Biochemistry News

The newsletter of the Department of Biochemistry at the University of Otago

editor: Bronwyn Carlisle

March 2012

In This Issue

View from the Corner

Welcome to the first Biochemistry Newsletter for 2012. It is great to be back and good to see the new students as they arrive. This year our undergraduate numbers look good. First year numbers are slightly down for the Health Sciences papers, but it is too soon to gauge the effect on BIOC 192 for next semester. Second year numbers are mixed with an increase in BIOC 221 but a small decrease in BIOC 222. Third year numbers look quite good and it is tempting to give some credit to our new outreach programmes for our first, second and third year students. Our new teaching staff members Liz Ledgerwood, Anita Dunbier and Lynette Brownfield will be featured more prominently in lecture theatres this year and I predict they will prove to be very popular. Annika Bokor and Cushla McKinney are helping out in addition to our usual cast.

We held an eventful strategic planning retreat on 3 February at Port Chalmers Town Hall. It was well-attended and expertly moderated by Alison Stewart. A summary of the discussion has been circulated to the staff and the extended planning group, so if you could not attend and were not e-mailed a copy, I encourage you to get a hold of a copy from your planning group representative or if that doesn't work, please e-mail me and I will get one to you. We are preparing now to move ahead with more planning as the year progresses and hope to unveil some new policies and ideas by year's end. However, no matter what we change you can trust that we will continue to teach our students, carry out research and provide service to the best of our ability.

If staff have seemed even busier than usual at the start of this year while doing course advising and preparing Marsden applications, I can tell you why. One ugly word, PBRF! It has been a sword of Damocles hanging over all of us. A Gordian knot of snarling bureaucracy. OK, I think you get the picture! However, as much as we hate it, it is a major source of income for the department and we know that we need to do our best on our Evidence Portfolios to be submitted later this year to TEC. For this year's round I have read almost everyone's EP, and I have to say I was extremely proud of all of our researchers. It was a truly outstanding effort!

If you haven't visited NZGL yet on the third floor I encourage to you to pop up and say "Hi" to Rob and Les and admire their fancy machinery. It's all working well now with sequencing backlogs vanishing. In addition to getting NZGL up and going, last year we acquired a small BiaCore surface plasmon resonance machine to complement our ITC device. By all accounts it is yielding great data.

cont'd over …

The front office is as busy as ever with administration and budgets but I wanted to be sure to mention that we are looking to hire a new compliance officer for the department very soon, in order give poor Julian some needed rest.

Finally I want to close by saying that we have had two PhD and one Master's completions in the past three weeks and congratulations are in order for Angela Hsu (MSc) with Tony Merriman and Sally McCormick, Brie Sorrenson, also with Sally, and Frances-Rose Schumacher with Catherine Day. If you see Angela, Frances-Rose or Brie sometime soon, please offer them your best! Have a great First Semester. See you in the next issue.

Best,

Recent Publications

Egor P. Tchesnokov, Sigurd M Wilbanks, and Guy N L Jameson

J.J. Evans, K. Chitcholtan, J.M. Dann, P Guilford, G Harris, L.K. Lewis, J. Nagase, A.A.W. Welkamp, R. Zwerus, and P.H. Sykes

Biochemistry, 2012 vol. 51 (1) pp. 257-264

The first experimental evidence of a tight binding iron(II)-CDO complex is presented. These data enabled the relationship between iron bound and activity to be explicitly proven. Cysteine dioxygenase (CDO) from Rattus norvegicus has been expressed and purified with similar to 0.17 Fe/polypeptide chain. Following addition of exogenous iron, iron determination using the ferrozine assay supported a very tight stoichiometric binding of iron with an extremely slow rate of dissociation, k(off) similar to 1.7 x 10(-6) s(-1). Dioxygenase activity was directly proportional to the concentration of iron. A rate of cysteine binding to iron(III)-CDO was also measured. Mossbauer spectra show that in its resting state CDO binds the iron as high-spin iron(II). This iron(II) active site binds cysteine with a dissociation constant of similar to 10 mM but is also able to bind homocysteine, which has previously been shown to inhibit the enzyme.

J.J. Evans, K. Chitcholtan, J.M. Dann, P Guilford, G Harris, L.K. Lewis, J. Nagase, A.A.W. Welkamp, R. Zwerus, and P.H. Sykes

Adrenomedullin interacts with VEGF in endometrial cancer and has varied modulation in tumours of different grades.

Gynecologic Oncology, 2012

Aniruddha Chatterjee, Peter A Stockwell, Euan J Rodger, and Ian M Morison

Comparison of alignment software for genome-wide bisulphite sequence data.

Nucleic Acids Research, 2012

Recent advances in next generation sequencing (NGS) technology now provide the opportunity to rapidly interrogate the methylation status of the genome. However, there are challenges in handling and interpretation of the methylation sequence data because of its large volume and the consequences of bisulphite modification. We sequenced reduced representation human genomes on the Illumina platform and efficiently mapped and visualized the data with different pipelines and software packages. We examined three pipelines for aligning bisulphite converted sequencing reads and compared their performance. We also comment on pre-processing and quality control of Illumina data. This comparison highlights differences in methods for NGS data processing and provides guidance to advance sequence-based methylation data analysis for molecular biologists.

M Chen-Xu, R Topless, C Mckinney, M E Merriman, A Phipps-Green, N Dalbeth, P J Gow, A A Harrison, J Highton, P B Jones, M Nissen, M D Smith, A Van Rij, G T Jones, L Rodriguez-Rodriguez, B Fernandez-Gutierrez, M Teruel, A Balsa, D Pascual-Salcedo, A M Ortiz, M A Gonzalez-Gay, S Steer, M Maehlen, B Lie, B P Wordsworth, L K Stamp, J Martín, and T R Merriman

Replication of association of the interleukin 23 receptor rs1343151 variant with rheumatoid arthritis in Caucasian sample sets.

Annals of the Rheumatic Diseases, 2012 vol. 71 (1) pp. 155-157

Berit Packert Jensen, Paul Ken Leong Chin, Rebecca Lee Roberts, and Evan James Begg

Influence of adult age on the total and free clearance and protein binding of (R)- and (S)-warfarin.

