
Biochemistry News

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

editor: Bronwyn Carlisle

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View from the Corner

September is gone and October has finally arrived. Every year I think that once I get my lectures out of the way in spring I will get caught up on a myriad of overdue assignments. But it is an illusion, because as soon as late September appears I am always more behind than ever! I think this time of year is busy for all of us. Reviews, reports, applications, nominations are all due around this time. If this sounds familiar to you, I would love to hear about it.

Speaking of reviews, this year is the appointed time for another Departmental Review. They happen about every five years, require a huge amount of work and a cynic might note that they often come up with the same recommendations, many of which are not acted upon. However this year's review could be quite special for us, as I think it gives us a great chance to think about branding.

By branding I mean what is it for which our Department is most known. For some departments this seems more straightforward. Physiology has the kisspeptin story and the cell biology of puberty. Anatomy has EM and now, deep sequencing. Microbiology and Pharmacology have well... microbiology and pharmacology, i.e. in the health sciences their discipline is still intact.

For Biochemistry it is another story. This is without a doubt the golden age of Biochemistry, but in some ways we are victims of our own success. Biochemistry is everywhere and done by, seems like, almost everyone. To illustrate this point I would point to the recent article by Shaune Hendy in July's New Zealand Research Digest compiled by Dr. Katharina Ruckstuhl. In his article, Shaune pointed out that the entire Dunedin campus is now noted for its articles in Pharmacology, Neurosciences, Biochemistry and Public Health.



Since everyone now is doing work in what used to be our patch, it may behoove us to claim some pieces of the patch that are special to us. These patches might be viewed as research clusters. Several areas come to mind immediately to me such as genetics, structural biology, and proteomics but I suspect each of us would have a slightly different list. This month as we prepare for our December review perhaps this issue deserves some contemplation and even a dialog in which we have a conversation about choosing our patch for the next five years. Of course thinking about research clustering doesn't mean that everyone has to fit in a research cluster to count, or that we don't have freedom to work in whatever area we wish. It's just a logical mechanism to boost our visibility within the Division, maximize our funding and our impact on the school. At least it's a great topic for a Review!

Kent Krause



August - September Publications

As found by PubMed search. Please advise the editor if your publication has been left out and we'll include it in the next issue of the newsletter.

It was a great two months for publications!

Amanda J Phipps-Green, Jade E Hollis-Moffatt, Nicola Dalbeth, Marilyn E Merriman, Ruth Topless, Peter J Gow, Andrew A Harrison, John Highton, Peter B B Jones, Lisa K Stamp, Tony R Merriman.

Human Molecular Genetics (2010)

A strong role for the ABCG2 gene in susceptibility to gout in New Zealand Pacific Island and caucasian, but not Maori, case and control sample sets.

Genetic variation in ABCG2 (rs2231142, Q141K), encoding a uric acid transporter, is associated with gout in diverse populations. The aim of this study was to examine a role for ABCG2 in gout susceptibility in New Zealand Māori, Pacific Island and Caucasian samples. Patients (n=185, 173 and 214, for Māori, Pacific Island and Caucasian, respectively) satisfied the American College of Rheumatology gout classification criteria. The comparison samples were comprised of 284, 129 and 562 individuals, respectively, without gout. Rs2231142 was genotyped and stratification accounted for using genomic control markers. Association of the minor allele of rs2231142 with gout was observed in the Pacific Island samples (OR=2.80, P(STRAT)<0.001 after accounting for effects of population structure) but not in the Māori samples (OR=1.08, P(STRAT)=0.70), with heterogeneity in association evident between the Māori and Pacific Island datasets (P(HET)=0.001). A similar dichotomy in association was observed when samples were stratified into Western (Tonga, Samoa, Niue, Tokelau) versus Eastern Polynesian (Māori, Cook Island) origin (OR=2.59, P(STRAT)<0.001; OR=1.12, P(STRAT)=0.48, respectively; P(HET)=0.005). Association with gout was observed in the Caucasian samples (OR=2.20, P=3.2x10⁻⁸). Unlike SLC2A9, which is a strong risk factor for gout in both Māori and Pacific Island people, ABCG2 rs2231142 has a strong effect only in people of Western Polynesian ancestry. Our results emphasise the need to account for sub-population differences when undertaking biomedical genetic research in a group defined by a geographical region and shared ancestry but characterised by migratory events that create bottlenecks and altered genetic structure in the founder populations.

Duncan G G McMillan, Imelda Velasquez, Brook L Nunn, David R Goodlett, Keith A Hunter, Iain Lamont, Sylvia G Sander, Gregory M Cook.

Applied and Environmental Microbiology (2010)

Acquisition of Iron by Alkaliphilic *Bacillus* Species.

