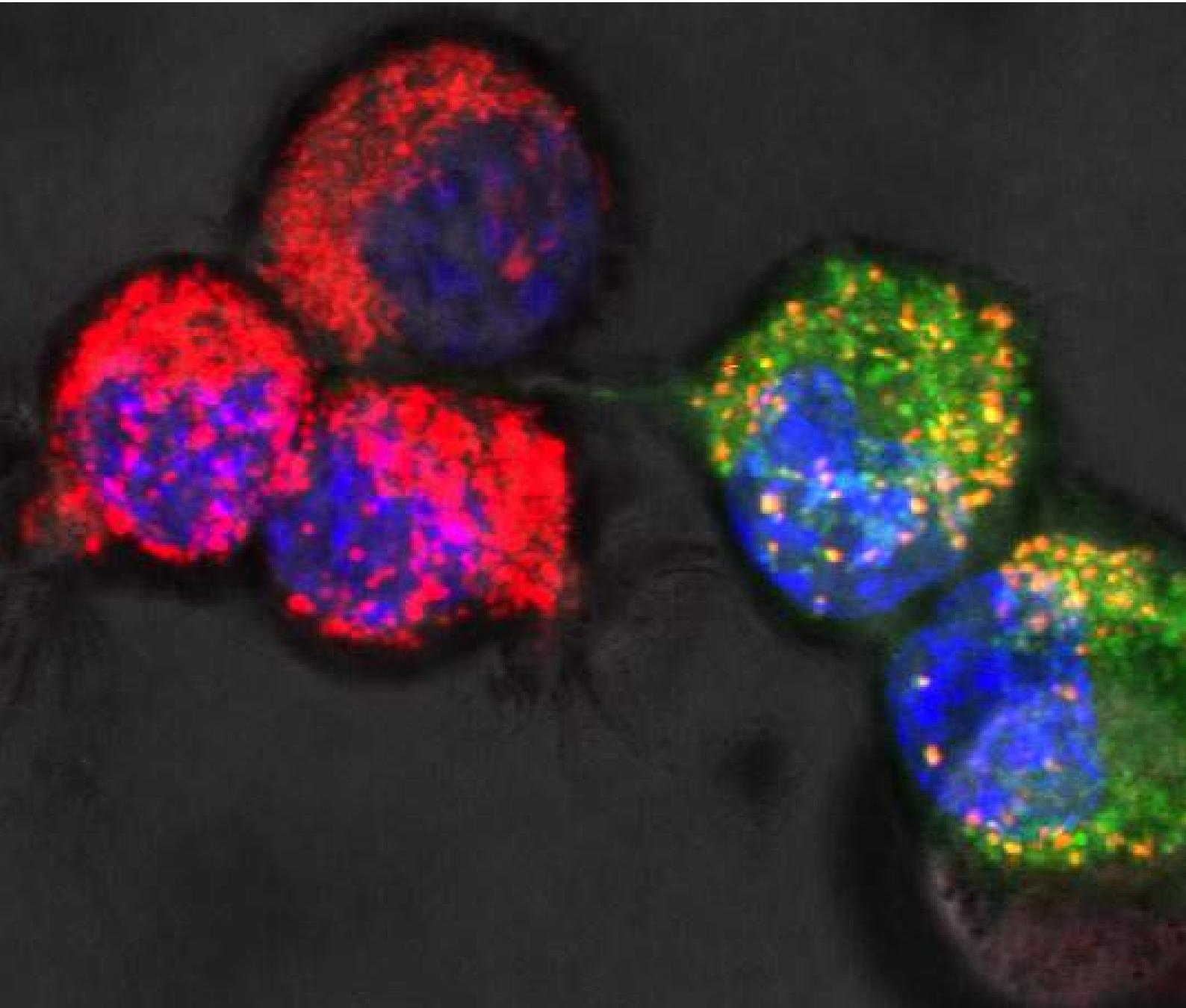




Mitochondria on the Edge of Life

Taking it to the people - Mike Berridge



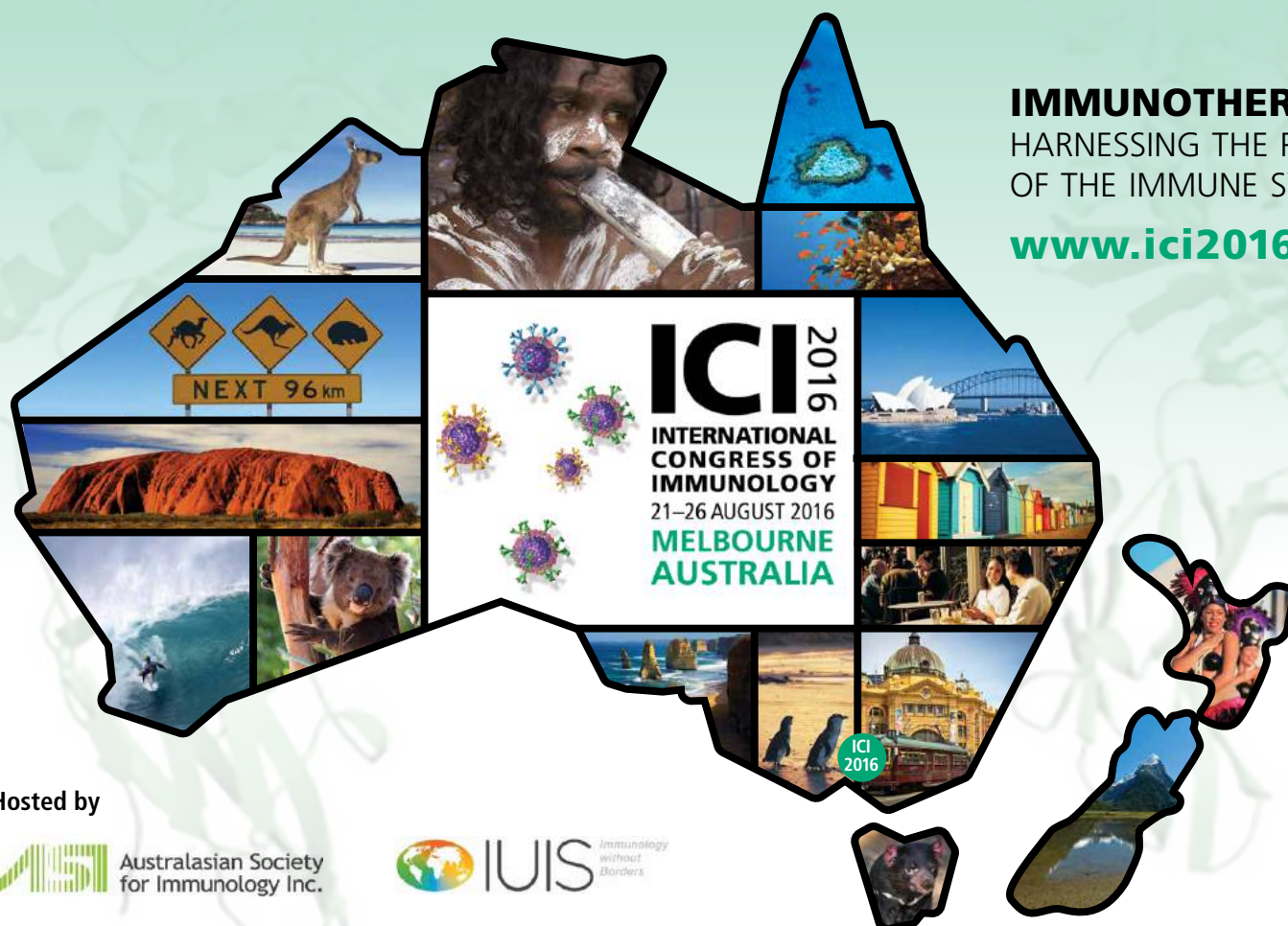
Also in this issue

- Meet Erika Duan and her magnificent macrophages
- Stuart Tangye - Pavlova in New York
- ASI 2015 Canberra winning Limerick!

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International Congress of Immunology 2016



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Invitation from the ICI 2016 President



ICI 2016 promises to be an unforgettable event that will bring together delegates from all over the world. We anticipate over 3000 participants, including international leaders at the forefront of the discipline that will present the most recent advances in basic immunology and clinical treatments.

This is an opportunity to be part of a major international immunology meeting in Australia as the last ICI was held in Sydney back in 1977.

