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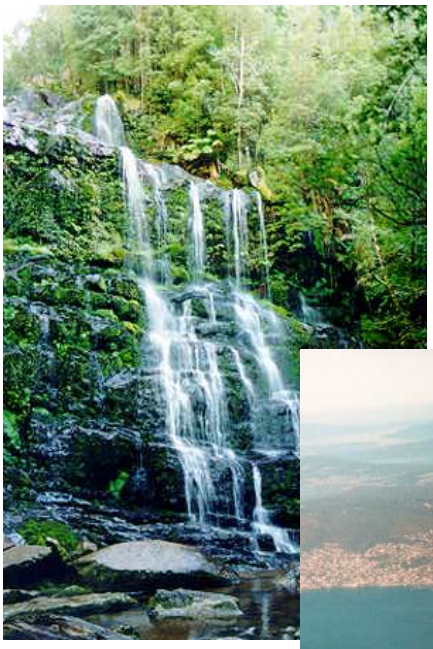
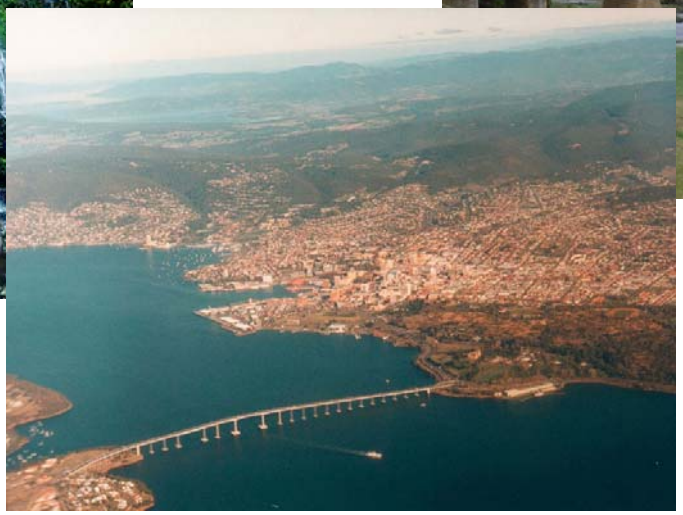
HUMANE SCIENCE





# 2010 ANZCCART Conference

## *"Ethics in a Changing Environment"*

Tuesday 20th - Thursday 22nd July

Wrest Point Conference Centre
Hobart, Tasmania

# Welcome to the 2010 ANZCCART Conference

*Hobart – as seen from the Eastern Shore of the Derwent (Wrest Point at Left hand edge)*

Welcome to Hobart – Australia's second oldest city and the Capital of Tasmania. Hobart was originally founded in 1803 as a penal colony and now is home to approximately 250,000 people. Geographically, Hobart is Australia's most Southern Capital city and arguably our most attractive with Mount Wellington (1,271 M) classically forming the backdrop and the Derwent River in the foreground of many photographs like the one above.

The Derwent River is often thought of by Australians as the end of the Sydney to Hobart yacht race, but it is also one of Australia's great rivers with a mean flow rate of 90 cubic metres of water per second. The river originates from Lake St Claire in the central highlands and flows over 187 km to New Norfolk. From this point on (another 52 km) is the estuary portion of the river that extends to the sea and offers one of Australia's finest deep water shipping ports.

Hobart is internationally recognized as a major gateway to Antarctica and is also the home of The Australian Antarctic Division. It is also home to a number of internationally recognized brands such as Cascade Breweries, Cadbury Chocolates and Incat high speed catamarans. It is surrounded by excellent wineries particularly renowned for their Chardonnay and Pinot Noir wines and is home to a working distillery.

It is pleasing to see that much of the history of Hobart and its surrounding regions has been preserved and is now appreciated by locals and tourists alike throughout the year. Historic sites like Port Arthur, the Shot Tower and the buildings around Sullivan's Cove including Salamanca Place, home of the famous Salamanca Markets. It is also surrounded by Natural beauty with areas like the Huon Valley and Mount Field National Park all within a short drive of Hobart ensuring that it is a popular stepping off point for bushwalkers and nature lovers alike.

Hobart is also regarded locally as something of a University Town as it has long been home to the University of Tasmania. The University of Tasmania was officially opened on 1 January 1890, being founded by an Act of the Colony of Tasmania's parliament. Referred to as one of the original sandstone universities, it was the fourth university to be established in Australia, and today maintains a strong reputation as a small to medium-sized university. The first campus location was the Queen's Domain in Hobart, but as enrolment numbers grew and study interests expanded, the new campus at Sandy Bay was developed in the early 1940s. This campus is located across the road from the conference venue

The university was reorganised in 1991 when it merged with the Tasmanian State Institute of Technology, which became the Newnham Campus. The centre at Burnie was opened in 1995.

With the close proximity of clean waterways and native bush land to Hobart, it is not surprising that a significant body of local research is based around activities such as aquaculture and wildlife conservation. With the relatively recent emergence of problems such as the fatal facial tumour disease it is not surprising that a lot of local research effort is directed at questions

relating to theses areas of interest and animal welfare. We will hear about some of this work and the ethical issues that emerge from it during the course of the conference.

## Climate

Hobart has a mild temperate oceanic climate. The highest temperature recorded was 40.8°C on 4 January 1976 and the lowest was −2.8°C on 25 June 1972. Compared to other major Australia cities, Hobart has the second fewest daily average hours of sunshine, with 5.9 hours per day. (Melbourne has the fewest). However during the Summer it has the most hours of sunlight of any city with up to 15.2 hrs on the Summer solstice. Although Hobart rarely receives snow during the winter, the adjacent Mount Wellington is often seen with a snowcap. Unseasonal mountain snow covering has been known to occur during the other seasons. During the 20th century the city itself has rarely received snowfalls at sea level occurring on average only once every 15 years, however outer suburbs lying higher on Mount Wellington receive snow due to cold air masses arriving from Antarctica coupled with them resting at higher altitude. These snow-bearing winds often carry on through Tasmania and Victoria to the Snowy Mountains in southern New South Wales and northern Victoria.