British Journal Of Clinical Pharmacology, 2012

Aims: To test the hypothesis that the clearance (CL) of warfarin, a very highly protein bound drug with capacity-limited metabolism, decreases with age. Methods: In a clinical study, a steady-state blood sample was taken from 72 patients (18-89 years) on routine treatment with warfarin. Concentrations of (R)- and (S)-warfarin were determined in plasma (total) and ultrafiltrate (free) by LC-MS/MS. Total and free CL and protein binding were determined and regressed against age and other covariates. In an ex vivo study, warfarin was spiked to plasma samples from 60 healthy subjects (19-87 years), and protein binding was regressed against age and other covariates. Results: For (R)-warfarin a significant decrease with age was found for both total and free CL ($P<0.001$). For (S)-warfarin there was a stronger signal of a decrease with age in free CL ($P=0.005$) versus total CL ($P=0.045$). The decrease in CL of (R)- and (S)-warfarin was 0.3-0.5% per year. Other covariates influencing CL were lean body weight for both (R)- and (S)-warfarin, and CYP2C9 genotype and blood sampling time for (S)-warfarin. Protein binding of (R)- and (S)-warfarin was not found to change significantly with age in either the clinical or the spiked samples, despite a slight decrease in albumin concentration with age. Conclusions: This data supports the hypothesis that the CL of (R)- and (S)-warfarin decreases with age. More accurate information was gained when measuring free CL for (S)-warfarin. Warfarin protein binding did not change significantly with age.

M.H. Vos, L. Bouzhir-Sima, J.-C. Lambry, H Luo, J. J. Eaton-Rye, A. Ioanoviciu, P.R.O. De Montellano, and U. Liebl

Ultrafast ligand dynamics in the heme-based GAF sensor domains of the histidine kinases DosS and DosT from *Mycobacterium tuberculosis*.

Euan J Rodger, Rachel J Suetani, Gregory T Jones, Torsten Kleffmann, Alan Carne, Michael Legge, and Sally P A McCormick

Proteomic analysis of aortae from human lipoprotein(a) transgenic mice shows an early metabolic response independent of atherosclerosis.

PLoS ONE, 2012 vol. 7 (1) p. e30383

BACKGROUND:Elevated low density lipoprotein (LDL) and lipoprotein(a) are independent risk factors for the development of atherosclerosis. Using a proteomic approach we aimed to determine early changes in arterial protein expression in transgenic mice containing both human LDL and lipoprotein(a) in circulation.

METHODS AND RESULTS:Plasma lipid analyses showed the lipoprotein(a) transgenic mice had significantly higher lipid levels than wildtype, including a much increased LDL and high density lipoprotein (HDL) cholesterol. Analysis of aortae from lipoprotein(a) mice showed lipoprotein(a) accumulation but no lipid accumulation or foam cells, leaving the arteries essentially atherosclerosis free. Using two-dimensional gel electrophoresis and mass spectrometry, we identified 34 arterial proteins with significantly altered abundance ($P<0.05$) in lipoprotein(a) transgenic mice compared to wildtype including 17 that showed a ≥ 2 fold difference. Some proteins of interest showed a similarly altered abundance at the transcript level. These changes collectively indicated an initial metabolic response that included a down regulation in energy, redox and lipid metabolism proteins and changes in structural proteins at a stage when atherosclerosis had not yet developed.

CONCLUSIONS:Our study shows that human LDL and lipoprotein(a) promote changes in the expression of a unique set of arterial proteins which may be early indicators of the metabolic disturbances preceding atherosclerosis.

Y Nakatani, S.M. Cutfield, N.P. Cowieson, and J.F. Cutfield

Structure and activity of exo-1,3/1,4-β-glucanase from marine bacterium Pseudoalteromonas sp. BB1 showing a novel C-terminal domain.

FEBS Journal, 2012 vol. 279 (3) pp. 464-478

Cushla Mckinney and Tony R Merriman

Meta-analysis confirms a role for deletion in FCGR3B in autoimmune phenotypes.

Human Molecular Genetics, 2012

Although deletion in the low-affinity IgG receptor gene FCGR3B has repeatedly been implicated in systemic autoimmune disease, the role of FCGR3B copy number variation (CNV) in autoimmunity still remains unclear. Factors such as study size, ethnicity, specific disease phenotype and experimental methodology may explain these conflicting results. Here we aimed at using meta-analysis to assess the role for FCGR3B CNV in autoimmunity. We excluded studies using SybrGreen-based genotyping and found strong evidence for association between low (<2) FCGR3B CN and systemic lupus erythematosus [OR = 1.59 (1.32-1.92), P(meta)=9.1 × 10(-7)], but not for rheumatoid arthritis [OR = 1.36 (0.89-2.06), P= 0.15]. However, a combined autoimmune phenotype analysis supports the deletion of FCGR3B as a risk factor for non-organ-specific autoimmunity [OR = 1.44 (1.28-1.62), P(meta)= 2.9 × 10(-9)]. This meta-analysis implicates the clearance of immune complex in the etiology of non-organ-specific autoimmune disease.

Rhesa Budhidarmo, Yoshio Nakatani, and Catherine L Day

RINGs hold the key to ubiquitin transfer.

Trends In Biochemical Sciences, 2012 vol. 37 (2) pp. 58-65

Ubiquitylation, the covalent modification of proteins by the addition of ubiquitin, relies on a cascade of enzymes that culminates in an E3 ligase that promotes the transfer of ubiquitin from an E2 enzyme to the target protein. The most prevalent E3 ligases contain a type of zinc-finger domain called RING, and although an essential role for the RING domain in ubiquitin transfer is widely accepted, the molecular mechanism by which this is achieved remains uncertain. In this review, we highlight recent studies that have suggested that the RING domain modulates the stability of the E2-ubiquitin conjugate so that catalysis is promoted. We also review the role of RING dimerisation and emphasise the importance of studying RING domains in the context of the full-length protein.

Biochemistry, 2012 vol. 51 (1) pp. 159-166

Annika A M Bokor, Linda M Kohn, Russell T M Poulter, and Jan A L van Kan

PRP8 inteins in species of the genus Botrytis and other ascomycetes.

