anzccart
HUMANE SCIENCE

NEWS

Volume 31, Number 2, 2018

Inside this issue:

Vale: John Schofield 1

2018 ANZCCART AEC Member of the Year Award Recipients Honoured 3

ANZCCART 2018 Conference Review 4

2018 ANZCCART (NZ) Animal Care Award Winners 6

Recent Articles of Interest 7

- Humane Studies of Octopuses get a Boost
- Dogs Could be More Similar to Humans Than we Thought
- We are Getting Closer to Transplanting Pig Organs Directly into People
- The Mice with Human Tumours: Growing Pains for a Popular Cancer Model

Vale: John Schofield

As many people are now aware, John Schofield passed away suddenly a few months ago. John has been a member of the New Zealand ANZCCART committee for many years and played a central role in the organisation of ANZCCART conferences in New Zealand and a large proportion of the publications produced by ANZCCART New Zealand. In fact, much of John's final day was spent at a meeting of the ANZCCART New Zealand Committee, discussing work he had been doing on our behalf and work he was planning to do.

John was well known among delegates at both ANZCCART and ANZLAA conferences, where his extensive knowledge, breadth of experience, gregarious nature and sense of humour meant that even if he was not presenting, he was thinking, questioning and helping out anyone and everyone he could. His regular presentations at these conferences always challenged, educated and amused his audience. These presentations were inevitably humorous and frequently included John demonstrating his tremendous musical talents as well.

Delegates at this year's ANZCCART conference and future meetings will miss out on learning what has been happening at John's favourite fictitious research institute (appropriately located on an island located between Australia and New Zealand) and their intrepid Animal Ethics Committee. The only way this deficit could be addressed this year, was to temporarily retire John's traditional slot in the conference programme, so the final morning of the conference began with a memorial and a minutes silence.

What follows, is a tribute to John that has been prepared by Pete Hodgson, the Chair of ANZCCART in New Zealand and long term friend of John Schofield.

John Schofield

7/6/1950 — 9/5/2018

Even as he would lean into the conversation – empathetically, attentively, cynically – you knew that at any moment John's mind could dart off in any of a dozen different directions. And then sometimes it did, proving the point with some startling or insightful remark.

Yet one could never describe him as mercurial; he was always too reliably on the other person's wavelength for that adjective to fit. Maybe effervescent would be a better word, or restless, or even impetuous.

Certainly, he epitomised the oft quoted man of many parts. His love of family was core, and the names of family members would pepper his conversation to demonstrate to others just where he was centred. And he went from there. He made and threw dozens of boomerangs, practised his golf swing with a tenacity bordering on obsession, kayaked, windsurfed and biked. He played the clarinet and Irish whistle.

In retirement he decided to take up portraiture: 'how hard can it be?'. Portrait after portrait flew off his easel. Some were decidedly works in progress, though that never troubled him, but some were jaw dropping. At his funeral people spoke of him as a Rotarian, a volunteer for Presbyterian support, a musical entertainer at a local rest home, a long-term mentor for an uncertain teenager. His default position was to be kind.

John's commitment as a veterinarian eclipsed all other passions, even in retirement. He completed his degree in 1974 and by 1978, having married the love of his life Lesley, and having completed the obligatory few years in club practice – Wairarapa – he fetched up in Chicago and began his career as a laboratory animal veterinarian, gaining qualifications (DACLAM]) and two children (Alex and Katie) during his 12 years there.

From 1991 until retirement in 2013 he was the veterinarian at the University of Otago, 'an outstanding professional gentleman' said a referee on his appointment. It was in those years that John made his mark throughout Australasia as a strong supporter of the ethical use of animals in research, as an advocate for laboratory animal welfare, and as a teacher of postgraduates and academics. As manager of the animal facility, Lesley was his vocational partner throughout.