The biochemical and molecular mechanisms used by alkaliphilic bacteria to acquire iron is unknown. We demonstrate that alkaliphilic (pH > 9) *Bacillus* species are sensitive to artificial iron (Fe(3+)) chelators and produce iron-chelating molecules. These alkaliphilic siderophores contain catechol and hydroxamate moieties and their synthesis is stimulated by manganese(II) salts and suppressed by FeCl₃ addition. Purification and mass spectrometric characterization of the siderophore produced by *Caldalkalibacillus thermarum* failed to identify any matches to previously observed fragmentation spectra of known siderophores suggesting a novel structure.

Wayne M Patrick, Yoshio Nakatani, Susan M Cutfield, Miriam L Sharpe, Rochelle J Ramsay, John F Cutfield.

The FEBS journal (2010)

Carbohydrate binding sites in *Candida albicans* exo- β -1,3-glucanase and the role of the Phe-Phe 'clamp' at the active site entrance.

Candida albicans exo- β -1,3-glucanase (Exg; EC 3.2.1.58) is implicated in cell wall β -d-glucan remodelling through its glucosyl hydrolase and/or transglucosylase activities. A pair of antiparallel phenylalanyl residues (F144 and F258) flank the entrance to the active site pocket. Various Exg mutants were studied using steady-state kinetics and crystallography aiming to understand the roles played by these residues in positioning the β -1,3-d-glucan substrate. Mutations at the Phe-Phe entranceway demonstrated the requirement for double-sided CH/ π interactions at the +1 subsite, and the necessity for phenylalanine rather than tyrosine or tryptophan. The Tyr-Tyr double mutations introduced ordered water molecules into the entranceway. A third Phe residue (F229) nearby was evaluated as a possible +2 subsite. The inactive double mutant E292S/F229A complexed with laminaritrise has provided the first picture of substrate binding to Exg and demonstrated

how the Phe-Phe arrangement acts as a clamp at the +1 subsite. The terminal sugar at the -1 site showed displacement from the position of a monosaccharide analogue with interchange of water molecules and sugar hydroxyls. An unexpected additional glucose binding site, well removed from the active site, was revealed. This site may enable Exg to associate with the branched glucan structure of the *C. albicans* cell wall.

Yoshio Nakatani, Iain L Lamont, John F Cutfield.

Applied and Environmental Microbiology (2010)

Discovery and Characterisation of a Distinctive Exo-1,3/1,4- β -glucanase from the Marine Bacterium *Pseudoalteromonas* sp. BB1.

Marine bacteria residing on local red, green and brown seaweeds were screened for exo-1,3- β -glucanase activity. Of the 90 bacterial species isolated from 32 seaweeds only one, a *Pseudoalteromonas* sp. was found to display such activity. It was isolated from *Durvillaea* sp., a brown kelp known to contain significant amounts of the storage polysaccharide laminarin (1,3- β -D-glucan with some 1,6- β -branching). Four chromatographic steps were utilized to purify the enzyme (ExoP). Chymotryptic digestion provided peptide sequences for primer design and subsequent gene cloning. The *exoP* gene coded for 840 amino acids and was located just 50 bp downstream from a putative lichenase (endo-1,3-1,4- β -glucanase) gene, suggesting possible co-transcription of these genes. Sequence comparisons revealed ExoP to be clustered within a group of bacterial glycosidases with high similarity to a group of GH3 plant enzymes of which barley exo-1,3/1,4- β -glucanase (ExoI) is the best characterized. The major difference between the bacterial and plant proteins is an extra 200-220 amino acid extension at the C-terminus of the former. This additional sequence does not correlate with any known functional domain but ExoP was not active against laminarin when this region was removed. Production of recombinant ExoP allowed substrate specificity studies to be performed. The enzyme was found to possess a similar level of exoglucanase activity against both 1,4- β -linkages and 1,3- β -linkages and so ExoP is designated as an exo-1,3/1,4- β -exoglucanase, the first such bacterial enzyme to be characterized. This broader specificity could allow the enzyme to assist in digesting both cell wall cellulose as well as cytoplasmic laminarin.

James M Smith, Andrew G Cridge, Peter K Dearden.

Evodevo (2010) vol. 1 (1) pp. 5

Germ cell specification and ovary structure in the rotifer *Brachionus plicatilis*.