Fungal genetics and biology : FG & B, 2012 vol. 49 (3) pp. 250-261

The mobile elements termed inteins have a sporadic distribution in microorganisms. It is unclear how these elements are maintained. Inteins are intervening protein sequences that autocatalytically excise themselves from a precursor. Excision is a post-translational process referred to as 'protein splicing' in which the sequences flanking the intein are ligated, reforming the mature host protein. Some inteins contain a homing endonuclease domain (HEG) that is proposed to facilitate propagation of the intein element within a gene pool. We have previously demonstrated that the HEG of the PRP8 intein is highly active during meiosis in Botrytis cinerea. Here we analysed the Prp8 gene status in 21 additional *Botrytis* species to obtain insight into the mode of intein inheritance within the Botrytis lineage. Of the 21 species, 15 contained a PRP8 intein whereas six did not. The analysis was extended to closely related (Sclerotiniaceae) and distantly related (Ascomycota) taxa, focussing on evolutionary diversification of the PRP8 intein, including their possible acquisition by horizontal transfer and loss by deletion. Evidence was obtained for the occurrence of genetic footprints of previous intein occupation. There is no compelling evidence of horizontal transfer among species. Three distinct states of the Prp8 allele were identified, distributed over different orders within the Ascomycota: an occupied allele; an empty allele that was never occupied; an empty allele that was presumably previously occupied, from which the intein was precisely deleted. The presence of the genetic footprint identifies 20 species (including *Neurospora crassa*, *Magnaporthe oryzae* and *Fusarium oxysporum*) that previously contained the intein but have lost it entirely, while only 18 species (including *Podospora anserina* and *Fusarium graminearum*) appear never to have contained a PRP8 intein. The analysis indicates that inteins may be maintained in an equilibrium state.

Emma R. Scaletti, Sylvia R. Luckner, and Kurt L Krause

Structural features and kinetic characterization of alanine racemase from Staphylococcus aureus (Mu50).

Acta Crystallographica Section D Biological Crystallography, 2012 vol. 68 pp. 82-92

Staphylococcus aureus is an opportunistic Gram-positive bacterium which causes a wide variety of diseases ranging from minor skin infections to potentially fatal conditions such as pneumonia, meningitis and septicaemia. The pathogen is a leading cause of nosocomial acquired infections, a problem that is exacerbated by the existence of methicillin-and glycopeptide antibiotic-resistant strains which can be challenging to treat. Alanine racemase (Alr) is a pyridoxal-5'-phosphate-dependent enzyme which catalyzes reversible racemization between enantiomers of alanine. As D-alanine is an essential component of the bacterial cell-wall peptidoglycan, inhibition of Alr is lethal to prokaryotes. Additionally, while ubiquitous amongst bacteria, this enzyme is absent in humans and most eukaryotes, making it an excellent antibiotic drug target. The crystal structure of S. aureus alanine racemase (Alr(Sas)), the sequence of which corresponds to that from the highly antibiotic-resistant Mu50 strain, has been solved to 2.15 angstrom resolution. Comparison of the Alr(Sas) structure with those of various alanine racemases demonstrates a conserved overall fold, with the enzyme sharing most similarity to those from other Gram-positive bacteria. Structural examination indicates that the active-site binding pocket, dimer interface and active-site entryway of the enzyme are potential targets for structure-aided inhibitor design. Kinetic constants were calculated in this study and are reported here. The potential for a disulfide bond in this structure is noted. This structural and biochemical information provides a template for future structure-based drug-development efforts targeting Alr(Sas).

Terry M. Bricker, Johnna L. Roose, Robert D Fagerlund, Laurie K. Frankel, and Julian J Eaton-Rye

The extrinsic proteins of Photosystem II.

Biochimica et Biophysica Acta - Bioenergetics, 2012 vol. 1817 (1) pp. 121-142

In this review we examine the structure and function of the extrinsic proteins of Photosystem II. These proteins include PsbO, present in all oxygenic organisms, the PsbP and PsbQ proteins, which are found in higher plants and eukaryotic algae, and the PsbU, PsbV, CyanoQ and CyanoP proteins, which are found in the cyanobacteria. These proteins serve to optimize oxygen evolution at physiological calcium and chloride concentrations. They also shield the Mn4CaO5 cluster from exogenous reductants. Numerous biochemical, genetic and structural studies have been used to probe the structure and function of these proteins within the photosystem. We will discuss the most recent proposed functional roles for these components, their structures (as deduced from biochemical and X-ray crystallographic studies) and the locations of their proposed binding domains within the Photosystem II complex. This article is part of a Special Issue entitled: Photosystem II.

Annette Lasham, Weini Samuel, Helen Cao, Rachna Patel, Reena Mehta, J. Lewis Stern, Glen Reid, Adele G. Woolley, Lance D. Miller, Michael A Black, Andrew N. Shelling, Cristin G. Print, and Antony W. Braithwaite

YB-1, the E2F Pathway, and Regulation of Tumor Cell Growth.

*Journal of the National Cancer Institut*e, 2012 vol. 104 (2) pp. 133-146

Background Y-box binding factor 1 (YB-1) has been associated with prognosis in many tumor types. Reduced YB-1 expression inhibits tumor cell growth, but the mechanism is unclear.Methods YB-1 mRNA levels were compared with tumor grade and histology using microarray data from 771 breast cancer patients and with disease-free survival and distant metastasis-free survival using data from 375 of those patients who did not receive adjuvant therapy. Microarrays were further searched for genes that had correlated expression with YB-1 mRNA. Small interfering RNA (siRNA) was used to study the effects of reduced YB-1 expression on growth of three tumor cell lines (MCF-7 breast, HCT116 colon, and A549 lung cancer cells), on tumorigenesis by A549 cells in nude mice, and on global transcription in the three cancer cell lines. Reporter gene assays were used to determine whether YB-1 siRNAs affected the expression of E2F1, and chromatin immunoprecipitation was used to determine whether YB-1 bound to various E2F promoters as well as E2F1-regulated promoters. All P values were from two-sided tests.Results YB-1 levels were elevated in more aggressive tumors and were strongly associated with poor disease-free survival and distant metastasis-free survival. YB-1 expression was often associated with the expression of genes with E2F sites in their promoters. Cells expressing YB-1 siRNA grew substantially more slowly than control cells and formed tumors less readily in nude mice. Transcripts that were altered in cancer cell lines with YB-1 siRNA included 32 genes that are components of prognostic gene expression signatures. YB-1 regulated expression of an E2F1 promoter-reporter construct in A549 cells (eg, relative E2F1 promoter activity with control siRNA = 4.04; with YB-1 siRNA = 1.40, difference= -2.64, 95% confidence interval = -3.57 to -1.71, $P < .001$) and bound to the promoters of several well-defined E2F1 target genes.Conclusion YB-1 expression is associated with the activity of E2F transcription factors and may control tumor cell growth by this mechanism.