**Climate data for Hobart (1881-2010)**

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Record high °C (°F)** | 40.8 (105.4) | 40.1 (104.2) | 37.3 (99.1) | 30.6 (87.1) | 25.7 (78.3) | 20.6 (69.1) | 22.1 (71.8) | 24.5 (76.1) | 31.0 (87.8) | 34.6 (94.3) | 36.8 (98.2) | 40.6 (105.1) | 40.8 (105.4) |
| **Average high °C (°F)** | 21.6 (70.9) | 21.6 (70.9) | 20.1 (68.2) | 17.3 (63.1) | 14.4 (57.9) | 12.0 (53.6) | 11.6 (52.9) | 13.0 (55.4) | 15.1 (59.2) | 16.9 (62.4) | 18.7 (65.7) | 20.3 (68.5) | 16.9 (62.4) |
| **Average low °C (°F)** | 11.9 (53.4) | 12.0 (53.6) | 10.8 (51.4) | 8.9 (48) | 6.9 (44.4) | 5.2 (41.4) | 4.5 (40.1) | 5.2 (41.4) | 6.4 (43.5) | 7.7 (45.9) | 9.2 (48.6) | 10.8 (51.4) | 8.3 (46.9) |
| **Record low °C (°F)** | 3.3 (37.9) | 3.4 (38.1) | 1.8 (35.2) | 0.7 (33.3) | −1.6 (29.1) | −2.8 (27) | −2.8 (27) | −1.8 (28.8) | −0.8 (30.6) | 0.0 (32) | 0.3 (32.5) | 2.8 (37) | −2.8 (27) |
| **Precipitation mm (inches)** | 48.0 (1.89) | 39.9 (1.571) | 45.2 (1.78) | 51.4 (2.024) | 46.8 (1.843) | 54.0 (2.126) | 52.5 (2.067) | 52.9 (2.083) | 52.7 (2.075) | 62.1 (2.445) | 53.7 (2.114) | 57.0 (2.244) | 616.2 (24.26) |
| **Avg. rainy days** | 10.9 | 9.4 | 11.3 | 12.4 | 13.6 | 14.5 | 15.4 | 15.5 | 15.2 | 16.3 | 14.1 | 12.8 | 161.4 |
| **Sunshine hours** | 248 | 206.2 | 198.4 | 159 | 130.2 | 117 | 136.4 | 155 | 177 | 201.5 | 207 | 229.4 | 2,165.1 |

*Source: Bureau of Meteorology*[7] *2009-12-28*

Typically, Winter days in Hobart are sunny with very little if any wind, albeit with a rather low average temperature. This means that during daylight hours, the climate is generally very pleasant. However, once the sun drops below the mountain, it gets very cold, very quickly so you would be well advised to dress accordingly. It will also often rain at night as well so always take a coat or jumper and umbrella with you.

## The Venue

The **Wrest Point Hotel Casino** was Australia's first legal casino, opening in the suburb of Sandy Bay, on 10 February 1973.

Historically, the *Wrest Point Riviera Hotel* was built by Arthur Drysdale and opened in December 1939, on the site of the current Wrest Point Casino. During World War II the hotel did a roaring trade and was later sold to its current owners (Federal Hotels) in March 1956.

In the 1960s, The Federal Group attempted to secure Australia's first casino license. At the time, Tasmania's natural scenery and beauty were not widely known elsewhere, and as a result the state wasn't attracting many tourists. The company hoped that a casino would be the draw-card that would kick-start Tasmania's tourism industry.

After a state referendum was finally held and narrowly passed, development of the casino included the construction of the 17-storey hotel tower commenced. This 64-metre octagonal tower is still the city's tallest building.

After the centre's opening in 1973 (when it was known as *Wrest Point Hotel Casino*) it became the catalyst that lead to the development of a further 12 casinos across the country. It also saw a huge growth in the Tasmanian tourist industry, which is now one of the States greatest sources of employment.

The conference centre we will be using was opened in 1984, and the boardwalk in 1996.

### *Bars and Restaurants*

Wrest Point Casino at Night

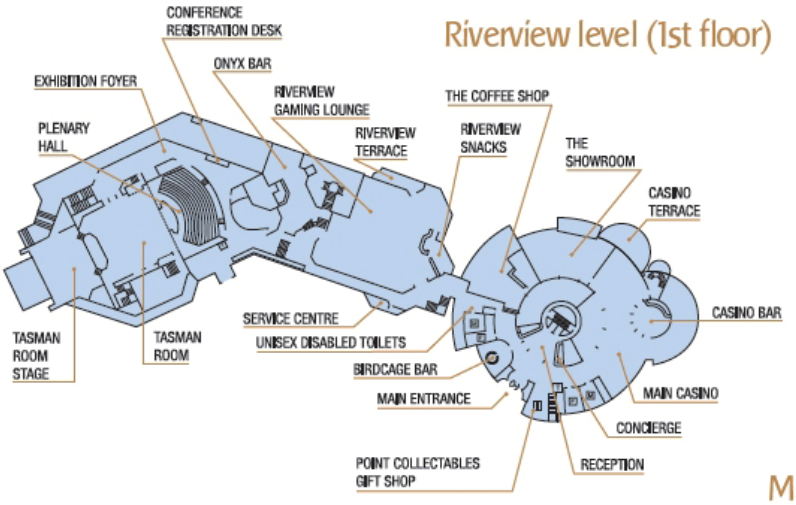
Wrest Point has a number of bars and restaurants.

