

THE SUN SHINE DOWN ROUNDHOUSE



Newsletter of the Veterinary Science Foundation at the University of Sydney



Issue 7 November 2002



ROUNDHOUSE
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Third year veterinary student Rachel Kent, with her dog BJ, was part of the hardworking team of several hundred student volunteers working with the Veterinary Science Foundation for the 2002 vets@work Open Day. Rachel and BJ 'worked the crowd' at the University Courses and Careers Day promoting the Open Day events taking place in the University Veterinary Centre and Faculty grounds.

Kristen Clarke

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Kristen Clarke

New capabilities

for the veterinary profession

Professor Reuben Rose,
Dean, Faculty of Veterinary Science

There is a widespread recognition in business of the need to invest in the development of staff and to capture the intellectual capital in organisations. In the Sydney Morning Herald's October 1 front page article, one of a series on workplace revolutions, journalist Sherrill Nixon wrote, "Management gurus around the world have finally hit on the next big thing in business – treating people like human beings". This may not seem particularly revolutionary but the important insight is that our ability to deal effectively with others and work successfully, often in the face of conflict, requires skills outside people's technical training. Following the success of Daniel Goleman's work on emotional intelligence, more organisations are realising the value of working on and recognising non-technical competencies. The four key emotional intelligence competencies have recently been reviewed by Loren Gary in the July 2002 Management Update Newsletter of the Harvard Business Review:

- Self awareness – accurately assessing one's emotions and their impact on others
- Self management – dealing effectively with emotions, with self reflection, ensuring trust is built and there is flexibility in interaction with others and a projection of optimism
- Social awareness – awareness and ability to empathise with other people's concerns and needs
- Relationship management – focusing on the ability to inspire, listen to and persuade others and resolve disagreements.

These skills and others that are the keys to enabling adaptive change, have been a major area of focus for the Faculty in the second half of 2002. A leadership development program involving twenty academic and general staff is being led by Michael Johnson and Maxime Fern,

Vantage Point Consulting, from July 2002 to February 2003. The program involves two residential weeks and ongoing action learning projects. The aims include: enabling people to be more self aware and more able to flexibly work with others; be better able to be part of and lead teams, and collaborate across the Faculty; have stronger communication and influencing skills; be able to effectively build trust; be more able to effectively adapt to and lead change; accept personal responsibility and contribute personal leadership; be better able to anticipate and respond flexibly to problems as they arise; and actively contribute to innovations and new initiatives.

These "soft" skills are increasingly being recognised in all areas of business and education as critical for our globalised and rapidly changing environment. To develop the skills needed for veterinarians and animal health professionals involved in the broad area of veterinary public health, the Faculty has developed a new postgraduate program – Veterinary Public Health Management, to commence in 2003. The material will be offered in distance education format leading to the award of a Certificate (one year part-time), Diploma (18 months part-time) or Masters (2 years part-time) qualifications. Apart from 1 to 2 week residential periods each year, study can be undertaken anywhere in the world. The program will provide postgraduate training in veterinary epidemiology, food safety, zoonotic diseases, animal health economics, disease control, and animal health policy development as well as core leadership and management skills that are increasingly relevant to all areas of veterinary science.

The Faculty's vision is to provide innovation and leadership in veterinary science. I believe these new programs will assist students, staff and the profession to meet the many challenges facing the profession in the 21st century.



Veterinary Science Foundation
UNIVERSITY OF SYDNEY

The Veterinary Science Foundation of the University of Sydney is the promotional and fundraising arm of the Faculty of Veterinary Science.



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contact us

Roundhouse is produced by the Veterinary Science Foundation of the University of Sydney.

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Kristen Clarke

Media celebrities ABC Radio 702 Sydney's Simon Marnie and Channel Nine Animal Hospital presenter Lochie Daddo compered the lams entertainment stage, and a mix of sponsors and animal societies (WIRES, the NSW Ferret Welfare Society, Pacofino alpacas and llamas, the Rabbit Fanciers Society NSW, RSPCA, Australian Herpetological Society, FATS (Frog and Tadpole Society), the Greyhound Adoption Program) entertained and educated the visitors.

vets@work 2002 attracted record sponsorship and the Foundation and Faculty are enormously grateful to these generous supporting companies. Our sponsors attended a Trade Fair for students and staff and many returned for the Open Day: Fort Dodge, Intervet Australia, Abbott, Bayer, lams, Apex Laboratories, Nestle Purina, Uncle Bens, AVA NSW, Hesta Superfund, Jurox, Provet, The Veterinarian, Novogen and Guild Insurance. A University of Sydney Good Neighbour Grant supported the visit of Professor Lonnie King.

Open Day featured media celebrities, including Channel Nine Animal Hospital presenter Lochie Daddo (below); senior vet students performed pet health checks (year 4 students Vickie Saye and Adam Gaudry with one of the visiting dogs).

vets@work 2002



vets@work, the annual event organised by the Veterinary Science Foundation and a dedicated committee of veterinary students, this year featured a week-long visit by high profile US veterinarian Professor Lonnie King, an inaugural research day, a Trade Fair for our sponsors, the second annual Open Day for the general public, and the Vet Ball.

Professor King, Dean of the College of Veterinary Medicine at Michigan State University, USA, delivered the Faculty's 2002 J D Stewart Address, sponsored by Fort Dodge (see story page 7). The Intervet Australia Research in Action showcased the diversity of research taking place across the Faculty, and the Open Day, held on Saturday 31 August to coincide with the University of Sydney Careers and Courses Day, again pulled around 3,000 members of the community and their pets.

The volunteer efforts of more than 250 veterinary students and staff ensured the Open Day's success. Teams of students smashed last year's dog wash record, shampooing 290 dogs, and senior veterinary students, under the supervision of clinicians, performed almost 200 pet health checks in the Sydney Clinic.



Kristen Clarke



Provet NSW supports bequest program

Provet NSW, a major contributor to the Sydney Animal Medical Centre capital campaign, is supporting the Veterinary Science Foundation through the unique input of key territory managers. The development of the Foundation's bequest program is critical to its ongoing growth, and past experience has shown it will be the clients of the University Veterinary Centres and private practitioners who will be our future benefactors. Provet NSW staff have undertaken to speak to veterinarians about the program during their visits, helping to distribute the Foundation's bequest posters and flyers.



Visit our new website

www.vetsci.usyd.edu.au/Foundation

The website of the Veterinary Science Foundation was relaunched in October 2002 with a brand new look. Foundation staff worked with Mr Federico Costa, the Faculty's website coordinator, who was responsible for developing the new site.

GALAH OCCASION

Sydney Animal Medical Centre Capital Campaign



Above: Third year vet student Louise Baker and border collie Kokanee modelling matching coats created for the highly successful silent auction by Leanne Whitehouse of the prestigious Whitehouse Institute of Design.