Book Review

Seeing Further: From celestial crystalline spheres to protein crystals

Bill Bryson's ability to share intelligent and revealing insights into people, their institutions and ideas shines through in the many faceted Seeing Further which he edited for the Royal Society 350th anniversary. The twenty-one contributors fulfil the subtitle's promise to tell The Story of Science, Discovery and the Genius of the Royal Society. It would be unreasonable to expect that the other contributors all share Bryson's humour and panache; their failure in this regard is only a minor disappointment. The different essays explore ways of seeing the world, from the celestial spheres of medieval cosmology to the protein crystals of mid-twentieth century molecular biology.

Several essays explore the extent to which the Royal Society was dedicated to an empirical world-view developed by Francis Bacon in the first decades of the seventeenth century. The founding memorandum identifies the Society as a "Colledge for the Promoting of Physico-Mathematicall Experimentall Learning", a phrase heavy with connotations of observation and prediction. In her essay, Margaret Wertheim explores how this approach both required a fundamentally different view of space, the fabric of the universe, and raised a still unresolved question of how to locate the spiritual in this new view of space. She argues that our faith in physical laws to always describe the universe has squeezed from the "real" world the spiritual and divine which once inhabited the ethereal regions beyond the stars: "For medieval Christians, a dualistic conception of the human person went hand in hand with a dualistic spatial scheme; with the advent of a purely physicalist world picture it has become increasingly difficult to argue for reality of any kind of non-physical dimension to human existence." For medieval intellectuals the crystalline (and therefore perfect) celestial spheres were not just an allegory of a spiritual plane, they were that spiritual plane. Modern science and the Royal Society explicitly reject that: "In the new era of science, continuity itself became the epistemic model - the continuity of the laws of nature, the continuity of space, the continuity of matter, the continuity of life." Our department's Maori name trumpets the view that life's quintessence can be described by chemical laws. Descartes, Galileo and Newton recognised the implication of such continuity. They were concerned that by demonstrating that the planets were governed by earthly laws they removed the spiritual element from humankind; we now worry about oxytocin taking the romance out of true love. If we believe that all real things have Cartesian coordinates somewhere in Euclidean space, then what becomes of "Cogito ergo sum" if you cannot localise thought?

Study of protein structure by X-ray crystallography is an extreme example of a physicalist explanation of our world and is the focus of Georgina Ferry's history of the senior and junior Braggs, J. D. Bernal and Dorothy Hodgkin. The story touches on the exclusivity of the Royal Society. The first two women to to gain fellowships (not until 1945, just ahead of the tercentenary!) were the biochemist Marjorie Stephenson and the crystallographer Kathleen Lonsdale. Ferry highlights that these women were not only scientific leaders, but leaders in the social (and more often than not, socialist) activism which attracted many mid-twentieth century biochemists and crystallographers. Ferry suggests that confidence and cooperation in science led to confidence and cooperation in politics. For many, one's place in the physical world establishes own place spiritually and socially.

Just what sort of science was the Royal Society about? Francis Bacon, guiding light to many of the founders, asserted, "all true and fruitful natural philosophy hath a double scale or ladder, ascendent and descendent; ascending from experiments to the invention of causes, and descending from causes to the invention of new experiments."1 Philip Ball, in his essay, shows that the emphasis on experiment did not imply the divide between pure and applied sciences which C. P. Snow made into a modern truism. Christopher Wren was the speaker at the inaugural meeting, with Robert Boyle in the audience. Utility of observations was an early virtue, as was bizarre interest. James Gleick offers a catalogue of early articles from the Philosophical Transactions: volcanoes and vipers, "young wanton girlies", monstrous births and weird fish, how to make and patent your own telescope, trans-species transfusions and more. The early Transactions preserve the weird and wonderful for others to enjoy (all available on line) more in the spirit of Youtube than of a scientific journal. Bill Bryson's volume partakes of the breadth and whimsy of the former, but serves as serious a purpose as the latter.

Seeing Further was published by Harper Collins under its Perennial imprint and is available in paperback at the University Book Store.

Sigurd Wilbanks

FOOTNOTE:

1Francis Bacon, 1605, The Advancement of Learning, Second Book,VII.1, ed. G. W. Kitchin, 1861, reprinted 1973 by J. M. Dent & Sons Ltd, London

Conference Report

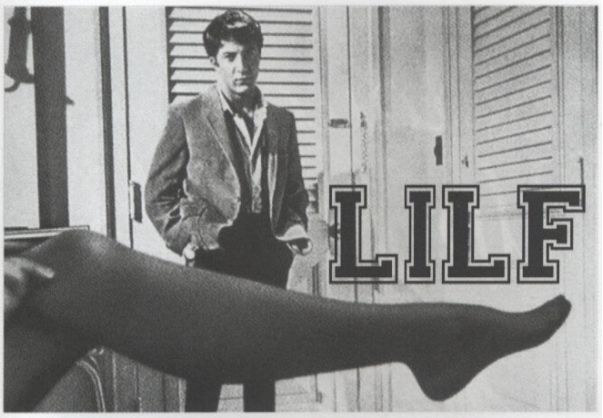
Gordon Research Seminar & Conference "Origin of Life", Galveston Texas, Jan 2012

It was the first Gordon conference I've attended, and I found the whole set-up ideal: presentations and accommodation in the same hotel (the historical Hotel Galvez on the Galveston waterfront), and all meals eaten together so lots of chances for meeting and talking to people. I particularly enjoyed meeting Steven Benner, the man behind the development of artificial genetic systems (able to incorporate non-naturally occurring amino acids into proteins) which form the basis of a number of medical applications in estimating viral loads in hepatitis C and HIV. Steven had some very helpful advice regarding protonated base pairs in RNA/DNA structure, which we incorporated into a paper Warren and I have recently had published on evolution of the RNA world at acidic pH. I also met George Fox (an old colleague of Kurt's at the University of Texas in Houston, and a really nice guy) who gave a talk on his work on the origin of the ribosome, a subject that relates to my work on the origin of the genetic code and coded protein synthesis. There were a number of extremely interesting talks, one by Mattanjah de Vries on the UV photo-properties of nucleic acids, their preliminary results suggesting that the canonical nucleobases have unusual (unique?) stability at particular wavelengths of UV, which may be the reason for their selection.