<u>Please note that booking are recommended</u>

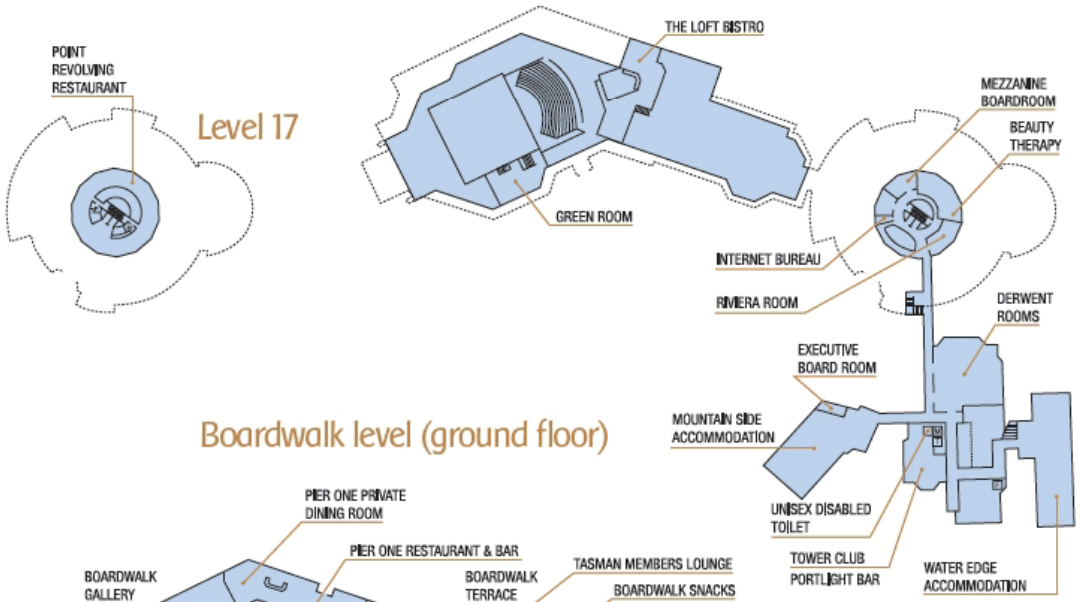
- The BirdCage Bar (Jazz and Cocktail Bar)
- The Onyx Bar
- The Point Revolving Restaurant
- The Point Lounge Bar
- Pier One Restaurant and Bar
- The Coffee Shop (Buffet Restaurant)
- The Loft Bistro
- Riverview Snacks
- Boardwalk Bar

# Wrest Point Directory

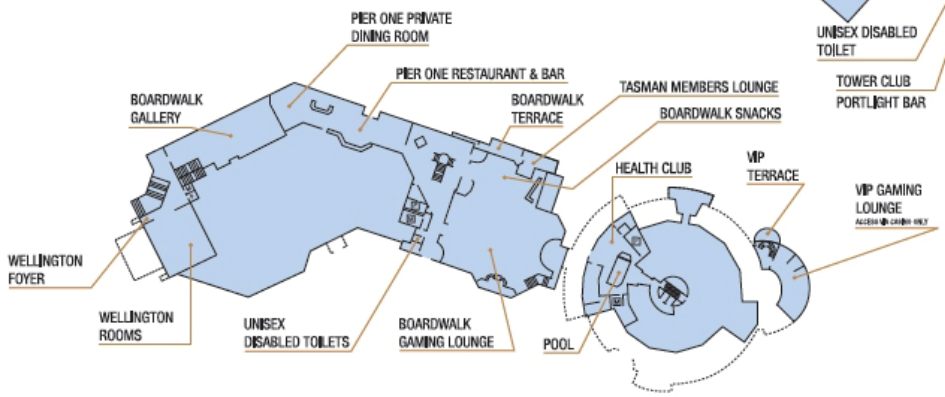
## Riverview level (1st floor)




## Mezzanine level (2nd floor)




## Boardwalk level (ground floor)




Wrest Point

**Security:** Delegates are required to wear their name badges at all times while attending conference sessions and functions. It is however strongly recommended that they are not displayed at other times or outside the conference area. Please take care not to loose your badge as we will not have the ability to make replacement badges at the conference.

**Mobile Phones:** Please ensure that your mobile phones are turned off during sessions if possible. If you must keep your phone turned on, it **MUST** be set on silent so it will not disturb the session if it rings.

## Social Functions

At ANZCCART Conferences, Social Functions are regarded as important conference sessions, which is why they are included in the registrations fees. This is based on the idea that interaction between members of different AECs, between AEC members and people that are not AEC members, between researchers and AEC members, between researchers and animal liberationists, etc are most beneficial when conducted in a relaxed and social environment. Both Australians and New Zealanders have a long standing tradition of enjoying active discussions over a drink or two and this has proven to be an important mechanism for generating and maintaining tolerance of cultural, political or social differences.

Guests accompanying a registered delegate are welcome to participate in these sessions provided they are:

1. Legally old enough to be on licensed premises
2. Registered for the social event sessions (having paid the prescribed fee) and
3. Do not deliberately disrupt proceedings.

**Tuesday Evening Cocktails:** This year, we have made a change away from the usual arrangements as a result of very special circumstances. You will have noticed that the registration fee paid this year did NOT include the Tuesday evening cocktail function, yet there was no separate charge for this function.