To celebrate the commencement of the \$3 million Stage 1 upgrade of the Faculty's small animal clinic and teaching hospital and to raise funds for Stage 2, the Veterinary Science Foundation held a very special event on Friday 25 October. The Galah Occasion, a charity dinner in the Great Hall at the University of Sydney, attracted three hundred attendees and raised significant funds in aid of the Sydney Animal Medical Centre Capital Campaign.

Prominent artists (including Archibald, Wynne and Sulman winners), designers and jewellers passionate about their animals came together in an extraordinary display of support to create dog and cat collars for silent auction – worn in a parade of veterinary students and their dogs and cats, and led by Channel Nine Animal Hospital presenter Rebecca Harris. Designer and animal-lover James Gordon generously created both a collar and props for the evening. Images of all the collars can be seen on the VSF website www.vetsci.usyd.edu.au/Foundation.

Animal trainer Steve Austin compered the Flyball Cup during pre-dinner drinks in the main Quadrangle with performances by the Parramatta International Agility Dog Group. Celebrity chef Luke Mangan, from Salt restaurant, The Wine Society, Kell's Creek Vineyard and Tooheys (Lion Nathan) subsidised or donated the food and drink, and Monica Trapaga and her musicians provided entertainment. Monica is a committed animal lover and has just opened Animajingo Pet Emporium in Summer Hill (phone (02) 9716 0242).

VIP corporate tables were sponsored by Breville, Dairy Farmers, Hill's Pet Nutrition, KPMG and Pet's First. Many other individuals and companies generously supported the night, and recognition was made of the significant donations already made to the campaign by Provet, Hill's Pet Nutrition and Apex Laboratories.

Special thanks to our artists: Bonita Bub, Pierre Cavalan, Marguerite Derricourt, Dinosaur Design, Ken Done, Ruth Downes, Lorna Napurrula Fencer, James Gordon, Bradley Trevor Greive, Steven Harvey, John Hatton, Annie Herron, Catherine K, Peter Kingston, Euan Macleod, Gerard Manion, Lotje Meijer, Reg Mombassa, Heidi Onisforou, Mary Pinnock, Joan Rabinowitz, Leo Robba, Mary Shackman, Victoria Spring, Aida Tomescu, Monica Trapaga, Elizabeth Wadsworth, Dick Watkins and Leanne Whitehouse.



Above left to right: Dr Graeme Dixon, General Manager Hill's Pet Nutrition; Dr Garth McGilvray representing Provet; Mr Rob Ferguson, Chair of the Sydney Animal Medical Centre Capital Campaign; Mr Dick Austen, Chair of the Veterinary Science Foundation; Mr Tony McGloin, Managing Director Apex Laboratories; and Professor Reuben Rose, Dean of the Faculty of Veterinary Science. Provet, Hill's Pet Nutrition, and Apex Laboratories are major donors of the fundraising campaign.



Left: One of the stunning collars designed by artists for the Galah Occasion, this exotic cat collar was created by Wynne and Sulman Prize winner Aida Tomescu.

Stage 1 Development

A Capital Campaign Committee, chaired by former CEO of Bankers Trust Mr Rob Ferguson, is responsible for raising the funds for the Centre. Stage 1 will include the Valentine Charlton Cat Centre, being supported by \$1 million from the Post Graduate Foundation in Veterinary Science. The University of Sydney is providing matching funding.

The architects Gordon & Valich have been appointed by the University as Architects and Principal Consultants for the upgrade. This firm has considerable and highly regarded experience in veterinary clinic design, and the University's Tender Board agreed the company stood out as the lead candidate. Gordon and Valich are soon to commence documenting the early works package, which will involve the demolition of the disused Horse Stables, expected to commence before Christmas and be completed in late January 2003.

The actual Stage 1 building work is expected to commence in June 2003 with completion by January 2004.



Dr Joan Lloyd, Academic Program Manager for the new postgraduate program Veterinary Public Health Management.

NEW FOCUS ON VETERINARY PUBLIC HEALTH

In response to the urgent need for veterinarians trained to effectively service national and regional livestock industries, the Faculty of Veterinary Science is developing an exciting new postgraduate program - Veterinary Public Health Management – with the first intake of students planned for February 2003.

The project, which is supported by Meat and Livestock Australia, the Vincent Fairfax Family Foundation and the University of Sydney Innovation and Technology in Education Ventures unit, has received widespread support from industry, government, community organisations and the University.

The program has two major objectives. The first is to develop veterinarians with technical expertise in veterinary epidemiology, food safety, zoonotic diseases, animal health economics, disease control, and animal health policy development.

The second aim - providing skills focused on team leadership and project management - recognises the need for veterinarians in animal health industries to work in multidisciplinary teams, and to manage research and policy processes.

The postgraduate program has three articulated award courses at the Graduate Certificate, Graduate Diploma and Masters levels and will be offered by a combination of distance education units of study and short, intensive residential units at the Camden campus. Distance education units will provide an appropriate learning environment for busy professionals, with small group interaction via a web-based classroom.

Dr Joan Lloyd is the Academic Program Manager for the Veterinary Public Health Management Program - she can be contacted by phone on (02) 9351 1713, facsimile (02) 4655 2374, or email joanl@camden.usyd.edu.au.

Faculty wins ARC grants

The Australian Research Council is boosting Australia's research and development initiatives with a significant cash injection in 2003 – and the Faculty of Veterinary Science has secured a share of the action. Each project also has the backing of industry partners. Faculty staff leading the key ARC grant supported projects are:

- Associate Professor Peter Wynn – 'Manipulation of the growth potential and carcass composition of domestic animal species' (\$420,000 over three years)
- Associate Professor Nick Sangster – 'Excitatory neuropeptides from nematode parasites of sheep' (\$75,000 over three years)
- Professor Gareth Evans and Associate Professor Chis Maxwell – 'Sex preselection of stallion spermatozoa' (\$210,000 over three years)

OVINE JOHNE'S DISEASE UNDER ATTACK



Primary Industry and Resources South Australia

In the most concerted effort yet to come to grips with a complex and frustrating disease, the Faculty of Veterinary Science has joined forces with Meat and Livestock Australia to undertake intensive research into Ovine Johne's Disease (OJD), a devastating and ultimately fatal disease of sheep already entrenched in south east Australia.

Meat and Livestock Australia (MLA) have provided a \$3.2 million grant, funded by the sheep industry, to support research focused on the early diagnosis of infection.

Professor Richard Whittington, Sesqui Chair of Farm Animal Health at the Faculty of Veterinary Science, says Johne's disease is the most serious disease problem he has seen in a 22-year career. "Because this is such a complex and difficult disease, quarantine restrictions have failed to halt the spread of disease, the sheep industry is

polarised in its views on control options and the newly released vaccine does not fully prevent infection".

