



Professor Jamie Rossjohn FAA FLSW

ARC Australian Laureate Fellow

Head, Infection and Immunity Program

Head, Infection and Immunity Laboratory



Monash Biomedicine Discovery Institute
Infection and Immunity Program

OTHER PROGRAM AFFILIATIONS



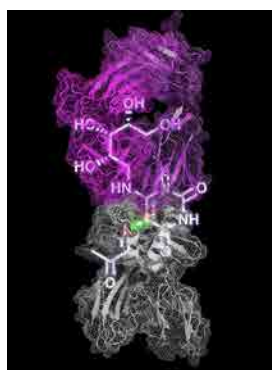
Cancer

EMAIL jamie.rossjohn@monash.edu

TELEPHONE +61 3 9902 9236

WEB research.med.monash.edu/rossjohn/index.php

The academic research program within this laboratory is concerned with understanding the processes that control infection and immunity, specifically host recognition, responses developed by the pathogen and therapeutic development to modulate and/or counteract these events. The laboratory's research in adaptive and innate immunity has provided an understanding of the basis of peptide and lipid presentation, T-cell triggering, aberrant T-cell reactivity, monomorphic and polymorphic Natural Killer (NK) receptor recognition. The team's research on anti-viral immunity has provided an understanding of the factors that shape MHC-restriction (e.g. *Immunity*, 2003; *Nature Immunology*, 2005). Moreover, we have demonstrated how the pre-TCR, a receptor crucial for T-cell development, functions by autonomous dimerization (*Nature*, 2010). In relation to aberrant T-cell reactivity, our team has provided insight into alloreactivity (*Immunity*, 2009), Celiac Disease (*Immunity*, 2012) and HLA-linked drug hypersensitivities (*Nature*, 2012). Regarding innate and innate-like recognition, the team has shed light into how Natural Killer cell receptors (*Nature*, 2011) interact with their cognate ligands. Further, we have provided fundamental insight into how the Natural Killer T-cell TCR recognizes lipid-based antigens – which markedly contrasted that of TCR-pMHC recognition – and this has implications for glycolipid-based vaccine development (e.g. *Nature*, 2007). Most recently, our team identified the long sought after ligand for MAIT cells, namely showing that MAIT cells are activated by metabolites of vitamin B (*Nature* 2012, 2014 –see image). Our research program uses numerous biochemical and biophysical techniques including protein expression and purification, surface plasmon resonance and three-dimensional structure determination with the use of the Australian Synchrotron. Further, cellular immunology techniques are taught within the laboratories of the collaborators of the Rossjohn laboratory.



Research Projects

1. MHC-restricted protective immunity
2. T-cell autoimmunity and alloreactivity
3. HLA-linked drug hypersensitivities
4. Lipid-mediated immunity
5. Metabolite-mediated immunity
6. NK cell recognition
7. T-cell signaling machinery

Selected significant publications:

1. Kjer-Nielsen L, Patel O, Corbett AJ, Le Nours J, Meehan B, Liu L, Bhati M, Chen Z, Kostenko L, Reantragoon R, Williamson NA, Purcell AW, Dudek NL, McConville MJ, O'Hair RA, Khairallah GN, Godfrey DI, Fairlie DP, **Rossjohn[#] J** & McCluskey[#] J. 2012. MR1 presents microbial vitamin B metabolites to MAIT cells. *Nature*. 491, 717-723.
2. Illing PT, Vivian JP, Dudek NL, Kostenko L, Chen Z, Bharadwaj M, Miles JJ, Kjer-Nielsen L, Gras S, Williamson NA, Burrows SR, Purcell AW[#], **Rossjohn[#] J** & McCluskey[#] J. 2012. Immune self-reactivity triggered by drug-modified Human Leukocyte Antigen peptide repertoire. *Nature*. 486, 554-558.
3. Vivian JP, Duncan RC, Berry R, O'Connor GM, Reid HH, Beddoe T, Gras S, Saunders PM, Olshina MA, Widjaja JML, Harpur CM, Lin J, Malveste SM, Price DA, Lafont BAP, McVicar DW, Clements CS, Brooks[#] AG & **Rossjohn[#] J**. 2011. Killer cell immunoglobulin-like receptor 3DL1-mediated recognition of human leukocyte antigen B. *Nature*. 479, 401-405.
4. Pang SS, Berry R, Chen Z, Kjer-Nielsen L, Perugini MA, King GF, Wang C, Chew SH, La Gruta LN, Williams NK, Beddoe T, Tiganis T, Cowieson NP, Godfrey DI, Purcell AW, Wilce MCJ, McCluskey[#] J & **Rossjohn[#] J**. 2010. The structural basis for autonomous dimerization of the pre T-cell antigen receptor. *Nature*. 467, 844-848.
5. Borg NA, Wun KS, Kjer-Nielsen L, Wilce MC, Pellicci DG, Koh R, Besra GS, Bharadwaj M, Godfrey DI, McCluskey[#] J & **Rossjohn[#] J**. 2007. CD1d-lipid-antigen recognition by the semi-invariant NKT T-cell receptor. *Nature*. 448, 44-49.

[#] denotes joint senior author