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Cancer

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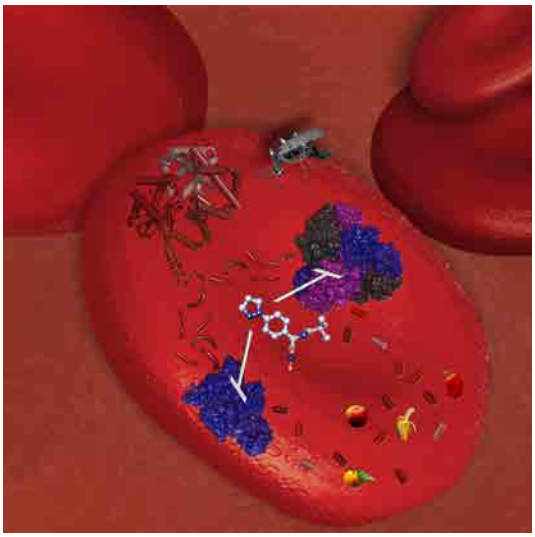
Our laboratory is interested in characterising new drug targets. We are primarily interested in the development of new drugs to control infectious diseases. Our lab has a strong research focus in the design of novel anti-malarial drugs as well as other parasitic and bacterial diseases. Primarily we are a structural microbiology laboratory using techniques in molecular biology, X-ray crystallography, biochemistry and biophysics to analyse drug targets of interest. We use this mechanistic information to design inhibitors or analogues with potential applications in human medicine. Our laboratory has close connections with both the Department of Microbiology and the Monash Institute of Pharmaceutical Sciences (in Parkville).

Research Projects

1. **Developing New Antimalarial Drugs**
2. **Development of Phage Lysins as Novel Antimicrobials**
3. **Development of New Drug Targets for Malaria**



Dual targeting of the M1 and M17 aminopeptidases for *P. falciparum* to develop novel antimalarial therapeutics.

Selected significant publications:

1. Mistry S, Drinkwater N, Ruggeri C, Kannan Sivaraman K, Loganathan S, Fletcher S, Drag M, Paiardini A, Avery V, Scammells P & **McGowan S**. 2014. A Two-pronged Attack: Dual Inhibition of M1 and M17 Metalloaminopeptidases by a Novel Series of Hydroxamic acid-based Inhibitors. *J. Med. Chem*. 57(21), 9168-9183.
2. **McGowan S**, Buckle AM, Mitchell MS, Hoopes JT, Gallagher DT, Heselpoth RD, Shen Y, Reboul CF, Law RH, Fischetti VA, Whisstock JC, and Nelson DC. 2012. X-ray crystal structure of the streptococcal specific phage lysin PlyC. *Proc Natl Acad Sci USA* 109, 12752-12757.
3. **McGowan S**, Oellig CA, Birru WA, Caradoc-Davies TT, Stack CM, Lowther J, Skinner-Adams T, Mucha A, Kafarski P, Grembecka J, Trenholme KR, Buckle AM, Gardiner DL, Dalton JP, and Whisstock JC. 2010. Structure of the Plasmodium falciparum M17 aminopeptidase and significance for the design of drugs targeting the neutral exopeptidases. *Proc Natl Acad Sci USA* 107, 2449-2454.
4. **McGowan S**, Porter CJ, Lowther J, Stack CM, Golding SJ, Skinner-Adams TS, Trenholme KR, Teuscher F, Donnelly SM, Grembecka J, Mucha A, Kafarski P, Degori R, Buckle AM, Gardiner DL, Whisstock JC, and Dalton JP. 2009. Structural basis for the inhibition of the essential Plasmodium falciparum M1 neutral aminopeptidase. *Proc Natl Acad Sci USA* 106, 2537-2542.
5. **McGowan S**, Buckle AM, Irving JA, Ong PC, Bashtannyk-Puhalovich TA, Kan WT, Henderson KN, Bulynko YA, Popova EY, Smith AI, Bottomley SP, Rossjohn J, Grigoryev SA, Pike RN, and Whisstock JC. 2006. X-ray crystal structure of MENT: evidence for functional loop-sheet polymers in chromatin condensation. *EMBO J* 25, 3144-3155.