For all his gentleness and impish grin, he was unforgiving of shortcuts or anything that offended his professionalism. The day before he died, at yet another animal welfare meeting, he thundered - regarding an institution guilty of a minor transgression: 'do these bastards know that what they are doing is against the bloody law?'

Not that he was a stickler for the rules. It depended whether the rules were up to the mark. If so then they ought to be followed; if not then his characteristic irreverence would be brought to the task of ridiculing them.

And he knew what he was talking about. One commentator described John's knowledge as encyclopaedic. His papers were a fixture at conferences, especially ANZCCART, where everyone got to meet him sooner or later, often – said a wag on his death – from the other side of the room. Ethical dilemmas were foisted on delegates, typically invented in preposterous settings, all the better to cause one to think. Ever the teacher; ever seeking to improve.

And ever seeking to learn. Recently MPI gave him the task of the 5-yearly audit of animal experimentation undertaken at AgResearch. 'I'm having a shit hot time' he said on the eve of his death. 'Learning heaps'.

He died early one Wednesday morning, suddenly, from a stroke. It was a most terrible shock.

One person describing the last she saw of John the evening before said 'we were waiting for the taxi when he walked past us on his way up to the University Book Shop. "It's just a block," he said and off he strode up the road.'

A perfect metaphor for his life: always reading the next book; always striding off somewhere.

2018 ANZCCART AEC Member of the Year Award Recipients Honoured

The recipients of the ANZCCART AEC Member of the Year Award for both Australia and New Zealand were announced at the conference dinner held in Canberra last month. This award, which is now in its tenth year, aims to recognise the outstanding contributions made to science, animal welfare and the AEC system in Australia and New Zealand each year made by members of Animal Ethics Committees who are often unpaid volunteers.

We would like to congratulate Mr Leigh Taylor from Adelaide, who was the recipient of the 2018 award in Australia. Leigh is a very worthy winner of this prestigious award as he has now devoted 20 years to Animal Ethics Committee work in Adelaide as a dedicated category D member. Leigh is currently serving on 5 AECs and so regularly faces more than one meeting a week, which is not a trivial undertaking when the agenda papers for some of those committees regularly exceed 1000 pages. Of course, as a semi-retired legal practitioner, Leigh is well accustomed to reading a lot, but over the years he has had to adapt to doing so by using a variety of electronic formats as well as hard copy versions, depending on the preference of the Institution. Not surprisingly, Leigh's other role as a highly respected lawyer has meant that he is also quite commonly asked to provide legal guidance to the AECs on which he serves and has always been willing to do so. Equally, his strong legal background also provides a framework for his review of each application considered, that helps to ensure those who gain approval are subject to an appropriate level of scrutiny.

This year, the New Zealand judges were unable to decide between two nominees for this award and so the decision was made to honour the service of both Dave Morgan and Deborah Samson by naming both as recipients for 2018.

Dr Dave Morgan from Lincoln was recognised for his 30 years of service to the Landcare Research AEC and its forerunner organisations. The predominant nature of the research work that this committee considers is in the area of wildlife conservation and vertebrate pest management and Dave was responsible for developing and implementing a comprehensive Code of Ethical Conduct to enable researchers to operate in compliance with animal welfare legislation. Dave has served as an MPI-accredited reviewer since 2003, assessing compliance by animal research organisations with the Animal Welfare Act. His reviews have often been recognised by research organisations as very helpful in enabling improvements to both compliance systems and animal welfare practice. He has also served on the National Animal Ethics Advisory Committee (NAEAC) for 7 years, including 4 years as Deputy Chair. His long term of activity in all four roles (i.e. scientist, AEC Chair, NAEAC member and independent reviewer) has enabled Dave to contribute much to the development of the animal ethics system and its implementation in NZ.