ABSTRACT: BACKGROUND: The segregation of the germline from somatic tissues is an essential process in the development of all animals. Specification of the primordial germ cells (PGCs) takes place via different strategies across animal phyla; either specified early in embryogenesis by the inheritance of maternal determinants in the cytoplasm of the oocyte ('preformation') or selected later in embryonic development from undifferentiated precursors by a localized inductive signal ('epigenesis'). Here we investigate the specification and development of the germ cells in the rotifer *Brachionus plicatilis*, a member of the poorly-characterized superphyla Lophotrochozoa, by isolating the *Brachionus* homologues of the conserved germ cell markers *vasa* and *nanos*, and examining their expression using in situ hybridization. **RESULTS:** Bpvasa and Bpnos RNA expression have very similar distributions in the *Brachionus* ovary, showing ubiquitous expression in the vitellarium, with higher levels in the putative germ cell cluster. Bpvas RNA expression is present in freshly laid eggs, remaining ubiquitous in embryos until at least the 96 cell stage after which expression narrows to a small cluster of cells at the putative posterior of the embryo, consistent with the developing ovary. Bpnos RNA expression is also present in just-laid eggs but expression is much reduced by the four-cell stage and absent by the 16-cell stage. Shortly before hatching of the juvenile rotifer from the egg, Bpnos RNA expression is re-activated, located in a subset of posterior cells similar to those expressing Bpvas at the same stage. **CONCLUSIONS:** The observed expression of *vasa* and *nanos* in the developing *B. plicatilis* embryo implies an epigenetic origin of primordial germ cells in Rotifer. -

Nattanan Panjaworayan, Sunchai Payungporn, Yong Poovorawan, Chris M Brown.

Viral J (2010) vol. 7 pp. 216

Identification of an effective siRNA target site and functional regulatory elements, within the hepatitis B virus posttranscriptional regulatory element.

BACKGROUND: Infection with hepatitis B virus (HBV) is major public health concern. The limitations of available antiviral drugs require development of novel approaches to inhibit HBV replication. This study was conducted to identify functional elements and new siRNA target sites within the highly conserved regions of the 533 base post-transcriptional regulatory element (PRE) of HBV RNAs. **RESULTS:** Computational analysis of the PRE sequence revealed several conserved regulatory elements that are predicted to form local

secondary structures some of these within known regulatory regions. A deletion analysis showed that sub-elements of the PRE have different effects on the reporter activity suggesting that the PRE contains multiple regulatory elements. Conserved siRNA targets at nucleotide position 1317-1337 and 1329-1349 were predicted. Although the siRNA at the position 1329-1349 had no effect on the expression of reporter gene, the siRNA target site at the position 1317-1337 was observed to significantly decrease expression of the reporter protein. This siRNA also specifically reduced the level of cccDNA in transiently HBV infected cells. CONCLUSION: The HBV PRE is likely to contain multiple regulatory elements. A conserved target within this region at 1317-1337 is an effective siRNA target.

Robert C Day.

Methods Mol Biol (2010) vol. 655 pp. 321-46

Laser microdissection of paraffin-embedded plant tissues for transcript profiling.

High-resolution cellular analysis will help answer many important questions in plant biology including how genetic information is differentially used to enable the formation and development of the plant body. By comparing transcriptome data from distinct cell types during various stages of development, insight can be obtained into the transcriptional networks that underpin the attributes and contributions of particular cells and tissues. Laser microdissection (LM) is a technique that enables researchers to obtain specific cells or tissues from histological samples in a manner conducive to downstream molecular analysis. LM has become an established strategy in many areas of biology and it has recently been adapted for use with many types of plant tissue.

Chu Wai Liew, Huaiyu Sun, Tony Hunter, Catherine L Day.

Biochem J (2010) vol. 431 (1) pp. 23-9

RING domain dimerization is essential for RNF4 function.

RNF4 [RING (really interesting new gene) finger protein 4] family ubiquitin ligases are RING E3 ligases that regulate the homeostasis of SUMOylated proteins by promoting their ubiquitylation. In the present paper we report that the RING domain of RNF4 forms a stable dimer, and that dimerization is required for ubiquitin transfer. Our results suggest that the stability of the E2~ubiquitin thioester bond is regulated by RING domain dimerization.

Robert J Weeks, Ursula R Kees, Sarah Song, Ian M Morison.

Mol Cancer (2010) vol. 9 pp. 163

Silencing of TESTIN by dense biallelic promoter methylation is the most common molecular event in childhood acute lymphoblastic leukaemia.

BACKGROUND: Aberrant promoter DNA methylation has been reported in childhood acute lymphoblastic leukaemia (ALL) and has the potential to contribute to its onset and outcome. However, few reports demonstrate consistent, prevalent and dense promoter methylation, associated with tumour-specific gene silencing. By screening candidate genes, we have detected frequent and dense methylation of the TESTIN (TES) promoter. RESULTS: Bisulfite sequencing showed that 100% of the ALL samples (n = 20) were methylated at the TES promoter, whereas the matched remission (n = 5), normal bone marrow (n = 6) and normal PBL (n = 5) samples were unmethylated. Expression of TES in hyperdiploid, TEL-AML+, BCR-ABL+, and E2A-PBX+ subtypes of B lineage ALL was markedly reduced compared to that in normal bone marrow progenitor cells and in B cells. In addition TES methylation and silencing was demonstrated in nine out of ten independent B ALL propagated as xenografts in NOD/SCID mice. CONCLUSION: In total, 93% of B ALL samples (93 of 100) demonstrated methylation with silencing or reduced expression of the TES gene. Thus, TES is the most frequently methylated and silenced gene yet reported in ALL. TES, a LIM domain-containing tumour suppressor gene and component of the focal adhesion complex, is involved in adhesion, motility, cell-to-cell interactions and cell signalling. Our data implicate TES methylation in ALL and provide additional evidence for the involvement of LIM domain proteins in leukaemogenesis.

