

FROM THE DIRECTOR



Welcome to the first Centre newsletter for 2011. I am delighted by the growing and continued enhancement of the Centre's international reputation. As detailed in the 2010 Annual Report, the Centre's *First Prato Conference on the Pathogenesis of Bacterial Infections of Animals* held at the superb Monash Prato Centre in Tuscany, Italy, was a resounding success. Planning is already underway

for the second conference in October 2012, to be chaired by Centre CI Julian Rood.

Later in May, the Centre in conjunction with my colleague Lee Smythe of Queensland Health Scientific Services will hold a workshop on leptospiral diagnostics at the National Institute of Animal Health, Bangkok, Thailand. The activity is funded by the Australian Government Department of Agriculture, Fisheries and Forestry together with the National Institute of Animal Health. I was privileged to be invited to organise the workshop by the Department of Foreign Affairs and Trade as a component of Australia's foreign aid commitment.

Planning is also underway for the *Sixth International Conference on Veterinary Vaccines and Diagnostics* hosted by the Centre in Cairns in July 2012, with new Centre CI Els Meeusen and me as co-chairs.

Finally, a warm welcome from me to new staff and students joining the Centre in 2011. Notably, the new students detailed below represent four countries in addition to Australia.

Truly, the scientific community is not constrained by national borders and can play an important part in enhancing international and intercultural communication and understanding.



Ben Adler
Director

RESEARCH HIGHLIGHTS

Cross protection provided by live attenuated *Leptospira* mutant

Leptospirosis is a global infection of production and domestic animals and a serious zoonotic infection of humans. The "holy grail" of leptospiral vaccinology has been the development of a vaccine which cross protects against heterologous serovars. Recent work reported in the *Journal of Infectious Diseases* from the research group of Centre Director Professor Ben Adler and Dr Gerald Murray, in collaboration with scientists at Khon Kaen University Thailand, describes cross protection of hamsters elicited by a live, attenuated mutant of *Leptospira*. "This is a very exciting result; the next step will be to identify the responsible antigens" says Prof Adler. (Srikram A, Zhang K, Lo M, Henry R, Hoke DE, Sermswan R, Adler B, Murray GL. 2011. Cross-protective immunity against leptospirosis elicited by a live, attenuated transposon mutant. *J Infect Dis*, 203, 870-879).

OTHER HIGHLIGHTS

Centre CI Jamie Rossjohn receives Australia Fellowship



Earlier this year, Prof Jamie Rossjohn joins five other researchers in Australia to be awarded the prestigious Australia Fellowship which is now in its fifth round and bestowed by the NHMRC. As an Australia Fellow, he has been awarded \$4 million to further his research on protective

immunity and aberrant T-cell reactivity in the body. Winning the fellowship reflects the recognition of Prof Rossjohn's work in the field of immunity. The fellowship will enable him to undertake new initiatives to further his current research program but also to mentor a new 'generation of biomedical scientists immersed in multi-disciplinary approaches focused on cellular immunity.

The Centre would like to extend its congratulations to Jamie on the latest addition to his highly impressive career accolades.

Poultry CRC grants

The Centre is now involved in two CRC Poultry projects that have been recently awarded.

The first grant worth about \$386,000 over 3 years is awarded to Centre Associate, Dr John Boyce. The project works on 'Rapid multiplex PCR assay for differentiating *Pasteurella multocida* serovars,' with the aim of developing a typing system that can classify various *P. multocida* strains based on the genetics of LPS biosynthesis and without the need for serology. Centre Research Fellow, Dr Marina Harper and Director Prof Ben Adler are working on this project which also involves a joint collaboration between Queensland Primary Industries and Fisheries and National Research Council, Canada. The project is a spin off from previous Centre research on improved identification of *P. multocida*, the cause of fowl cholera.

The second grant worth about \$1.5 million over 5 years is also awarded to another Centre Associate, Dr Rob Moore from CSIRO Livestock Industries. This project is on 'Vaccines against *Clostridium perfringens* to protect birds from necrotic enteritis'. Both Prof Julian Rood and Dr Trudi Bannam from the Centre will be collaborating with CSIRO on this project.