Dr Deborah Samson from Auckland was recognised for her exceptional service to the University of Auckland AEC for over 12 years. As a representative of the New Zealand Veterinary Association, Deb has taken time off from her small animal veterinary practice, raising a family and completing her Master of Veterinary Medicine to volunteer on the AEC and to mentor other veterinarians and support staff, particularly in the area of fear-free animal handling techniques. Deb has also taken the extraordinary step of ensuring she researches any and all techniques that are part of any proposal going before her AEC so she is in a position to advise and support her fellow members through the review process.

ANZCCART would like to congratulate all this year's recipients and advise that we are now open to receiving nominations for 2019.

ANZCCART 2018 Conference Review

Yvonne Beynon

I would like to thank ANZCCART and the Office of Research Ethics and Integrity (OREI) for making it possible for me to attend this conference. This will be the 5th conference I have attended in my 8 years as a Category C member on the University of Melbourne, Faculty of Science's AEC.

First a bit of sad news. We were informed that John Schofield died suddenly in May. I only know John through the conferences. He was definitely a "twinkle in the eye" person with a passion for animal welfare. I am sure he is sorely missed by family, friends and colleagues.

I always find it a challenge to briefly review these conferences. Please note that what follows is my interpretation of what was presented and not necessarily that of the presenters or ANZCCART. Unashamedly I admit to using phrases and sentences directly from the various abstracts so that I get the presenters' wording as correct as possible.

This year's theme was "Keeping it Relevant", but keeping what relevant? Does this refer to ANZCCART or AECs; research or new innovations or The Code (8th edition of the *Australian Code for the care and use of animals for scientific purposes*) and other supporting publications? My sense of this conference was that all of the above were touched on in their relevancy to the 3Rs – Reduction, Refinement; Replacement.

Reduction: using the least number of animals possible while still getting useful, reliable data

Reduction is accomplished by designing a research project that has been well planned, so that all the steps to reach useful, reliable data have been mapped out and the number of animals needed governed by good statistical computation. Prior investigation into what research has gone before is important. Needless repetition means animal wastage. Poor choice of the animal model and poor design can also mean animal wastage. A research project wastes animals if it cannot be faithfully duplicated and so randomisation, omission of bias and a reproducible experimental environment are extremely important in good research design. True and unbiased publication of results also lead to best practices in reduction. Geoff Dandie (ANZCCART) discussed why ANZCCART has formally endorsed the ARRIVE and PREPARE guidelines. It is felt that these guidelines will be of great assistance in the reduction of animal use. ARRIVE (Animal Research: Reporting of *in vivo* Experiments) guidelines are aimed at experimental authors; journal dditors; peer reviewers and funding bodies and can assist AECs. PEPARE (Planning Research Experimental Procedures on Animals: Recommendations for Excellence) guidelines were prepared as part of Norecopa's ongoing efforts to reduce waste and increase the reproducibility of animal research and testing. It is a highly useful tool for planning the stages of a project and can act as a prompt for researchers to ensure all requirements are met. It will help improve compliance and has a strong focus on animal costs/harm vs the benefits of the proposed research. It is an excellent tool for AECs. Clive N May (Preclinical Critical Care Unit; Florey Institute, Vic) showed how important it was to choose the right animal model. Margaret Rose (Prince of Wales Clinical School; University of NSW) pointed out the flaws in experimental design that could reduce a research projects validity. She asked: "If research has no scientific validity then is it ethically acceptable?"

Refinement: ***minimising potential suffering and improving animal welfare***

Jillian Barr (Director) and Mary Bate (Assistant Director; Ethics and Integrity Section, Research Quality & Priorities Branch, NHMRC) presented the results of the recent survey by ORIMA on behalf of NHMRC. It was found that *refinement* was the most common area of misconception of the 3Rs. Joy Verrinder (Animal Welfare League, Qld), as part of her presentation "Can ethics be considered a science?" discussed how we now have a number of parameters for measuring well-being in animals. She pointed out that the same region of the brain in all animals registers artificial negative arousal. Fear of harm and death is

