Professor Winston’s Kiwi connection

New roles for Liggins leaders

Explaining epigenetics

Lasting effects of early life
On our cover: Professor Winston’s Kiwi connection

On his visit to New Zealand last August, Professor Lord Robert Winston took time out to learn about the kiwi breeding programme at the Maungatautari Ecological Island near Cambridge.

The well recognised British scientist is a scientific patron of the Liggins Institute and a member of the scientific advisory panel for the National Research Centre for Growth and Development (NRCGD) headquartered at the Institute. His visit was made possible through the award of a 2007 Hood Fellowship by The University of Auckland and supported by The Lion Foundation.

During his Fellowship he began a research collaboration with members of the Institute and NRCGD partners at AgResearch, Ruakura. Professor Winston has an international reputation as a pioneer in the field of fertility research and the development of assisted reproductive technologies. He shares with Liggins and NRCGD scientists an interest in how the development of the human embryo is affected by factors within its environment.

Scientists at AgResearch have developed a unique array of reproductive technologies that they are applying to the livestock industry. Professor Winston is utilising some of these techniques to investigate how the ‘test tube’ environment of the developing embryo affects its long term development and health.

The use and misuse of reproductive technologies came under the spotlight in a public lecture that Professor Winston gave at Auckland Museum. Earlier that day in his lecture Meddling with Reproduction, he had challenged 900 senior science students from 40 Auckland schools to think about science in the context of society and the ethical issues that it raises.

Lord Winston also launched the Liggins’ Seasons of Life 2007 series with his popular lecture on the theme of ‘happiness’ (see page 11).
Focus on LENS

High-school programme challenges young minds

The Institute’s Sir John Logan Campbell Classroom has become home base for an ambitious programme for high-school students - the Liggins Education Network for Science (LENS).

The Institute does not charge schools for the LENS programmes believing that access should not be limited by schools’ individual resources. The merit of this philosophy was demonstrated last year by an innovative pairing of 15 talented students with scientist mentors.

“The Student-Scientist Mentor Programme is designed both to extend high-achieving students and to encourage those in this category who have limited access to support,” says LENS Director Jacquie Bay.

Six students were selected as a result of their outstanding achievements at the 2006 NIWA Auckland Science and Technology Fair and nine were Year 10 students from the Tamaki College enrichment programme. They spent the year developing and carrying out individual research projects to meet the standards of the Royal Society of New Zealand CREST (Creativity in Science and Technology) awards scheme. Throughout the year they were supported by workshops at the Liggins Institute and a mentor from within the University of Auckland.

Many students chose to research topics that had a particular interest or significance for them. Karlene Vakaheketaha from Tamaki College wanted to know how a sudden change in diet would affect body composition. Sudden changes to the fat rich diets of countries like New Zealand have been linked with obesity in Pacific migrants. Her mentor, Liggins PhD student Bettina Ikenasio, shared Karlene’s concern and her Pasifika background. Bettina’s own research is on the early life origins of obesity, diabetes and hypertension, so she was able to guide Karlene in designing a plan for her investigation.

Motivated by the commonly held view that a good breakfast improves learning, Charlotte Stephens of Diocesan School for Girls, used her mentoring relationship to learn about research models. She then developed her own experiment using mice to test her hypothesis – and scooped the top award at the regional science fair.

Jacquie is delighted by the students’ success.

“They all achieved CREST awards – most of them at a level beyond their school year level,” she says. “Eleven gained major awards at the science fair with three going on to further success at the national event, Realise the Dream. It clearly shows what is possible when students at all levels are challenged and supported.”

Charlotte and Josephine Mak from King’s College have been chosen as New Zealand representatives at the Beijing Youth Science Creation competition in March.

The scheme is set for exponential growth. The students can remain in the programme throughout their school years while a further 15, selected on a similar basis, will enter the programme each year.
Changing roles for Liggins Profs

Promotions and awards highlight achievements of the Institute’s academic leaders

The Liggins Institute’s international standing is in large part due to the reputations of its senior staff. In 2007 every one of its five professors achieved a personal career milestone.

**Professor Jane Harding – managing the University’s research**

While nights on call tending critically sick babies may now be only a memory, the pressures are no less intense for Professor of Neonatology Jane Harding who began 2007 as the University of Auckland’s new Associate Deputy Vice Chancellor (Research).

The role saw her move away from clinical medicine and coming to terms with helping manage the University’s diverse research portfolio. What she did not expect was that by year-end she would be Acting Deputy Vice Chancellor (Research) after the departure of the previous DVC (Research), Professor Tom Barnes. The office of the DVC (Research) is responsible for managing all of the University’s non commercial research and setting, managing and advising on all research related policies, funding and administration.