Johne's Disease exists worldwide and many countries live with the disease. Efforts are being made in Australia to control the disease long term, but Richard says lack of basic knowledge about the disease is hindering the design of improved tests, treatments and effective vaccines.

The MLA grant will enable a team of five leading scientists and additional research students to be established at the Faculty's Camden laboratories to study the basics of Johne's infection. The latest genomics technology will be applied to the problem, and over three years it is hoped that discoveries will be made leading to tests capable of detecting the infection before it has had a chance to spread.



REPROGEN – THE STORY

Reprogen, the Centre for Advanced Technologies in Animal Genetics and Reproduction, was launched in December 1999 within the Faculty of Veterinary Science. Co-founders Professors Herman Raadsma and Frank Nicholas could see the Faculty had strengths in animal genetics and reproduction capable of bringing advanced animal breeding technologies to the animal industries. They added a third strength - the then-emerging discipline of cell-based animal biotechnologies.

Herman Raadsma was appointed Director in April 2000. He says, "The establishment of Reprogen as a University-approved specialist research centre allows us to be recognised as a national focal point for integrated research, training, and the practical application of genetic and reproductive knowledge. Reprogen's mission is to apply this knowledge towards the sustainable utilisation and well-being of domestic animals". Herman maintains harnessing the synergy between Reprogen's three core disciplines – genetics, reproduction and cell biology – is essential if applied outcomes such as germ plasm conservation, early genetic/diagnostic screening, gene therapy, and accelerated genetic gain for animal industries are to be achieved.

Reprogen has already achieved notable success. In addition to international recognition for the project Online Mendelian Inheritance in Animals (see below), milestones include:

- Breeding the world's first lambs born from sex-sorted frozen semen
- Discovery of the causative mutation for chondrodysplasia (dwarfism) in Dexter cattle
- Establishing the most comprehensive genetic maps for major genes affecting production traits and disease resistance in pigs and sheep
- Undertaking transplantation therapy of neural stem cells in inherited demyelinating disease (Twitcher Disease) in mice

Reprogen is continuing the Faculty's distinguished history in animal reproduction and genetics. Since 1936, when Professor Gunn's work led to the birth of Australia's first lamb from artificial insemination, and including the work of the Faculty's founding geneticist Professor Stuart Barker from 1956, the Faculty continues to achieve major breakthroughs in animal reproduction and genetics.

Reprogen began with seven founding members, two honorary fellows, five

postdoctoral fellows, and seventeen research students. The founding members had diverse areas of interest: Professor Herman Raadsma (DNA technologies in animal breeding, the genetics of disease resistance), Professor Frank Nicholas (geneticist, identification of the genetic basis and control of inherited disorders), Associate Professor Chis Maxwell and Professor Gareth Evans (applied reproduction in domestic and wild animals, sperm sexing, semen and embryo preservation and transfer), Associate Professor Chris Moran (genomics research in the pig), Dr Peter Thompson (quantitative biology), and Dr Rosanne Taylor (gene therapy, neural stem cell research). Dr Paul Sheehy added strengths in cell biology, and the research focus of the five founding postdoctoral fellows, Drs Imke Tammen, Justine O'Brien, Yizhou Chen, Bill Blackhall and Sharon Mortimer, ranged from gene mapping, DNA tests to eradicate disease, sperm function and preservation to the conservation of endangered species.

Since 1999, Reprogen has experienced rapid growth. A first commercial spin-off company for sperm sexing technologies is on the drawing board with industry partner US-based XY Inc., and an initial grant income base of \$900,000 pa (from diverse industry and government sources) has grown to over \$2 million for 2003. Reprogen's most significant achievement, becoming lead agency in the gene discovery program of the CRC for Innovative Dairy Products (securing \$7.3 million over seven years), means responsibility for a large functional genomics program in lactation biology.

Today Reprogen has eighteen PhD and Masters students. Dr Imke Tammen has recently been appointed a University of Sydney Sesqui Lecturer in Animal Biotechnology, Associate Professor Peter Wynn has joined the team and further senior appointments will include a Bioinformatics Fellow and a new Chair in Livestock Functional Genomics – believed to be the first in Australia. There are also seven new research/postdoctoral Fellows in place with more to come - Drs Cavanagh, Eriksson, Gillian, Morris, Nair, Riley and Zenger. The initial core species focus has also expanded, from pigs, sheep, cattle and mice to include the horse, dog, peccary and the crocodile.

Herman Raadsma predicts revolutionary advances in cell biotechnologies and says Reprogen must capture these to achieve improvements in animal production and to combat inherited diseases: "This is an incredibly exciting era for animal biology and Reprogen intends to provide the Faculty with a seat in the front row".



Professor Herman Raadsma, Director of Reprogen and the Faculty's Associate Dean for Research.



Natasha Ellis with Viscount, the Australian Champion 2 year old of the 2000-2001 season and one of her favourite horses from that year.

ACE PERFORMANCE

Can gene mapping increase the chances of selecting winners for the racetrack?

PHD STUDENT NATASHA ELLIS, WITH THE FINANCIAL ASSISTANCE OF THE NEW SOUTH WALES RACING RESEARCH FUND, IS UNDERTAKING AN IN-DEPTH MOLECULAR (DNA) ANALYSIS OF GENES ASSOCIATED WITH PERFORMANCE.



This horse treadmill is part of the Sydney University Equine Performance Laboratory at Camden, a unique facility with the capacity to measure physiological parameters of racing performance.

The genetic basis underlying most complex traits in horses such as disease, conformation, reproductive ability, soundness – and athletic performance in racehorses – is largely unknown. With Reprogen colleagues Dr Imke Tammen, and Professors Frank Nicholas and Herman Raadsma, Natasha has been working on the characterisation of the equine angiotensin-converting enzyme (ACE) gene, an enzyme specifically involved in increasing blood pressure during conditions of physiological demand.

A polymorphism discovered in the human gene encoding for this enzyme has been shown to be related to differences in susceptibility to conditions such as hypertension, and cardiac and renal disease. The allele involved also has an association with elite endurance performance in human athletes, appearing in much higher frequency in athletes such as Olympic rowers, mountaineers and long distance runners than in the normal population.

Natasha's study has already physically mapped the ACE gene to horse chromosome 11 (ECA11). The gene sequencing and mapping was made possible through a Bacterial Artificial Chromosome library, currently consisting of around 100,000 clones, created for the research projects of

the International Equine Gene Mapping Workshop participants.

Now the gene is mapped, Natasha is screening for polymorphisms, using two equal pools of horse DNA – one from 10 unrelated thoroughbred horses, and the other from 10 horses of mixed breeds (clydesdales, standardbreds, quarterhorses, warmbloods and ponies).

Polymorphisms discovered will then be used in an association study to investigate links between the gene and equine athletic performance. This will be done in collaboration with Professors David Hodgson and David Evans from the Sydney University Equine Performance Laboratory in the University Veterinary Centre at Camden. The laboratory's facilities can measure physiological parameters of racing performance, including measuring traits such as VO₂max (maximal oxygen uptake) on a horse treadmill. The analysis will also include other performance data such as racing records.