Ryuji Fukuzawa, Sarah K Holman, C W Chow, Ravi Savarirayan, Anthony E Reeve, Stephen P Robertson.

Journal of Medical Genetics (2010)

WTX mutations can occur both early and late in the pathogenesis of Wilms tumour.

Background Somatic mutations in the X-linked tumour suppressor gene WTX have been observed in 6-30% of sporadic cases of Wilms tumour. Germline mutations in the same gene cause the sclerosing skeletal dysplasia, osteopathia striata congenita with cranial sclerosis (OSCS). No evidence points towards a susceptibility to the development of tumours in individuals with OSCS, suggesting that there are unrecognised additional determinants that influence the phenotypic outcome associated with germline mutations in WTX. One explanation may be that a somatic mutation in WTX may need to occur late in tumour development to contribute to tumourigenesis. Methods Here a panel

of four sporadic Wilms tumours with associated nephrogenic rest tissue and characterised WTX and CTNNB1 mutations is studied to ascertain the temporal sequence of acquisition of these mutations. Additionally, a family with OPCS is described segregating a germline mutation in WTX and manifesting a lethal phenotype in males. One male from this family had bilateral multifocal nephrogenic rests at autopsy. Results In one of the four tumours the WTX mutation was present

in both tumour and rest tissue indicating it had arisen early in tumour development. In the remaining three tumours, the WTX mutation was present in the tumour only indicating late acquisition of these mutations. Conclusions These data indicate that WTX mutations can arise both early and late in Wilms tumour development. WTX mutations may predispose to nephrogenic rest development rather than Wilms tumour per se.



Prof Bostjan Kobe

An evening at the movies

About thirty staff and students turned up to watch the movie "Naturally Obsessed - the Making of a Scientist" on the evening of 20th August.

An impromptu panel discussion took place after the screening, with students quizzing academic staff as to the relevance of the movie to the New Zealand situation and current conditions.



The movie crowd gathers

Visiting speakers

Bostjan Kobe

Noted Queensland structural biologist Prof. Bostjan Kobe, ARC Federation Fellow Professor of Structural Biology, School of Chemistry and Molecular Biosciences and Institute for Molecular Bioscience (Division of Chemistry and Structural Biology) and Centre for Infectious Disease Research visited our department and gave a seminar on 20 August 2010. He discussed recent progress in his laboratory on the structures of proteins that protect plants from diseases.

Following his seminar Bostjan stayed on for the Departmental Movie night and formed part of a panel that wielded questions following our screening of the movie Naturally Obsessed.

Thomas Proft

University of Auckland senior lecturer Thomas Proft visited the department on 28th September and presented a discussion of his latest research on *Streptococcus pyogenes* virulence mechanisms, along with new protein crystallography data on Gram positive pilus proteins.



Dr Thomas Proft

Lab News

From the Workshops

Murray's adventures in Alaska.

Despite dire predictions from workmates about mosquitoes and bears I caught a plane to Anchorage via Vancouver and travelled on the Alaska Railroad to Denali National Park where I spent the first night under canvas at Riley Creek. The next five days were spent camping at Savage River approximately fifteen miles further into the park. With six million acres to explore I had to be up fairly early but it is still daylight at midnight and light again at 4.00 a.m. Squirrels, marmot and porcupine were my first companions at the campsite and by carefully extending my range from Savage, sightings of bear, moose and caribou. Park rangers visited campgrounds delivering talks on safe distances and behaviour if confronted by some of the animals. Talk while hiking they said to avoid surprising bears and moose. I had given up talking to myself but thought whistling would be OK. Stay at least 300



yards from bears and 25 yards from moose. Don't whistle they said as ptarmigan (grouse) whistle and is a favourite food of bears and wolves. Exactly. With the park at 3000ft above sea level weather can change quickly and I did experience this on one day when temperatures plummeted to below zero following days at +16° C. The park flora is a mix of taiga and tundra with spruce interspersed with low aspen and alder. Temperatures in winter drop to -40° C and twenty foot trees may be fifty years old. Spruce, by the way, is the favoured building material for log cabins, of which there are a number in the park. I didn't quite make it around the six million acres before returning to Riley Creek for my final night prior to catching the train back to Anchorage. A night at Backpackers Hostel, Anchorage gave me time to clean my kit before flying back to Vancouver and over to Campbell River on Vancouver Island