OTHER NEWS

New Member Appointed to Scientific Advisory Board

After extensive consideration and consultation, the Centre's Scientific Advisory Board has found a replacement for Prof Graham Mitchell who stepped down early last year due to time commitments. Prof Marshall Lightowlers is a professor in the Faculty of Veterinary Science at the University of Melbourne. His expertise lies in molecular parasitology and vaccine development. We hope that you will be able to meet Prof Lightowlers at the Annual Scientific Meeting in November this year.

Centre to host the 6th IVVDC Conference

The Centre has been given the rights to host the 6th International Veterinary Vaccines and Diagnostics Conference in 2012 in Australia. This conference which first started in 1997 in Madison, Wisconsin is an important meeting for regulatory authorities, pharmaceutical companies and the scientific community working in the area of veterinary vaccinology and diagnostics.

The 6th conference in 2012 will bring the community down to the Southern Hemisphere for the first time. This will be a great opportunity to showcase the Centre's research as well as extend its network internationally.

Plans are underway in organising the conference and more details will be released in due course.

NEW STUDENTS

Please welcome the following students who have recently joined our Centre.



Priyangi Alwis

Origin: Singapore

Course: PhD

Thesis: Characterisation of two-component signal transduction systems in *Burkholderia pseudomallei*

Supervisors: Dr John Boyce, Prof Ben Adler, Dr Elizabeth Allwood



Tammy Cashmore

Origin: Cape Town, South Africa

Course: PhD

Thesis: Biosynthesis of the mycobacterial cell wall

Supervisors: Prof Ross Coppel, Dr Paul Crellin



Sam Forster

Origin: Australia

Course: PhD

Thesis: Whole transcriptome analysis of the innate immune response

Supervisor: Prof Paul Hertzog



Amy King

Origin: Australia

Course: PhD

Thesis: Characterisation of potential virulence factors in *Leptospira interrogans*

Supervisors: Prof Ben Adler, Dr Gerald Murray



Chai Yee (Sheryl) Kua

Origin: Kuala Lumpur, Malaysia

Course: B. Biotech (Hons)

Thesis: Type IV fimbrial biogenesis of *Dichelobacter nodosus*

Supervisors: Prof Julian Rood, Dr Xiaoyan Han, Dr Ruth Kennan



Hamish McWilliam

Origin: Geelong, Melbourne

Course: PhD

Thesis: Searching for novel vaccine targets for the human blood fluke, *Schistosoma japonicum*

Supervisors: Prof Els Meeusen, Dr David Piedrafita



Cara Nethercott

Origin: Melbourne

Course: BA/BSc (Hons)

Thesis: Characterisation of putative complement resistance mediators in pathogenic *Leptospira*

Supervisors: Prof Ben Adler, Dr Gerald Murray



Sarah Preston

Origin: Temora, NSW

Course: PhD

Thesis: Identification of immune cells and mediator up-regulated at the site of *Haemonchus contortus* infection in sheep

Supervisors: Prof Els Meeusen, Dr David Piedrafita, Dr Stephen Walkden-Brown (UNE)



Adam Shahine

Origin: Melbourne

Course: PhD

Thesis: Structure-function investigation of mycolic acid biosynthesis in *Mycobacterium tuberculosis*

Supervisors: Prof Jamie Rossjohn, Dr Travis Beddoe



Lakmini Weeramantri

Origin: Moratuwa, Sri Lanka

Course: PhD

Thesis: Role of conjugative plasmids of *Clostridium perfringens* in toxin production and virulence

Supervisors: Prof Julian Rood, Dr Vicki Adams, Dr Jackie Cheung

STAFF PROFILE

Marina Harper



Dr Marina Harper has been a Research Fellow in the ARC Centre of Excellence in Structural and Functional Microbial Genomics since its inception in 2005. She works together with Centre Director Professor Ben Adler, Centre Associate Dr John Boyce, Centre research assistant

Marietta John and overseas collaborator Dr Andrew Cox on a project aimed at understanding lipopolysaccharide biosynthesis in *Pasteurella multocida* and its role in pathogenesis.