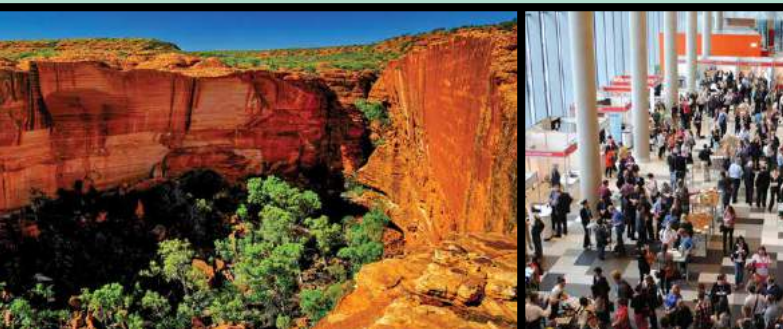
The Congress will provide a key networking and educational interface for colleagues from industry, university, health providers and independent research organisations to come together.

José A Villadangos

Jose Villadangos

President, International Congress of Immunology 2016

Peter Doherty Institute and Bio21 Institute, The University of Melbourne



KEY DATES

Abstract Submission: Open

Registration: Open

Abstract Submission Closes: 25 January 2016

Author Abstract Notification: 15 April 2016

Early Bird & Author Registration Deadline: 11 May 2016

SOME OF THE CONFIRMED SPEAKERS

Erin Adams

University of Chicago, Chicago Illinois USA

Shizuo Akira

Osaka University, Osaka Japan

Jim Allison

The University of Texas, Houston Texas USA

Yasmine Belkaid

National Institute of Allergy and Infectious Diseases,
Bethesda Maryland USA

Xuetao Cao

Chinese Academy of Medical Sciences, Beijing China

Richard Flavell

Yale University School of Medicine, New Haven USA

Christopher Goodnow

The Australian National University, Canberra Australia

Gillian Griffiths

University of Cambridge, Cambridge UK

Kris Hogquist

University of Minnesota, Delaware, Minneapolis USA

Carl June

PENN Medicine, Philadelphia Pennsylvania USA

Stefan Kaufmann

Max Planck Institute for Infection Biology,
Berlin Germany

Thirumala – Devi Kanneganti

St. Jude Children's Research Hospital, Memphis
Tennessee USA

Ira Mellman

Genentech, San Francisco California USA

Virginia Pascual

Baylor Institute for Immunology Research,
Dallas Texas USA

Hidde Ploegh

Whitehead Institute for Biomedical Research,
Cambridge Massachusetts, USA

Fiona Powrie

University of Oxford, Oxford UK

Federica Sallusto

Institute for Research in Biomedicine,
Bellinzona Switzerland

Feng Shao

NIBS, Beijing China

Carola Vinuesa

The Australian National University, Canberra Australia

Eric Vivier

Centre d'Immunologie de Marseille-Luminy,
Marseille France

[Find the full list of confirmed speakers on the ICI 2016 website.](#)



SCIENTIFIC PROGRAM HIGHLIGHTS

The following disciplines/themes will form part of the program.

- Innate immunity
- Inflammation
- Acquired immunity
- Vaccines
- Tumour Immunology
- Transplantation
- Allergy
- Autoimmunity and the maintenance of tolerance
- Immunoregulatory gene networks
- Immune deficiencies
- Dendritic cells
- T cell differentiation
- B cell immunity
- Metabolic control of immunity
- Regulation of the immune system by commensal flora
- Therapeutic antibodies
- Mathematic modeling of immune responses

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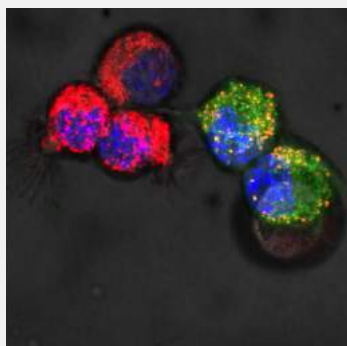
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ASI 2015 in Canberra - Jacques Miller and Anselm Enders in the limelight. For more photos from the ASI 2015 meeting and the winning limerick recorded for posterity, see page 20.



Cover Image

An Tan and Mike Berridge

4T1 murine breast cancer cells (red mitochondria) interchanging mitochondria with 4T1ro cells devoid of mitochondrial DNA (green mitochondria) See cover story on page 8 for more.



Mighty Macrophages

Erika Duan

Macrophages and their journey to greatness: Erika Duan describes her perspectives on her research so far (page 12) and depicts the story of macrophages in a full page annotated picture on page 13.



Pavlova in New York

Stuart Tangye

Rockefeller University in New York was where the Jacques Miller Senior Travel Award Recipient, Stuart Tangye, spent his sabbatical. Read about his time there on page 18.

Editorial

Thinking straight

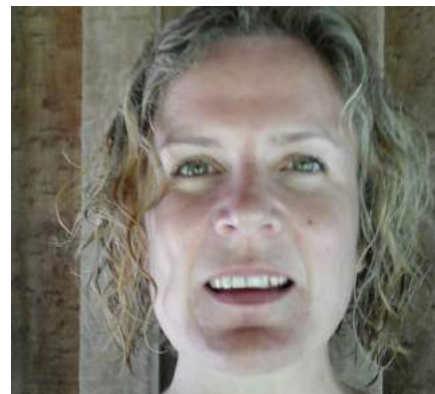
Imagine a student researching a PhD thesis on the iconography of modern film supervised entirely in an Immunology Department! It is an idea that is equally humourous as it is disturbing. This is a great analogy from Chris Goodnow (see his President's column in this issue of the newsletter) to capture all the strangeness of a PhD on the subject of the analysis of vaccination policy coming out of a School of Humanities.

Unfortunately, we scientists seem to be losing our reputation with the public. The unrepeatable nature of some studies and mis-interpretation of data in others stands out like the proverbial sore thumb. Bad and weak science can still be published and then quoted in a treatise in support of a position.

Two brave men who come to mind for speaking as they find on this subject are John Ioannidis and Richard Horton. Last year Richard Horton, editor of *The Lancet*, said this: "The case against science is straightforward: much of the scientific literature, perhaps half, may simply be untrue. Afflicted by studies with small sample sizes, tiny effects, invalid exploratory analyses, and flagrant conflicts of interest, together with an obsession for pursuing fashionable trends of dubious importance, science has taken a turn towards darkness." This makes me want to wail and put on sackcloth.

My experience of learning how to think, back when I was still working out how to balance a centrifuge, was affected by awe-inspiring scientists who were passionate about the truth and the quest to know if your data really proved what you wanted it to prove.

That approach is not universal. But it doesn't make sense to do science at all unless doing it really well is your aim. You'd make more money, have more job security, and possibly more free time, doing something else. So ya gotta do it for the luuurve of it!



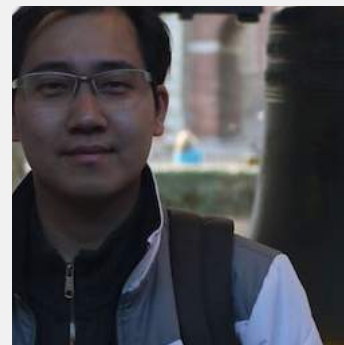
Joanna Roberts - Editor ASI Newsletter. Flow cytometry specialist with Flowjoanna. Opinions, comments, ideas, contributions - welcomed and appreciated. Send to joanna.roberts@gmail.com.



Fern Koay

Vienna and back

The European Congress for Immunology, held in Vienna, did not disappoint. Fern Koay reports back on page 24.



Andrey Kan

Bells and whistles

Andrey Kam swears it wasn't him who cracked the Liberty Bell. You can read about what he actually got up to on his recent trip on page 24.

The Society

Immunology in Australasia

The aim of the ASI is to encourage and support the discipline of immunology in the Australasian region.

The Australasian Society for Immunology Incorporated (ASI) was created by the amalgamation in 1991 of the Australian Society for Immunology, formed in 1970, and the New Zealand Society for Immunology, formed in 1975. It is a broadly based society, embracing clinical and experimental, cellular and molecular immunology in humans and animals. The Society provides a network for the exchange of information and for collaboration within Australia, New Zealand and overseas. ASI members have been prominent in advancing biological and medical research worldwide. We seek to encourage the study of immunology in Australia and New Zealand and are active in introducing young scientists to the discipline.

