BD Biosciences, Silver Sponsors Jomar Bioscience as well as Miltenyi Biotech, Edwards Group, Life Technologies and Australian Biosearch.

Dates:
Thursday 12th & Friday 13th September 2013
Location:
Peppers Resort Craigieburn, Bowral
Registration:
www.garvan.org.au/symposium/asinsw

Visiting speakers

NSW has benefited from some fantastic ASI speaker visits this year – most recently Prof. Branch Moody of the Brigham and Women's Hospital, who gave a brilliant seminar on CD1a, b and c restricted T cells and the striking importance of CD1a restricted T cells in IL-22 production in the skin. Many people also benefited from energetic discussions with Prof. Moody. Thank you to the ASI Visiting Speaker Program for bringing him to Sydney.

Next up we have Prof. Marc Jenkins of the University of Minnesota visiting the Garvan Institute to give a seminar at midday on Wednesday, 22nd May.

If you are interested in nominating high profile speakers for future invitations, please be aware that you can do so through me.

2014 meeting

You may be aware that NSW is hosting the ASI Annual Scientific Meeting in 2014. Organisation for this is well underway and we have some stellar international plenary speakers locked in already. It is going to be held at the lovely beachside Novotel Northbeach in Woollongong from Monday 1st to Friday 5th December 2014 – so put it in your long term diaries now! Woollongong is only a short distance from Sydney and we'll be helping to arrange transport from central Sydney for those who need it. Note that the program is going to be shifted forward a day so that the Workshops will take place on the Monday, rather than the Sunday as traditionally occurs. More to follow over the course of the next 18 months.

Marcel Batten
Councillor

S.A./N.T. News

The last week of April has been a busy week for the SA/NT branch of ASI. On Monday, 29th April we teamed up with the Royal Institute of Australia (RiAus) to celebrate the Day of Immunology by running a 'Vaccination Café'. Members of the public were invited to come along to experience immunology in action and get their flu vaccine and learn about immunology while they wait.

The event was opened by Professor Paddy Phillips, the Chief Medical Officer of South Australia and a strong advocate for vaccination, who spoke candidly about the importance of vaccination and its significant impact on improving human health. With 100 people pre-booking their vaccination online we quickly sold out and were kept busy with plenty of questions from the interested public about vaccination, cancer and allergy to name a few. The event was such a success that we have already started making plans with RiAus about how to make the event bigger and better next year. A big thankyou to our invited guests who came along on the day to share their passion for immunology – Claudine Bonder, Michele Grimbaldeston, Helen Marshall, Lachlan Moldenhauer – and the organising committee, who helped in the lead up to the event as well as on the day: Susan Christo, Pallave Dasari, Lisa Ebert, Tessa Gargett, Natasha Kolesnikoff, Natalie Stevens, Houng Taing.

Prof. Paddy Phillips opening the Vaccination Café

With 100 people pre-booking their vaccination online we quickly sold out

Dr Lisa Ebert set up an interactive station with a microscope to show interested members of the public what the cells of the immune system look like

A team effort (LtoR: Natasha Kolesnikoff, Tessa Gargett, Susan Christo, Natalie Stevens) in answering the questions of a Year 12 student keen to get the facts on the vaccination debate

Before the week was over we started to plan the next big ASI event for SA/NT, the 9th Annual Adelaide Immunology Retreat (AIR-9). The success of this event has grown tremendously over the years and it's great to have so many people volunteer to be involved in the organising committee. The retreat, which is aimed at giving PhD students, Honours students and Research Assistants the opportunity to present their work and interact in a relaxed environment, will be held in August this year. An notice of the exact date and call for abstracts will be sent out by email to all SA/NT ASI members in June. Please support this event if you are a supervisor by encouraging your students and staff to attend as it is a great opportunity for them to give an oral presentation to their peers in a relaxed environment. Another incentive is that there are prizes for the Best Presentations. For queries or more information, I can be contacted by email at Cara.Fraser@sahmri.com. We look forward to seeing you there!

Cara Fraser
Councillor

Sustaining Membership

ASI Inc acknowledges the support of the following sustaining member:

• Jomar Bioscience

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. To help those who wish to attend both the ASI 2013 and AFCG 2013 meeting, we will offer a 25% discount on early-bird registration (full only). Online registration and abstract submission are open and awaiting you.

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. Additionally the Australasian Virology Group will hold its annual meeting from 8-11 December 2013 in the lovely Queenstown. Please visit the following websites for further information:

Australasian Flow Cytometry Group (AFCG): http://www.afcg2013.org
New Zealand Institute of Chemistry (NZIC): http://nzic.org.nz/conferences.html
Australasian Virology Group (AVG): http://www.avg.org.au

ASI Visiting Speakers 2013

In the last few months we had two excellent visits by the ASI Visiting Speakers: John Wherry in Auckland and Branch Moody in Wellington. Both visits were widely attended by NZ ASI members and many lively discussions ensued during the social events. We are looking forward to hosting many more ASI visiting speakers in the future.