Professor Harding has a wealth of knowledge about these matters gained from leading clinical and biomedical research programmes and serving on councils and committees of professional and funding bodies such as the Health Research Council of New Zealand, the Royal Australasian College of Physicians and the National Children’s Health Research Foundation.

For nearly 20 years Professor Harding was a clinical specialist in the neonatal intensive care unit at Auckland’s National Women’s Hospital.

“Despite the unsociable hours - the smallest and sickest babies invariably arrive in the middle of the night - the work has been tremendously rewarding,” she smiles.

“There have been huge advances in both knowledge and technology, meaning that now babies as young as 23 weeks gestation and weighing as little as 500 grams have a chance of survival. However they still face considerable risks of ill health in childhood and as adults.

“That is why the Liggins research is so important,” she adds, “and why my own research is focused on finding what drives fetal growth – and what we can do to improve a mother’s capacity to maintain a healthy pregnancy.”

Professor Harding continues her work as part of the Institute’s Fetal and Neonatal Physiology research group, which includes clinical, biomedical and agricultural scientists (see page 8).

**Professor Wayne Cutfield – Deputy Director**

The University of Auckland’s annual promotions round brought the award of a Personal Chair to paediatric endocrinologist Wayne Cutfield.

“This is a well deserved and distinct honour,” said Liggins Director Peter Gluckman congratulating the new professor. “It is recognition of Wayne’s immense contributions to research, the University, medical teaching and the academic and clinical fields of paediatric endocrinology.”

A graduate of The University of Auckland School of Medicine, Professor Cutfield was for many years Director of Endocrinology at Auckland’s Starship Children’s Hospital, caring for children with hormone based conditions such as diabetes and growth disorders. He has an international reputation for his research assessing how the hormone insulin is secreted and acts in children, and for population based studies of childhood growth and the efficacy of growth hormone therapy.

As Director of the Institute’s Maurice and Nessie Paykel Clinical Research Unit, he leads clinical research showing how environmental influences early in life can affect childhood growth and development in ways that could lead to chronic conditions such as diabetes and obesity. In a landmark study published in the prestigious *New England Journal of Medicine*, his group showed that infants born prematurely were at risk of developing diabetes later in life (see page 9).

However, he rates amongst his greatest challenges his recent appointment as Deputy Director, taking charge of the Institute’s operations.

“We carry a huge responsibility as the University’s first large-scale research institute,” he says. “In our first six years we have established a formidable reputation as research leaders in growth and development. We must now grow in numbers and in strength by training and attracting the best and brightest in the field. This places enormous pressure on our space and financial resources.”
Professor Peter Lobie – leading the campaign against breast cancer

In November, Associate Director Professor Peter Lobie was appointed to New Zealand's first academic Chair in Breast Cancer Research. The appointment is the culmination of five years of fundraising by the Breast Cancer Research Trust.

Alison Taylor, (then) Chair of The Trust, hailed the appointment as a unique development that will enhance the partnership between the Trust and the University of Auckland.

“By creating a centre of excellence of breast cancer research at the University of Auckland, we can hope to generate and attract further breast cancer researchers and projects, taking us closer to our goal of finding a cure for breast cancer in our lifetime.”

Professor Lobie is an international authority on molecular mechanisms of hormone action, in particular the role of growth hormones in cancer. Since joining the Liggins in 2003 he has built a dedicated team of researchers investigating how hormones produced by tumour cells differ from the body's normal hormones and contribute to pathways that lead to cancer.

In his new role he will continue directing his current research programme at the Liggins Institute while building relationships with cancer research groups in the Faculty of Medical and Health Sciences.

“The funding from the Breast Cancer Research Trust will be immensely valuable in expanding the existing research capability to study all aspects of breast cancer,” he says. “I am honoured and excited to be given this opportunity to take both the University and New Zealand research to the next level in this global problem.

“The greatest tragedy of this disease is that it robs young families of mothers and grandmothers, the important women in their lives,” he observes. “It is important to me do be doing research that makes a difference.”

Professor Murray Mitchell – prestigious research fellowship

Also in November the Institute’s Research Director Professor Murray Mitchell became one of four leading New Zealand scientists awarded a 2007 James Cook Fellowship.

The highly competitive, government funded Fellowships allow their recipients to spend two years focusing on research that is expected to make a significant contribution to New Zealand’s knowledge base.

Professor Mitchell is an international expert in the hormonal mechanisms that regulate pregnancy and labour. He will spend his Fellowship investigating how environmental factors can modify the actions of key genes in the fetus and placenta to influence not only the course of a pregnancy but the baby's health as an adult.

“Our long-term goal is to find new ways to prevent and treat the key diseases of pregnancy and reduce the risk factors that lead to adult disease.

