



Anthony Wayne Purcell

Address: Monash University

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Current Positions:

Professorial Fellow and NHMRC Principal Research Fellow,
Head Immunoproteomics Laboratory, Infection and Immunity Program, Monash Biomedicine
Discovery Institute, Monash University, Australia

Deputy Head of Department (Research), Department of Biochemistry and Molecular Biology,
Monash University, Australia

Visiting Professor, Cancer Sciences, University of Southampton, U.K.

Research experience:

Purcell has been at the forefront of antigen presentation and immunopeptidome research for the past 20 years and has made many contributions to the field. For example, in the last 5 years, quantification of tumour, viral and self epitopes at the surface of relevant cell types; differentiating ligand binding specificity of closely related HLA molecules at qualitative and quantitative levels (e.g. for HLA B27, B44 and DR4 allomorphs); identification of post-translationally modified peptides as targets in cancer, infectious and autoimmune diseases and the development of new methodologies for in depth peptidome analysis. Moreover he has successfully taken these observations and placed them into clinical context to not just drive technology but critically inform the biology of disease.

Selected recent publications (from 201 peer reviewed publications, >10,456 citations, Hirsch-index 54)

- B Gerlach et al. (2011) Linear ubiquitination prevents inflammation and regulates immune signalling. *Nature*, 471:591-6
- E Day et al. (2011) Structural basis for enabling TCR diversity within biased virus-specific CD8+ T-cell responses. *PNAS*, 108: 9536-41
- J Selkrig et al. (2012) Discovery of an archetypal protein transport system in bacterial outer membranes. *Nature Struc Mol Biol*, 19:506-10
- Y Ramdzan et al. (2012) Tracking protein aggregation and mislocalization in cells with flow cytometry. *Nature Meth*, 9:467-70
- K Scull et al. (2012) Secreted HLA recapitulates the immunopeptidome and allows in-depth coverage of HLA A*02:01 ligands. *Mol Immunol*, 51:136-42
- P Illing et al. (2012) Immune self-reactivity triggered by drug-modified HLA-peptide repertoire. *Nature*, 486:554-8
- N Dudek et al. (2012) Constitutive and inflammatory immunopeptidome of pancreatic β cells. *Diabetes*, 61:3018-25
- L Kjer-Nielsen, et al. (2012) MR1 presents microbial vitamin B metabolites to MAIT cells. *Nature*, 491:717-23

- S Broughton et al. (2012) Biased T Cell Receptor usage directed against Human Leukocyte Antigen DQ8-restricted Gliadin peptides is associated with Celiac Disease. *Immunity*, 37:611-21
- N Croft, et al. (2013) Kinetics of antigen expression and epitope presentation during virus infection. *PLoS Pathog*, 9: e1003129
- S Valkenburg, et al. (2013) Preemptive priming readily overcomes structure-based mechanisms of virus escape. *PNAS*, 110:5570-5
- M Rist et al. (2013) HLA peptide length preferences control CD8+ T cell responses. *J Immunol*, 191:561-71
- S Scally et al. (2013) A molecular basis for the association of the HLA-DRB1 locus, citrullination, and rheumatoid arthritis. *J Exp Med*, 210:2569-82.
- L Dagley et al. (2014) Quantitative proteomic profiling reveals novel region-specific markers in the adult mouse brain. *Proteomics*, 14:241–261
- L Dagley et al. (2014) Discovery of novel disease-specific and membrane-associated markers in a mouse model of multiple sclerosis. *Mol Cell Proteomics*, 13:679-700
- H Safavi et al. (2014) Combined proteomic and transcriptomic interrogation of the venom gland of *Conus geographus* uncovers novel components and functional compartmentalization. *Mol Cell Proteomics*, 13:938-53
- J Trujillo et al. (2014) Structural and functional correlates of enhanced antiviral immunity generated by heteroclitic CD8 T cell epitopes. *J Immunol*, 192:5245-56.
- Y Liu et al. (2014) A molecular basis for the interplay between T cells, viral mutants, and Human Leukocyte Antigen micropolymorphism. *J Biol Chem*, 289:16688-98.
- D Leyton et al. (2014) A mortise-tenon joint in the transmembrane domain modulates autotransporter assembly into bacterial outer membranes. *Nature Commun*, 5:4239
- J Trujillo et al. (2014) The cellular redox environment alters antigen presentation. *J Biol Chem*, 289:27979-91
- J Miles et al. (2014) An extensive antigenic footprint underpins immunodominant TCR adaptability against a hypervariable viral determinant. *J Immunol*, 193:5402-13
- V Pathiraja et al. (2015) Proinsulin specific, HLA-DQ8 and HLA-DQ8 transdimer restricted, CD4+ T cells infiltrate the islets in type 1 diabetes. *Diabetes*, 64:172-82
- S Robinson et al. (2015) Discovery by proteogenomics and characterization of an RF-amide neuropeptide from cone snail venom. *J Proteomics*, 114:38-47
- M Hardy et al. (2015) Ingestion of oats and barley in patients with celiac disease mobilizes cross-reactive T cells activated by avenin peptides and immuno-dominant hordein peptides. *J Autoimmun*, 56:56-65
- R Schittenhelm et al. (2015) Revisiting the arthritogenic peptide theory: Quantitative not qualitative changes in the peptide repertoire of HLA-B27 allotypes. *Arthritis Rheumatol*, 67:702-13
- DG Gorasia et al. (2015) Pancreatic beta cells are highly susceptible to oxidative and ER stress during the development of diabetes. *J Proteome Res*, 14:688-99
- H Safavi et al. (2015) Specialized insulin is used for chemical warfare by fish-hunting cone snails. *PNAS* 112:1743-8
- N Croft et al. (2015) Simultaneous quantification of viral antigen expression kinetics using data-independent mass spectrometry. *Mol Cell Proteomics*, 14:1361-72
- M Rist et al. (2015) T Cell Cross-Reactivity between a Highly Immunogenic EBV Epitope and a Self-Peptide Naturally Presented by HLA-B*18:01+ Cells. *J Immunol* 194:4668-75.
- K Giam et al. (2015) A comprehensive analysis of peptides presented by HLA-A1. *Tissue Antigens*, 85:492-6
- R Dunstan et al. (2015) Assembly of the secretion pores GspD, Wza and CsgG into bacterial outer membranes does not require the Omp85 proteins BamA or TamA. *Mol Microbiol*, 97:616-29