Anne La Flamme
Councillor

Queensland News

On Sunday 28th April, iQ held its Inaugural Day of Immunology event at the Queensland Museum. Entitled "Our Amazing Immune System", it was a public event designed to both educate and fascinate people about different aspects of the immune system with six engaging sessions from local speakers. We would like to thank Prof. John Aaskov, Prof. Tim Florin, Assoc/Prof. David Harrich, Mr Brendan Parkes, Prof. Ranjeny Thomas and Prof. John Upham for discussing their research and experiences and, in the process, generating a lot of interest, questions and discussion amongst the attendees and speakers. Based on its success, iQ hope to make this an annual event.

Ashraful Haque
Councillor

A.C.T. News

The ACT Branch marked World Day of Immunology by hosting the 14th Frank and Bobbie Fenner Conference on 29th and 30th April at The John Curtin School of Medical Research. Embracing The Australian National University's plan to celebrate its Nobel Prizes during Canberra's Centenary in 2013, our event featured public lectures by Professor Rolf Zinkernagel on *Immunity Against Infections* and by Professor Peter Doherty on *Science in the Public Space: Distinguishing Truth from Falsehood*. Both lectures were extremely well attended with the JCSMR's lecture theatre being absolutely packed for both evenings. For those who missed the lectures, or want to listen to them again, a video of both lectures is available at: http://jcsmr.anu.edu.au/News-events/past-events.

Arranged around these public events was a 2-day scientific meeting exploring the consequences of the Laureates' seminal discovery under the broad them of *Perspectives on Immune Recognition*. The meeting was a great success, being attended by approximately 90 mainly local immunologists with a sprinkling of interstate visitors, who heard snippets of cutting-edge immunology happening in Australia.

Anselm Enders
Councillor

Victorian News

Following on from the success of the ASI Annual Scientific Meeting held in Melbourne last year, there are a series of interesting events planned for 2013 that are sure to be of interest to local members. Activities associated with the Day of Immunology continue to grow in prominence and popularity each year, with the Melbourne event again highly successful (see report elsewhere) and a spin-off event planned for Ballarat on June 4 that will see local VCE students undertaking a day-long series of lectures and practical demonstrations about the importance of Immunology to the community and as a potential career option.

The Immunology Group of Victoria (IgV) has announced it will hold its annual Master Class in Immunology at the University of Melbourne on June 13, and the Winter Seminar will again feature a presentation by a prominent Australian immunology researcher. The annual IgV Scientific Meeting will resume its normal place on the schedule and will be held at the Forest Resort in Creswick. This is a fantastic venue and the facilities are top notch (excellent conference rooms, golf course, spa facilities, great rooms and an understanding host who appreciates the need to discuss the Instructional and Selective theories of thymic selection over a quiet drink at 2am). The Creswick region (near Ballarat) is famous for its gold mining history and its wonderfully clean air and clear skies so, if the weather behaves, expect the ASI President to host gold prospecting tours with his high-powered metal detector, and star-gazing sessions with his Hubble-sized telescope (these excursions to be confirmed). IgV is also hosting several speakers who are part of the ASI Visiting Speaker Program. A/Profs John Wherry and Branch Moody have already delivered well-received seminars at different institutes around Melbourne and Professor Marc Jenkins will be delivering a seminar at WEHI (hosted by David Tarlinton) on May 23 about the composition of the naïve T cell repertoire. Please feel free to contact me if you have a nomination for the Visiting Speaker Program, or if there is another ASI related matter you would like to discuss.

Members will have hopefully completed the online survey providing feedback about ASI. The survey is part of a broad review of ASI activities, designed to ensure the events run by ASI and the prizes and awards on offer under different schemes are providing maximum value for our members. Lastly, please remind your colleagues to make sure they are enrolled as an ASI member. The membership fees are crucial for running the many different programs that ASI and IgV provide and ASI membership gives you and your colleagues a range of benefits, including discounted registration to conferences and events, eligibility for prizes and travel awards, and opportunities to network with colleagues. It is important to remind new students and post docs about ASI membership as they may not be aware of the benefits it provides.

Stuart Berzins
Councillor

Speakers at the 14th Frank and Bobbie Fenner Conference, The John Curtin School of Medical Research, 29-30 April, 2013.

Contributions sought for the ASI Newsletter

You could win $200

Deadline for the next issue :
1st August 2013

Please email your contributions to the Secretariat by the above date.
asi@21century.com.au

TRAVEL AWARD CONFERENCE REPORTS

The 2nd NIF Winter School on Advanced Immunology

Owen Siggs
University of Oxford & The Scripps Research Institute

Like most of its young delegates, The Network of Immunology Frontier (NIF) Winter School has only recently emerged onto the immunology meeting scene. Following a successful debut on Awaji Island, Japan in 2012, the 2013 meeting was held on Sentosa Island, Singapore, 20–25 January. Now a popular resort, Sentosa Island was once a WWII fortress, built to repel a Japanese invasion from the South China Sea. You could imagine how unpleasantly surprised the Singaporeans were when Japanese troops marched down the Malaysian peninsula, capturing Singapore and turning Sentosa into a POW camp for Australian and British troops.