Natasha has a solid working relationship with the thoroughbred industry and loves her equine subjects - she also holds the position of Senior Swab Official for the Thoroughbred Racing Board, working both provincial and metropolitan tracks.



TRACKING INHERITED DISEASE ONLINE



Professor Frank Nicholas is the curator of the international database project, Online Mendelian Inheritance in Animals.

Professor Frank Nicholas is the curator of a massive comparative database of inherited disorders of farm and companion animals, Online Mendelian Inheritance in Animals (OMIA). OMIA will ultimately include all published references on all supposedly single-locus traits (including disorders) in all domestic animals, together with summary paragraphs about each trait and/or disorder.

The project began in 1980 and went 'live' on 26 May 1995 via the home page of the Australian National Genomic Information Service (ANGIS) - <http://www.angis.org.au/omia>. Compilation of information has continued since the project's inception and while the task of maintaining the database is huge, Frank says it is rewarding to see OMIA being accessed from around the world each week.

Modelled on Professor Victor McKusick's human database Online Mendelian Inheritance in Man (OMIM), the project has been undertaken in collaboration with ANGIS and internationally with the National Center for Biotechnology Information (NCBI), Washington, and with Professor McKusick at Johns Hopkins University, Baltimore, USA.

Since October 1997, hyperlinks from OMIM to OMIA have enabled human medical geneticists to gain instant access to up-to-date information on animal models of human inherited disorders.

As part of a sister site for OMIA, Drs Paul McGreevy, Peter Thomson, Paul Della Torre and Frank Nicholas are developing a website called Listing of Inherited Disorders in Animals (LIDA). LIDA will provide veterinarians, breeders and pet purchasers with up-to-date information on the prevalence of inherited disorders, as recorded online by cooperating veterinary practitioners throughout Australia.



Above: Member of the Reprogen team, Post-doctoral Fellow Dr Justine O'Brien.

Above right: A social grouping of the Hamadryas baboons involved in the study focused on improving the conservation and captive management of endangered primates.

GIVING NATURE A HELPING HAND

Sex-sorting the sperm of Hamadryas baboons could lead to breakthroughs in the conservation of endangered primates according to Post-doctoral Fellow Dr Justine O'Brien, a member of the Reprogen team who is working in the area of reproductive research for the management and conservation of endangered species.

Justine is undertaking a project involving the baboons at the National Baboon Colony of Royal Prince Alfred Hospital's (RPAH) Department of Renal Medicine. Her study aims to assist zoological institutions maintain captive populations in conditions resembling those in the wild. This means mimicking each species normal social organisation, group size, genetic relationship and importantly, the group's sex ratio – the number of males to females.

The Hamadryas baboon (*Papio hamadryas*) exists in the wild in harem groups, typically one male, several adult females and their immature offspring. To achieve this in captivity, surplus sexually mature male baboons must be removed from the family group to avoid problems with male-male aggression.

The most effective way to cope with excess males is to structure the group's breeding program to produce predominantly female offspring through the application of sex-sorted sperm, a solution that could also significantly accelerate re-population of endangered species with slow reproduction rates.

Justine's study, which is funded by XY Inc., the Zoological Parks Board of NSW and the Australian Research Council, has three objectives. First, she must establish methods for the collection and processing of semen from the Hamadryas baboons, a project undertaken in collaboration with RPAH's Scott Heffernan and the Faculty's animal behaviour specialist, Dr Paul McGreevy. Paul has designed a program to train the male baboons to adopt a safe position for non-invasive semen collection using "clicker" training to shape the desired behaviour. The clicker, a device used for decades in the training of marine mammals, alerts the animal to the imminent arrival of a food reward.

Once the baboon spermatozoa is collected, it must be sex-sorted accurately while ensuring maximum sperm quality.



Justine O'Brien

Sex of offspring is determined by the fusion of either an X or Y chromosome-carrying sperm with an X chromosome-carrying oocyte. Sperm separation by flow cytometry relies on the fact that the X chromosome of mammals carries more DNA than the Y chromosome, and purities of greater than 90% of the desired sex can be achieved using current sperm sorting technology. The technique has already been used successfully in a number of mammalian species, and members of the Reprogen team, including PhD student Fiona Hollinshead, Associate Professor Chis Maxwell and Professor Gareth Evans, have been among the first in the world to achieve successful birth of predetermined sex offspring in species such as the sheep.

The final objective of Justine's work is to establish methods for the cryopreservation of baboon spermatozoa prior to and after sorting, and to undertake artificial insemination trials in the baboon to investigate the fertility of sorted spermatozoa. Additional research has been conducted on the sorting of frozen-thawed spermatozoa (as opposed to freshly collected sperm).

Used in conjunction with artificial insemination, in vitro fertilisation or embryo transfer, sex pre-selection of offspring using sex-sorted sperm could become a powerful tool for the captive management of endangered primates with single sex-dominated social structures - such as the one-male mating system of the gorilla. Justine's work, through the import or export of frozen semen of pre-determined sex, also has the potential to help maintain genetic diversity in captive wildlife species worldwide.



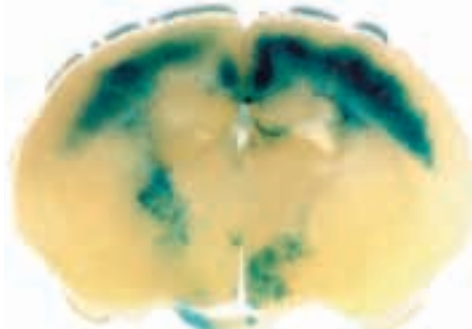
REPROGEN'S STEM CELL TEAM

Stem cell research is now a critical strength of the dynamic Reprogen team, and a group led by Dr Rosanne Taylor is currently testing therapies with the potential to restore myelin in the brain and spinal cord.

Stem cells have great potential for repair. They are multipotent - that is, they are capable of making many different cell types - and can respond appropriately to damage. Stem cells come from a variety of sources, including the brain, bone marrow stroma and embryo, but the characteristics and therapeutic potential of each have yet to be fully explored. Can adult stem cells, such as those from marrow as opposed to those from embryos, still be multipotent? Some scientists believe this occurrence is too rare to be useful for therapy.

The Reprogen stem cell team has taken up this challenge and is testing different types of stem cells in mice with myelin damage. Based at the Faculty's Sydney campus, the group - postgraduate student Guoying Zhao, research staff Nigel McCarthy, Kerrie Murdoch and Brad Dong - are investigating neural stem cells with collaborator, Dr Evan Snyder at Harvard University, embryonic stem cells with Dr John Rasko of the Centenary Institute Sydney and marrow stromal cells with postdoctoral fellow Dr Juliana Lamoury at St Vincent's Hospital, Sydney. Their work is supported by National Health and Medical Research Council, Multiple Sclerosis Australia and Hunter's Hope, USA.