Marina's interest in Microbiology started in 1986 through her Honours project on fimbrial proteins of *Dichelobacter nodosus* with Professor Julian Rood. Since then she has developed a strong interest in bacterial pathogenesis and has studied a range of bacterial pathogens. In 1998, a year after the birth of her second child, she enrolled in a PhD with Professor Ben Adler and Dr John Boyce. In her PhD research project she utilised signature-tagged mutagenesis to study the virulence determinants of *Pasteurella multocida*. Marina has continued her work on *Pasteurella multocida* as a centre Research Fellow and is an investigator on a recently funded Poultry CRC project aimed at developing a multiplex PCR for *P. multocida* LPS typing.

Marina was born in Northern Ireland and until aged 10 she travelled extensively with her RAAF family. She still enjoys travelling, but is now firmly settled in Melbourne. As the mother of two teenage children and the wife of a dedicated 100km Oxfam Trailwalker she has limited spare time. However, she still has a vague memory of once enjoying hobbies and tries to maintain a healthy lifestyle by exercising regularly and eating well. This includes a daily visit to Cinque Lire Cafe for coffee and her share of a muffin!

STUDENT PROFILE

Jessica Wiesniewski



Jessica Wisniewski is a Centre PhD student analysing the mechanism of conjugative transfer in *Clostridium perfringens* with Professor Julian Rood and Dr Trudi Bannam.

Jessica completed her BSc at Monash University and subsequently Honours in the Rood laboratory, analysing the role of genes encoded on the conjugative transfer locus in *C. perfringens*. Having enjoyed her honours year, Jessica returned to the Rood laboratory to continue her research on *C. perfringens* conjugative transfer.

Conjugation in *C. perfringens* has important implications for the spread of toxin genes in *C. perfringens*, and the unique *C. perfringens* conjugation system is fast becoming one of the best characterised Gram positive conjugation systems. The focus of Jessica's research is to analyse the role of a potential DNA binding and processing protein, IntP, in the conjugative transfer of *C. perfringens* plasmids. Jessica would like to determine whether IntP is involved in conjugation and, if so, what role it has in processing plasmid DNA prior to its transfer, an exciting prospect since IntP would represent a novel DNA processing protein in conjugative transfer. IntP will be characterised by mutagenesis studies, DNA binding and footprinting studies, as well as analysis of DNA cleavage.

During her PhD Jessica has been fortunate enough to be able to present her research at a number of national conferences, as well as the International Plasmid Biology Conference in Argentina, aided by the award of a support fellowship for PhD students by the International Society for Plasmid Biology.

In her spare time Jessica enjoys swinging a golf club, even if it is mostly down at the driving range, and recently made her first par four.

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The Centre works in partnership with the following organisations:

Australian Genome Research Facility Ltd
CSIRO
Pfizer Australia
University of Queensland
University of Sydney
Victorian Bioinformatics Consortium
Victorian Partnership for Advanced Computing

UPCOMING EVENTS

ARC Centre Annual Scientific Meeting

This year, the Centre's Annual Scientific Meeting will be held from 27 - 29 November at the Yarra Valley Conference Centre.

Please mark these dates into your diary. More details will be released soon.

CONTACT

Suggestions for articles are welcomed, as well as requests to be placed on the mailing list, and should be sent to:

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The ARC Centre of Excellence in Structural and Functional Microbial Genomics is an Australian Research Council (ARC) funded institute through the Centre of Excellence program. It aims to elucidate key aspects of microbial pathogens and the hosts they infect. The ARC Centres of Excellence are an Australian Government initiative designed to create prestigious hubs of expertise where high-quality researchers can maintain and develop Australia's international standing in research areas of national priority.

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