This year, all ANZCCART conference Delegates (and Partners) have been invited by His Excellency, The Honourable Peter Underwood AC, Governor of Tasmania to attend a cocktail function on Tuesday Evening at Government House. This event is strictly invitation only and all registered delegates should have received an invitation from The Governor to attend as a part of their registration package.

We have arranged for bus transport from the Conference to Government House and then back to the Conference venue again at the conclusion of proceedings. All delegates attending this function will have to be ready to Board the bus outside the Hotel reception area (Tower end of the venue) promptly at 5.30pm.

**Conference Dinner:** The Conference Dinner will be held on Wednesday 21st July from 7.00 pm at the Moorilla Estate Winery in Berridale and will conclude at 11.30pm. Once again, bus

transport to and from the venue has been arranged and buses will depart from outside the main hotel reception area promptly at 6.15 pm. During the course of the evening, AEC member awards will be presented.

This will also be a very special occasion as the first ever Honorary Life members of ANZCCART will be presented.

Once again, accompanying persons are welcome to attend the dinner if they have pre-booked and paid the prescribed fee.

## Acknowledgements

ANZCCART would like to thank the members of this year's organizing committee for all their time and effort. Members of the 2010 organizing committee were:

Dr Geoff Dandie
Mr Peter Maley
Dr Erich von Dietze
Ms Chris Wadey
Mrs Nicola Hodgman
Dr Justine Stewart

We would also like to acknowledge the support of the following organizations that have helped make this conference possible:

anzccart
HUMANE SCIENCE

Victoria
The Place To Be

Welcome to the
DEPARTMENT OF PRIMARY INDUSTRIES
...growing Victoria's future

# 2010 ANZCCART Conference Programme

**Tuesday 20th July 2010**

**9.00am** **Conference Registration Desk Opens**

**10.00am** **Tea & Coffee served**

*Session Chair* *Geoff Dandie, CEO ANZCCART*

11.00am Welcome & General Administrative Announcements

Conference Opening (Professor Richard Russell AO, Acting Chairman of ANZCCART)

11.30am Matt Leach "Analgesic use in laboratory animals in recent times: species and international differences"

11.50am MaryLou Conway "Regulating Animal Research in a Changing Environment"

12.30pm Barrie Wells "Welfare Issues with Tasmanian Devil Research"

1.00pm – 2.00pm **Lunch**

*Session Chair* *Peter Maley, Conference Organizing Committee*

2.00 – 2.30pm Andrew Lawrence "Using animal models in addiction research"

2.30 – 3.00pm Short Presentations

Denise Noonan "Informed consent to use privately owned animals"

Grant Shackell " The Human / Animal interaction – are we showing respect or guilt?"

3.00pm – 3.30pm Discussion Groups by AEC Category

3.30pm – 4.00pm **Afternoon Tea**

4.00pm – 5.00pm Discussion Groups by AEC Category

5.15pm Delegates assemble in Foyer

5.30pm Buses Depart for Governor's Cocktail Function

7.30pm Buses return from Government House

**Wednesday 29th July**

*Session Chair Geoff Dandie*

9.00am Simon Foote "The use of large numbers of mice in genetic screens."

9.30am Di Nicol " Ethics in a Changing Environment – Weighing the Evidence"

10.00am John Purser – "Fish welfare and the animal ethics approval process"

10.30am **Morning Tea**

*Session Chair Erich von Dietze, Conference Organizing Committee*

11.00am Matt Leach – "Recognition of pain in rodents and rabbits"

12.00 noon Mary Bate - "An update on the status of the review of the Code of Practice for the care and use of animals for scientific purposes."

12.30pm Brief Plenary Discussion

1.00pm **Lunch**

*Session Chair Mark Fisher, Chairman ANZCCART New Zealand*

2.00pm Ian Gentle – "Advanced Imaging and Therapy: The Use of the Imaging and Medical Beamline at the Australian Synchrotron in Translational Research"

2.30pm Group Discussions by Pseudo – AEC groups

3.30pm **Afternoon Tea**

*Session Chair Richard Russell, Deputy Chairman ANZCCART Board*

4.00pm Susan Jones – "A scaffolded approach to developing university students' appreciation of animal ethics issues"

4.30pm Warwick Anderson – "Title to be advised"

5.00 pm Session ends

6.00pm Meet in foyer to catch bus for dinner

6.15pm Buses Depart for Conference Dinner

7.00pm – 11.30pm **Conference Dinner**

**Thursday 30th July**

*Session Chair Geoff Dandie, CEO ANZCCART*

9.30am Margaret Rose "Animal welfare and science: an evolving construct "

10.00am John Schofield **"**IACUC/AEC Approvals Devalued by the Scientific Imperative; Inconvenient Animal Ethics Sacrificed on the Altar of Research"

**10.30am Morning Tea**

*Session Chair Nicola Hodgman, Conference Organizing Committee*

11.00am Matt Leach "New approaches to assessing the emotional component of pain in animals"

11.30am Yvette Chen - " Genetically modified mice as laboratory reagents?"

12.00pm Geoff Dandie - "Dealing with Issues of non-compliance"

12.30pm Mark Fisher - "ANZCCART 2011- a brief update"

1.00pm **Lunch**

*Session Chair Geoff Dandie, CEO ANZCCART*

2.00pm Greg Woods - "Tasmanian Devil facial tumour disease"

2.30pm Moira Desport – "Tales of the Unexpected - Projects conducted in other countries in association with Australian Institutions"

3.00pm Gabby Brown – "Can a devil's immune system save it from Facial Tumour Disease?"