ASI Member Benefits include:

- International Travel Awards
- Bursaries to attend ASI's Annual Meeting
- New Investigator and Student Awards at ASI Annual Meeting
- ASI Women's Initiative to support female scientists
- Special offers from ASI's Sustaining Members
- Full access to the journals *Immunology and Cell Biology*, *Nature Immunology*, and *Nature Reviews Immunology*

ASI Council

Executive and Council

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Meeting Co-ordinator - TBC

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Honorary Archivist - Judith Greer

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2017 LOC meeting chair - Kristen Radford

kradford@mmri.mater.org.au

The **ASI membership directory**, listing all financial members of the Society, is available at <http://www.immunology.org.au/asi-membership-directory/>. To join the ASI or renew your subscription, go to <http://www.immunology.org.au/membership/>



"I guess we can do this (challenge neurobiology dogma) because we are **simple-minded cancer cell biologists** in an **immunology environment**."

- Mike Berridge

Knowledge and Mitochondria: how to share them

Mike Berridge offers his ideas

Donald Rumsfeld, an earlier Donald to have loomed large on the political landscape, is famous for his quote on 'unknown unknowns'. Mr Rumsfeld provided a framework for complexity and uncertainty; and an opinion put forth by a political figure can appear to have so much depth (to the point of being tautological) that one loses focus on other issues at play. While we can't know if this was the hope of Mr Rumsfeld at the time of the invasion of Iraq, nevertheless his expression of unknown unknowns is a good description of science!

Mike Berridge quotes Donald Rumsfeld at the start of his new book and goes on to say '**Scientists often feel as comfortable with the unknown as they do with what they already know and are driven to ask questions about the unknown and to challenge dogma.** A new idea can be like an

adrenalin rush or can infuse slowly through the mind, but if it passes filtering and scrutiny it can inspire years, decades or even a lifetime of intense pursuit – and occasional reward.'

The Edge of Life by Mike Berridge published by BWB books takes the lay reader through some of the life-saving and life-enhancing stories of medical science, providing the background to the science that led to the breakthroughs. It explains and expands on their impact in our lives and discusses the nature of some public contention.

Mike did not write this book out of frustration with pseudo science. He says, 'It's really because there's an issue with knowledge. We carry out our experiments; we work in laboratories; we generate knowledge. That knowledge accumulates, but

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Donald the First

Donald Rumsfeld

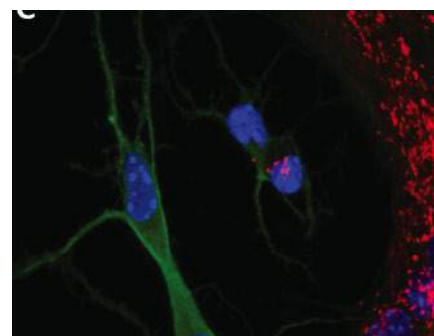
Donald Rumsfeld confounds the press gallery with his views on what can be known. <https://www.youtube.com/watch?v=GiPe1OiKQuk>



Donald the Second

Donald Trump

Donald Trump shares his views on vaccination. Parental Advisory for all scientists who may find un-science stressful. <https://www.youtube.com/watch?v=AffuKjGV6BA>



Astrocytes at play

Mitochondrial transfer

Mitochondria from primary astrocytes (red) detected in primary neurons (green) Image from Mike Berridge's group, Malaghan Institute of Medical Research, Wellington.

COVER STORY

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cont from previous page...

that knowledge doesn't always filter through very effectively to the public. And that communication gap, I think, is something that needs to be addressed. So this book, really, was a way of communicating some science and getting people to think about the science, to put science on an equal basis with people's points of views.'

There is a key issue that Mike touches on that explains some of the misunderstanding between the lay public and scientists. 'Science does not set out to prove or disprove anything, but

rather tests ideas or hypotheses and builds a framework of useful knowledge. An overly precautionary approach to science that demands proof involving no risk misrepresents science and is unreasonable, unattainable and blunts progress.'

In no mood to see progress blunted himself, Mike is currently fascinated by mitochondrial trafficking (see [here](#) for his latest paper showing transfer of mitochondria into tumour cells devoid of mitochondrial DNA). Mike says, 'We have now also established that mitochondrial transfer occurs in the brain to GBM cells (GL261)

lacking mDNA and are very keen to crack the brain bioenergetics dilemma relating to how mitochondria and energy production are maintained at synapses that can be metres away from the cell body which contains the nucleus that contains the information for 98% of mitochondrial proteins. The current dogma of axon trafficking just doesn't make sense so we are pushing astrocyte-neuron mitochondrial transfer.

'Few have the will or gall to challenge the neurobiology establishment on this issue. I guess we can do this because we are simple-minded cancer cell biologists in an immunology environment. So we are not trying to keep the idea under wraps but will work with anyone who is keen to explore the idea. I'm for open science on this issue.'

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Watch Mike on 'The Nation', TV3, discussing health here: https://www.youtube.com/watch?v=Is_r06dnWFY

Professor Mike Berridge

Cancer Cell Biology Group
Leader, Malaghan Institute of
Medical Research, Wellington;
mberridge@malaghan.org.nz
ph+64 4 499 6914 ext 825

To find out more about *The Edge of Life*, see the book review on page 9 in this newsletter.

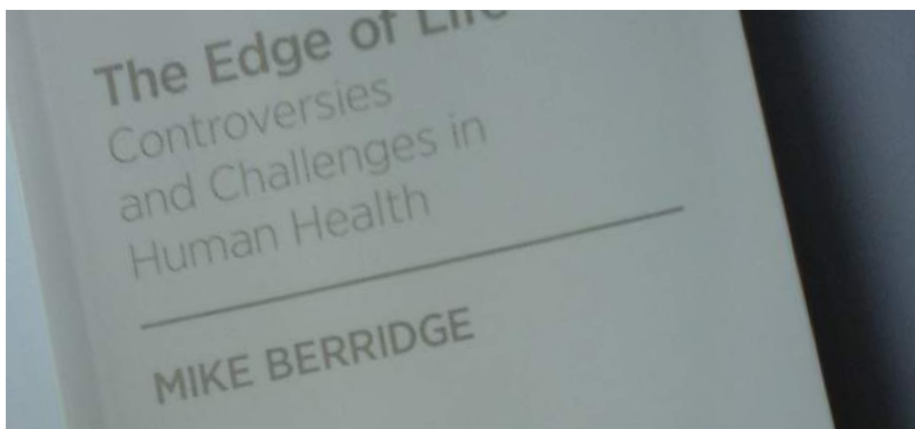
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The Edge of Life by Mike Berridge

Reviewed by Peter Doherty for NZSR



Though the past decades have seen a revolution in medical understanding and practice that has greatly improved health outcomes and increased human life spans, most of us have a very incomplete understanding of what has actually occurred. That need no longer be the case if we take the trouble to access this elegant little book by Malaghan Institute (Wellington) cancer researcher Mike Berridge.

The case for evidence-based medicine is put clearly, using language that everyone can understand. Complex ideas backed by years of detailed research are explained succinctly and in plain English. There is a complete absence of jargon and, at no stage, does the author 'talk down' to a non-scientist reader. The topics covered range from the 150-year-old plus history of infection and immunity, through the case for fluoridation of water supplies, to the recent focus on the importance of the gut microbiome, to the view that being 'too clean' can be bad for us, to the evolving area of regenerative medicine, and new insights from areas like epigenetics that are illuminating our understanding of cancer and, in fact,

of who we are in the hereditary sense. The text is topical, lively and a pleasure to read.

Though shorter and, of course, much more up-to-date, the book reminds me of the widely read Lewis Thomas classic, *Lives of a Cell*, that provided such a clear exposition of medical advances in the 1960s and 1970s for intelligent, but non-specialist readers of that time. And locals will enjoy the fact that it is written from a New Zealand perspective.

Beyond the science, Mike Berridge also discusses the profound ethical issues that have arisen as a consequence of our newly accessed capacity to manipulate the human genome. The era of cell and gene therapy is already here from the viewpoint of the researcher and, increasingly, the doctor and patient. These technologies can potentially impact each and every one of us. Democracy only functions well if voters are informed. Reading *The Edge of Life* provides an accessible and non-threatening 'in' to these complex and massively important issues.

Originally published in *New Zealand Science Review* Vol 72 (4) 2015, p 87 Used with Permission



About Mike Berridge

Mike Berridge is Distinguished Research Fellow and Senior Scientist at the Malaghan Institute of Medical Research, Wellington and Professor, School of Biological Sciences, Victoria University, Wellington.



About Peter Doherty

Peter C Doherty is Laureate Professor, Department of Microbiology and Immunology, University of Melbourne at the Doherty Institute and the Michael F. Tamer Chair of Biomedical Research at St Jude Children's Research Hospital, Memphis.