to visit the Orcas in Discovery Channel. Also to visit the site of Ripple Rock where miners used 1.7 million tons of explosive to blow the top off two underwater mountains and clear a shipping lane. A floatplane trip to Salt Spring and Maple Bay completed my week on the island. Back to Vancouver, kit cleaned at the VIA railway station, then onto the train for an overnight trip to Jasper in the Canadian Rockies. Camped at Whistler Camp Ground, I experienced wildlife at close quarters when a herd of Elk (Wapiti) invaded the area. Great photo opportunity but had to climb into my tent that night with one of the animals quite close to my tent. Jasper has black bears, elk, deer and they are everywhere. A bear up a tree in the centre of town was eventually coaxed down by the wildlife service



using ice hockey sticks, tranquilized and taken back up into the hills. After a week in Jasper I was beginning to feel I had walked a million miles. I had booked to return by train to Vancouver but having hiked that day in very hot conditions, I was in need of a change of clothes before boarding. Not much time to change but into the toilets, first cubicle, off with gear and just about to pull on fresh underwear when a woman's voice was heard. Exactly! Waiting for voices to go away, hat pulled well down, sunnies on, pack held high I exited walking briskly past another woman applying lipstick. Back to Vancouver, board plane, no international incident reported. Home jetlagged. What an adventure!

Murray Cockerill



Eaton-Rye Lab

2010 has seen a few comings and goings in the Eaton-Rye lab. At the start of the year Regan Winter joined Esther in Montreal, Canada, and is writing up his PhD thesis there. Roger Young submitted his MSc thesis and took up an ARF position in Botany with Tina Summerfield. Simon Cabout and Max Waack both joined the lab to do their MSc. We have had two European visitors come and work with us as part of their training. Melissa was here from the Netherlands, and Jenny from Germany, both have since returned home after spending nine and six months with us, respectively. Jackie came back to the lab in April from Maternity Leave and Jonathon Moore recently returned home to Auckland to write his MSc thesis. We now wait for the next influx of summer students.

More recent news ... this last month saw a good part of the lab take off to China for the 15th International Congress of Photosynthesis in Beijing. Not a lot of conference news was talked about (although the structure of the photosystem II complex was reported at atomic resolution!); however, stories of eating deep-fried scorpion and tarantula, and many other exotic delicacies were the hot topic of conversation. The arrival of international wrestling teams in the accommodation complex was also of interest, where the boys were having to go through scanners to enter their hotel rooms, passing giant Russian wrestlers in the corridors as well as large Sumos wondering around. Not the usual sights a Dunedin scientist would see everyday. The street-bargaining of laser pointers was of much humour and they all came back with rather powerful pointers that apparently drain batteries after one talk/lecture. With Julian's small obsession with laser pointers, it is one more to add to his collection.

Simon Jackson decided to clear his head after the Beijing conference, and has been trekking in Nepal for the last 3 weeks. He has just returned, so we look forward to hearing about his adventurous trip. [We will be looking forward to a report in the next newsletter - Ed]

Ryan Hill is about to head off to the USA to give a talk next week at the Clostridium 11 conference about his PhD project on butanol production by *Synechocystis* sp. PCC 6803. While he is over there he is going to catch up with an ex-lab member Hao Luo who took up a postdoc in June with Professor James Liao at UCLA— also on biofuel production — (that's all we know ... he cannot talk to us about it).

And to end our update on a good note, we recently congratulated Martin Hohmann-Marriott on getting his Marsden Grant, a fantastic achievement!



Ryan with deep fried snake



Rob with deep fried scorpion

Jackie.



Simon and Ryan enjoying a Chinese beverage



Peter enjoying a chicken head a tad too much

Spring in the Merriman Lab:

September has been a busy month for us all and brought us lots of good Spring news

We have celebrated Sara's Engagement to Zeeshan this week (Zeeshan is currently doing a PhD at the University of Adelaide) and had Marilyn's birthday. Sara also spent a week in Australia visiting Melbourne, Adelaide and Sydney recently. She found that Australia was not too bad and the people are fairly 'normal'. Ruth and her husband have purchased a new home and are beginning the grand move this weekend. The Merrimans are having the quietest school holiday for a while as their two eldest are away with their Grandma. Mandy and Jade have been busy with their boys and Jade has been assaying the samples she got last month from a Collaborator. Like everyone else we are enjoying the (mostly) warmer weather and evening daylight.

Murray, Ruth and I have been busy with incoming samples, and we now have a much larger number of samples to genotype. We are in the initial stages of reorganizing our sample storage, which is a rather large task. We have also been getting SCL to do a number of clinical tests done for us which has meant a lot of aliquoting. Mohan and Morgan have been beaver away with writing their theses. Angela has been working out the complexities of fresh versus frozen on Lp(a) assays. Just like with fruit and vegetables it seems fresh is best!!