“We want to understand how spontaneous and environmentally induced changes affect the pathways that control fetal development, particularly at the critical points of implantation and birth. These developmental changes can be passed on through future generations affecting the cardiovascular, immune and neural systems.”

The science of how inherited genes can be permanently switched on and off as a result of environmental influences is known as epigenetics. It is a field of research where the Liggins Institute and the National Research Centre for Growth and Development, of which Professor Mitchell is the Deputy Director, are acknowledged international leaders. For instance, they have shown that babies that are poorly nourished in the womb may be born prematurely and are at risk of developing conditions such as diabetes, obesity and heart disease in later life.

“This award is richly deserved,” comments Professor Peter Gluckman. “Murray has made a major contribution to our current understanding of the biology of pregnancy and the mechanisms of birth. The Fellowship gives him the opportunity to use the new technologies and multidisciplinary approaches that we have available at the Liggins to move that knowledge to a new level.”

Professor Peter Gluckman – DCNZM

The Institute’s professorial hat-trick was completed on the final day of 2007 when the Director was named in the New Year Honours List. Professor Peter Gluckman received one of the country’s highest honours becoming a Distinguished Companion of the New Zealand Order of Merit (see page 14).
The quality of postgraduate training at the Liggins has been endorsed as its graduates are snapped up by leading international research centres. Last year four students received offers of prestigious postdoctoral positions as they submitted their PhD theses.

Denis Evseenko obtained his medical degree and initial training in developmental pathology in his native Russia. His work on the placenta and associated tissues sparked his interest in research and led him to seek further training in basic science and experimental technologies at the Liggins. His PhD project, completed in just three years, investigated the molecular mechanisms behind the death, regeneration and differentiation of cells in the human placenta. It led to six published papers and nine presentations at international conferences. Denis is now working on a large project developing stem cell therapies at the Children’s Hospital of Los Angeles.

The opportunity to work in stem cell biology has also drawn Mohankumar and Nagarajan (Raj) Kannan to North America. They both came to the Liggins from India to work in Professor Peter Lobie’s newly established breast cancer research group.

Mohan’s research delved into the complex molecular signalling pathways that lead to the growth and spread of breast cancer cells. He also achieved the distinction of being first author of a paper in *Oncogene*, a journal of the prestigious Nature Publishing Group.

Now at St. Jude Children’s Hospital, Memphis working on brain tumour stem cell biology, he says he will miss the camaraderie of his fellow students. “My stay at Liggins not only provided me with a good understanding of breast cancer signalling but also has given me truly international experience,” he says.

Inspired by the widespread incidence of cancer that followed the leak of poisonous gas from the Union Carbide chemical factory at Bhopal, India in 1984, Raj Kannan began his PhD studies determined to acquire the knowledge and skills to make a difference. His work led to the discovery of a promising new strategy for treating breast cancer. Last year he received a prestigious scholar-in-training award at the American Association for Cancer Research’s centennial year celebrations.

He will continue his interest in breast cancer research at the Terry Fox Laboratory of the British Columbia Cancer Agency in Canada.

Meanwhile, Stefan Krechowec, who graduated PhD in September, has begun a postdoctoral fellowship at the University of Liverpool.

The entrepreneurial approach

Two former Liggins students are pursuing their interests in commercial applications of bioscience.

Privahini Bradoo believes she has always been entrepreneurial. “I guess a lot of people see an entrepreneur as someone who sets up a business,” she says. “To me it means taking risks in the constant pursuit of opportunities.”

Priv has always been fascinated by biomedical sciences and biotechnology. Her interest brought her to the Liggins Institute and doctoral research supervised by Professor Peter Gluckman and Dr Frank Sieg, a scientist at biotechnology company Neuren Pharmaceuticals. Her research provided the first confirmation of the existence of a family of genes carrying the information for cells to make Neuronal Regeneration Peptides - a new family of proteins involved in the survival and regeneration of brain cells.

Priv also started two not-for-profit ventures at The University of Auckland: Spark and Chiasma. She received a 2006 Fulbright-Platinum Triangle Scholarship in Entrepreneurship to complete an MBA at Harvard Business School. Now, half way through her course, she bubbles over with enthusiasm for the fast paced life at Harvard and the learning opportunities it has presented. But what does she miss about New Zealand?”

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Research excellence recognised

Renewed funding demonstrates government confidence in the Liggins

Success in two government funding rounds in 2007 has ensured the continuation and growth of two major research programmes based at the Liggins Institute. Both funds were established to stimulate innovative research in areas of strategic and economic importance to New Zealand.

In 2003 the Liggins-led research network, the National Research Centre for Growth and Development (NRCGD) became one of the prestigious Centres of Research Excellence (CoREs).