Not that Peter Doherty

Singer in British Rock Band 'The Libertines'. May not be that into immunology though you never know.

Presidentorial

Vaccination, the Ph. D and media storms

Our Society was contacted by our microbiology colleagues this January for assistance in making a joint response to a flare up in the “debate” about whether or not we should vaccinate our children. Vaccination is a key choice that parents and all members of society make, requiring ongoing education and evidence-based debate. But this episode also raises substantive issues about what we expect in a PhD thesis and the training environment for one of society's highest academic degrees. Vaccination rates have already fallen below those needed for herd immunity in many parts of Australia and New Zealand, sparked by an elaborate fraud linking vaccination to autism led by Andrew Wakefield in the UK. The low coverage has already resulted in outbreaks of measles and whooping cough that have touched friends and colleagues personally, tarnished the reputation of “the happiest place on Earth” (Disneyland), and led to a tragic near-death from tetanus in Auckland.

The current media debate was triggered by the award of a PhD by the Faculty of Law, Humanities and Arts at the University of Wollongong to Judy Wilyman for a thesis entitled “A critical analysis of the Australian government's rationale for its vaccination policy”. You may wish to read the thesis at: <http://ro.uow.edu.au/theses/4541/>

Dr Wilyman's thesis is part of a website that presents her arguments aimed against vaccination: <http://vaccinationdecisions.net/>

On reading the PhD thesis, it seemed to me that it would be valuable to be able to read “A critical analysis of “A critical

analysis...””, should one be written, but in an accepted academic forum and not in a trial by media. The media debate is captured in: <http://www.abc.net.au/news/2016-01-13/wilyman-phd/7086346> and <http://www.theaustralian.com.au/higher-education/judy-wilymans-antivaccine-phd-not-included-in-unis-review/news-story/874833db483a8f733a7a52023b2caec5> On the merits of vaccination, an illustrious list of leading academics of the University of Wollongong Faculty of Social Science and Faculty of Science, Medicine and Health released a detailed and very balanced statement on January 18. The Science Faculties' statement provides to parents evidence and sources of information that immunisation is one of the best choices a parent can make, along with good education, healthy diet and a loving environment. I encourage you to read their cogent statement at: <http://socialsciences.uow.edu.au/has/UOW208852.html>

We decided the best assistance the ASI could give to parents as they make these choices was to join with other learned societies (ASM, ASID, AVS, ASCIA) to affirm the University of Wollongong Science Faculties' statement about the merits of vaccination, and to avoid public comment on an individual PhD thesis from the Arts Faculty. You can read our joint media release on ASI's website at: <http://www.immunology.org.au/news/australasian-medical-research-and-clinical-societies-applaud-support-of-vaccination-by-university-of-wollongong-academics/> Learned societies publicly attacking a PhD student's thesis would work against the goal of helping parents make the most informed decisions, by raising doubts about our impartiality and professionalism.

But let's consider here a more general issue: what do we expect from a Doctor



Chris Goodnow

President ASI

c.goodnow@garvan.org.au

Professor Christopher Goodnow FAA FRS, The Bill and Patricia Ritchie Foundation Chair, NHMRC Australia Fellow, Deputy Director Garvan Institute, Sydney, Adjunct Professor, John Curtin School of Medical Research, Australian National University

of Philosophy thesis? In the context of academic degrees the term philosophy accords with its original Greek meaning, “love of wisdom”. I have Wikipedia to thank for that explanation to a question I've long puzzled.

The thesis sparking media debate comes from a PhD candidate who has toiled for several years, aiming to demonstrate their love of wisdom by providing an original research contribution to knowledge about the science of public health. But was it wise to set the candidate up pursuing their research problem in an Arts and Humanities department, where no supervisor was available with expertise

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PRESIDENT'S COLUMN

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to mentor in this field of science? Where no advisory panel could provide the high level of training in scientific evaluation of evidence that we expect from modern Doctors of Philosophy?

My first reaction was to view this episode as an aspect of the problems that arise from academic disconnect between the arts and the sciences, articulated in CP Snow's *Two Cultures*. It would seem equally negligent if I encouraged a student to research a PhD thesis on the iconography of modern film supervised entirely in a Department of Immunology. Indeed within every Department of Immunology and Microbiology I've worked, higher degrees committees painstakingly

considered whether or not there was sufficient capability in the faculty to ensure a high quality outcome for prospective PhD students seeking to work on microbiological problems, let alone problems in film, economics, law or literature.

But on reflection, perhaps it gets to a deeper, more challenging issue for all of us to grapple with. In some very good humanities faculties I know, it is commonplace for a meritorious prospective PhD student to choose a problem based only on their interest without regard to the capacity of the faculty in that topic. They are then assigned a supervisor who sometimes hasn't the slimmest knowledge or interest in the area. And perhaps this

happens in some science faculties, limited only by the question of who will pay for the costly research materials and equipment. Optimistically, this *laissez faire* approach to PhD training ensures originality and creativity. Pessimistically, it provides a tidy income to the department. And pragmatically, it establishes a precedent that makes it impossible to discourage a student from working on a problem where they will receive inadequate training and fall short of producing an original, quality piece of research.

Grapple with this deeper problem we must, for in the end low quality research propagates famines, as the Soviets learnt from Lysenko. And to the outbreaks of measles we are all experiencing today.



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Erika Duan, second from left, and 2014 Day of Immunology GTAC workshop demonstrators Maria Demaria, Jodie Abramovitch and Tim Gottschalk

Introducing Erika Duan

ASI 2014 Wollongong Graham Jackson Memorial Prize Winner

A lot of interesting advances have recently been made in the field of macrophage biology. Transcriptome profiling has enabled researchers to map the entire spectrum of macrophage activation in response to bacterial products, cytokines and lipids, demonstrating that the breadth of macrophage polarisation is much broader than previously regarded^{1,2}. Meanwhile, tissue macrophages such as microglial, kupffer cells and alveolar macrophages are now known to be derived prenatally from yolk-sac macrophages or foetal monocytes and maintained through self-proliferation rather than from peripherally recruited monocyte pools³⁻⁵. Essentially, our entire understanding of the behavioural capacity and origins of macrophages has shifted by a few paradigms, and interesting future research questions will be centred on how tissue macrophages

maintain their separate functional identities and how these processes may contribute malignantly to the development of chronic diseases.

During my PhD (in Assoc. Prof. Margaret Hibbs' laboratory), I was focussed on characterising the phenotype of chronic lung disease-associated alveolar macrophages, which reside within the airspaces of the lung parenchyma. As befitting your standard PhD experience, some of our initial hypotheses proved to be incorrect, but in an interesting and ultimately fruitful way. By 2009, the field of macrophage biology was heavily focused on the M1 versus M2 paradigm of macrophage polarisation, which stipulated that activated macrophages could exist in a spectrum of either more classically pro-inflammatory or alternatively immunomodulatory

states⁶. Alternatively activated M2 macrophages were further associated with chronic inflammatory conditions from asthma to tumorigenesis. Whilst these observations do appear in heavily IFN-gamma/ LPS or IL-4 dominant scenarios *in vitro* and *in vivo*, we found that few *in vivo* M1 versus M2 surface markers of alveolar macrophages existed during acute or chronic lung inflammation. More interestingly, in mouse models of chronic lung inflammation, deregulated macrophage activation did exist, but was marked by a constitutive upregulation of CD11b instead of other more exotic markers⁷.

At the time, CD11b was a relatively humble surface molecule. For one, it was everywhere; on neutrophils, monocytes as well as many tissue macrophages. One place where it was not expressed, however, was on

ASI PRIZE WINNER PROFILE

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resting state alveolar macrophages, with adoptive transfer studies implicating the lung microenvironment to actively maintain this phenotype⁸. These observations alone suggested something interesting, that different tissue macrophages may possess distinct functional phenotypes which are dictated by unique factors in their local microenvironment. For us, it also suggested that two macrophage-related pathways actually existed in the lungs during inflammation: 1) the transient activation of residential alveolar macrophages and 2) recruitment of transcriptionally activated monocytes (producing both pro-inflammatory and anti-inflammatory cytokines). Importantly, constitutive upregulation of CD11b on residential alveolar macrophages was a marker

of chronic inflammatory lung disease in our mouse models of chronic obstructive pulmonary disease.