Tony has been successful in setting up recruitment of people from a small Pacific coral atoll housing about 300 people, called Pukapuka (~1 sq Km, 6 Km X 3.3 Km) [Not quite sure how this math works out - Ed]. Pukapuka is part of the Cook Islands, but is 1150 KM northwest. And no, we haven't ventured there (yet) however the other 90% of the Island population now mostly resides in the Auckland region. This collaboration will be an important as we look at the pathways leading to gout and its associated comorbidities.

We wish the students who have exams and are writing up their fourth year projects all the best. That's it for this month from us.

Marilyn

On TV

Kurt was on TV a while ago being interviewed about "Medical Tourism". Check it out on <http://www.3news.co.nz/Medical-tourism-blamed-for-spread-of-drug-resistant-bug/tabid/372/articleID/170184/Default.aspx>

Many happy returns to the Wilbanks Lab

Peter is back from Beijing, with pictures of himself on a Great Wall and tales of scorpion-on-a-stick and other delicacies. Among other news at the triennial photosynthesis congress, the first crystal structure of Psb27 proved that Peter's prior NMR structure of the same protein was as good as it gets; not only was his structure sufficient to phase their data, their final structure showed nothing that Peter had not already described.

As in many labs, our fourth year denizen, Samuel, is back with the living after the total immersion experience which is the undergraduate thesis. A couple of nights sleep and infusions of beer and pizza at Filadelfio's with his compatriots and members of the faculty have put the rose back in his cheeks.

Jess is back from visiting family in Nelson and has tamed her bête noire, the limited proteolysis assay. She also ensured that the pig whose ultimate sacrifice was mentioned in our last newsletter did not die in vain – the first known purification of porcine Hsc70 was a success, and the product awaits further analysis.

Malcolm is back in the lab following his post-cysteine dioxygenase break. Now on the Hsc70 side of the fence, he has started DnaK production and will shortly try his hand at the tau protein, which is substrate-designate for his first Hsc70 studies.

Labouring on without Malcolm's assistance, Egor and Richard have been cranking out a heap of cysteine dioxygenase and now have enough to return to the Mössbauer spectrometer in pursuit of the elusive, blue tryptophan radical.

Eleni has returned from her capoeira performance at Te Papa and is trying to make sense of data from her HPLC assay. What do you do with an enzyme which *accelerates* as substrate is depleted? [Assay it again? - Ed]

Lamont lab News.

The month of September has been a very busy one for most of people in the Lab. Iain was away earlier in the month giving an oral presentation at the Queenstown Molecular Biology conference, Andrea was in Sydney giving a poster presentation at the Australian New Zealand Forensic Science Society Conference. Anna completed her oral exam for her PhD, which she passed and she is now writing papers. Howard and Emma are writing up their dissertations for Honours and DipSci degrees. Becky is finishing off the last of her experiments with us before going back home to Wellington and her other lab. Additionally, as I am writing this Richard is about to leave to go to COMBIO in Melbourne and Xin is currently on holiday in Christchurch, while everyone else in the lab is working hard.

Tate Lab Update

As always a number of personnel changes have taken place in the lab this year. The downside of this is that we say goodbye to people who have given a lot to the Lab and who will be missed. The upside is the new energy that is brought to the lab by budding young scientists eager to learn.

So far this year we have said goodbye to three very successful lab members-our Cambridge brigade. Firstly, Nathalie Saurat left us part way through the year. She has been spending time traveling in South America and Europe. Nathalie had an unfortunate accident while on holiday in Italy and is now sporting a brand new titanium vertebra. Fortunately we have heard she is going to make a full recovery, although she acknowledges that she may lose a few social points upon arrival at Cambridge (her neck brace is not allowed to be removed for at least 3 months). Nathalie plans to work on RNA and neural development during her PhD project on a Woolf Fisher Scholarship. Julian Peat also left us more recently to take up his Rutherford PhD scholarship at Cambridge. Julian is to be studying stem cells. He too has spent a brief period prior to starting his project traveling the world. It has been reported that Julian was last spotted somewhere around Montenegro. Some well earned rewards for both Nat and Julian and we wish them the best of luck.

We also said goodbye to our third departee Aamir Mukadam. Where is he off to? You guessed it....

Cambridge! Upon hearing of Aamir's success in gaining a Nehru scholarship for PhD study at Cambridge, the Tate lab put in a multi million dollar application for funding as a personal training and development "satellite lab" for Cambridge if you will. Ok – only joking, if anything we are being scalped for our high achievements!

This year has not all been about departures of course! Those of us still here we have been busy beavering away in the lab, and there have been many successes to report. Harold Bernhardt has completed his PhD and will return to us as a Postdoctoral fellow in the coming weeks to test experimentally his new theoretical concepts for the origin of life –he has graduated to a bench with a view? Congratulations are also in order also for David Young who saw off some considerable opposition to gain a prestigious Post-Doctoral position working with Alan Hinnebusch at NIH- he will take this up early next year. David has been somewhat of a Tate Lab Titan, having been with the group now for over half of this millennium - he will now become an American Gladiator.