intrinsic. The area of the brain that responds to physical pain has also been shown to respond to social pain. One of the topics in our second workshop was, "When is pain too much pain?" The importance of proper analgesics and anaesthesia; a good understanding of the natural behaviours of your animal model; good intervention/endpoint criteria using several parameters and good monitoring of individual animals were paramount to good animal welfare. Megan Fisher (CSIRO Australian Animal Health Laboratory, Vic – PC3/4) and Jodi Salinsky (Animal Welfare Officer / University Vet, University of Auckland) showed how environmental enrichment was used to help alleviate stress of animals in confinement situations and how handler/animal training assisted in less stressful methods of animal handling and data collection. Tristan Reid (CSIRO Australian Animal Health Laboratory, Vic – PC3/4) demonstrated how a new surgical implant was a superior way of measuring a ferret's body core temperature than the currently used subcutaneous microchip. In a pilot study, although the surgical procedure was more invasive for the implants, there was less handling post-implant as body temperature was measured remotely. Constant temperature readings, post–introduction of a highly pathogenic avian influenza, gave better and earlier indication of the animal reaching endpoint criteria. The main negative was the costs involved in surgery, wifi monitors and laptops. Gail Anderson (Animal Welfare Officer, University of Adelaide) showed us a number of low-fidelity and high-fidelity non-animal models, that were used by medical and vet trainers in initial teaching stages of invasive procedures. It was found that students allowed to gain skillsets incrementally using models had more confidence when they moved to the next stage of training using cadavers or live animals/humans. Training for venal punctures, intraperitoneal injections, rectal examinations, calf presentation *in uteri* are a few examples of models used for initial training. (A Canadian company, Veterinary Simulator Industries, produce various life-like animal parts with 'bells and whistles' that can simulate subtle or gross variation as might be encountered with a real animal). Gail pointed out that some of the low-fidelity models were just as effective as the high-fidelity ones and could be made from materials at hand with a little ingenuity. Leigh Taylor (Cat D of multiple South Australian AECs) and Arnja Dal (Chief Scientific Officer SPCA, New Zealand & NZ ANZCCART Board Member) stressed that AEC members, especially external members, should have confidence in their ability to understand the impacts of procedures to animal welfare and feel able to ask questions and voice doubts. Training may be necessary to give them confidence to have their say.

Replacement: where possible, replacing animal use with alternative techniques

The ultimate goal where possible. Certainly great steps have been made since the coming of sophisticated technology, like supercomputers and life-like models. Amanda Buyan (Research School of Biology, Australia National University) and Steve Fairweather (Biomedical Sciences & Biochemistry, Australia National University) showed two different projects where computers are used to show the effect of various drugs on conditions like epilepsy, chronic pain and myocardia at a cellular level. Drugs can be tested on computer models of protein and nerve cells that have been produced from a patient's cells, instead of using animal models. The reaction of these cells will be a better indicator of how the patient will react than the animal model. Molecular Dynamic simulations and Rational Drug Discovery programs reduce the number of animals needed to test drugs for a number of conditions. Computer models can be used in drug discovery. pre-clinical studies and post-approval stages. In other instances, computer models can be constructed and tested for various scenarios once enough base data is gathered using animal models. Despite these innovations, it was generally felt that not enough effort by institutions, their financing bodies, and researchers goes into seeking alternatives to animal use and that AECs may be too accepting in relying on researchers' statements regarding alternatives. It was queried that a listing of successful non-animal usages, i.e. an electronic reference library, could be developed and made accessible through an inter-State/cross Tasman body such as ANZCCART.

The 3Rs are an integral part of The Code. Karina Burns (PhD Candidate, Dept of History, University of Adelaide) is studying how the current system of animal research regulation has been influenced by the cultural and political climate between 1969 and 2013.