**3.30pm Conference Ends**

**Afternoon Tea**

# Abstracts for

# Presentations given on

# Tuesday 20th July

# Analgesic use in laboratory animals in recent times: species and international differences

**Matt Leach**
**Newcastle University, UK**

Almost all guidelines covering animal-based research state in some way that pain should be 'minimised and/or alleviated…'. Administration of analgesia is often the most effective method of achieving this. Consequently we should expect analgesia to be commonplace and widely utilised. A literature survey in 2005 (Richardson & Flecknell 2005) showed that for laboratory rodents, 85% papers surveyed for 1992 did not administer analgesia in any form. Although, this decreased to 58% papers surveyed by 2002, a large proportion of laboratory rodents still did not receive analgesia. This is not surprising when we consider the relatively poor use of analgesics in veterinary clinical practice in the last 10 years (Lascelles et al. 1999).

More recent literature surveys have again looked at analgesic use in rodents (Stokes et al. 2009) and larger species (rabbits, sheep, pigs, dogs and primates) (Coulter et al. 2009). The surveys covered studies carried out in a number of countries and were published between 2005 and 2006. The number of rodents not receiving analgesia has fallen further since 2002, with 55% of papers surveyed not providing analgesia. In contrast for larger species the number of papers reporting no analgesic use was only 12%. The number of papers reporting no analgesic use in both rodents and larger species varied between 7% and 38% according to the country where the work was carried. The comparing analgesic use by country is indicative, but should be interpreted with extreme care, as these studies were not designed to differentiate between countries.

There are number of possible reasons why we see such low and varied use of analgesia in animals despite the prevalence of guidelines. (1) Some consider that animals don't feel pain. (2) There is no perceived need to give analgesics, however this is often due to a failure to recognise indicators of pain. (3) Concern over interactions between the analgesics and the experimental protocols that are carried out. (4) Concern over potential side effects associated with analgesics. (5) Tradition or historical data showing that painful procedures can be carried out without analgesics.

However, unalleviated pain is not only difficult to justify from an moral and ethical standpoint, but also from the perspective of scientific validity as pain can cause more variation in the data than either interactions between analgesics and protocols or potential side effects associated with analgesics.

**References:**

Coulter et al (2009) Laboratory Animals 43: 232-238.

Lascelles et al. (1999) Veterinary Record 145: 601-604

Richardson & Flecknell (2005): ATLA 33: 119-127

Stokes et al. (2008) Laboratory Animals 43: 149-154.

# Regulating Animal Research in a Changing Environment

**Mary Lou Conway,** BVSc, PhD, MACVS (Animal Welfare)
Inspector of Animal Research, DPIPWE, Tasmania

Animal Research legislation attempts to balance community concerns about animal welfare with a view that the use of animals in research is legitimate. Assurance that animal research is conducted in an ethical and humane manner rests heavily on the Research Code of Practice – a legal burden that must be addressed during the current review of the Code. The regulation of animal research in Tasmania reflects the nature of a small jurisdiction with an active and diverse research community.

Animal research is defined in Tasmania as those activities in which new knowledge is sought and is likely to have a significant adverse effect on the welfare of the animal/s involved. Such activities are protected from cruelty provisions if they are conducted with the approval of an AEC, in accordance with the approved Research Code of practice (the Australian Code of practice for the care and use of animals for scientific purposes, Edition 7, 2004). As the definition is narrower than the Code's, other research activities using animals that do not fall into the legislative definition, may access AECs for publishing or funding purposes or in compliance with internal institutional policies.

The size of Tasmania and its research community provides interesting challenges and requires good communication and clear legal arrangements between institutions and their respective AECs. Monitoring field projects, recruitment of AEC members, and managing different ethical positions within a tight knit community are other issues briefly explored.

The major risk factors for animal welfare in research in Tasmania are the resourcing of AECs and education of investigators in animal welfare science. This would not be unique to Tasmania. While it is impossible to regulate for an appropriate attitude towards animals, the Code has managed to gently encourage a significant improvement in attitude from users of animals in research.

# Welfare Issues with Tasmanian Devil Research

**Barrie Wells**
Veterinarian & Animal Welfare Officer, University of Tasmania

Devil Facial Tumour Disease (DFTD) is the disease currently threatening the Tasmanian Devil population and a considerable amount of research is being carried out under the banner of the Save The Tasmanian Devil Program (STTDP). To understand the welfare issues associated with the program it is necessary to know a little about the disease and the life cycle of devils

DFTD is a cruel disease. Devils in advanced stages will have tumours that invade the bone resulting in gross facial deformity, jaws breaking, teeth falling out, eyes becoming obliterated, etc and ultimately death results from either starvation or secondary metastases resulting in internal organ failures. It is not a nice condition.

Swabs taken from devils with tumours in their mouths or with sinuses running from facial tumours to the mouth show high levels of free floating tumour cells in the saliva and we believe that spread is by direct inoculation from an infected devil to a clean devil. The rate of tumour growth is unclear and may vary from animal to animal. It was originally hypothesised that devils would die in about 6 months but there are indications that some infected animals will live much longer although "death as an end point" studies have not been done.

Devils breed annually with mating taking place from February to April on average and birth 21 to 31 days later with multiple offspring being born in true marsupial fashion. Devils have four teats and only a maximum of four offspring can attach to teats and survive. After four months in the pouch the young are hidden in a den while the mother goes on foraging trips.

Welfare issues arise when infected wild devils are captured in monitoring or research projects. Should we immediately euthanase them as has been suggested? What about the females with joeys in the pouch? What about lactating females with denned young? The current position is to euthanase infected males, but females must be treated on their merits. To euthanase a lactating female is effectively killing up to five animals with the joey's dying of starvation.