Those of us busy away elsewhere have not been forgotten! Earlier this year we welcomed the arrival of Emily (see picture) to proud mother Katie Bourne. Warren has offered to have a crèche in his office (see picture again!). Finally, to our fourth year students Caillin Crowe-McAuliffe (Biochem), Georgie Hampton (Genetics), and Manu Singh (BBMed Sci), congratulations on a fantastic year and all the best for the coming examinations!



The Tate Lab



P.s. A little bird also wished to pass on a Happy 21st birthday to Warren on the 30th of October...

Marshall Lab

A lot of work has gone down since the last newsletter. And we are all glad for the extended hours of sun which is starting to beam through our windows once more. Though I think the light sensitive buffers would have to disagree.

James has successfully created an expression plasmid and looks forward to producing some good quality antifreeze. Just as soon as exams have finished, both for him and the many undergrads who have decided to undertake his assistance in exchange for funds.

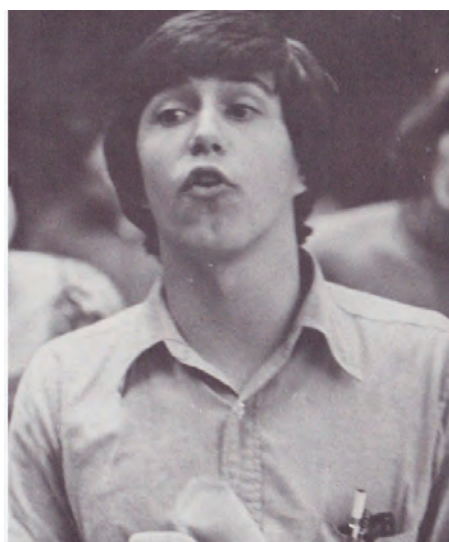
Abhishek has subsided his use of the raw fish which takes over the lab with its unique odor and has reduced his protein to almost perfect purity. Just a few isoform issues which I suspect he will clear up with exceptional perfection in the near future.

Steven is continuing with his work well and, after many attempts of varying success, has managed to produce some publication worthy gels. Melanie has been in and out with a combination of illness and excess assignments etc and looks forward to putting exams behind her so she can proceed with her oysters. Craig and Lincoln enjoyed a few of the remnants of her research.

As for Lincoln he has graced us with his presence for the last few weeks and has just today packed up his things to head back to the lovely sunny Nelson. We wish him well with writing up his thesis and all the best.

Michelle has poked her head in during the last week and my assumption is we shall see a bit more of her in the next coming months. Last but not least Craig has finished 192 lecturing (with relief) will now be ruing the thought of exam marking. As, I'm guessing, will be most of the department.

But bye for now and we all wish everyone a wonderful Spring and Summer to come and fingers crossed we will have little need to adapt any freezing temperatures in the coming months.



Guess
who.

News from Frances

It has taken me a while to recover from my overseas holiday, back into the hectic life of managing our budget, children and country life. Lambs seem to be ok in South Otago although we did get quite a bit of snow and bad weather, but not as bad as Southland. It has been a terrible year for potatoes, and Russell is looking forward to next year being better but this all depends on the weather cooperating and it hasn't done too much of that. Luckily dairy has fared better. Our sharemilker has moved into the house down the road (the one we had moved down from Christchurch) and it appears to be working out. We also have two other cottages being built for farm workers so everyone should be happy with their accommodation for a while.

My step daughter, Sarah, is in the States for 6 months to experience life as an American teenager and loving it. Hamish is still busy flying about the South Island. Natalie is working really hard at Columba and Becca is finishing off her second year here at Otago, scary how fast they are all growing up.

Dearden lab news.

The Dearden lab has had a reasonably quiet month (after the last few months of conferences and trips around the world), with a couple of notable exceptions!

Peter and Megan Wilson have been awarded a Marsden grant, which is pretty freaking awesome – the grant is entitled *Constraining and buffering evolution: How do complex gene networks evolve?* Watch this space.

Also, Liz Duncan was awarded the Illumina Emerging Scientist award at QMB earlier in the month, this award recognises early career researchers who have demonstrated research excellence in any research area using molecular biology – well done Liz!

Nathan Kenny has left us to take up his PhD position at Oxford University. He is to be working with Dr Sebastian Shimeld and looking at the establishment and maintenance of internal asymmetry during development, primarily in Lophotrochozoans (animals like molluscs and annelids), but occasionally in other models. He'll be looking at the cell signalling pathways and other mechanisms that allow 'left' and 'right' sides of the body to be established and then maintained through development and growth. He'll also investigate how these have diverged over evolutionary time, follow any interesting leads that come up through that research, and no doubt drink a lot of Pimms as well.