Today, the island is a popular destination with tourists and immunologists alike. Artillery muzzles have been replaced by coconut palms, and POW camps by theme parks and luxury hotels. One of these hotels held 76 immunologists from around the world, 20 of whom were established faculty, with students and young postdocs making up the remainder. Every attendee, whether first-year PhD student or senior Department Head, had their moment in the limelight. Talks covered all aspects of the immunological spectrum from innate to adaptive and basic to applied, and speakers were kept on their toes with some articulate questioning by Adrian Hayday.

Some scientific highlights include Andreas Strasser's odyssey in cell death research, Bernard Malissen's revelation of a new mediator of CD28 signalling, Abul Abbas and his inspiring overview of T cell tolerance, and Vijay Kuchroo's presentation of a role for sodium chloride in promoting Th17 cell development (salt shakers were promptly shunned for the remainder of the meeting). Many of the younger attendees had exceptional stories of their own, with Victor Peperzak (Tarlinton lab), Takuma Misawa (Akira lab) and Hannes Bergmann (Goodnow/Enders lab) giving the audience a preview of upcoming issues of *Nature Immunology* and *JEM*.

To conclude the week, participants were taken on a tour of the 5 year-old Singapore Immunology Network: a 6000 square metre core-funded institute at the Biopolis campus. Local faculty relished the chance to show off their digs, complete with a shiny new CyTOF, and a not-so-subtle (but well-timed) advertisement for open postdoc positions.

I'd encourage all young ASI members to apply for the 3rd NIF Winter School, which will return to Awaji Island in January 2014. It's a fantastic chance to build relationships with your future colleagues, and to have long discussions with some big names in immunology. And if you're fortunate enough to have an ASI travel award, the experience is even better. Thank you ASI.

Owen Siggs (far right) enjoying some of the local teh halia (ginger milk tea) with colleagues

Keystone Symposia: Immunological Mechanisms of Vaccinations, Ottawa, Canada

Stephanie Chan
JCSMR, ANU, Canberra

I am a final year PhD student at the Australian National University, John Curtin School of Medical Research. I am supervised by Professor Christopher Goodnow and Dr Edward Bertram; the focus of my PhD project is to study the generation of memory CD8 T cells in two ENU gene variant mutants. After I finish my PhD, I am interested in venturing into application of the studies of CD8 memory in the area of vaccination and was keen to attend the Keystone symposia, Immunological Mechanisms of Vaccination in Ottawa, Canada. At the same time, I wanted to visit some laboratories to seek potential post-doctoral positions in the US or Canada. I was delighted to receive the ASI post-graduate international travel award that provided the funds I needed to make this trip possible.

It was a great privilege and opportunity to be able to travel to Atlanta, USA, for a visit at Professor Rafi Ahmed's laboratory as well as Professor Tania Watt's laboratory in Toronto, Canada. I was able to talk face to face with leading experts in the field and had a great time of constructive exchanges and quality conversations about science, career and life in general with the students and post-docs in their laboratories.

Attending the Keystone symposia in Ottawa, Canada was another great highlight of my trip where I met many experts in the field. We were able to discuss science and ideas from very different and unique perspectives and it gave me a great opportunity to tap into the brains of these brilliant scientists. They also gave me advice on the pros and cons to look out for as I sought out a suitable laboratory for a post-doctoral position. One constant piece of advice I received from senior investigators I met at the conference was to find a lab with a nurturing environment if I am looking for a post-doctoral position. I also met with scientists at their various stages of their research career and obtained useful advice that helped with determining my plans for the next phase in life. I also managed to network with many peers who were also finishing their PhD and were looking out for what is next in their lives.

I was given the opportunity to present my poster at the Keystone symposia and received constructive feedback about my work. It was a good learning curve to learn how to describe and present my work to others. That brought about more experiments to do and more questions to address! Overall, it was a very fruitful trip and definitely broadened my perspectives and helped in defining my next steps for my career. Last but not least, I would like to thank ASI for providing the funding to enable such a successful trip.

54th Annual ASH Meeting and Exposition, Atlanta, USA

Motoko Koyama
Queensland Institute of Medical Research

The 54th Annual American Society of Hematology (ASH) meeting and exposition was held in Atlanta, Georgia, USA from 8–11 December, 2012 and I was fortunate to have the opportunity to present my research. I am deeply grateful for the support from ASI by awarding me the ASI Postgraduate International Travel Grant to attend this meeting.

My research interests are in haematopoietic stem cell transplantation and I am investigating transplant immunology, particularly graft-versus-host disease (GVHD) and graft-versus-leukaemia/lymphoma (GVL) effects using murine bone marrow transplantation (BMT) models. My oral presentation focused on the role of DNAX accessory molecule 1 (DNAM-1) which is a co-stimulatory and adhesion molecule expressed by mainly NK cell and T cells. My presentation was well received and was followed by good discussion.

