

# CoRE of The Matter



NATIONAL RESEARCH CENTRE FOR  
GROWTH AND DEVELOPMENT

7 JULY 2004  
EDITION NO. 3

## Contents

| FROM THE DIRECTORATE                            |  | POST STUDENT MEETING       | GRADUATE MEETING |
|---|--|----------------------------|------------------|
| GENOMICS SCIENCE PLANNING DAY AT THE UNIVERSITY | JOINT NRCGD / NEW ZEALAND SOCIETY OF ANIMAL PRODUCTION MEETING | NGAPOURI RESEARCH FACILITY | ANIMAL           |

### From the Directorate

Another busy month with several initiatives coming to fruition and others just beginning. Please read on for further information on some of the month's highlights.

In addition, we are pleased to announce that our website is up and running! You are welcome to check out the site at: <http://www.growthcentre.ac.nz/>

With best regards, Steve Hodgkinson

### Post Graduate Student Meeting.

On Monday the 28<sup>th</sup> of June the first meeting of NRCGD PhD students was held at the Liggins Institute. This was the first of what we anticipate to be many meetings in which we can share our ideas, results and knowledge in order to advance our studies into growth and development. Present at the meeting were Rene Corner (Massey University, Palmerston North), James Elwothy (Otago University, Dunedin), Joanne Lim (Pharmacology department, University of Auckland) and Ayla Graf, Jennifer Miles, Sarah Hopkins, Himani Ranasinghe and I (Liggins Institute). Unfortunately Shawn Harrison and Chris Rumble were unable to attend.



The picture shows (left to right) post graduate students Larissa Christophidis, Sarah Hopkins, Jennifer Miles, Himani Ranasinghe, Rene Corner, Jo Lim, Ayla Graf and James Elwothy.

The meeting was kicked off with an introductory address about the CoRE from Murray Mitchell. We then discussed our aims by devising a mission statement (yet to be finalised) and nominated Ayla Graf to be our student representative and Rene Corner to be her

deputy. Throughout the day each student gave a 10 minute presentation which introduced the background and aims of their project as well as the techniques that they will be using.

Overall the meeting was an interesting montage of diverse presentations all related to various aspects of growth and development. During the day we also had the opportunity to be familiarised with the CoRE equipment including the Clinical Chemistry Automatic Analyzer, Mass Spectrometer and Discovery 1.

On behalf of all the students in attendance I'd like to thank Pierre and Pritika for showing us the equipment and Ayla for organising such a great day. The next meeting is planned to be held in the Rotorua area at the end of September, as Rene has kindly offered to host a NRCGD PhD student/Post Doc meeting.

Larissa Christophidis

### Genomics Science Planning Day at the University of Otago

A successful meeting involving 18 CoREers was held in Dunedin on 8 June to discuss the epigenetic and genomic aspects of the NRCGD objectives.

The morning session began with Tony Reeve giving an overview of epigenetics and the Otago Genomics Facility (OGF) followed by Ian Morison who gave a more detailed discussion of epigenetics, transgenerational effects, and possible research opportunities. James Elwothy outlined progress on his PhD project of six months gestation which will examine the relationship between genetic polymorphisms in the folate pathway and DNA methylation.

Peter Lobie posed the question as to whether growth hormone can stimulate epigenetic events and described interesting experiments using an immortalised mammary epithelial cell line model. Farhad Shafei who had only been in his new Post Doc position for a few weeks outlined progress in measuring DNA methyltransferase gene expression in MCF-7 cells overexpressing human growth hormone. Before retreating to the University staff club for a mid-day feast, Les McNoe briefly described facilities in the OGF and then highlighted some of the tools for mining gene expression microarray data.

The afternoon session divided into two camps - the arrayers and the epigeneticists. Les McNoe led the arrayers and explained the role of the OGF and help that it could provide. A lot of technical information was discussed, e.g. the printing process, experimental

design, replication issues, hybridisation and analysis protocols, as well as discussing ongoing support. Ian

Morison co-ordinated discussion within the other camp to explore opportunities for collaborative epigenetic research within the CoRE. There were two main sections to the discussion.

First, Hugh Blair outlined projects on periconception diet, gestational stresses and maternal constraint models on lamb weights. Although there was a general desire to “futureproof” these studies for possible epigenetic research in the future, the consensus was that the nature of the underlying biology is not yet sufficiently well understood to allow the formulation of meaningful experiments for testing of epigenetic hypotheses. Clarification of candidates should be an outcome of the first year of trialing.

Second, Wayne Cutfield discussed the possibility of epigenetic errors in children after IVF. Given the significant body of existing evidence together with his excellent clinical material, a strong desire was expressed by him and Ian Morison to collaborate to find epigenetic abnormalities in this group.

The meeting was useful in that some real projects started to crystallise. Now it will be important to meet in smaller groups and on an individual basis to focus on the details. It is proposed that the Ian Morison shortly visit Auckland to agree sample extraction and storage protocols for methylation analysis.

Contributed by Tony Reeve, Ian Morison and Les McNoe

### NRCGD Contract Session at the recent New Zealand Society of Animal Production Conference at Newstead, Hamilton

On the afternoon of Monday 28 June the New Zealand Society of Animal Production held a successful session to explore linkages between medical science and animal production. The focus was on those fields central to the effort of the CoRE. The goal was to inform attending science groups of the resources and interests of the other and to encourage networking and the development of joint research proposals.