Building on the Liggins strength in growth and development, it unites many of the Institute's researchers and graduate students with colleagues in the Universities of Auckland, Otago and Canterbury, Massey University, AgResearch and now Landcorp. The research focuses on understanding how biological cues in the earliest stages of life can herald consequences throughout the life course that impact on human health and disease and productivity in agriculture.

In June the government announced that it would continue and increase funding to the NRCGD, contributing 43.3 million dollars over a further six years.

In his announcement, then Minister for Tertiary Education, the Hon Dr Michael Cullen commended the NRCGD's potential for addressing understanding of public health problems like diabetes and obesity. He singled out the achievements of the NRCGD and the MacDiarmid Institute for Advanced Materials and Nanotechnology, saying, "They are showing what can be achieved when researchers from across the sector work together and that, by understanding the body's biological responses to injury and disease, investigators will be able to identify key points where they can target interventions to disrupt these destructive processes.

To date this early stage discovery programme has focused on the natural repair processes that follow brain damage and the role of local growth factors in repairing tissues. Investigators will be able to identify the key points where they can target interventions to disrupt these processes.

I congratulate the directors of those two CoREs.”

The NRCGD's uniquely multidisciplinary approach is seen as one of its major strengths by its Director Professor Peter Gluckman. “Our research draws on medicine, mathematics, agriculture, epidemiology and economics,” he says. “This gives us the capacity to rapidly translate discoveries in basic science into clinical practice, recommendations for public health policy and improvements in agriculture.

“Inclusion of AgResearch and Landcorp in the Centre gives all partners access to a full range of research technologies and opportunities - from animal genomics to large-scale field trials. Our international collaborations with leading groups in the UK and Asia demonstrate that we have met the Crown's expectations for the CoREs as world class centres for building a knowledge-based economy and workforce.

“In a notoriously unstable funding environment, the CoRE renewal provides the stability we need to realise our potential and utilise new technology platforms.”

Two projects that have grown from NRCGD research were chosen for funding by the Foundation for Research Science and Technology (FoRST), allowing scientists to apply their discoveries in the rapidly expanding science of epigenetics.

The projects make up part of an eight million dollar investment in Liggins research which includes renewal of the Institute's innovative drug discovery programme.

The Endogenous Responses and Novel Human Therapies programme led by Professor Gluckman is based on the concept of public health problems like diabetes and obesity. He singled out the achievements of the NRCGD and the MacDiarmid Institute for Advanced Materials and Nanotechnology, saying, "They are showing what can be achieved when researchers from across the sector work together and that, by understanding the body's biological responses to injury and disease, investigators will be able to identify key points where they can target interventions to disrupt these destructive processes.

To date this early stage discovery programme has focused on the natural repair processes that follow brain damage and the role of local growth factors produced by cancer cells. The aim is to identify promising compounds that can be further developed by the emerging New Zealand biopharmaceutical industry.

To date the programme has produced three molecules that have entered clinical trials under licence to commercial partners.

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“Definitely the people! I think the Kiwi optimism, immense ingenuity, and can-do attitude, while being humble and understated, is truly unique and special.”

On the other side of the Atlantic, Dr Chris Rumball is a Gates Scholar at the University of Cambridge's Institute of Biotechnology and the Judge Business School. There he is following his PhD with a Master's degree in Bioscience Enterprise - a one year course on the commercialisation of science and technology.

Chris’ previous medical career had included a stint with Médecins sans Frontières in Afghanistan.

“I was attracted to the Liggins as a place where clinicians could do scientific research,” he says. “I was also intrigued by the commercial aspect of the Liggins and its biotechnology spinout companies.”

His PhD dealt with two situations where the pre-birth environment might affect the growth and health of the fetus. He showed that poor maternal nutrition around the time of conception slows fetal growth in late pregnancy and alters the hormonal regulation of glucose metabolism.

Eventually Chris would like to combine entrepreneurship with his medical and scientific career.

“I enjoy the practical applications of science and chose this direction to experience the creativity and challenge of starting a business,” he says. “I think it is one of the most difficult things to do, but creation of new businesses is very important for New Zealand society and the economy.”
PhD inspired by ‘The Alice’

The challenges of Aboriginal health care led a paediatrician to seek answers at the Liggins

“I found the place got under my skin,” says paediatrician Anne Jaquiery, explaining how she came to spend nearly seven years working at Alice Springs Hospital in Australia’s Northern Territory.

Dr Jaquiery left New Zealand to finish her specialist paediatric training in Australia. “While I was in Adelaide, I was rostered up to Alice Springs and found myself at once moved and challenged by the social and health issues affecting the Aboriginal population.”