It was a well attended meeting with several concurrent sessions covering experimental and clinical haematology. In clinical research, the trend seems to go to double unit-cord blood transplantation or HLA-haploidentical transplantation for high-risk hematologic malignancy in patients without conventional donor. Especially to improve the outcome of haploidentical transplantation where severe alloreaction would be expected, several ways of intensive immune suppression therapy were progressed including cell therapy using regulatory T cells.

In experimental research for transplantation, most of the studies (including mine) focused on T cells and dendritic cells (DC) and examined the various molecules on them in ex vivo assays. My impression was that the role of antigen presenting cells other than DC in BMT was not well understood and that very little research was being undertaken in chronic GVHD. Thus further understanding of transplant immunology would support ongoing clinical trials and develop future therapy for the transplants using alternative stem cell sources. I renewed my motivation for my projects.

Overall, my attendance at the ASH annual meeting 2012 gave me the opportunity to hear the current research in clinical and experimental stem cell transplantation and also to meet the investigators in this field. Especially, it was delightful to talk with early career researchers like me from other laboratories all over the world. Thank you very much to ASI!

3rd European Congress of Immunology, Glasgow

Gerard Kaiko
Hunter Medical Research Institute, University of Newcastle, NSW

With the assistance from the ASI Post-doctoral travel award I was able to attend the 3rd European Congress of Immunology (ECI) held in Glasgow in September 2012. This triennial conference brings together not only Europe's finest Immunology and Inflammation researchers but also many of the world's best. There were many fantastic talks and an attitude to also present unpublished work, which I had not previously observed at conferences of this size (~4000 attendees). The social events organised for the conference were definitely first class and provided plenty of entertainment.

During the conference I presented a talk entitled "MicroRNA regulate bacterial phagocytosis in the lung". The feedback from the seminar was very useful and definitely provided me with a couple of new ideas to pursue with this project, including trialling our microRNA inhibitor in several antibiotic-resistant bacterial strains.

A few of my conference highlights included Kingston Mills' talk on the role of IL-17 and IL-22 at mucosal barrier surfaces, and insights into how the two cytokines may have divergent functions in tissue protection vs inflammation rather than the historically close functional association of the two cytokines in autoimmune disease. This is work that I found highly relevant to our own. Richard Grencis discussed the complex interplay between chronic low lying nematode infections and the microbial community of the gut. Interestingly, he demonstrated how these infections may bring about life-long changes in the normal flora of the gut potentially leading to susceptibility or resistance to a variety of inflammatory conditions. Facundo Batista presented interesting work on new multi-photon imaging techniques for the visualisation of lymphocyte responses and antigen presentation to B cells.

Although Glasgow is not necessarily everyone's pick as the pinnacle of European cities (tongue in cheek), there are certainly some very interesting revitalised parts to the once great industrial capital of Britain. If you can bear the "arctic" weather (even on the tail end of summer), it's a city worth exploring. I would also thoroughly recommend the picturesque train journey that winds north from London rather than flying.

The new 'green' paperless programme was trialled at ECI requiring attendees to use smart phone apps or wifi to navigate the conference. It does take some getting accustomed to and probably needs refinements, but this is clearly the way of the future for major conferences where it will save literally millions of pieces of print.

Overall, I thoroughly enjoyed this conference the content of which I found very informative and relevant to many of our own projects. I definitely gained several new project avenues to pursue in the future after attending ECI 2012.

With the assistance from the ASI award, I was also fortunate enough to join the lab of Dr Mark Wilson and Dr Gitta Stockinger at NIMR in North London for a short-term visit to facilitate a project collaboration investigating the existence and function of Th22 cells. While there I was able to utilise a fate reporter mouse system designed by Dr Stockinger and Dr Alexandre Potocnik to enhance our project back in Australia by enabling us to track the origin of our cells. Hopefully we can translate this into a novel publication in the not too distant future. On a personal level I gained a tremendous amount from this wonderful opportunity at NIMR, both in regards to learning new techniques and exposure to the fantastic MRC-driven research culture within the institute. While there I was really privileged to interact with some world-class Immunologists in a truly unique environment. I am very thankful for the generosity of Dr Wilson for being so welcoming into his lab and for all his assistance, and everyone at NIMR for their inclusive nature for my short-stay. For any Postdocs looking for future opportunities, I couldn't recommend this institute any more highly!!

Once again thanks to ASI for supporting this conference and lab visit.

ThymUS 2012, Miami, USA

Steve Daley
JCSMR, ANU, Canberra

Who is the most passionate 'special interest group' in immunology on the face of the planet? It's hard to go past the thymologists. This dedicated group meets annually to talk all things thymus. Equal opportunity is alive, as all talks run for 20 minutes. The organisers aim to eke out as much data as possible in four days, so introductions must be brief and you'd better finish in time for questions. It is a good formula, because a couple of hundred thymus specialists turn up regardless of whether Australia, Japan, Europe or the US is playing host.