Numbers of devils are now in captivity in breeding and research facilities. Some research projects are short term (months) and some may extend for years. What should happen to the short-term research animal when the project comes to an end? Quarantine regulations prevent them from being released back into the wilds. The current aim of UTas researchers is to use older animals at the end of their breeding life for short term research projects whenever possible (only breed until they are about five years old although they may live until they reach seven).

A suggestion has been made that we should build up insurance populations on offshore Tasmanian islands where they will be safe from the disease. This ignores several serious welfare issues. What happens to the resident seabird populations that will almost certainly make up the main food source for the devils? It is possible that devil populations would initially increase in response to an abundant food supply only to starve as the seabirds were eaten out. Little thought has been given to regular monitoring and there is a strong view is that offshore islands must be left well alone.

It has been suggested that infected devils might mount an immune response which would see the tumour growth halt and eventually be rejected by the host. To euthanase infected animals could be killing those animals that may have the ability to survive DFTD. These would be the very animals whose genetic makeup is desperately needed in the devil population but currently we do not release infected animals with this in mind, as there has been no evidence yet that genetic resistance is developing.

# Using Animal Models in Addiction Research

**Andrew J Lawrence**
Florey Neuroscience Institutes, University of Melbourne, Royal Parade, Parkville, Vic 3010

Drug and alcohol abuse and addiction are major health, economic and social problems. Indeed, it has been estimated that addictions cost developed countries up to 3.5% of their GDP (Pouletty, 2002). Moreover, current therapies targeting addiction are far from ideal and accordingly there is a real and pressing need for novel treatment strategies, borne out of improved basic knowledge. A major clinical feature of addiction is the enduring propensity to relapse, long after withdrawal physical dependence have passed. This issue is likely due to neural adaptation caused by long-term, intermittent drug use. Another feature of addiction is that drug use continues despite adverse consequences, and that previously neutral stimuli (cues) that are associated with drug use take on increased salience. Indeed, the cues can become conditioned reinforcers that can initiate craving that may precipitate a relapse. In my laboratory, we examine different aspects of behaviour related to drug addiction, using rodent models. For example, we study self-administration of drugs of abuse, either orally or intravenously. In addition, we study the ability of previously neutral cues to take on a meaning of drug availability. We also examine models of relapse to drug-seeking, either following abstinence or following extinction training (a rodent equivalent of going to rehab). To gauge the ability of drugs to cause lasting neural adaptations we study behavioural sensitization and also examine structural and chemical changes within the brain. In many of these paradigms we challenge the rodents with pharmacological interventions in an attempt to identify novel therapeutic possibilities. My talk will discuss this area and use original data from our studies to exemplify the approaches taken.

Pouletty, P. (2002) Drug addictions: towards socially accepted and medically treatable diseases. Nature Reviews Drug Discovery, 1, 731-736.

# Informed Consent to Use Privately-Owned Animals

**Denise Noonan**

The University of Adelaide, Adelaide 5005.

Use of privately or commercially owned animals for research and teaching is common in agricultural and veterinary animal studies. As part of its deliberations, the Animal Ethics Committee (AEC) needs to ensure that a clear understanding of i) the scope, details and duration of animal use; and ii) responsibilities for animal care, have been established between the investigator/teacher, owner and other relevant parties. In some situations there are documented agreements such as legal contracts and Memoranda Of Understanding. However when these are not in place, the AEC may require the investigator or teacher to prepare an Owner Consent form to document the relevant responsibilities and agreement details.
In this short presentation, several examples of owner consent forms will be presented and discussed.
Key Issues/Components:

1) An Information Sheet prepared by the investigator/teacher for the owner of the animal participant. This sheet summarises the animal use, the duration of use, and the AEC approval and contact details. Issues that might be itemised include: Voluntary participation of the animal(s); Owner and animal confidentiality and privacy; Financial implications; Management of foreseeable and unforseen risks; Termination of the study; Publication of research findings; Notification to insurers of the animal's participation. The details included are tailored to the particular research or teaching use.
2) Contact details for both the investigator/teacher and the AEC are provided so that the owner might contact the relevant person if there are queries, concerns or problems.
3) Contingency planning in case of unexpected adverse events.
4) Documentation of informed and voluntary consent given by the owner of the animal.

**Human/Animal interaction in a changing environment - are we showing respect or guilt?**

**G H Shackell**
AgResearch Invermay, Mosgiel, New Zealand

Over time, human interaction with animals has changed. The relationship has evolved from prehistoric times when the natural law was eat or be eaten, through domestication and dominion to what some now regard as exploitation. To cope with this, modern humans impose defined laws for interacting with animals. Ancient hunters complied with nature from a position of respect for animals, but do modern laws imply respect or do we use them to assuage guilt?

When relationships between humans and animals were simply eat or be eaten, the fundamental driver was survival, and interactions based on instinct. As humans developed, they discovered ways to immobilise or kill animals without having to get close to them, thereby avoiding any danger. The interaction then, became biased in the humans' favour by their ability to think and manufacture tools and/or weapons. These first humans were hunters who, although they saw animals as a source of food, viewed them with a reverence that was largely fuelled by awe.

As humans and animals co-evolved, it became clear that some animals had value beyond that of food. Some produced renewable food sources (e.g. milk) that could be harvested, processed (if needed) and stored. Others produced fibre, which could be turned in to clothing. Still others were strong enough to help cultivate land. Humans began to 'keep' animals. Shepherds, corrals or fences contained animals and coincidentally protected them from predators. Humans found that some animals could be fun 'just to have around' and kept them as companions, rewarding their friendship with food and housing. Domestication had benefits for both animal and human. Humans assumed Guardianship with the interaction based on co-dependence.