She returned there as a consultant paediatrician, focusing on the most pressing problems - nutrition, infectious diseases and child protection.

“After a while it became obvious that we needed to look at the bigger picture and what lay behind the conditions we were seeing in the Aboriginal women and their children.”

As chance would have it, she noticed an advertisement on a College website for a PhD project at the Liggins on the effects of periconceptional under-nutrition. “I had always intended to do a higher qualification and this was an unexpected and amazing opportunity.”

Dr Jaquiery’s PhD, supervised by Professor Jane Harding, allowed her to explore the clinical problems seen in mothers who are poorly nourished when they conceive, using the fetal sheep model that has been developed by the Auckland investigators.

“Normally, women adapt to being pregnant by adjusting their metabolism and its hormonal regulation in a way that will ensure nutrients are made available to the baby and not taken up by the mother. We found mothers that entered pregnancy in poor condition did not make these adaptations, which may have affected fetal growth. We also found that, after birth, the lambs’ growth was affected and the normal relationships between milk intake, growth related hormones and growth were disrupted.”

“It is exciting to find possible parallels between these experiments and some of the health issues we were trying to address in Alice Springs, so I am keen to explore them further and look at their continuing effects on health.

“Research by this group has previously shown that ewes that are undernourished when they conceive tend to deliver pre-term. I am now working with the team to help develop a model for prematurity in lambs. “Although clinical care of premature babies has improved considerably over recent years, we still have a lot of questions about the best way to nourish and care for them, partly because we don’t have a relevant experimental model. The intensive care facility for pre-term lambs that we are setting up at our farm-based research facility will provide a model we can use to answer many of our outstanding questions and provide information we can use to improve clinical practice.”

Dr Jaquiery is now a Senior Lecturer in the Faculty of Medical and Health Sciences at The University of Auckland and a part time paediatrician at Rotorua Hospital. “This gives me the opportunity to undertake research that is directly relevant to my clinical work and to share information with clinical colleagues, junior staff and students, and those working in the community.”
The legacy of early birth

Clinical studies are assessing the long term health of babies born pre-term

PhD student Caroline de Wit is looking for 100 people in Auckland aged between 18 and 20 who were born before 32 weeks gestation. She also needs 400 ‘control’ subjects in the same age group who were born at term (37-42 weeks).

Caroline’s recruits will take part in a study led by Professor Wayne Cutfield, Deputy Director of the Liggins Institute. It is part of an ambitious international project (a parallel group of 500 young people in the Netherlands is also being tested) to understand how being born prematurely affects long term health.

Recent results from Professor Cutfield’s research group have shown that children born pre-term have altered responses to the hormone insulin, giving them an increased risk of developing diabetes later in life.

Professor Cutfield believes that the fetal environment may alter the way the genes that determine growth and susceptibility to diabetes are regulated.

“We want to see if these genes are changed in people born prematurely. It is possible that the studies will identify those at risk of developing diabetes,” he says. “We can then recommend lifestyle changes that might prevent or delay the onset of the disease.”

Caroline says that taking part in the study will be quite simple. “It only requires one visit to the Maurice and Nessie Paykel Clinical Research Unit at the Liggins Institute. We will take a blood sample to assess the genes we are interested in and a rapid scan to measure body composition.”

Caroline is taking time out from her medical degree at the University of Leiden in the Netherlands to do a PhD at the Liggins.

“My interest grew from a compulsory research internship in human genetics at Leiden University Medical Centre and I decided to continue in research before going into the clinical world,” she says.

“Both personally and scientifically, this will be a challenge, but I’m more than happy to be part of such an exciting and important project during my three years in Auckland.”

To find out more about participating in the study contact Caroline on (09) 3737 599 ext. 86121 or email c.dewit@auckland.ac.nz.
PhD student Praneeti Pathipati found herself the centre of unexpected media attention last July. The paper she was presenting at the World Congress of Neuroscience in Melbourne was chosen as the subject of a news release by the conference organisers. Her story was subsequently reported by papers throughout Australia and New Zealand.

Praneeti’s research demonstrated the potential of growth hormone to assist recovery following a stroke. The Liggins team had injected growth hormone into rats to boost the level of the hormone produced naturally following an induced stroke.

“Remarkably, the rats regained 100 per cent movement function within seven days – significantly faster than untreated control animals.”

Heart Foundation support for PhD

Doctoral student, Amy Norman (Te Arawa) has been awarded a two year National Heart Foundation Maori Cardiovascular Research Fellowship.

Amy’s research project, supervised by Associate Professor Bernhard Breier, builds on the observation that low birth-weight babies become more susceptible to obesity and metabolic disease in adulthood. Amy hopes to demonstrate how we are set up from birth to use and store energy fuels.

