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ANZBMS 2010, Adelaide. Christine and T J Martin Research Travel Award.

I am very grateful to the ANZBMS, Professor Jack Martin and Amgen for this very generous grant and the wonderful opportunities that it gave to me. The ANZBMS Christine and T J Martin Research Travel Award provided me the opportunity to attend the 2010 ASBMR conference in Toronto, the Jackson Labs Workshop on Surgical Techniques in the Laboratory Mouse in Bar Harbor ME, USA, and to visit a several prestigious international bone research groups. The experience gained on this trip, the insights into the working of different labs, the brilliant people I met and the stunning locations were all invaluable.

ASBMR, Toronto:

First I attended the American Society for Bone and Mineral Research 32nd Annual Meeting in Toronto, Ontario, Canada. This immense international gathering of researchers, clinicians and industry was fascinating and at times overwhelming, often with concurrent sessions which all had something I wanted to hear. The conference also brought together many groups from around the world who work on similar topics to my PhD project, links between fat and bone. In the poster sessions where I had the opportunity to present my work and to look at related work by others, it was brilliant to speak to the authors of seminal papers in the field, especially those whose data was contrary to our own. Firstly it was great to talk with people who share the passion as the same area of research. Discussions were filled with casual observations, phenomena and tips that don't make it into papers. Equally important were the insights from those in very different fields, with news angles and approaches to broaden to my focussed perspective. Furthermore, the occasional competitive or negative comments were very constructive and helpful whilst preparing the work for publication.

Furthermore, the organized poster tours were excellent; a senior scientist would take a group through the posters which they identified as particularly interesting, or related to a theme. The conference also provided several highly valuable social events such as the networking breakfast and the 'speed networking' event, where upon meeting Professor Raj Thakker he was kind enough to organize a visit to his lab in Oxford when I would be in the UK, on the spot.

Finally, I attended the International Society of Bone Morphometry Histomorphometry Workshop. This is a technique that I wish to pursue in the future and I found that a huge amount of information was shared and very well communicated. The collective depth of knowledge allowed for elucidation of many subtle nuances of these techniques and effective troubleshooting for the group.

Prof Cliff Rosen lab

Following the ASBMR I visited Professor Cliff Rosen and his team at the Maine Medical Center Research Institute, Maine, USA. Professor Rosen is a Senior Scientist at the Maine Medical Center Research Institute, leading both clinical and basic bone research. He is a world expert in research

based on genetic mouse models and is an internationally recognised leader in the investigation of interactions between fat and bone.

I shadowed his team to learn about as many techniques happening in the lab as possible, seeing some different approaches to methods I was experienced with, including osteoblastogenesis, osteoclastogenesis and micro-CT; as well as witnessing experiments new to me, such as a fat tissue culture and co-culture with bone marrow and a bone marrow ablation and cell transplantation model. I am very appreciative for the chance to sit in on the groups lab meetings and to talk with Cliff himself and get a snapshot of all the projects in play and to discuss the role of fat, particularly marrow fat, on bone physiology.

Coincidentally one of Cliff's lab staff and I were both enrolled to participate in a workshop on Surgical Techniques in the Laboratory Mouse at the Jackson Laboratory in Bar Harbor, Maine. This worked out fortuitously as I was generously offered a lift and had someone to talk to over the 4 hour trip and knew someone during the course.

Jackson Labs surgery course:

Jackson Labs is a world leader in generating, breeding and managing large colonies of mice to supply other research institutions and laboratories. They also carry out research and teach courses and seminars on a plethora of topics related to genetics and mouse models of disease. I attended a five-day intensive hands-on workshop on Surgical Techniques in the Laboratory Mouse. This surgical techniques course was fantastic; highly professional whilst maintaining a friendly, relaxed atmosphere. There was a 1:4 teacher-student ratio and the depth experience of the tutors was evident in the clear explanation and teaching style as well as the expertise shown when demonstrating surgeries to the class, projected onto a big screen for all to see in detail. We were walked through the techniques and given anecdotes explaining pros, cons and tricks for each approach. In addition to learning sterile surgical technique and animal anaesthesia, we performed techniques such as: ovariectomy, splenectomy and thyroidectomy; the most challenging and rewarding experiences were delicate procedures such as jugular vein catheterization and ovary transplant. The location of the lab, Bar Harbor, Maine, is within Acadia National Park, with phenomenal of the sea, mountains and woods; such that the accommodation for the workshop was an old mansion perched on a cliff overlooking the sea.