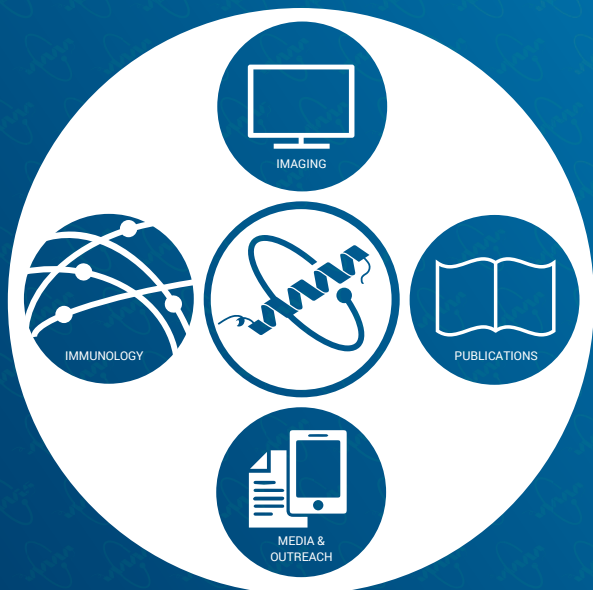
With these preliminary findings in place⁷, we then took a more circuitous and difficult route to gauge the overall importance of CD11b upregulation to respiratory health. By the time I had started my PhD, basic immunology was taking an interesting turn in terms of research focus. 'Humans are not mice', was the verdict of the first Lafferty debate that I attended (and whether from the youthful naivety of attending my first ever conference, this has remained the only Lafferty debate whose verdict immediately filled my soul with terror). Humans, however, are indeed not as immunologically homogeneous as inbred mice and the easiest way (or so I foolishly thought) to

prove that something was biologically interesting was for it to also appear in humans. For us, this meant a working hypothesis that CD11b was also absent in the alveolar macrophages of healthy individuals, but upregulated in the lungs of patients with chronic inflammatory lung diseases.

Naturally, that assumption turned out to be false. And neither did other binary 'on' and 'off' alveolar macrophage expression patterns exist for CD11b signalling pathway-related surface markers, or even standard human M1 and M2 macrophage markers. There were interesting observations amidst all the confusion, however. Selective myeloid cell populations did exist in the bronchoalveolar lavage cells of select human patients. CD11b upregulation



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was also positively associated to other indices of lung inflammation (neutrophil recruitment and activation) in both mice and humans. Alveolar macrophage CD11b expression was also comparatively heterogeneous (sometimes low, sometimes very high, often a blur in between) compared to other surface markers associated with macrophage activation. The difficulty



Erika Duan

'Humans are not mice', was the verdict ...whether from the youthful naivety of attending my first ever conference, this has remained the only Lafferty debate whose verdict immediately filled my soul with terror ..."

was in being able to empirically demonstrate it. As strange as it now sounds, directly comparing the expression of a continuously distributed surface marker on macrophages is extremely difficult in a clinical setting. A rough way of doing this is to stain cells with a constant CD45 positive control, and use the relatively constant expression of this positive control to demonstrate that signal differences between antibody stained and non-stained cells are valid. But the difficulty of quantitating exactly how much difference existed (and of designing

something that could be interpreted by clinicians without the necessity of complex methodologies) still existed. Fortuitously, with our eye on other constant immunological factors within our experiments, blood neutrophils which also expressed CD11b turned out to be a surprisingly consistent factor we could use as a method of internally standardising alveolar macrophage CD11b expression in both mouse and mice. Thus, we could finally demonstrate that parallels in CD11b expression (together with the absence or presence of monocytes

and eosinophils) did exist and may potentially be used to distinguish hyper-inflammatory endotypes of lung disease patients in the future ⁹.

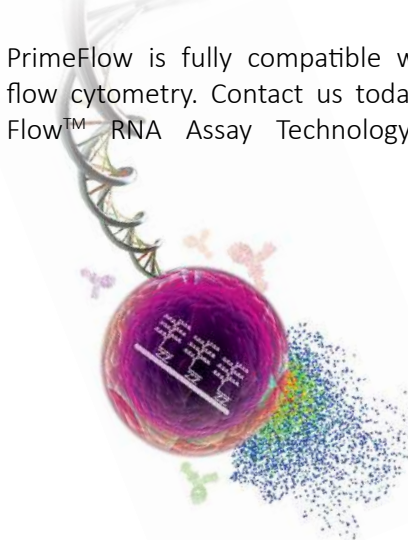
Nowadays in my post-doc (in Prof Weisan Chen's lab within the NHMRC Influenza Research Program led by Prof. Steve Turner), we are making use of our improved accessibility to next generation sequencing facilities and targeted genomic editing techniques to search for alveolar macrophage-derived regulators of inflammation induction and resolution following influenza infection, a high-risk but hopefully



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ASI PRIZE WINNER PROFILE

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high reward venture of its own. With Assoc. Prof. Patrick Reading and his research group's investigation of novel macrophage-derived receptors of virus entry and effectors of abortive (non-productive) infection 10, this may hopefully enable the Influenza Research program to wholly characterise the functional contributions of this central lung innate immune cell to all the facets of influenza virus infection.

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Erika Duan's depiction of the story of macrophages is on the following page (page 16).

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Conference

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- 1 April, 2016
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(Garvan Institute of
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- Catherine Suter
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Keynote Speakers

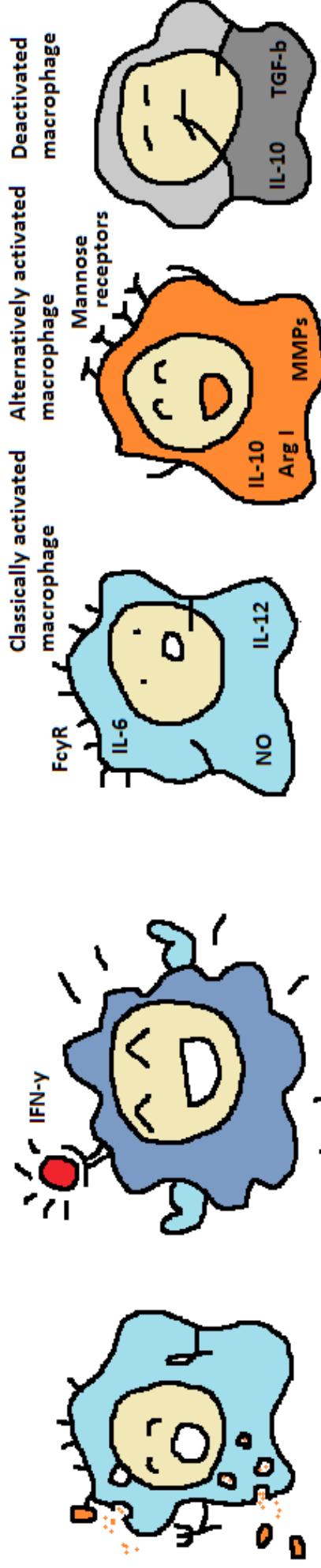
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(University of Washington)
- Oded Rechavi
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Macrophage biology: there and back again.



1880s: First hypothesised to non-specifically phagocytose invading pathogens and debris.

1980s: Cytokines and bacterial products, later discovered to be toll-like receptor ligands, are known to activate macrophages to become more pro-inflammatory and bactericidal.

1990s: Macrophages are discovered to exhibit an alternate activation profile in response to IL-4. Immunosuppressive deactivated macrophages and macrophages which help facilitate wound healing are also characterised. Later, an emphasis on the differential activation profiles in response to IFN-γ and LPS compared to IL-4 leads to the formation of the theory M1 versus M2 macrophage polarisation.



2000s to 2014: However, arginase 1 (a marker of alternatively activated macrophages) can also be activated downstream of bacterial toll-like receptor signalling. Transcriptome studies of human macrophages also finds that macrophages exhibit a spectrum of transcriptional profiles in response to diverse stimuli.

2012-2015: Importantly, many residential tissue macrophage populations are found to be derived from foetal monocytes and embryonic yolk-sac macrophages before birth, and maintain themselves independently of circulating blood monocyte pools.