“It may also tell us how we can manipulate these pathways to improve health,” she says. “For instance, understanding how nutrition during development interacts with postnatal exercise might lead to novel obesity-fighting therapies that enhance the benefits of exercise.”

Amy is intrigued by research that has both real world and personal significance - she has two young nieces who were born small, weighing less than one kilogram each.

An Asian perspective

Two years of interaction and planning have led to a unique partnership between the Liggins Institute and the Singapore Institute for Clinical Sciences (SICS). Together they have established a major new laboratory in Singapore that will conduct research into the origins of obesity and diabetes.

The partnership recognises the Liggins as one of the world’s major contributors to research addressing the role of developmental factors in the pathway to metabolic disease.

The Singaporean government has made a major commitment to research in the life sciences, seeing industry based in the area as key to its economic future.

The programme is being directed by Professor Peter Gluckman and will involve many of the Institute’s senior staff. It is funded by the Singapore Government’s research organisation A*STAR (Agency for Science, Technology and Research).

It will use animal and human models to study how the environment that the fetus and infant are exposed to can influence the development of type II diabetes and obesity in adolescence and adulthood.

These diseases are expected to have a growing impact on health and health care expenditure in Singapore. To date, most research has been conducted in Caucasian populations but data suggest that aspects of the diagnosis, prevention and treatment of metabolic diseases could be different in Asians and amongst Asian ethnic groups.

“I am delighted to be associated with this exciting initiative of SICS and A-Star,” says Professor Gluckman. “It is an opportunity to look at the development of diabetes and obesity from a unique perspective.

“It demonstrates the standing of the Liggins Institute and its research that we have been approached to help address the exploding issue of metabolic disease, which is of global importance but particularly in Asia. Because of the Singaporean infrastructure we will be able to undertake research that is just not possible in NZ.”
While the jury may still be out on whether science can make us happy, a thrilled Auckland audience left little doubt that Professor Robert Winston can.

Professor Winston opened the Liggins 2007 Seasons of Life lecture series last August posing the question “Can science make us happy?”

Brandishing a glass of red wine, he strode to the lectern declaring, “That makes you happy!”

“I have no credentials for talking about happiness,” he continued, “That’s something you should know right from the start.”

Undeterred, the audience revelled in his entertaining and erudite exploration of the nature of happiness that ranged through history, art, literature, psychology and neuroscience.

His scene opened on Renaissance artist Agnolo Bronzini’s allegorical painting depicting Happiness with Cupid, Justice and Prudence, above her, Fame and Glory.

“It is interesting,” he noted, “that when the picture was painted in 1560, fame and glory were considered important for happiness – as sadly they are now. In my view that is a huge mistake.”

He went on to point out that in her left hand Happiness holds the ‘horn of plenty’ and in her right, the caduceus – the symbol of health – observing that indexes of health are important measures of happiness.

For measures of modern happiness Professor Winston drew on recent studies: in one a thousand women scored their levels of happiness throughout the day – with the conclusion that their greatest happiness came from sex and their least from the morning commute! In fact one study revealed that subjects’ moods at 6am made it extremely unwise for them to drive a car.

To demonstrate the biological basis of empathy he described a study involving couples who loved one another. It showed that identical parts of the brain were activated in those suffering pain and in those observing their partner’s pain. “Empathy, I think, is a part of love and therefore part of happiness,” he concluded.

The same brain activations that occur during happiness and contentment also occur in response to harmonious music. In his first public performance on the clarinet, Professor Winston elicited exaggerated ‘unhappy’ responses in the brains of his delighted audience by deliberately playing a discordant note in Beethoven’s Ode to Joy.

He observed that happiness is strongly related to spirituality. His examples spanned 30,000 years: from evidence found in subterranean caves of mankind’s early attempts to reach through to the transcendental - to the image of Auschwitz as an example both of man’s ability to forget and remember the spiritual.

Asking whether one can ever experience true happiness without having been truly unhappy, he quoted 16th Century essayist, Michel de Montaigne’s famous remark that he thanked Fortune for his bouts of excruciating pain from bladder stones because he knew, between episodes, what joy it was to be pain-free.

“Hamlet,” he observed, continuing the literary theme, “is typical of something that Shakespeare understood, the human mind. Hamlet is a classic example of a neurotic personality. At every stage he tries to endanger himself, knowing the consequences – getting his happiness through psychic damage.”

With TS Eliot’s The Love Song of J Alfred Prufrock, Professor Winston introduced the concept of self esteem - claiming that Prufrock was depressed because his childhood was lost and he lacked self esteem.

“Something that research shows us and we need to recognise in the happiness of the next generation, is that self esteem is hugely important in how we bring up our children. What studies show is that children’s happiness and their long term welfare depends on the value that they put on themselves.”