The group's long term objective is to develop stem cells that will preferentially migrate into areas of damage in



Above left: The Reprogen stem cell team, from left to right, Dr Rosanne Taylor, postgraduate student Guoying Zhao, and research staff Kerrie Murdoch and Nigel McCarthy.

Above: Stained stem cells migrating widely through the brain of the mouse, demonstrating the capacity of stem cells to migrate to areas in need of repair.

the brain and develop into mature cells that can replace the function of those lost to disease. The group is particularly interested in treating myelin damage - the loss of the insulating sheath that enables nerve axons to transmit messages efficiently. This occurs in Multiple Sclerosis, a common cause of disability in young adults, and in Krabbe disease, an inherited disease of children.

The group is achieving encouraging results. In myelin damage caused by immune attack, Rosanne's team has genetically engineered cells that produce transforming growth factor beta, a factor that reduces the damaging immune response and enhances the cells' development into myelin-forming oligodendrocytes. The cells are tracked in the mature brain by inserting a "glow in the dark" green fluorescent protein gene from jellyfish, visible under a fluorescent or confocal microscope. The group has also found that neural stem cells genetically engineered to express a missing enzyme, galactocerebrosidase, are more resistant to toxic damage in a mouse model of Krabbe disease.

Ultimately the team's work has the potential to improve the mobility and quality of life of the many people suffering from debilitating nervous system diseases such as Multiple Sclerosis.

ANIMAL MODELS TO BENEFIT HUMANS

The Neuronal Ceroid Lipofuscinoses (NCL), or Batten Disease, are a group of fatal inherited neurodegenerative diseases in humans and numerous animal species characterised by the intracellular accumulation of an autofluorescent lipopigment in various tissues. Symptoms include visual failure, dementia, motor disturbances, seizures and premature death.

Dr Imke Tammen, a Reprogen Research Fellow and newly appointed Sesqui Lecturer for Biotechnology working in the areas of inherited diseases and biotechnology, is currently identifying the causative genes of NCL in Merino sheep and Devon cattle. She says animal models have already been useful for enhancing the understanding of the disease, and her study could provide valuable models for the development and validation of possible treatments, including enzyme replacement and/or gene therapy.

The disease was first described in Australia in Devon cattle in 1988, and in Merino sheep in 1997. NCL in both species has an autosomal recessive mode of inheritance, but while the disease in sheep progresses quickly with death around 20 months of age, cattle show less severe symptoms (blindness and some behavioural changes) and can reach maturity in a safe environment.

Identification of the disease gene and of the causative mutation is potentially the most reliable way to eradicate the disease and a DNA test would allow unambiguous identification of all carriers and early diagnosis of affected animals. Through Imke's study, a breeding program of affected sheep and cattle has



Sesqui Lecturer for Biotechnology, Dr Imke Tammen

been established to enable gene mapping and identification of causative mutations.

The study, which is currently funded by the Batten Disease Support and Research Association, is expected to have important ramifications for human NCL research by identifying genes in cattle and sheep homologous to those mutated in human disease. Imke has already mapped NCL in Merino sheep to a region homologous to that on a human chromosome mapped for the NCL variant CLN6, the gene that causes the human late-infantile form of the disease. In collaboration with Dr D Palmer in New Zealand the sheep CLN6 gene is currently being characterised and screened for mutations.

There are at least eight different forms of NCL in humans, and sheep are now regarded as relevant models for studying this particular human variant. Future identification of causative mutations has the potential for breakthroughs in NCL treatment and management in both animals and humans.

CLOSE UP



STUDENT PROFILE BERNIE GLEESON

You came to vet science with farming experience and a passion for pigs – what did you do after you left school?

I am the third son of a farming family from Gunnedah and after completing my HSC in 1983 I joined my brothers to work on the farm in cropping, beef, lambs and wool, and pigs. We started the piggery in the mid-70s and it grew to 130 sows - it was always my favourite farming activity and because of this I became the person in the family most responsible for the piggery management.

When did you think about becoming a vet?

We made the decision to sell the farm in 1994 and I went to Western Australia to manage a piggery for two years. The people I met there and the work I was doing made me start to think seriously about a career in veterinary science. My wife, who also grew up in the country, encouraged me and I first began a science degree at the University of Sydney in 1997 before transferring across to vet science in 1998.

Has the decision been a good one?

Yes – it's been a wonderful experience and I feel extraordinarily privileged to have had the opportunity to become a veterinarian.

What attracts you to working with pigs?

I love pigs as animals but I also like the way the animal production industries are closely integrated and controlled. A vet can have a profound influence on everything from food production, health and disease management and animal welfare issues to the lifestyles and profitability of those who own and work with pigs.

What are you planning to do after graduation?

As my wife has a very good job we plan to be practical and stay in Sydney for the first 1-2 years and I hope to work in private practice. After that we both want to go to the country and I will be looking for a job either in a mixed country practice (I still like cattle, sheep and horses), a specific porcine practice (although they are rare) or working with pigs in an industry position. Further study is also an option and I would be interested in undertaking a Masters or PhD – in pig health and production of course.

Do you believe this course prepared you for your career plan?

I am in the second last year before the new curriculum reaches fifth year and I think for us there has been too much emphasis on small animals. The new curriculum should address that by giving students exposure to large animals much earlier in the degree.

What do you do in your spare time?

Read textbooks and watch football!

Who inspires you and why?

My greatest inspiration comes from all the people who have supported me so much through my recent studies. Most particularly this is my wife Helen, as well as all my family and friends and of course the staff of the veterinary faculty and the wider veterinary community. I feel sure that it is only through such support and assistance that someone as ordinary as me can achieve something extraordinary.

SYDNEY UNIVERSITY VETERINARY CENTRES

CAMDEN CLINIC OPENS ITS NEW (STABLE) DOORS

Several thousand members of the general public joined staff, veterinary company sponsors and students in June to celebrate the completion of the new and renovated stables at the University Veterinary Centre Camden. The event's focus was the official opening of the stables by Rachel Sanna, Sydney 2000 Olympic Games equestrian and longstanding client of the Camden Clinic.

Organised by Senior Lecturer Dr Christina Dart and the Camden Veterinary Centre staff, the Open Day showcased the diverse small and large animal services of the University Veterinary Centre Camden (UVCC). In addition to the diversity of animal species on display – reptiles, different horse breeds, llamas and alpacas, goats, cattle, dogs and cats - senior veterinary students provided free pet health checks, and clinic staff gave a series of lectures on equine reproduction, arthroscopic surgery, hoof conditions and parasites, and mastitis and foot care in dairy cattle. Practical demonstrations included the spectacular horse treadmill, cattle hoof trimming and the use of ultrasound.