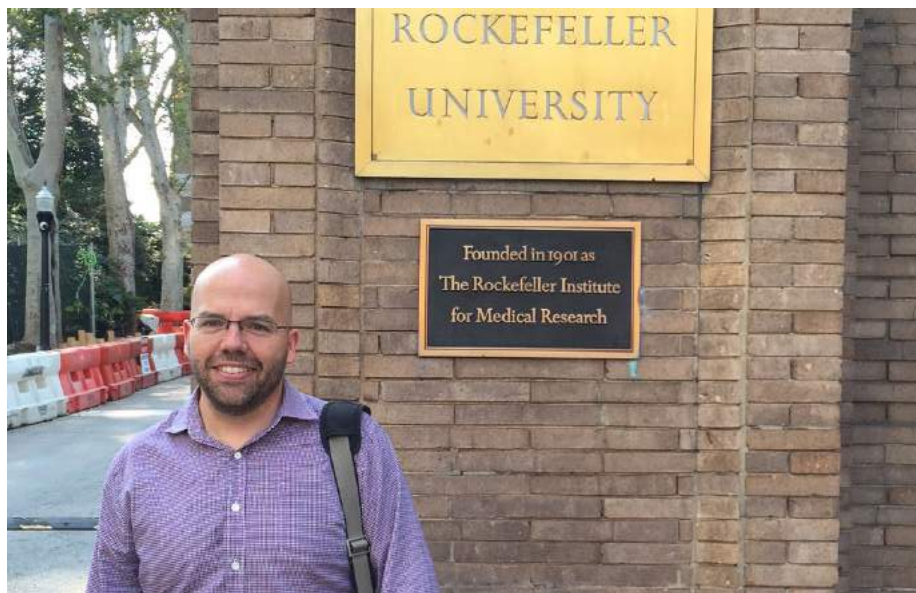
So do lung monocytes and residential alveolar macrophages exhibit different functions during influenza virus detection, clearance and the resolution of inflammation? Using next generation sequencing and targeted genomic editing studies, our lab aims to find this out.

New York, New York

Stuart Tangye at St Giles Lab of Human Genetics of Infectious Disease, Rockefeller University, New York

I was fortunate to be awarded the **Miller International Travel Prize from ASI in 2015**. This was used to help fund a sabbatical that I had planned to take in the second half of 2015. So, on 12th August 2015, me and my wife Gill and our three kids boarded a plane in Sydney to commence our journey – we were headed to JFK airport in New York, and then to the Upper East Side of Manhattan. Here, I would be based for five months as a Visiting Professor in the St Giles Lab of Human Genetics of Infectious Disease at Rockefeller University, headed by Professor Jean-Laurent Casanova.

My research interests cover many aspects of human lymphocyte development, differentiation and function and how these processes are affected by germline monogenic mutations that cause primary immunodeficiencies (PIDs). PIDs are characterized by increased infectious susceptibility to various pathogens, as well as an increased incidence of malignancy. The Casanova lab studies the genetics of infectious diseases – for more than 20 years, they have been at the forefront of identifying disease-causing gene mutations in many different PIDs. More recently, our labs have been collaborating to try to work out how these mutations compromise specific functions of immune cells. The goal of my sabbatical was to learn about the current techniques used by the Casanova lab to identify the genes that have these mutations in affected individuals, and determine whether they are likely to be disease-causing – finding the proverbial needle in the haystack. A whole new series of tools have been developed – often



This was my first day starting my **sabbatical** at Rockefeller University

by bioinformaticians in the Casanova lab - to help with this process and it was these tools that I was being introduced to. In Sydney, in collaboration with many clinicians, geneticists, and scientists, we are establishing a pipeline to discover mutations in genes in patients with severe immunological diseases, such as PIDs and infectious diseases or early-onset autoimmunity – I will be applying this newly-acquired knowledge to this initiative, with the ultimate goal being improved diagnosis of genetic diseases, enhanced insight into the mechanisms underlying these diseases and hopefully better treatment options and outcomes for affected individuals.

Beyond learning what I planned on learning, being primarily a cellular immunologist I found myself interacting on a daily basis with colleagues in the



Real Food

My last day at work at Rockefeller – where we treated the lab to a real Aussie afternoon tea of pavlovas and Tim Tams

JACQUES MILLER SENIOR TRAVEL AWARD

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Jacques Miller Senior Travel Award

To be eligible for the Miller Award you must have at least 14 years post-doctoral experience. Current financial ASI members who have been full financial members for at least the 5 years preceding the submission of an application are eligible. One award per year of \$6000 is available. See <http://www.immunology.org.au/awards-and-bursaries/senior-travel-awards/> for details on how to apply.

Slow Scientists Crossing – Stuart was looking for where the Fast Scientists could cross.

host lab who are virologists, molecular biologists, geneticists and biochemists. This also provided fresh perspective on aspects of my research and exposed me to experimental approaches that can be implemented into my research programs here in Sydney. I was also able to meet with numerous Faculty members of Rockefeller University, Weill Cornell Medical College and Memorial Sloan Kettering Cancer Centre – who are leaders in their own fields. This presented me with the opportunities to discuss my work with these experts and have their critical input into the latest findings from the research being performed in my lab. And the seminar that I was able to attend in this precinct was fantastic.

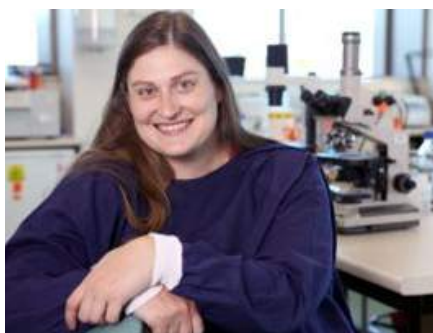
The “work” side of things was just one part of my sabbatical experience. I had the opportunity to give seminars at numerous research institutes in New York (Mt Sinai Medical School; Memorial Sloan Kettering Cancer Centre; Rockefeller University) and beyond (Children’s Hospital, Boston; NIAID, NIH in Bethesda), attend the

JAK/STAT Keystone conference held at Steamboat Springs in Colorado, and visit pharmaceutical companies to engage in discussions of translating some aspects of my research to commercial outcomes. It’s early days – but hopefully this will progress. I also met with editorial staff for various journals in Boston (*Immunity*) and Bethesda (*JACI*, *J Immunol*) areas – not that I am expecting any different reviews for the next papers we submit there! These opportunities are just not available from Sydney – so to be able to visit such institutes/companies/publishers with relative ease was great. I also had the time to finish writing several lab papers that had been piling up on my desk/computer and develop future collaborations with both the New York and Paris branches of the Casanova lab.

And of course, I would be dishonest if I did not mention that the chance to live in New York City was one that we grabbed with great gusto. To be able to walk to Central Park, visit the American Museum of Natural History, the Met, the

Bronx and Central Park Zoos, Botanic Gardens, see the actual Batmobile that featured in the ’60s TV show at the New York Historical Society Museum, take a ferry down the East River to Brooklyn, cross New York Harbor and see the Statue of Liberty up close on the Staten Island Ferry, view the Manhattan skyline from the “Top of the Rock” (70th floor of the Rockefeller Centre), take the kids ice-skating, walk the Highline – simply amazing experiences for all of us that will be long remembered.

I am extremely grateful to ASI for this travel prize. It provided me with an amazing experience and opportunity to work in one of the leading international labs that studies genetics of human infectious diseases – to be immersed in this intellectual, scientific and medical environment was incredibly exciting, influential and enriching, and will no doubt have a long-lasting impact on the research done in my lab. It also allowed us to introduce a little bit of Australiana into New York.



Visiting Speaker Program

Jo Kirman

Visits for 2016

The ASI Council agreed that the Visiting Speaker Program would be smaller than usual to account for the large influx of international visitors around the time of ICI this year. Nonetheless, we have an exciting range of confirmed nominated speakers for 2016. The itineraries are yet to be finalised; please check out the website for updates on these or contact your ASI Branch Councillor to express your interest in having your branch host a speaker.

Dr Ben Seddon (*University College*

London, Royal Free Hospital, London)
Research interests: T cell development and maintenance

Visit expected in June/July and will be co-ordinated by Roslyn Kemp, roslyn.kemp@otago.ac.nz

Prof. Clare Lloyd (*National Heart and Lung Institute, Imperial College, London*) Research interests: pulmonary inflammation; epithelial-immune interactions

Visit expected in August/September and will be co-ordinated by Phil Hansbro, philip.hansbro@newcastle.edu.au

Prof. Arlene Sharpe (*Department of Microbiology and Immunobiology, Harvard Medical School, Boston*)
Research interests: T cell co-stimulation

Visit expected in August/September and will be co-ordinated by Michelle Wykes, michelle.wykes@qimrberghofer.edu.au

Prof. Hiroshi Kiyono (*Division of Mucosal Immunology, The Institute of Medical Science, University of Tokyo*)
Research interests: mucosal immunity and vaccine development

Visit anticipated to be towards the end of 2016 and will be co-ordinated by Julie Cakebread, julie.cakebread@agresearch.co.nz

Nominations for 2017

Due to ICI there will only be one nomination round in 2016, which will be opened and announced in August/September. This round will be for 2017 visitors, and we ask members to be alert for potential Visiting Speaker candidates when attending ICI this year. Nominations are welcome from any member and the guidelines are available at <http://www.immunology.org.au/events-calendar/the-asi-visiting-speaker-program-vsp/>

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Canberra: ASI annual meeting 2016

Winning Limerick of the Bursa of Fabricius and Photo selection

In Germans we have been immersed
And not once have I suffered from thirst
But all that sauerkraut
Has given me gout
And I'm going to burst from the wurst.