However, possibly the most interesting - and anticipated - talk was given by Felisa Wolfe-Simon, titled "Characterizations of intracellular arsenic in a bacterium". She was the main investigator on the extremely controversial paper published in Science at the end of 2010 that suggested that arsenate had replaced phosphate in the DNA backbone of a bacterium growing in high arsenic conditions. In view of the controversy the paper attracted, it was brave both for the organizers of the conference to invite her to speak, and for Felicia to agree. Unfortunately the talk itself was disappointing, with subsequent work not appearing to support the paper's findings. In particular, a pie chart showing that, of the amount of phosphorus expected, only ~5% was unaccounted for (and therefore could have been replaced by arsenic) in her bacterium was a bit of a bombshell. Nor did Felicia's ambition to crystalize the organism's ribosome seem like a particularly direct way of approaching the problem. Perhaps understandably, the questions at the end were fairly brutal. I was surprised to learn later that Wolfe-Simon is a post-doc, and has had to basically front-up on her own to the barrage of criticism the work has attracted (the head of her lab is apparently nowhere to be seen). She is also apparently working largely alone in carrying out the experiments to support her findings in response to the huge number of criticisms and suggestions that have come in. A lesson for young players, perhaps.

Staff mentioned in the media[1].

Do they have no respect? Who will be next?



Hello, Peter. May I call you Peter? Whenever I ask you this in my head, you say that I can call you anything I like, and wink roguishly. Of course, I am more than willing to call you "sir", if you would prefer.

In my first year of study I had the delight of being in your CELS191 lectures, and oh boy, did you get my gametes excited or what. I'd sit a few rows from the front, close enough to see the lights of the lecture hall glint sexily off your spectacles, surrounding your face in a radiance I thought only an angel could possess, but far enough away that my giggles of infatuation could not be heard.

I tried to make my BA friends come to lectures with me so that they could hear your delicious voice utter its cries of "Craig Venter is a wanker!" You don't need to be a wanker, Pete. My body is willing. I sat there, my raucous laughs at your brilliant jokes disguising my bosom, which heaved with a passion so heavy I sometimes thought I'd be unable to walk. I might have stumbled with the weight of it, and fallen against the button-up shirt that concealed your Adonis bod, accidentally tearing it. I might have fallen to the ground in front of you, and my legs might have accidentally fallen apart, or something. Accidents happen, sometimes repeatedly.

Of course, I understand that objectifying someone to such a sexy degree without respect for who they are as a person is wrong. It really is, and those who think such nasty, hot thoughts should be flayed in the groin for their disrespect of the mind within. That is why I feel it necessary to point out that your mind is a thing of beauty. It is a biological supercomputer in a room full of hamster ovaries; an aura so strong, hippies are repelled at 200 metres; it is an entity worthy of respect, if not full-blown worship.

It is not mere lust that drives me to your office window at night, hoping to find body fluids for sequencing/cloning. It is respect. Respect for the brilliance that resides within your bonus body. May you be reproductively successful, Mr Dearden, for your loins possess a random assortment of some seriously advantageous traits.

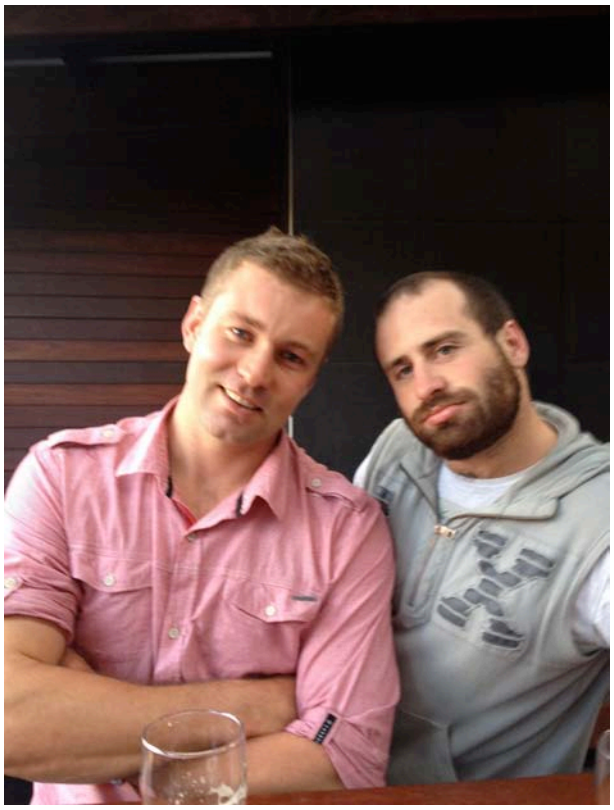
P.S. I saw you with Tony once. Are you friends? Are you more than friends? If not, could you be?

P.P.S. Did you get the haiku I wrote on your evaluation form?

1 *Critic*, 1, Feb 27, 2012

News from Around the Department

Day Lab



First of all, yours truly would like to apologise for being slack in broadcasting exciting news from our lab. I just … you know … got a lot of things to think about … like science and life and avocado and bacon and stuff :p

The past couple of months have been like a roller coaster ride for us. We were all very excited when the news about Catherine being a Professor reached our camp. Congratulations, Catherine! We're mighty proud indeed. This, of course, calls for a celebration! And a celebration won't be complete without a cake and a bottle of bubbly! Yay!!!

Despite all the cheeriness, we were faced by the grim reality that Bodhi had to leave us to pursue his dream of becoming an artisan winemaker in his native Blenheim. So with mixed feelings, we finished our cake and drank our bubbly … Bodhi has now left Dunedin. We won't forget the awesome things he did inside and outside the lab. Thanks heaps, Bodhi! And all the best!

It's very sad but you gotta do what you gotta do. And we've got to move on. So the most current line-up of our lab now consists of Catherine, Fran, Yoshio, Gabby, Josh, Mat, myself, and a new ARF Georgina. Georgina has been picking things up very quickly since the day she arrived. Protein preps and GST pull-downs will soon be her bread and butter. Josh and Gabby are finishing their summer projects before starting a new chapter in their scientific lives. After submitting their reports, Gabby will start her new position as a technician and Josh will be a full-fledged PhD student.