In both ancient and modern times, humans have regularly assigned spiritual values to animals. In ancient times domesticated animals became a source of offering to spiritual entities in an effort to ensure good fortune. Even in modern times some wild animals are believed to poses certain powers in themselves or in their body parts and are killed indiscriminately with only a very small part of the carcass harvested while the rest is discarded. Human spiritual interactions with animals implied a position of dominion. While some species were domesticated, others were left to exist primarily in the wild. Occasionally, wild animals were captured and used as a source of entertainment. Some animals, both domesticated and wild, were used for financial gain. Guardianship and Dominion were being replaced by Exploitation.

If humans have Dominion over animals then, we assume that animals can exist for the benefit of humans. This may be as a food source a companion or any other 'use' that is appropriate. From this perspective it is a simple step to allow animals to be used in science. The endpoint for many of these animals is death. In its simplest context, such human/animal interaction appears to be based on expedience. However, we recognise that Research and teaching use of animals imposes a cost on the animal. It also implies that such use must be both meaningful and relevant. Stress, health or physiological aberrance can render the animal's contribution valueless. Therefore, we impose rules or laws that in a modern context enshrine the ancient human perception that animals should be treated with reverence and awe. The only way these laws will work is if the interaction between the humans and animals is based on Respect.

It has become increasingly fashionable to question whether any interaction at all between humans and animals is reasonable. In this context, the issues of Welfare, Rights and Ethics are raised, and can become confused. We should therefore also question whether we are basing our human/animal interactions on laws that imply Respect for animals, or we are hiding behind the laws to disguise Guilt?

# Abstracts for

# Presentations given on

# Wednesday 21st July

# The Use of Large Numbers of Mice in Genetic Screens

**Simon Foote**
Director, Menzies Research Institute, University of Tasmania

Basic, preclinical biological research relies heavily on animal models. Chief among these is the mouse. The confluence of biological systems, the ease of breeding and husbandry and the massive amount of murine biology known by researchers adds to the appeal of the mouse as a biological model organism. This talk will be a personal view of the mouse in biology with discussion around the ethics of large-scale murine research projects. I will touch on genetic modification, genetic mapping experiments and large-scale mutagenesis experiments.

# Ethics in a Changing Environment – 'Weighing the Evidence'

**Di Nicol**

Chair, University of Tasmania AEC

Question: where does an ethics committee turn to for accepted best-practice techniques in socially sensitive research on endangered species unique to a small ecological area?

Answer: if the information isn't there already, you are ethically obliged to try to find out the answers for yourselves.

Recent years have seen rapid advances in the technology available for telemetry studies. This undoubtedly has the potential to advance animal welfare, but the degree to which researchers make use of 'best practice' technology remains unevenly distributed amongst taxa and even amongst research groups within research institutions.

In particular, in Tasmania, the UTAS AEC has dealt with complex issues associated with long-term telemetry attachments to seabirds and marine mammals to assess foraging behaviour and more recently to Tasmanian Devils to assess movement patterns and contact rates. It became imperative to better understand ecology of the Devil Facial Tumour Disease (DFTD). While clearly the UTAS AEC recognised the importance of this research, the committee was challenged to assess all the ethical issues.

To aid protocol assessments for committee members, the Animal Welfare Officer routinely conducted literature searches on body weight to gear ratios for various species. However, a number of specific issues arose that led the UTAS AEC to seek more concrete information on the general use of telemetry gear on birds and native mammals.

To achieve this, UTAS AEC convened a specialist Welfare Advisory Panel (WAP), comprised of leading zoologists and wildlife vets, to work with a highly credentialed research assistant to assess the available literature from around the world.

The resulting guidelines and supplementary application form better informs researchers and AEC committee members about the appropriate use of telemetry gear in wildlife studies. The guidelines have also formed the basis of a paper published by the research assistant in the journal *Animal Behaviour*.

This presentation will discuss the ethical framework employed to bring together what has become a set of best practice guidelines for wildlife research, and to discuss the resulting guidelines and their implementation.

# Fish welfare and the animal ethics approval process

**John Purser**

National Centre for Marine Conservation and Resource Sustainability, Australian Maritime College, University of Tasmania, Locked Bag 1370, Launceston, Tasmania 7250. Ph +61 (0)3 63243820, j.purser@amc.edu.au

Fishes are members of an important group of vertebrates used extensively in research, teaching and extension. While fish should be treated like other vertebrates under the Australian Code of Practice it has become clear during the approval process that some natural characteristics and attributes associated with an aquatic existence are not comparable to many other animals. In Tasmania the UTas Animal Ethics Committee regularly receives applications from staff and students examining fish in the laboratory, field and captive environs. While some of these are driven by basic research, many are applied in nature and strategically aligned to the significant aquaculture and fisheries industries in Tasmania. Consequently, a number of fish-specific issues are considered by the Committee. This presentation will highlight some of the challenges and perceived welfare issues associated with the approval of fish projects together with the biological and behavioural characteristics of fish with a particular focus on aquaculture (and fisheries) activities in the National Centre for Marine Conservation and Resource Sustainability (NCMCRS). In compiling the information, I have drawn on my 30 experience in research, teaching, school and industry extension, the aquaculture industry and as an animal ethics committee member.