Above: Llamas and alpacas made friends with the Open Day visitors

Left: Open Day coordinator Dr Christina Dart, Senior Lecturer and registered specialist in veterinary anaesthesia, with her dogs Zoe and Zac.



Christina enlisted the support of local Cobbitty and Camden businesses and the community – Cobbitty School catered for the day – as well as Faculty staff and veterinary students. She said, "We welcomed old clients and made new friends and, as well as providing an important opportunity to promote the Veterinary Centre to potential clients, the Open Day turned out to be one of the best team building exercises we have ever done".

CAMDEN HOSPITAL DIRECTOR



Associate Professor Andrew Dart, Hospital Director University Veterinary Centre Camden, with Sydney 2000 Olympic Games equestrian and Camden Clinic client Ms Rachel Sanna.

Tamworth before returning to Camden in 1994 as Senior Registrar Large Animal Surgery. Andrew is a Registered Specialist in Equine Surgery, Australia, a Diplomate of both the American and European Colleges of Veterinary Surgeons, and an Associate Member of the Australian College of Veterinary Scientists.

A lecturer to veterinary undergraduates, Andrew has also supervised more than thirty-five candidates in postgraduate and Australian College of Veterinary Surgeon studies - he is now the Chief (Australian) College Examiner in Equine Surgery. Andrew's research has led to the publishing of more than seventy papers in refereed journals and he has contributed chapters in a number of large animal medicine and surgery texts.

Associate Professor Andrew Dart has been Appointed Hospital Director of the University Veterinary Centre at Camden. A Queensland graduate, Andrew's career has been highly focused on developing expertise in large animal medicine and surgery, starting with a Diploma in Veterinary Clinical Studies at Camden. He undertook a Residency Certificate in Large Animal Surgery at the University of California at Davis, USA, becoming Staff Surgeon from 1991 to 1993. Back in Australia he worked as an equine surgical specialist at

CLINICS ACHIEVE COLLEGE SUCCESS

Staff from the University Veterinary Centres at both Sydney and Camden achieved outstanding results at the July 2002 College Science Week.

Successful Faculty candidates in College membership examinations were Camden Clinic Registrars **Jo Rainger** (anaesthesia) and **Rachel Tan** (equine medicine). The Sydney Clinic was also well represented with new College members Registrars **Sally Pegrum**, **Julian Lunn** and **Martine Perkins** (all small animal medicine), Resident **Craig Bailey** (small animal surgery), and Registrar **Karen Plimmer** (emergency medicine). A highlight was then-Sydney Registrar **Penny Tisdall** gaining a Fellowship in Small Animal Surgery.

Craig Bailey and Senior Registrar **Jody Braddock** (small animal medicine) won the Small Animal Young Speakers Awards at the conference following the College exams.

UNDERGRADUATE ACTIVITIES



Year 4 students with staff veterinarian, Dr Pip Friday, during one of their extramural rotations at the RSPCA.

RSPCA experience for students

The RSPCA and the Faculty are forging even stronger links with the RSPCA's inclusion in extramural rotations for fourth year students.

Students now undertake part of their clinical rotations in the RSPCA, with groups of 5 to 6 students spending a week on site at the animal welfare organisation. The year 4 students are finding the RSPCA provides excellent and varied clinical material, and their rotation includes the clinic, surgery, anaesthesia, hospital care and inspectorial matters.

Parents meet the Dean

ABC Science Show presenter Robyn Williams, the University of Sydney Chancellor, The Hon Justice Kim Santow, and the Dean, Professor Reuben Rose, addressed Year 1 students and their parents in June during a special evening that gave students and parents an opportunity to learn about some of the initiatives undertaken by the Faculty and the Veterinary Science Foundation. Student musicians Andrew Peters, Rachel Kent, Laura Bewley, Richard Lam, Louisa Ho and Sujatha Ramoo reinforced the tremendous diversity of the Faculty's undergraduates.

Exercise Minotaur testing students as well as vets

Learning opportunities from Exercise Minotaur, the highly publicised national foot and mouth response simulation, were extended to veterinary students through a workshop on the principles of emergency disease management.

One hundred and twenty Year 3 students tackled the issue of

'sudden death' during a September 2002 visit to the Elizabeth Macarthur Agricultural Institute (EMAI) at Camden as part of a series of weekly case studies in second semester.

The students were taken through the process adopted by NSW Agriculture when a producer submits a tissue or blood sample from a dead or sick animal, and quizzed on the correct sequence of events following an emergency response announcement (they were considered 'up to speed'). Their visit coincided with the actual simulation and is part of a push by EMAI and the Faculty to build on existing collaboration and to develop future joint projects.

Vet Soc supports Taronga

Enhancing the Faculty's inclusion of wildlife in the curriculum through Veterinary Conservation Biology and its close working relationship with Taronga Zoo, the Faculty's student representative group Vet Soc

sponsors one of the Zoo's most unique animals, a New Zealand Tuatara. The group has contributed \$500 each year for the past three years towards the Tuatara, a creature that is described as one of the sole survivors of a group of reptiles that died out with the dinosaurs about 65 million years ago.



Veterinary students Andrew Peters and Laura Bewley were two of the student musicians providing background music for the Year 1 Evening with the Dean.

FACULTY STAFF NEWS



Dr Richard Malik's (above) long-standing work on diseases of the cat, including feline lymphosarcoma, cryptococcosis and leprosy-like diseases, has contributed to his international standing and recognition.

Faculty staff members have recently been honoured with exciting and prestigious awards and appointments:

Feline specialist and Post Graduate Foundation in Veterinary Science Valentine Charlton Fellow **Dr Richard Malik** received the 2002 *European Society of Feline Medicine International Award for Outstanding Contribution to Feline Medicine* when speaking in Munich in September. Richard is the only Australian veterinarian to be acknowledged by this Society at the highest level.

Dean of the Faculty, **Professor Reuben Rose**, was presented with the *VMS Award for Excellence in the Equine Veterinary Field*, announced at the July 2002 Bain Fallon Equine Conference. This Australasian equine award recognises leadership and enterprise, contribution to knowledge, involvement in postgraduate education and significant contributions to the equine veterinary profession.

Professor Richard Whittington received the *Ian Clunies Ross Memorial Award*, an honour given to a young veterinarian who has made an outstanding contribution to veterinary science in Australia and New Zealand.

The recent World Veterinary Congress elected **Associate Professor Tony English** *Chairman of the World Association of Wildlife Veterinarians (WAWV)* for the next 4 years. The WAWV, which is part of the World Veterinary Association, has over 400 members in 50 countries.

Dr Kathy Zhu, a Research Fellow working with Professor David Fraser and Dr Heather Greenfield in the field of nutrition, was awarded the *Young Investigator Award* for her presentation "Effects of milk supplementation on bone mineral accretion and bio-markers of bone turnover in Chinese adolescent girls".