The US election happened during the meeting. As CNN announced the Democrats' victory, a cheer rang out from the researchers whose funding prospects rode on the election result. Ironically, we were staying in a towering hotel owned by Donald Trump, Obama's most vocal critic.

My next stop was breezy Boston, where I gave a seminar at Harvard Medical School. Many thanks to my friend from PhD days, Alison Paterson, who hosted my visit.

Not yet finished with thymuses, I visited the Jameson-Hogquist lab in Minneapolis, where huge grain silos sit on the horizon, a reminder of the agricultural might of a country bisected by the Mississippi. By any measure, chatting with people from the Jamquist lab and Mike Farrer's lab matched the heights of the Miami conference.

Thanks ASI for contributing to a great experience.

Keystone Symposium – Cancer Immunology and Immunotherapy, Vancouver 2013

Stephen Mattarollo
The University of Queensland Diamantina Institute, Brisbane

I recently attended the Keystone meeting – Cancer Immunology and Immunotherapy – held jointly with the Antibody as Drugs meeting, in the lovely city of Vancouver, BC.

Prior to the meeting I embarked on a road trip along the US West Coast as part of my lab visit schedule. After enduring the painfully long flight from Brisbane to LA (caught up on my movies at least), there was a short connection to San Francisco where I spent the first couple of days. Although I had left behind 35^{0}C heat in Brisbane to hit <8^{0}C mid-winter, the weather was beautiful and, as it turned out, was the only sun I saw for the whole trip! After some well earned sightseeing I travelled down to Stanford to meet with Prof Ron Levy at Stanford University. Unbeknown to me it was a public holiday to commemorate Martin Luther King, and Ron was kind enough to come in to meet with me. Ron has pioneered research into immune-based therapies for blood cancers and, as it turns out, we are working on very similar concepts. It was a pleasant change to be speaking to someone with similar thoughts and ideas and our brief meeting led to discussion about collaborative research.

Another first for me was driving on the 'wrong' side of the road as I made my way up the amazing coastline to Portland. The "Avenue of Giants" was a highlight, driving past massive 2000 year old Redwood trees. Along the way I managed to pick up a virus (peak flu season over there!) which prevented me from meeting with Prof Lisa Coussens at OHSU in Portland, which was very disappointing for me. Instead I slept and built my strength to cross the border into Vancouver. I had a stop-over in Seattle (raining!) and then checked into the Fairmont Vancouver Hotel, also the location of the Keystone meeting. Great old venue, but more than one of us reported strange noises in the rooms at night!!

The meeting opened with a Keynote Address from James Allison (MD Anderson Cancer Centre, USA) who once again wowed us with the incredible therapeutic outcomes of the recently FDA approved monoclonal antibody – anti-CTLA-4 (Ipilimumab) against metastatic melanoma. They are now investigating in more detail the mechanisms of immune regulation by Ipilimumab and assessing the therapeutic benefit of combining this with other immune-based and conventional anti-cancer therapies.

On the coastal track heading towards the iconic Golden Gate Bridge in San Francisco

The remainder of the meeting consisted of a fantastic line-up of world renowned immunologists including the likes of Wolf-Herve Fridman, Rob Schreiber, Drew Pardoll, Carl June, Cornelis Melief, Stanley Riddell, Nick Restifo, Laurence Zitvogel, Vincenzo Bronte, George Prendergast and Glenn Dranoff just to name a few. There was large emphasis on antibody-based therapies, genetically engineered T cells and a resurgence of adoptive immune therapy (organizers' bias … perhaps). I was personally impressed by the quality of the 'up-and-comers', the junior scientists of the next generation. The quality of research was incredible. I was equally impressed by the quality of the food that was served at the meeting. Listed as "Lite Bites" in the program, it turned out to be restaurant quality two course dinners. Well done Fairmont!! Wine + posters did not fail to promote some fantastic and at times intense discussions, and I believe many of the students appreciated the chance to talk to senior investigators in an informal setting. Overall, a very well organized meeting which I thoroughly enjoyed. I feel refreshed and motivated to get on with the research at UQDI (once these grants are submitted!).

Oh, and I must mention that I finished my trip with a couple of days up in the mountains of Whistler. I had barely ever seen snow before in my life, let alone skied, and this was an amazing introduction to both. Not having time for lessons, I decided to take the non-recommended approach of grabbing some skis and heading for the slopes. I found out later that Whistler has some of steepest green 'easy' runs in the world, which may explain why I spend most of my time eating snow! Lessons next time! What an amazing part of the world. My only disappointment of the trip was not sighting a black bear (all doing the sensible thing of hibernating for the winter). Finally, a big thank you to ASI for providing the Travel Grant to allow this trip to happen.

One of the peaks at Whistler mountain

Keystone Symposia: B Cell Development and Function

February 10–15, 2013, Keystone, Colorado USA

Zahra Sabouri, Australian National University

I am very appreciative of ASI Travel Award organizers for supporting and giving me the opportunity to me to attend Keystone Symposia: B Cell Development and Function which was held jointly with HIV Vaccines in Keystone, Colorado, USA. I was fortunate enough to present my PhD project findings as poster and oral presentation in this meeting.