Jo Kirman



BRANCH REPORTS

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New Zealand Report

Roslyn Kemp

New Zealand is looking forward to hosting two ASI VSPs this year –

Ben Seddon, hosted by Ros Kemp at Otago University, Dunedin (roslyn.kemp@otago.ac.nz), and Hiroshi Kiyono, hosted by Julie Cakebread at AgResearch, Hamilton (Julie.cakebread@agresearch.co.nz). Please let us know if you wish these speakers to visit your branches.

The New Zealand branch will not hold an annual scientific meeting this year, but instead will support students and post-docs to attend ICI in Melbourne. NZASI recently supported three students to attend ASI 2015 – Karmella Naidoo and Kerry Hilligan (both from Malaghan Institute) and Kirsten Ward Hartstonge (University of Otago).



Victoria/Tasmania Report

Daniel Gray

The ASI Annual Conference in December last year was a great success! Congratulations to the

organising committee and its Chair, Dr Anselm Enders, on putting together a

stellar program of science and social events. The Foundation Lecture from Prof. Jacques Miller was an amazing insight into the history, inspiration and tribulation of his greatest scientific breakthrough – the discovery of the immunological function of the thymus. Jacques' continued energy and enthusiasm for science is inspiring and his contributions remain of the highest class (e.g. his recent Cancer Cell review on immunotherapy, PMID: 25858803). The Keynote lectures from Profs Diane Mathis and Michel Nussenzweig continued this calibre of scientific excellence, with updates on the state-of-the-art on thymic tolerance and broadly neutralising antibodies in the fight against HIV-1. All the national and international invited and selected speakers were excellent and the poster sessions and workshops very lively. The Burnet Oration from Prof. Richard Boyd was another highlight, continuing the theme of thymus biology and providing an ideal mix of great science and anecdote (I don't think anyone will be able to look at emus in the same way again). Overall, the conference was a fantastic end to the ASI year, as we head into a pause for Annual Conference in 2016.

The International Congress of Immunology looms large on the ASI calendar and the Vic/Tas branch is super-excited about the preliminary program. As part of the amazingly generous >\$100,000 pledged by ASI in travel bursaries, IgV has committed \$30,000 exclusively for Victorian and Tasmanian members! This assures all students and early career postdoctoral fellows an extremely high chance of covering their major expenses for attending ICI. So, I hope all your colleagues have paid up their Society dues and you have all submitted an abstract for the conference! Stay tuned for details on the fabulous events planned around showcasing our

youngest and brightest to select bursary recipients.

As if that wasn't enough, we're also looking forward to a busy Visiting Speaker schedule this year and I'll remind you all of the opportunities to meet with these speakers when they visit. Keep an eye out for notifications for these seminars and the local host will help with these schedules. There will also be other major IgV events throughout the year (such as the popular Masterclass and Winter Seminar). With so much on offer from ASI this year, I urge you all to ensure your colleagues pay up their 2016 dues right away, so no-one misses out!



Queensland Report

Kristen Radford

Sadly we will be having a one year hiatus from our beloved BIG meeting this year, however there are still plenty of activities for Queensland members to get involved in:

World Day of Immunology: Friday 29th April 2016: This year we will be celebrating with a public lecture forum and lab tours at the Translational Research Institute, Brisbane, and "A Day in the Life of an Immunologist" one day lab experience for high school students at SPARQed TRI and QIMR education facilities. For more details and to get involved, contact the Qld DoI co-ordinator Danielle Stanisic d.stanisic@griffith.edu.au

ICI2016: We hope that the sunny effervescent atmosphere that BIG is

BRANCH REPORTS

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renowned for will be showcased in Melbourne this year by having strong representation from Queensland immunologists at ICI2016. In addition to those offered by ASI, the Queensland Branch will be offering a substantial number of bursaries exclusive to the Queensland membership to help get students and postdocs there.

ASI2017 will be held at the Brisbane Convention and Exhibition Centre from Monday 27th November – Friday 1st December, 2017. An exciting program is already being compiled, more details to follow soon.



South Australia Report

Iain Comerford

I would like to introduce myself as the new SA/NT Councillor. I have been an active member of the Society for the past seven years and have enjoyed participating in the organisation of many ASI events during this time. I am greatly looking forward to fulfilling my new role as Councillor for SA/NT and hope that I can maintain the wonderful example set by our previous Councillors, most recently Cara Fraser. On behalf of SA and the NT, I would like to thank Cara for all of her hard work and dedication over the past three years. Cara has done a fantastic job and has left the branch in a very healthy position with more members and the annual retreat attracting more and more delegates each year that she ran this

event. I hope that I can continue to run the branch as successfully as Cara has done and I welcome any suggestions for ways in which we could improve or increase the branch's activities to make it work as well as it can for all of us.

We would like to wish a big congratulations to prize winners from our branch announced at the 2015 Annual Meeting in Canberra. Yuka Harata-Lee was the winner of the Chris and Bhama Parish ICB Publication of the Year award, Tessa Garget won the Thermo Fisher Scientific Publication award, and Duncan McKenzie was a runner up in the best PhD poster prize. These are fantastic achievements and congratulations to you all.

This year we shall be endeavouring to support as many students and ECRs as we can from the branch to attend the ICI in Melbourne. We have been negotiating with all the universities and institutes in SA/NT to maximise the branch's capacity to support travel awards to the World Congress. I am delighted to announce that The University of Adelaide, The Sansom Institute at The University of South

Australia, Flinders University, The Centre for Cancer Biology and The Hospital Research Foundation have all committed to co-sponsor travel awards for students from their institutions. This co-sponsorship scheme alongside the other generous travel awards that have been announced shall hopefully enable as many members from the SA/NT branch of ASI to attend ICI as possible. More information on travel awards supported by the branch will be announced shortly.

In addition, The World Day of Immunology will be coming up on 29th April and we are planning to run a Vaccination Café in conjunction with RiAus to promote the great importance of both vaccination and immunology research in SA/NT to the wider community. I will soon be calling for volunteers interested in participating in the event, so keep an eye out for my email as I am keen to hear any ideas.

Please don't hesitate to contact me at iain.comerford@adelaide.edu.au if you have any questions or suggestions about ASI events.

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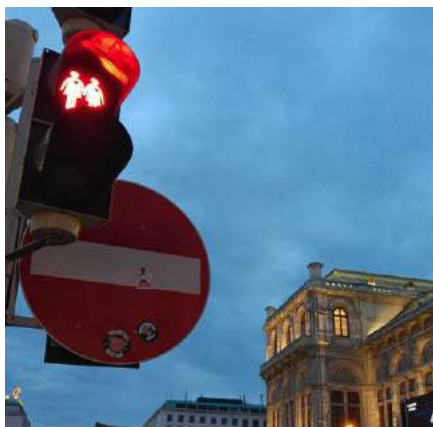
Fern Koay

European Congress of Immunology, Vienna

It only took slightly more than 28 hours for me to get from Melbourne to Vienna, the city hosting the 4th European Congress of Immunology (ECI). ECI is well known to be one of the largest immunology meetings, and this being my first attendance to a 'big' conference, it was certainly eye-opening. It solidified the claim that every student should pick and experience one of these non-boutique, sizable conferences at some stage of their postgraduate studies, and I would like to thank the ASI Postgraduate Travel Award for this support.