Dr Rosanne Taylor received a *Vice-Chancellor's Award for Outstanding Teaching 2002*.

In other staff news, **Associate Professor Andrew Dart** has been appointed new *Hospital Director of the University Veterinary Centre Camden* (see story page 6); **Dr Imke Tammen**, is the Faculty's *Sesqui Lecturer in Animal Biotechnology*; **Dr Michelle Hyde**, *Senior Lecturer*; **Dr Mark Krockenberger**, *Lecturer in Veterinary Pathology*; **Dr Jody Braddock**, *Lecturer in Small Animal Medicine*; and **Dr Jan Williamson** is *Practice Coordinator of the University Veterinary Centre Sydney*.

Fort Dodge sponsored the 2002 J D Stewart Address delivered by Professor Lonnie King. From left Mr John Heath (Fort Dodge), Professor King, Mr Rob Barclay (Fort Dodge) and Dean Professor Reuben Rose.



Kristen Clarke

21st CENTURY VETS SAFEGUARDING HUMAN AND ANIMAL HEALTH

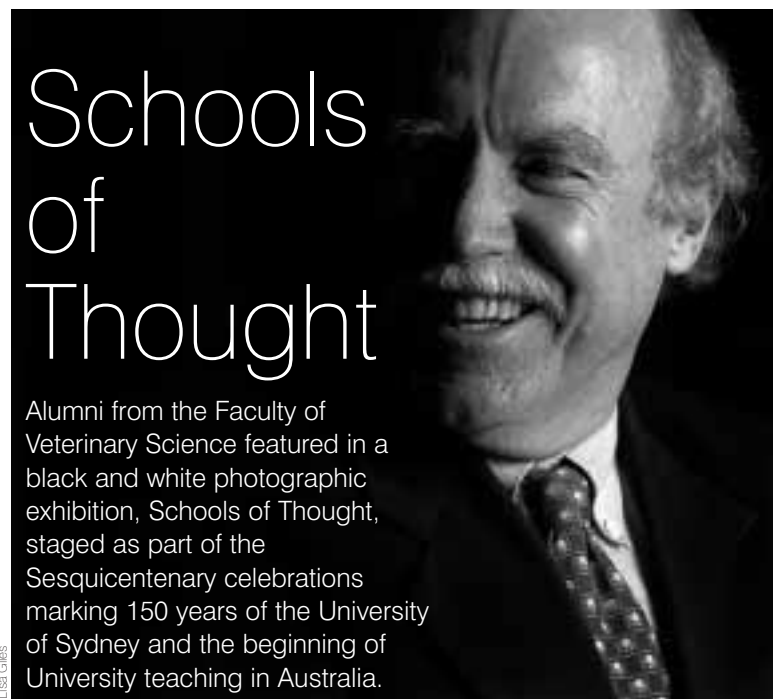
Professor Lonnie King became only the second veterinarian to address the National Press Club in Canberra (the first was Nobel Prize winner Professor Peter Dougherty) during a visit that contributed significantly to current debate on exotic disease surveillance and preparedness, food animal health and production, the rural vet crisis, and future veterinarians and their place in public health. He visited Australia in August as a guest of the Faculty of Veterinary Science, presenting the 2002 J D Stewart Address, sponsored by Fort Dodge. His visit was also supported by a University of Sydney Good Neighbour Grant.

Professor King is Dean of the College of Veterinary Medicine at Michigan State University, USA. He recently spent time at the Centre for Disease Control in Atlanta working on infectious diseases (he is involved in the current US outbreaks of West Nile disease), and his previous role was Administrator of the Animal and Plant Health

Inspection Service for the United States Department of Agriculture (USA's chief veterinary officer).

His time in Australia coincided with the federally-funded Rural Veterinary Review, and the visit to Canberra, with Dean Professor Reuben Rose, included discussions with key federal Ministers and their staff, senior staff from Agriculture, Fisheries and Forestry Australia and the Department of Education Science and Training, and Animal Health Australia.

Professor King's National Press Club address – Safeguarding Human and Animal Health: the Changing Face of Veterinary Medicine in 2002 – highlighted the expanding role of the veterinarian and issues of bioterrorism, zoonoses and emerging disease. The address can be viewed on the Veterinary Science Foundation website – www.vetsci.usyd.edu.au/Foundation.



Portrait of Professor Graham Mitchell AO, Faculty of Veterinary Science alumnus, featured in *Schools of Thought*.

Created by photographer Lisa Giles, the collection of fifty images presented insights into the University's community of students, teachers and alumni - from laboratory technicians to professors, people respected for their work, and contributors to the University's outstanding tradition of teaching - and of being taught.

Alumnus Professor Graham Mitchell, Director of Foursight Associates Pty Ltd, featured prominently. Lisa commented, "I knew from my initial phone conversation with Dr Graham Mitchell that this would be fun - he has a warm personality..... Graham is passionate about biotechnology, and the firm he runs with Sir Gus Nossal AO, which advises high profile Australian investors on industry

opportunities. I found it refreshing that he could be so approachable and it is easy to see why he would have been comfortable as Director of the Melbourne Zoo."

Dr Rosanne Taylor, another alumnus in the exhibition, is a Senior Lecturer at the Faculty, a researcher conducting work on stem cells and is highly committed to teaching as Chair of the Faculty's Teaching and Learning Committee.

Lisa Giles has spent the past three years in Sydney working with professional portrait photographer, Stuart Spence. This is her first solo exhibition of portraits. The exhibition can still be viewed on the University's website at: www.usyd.edu.au/sesqui/SchoolsOfThought

CLOSE UP



Anne Quinn

DR GLENN SHEA

What are your current positions?

Senior Lecturer in Veterinary Anatomy, First Year Coordinator, and Sub Dean for Bachelor of Science (Veterinary).

What qualifications do you hold?

Bachelor of Veterinary Science and PhD, both from the University of Sydney.

How did your career begin?

I have always been fascinated by reptiles, even as a child, and I did Veterinary Science because I felt it was going to be a useful, competitive, applied biological science degree to help me achieve a research career in this field. Discovering, as an undergraduate, the wealth of information held in university libraries confirmed my feelings that this was the best place to work. After graduating, I applied for a job as one of two part-time demonstrators in Veterinary Anatomy, and being only the second applicant, Professor Brian Farrow rang and asked when I wanted to start!

What are your current key projects?

I am working on a variety of reptile projects, including taxonomic revisions of New Guinea skinks, Australian whip snakes and blind snakes, evolutionary relationships among the pygopod lizards, reproduction in a number of lizards and snake lineages (particularly male and female reproductive cycle seasonality and long-term sperm storage by the reptilian oviduct), and collaborative field surveys with the Australian Museum and the Australian Herpetological Society of the reptile and frog fauna of western NSW.