The meeting provided a unique overview of B cell biology and HIV vaccine development. Being able to attend both meetings provided a unique opportunity for me to explore the application of my PhD study in HIV vaccine development.

In general the meeting provided an update on cutting-edge science in B cell immunology and covered almost all aspects in B cell biology and HIV vaccine development. The topics which were discussed included: B cell Genesis, B cell Development and Signaling, Molecular basis of antibody diversification, Antibody effector function and envelope-based immunogen design, Early events in B cell activation, B cell evolution and repertoire selection, Quality of immune response, B cell response to vaccines and HIV, Mucosal B cell responses, Mucosal antibody responses, Germinal center, Plasma cell and memory B cell differentiation, germinal center B cell response, plasma cells and B cell response, autoimmunity and neoplasia, Protective antibody response against HIV, MicroRNAs and B cell neoplasias, New concepts in innate immunity and stimulation, CD4 T cell help, Autoimmunity and regulatory B cells and Antibody genomics and immunogen design.

The conference started on Sunday, February 10 with welcoming of participants and a joint session with a great talk entitled "Evolution of adaptive immunity in vertebrates" by Max Cooper (Emory University). The second lecture was given by Michel Nussenzweig (Rockefeller University). His talk was about "The Human Antibody Response to HIV".

The second day of the conference included excellent presentations by B cell genetecists. I enjoyed very much Prof. Tasuku Honjo's (Kyoto University, my previous mentor) talk on acquired immunity, genome instability and cancer. He presented data suggesting that AID (activation-induced cytidine deaminase) edits miRNA to downregulate Topoisomerase 1 mRNA translation. By reducing Top1, AID induces mutations and enhances the formation of aberrant DNA structure in immunoglobulin and genes loci.

Zahra Sabouri (right) at the last dinner of conference on Feb. 14, with her roommate Marie-Luise Humpert from the Institute for Research in Biomedicine, Switzerland.

On the following days of the conference I particularly enjoyed very much participating at "Germinal center B cell response", "Autoimmunity and neoplasia", "Quality of immune response" and "Antibody genomics and immunogen design" sessions. I also met with the presenters after their lectures and poster presentations and enjoyed very much the discussions.

During my staying in the USA I visited three HIV vaccine development laboratories for my future postdoctoral studies. I visited Dr Barton Haynes's lab in Duke Human Vaccine Institute (DHVI) in Durham, North Carolina; Ian Wilson's lab at The Scripps Institute in San Diego (his team works on Crystallographic Studies of Immune Recognition and Viral Pathogens, including HIV and Flu viruses.); and the last laboratory visit was at Vaccine Research Center (VRC) at NIH with Dr John Mascola. These visits were extremely productive. I presented my findings in these laboratories and met with almost all members in the lab, discussed the research which is being done in their laboratories and I also received valuable feedback on my research.

Overall, the Keystone Symposium provided an excellent opportunity for me to update my knowledge about cutting-edge B cell immunology research and HIV vaccine development, present my own PhD project findings and interact with most of the experts in these fields. Thank you ASI for supporting my trip!

The Keystone Conference Centre

Keystone Symposium, B Cell Development and Function

Mehmet Yabas
The John Curtin School of Medical Research, The Australian National University, Canberra

I was very grateful to be awarded a travel bursary by the Australasian Society for Immunology to attend the Keystone Symposium on B Cell Development and Function which was held in Keystone, Colorado, USA between 10th-15th February 2013. This was hosted as a joint conference with the HIV Vaccines Symposium.

In general, it was a brilliant conference with an outstanding program addressing all aspects of B cell and HIV fields. The conference started with two fascinating talks delivered by Myron Cohen and Michel Nussenzweig about the generation of broadly neutralizing antibodies against HIV in humans. Some other highlights of the conference included an interesting presentation by Max Cooper on the immune system in lampreys, Carola Vinuesa's talk on the discovery of Roquin 2 and its role in humoral immunity, and David Baltimore's talk on the role of miRNA-146a in the generation of hematopoietic stem cells and malignancies. On the last day of the conference, Louis Staudt gave an excellent presentation on the effectiveness of the potential B cell receptor signaling inhibitors in human lymphomas. He also talked about a potential role of ligand-induced signaling by TLRs in the survival of B cell lymphomas.

In addition to the great talks during the day there was a fruitful poster session in the evening. In total there were about 220 posters for B cell development and function session, and about 145 posters for HIV Vaccines session presented over three days. The designated poster sessions were quite beneficial and provided an opportunity to speak with the presenters about their research in a friendly and informal atmosphere. I was able to present a poster about my PhD project, and I received feedback and many good suggestions for future experiments.