Some examples are:

- 1996-1984: animals are referred to as a "tool" of research
- 1985-before 5th edition: "ensure considerate treatment of animals in research"
- 5th edition: greater emphasis on the 3Rs
- 6th edition: need to ensure use of an animal is justified
- 8th edition: "An obligation to respect animals.." underpins the Code
- In 2013 the word 'sentient' is first used in the Code.

Linda Hearder (Principal Consultant, Dept of Education, Western Australia) argued that The Code is not relevant, or at least not a 'good fit', for regulating the use of animals in schools and especially in farm schools. She believes the mechanism of AEC oversight for low impact, short term use of animals in primary and high schools is inefficient and cumbersome, with inconsistency in which applications go for approval and which activities are deemed "pre-approved". Technically farm schools do not require approval by an AEC, yet there is a potentially greater risk for animals and humans. She would like to see a review of the Code as it relates to schools and a simplified, more manageable code of regulation.

Malcolm France, (Independent consultant in laboratory animal care and management, Sydney) presented the many biases that can occur in opinion polls and the care needed in interpreting polls on public attitude towards animal research, concluded that some of the more robust polls show a downward trend in support for animal use in research, both in Australia and New Zealand. He asked "Would it be beneficial for Australian institutions to align their training requirements and share educational resources in order to promote some degree of standardisation of training in Australia?" The University of Western Australia's Deirdre Bourke and Melissa Lindeman had conducted an online survey in 2017 regarding education and training programs for researchers, teachers, animal care staff and AECs trans-Tasman. It showed a strong support for standardisation of education and training for those working with animals in science and for those deciding on appropriateness of applications. One of the greatest barriers is the difference in the relevant regulatory frameworks between Australian regions and between Australia and New Zealand. The success of a standardised training program would be dependent on all parties being "on the same page". There was much discussion and other presentations regarding standardised regulation and training. In an open forum all agreed that some type of accredited modules should be made available for institutions and researchers. Training for AEC members was also agreed upon as needed.

Questions arose as to what type of modules should be offered; the manner in which the modules will be delivered; who will be the accreditors for both the organisation and trainers and what would the timeframe be for requiring refresher training? Although ANZCCART is not a regulatory body, could it be the 'host' of such a program? It may be necessary to lobby the various States/Territory governments to work together to standardise regulations regarding animal welfare as this would facilitate a country-wide accredited training program for researchers, AWOs, animal facility technicians and AEC members. If ANZCCART was to start the ball rolling, how would it be financed and staffed? Many suggestions were made as to examples of systems already out there that have accredited training. What the first modules might be was also discussed. What was resolved is that ANZCCART, with the help of some of the other affiliated organisations, would begin the process of developing the idea of standardised training Trans-Tasman.

Geoff Dandie (ANZCCART) has asked for any examples of training modules used by institutions for AECs or research methods, that they would be willing to share, that could be used as a basis of a common training module and ways to finance the development and delivery of such programs to be emailed to ANZCCART.

So you who are reading this get your thinking caps on and contribute if you also feel standardisation in regulations and accredited training will bring about better standards in animal welfare in research.

Next Conference: 23 to 25 July 2019
Hobart, Tasmania

2018 ANZCCART (NZ) Animal Care Award Winner

Technicians and research assistants working in research, testing and teaching organisations are the personnel who make the use of animals possible in a wide range of experimental situations. ANZCCART New Zealand has established a national award to recognise the significant contribution made by individual New Zealand-based technicians, particularly in regard to the welfare of the animals.

The winners of the 2018 ANZCCART (NZ) Animal Care Award are the technicians of the Large Animal Unit, which is part of the Vernon Jansen Unit, Faculty of Medical and Health Sciences, University of Auckland.

The unit supports research groups working on fetal physiological monitoring, chronic ischaemic heart disease and stroke, vocal cord repair, and gastrointestinal monitoring with sheep, pigs, rats, mice, rabbits and guinea pigs, providing surgical and anaesthetic services, and training, pre and post-surgical care, and welfare monitoring.