Medical speakers from the Centre (Jane Harding, Stefan Krechowec and Harriet Miles) outlined the issues behind pre – partum and immediate post – partum growth and reviewed the relevant evidence of effects in later life.

Many of these issues were not known to animal scientists and generated great interest among the conference participants. Animal science speakers including Matt Lucy, Tom Barry, Chris Morris, Geoff Asher and Tony Pleasants reviewed these issues from their perspective and noted the huge databases available that have recorded nutritional effects for sheep, cattle and deer. These databases can be interrogated with the medical issues in mind.

Clearly there are many opportunities for joint work between medical scientists and animal production specialists. It is to be hoped that this contract session stimulated people to explore these opportunities.

Contributed by Tony Pleasants

### Appointments

- Alex Buckley (Major Project 1)

Alexandra has recently joined the CoRE at the Liggins Institute from Sydney. She completed both her BSc (Hons1) and her PhD in the School of Molecular and Microbial Biosciences at the University of Sydney. During her PhD, Alexandra was awarded a fellowship for young scientists from the European Association for the Study of Diabetes, enabling her to conduct 7 months of her PhD research under the supervision of Dr Susan Ozanne and Professor Nick Hales in the Department of Clinical Biochemistry at the University of Cambridge, UK.

The main project of Alexandra's PhD investigated the negative impact that maternal consumption of a diet high in  $\omega$ -6 polyunsaturated fat, prior to and throughout gestation, had on the metabolic programming of the offspring. Significant risk factors for the development of metabolic diseases were evident in rodent offspring exposed to a maternal high fat diet whilst *in utero*. These risk factors included elevated proportions of total and abdominal body fat, elevated plasma insulin levels in response to an oral glucose challenge, increased accumulation of hepatic triglyceride and compromised expression of key insulin signalling proteins. Alexandra observed similar phenotypic and metabolic disturbances in age-matched rats that had not been exposed to the high fat diet whilst *in utero* but had actually consumed the adverse diet from weaning age.

Alexandra has joined the Liggins Institute as a Postdoctoral Research Fellow. Together with Jane Harding and Mark Oliver, she is interested in investigating the timing of undernutrition during the periconceptual period and its effect on postnatal survival, growth, endocrinology, metabolism, immunology and behaviour.

- Shawn Harrison (Major Project 5)

Shawn recently arrived from the United States where he was studying Mathematical Biology at the University of Utah. Mathematically, Shawn's interests were in nonlinear dynamics and bifurcation theory, while biologically he worked on modelling neural networks.

Shawn completed his MS in Applied Mathematics at the University of Utah in 2003 where he focused on using mathematics as a tool to explore and understand biology. Shawn completed a summer research project working with Professor Gary Rose in his neurobiology lab on modelling temporal selectivity of certain midbrain neurons in Anurans and also on memory template representation in Songbirds.

Shawn recently joined the National Research Centre for Growth and Development as a PhD student working in conjunction with Professor Peter Lobie (Liggins Institute) and Dr Tanya Soboleva at AgResearch Ltd based at Ruakura, Hamilton. He is interested in cell signalling dynamics; particular those of the JAK/STAT pathway and factors impinging on STAT5 mediated growth.

### Start of operations at the Ngapouri Animal Research Facility

The purpose-built sheep research station at Ngapouri is finally nearing completion, and the first sheep have already taken up residence. This world-class facility has been constructed by Landcorp on one of their sites south of Rotorua and boasts the capability to individually pen 120 ewes, plus group-pen another 150. In addition, there is a surgical theatre and an area suitable for studies in individual metabolic cages. A huge amount of thought and effort has gone into designing this facility,

particularly by Dr Mark Oliver and Geoff Hobson of the Liggins Institute and the result does credit to all involved.



*The indoor animal housing facilities at Ngapouri.*

In late May the first sheep study, a CoRE-funded pilot project designed to investigate the glucose/insulin and hypothalamic-pituitary-adrenal (HPA) axes in twin versus singleton offspring of well-fed ewes and named TwinZ '04, was carried out at Ngapouri. This involved conducting a glucose tolerance test on one day and a

CRH/AVP challenge of the HPA axis on the following day on 27 sheep simultaneously. A large contingent of people went down to Ngapouri for 3 days, although whether that was out of a desire to contribute to the study or to take part in an impromptu inaugural party and then to recover from that is debatable. However, both the party and the study went extremely well, and the fact that the glucose curves from both singletons and twins were so tight that the error bars are barely visible, although not the result we hoped for, demonstrates the feasibility of performing these sorts of studies on large numbers of animals in a short space of time.

Contributed by Frank Bloomfield

#### Upcoming Dates

- 14/7/04. Executive Committee and Board of Governance Meeting at the University of Otago
- 30/7/04. Official opening of the Centre by the PM at the Liggins Institute.

#### Contact

Contributions to the next Newsletter are most welcome and should be sent to Tracey Tarr (t.tarr@auckland.ac.nz) by the second Friday of each month. If you would like to subscribe or unsubscribe to this newsletter or know of someone else who may want to receive a copy please contact t.tarr@auckland.ac.nz