Prior to the conference, I had a chance to visit two institutes in Chicago and Dallas where I gave a talk about my research and explored a possible post-doc position. I first visited the laboratory of Marcus Clark at the University of Chicago, and learned about the excellent work being done in the laboratory on the early B cell development. I then visited Bruce Beutler's laboratory at the University of Texas Southwestern Medical Center and gained more information on the ENU-mutagenesis screen, which is one of the biggest ENU screening facilities in the world.

Overall, it was a great opportunity to learn about cutting-edge research related to B cells as well as to closely interact with the people attended the meeting. Visiting the different institutes was also a great experience and very beneficial to my future career. Therefore, I would like to take this opportunity to thank the Australasian Society for Immunology for providing financial support for my trip to the USA.

Keystone Symposia: Understanding Dendritic Cell Biology to Improve Human Disease Keystone Colorado, USA

Jason Waithman
Telethon Institute for Child Health Research, Perth

Researchers from all over the world gathered in Colorado between March 3-8, 2013 to present and discuss the latest developments on our understanding of dendritic cell ontogeny and function. All "Short Talk" presentations at the meeting were dedicated to the memory of Nobel Laureate Ralph Steinman. He was responsible for initiating Keystone Symposia's new program format of short talks and believed they were a great opportunity, especially for early-career scientists, to gain exposure for their scientific research by allowing them to present their results during a plenary session.

A large proportion of research presented focused on dendritic cell ontogeny and nomenclature. Controversies regarding the best way to distinguish macrophages from dendritic cells *in vivo* were discussed. A host of different investigators proposed using CD64 (Fc-gamma receptor 1) as a marker to discern tissue-derived $CD11b^+$ dendritic cells from macrophages/monocytes. In regards to ontogeny, many elegant studies showed that dendritic cells derive from a specific hematopoietic lineage in the bone-marrow controlled by a unique molecular program distinct from other myeloid programs.

A main goal of the meeting was to review recent development in our understanding of basic dendritic cell biology and function. Many recently identified surface markers were used to identify dendritic cell populations with unique characteristics (e.g. the chemokine receptor XCR1 identifying cross-presenting dendritic cells). Furthermore, many of the discussed molecules were being targeted with antigens to manipulate immunity. There were some discrepancies between groups using an identical experimental protocol, but overall the data looks promising. All forms of adaptive immunity could be altered with some responses being augmented and others dampened down. Both are desirable effects and this methodology could be implemented to tailor immune responses during cancer or autoimmunity as well as other malignancies.

The final remarks focused on translating dendritic cell biology into medicine. To date, this has not been an overwhelmingly successful endeavor. However, dendritic cells are the master regulators of immunity and a greater understanding of their role in co-ordinating various immune responses should allow us to utilize their abilities for immunotherapy within a clinical setting.

This meeting personally provided me with new insights into an ever changing field and the directions into which the current research is headed. In addition, it provided me the opportunity to catch up with old colleagues and establish new, vital collaborations. I would like to thank the ASI for awarding me a travel grant to attend this meeting.

Publications List

Congratulations to ASI members who have published their following work in the last three months

Binz N, Ali Rahman IS, Chinnery HR, McKeone R, Simpson KM, Speed TP, Lai CM *et al.* **Effect of vascular endothelial growth factor upregulation on retinal gene expression in the Kimba mouse**. *Clin Experiment Ophthalmol* 2013; **41**(3)**:** 251.

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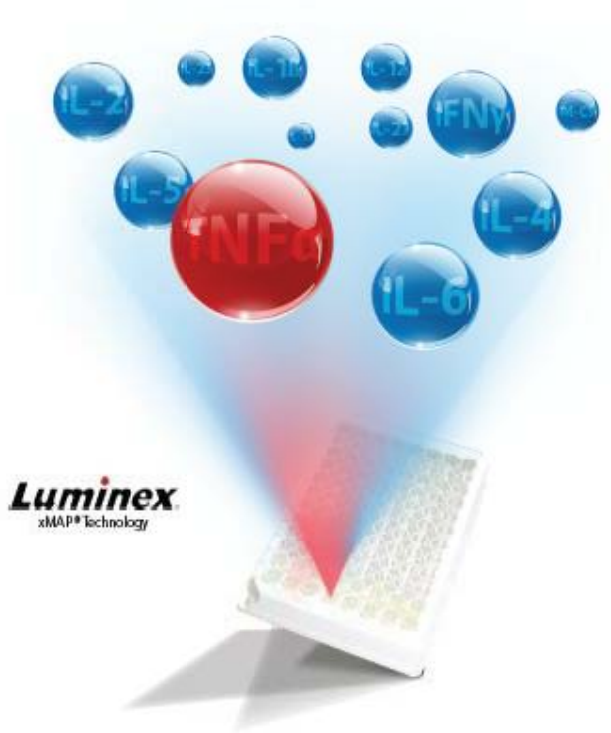

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IL-12p70
TNFα

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IL-4
IL-5
IL-6
IL-12p70
TNFα