The 2018 award is for their work:

- establishing animal health induction processes for each species to determine specific welfare issues; refining animal handling and transport procedures to reduce animal handling stress;
- refining anaesthetic and surgical procedures, to help speed animal recovery;
- developing welfare monitoring sheets for different experimental procedures, that incorporate welfare monitoring good practice;
- providing surrogate companion animals for sheep, to reduce stress – Bob the sheep. Bob is a cardboard box covered in sheep skin with a mirror attached to the side to allow the sheep to see another sheep looking back.

Their work to ensure excellence in animal management and monitoring and expert clinical services has seen very successful research outcomes, including treatments that have successfully transitioned from lab to clinic.

Runners up for the award, with a Highly Commended mention, were the Malaghan Institute of Medical Research in recognition of their outstanding commitment to improving animal welfare at Victoria University of Wellington. In researching the immune system to fight diseases such as cancer and allergy, the team have included modern circadian rhythm lighting in their facility; used embryo cryopreservation to reduce the numbers of animals used; and introduced a compassion fatigue programme for staff. By using modern sampling techniques, they have also managed to reduce live animal use by 60% without any reduction in pathogen detection capabilities.

Recent Articles of Interest

Humane Studies of Octopuses get a Boost

Cephalopods might not seem to be ideal laboratory animals however their unique biology and behaviour have made them vital to researchers in many fields. Because of their complex brain they have been given similar protection to vertebrates in Canada, the European Union, New Zealand, and some Australian states which means that ethical approval is needed when they are used in experiments and anaesthesia is also required for procedures that could cause pain.

Either ethanol or magnesium chloride has been used mostly for anaesthesia as they have both been shown to have a paralysing effect, with the cephalopods recovering quickly. European researchers raised concerns that the drugs might be more muscle relaxants, blocking movement but not pain, and so further studies into pain responses were undertaken. One of the experimental techniques undertaken involved an anaesthesia being added to seawater in the tanks of three cephalopod species. Their nerve signals were then monitored by attaching electrodes to a nerve located just inside the mantles of the animals and their skin was lightly pinched at regular intervals.

Both the ethanol and magnesium chloride were found to suppress pain signals however the results did show that each drug had some limitations and the researchers needed to adapt

their practices accordingly in the laboratory. Overall, the findings did reassure the researchers that they were treating their subjects humanely as well as being compliant with the law.

The full article can be read at:
http://science.sciencemag.org/content/360/6384/14.full

Dogs Could be More Similar to Humans Than we Thought

Dogs, like humans, have a growing obesity problem and a recent nutritional study on gut micro-organisms suggests they have more similarities to humans than pigs or mice.

Researchers from the European Molecular Biology Laboratory, in collaboration with Nestle Research, explored how different diets react with the gut micro-organisms of dogs. An equal number of retrievers and beagles, with each breed having equal numbers of lean and overweight dogs, were used in a randomly controlled trial. The eight week trial involved a normal diet fed to all dogs for the first four weeks. The group was then divided randomly in two with one group being fed a low-carb, high-protein diet and the other group fed a high-carb, low-protein diet for the remaining four weeks.

DNA was extracted from the stool samples taken at four and eight weeks of the trial and the researchers created a dog gut register of over one million genes. This register was compared to existing data from humans, pigs and mice and the findings suggest that dogs could potentially be a better model for human nutritional studies and in turn, humans could potentially be a good model to study the nutrition of dogs.

Read more at:
https://www.alnmag.com/news/2018/04/dogs-could-be-more-similar-humans-we-thought?et_cid=6319555&et_rid=454969632&type=cta&et_cid=6319555&et_rid=454969632&linkid=https%3a%2f%2fwww.alnmag.com%2fnews%2f2018%2f04%2fdogs-could-be-more-similar-humans-we-thought%3fet_cid%3d6319555%26et_rid%3d%%subscriberid%%%26type%3dcta

We are Getting Closer to Transplanting Pig Organs Directly into People

Thousands of people worldwide are waiting for organ transplants and when the organs do become available they are not always a match for the people on the waiting lists.