His final image returned to Bronzino, this time the painting of Venus with Cupid, Folly and Time. A fourth figure - once thought to be Anger or Jealousy – is now believed to represent syphilis.

“A heavily critical analogy that the pursuit of pleasure as opposed to true happiness ends in this kind of loss of human life,” he concluded - with the wry observation that the foot of Cupid in the painting is the same famous foot that comes down on Monty Python’s Flying Circus.

Coming events

The 2008 Seasons of Life series will be previewed in the next Dialogue. For advance notice of these and other public lectures and events, check ‘Events’ on our website: www.liggins.auckland.ac.nz or email your name and contact details to: friends@liggins.auckland.ac.nz with “Subscribe” in the subject line.
Note to Friends

One of the things I find inspiring about the Liggins is their commitment to sharing their research and knowledge with the community. That way people like me without a scientific background can understand some of the complexities of modern science in the language and context of our everyday lives.

It has been a real thrill to meet and hear Professor Robert Winston who is now a regular visitor to the Liggins. His two visits were highlights of the Friends activities last year. His entertaining address tracing historical milestones in reproductive technologies, interspersed with anecdotes based on his experiences in the House of Lords, contributed to the huge success of our event ‘Celebrating Creative Connections’ last August.

Robert Winston’s commendation of the international standing and the importance of the Liggins Institute’s research provided a fitting background for Peter Webb’s auction of the Team McMillan BMW Art Bonnets that collectively fetched $70,000. The wonderful evening was the result of hard work, support and contributions from many good Friends and sponsors, in particular BMW Group New Zealand, Peter Webb, Lion Nathan, Elizabeth Arden, Oliver Young and Mike Hosking our MC - who moved and entertained us recounting his own experiences of fatherhood and fertility.

Of course our special thanks goes to Team McMillan BMW not only for the centrepiece of the event - the Art Bonnets, but for their ongoing support of the Institute through their sponsorship of Dialogue and their loyalty programme for our Friends and associates (see the back cover for more details).

In February we held the first of our intimate luncheons where Friends and supporters gathered at Old Government House to hear Harvard professor, Karin Michels tell us about her research on links between diet and lifestyle and disease – in particular her specialist area, breast cancer.

The Institute has more exciting experts on their visiting list – including Lord Winston – and we shall be having more of these lunches during the year. However, numbers are limited to 40 guests and Friends are given priority, so make sure you keep your subscription up to date.

Warm regards,

Roxane Horton
Chair of the Friends of the Liggins Institute Committee

Celebrating the success of ‘Creative Connections’ (from left) Peter Webb, Lord Robert Winston, Roxane Horton and Peter Gluckman.
Greg Lucier, CEO of international life sciences company Invitrogen Corporation, was so impressed by research he saw at the Liggins Institute that he asked Research Director Professor Murray Mitchell how the company could help.

Now, a gift from Invitrogen Australasia is helping to fund a postdoctoral fellowship investigating the epigenetic regulation of the process of implantation in early pregnancy.

The new fellow, Anna Ponnampalam, graduated with a Bachelor of Technology degree in biomedical sciences from The University of Auckland before heading off to PhD studies at Monash University in Melbourne. At Monash, she worked with Professor Peter Rogers Director of the Centre for Women’s Health Research.

“My work in the Centre investigated changes in the extent to which certain genes are expressed in the human endometrium (the lining of the womb) during the menstrual cycle,” says Anna. “Many of the investigators there had links with Professor Mitchell and the Liggins so I was well aware of the Institute’s reputation and its research.”

Back in Auckland, Anna is working with Professors Murray Mitchell and Peter Lobie to unravel some of the complex epigenetic mechanisms that determine a successful pregnancy. She explains epigenetics as the process through which factors in the internal and external environment influence the expression and regulation of genes without changing their DNA sequence.

“Epigenetic mechanisms are important in many biological processes,” she says. “There is increasing evidence that environmental factors such as hormone levels and the culture media used for in vitro fertilisation can affect the epigenetic processes that control implantation, development of the placenta, formation of the fetal organs and fetal growth.”

However, Anna says that epigenetic regulation of implantation is a vastly unexplored field. She believes that understanding the cyclic changes and hormonal regulation of the genes and enzymes involved in implantation will help us appreciate the role epigenetics plays in these early life processes. In turn, this knowledge will lead to ways of improving pregnancy outcomes and identifying new targets for contraception.

Invitrogen’s Sales Manager, Australasia, Dr Steven Ilgoutz says that Anna’s research fits well with the company’s commitment to provide innovative products and technologies that support scientists’ effort to understand how life works and ultimately improve the human condition.