- H Benham et al. (2015) Citrullinated peptide dendritic cell immunotherapy in HLA risk genotype-positive rheumatoid arthritis patients. *Sci Transl Med.* 7:290ra87
- E Caron et al. (2015) An open-source computational and data resource to analyze digital maps of immunopeptidomes. *eLife* 10.7554/eLife.07661
- D Beringer et al. (2015) T cell receptor reversed polarity recognition of a self-antigen major histocompatibility complex. *Nature Immunol.* 16:1153-61
- N Ternette et al. (2016) Defining the HLA class I-associated viral antigen repertoire from HIV-1-infected human cells. *Eur J Immunol* 46:60-9
- K Woods et al. (2016) Mismatch in Epitope Specificities between Ifngamma Inflamed and Uninflamed Conditions Leads to Escape from T Lymphocyte Killing in Melanoma. *J Immunother Cancer* 4:10
- S Robinson et al. (2016) A Naturally Occurring Peptide with an Elementary Single Disulfide-Directed β -Hairpin Fold. *Structure* 24:293-9
- R Schittenhelm et al. (2016) HLA-B27 allotype-specific binding and candidate arthritogenic peptides revealed through heuristic clustering of DIA-MS data. *Mol Cell Proteomics*, 15(6):1867-76
- D Gorasia et al. (2016) A Prominent Role of PDIA6 in Processing of Misfolded Proinsulin BBA - Prot Proteomics, 1864:715-23
- H Safavi et al. (2016) Rapid expansion of the protein disulfide isomerase gene family facilitates the folding of venom peptides. *PNAS*, 113:3227-32
- J Wynne et al. (2016) Characterization of the antigen processing machinery and endogenous peptide presentation of a bat MHC class I molecule. *J Immunol*, 196(11):4468-76
- JH Kim, et al. (2016) CD1a on Langerhans cells controls inflammatory skin disease. *Nature Immunol*, 17:1159-66
- P Pymm, et al. (2017) MHC-I peptides get out of the groove and enable a novel mechanism of HIV-1 escape. *Nature Struc Mol Biol*, 24(4):387-394
- AN Keller, et al. (2017) Drugs and drug-like molecules can modulate mucosal-associated invariant T cell function. *Nature Immunology*, 18(4):402-411
- C Li, SH Ramarathinam, J Revote, G Khoury, J Song, AW Purcell (2017) HIVed, a knowledgebase for differentially expressed human genes and proteins during HIV infection, replication and latency. *Science Reports*, 7, 45509
- YM Ramdzan, et al. (2017) Huntingtin Inclusions Trigger Cellular Quiescence, Deactivate Apoptosis, and Lead to Delayed Necrosis. *Cell Rep.* 19(5):919-927
- JD Ooi, et al. (2017) Dominant protection from HLA-associated autoimmune disease is conferred by antigen specific regulatory T cells. *Nature*, 545:243-247
- Kaur G, et al. (2017) Structural and regulatory diversity shape HLA-C expression levels. *Nature Commun.*, 8:15924
- PT Illing, AW Purcell, J McCluskey (2017) The role of HLA genes in pharmacogenomics: unravelling HLA associated adverse drug reactions. *Immunogenetics*, 69(8-9):617-630.
- W Shao, et al. (2017) The SystemMHC Atlas project, *Nucleic Acids Research*, gkx664, <https://doi.org/10.1093/nar/gkx664>
- JI Mobbs, PT Illing, NL Dudek, AG Brooks, DG Baker, AW Purcell*, J Rossjohn*, JP Vivian* (2017) The molecular basis for peptide repertoire selection in the Human Leucocyte Antigen (HLA) C*06:02 molecule. *J Biol Chem.* Epub Aug 30. pii: jbc.M117.806976. doi: 10.1074/jbc.M117.806976.JI
- JW Wynne, S Todd, V Boyd, M Tachedjian, R Klein, B Shiell, M Dearnley, AJ McAuley, AP Woon, AW Purcell, GA Marsh, ML Baker (2017) Comparative transcriptomics highlights the role of the AP1 transcription factor in the host response to Ebolavirus. *J Virol Epub Sep 20.* pii: JVI.01174-17. doi: 10.1128/JVI.01174-17