Recently, Mat just came back from the "CCP4 School on Advanced X-ray crystal structure analysis" at the Australian Synchrotron where he brushed shoulders with a few legends of X-ray crystallography. This trip proved to be valuable in aiding his 'coiled-coils structure solving' endeavor. Anyone who has worked on coiled-coil proteins will know that it ain't a walk in the park. It's suffice to say that he won't feel SAD or MAD after the trip (LOL! Ehemm … Sorry).

That's all from us for now. Stay safe and may be force with you. Lastly, when introducing an inactivating mutation in your favourite protein, please don't mutate every friggin' amino acid into Alanine! Trust me! You'll thank me later. Bye!

Rhesa,

for Lab 223

From the office:

Robyn has been away enjoying the sights of Auckland, however we are sure she has not been relaxing as she took with her three grandchildren, her daughter and her son-in-law. We heard that Kelly Tarlton's was on the schedule along with a shopping expedition to Dress Mart.

Mat is looking forward to a trip away in May also to Auckland, to see Florence and the Machine along with visit to Dress Mart amongst other things. Might have to ask him to visit Devonport Chocolates for us as well!

Frances has been jet setting lately with trips to Australia, Queenstown, Wellington and Auckland to see Lady Gaga. Due to the rain in Australia she has boosted the Australian economy with her purchases, one of the fabulous items she got was a pair of beautiful pair of fire-engine red Jo Mercer shoes. Her elder daughter Rebecca has started her clinical psychology 4th year here at Otago and is really enjoying it and Natalie does year 12 this year (she is available for babysitting too)

Teena has been learning how to roller derby (along with another student member of the department). She has passed her minimum skills skating test and her 25 laps in 5 minutes. Just a rules test to pass and then she can bout! http://www.dunedinderby.co.nz/

Cancer Genetics

CGL has a lot of exciting new people, since the start of last year 10 new students and staff have joined the lab. This year Parry's group welcomes 2 and a half new honours students Henry, Veronica and Chris, as well as Tyler to start his PhD. Bryony is back along with her contagious laughter. She has spent her summer in Nepal and India and now is starting her PhD as well.

Anita's group has been joined by a new ARF Jody, as well as a PGDipSci Genetics student named Tania. They are amazing, as are Anita's muffins.

Tate Lab

This month the Tate lab is once again at full capacity! We welcomed back Erin Sweetman this week. Erin earned 1st class honors last year and has just returned to the Tate lab from a European adventure to join the one-year masters program researching Chronic Fatigue Syndrome.

We also welcomed new 4th year students Geremy Ralston (two-year masters student) and Tabetha Lindsay (genetics honors student) who will both work working on Alzheimer's & memory mechanisms related research.

We had to say a sad farewell to 2nd year student of 2011 Abbey Burgess who has helped make our lab a fun place to be over the summer. And she worked so hard! We will miss you Abbey, good luck with third year.

Harold Bernhardt (Post doc) presented a poster at a conference in Galveston (Texas) on acid environments and the origin of life. See review for details.

On the 2nd February Professor Warren Tate was surprised at the Otago School of Medical Sciences prize day by getting the award for Excellence in Postgraduate Supervision. This prize is awarded based on student nominations. This award came with $2000 price money, some of which has already been eaten by the lab, with the rest already earmarked by the nominators!

Harold and Warren have recently had published the third and final part of their trilogy in the on-line journal Biology Direct. This one looks at the possibility that the environmental conditions in which the RNA world evolved might have been decidedly tangy:

Primordial soup or vinaigrette: did the RNA world evolve at acidic pH? *Biology Direct* 7:4 (2012).

One of the findings of the paper is that tRNAs from three archaebacterial species with reported acidic cytoplasms, have a higher than expected number of potentially protonatable A-C 'mismatches'. Harold was undecided whether to use 'vinaigrette' or 'french dressing' in the title, but a small lab committee decided the former was a lot more classy! The paper was the second most highly accessed paper a month after publication, with over 750 'hits'.

Katie

Summer News from the Merriman Lab

Over the summer, we had three (THREE!) weddings.

Sara was married to Zeeshan in Pakistan in a traditional 4-day ceremony. Now, she is Sara Zeeshan, as it is customary in Pakistan that a wife takes the first name of her husband for her surname, and they become their own new little family.

Aimee married William in Nelson, with now-8 month old Adelyn in attendance, and is now Mrs Parkyn.

Rebecca D. married Thomas in Clyde, also in January, and they honeymooned (money-hooned, Tony calls it) in the Maldives – lucky things!!!

Murray spent Christmas in Central Otago with his wife, Hana, and they have both since been busy doing MATH160 at Summer School. Murray says it is all to get credit towards his BSc but I think he just wanted to hang with Hana for a few extra hours each day.

Ruth, Mark and Charlotte visited family in Taranaki, and were able to introduce Charlotte to family she'd yet to meet.

I (Mandy) spent Christmas in Rangiora with my lot (our first trip away together with our boys – only 17 months in the making!) We enjoyed the hot sunny weather, and didn't enjoy the reasonably large earthquakes (for those who may be interested, experiencing an earthquake while driving a car feels very much like your tire has blown out).

Tony and Marilyn and kids toured the North Island for two weeks in January, driving all the way up to Cape Reinga, and then back down again. They managed to score 50kg of Katikati avocados along the way (we hear they have connections in high places). Just to make some readers feel their age, Tony and Marilyn's eldest, Kara, started high school this year!

The lab has had some departures and a few arrivals.

Angela and Mohan left in early February: Angela to look for a science job, and Mohan to take up a PhD at University of Auckland. The latter was a bit of a surprise to Tony just now. Oops.

Jade and our summer students have finished up (and we now actually fit in our lab - just).

We are excited to have Ruth back from parental leave from next week. She has been busy with Charlotte (now 6 months) and also planning some kitchen renovations.

We welcome Kim Hughes (BMLSc) who is starting her Masters with us looking at genes that predispose to end-stage renal failure.

Jarrod Moors is also new, and will be doing gout research with us for his PGDipSci.

Tanya isn't new at all (having already completed a summer studentship and also been employed in the lab) but she's now embarking on her PhD with us, examining the genetic mechanisms behind urate transport and gout (as well as working for us part-time). She's a busy girl but she is making the time to fit in the Evanescence concert in Auckland at the end of March. (I'm more than a bit jealous).