The organs of pigs share genetic characteristics with humans, and scientists have long-been researching how these organs can be used. There have always been problems with the human body rejecting the pig organs and also with an existing virus in pigs, known as PERV, causing infections in humans. Using gene-editing technology, CRISPR, Luhan Yang, a scientist at eGenesis, believes she has found a way to create customised organs for human transplants from pig organs. The technology cuts through gene DNA and can edit genes to remove and alter characteristics. The technique has been used to make changes to human cells and last year enabled a pig without the virus, giving hope of one day being able to donate pig organs for transplants.

Read more at:
https://www.fastcompany.com/40558795/we-are-getting-closer-to-transplanting-pig-organs-directly-into-people

The Mice with Human Tumours: Growing Pains for a Popular Cancer Model

The use of mice transplanted with patient tumour cells (PDX mice) has grown in popularity over the past decade and is beginning to supplant other techniques for modelling cancer in research and drug development, such as mice implanted with cancer cell lines. Because the models use fresh human tumour fragments rather than cells grown in a Petri dish, researchers have long hoped that PDXs would model tumour behaviour more accurately, and perhaps even help to guide treatment decisions for patients. However, PDX models are not perfect and scientists are beginning to recognize their shortcomings and complexities. The tumours can diverge from the original sample, for example, and the models cannot really be used to test immunotherapies.

Biologists are now scrutinizing PDX mice and looking for creative ways to cope with the challenges. Recognising that every model is artificial in some way, means questions are now being asked about how predictive these models are going to be. The popularity of PDX mice has however, soared in the research realm. Scientists have embraced the models to improve their understanding of tumour biology and to find new drugs, yet questions remain as to whether they are better than previous models.

Work from Massachusetts, published recently, indicated that PDXs responded to approved drugs just as human responses predicted and the tumours responded as they did in people. Equally, just like in humans, these therapies don't always work. Other researchers have found that a chemotherapy drug - pembrolizumab, which ramps up the T-cell response, curbs bladder-cancer growth in mice with a humanised immune system from one donor, but not in mice carrying cells from another human donor, even though both mouse types carried pieces of the same tumour. This introduces the tantalising possibility that we are actually getting close to what everybody has been asking for: a mouse model that mimics what's going to happen in the clinic. It will be fascinating to see how this work develops.

More details can be read at:
https://www.nature.com/articles/d41586-018-05890-8?WT.ec_id=NATURE-20180809&utm_source=nature_etoc&utm_medium=email&utm_campaign=20180809&spMailingID=57149752&spUserID=MjA1NzU1ODMzOQS2&spJobID=1461171717&spReportId=MTQ2MTE3MTcxNwS2

ANZCCART NEWS ©

is free of charge and is published by the Australian and New Zealand Council for the Care of Animals in Research and Teaching Limited.

It is a publication for: researchers and teachers; members of Animal Ethics Committees; staff of organisations concerned with research, teaching and funding; and parliamentarians and members of the public with interests in the conduct of animal-based research and teaching and the welfare of animals used.

The opinions expressed in *ANZCCART NEWS* are not necessarily those held by ANZCCART.

Contributions to *ANZCCART NEWS* are welcome and should be sent to the Australian Office of ANZCCART.

Contact details:

ANZCCART
C/- The University of Adelaide
South Australia 5005
Australia

Tel. 61 8-8313 7585. Fax. 61 8-8313 7587
Email: anzccart@adelaide.edu.au
http://www.adelaide.edu.au/ANZCCART/

ANZCCART New Zealand
C/- Royal Society Te Apārangi
PO Box 598
Wellington, 6140, New Zealand

Tel. +64 4-472 7421. Fax +64 4-473 1841
Email: anzccart@royalsociety.org.nz

ISSN 1039-9089