Professor Rosen also works as a Senior Staff Scientist at the Jackson Laboratory in Bar Harbor, Maine, studying growth hormones in inbred strains of mice. Cliff kindly organised for me to meet with a senior bone researcher at Jackson Labs, Dr Wesley Beamer. He is remarkably experienced in the study of mouse bone and genetics and walked me through his current project: a huge mouse study, crossbreeding inbred strains of mice with high and low bone mass in order to identify the genes responsible for these traits. The thought of interpreting the complexity of the output was daunting but Wes, who is actually retired, said that it's the challenge and excitement of the work that keeps him coming back. This was a great example for me to emulate in my motivation to do research.

Lab visits:

I had the privilege of joining six more lab groups over 4 weeks to increase my understanding of how different groups carry out both their specialised techniques and the common place challenges and tasks faced by every lab.

Carrying on from Maine, I travelled to New York to meet Professor Nicola Partridge, the chairperson of the faculty of Basic Science and Craniofacial Biology at New York University Dental School. Here I presented the work from my PhD to a diverse audience of experts in biomaterials, dentistry, and developmental, genetic and signalling in bone. I was then privileged to have a full day of casual discussions and interviews with principal investigators within the faculty. It was fascinating to learn about what work was going on in departments not directly related to my work, such as regenerative medicine and biomaterials. It was a great learning experience to talk to the basic bone biologists and see the cutting edge approaches they are using. Furthermore I interviewed for several post-doctoral positions and the intensive interview schedule provided valuable experience for me. I also had the chance to attend a bone research seminar series for the New York region with a talk by Dr Christopher Hernandez about 3D dynamic histomorphometry.

I then crossed the Atlantic to Trondheim, Norway. Professor Unni Syversen's laboratory at the Norwegian University of Science and Technology, which is specialised in research for fat, exercise and energy metabolism on bone. Although the autumn days were short and gloomy, my experience walking on ice was limited and temperatures dropped to -17 degrees C, my time here was unforgettably good. Professor Syversen investigates adipocyte related proteins including adiponectin and leptin, my favourites. The facilities in the hospital in which the department is situated are very impressive. The animal unit was particularly notable however the autonomous robots delivering goods around the hospital were a step further. I was able to help troubleshoot some challenges with micro CT analysis and, with the help from notes taken from the Bone Histomorphometry Workshop in Toronto, was able to help as the group established the technique for themselves. I also attempted to cross country ski and did some climbing in sub-zero temperatures.

In England I visited Professor Rajesh Thakker at the Oxford Centre for Diabetes, Endocrinology & Metabolism, coinciding with my supervisor Professor Jill Cornish. Following a group meeting and a seminar by a visiting speaker I met with each of the team members briefly to discuss what they do and how they got there and their thoughts on academia and a career in science. In talking with Professor Thakker about the role of a principal investigator, he enlightened me: you are like an explorer, you can go where you are told, but if you want to go your own way, to steer the ship, you need to finance the voyage. Similarly Sir Edmund Hillary didn't just climb Everest, he had to do a huge amount of work to raise funds to do this. The expedition metaphor has stuck with me.

I then met with Dr Vijay Yadav at the Sanger Institute, Cambridge. He had recently published work on leptin and serotonin that had stirred debate in the field. I presented the work from my PhD and we had a great discussion about our work with leptin, where data from his former lab was contradictory to our own. He had an interesting insight about how when the data is different in two cases, this is the great opportunity to learn how the system is really working, to tease apart the mechanism, through collaboration rather than competition.

In Paris, France, I reconnected with Dr Anne Blais whom I had visited once previously and collaborated with our group studying lactoferrin. I present a seminar of my work with adiponectin to the bone research department at AgroParis Tech and also saw their techniques for quantification of rodent metabolic rates and their animal unit which is nestled into the original brickwork the historical building's basement.

On my final leg of this journey, I was kindly hosted by Professor Annalisa Santucci at the University of Siena, Italy. The beauty of Siena is astounding: narrow streets winding through ancient neighbourhoods, the expansive Piazza del Campo, Tuscan sunsets. Here I learned some signalling techniques and how the department was growing chondrocytes in a 3-dimensional surrounding of cartilage and stimulating them with hydrostatic pressure.

It was an amazing opportunity to be able to take in the range of approaches taken by labs around the globe in such a short space of time. These new perspectives opened my eyes to the different working environments that I may encounter embarking upon a postdoctoral career. This experience better equipped me to make decisions when pursuing lab placements and gave an insight into life in different cities. I was impressed by the research I saw at the ASBMR and through visiting these laboratories but I also gained a new appreciation for the high quality and internationally competitive research that Australasia produces. Furthermore, I realise that the lab organization and depth of and experience in the Auckland Bone Group is not easy to come by and that I was extremely lucky to do my PhD there. I learnt many new laboratory and surgery techniques, made many new professional and personal connections and learned a great deal about both scientific thinking and careers. I am especially thankful to all those who welcomed me into their labs and for the opportunities to present my work to the department and to discuss possible post-doctoral opportunities for the future.