Speaking of arrivals, continuing in the grand Merriman tradition, we are happy to report that Cushla is expecting a baby girl in late July, a wee sister for Anya.

Also lovely news, Mansour and his wife, Zeinab, are due to have a baby in September.

We are considering renaming the Merriman lab to the Centre for Reproduction and Gout (CRG) but it is possible that this acronym may already be taken.

Tony has been globetrotting. A lot.

He recently returned from Amsterdam and Brussels for an HRC-sponsored trip to the Conference on diabesity (note, the newly coined word) run by the European Commission to map the way forward on the types of studies needed in the future. Tony was pleased to get his proposal for a clinical trial of vitamin D supplementation in Type 1 Diabetes accepted unanimously. Pleased is an understatement. He looks like the cat that caught the canary, and I'm sure we'll never hear the end of it.

At the end of this week, Tony is flying back to Europe (Ireland, Scotland, France and Switzerland) for more conferences and collaborations. We are demanding that he returns with European chocolates instead of the usual vitamin D pills he peddles on his return. Actually, he tells us that he brought back Belgian chocolates for Marilyn after the last trip, but she's not sharing so we need a lab supply.

Hoang, Mansour, Humaira and Aimee are all continuing on in the thick of their research.

Murray is busy handling the pipeline for the large amount of sequencing data that is coming though from NZGL, and once he's ironed out all the wrinkles, we ALL expect to be very busy analysing the data for our favourite gene regions. It will be invaluable to have sequence data for our unique New Zealand populations.

A lot of Sara's time has been eaten up by remotely trying to make the Pakistani authorities send her security clearance records to New Zealand so that her student visa can be approved. We understand that the policeman visited her parental home yesterday where he stayed for lunch and dinner and finally left with a large sum of rupees, and now the required documents will be forwarded within 10 days. This is how it is done apparently! In contrast, we let Sara move into the office

next door to write up her PhD. For free!

That's it from us.

Mandy

for the Merriman Lab

Macknight Lab News

The lab has been bustling with activity lately, with a few new additions being exposed to the exciting world of plants! Two summer students, Kelsey and Wen Hann, have been with us for the last couple of months working on different aspects of flowering in Medicago. Both have achieved some good results and we hope that they will stay on and get some more. Robyn has been doing well to keep them in line as well as stay on top of her own work, all the while keeping a calm appearance, well done Robyn! We also have a new PhD student from Iran, Manda, who is also working on flowering in Medicago (Arabidopsis flowering is old news!). Manda was very excited to find out that an Iranian film won an Oscar, we can be sure the same level of excitement will come with her scientific results.

Richard, Rowan, Rob and Lynette have just returned from a conference in Melbourne on "Plant Reproduction for Food". All four gave talks which were well received, and the conference was a great success. There were plenty of social events as well, including a (very fancy) BBQ, a wine tour and the obligatory conference dinner, making for an enjoyable (although fattening) trip. Rowan took a detour to Brisbane on the way back to visit the University of Queensland, coincidentally catching the same flight home as Jane who was in Brisbane for a wedding. Brisbane is a happening place, apparently.

Jared, meanwhile, has entered the joyous world of cloning, discovering the true meaning of being a masters student. Hopefully he will make the realization soon that pixies moderate PCR reactions, spectinomycin is a mythical substance and that E.coli has its own secret agenda. Good luck Jared!

All in all we're gearing up for an exciting year with lots of new discoveries (probably about Medicago flowering), new students coming and old students finishing (looking at no-one in particular *cough*Rowan*cough*).

Taking a break with the Wilbanks lab

Someone, at least, earned his break; since we last reported Egor had publications in PNAS (from his last job, not from Otago, but the VC should be pleased anyhow, in a PBRF way) and in Biochemistry. Well done!

December concluded with many lab members, including Samuel and Peter, hard at work. Having completed his end of the year sprint for data, Samuel departed to the North Island to write it all up, with occasional forays into the bush to maintain his sanity. Peter departed for rest and recuperation in Australia, and Sigurd followed in February. The Lorne protein conference was engaging, as always, and the Coonwarra valley and Grampian mountains had charms as well. Like Samuel, Jess vacationed in God's own country, while Aimée celebrated the end of fourth year with a South Pacific island get away. Richard went really further south for his Island getaway, but Tracy wins the REALLY far south sweepstakes..

During Malcom's latest holiday, his friend Marion broke one of the Golden Rules of Vacation Success, viz. All bones should at stay on the inside the skin at all times. The attending surgeon scored it a 10 out of 10 and asked to take photos for teaching purposes. Malcolm scored the vacation thus:

Time actually spent cycling the Rail Trail: 2 hours

Time spent in visiting hospital: 8 days

Given Malcolm's enthusiasm for physical exertion, this may qualify as a good break!

Alumni old and new. We will bid Eleni Farewell the end of March. Richard Davis, who completed a BSc(Hons) in the Wilbanks Lab, visited while on vacation from a post-doctoral fellowship at the University of Amsterdam, where he using induced pluripotent stem cells to make models of heart disease. As of 9 February, Anshul Awasthi, now a post-doctoral fellow in Montreal, is a proud father. Mother, Divya, and son are well.

There are fresh, young faces in Dunedin, too: three fresh faces and the return of one young visage we have missed. PhD student Antonia has joined us from Germany to investigate the mechanism of myeloperoxidase. Also from Germany, Henning joined us in January to work on intein-mediated production of cyclotides, and has already achieved our first HPLC purification. Yohan has returned to undertake masters study, looking at the coordination of the first and last steps of splicing in inteins. After a summer across the hall, Rachel has joined us to take over from Samuel on single molecule studies of Hsp70 chaperones. It looks like a fun year ahead!

Lamont Lab

Well another year is upon us and we are hoping that this year has less health issues for our members than last year.

This year we have two new fourth year students, Tom Bishop who is doing Biochemistry Honours and Julia Brown who is doing Genetics Honours. We welcome them into our lab and hope that they have a productive and enjoyable year.

Iain is back in the teaching mode, meaning that his phone rings continuously, email is full, notes written on his door and he isn't there to answer any of them.

Lois is busy working on trying to make pseudomonas glow. Cynthia is currently on holiday in Auckland for a week, but will be busy doing more real time PCR when she returns. Leo is trucking along (at some point starting to write) when he is not on coffee dates. Georgi is about to start her PhD with us, instead of being Iain's slave girl. (Yay) Andrea is back into the full swing of experimental work despite having so many operations last year, so she is very excited by that.