I'm also presently collaborating with two other authors on a field guide to the reptiles of New South Wales, and slowly accumulating the information to write a history of Australian herpetology. All these studies are essential to developing a basic platform of knowledge about the Australasian reptile fauna – knowledge taken for granted as available for other species such as birds and mammals.

What project is giving you the most satisfaction at the moment?

Sorting out the identity and relationships of a major group of New Guinea skinks, considered too difficult to differentiate for over a century. Luckily, the very large collections (I'm talking several thousand specimens) stored in museums in the USA, Australia and the Netherlands over the past forty years are helping to solve the problems. These skinks are related to the largest lineage of Australian skinks, so this knowledge will contribute to their subsequent analysis.

What have been recent career highlights?

My hundredth research paper (recognition of a major new lineage among primitive skinks), and descriptions of two bizarre new genera of skinks.

What do you do in your (limited) spare time?

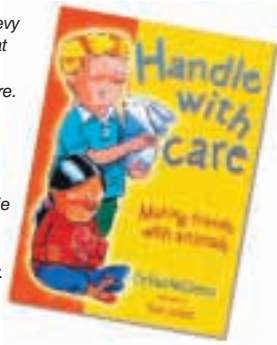
Spare time - what's that? Outside the University and Australian Museum (I'm a Research Associate of the Museum), I promote amateur involvement in herpetology, primarily through the Australian Herpetological Society (I've been a committee member for over two decades). I'm also on the Native Animal Keepers' Consultative Committee with National Parks and Wildlife Service, the Non-Indigenous Animals Advisory Committee of NSW Agriculture, the Peter Rankin Trust Fund in Herpetology, and the Australian Museum's Animal Care and Ethics Committee.

Who inspires you and why?

Vet students and amateur herpetologists. Both are unbelievably keen to learn. Amateurs have contributed in a variety of major ways to developing our knowledge of the diversity and biology of the Australian herpetofauna, all simply for the sake of gaining more knowledge.



Dr Paul McGreevy signing books at the launch of *Handle with Care*. The book was launched by Channel Nine Animal Hospital presenter Lochie Daddo at the vets@work 2002 Open Day.



because of some ill-considered human action. "Animals and children can gain so much from playing together if the kids, and parents, are equipped with the right information."

He also believes in the important lessons children can learn from animals. "Having a pet teaches children all sorts of things – empathy,

HANDLE WITH CARE

Senior Lecturer and animal behaviour expert Dr Paul McGreevy is passionate about the human-animal bond, and about exploring and encouraging behaviour that enables people and animals to live together in harmony. His new book, *Handle With Care*, may be a children's book, but it's just as relevant for adults and it's designed to explain animal behaviour, how animals talk to each other, and how children and grown-ups can safely meet and make friends with all kinds of animals, large and small.

Paul says children instinctively want to approach and interact with animals, and this sometimes results in injury – nearly half of all dog bites occur

tolerance, responsibility and gentleness," Paul says. "And the animals can benefit too when children know how to handle them properly."

Handle with Care is sponsored by the Veterinary Science Foundation and endorsed by both the Royal Society for Prevention of Cruelty to Animals (RSPCA) and Kidsafe. In recognition of the book's role as an important educational resource for children and parents, the Veterinary Science Foundation is sponsoring the distribution of the book to every NSW state school.

Handle With Care – P McGreevy, Halstead Press, hardback RRP \$27.95, ISBN 1 875684 76.

SHARED LEADERSHIP

The Faculty's leadership program – Shared Leadership for our Future – is a bold and exciting development for a University Faculty, and reflects the Faculty's commitment to its staff and confidence in their capacity to work together as a cohesive team despite the enormous challenges we face.

The program, which is open to every staff member, explores the concept of exercising leadership at all levels, of effective collaboration and team work leading to positive change, and encourages individuals to 'accept personal responsibility and shared leadership for our future', a key inclusion in the Faculty's culture statement.

Shared Leadership has been designed and facilitated by Maxime Fern and Michael Johnstone, from Vantage Point Consulting. The 2002 program, which produced enthusiastic and positive feedback from participants, commenced in June with a 2-day interactive seminar for fifty members of staff, and was followed by two intensive weeks in July and October for twenty staff. The participants were drawn from all areas of the

Faculty (clinicians, academics, technical and professional staff), and from both Sydney and Camden campuses, providing the added benefit of pulling together staff normally located in different - and often distant - areas of the Faculty.



Maxime Fern and Michael Johnstone, Vantage Point Consulting, facilitators of the leadership program.



The Faculty's first group of leadership program participants.

VEIN

www.library.usyd.edu.au/VEIN/

The Veterinary Education and Information Network (VEIN) website continues to grow exponentially with more than 32,000 unique page hits during September (and over 309,000 page accesses since the site's launch in May 2000).

New features include Dr Robert Dixon's Exotic Diseases resource, the Merck Veterinary Manual and the VEIN Directory of Organisations. The Library is currently working on more links pages including a diseases gateway index, small business

management and a pig gallery. Current top twenty pages include horses, animal behaviour, cattle, dogs, production animal toxicology, marine mammals, sheep and legislation and standards.

VEIN, a partnership between the Sydney University Library, Post Graduate Foundation in Veterinary Science, and the Veterinary Science Faculty and Foundation, is the leading information service for veterinarians and animal scientists in Australasia.

For further information about VEIN, contact Su Hanfling, Coordinator Library Services (Life Sciences), on (02) 9351 5426 or email S.Hanfling@library.usyd.edu.au.

A Market Update from the Director.



Mark Morrison
Director: Companion Animal Business

Strong Sales Growth for the Flea Market



Merial is focused on bringing more pet owners into veterinary practices.

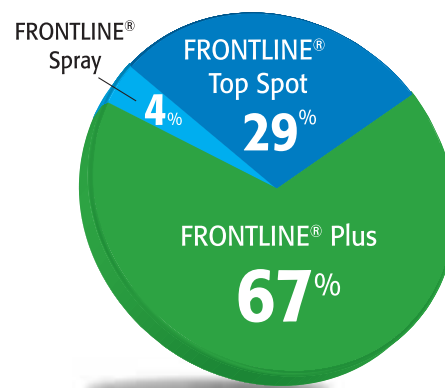
Each quarter, Merial invests over \$1 million dollars in various activities designed to bring more pet owners into veterinary practices.

In the 9 months to September 30, the market place has experienced strong growth on prior year, with FRONTLINE sales by veterinary practices in 2002 exceeding 2001 levels by over 30%. Importantly, this represents real market growth, and not just changes in market share. That is great news for veterinary practices.



Merial Australia Pty Limited, Level 6, 79 George Street, Parramatta NSW 2150 (ACN 071 187 285)
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A FRONTLINE® Plus Update



Within 3 months of launch, FRONTLINE® Plus represents over 67% of total FRONTLINE® sales in both dogs and cats.

As in the United States, the profession has readily adopted the new technology that offers superior results for pet owners.



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