The conference opened in an enormous hall with commencement speeches and a string orchestra playing Bach and Strauss (but of course!). With the incredible diversity of tracks and topics, we get the immediate opportunity to broaden our immunological knowledge out of our respective focuses (unconventional T cells for me). Delegates were offered 150+ talks by invited speakers, plenary lectures by immunology icons, more than 400 oral presentations selected from abstracts, as well as guided poster walks. The 4-track program of innate immunity, adaptive immunity, diseases of the

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Andrey Kan

Tracking cells in Philadelphia and Bioinformatics in the Rocky Mountains



Liberty Bell is a symbol of American independence. The crack was there before I came, I promise - **Andrey Kan**

My early Christmas gift last December, **generously supported by ASI, was a two-week trip to the US filled with science, engineering, caffeine, and travel impressions.** The journey had two parts: visiting our collaborator from Drexel University in Philadelphia, PA, and attending a computational biology conference in Snowmass, CO (a ski resort in Rocky Mountain area). After spending a ridiculous amount of hours in airplanes and airports – the longest possible flight on our planet? – I finally arrived in Philadelphia, and starting from the next morning, spent several working days in the laboratory of Dr Andrew Cohen. At this point, I should take a step back and explain that my research interests include applying computational methods to study population level kinetics of T and B cell responses. *In vitro*, these responses can be recreated and measured in a controlled environment, which is appealing as it enables development of mathematical models capable of precise characterisation of response dynamics. As such, one of my ongoing projects involves filming live cells using fluorescence microscopy. Single cell tracking is then essential for extracting information from such data. Dr Cohen's group at Drexel University is one of the world leaders in cell tracking software development, and previously we have established

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Streetscape around the **Vienna Opera House** - Fern Koay

STUDENT TRAVEL REPORTS

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Melbourne postgrads in Vienna - Sampling some sturm in a picturesque harvest festival, Kirstie Mangas, Katrina Falkenberg, **Fern Koay**, Sera Ftouni and Carmen Yong.

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Fern Koay cont.

immune system and immune interventions ran daily with at least eight concurrent sessions, certainly overwhelming but tested our abilities to be discerning. **I was given the chance to present my own research on the characterisation of Mucosal Associated Invariant T (MAIT) cells in mice.** My presentation included data from our recent publication and that sparked interests in the session's audience sitting in to hear about Natural Killer T and other related innate-like T cells. Right after the presentation was also an excellent time for me to approach and put some faces to big names, both in and out of the innate-like T cell field.

I especially enjoyed drawing parallels from multiple talks in the innate and adaptive immunity tracks, but also appreciated the special focus this conference put on the fine balance between basic and translational research. It is always nice to hear about successful clinically applied stories when we tend to be too focussed in our little basic immunological niches. One of the sessions highlighting that fact was the Cancer Immunotherapy symposia, delivered by Ignacio Melero, Tasuku Honjo and Laurence Zitvogel. Professor Honjo, world renowned for his pioneering research in class switch recombination and checkpoint therapy, gave a snapshot of the history and his thoughts on the future of anti-CTLA4+ PD-1 blockade therapy. he was given a standing ovation, a nice act of recognition from the scientific community which he

cont on page 26

...cont from previous page

Andrey Kan cont.

a collaboration in order to tailor their tracking software for our movies.

Visiting Dr Cohen's group during this trip gave a significant boost to this ongoing work, and set the direction for further joint projects. Face-to-face communication is so much more efficient compared to ever growing email threads, and even Skype meetings. We found it important to talk through certain biological and experimental aspects of the acquired movies. In turn, I learned about the architecture of the tracking software, and also trained as an advanced end-user. This expertise is important because back in Melbourne we plan to use it in ongoing and future imaging projects and I can help train many other WEHI imagers queued up to apply the method to their own applications. Apart from work-related activities, a number of informal conversations, lunches and beers made this visit quite joyful, and I'd like to thank Dr Cohen and his lab members for the warm welcome.

My next destination was Rocky Mountain Bioinformatics Conference, where I gave an oral presentation of our imaging work, as well as presented a poster on flow cytometry measurement

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Snowmass village in Colorado is a beautiful place for hosting conferences -
Andrey Kan



STUDENT TRAVEL REPORTS

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...cont from previous page

Andrey Kan cont.

models for lymphocyte responses. This was a relatively small conference with a single presentation track so one can sit back and relax, avoiding the hassle of switching between sessions. The poster night was a lively event complementing the conference. Rather than focusing on any particular aspect of biology in depth, the conference program featured a diverse array of talks describing applications of a broad range of computational methods to different biological data, which largely reflects the state of modern computational biology. I took advantage of this

breadth to learn both biological and computational topics beyond my usual scope. These included an introduction to the fascinating gut microbiome (talk by Lusine Khachatryan, Leiden University), and the application of graph theory to genome assembly (talk by Max Alekseyev, Washington DC).

Yet another established aspect of computational biology that was the subject of quite a few talks and posters was integrated data analysis. Here, data is pulled from various curated public datasets, and the analysis is performed simultaneously on the results from many biological labs. A trending branch of such an approach is data-enriched literature search (e.g. talk by

Karin Verspoor, Melbourne), where the search from PubMed archive is supplemented by genomic data. It is promising to see various free online services emerging, and I encourage everyone to try tools, such as those provided by Casey Greene's lab (talk by Casey Greene, Pennsylvania): <http://www.greenelab.com/webserver/>

In conclusion, I would like to thank ASI for supporting my international travel. This was certainly a productive trip, fostering an ongoing collaboration, exposing our work to a wider audience, receiving feedback, and meeting and learning from like-minded people.

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FRIDAY APRIL 8TH

TUESDAY APRIL 12TH

FRIDAY APRIL 15TH

STUDENT TRAVEL REPORT

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...cont from page 24

Fern Koay cont.

wholly deserves.

Apart from the significant presence of Viennese scientists in the program, we found that Vienna has a very notable scientific footprint, evident by the foyer exhibitions on "Vienna's Contributions to Immunology" and the city's University+Biocenter precinct. A few of us delegates were reunited with fellow Melburnian and dear friend Katrina Falkenberg, currently doing her postdoc at the Research Institute of Molecular Pathology situated in the aforementioned Biocenter. We got the local treatment on everything cultural (cathedrals and operas) to scientific (the campus biocenter is still expanding, watch this precinct!), and a newfound appreciation on just how incredibly advanced this capital is, yet still preserving its unique cultural identity.

Off for a week to earn a little bit of Europe points, thank you ECI and ASI again for this fantastic experience, I am looking forward to the enormous International Congress of Immunology 2016 in Melbourne already.



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\$200 Best Newsletter Contribution 2015
Jim Harris

Winner of ASI Quarterly Newsletter Prize for 2015. Well done Jim for winning the \$200AUD for best contribution to the 2015 Newsletter. Your prize will be heading your way shortly! See Jim's article [here](#) pg15.

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Publication List - Our Journals and Sustaining Members

November 2015 to January 2016

Popular articles from *IMMUNOLOGY AND CELL BIOLOGY* and *CLINICAL AND TRANSLATIONAL IMMUNOLOGY* from recent months as well as publications making use of tools, services or reagents supplied by our SUSTAINING MEMBERS.



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Diagenode – MicroPlex kit



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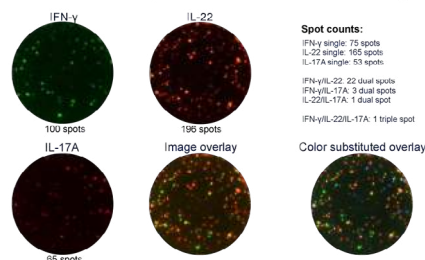
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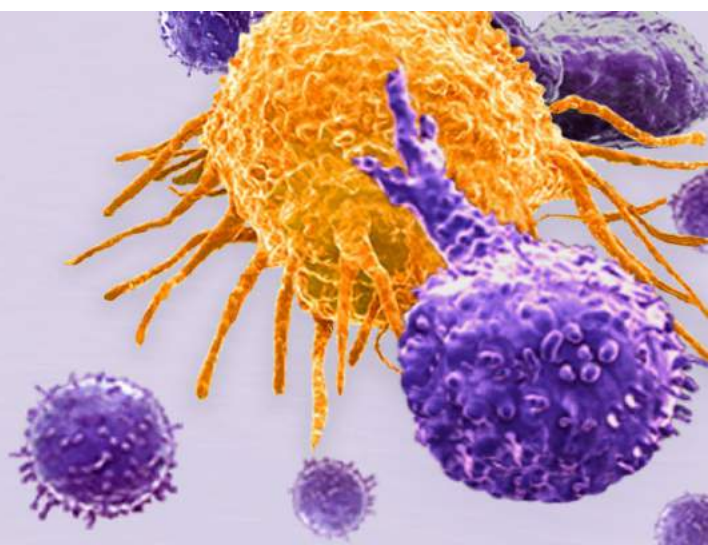
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