The bee season is starting to show signs of ramping up [yes I'd noticed the bee crap on my car again - Ed.], which will make everyone (*everyone*) very happy (and not-coincidentally swearing in the lab is also ramping up), and the rest of the group are plugging along like normal. Nothing too exciting going on.

Macknight Laboratory

The big news is that Becky Laurie is leaving the lab – but luckily not leaving the department. Becky has been in the lab for over seven years – so I am not really sure how we are going to cope without her. I expect we will have to just keep pestering her. As well as doing her own research, she has been always been available to help and encourage others in the lab – particularly the students. Sometimes this has got out of hand with one PhD student even happy to call her at home late at night to ask important questions – like ‘so how do you do a ligation? Becky has two new jobs – working in Kurt’s lab and helping make the Biochemistry department an even more attractive place for students.

Most of the lab went to the Queenstown Plant Satellite meeting at the end of August – almost everyone from Julian’s end of the lab were also away, so poor Rachel Herron and Jane Campbell were left in an empty lab to chat to the plants and keep them watered. Rob Day was asked to speak at the meeting and did an excellent job and it was Rowan’s turn to win all the prizes. Last year we let Mau Jaudal win an iPhone and a Poster Prize. This year Rowan won a camera from the trade display competition and received a large cheque for the best student poster.

The exciting news from Mau is that she is expecting her first baby in January! So she is busy finishing her thesis and finishing off some microarray experiments. Chris Farr is also writing his thesis and is getting on well.

Rachel Herron, our Genetics Honours student, has had a good year studying why some plant genes initiate translation at a CUG rather than an AUG. and is also busy writing up her thesis.

Robyn Lough has been in the lab since Jan – coming down from Auckland where she was working at Plant and Food Research on Kiwi Fruit flowering. So in a complete change in research direction she is now working on flowering in onions, as part of a collaborative project with Plant and Food, in Lincoln this time.

Richard

News from the IT office.

Peter has been away in Australia to attend an Apple Developers’ conference organised by the Apple University Consortium. Otago University has recently joined this consortium (AUC) which is funded from a percentage of the purchases made by member institutions, which currently number some 30 in Australasia. Four delegates were selected for each member and the accommodation and travel costs are extensively subsidized.

The conference was directed towards the development of applications for MacOS and iPhone/iPad environments using the latest generation of development tools. The conference proper was preceded by a workshop on the use of the development environment, though this was a bit challenging, since a 3 day course was delivered in one.

Peter’s hope is that the skills acquired will be useful for converting some less friendly command line programs into more approachable applications, especially for some of the X-ray crystallography tools.

Neurosurgery protest



Journal Club on the 6th August was postponed to allow staff to attend the protest rally opposing the proposed shifting of neurosurgery services to Christchurch.



What is the significance of this?

These photographs were taken in the Department. A lollipop (or something) to the first person who can tell us the history behind the “graffiti”, and another for the person who comes up with the most interesting wrong answer.

Entries by email to bronwyn.carlisle@otago.ac.nz



Science horoscopes

contributed by Sarah Morgan



VIRGO

I'm sorry. I'm so sorry. None of your cloning will work this month. (next month you will randomly check your stocks and find them contaminated – problem solved!)



AQUARIUS

You will discover a new type of fungus growing in your cultures. No Nobel prize for you – but your glassware will be the prettiest colour for 3 washes. (Your tubes were the blue labelled ones right?)



TAURUS

Your relationships will get better. The ones in your lab, I mean. Your love life is probably screwed.



ARIES

You will die in a fire. Or set something on fire. Or blow something up. My vision is obscured – by smoke.



CANCER

Exams. Exams are in your future – either through sitting them, writing them or marking them. Maybe you see someone else sitting/writing/marking exams. It's going to happen – trust me.



LEO

There will be no milo for you this month. The tea room will always be out when you turn up for a cuppa. You'll think it a conspiracy, but it's just fate. You should just go buy chocolate now.



SAGITTARIUS

That secret diary you keep on your shelf between the blue textbook and the white conference proceedings will be found. And read. And everyone will know you fancy the HOD. How embarrassing!



LIBRA

This month you will put your iPod on to play in the lab – only you'll leave it on shuffle – whole library shuffle. Everyone will know you still like Britney. She was sooo last year. Honestly.



PISCES

You might get lucky this month. You keep your fingers crossed yeah? That always works.



CAPRICORN

The hair cut you get this month will be horrible. It'll be that in-between length, too short to tie up, too long to stay out of your face and your eppendorfs. (has anyone else told you that you pipette too close to your face?!).



GEMINI

You will inexplicitly fall off the step ladder and have to fill in an incident report. Oh no – an incident report! (Alternately, you look over your shoulder at the last minute and see me coming – no report to fill in!)



SCORPIO

A secret will come out this month. That secret you were talking about with your friend in the tea room when you thought no one was in the seminar room quietly listening. Yeah, that one.