Th1/Th2 Cytokine Panel (11 plex)
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IL-4
IL-5
IL-6
IL-12p70
TNFα
GM-CSF
IL-1β
IL-2
IL-13
IL-18
Th9/Th22/Th17/Treg Cytokine Panel (7 plex)
IL-9
IL-10
IL-17A
IL-21
IL-22
IL23
IL-27
Cytokine Panel 1C (7 plex)
IFNα
IL-1α
IL-1RA
IL-7
IL-15
IL-31
TNFβ
IL-1β
IL-2
IL-13
IL-18
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GROα/CXCL1
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IL-4
IL-5
IL-6
IL-12p70
TNFα
GM-CSF
IL-1β
IL-2
IL-13
IL-18
Th9/Th22/Th17/Treg Cytokine Panel (7 plex)
IL-9
IL-10
IL-17A
IL-22
IL-23
IL-27
Chemokine Panel 1 (9 plex)
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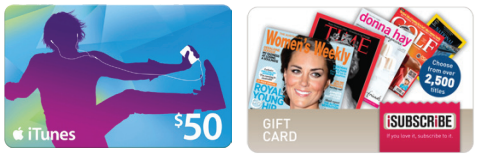

*Conditions apply. Promotion does not apply to MitoSciences® kits. Order must be placed between May 13 – July 31, 2013. Promotional code must be quoted at time of order to receive this offer either **EIA- iTunes** or **EIA-iSubscribe**, based on customer preference. Offer valid for Australia and New Zealand customers placing an Abcam order through Sapphire Bioscience, while stocks last.

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QUANSYS BIOSCIENCES

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Q-Plex Singleplex arrays - The Evolution of Single Analyte Measurement

These kits employ High Dynamic Range (HDR) technology, where optimized capture antibodies are used to measure the high and low regions of the complete theoretical range associated with an analyte. The kits are efficient and easy to run, requiring only 50µL per sample and utilising a protocol similar to traditional ELISAs.

To take advantage of the Q-Plex Singleplex array Buy one Get one Free offer, please contact Sapphire Bioscience and quote the promotion code **QBSINGLE13**.

This offer expires on September 30, 2013.
* Limited to first order of up to 3 kits.

www.quansysbio.com

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Minilys 5 day FREE TRIAL!

Free 5 day trial available!

*Pricing shown is AUD, NZD price is $3908.

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Tag Control Antibodies for $73 AUD

Purchase the monoclonal tag control antibodies listed below (50 µg) for just $73 AUD.

- Myc Tag (Cat# OAEA00011)
- Flag Tag (Cat# OAEA00002)
- His Tag (Cat# OAEA00010)
- HA Tag (Cat# OAEA00009)
- GFP Tag (Cat# OAEA00007)

Also available

GAPDH Loading Control (Cat # OAEA00006) for only $90 AUD.

Offer ends June 30, 2013. Contact Sapphire Bioscience and mention the promotion code **AVIVA13TL** when placing your order.

www.avivasysbio.com

SAPPHIRE BIOSCIENCE

www.sapphirebioscience.com

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Ph: +61 2 9698 2022
Fax: +61 2 9698 1022
sales@sapphirebioscience.com

In New Zealand:
Sapphire Bioscience (NZ) Ltd.
Ph: 0800 532 476
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In order to help you get the most of your reagents, Abcam is offering a FREE flow cytometry ebook (ISBN: 978-1-118-68839-7) with every product accessible through the flow cytometry multi-color selector tool. This book explains the basic principles of flow cytometry, surveying its primary scientific and clinical applications and highlighting state-of-the-art techniques.

Must quote **FACS-TBISS** when placing your order. Valid until June 30, 2012 or while stocks last.

SAPPHIRE BIOSCIENCE

20% off Inventory

Visit **www.sapphirebioscience.com/inventory**

GeneTex

15% off Antibody Panels

Over 80 antibody panels available, for details please visit sapphirebioscience.com/specials

You must quote **GENETEX12AP** with your order. Valid until June 28, 2013.

Immun Diagnostik

Buy 3 MutaREX or MutaPLEX Norovirus kits for AUD 924 ea*

The kits are based on PCR-tests for reliable virus detection. These kits will detect the new strain of norovirus known as "Sydney 2012". Both kits come with separate RNA-extraction control.

Offer ends June 30, 2013. * Price per kit for a minimum order of 3 kits.

AVIVA SYSTEMS BIOLOGY

$82 AUD Antibodies

Aviva is releasing over 17,900 antibody (50 µg) samples for only $82 AUD each. These products have predicted homology listed for over 5000 species. Further details see sapphirebioscience.com/specials

Offer ends June 30, 2013. Credit note will be provided if the antibodies do not perform successfully in western blots. Please quote the promotion code **AVIVA1382** when placing your order.

Molecular Innovations, Inc.

ELISA kits $158* each

Molecular Innovations are offering ELISA kits to first time customers for $158 (AUD).

Valid for one kit per order, must quote **'NEW2012'**.

Offer ends June 28, 2013.

*Price shown is in AUD. Kits are $200 NZD for New Zealand Customers.

For details of these promotions and more, please visit:
www.sapphirebioscience.com/specials