“The Liggins team are acknowledged leaders in this rapidly emerging field and we are delighted that we can assist them. Invitrogen supports a number of science education projects worldwide, but this is the first time the company has supported a research fellowship in this way,” he says. “We look forward to watching Anna’s progress.”

Anna demonstrates her work to (from left) Dr Steven Dodd (Account Manager Invitrogen Oceania), Dr Steven Ilgoutz and Professor Murray Mitchell.
The 2008 New Year Honours List saw Professor Peter Gluckman join an elite group of New Zealanders “who in any field of endeavour, have rendered meritorious service to the Crown and nation or who have become distinguished by their eminence, talents, contributions or other merits”.

The Honour recognises Professor Gluckman’s career as a medical scientist and leader in medical and health education and communication. His research has focused on some of the most vulnerable in society – premature and brain damaged infants - and has sought ways to translate discoveries in basic science into effective therapies and public health initiatives.

He says he feels both humbled and proud to receive this Honour “It recognises the contributions of many New Zealand scientists and clinicians.”

His teams have been at the frontline of international research showing the importance of early life development in determining health throughout life.

“We have increasing evidence that a healthy start to life is an essential component of long and healthy lives. If things go wrong at the beginning we and our communities carry the burden for life - and into future generations,” he says. “The economic and social costs are potentially huge.”

In 2004 he chaired a committee of the World Health Organisation which looked at how current research knowledge could be used to improve the outcomes of pregnancy world-wide. The resulting report identified a number of areas where changes in public health practices and social mores – including the status and nutrition of women in many countries - would have a significant impact on infant and maternal mortality and disability.

Four years on, he remains frustrated by the reluctance of health authorities to implement the committee’s recommendations. He is leading an initiative of his own, setting up an international consortium of economists, scientists and public health experts to evaluate the costs across populations in different stages of economic and nutritional transition. “We want to show politicians the economic benefits that can be gained by focusing public health initiatives on the earliest stages in life rather than managing the later-life results of poor beginnings.”

Members of the consortium will meet in Auckland and Wellington in April to discuss their progress.

More recently Professor Gluckman has started to look beyond our genetic and developmental origins to consider them in an evolutionary context. “And therein lies the mismatch,” he claims. “Human beings have been very resourceful in redesigning their world, inventing technologies that make our lives easier; unfortunately our bodies were designed for something far simpler.”

Passionate about increasing the understanding of science and issues related to health in the community, he has expanded his theories in a popular science book Mismatch – why our world no longer fits our bodies, co-authored with long time colleague Mark Hanson of the University of Southampton. The pair is currently working on a second book for non-scientists and a text book on evolutionary medicine for health professionals and students.

The New Zealand Order of Merit, an Order of Chivalry, was instituted by Royal Warrant in 1996. In 2000 the use of titles (knights and dames) within the Order was discontinued and replaced by the new designations of Principal and Distinguished Companions.
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New tax rules increase the power of charitable gifts

Changes to the tax rules governing charitable donations are expected to provide a welcome boost to New Zealand’s non-profit sector by removing impediments to giving and by laying the foundation for a stronger culture of philanthropy.

From 1st April 2008 the Government will remove the $1,890 rebate threshold applying to cash donations to charities made by individuals; the 5% limit on deductions that companies can claim for cash donations to charities; and the restriction on unlisted companies with five or fewer shareholders claiming deductions for donations.

Under the new rules: individual donors will be able to claim a 33.3% tax rebate on all donations up to their annual net income and companies (including unlisted companies with five or fewer shareholders) and Maori authorities will be able to claim a tax deduction for donations up to their annual net income.

For example, if a gift of $3000 is made to The Friends of the Liggins Charitable Trust from a donor’s net income, it costs the donor only $2000 once the $1000 rebate is taken into consideration.

The removal of the rebate cap brings New Zealand into line with the treatment of donations in other OECD countries such as Australia and the United Kingdom.

The Liggins Institute is an international centre of intellectual excellence that New Zealanders can be proud of. However, medical research is expensive and New Zealand’s national investment in this area is very low compared with Australia, Europe and the United States. The Institute is required to be financially self-sustaining. It competes successfully for public and commercial research funding, but these sources are limited and unpredictable. To grow and develop, and to carry out the truly innovative research for which it is famous, it looks to its community for help.
TEAM McMILLAN AND THE LIGGINS INSTITUTE  A partnership of excellence

Team McMillan BMW and MINI support the Liggins Institute's quest for a healthy start to life. They underwrite the production costs of this newsletter, and donate $500 to the Institute every time a Friend or associate of the Institute purchases a new or approved used BMW or MINI; please mention the Liggins Institute at the time of purchase.