Overall the Lamont Lab is back into full swing and would like to wish everybody and healthy and productive 2012.

Krause Lab

The Krause lab members had an eventful summer, making the most what sun was available and enjoying the break away. Ashley Campbell went home to Wellington and spent Christmas with her family. She then had a very rainy but relaxing holiday at Riversdale beach where she went boogie boarding. Since then

Ashley has been busy training as a blocker in the lesser known sport of roller derby (a contact sport played by two teams, characterized by rough play, in which roller skaters race around a banked, oval track trying to score points by lapping opponents).

From the 12th to the 15th of February, Franziska Huschmann, and Karen Knapp along with other members of the Biochemistry and Pharmacy departments got the opportunity to participate in the CCP4 School on Advanced X-ray Crystal Structure Analysis at the Australian Synchrotron in Melbourne. A great combination of lectures, tutorials and workshops covered major developments in macromolecular crystallography. The main subjects were data collection, processing and structure determination. The presence of international experts was extremely excellent allowing the attendees to discuss matters with the specialists.

On top of attending the Advanced X-ray Crystal Structure Analysis at the Australian Synchrotron in Melbourne Karen has recently finished and launched the Krause Lab Website, a stunning site showing off among other things current research, members, news & events and a detailed photo gallery of all the Krause lab shenanigans. Here's the link: http://biochem.otago.ac.nz/krause-lab/ go check it out.

Rob Fagerlund has been busy purifying proteins and has been seen serenading his crystallisation drops urging crystals to form - he'd even be happy with baby micro ones! Outside science Rob has been camping with the whanau and preparing for the hockey season that is (too) quickly approaching.

Two new PhD students have been added to the group, Sinothai Poen and Roman Mortuza:

Born and raised in Bangkok, Thailand, Sinothai Poen achieved B.Sc. and M.Sc. from Kasetsart University in Aquaculture and Genetic Engineering in 2006 and 2009, respectively. Having worked for BIOTEC (a government research institute in Thailand) for two years in a project focusing on structural determination of potential drug-target enzymes from the malaria parasite, he has a keen interest in pursuing research in the field of Structural Biology. Apart from study, Sinothai loves playing as well as watching football and he is a big fan of Arsenal FC.

Roman Mortuza is another new PhD student in the Krause lab. He holds a B.Sc. and M.S. degree in Biochemistry and Molecular Biology from the University of Dhaka, Bangladesh. During his training he worked on the project-'Maternal Genitourinary Infections and Adverse Perinatal Outcomes in Sylhet District, Bangladesh' which was funded by NIH. Roman loves playing and watching cricket. That sums up the Krause lab summer, wishing it could have lasted a little longer but we're all making the most out of Autumn.

Hugh McGillan

Lab JER

2012 has started with everyone suitably rested and rehabilitated after a great Christmas and New Year break.

To continue with our accident-prone theme that we seem to have in the lab, Jake Lamb fell off his bike and broke his arm. Clearly, Jake, I don't think you were ready to take your training wheels off.

Ryan Hill tells me he is "writing up his thesis". This apparently happens in between the caffeine highs when he is in the lab driving everyone crazy.

And word is that Asher got an experiment to work, kind of. Nice one Asher!!

Martin Hohmann-Marriott left us at the end of last year and has settled into his position in the Department of Biotechnology at Norwegian University of Science and Technology, NTNU, Trondheim, Norway. We have received some beautiful picturesque photos of the snow-covered town (which is probably more picturesque viewing photos here in our summer, than it is actually living in the 3 feet of snow).

The last couple of weeks have seen the JER lab graced with a few visitors, which we have enjoyed the company of. Imre Vass was here from the Institute of Plant Biology, Biological Research Center, Szeged, Hungary, and is a specialist in both Thermoluminescence (TL) and chlorophyll fluorescence. He gave us a worthwhile session on TL Measurements and instrumentation, and fluorescence to measure PS II reactions. He also spoke in our Departmental seminar on Photodamage and photoprotection in plants and cyanobacteria. Then, Professor Wolfgang Hess who is visiting Botany, from Germany, as a William Evans Fellow, talked to us about transcriptome analyses in cyanobacteria. This was a successful day of our mini-Science Festival, and ended with a tame, relaxed and yummy meal at Paasha. Last, but not least, Claudia Steglich, also from Freiburg University in Germany, very recently talked in our Departmental seminar about the role of antisense RNAs in the lytic infection cycle of cyanophage P-SSP7 and its host Prochlorococcus MED4.

Now we look forward to our new 4th years, which arrive in the lab next week. I just hope they survive 308!!!

McCormick Lab

The lab has been a clearing house recently with firstly Brie, then Nina having submitted their PhDs and Angela having submitted her Masters. Brie headed on up on to sunny Auckland where she has just secured a postdoctoral position but not before writing a couple more papers one of which has just been submitted to a fairly decent journal. Nina headed to the mountains before starting a research fellow position with Tony Kettle in Christchurch. Angela headed to sunny Nelson to spend time with her family but also managed to write a paper from her Masters research.

Celebrations were all round for Brie last week who gave her departmental seminar and sat her PhD oral culminating in much wining, dining and celebration. She also managed to fit some student training in giving Alex, our new BBiomedSc Honours student, the low down on PCR, we will miss you Brie the PCR Queen, Cell Culture Queen, Cloning Queen, the list is endless!

Sally's first ever medical student, Gavin Yeh, also did a runner, back to Medical School but not before turning in a fairly useful bioinformatics-based summer studentship report. A big thanks to the gene jockeys in the Merriman and Black lab, particularly Murray for helping Gavin with his project.

So whose left in the lab you might ask? Well there's Anne, who having battled with an ethics application for the last few weeks, is now all ethically approved and back in the lab and rearing to go, the samples can't come in quick enough. She is also helping Alex master the art of transferring very large proteins in the shortest time possible. And there's Tom who has been rumoured to have been sighted in the lab more than once or twice this year including once in the weekend! Humaira from the Merriman lab joins us occasionally to dabble in the world of FPLC and ELISAs. Oh and there's Sally who is busy getting BIOC355 on track and preparing three talks for the upcoming International Atherosclerosis Meeting and associated Satellite Meeting in Sydney next week.