In Europe the aquaculture industry, working collaboratively with researchers and regulators, is keen to identify and quantify key fish welfare indices. To date the development of comprehensive easy-to-use measures has been a challenge and is currently being considered as one of the components of the European COST Action 867 network and forum (Welfare of Fish in European Aquaculture) of which NCMCRS is an associate member. In the Australian context and at a national level the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes (NHMRC), Australian Animal Welfare Strategy (Department of Agriculture, Fisheries and Forestry) and the Aquatic Animal Welfare Guidelines (National Aquaculture Council) are references for the Australian aquaculture industry and researchers, while at a state level the Animal Welfare Act, Animal Ethics Committee, Animal Welfare Officer, and the industry Codes of Practice guide research and husbandry processes.

In aquaculture, welfare issues focus on such environmental, husbandry and physiological factors as water quality, stocking density, handling, anaesthesia, osmoregulation, respiration, metabolism, stress, hormone cycles, tissue sampling following euthanasia, transport, food modification, health and general observation of behaviours. In fisheries, key issues include tag-release-recapture, population dynamics, biodiversity, environmental impacts and trawling or net sampling processes involving an unknown range/number of target species and by-catch. While most applications are animal-ethics based, when surveys and sensory testing of seafood is undertaken such activities also include human ethics approval. This presentation will detail these and other issues associated with the approval of fish-based animal (and human) ethics applications.

# Recognition of pain in rodents and rabbits

**Matt Leach**
**Newcastle University**

The recognition of animal pain is critical for both animal welfare and the validity of data collected from experimental animals. Recently the 'more traditional' methods of assessing pain in animals (e.g. subjective judgements, measurement of bodyweight change etc.) have been superseded by the scoring of pain-related behaviours in a wide range of species. Behavioural-based pain assessment offers two main advantages. (1) An immediate cage side assessment of pain allows appropriate treatment (e.g. analgesia) to be administered immediately. (2) The effectiveness of treatments can be objectively judged and any further treatment given.

The pain systems group at the Newcastle University has developed behavioural-based pain assessments for rats, mice and rabbits. These assessments are composed of behaviours that are directly related to pain, easily recognisable with minimal training, require a relatively short period of observation, and offer an improvement over traditional methods. The development of behavioural-based pain assessment is most advanced in the rat (Roughan & Flecknell 2003, 2006) followed by the mouse (Wright-Williams et al. 2007; Dickinson et al. 2009) and least advanced in the rabbit (Leach et al. 2009). This presentation will contain video examples of the main pain-related behaviours identified in rats, mice and rabbits and will give delegates the opportunity to compare VAS and behavioural-based pain assessments directly for themselves.

The major limitation to using the current behavioural-based pain assessments is that they are very time-consuming to carry out effectively. However, with the recent development of HomeCageScan (HCS) an automated method of assessing rodent behaviour we hope to overcome this major limitation of manual scoring. We have demonstrated that HCS is able to score a limited number of behaviours of mice in a similar way to that of manual scoring, but in about a tenth of the time. Effective assessment of pain depends on knowing not only which behaviours to observe but also looking in the correct place to see them. A recent study suggests that in rabbits at least we focus predominately on the face. This suggests that we could miss critical pain-related behaviours if they are exhibited anywhere else than in the head or face (Leach et al 2010).

## References

Dickinson et al. (2009) Laboratory Animals 43: 357-361.

Leach et al. (2009) Research in Veterinary Science 87: 336-347.

Leach et al (2010) PlosOne – Submitted.

Roughan & Flecknell (2003) European Journal of Pain 7: 397-406.

Roughan & Flecknell (2006) Applied Animal Behaviour Science 96: 327-342.

Wright-Williams et al (2007) Pain, 130: 108-118.

# An update on the status of the review of the Code of Practice for the care and use of animals for scientific purposes

**Mary Bate**
Assistant Director | Health & Research Ethics
National Health & Medical Research Council

Mary has recently been appointed to the position of Assistant Director, Health and Research Ethics at the National Health and Medical Research Council in Canberra. In this position, Mary will be playing a major role in overseeing the revision of *the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes (The Code)* into its 8th Edition.

Mary brings a wealth of experience to this position having been Animal Welfare Officer at the University of Newcastle, a member of the Research and Teaching Implementation panel of the Australian Animal Welfare Strategy and a co-author of many fundamental documents in this area that have been published by both ANZCCART and the NHMRC including the recently published and widely recognised Guidelines to Promote the Wellbeing of Animals used for Scientific Purposes.

The first part of this session will be a presentation by Mary, updating us all on the progress made to date with revising the Code and what will be happening next.

The second part of this session will then take the form of a forum where issue of general interest can be raised and discussed in a way that can feed back into the revision process.

# Advanced Imaging and Therapy: The Use of the Imaging and Medical Beamline at the Australian Synchrotron in Translational Research

**Ian Gentle**
Australian Synchrotron
800 Blackburn Road
Clayton 3168 Victoria

The Australian Synchrotron is a major investment in research infrastructure for scientists in Australia and New Zealand. Opened in 2007, it currently has user programs on eight laboratories ("beamlines"), covering a very wide range of fields from biology and medicine to materials science and engineering. There are currently over 1800 registered users of the facility. The most ambitious beamline, the Imaging and Medical Beamline, has begun expert user experiments and when complete will host a user program which is directed in part towards research that will lead to improved clinical outcomes through the application of advanced imaging and microbeam radiation therapy techniques. The advantages of the use of the synchrotron include great improvements in imaging resolution and contrast, minimisation of radiation dose to patients and a shortening of the time needed for procedures. During this talk I will give an overview of research at the Australian Synchrotron, focussing on the IM beamline and the translational research that will be undertaken at this exciting facility.

# A scaffolded approach to developing university students' appreciation of animal ethics issues

**Susan M. Jones and Ashley Edwards**
School of Zoology, University of Tasmania, Private Bag 5 Hobart 7001

Students in the biological sciences should graduate with not only a deep understanding of their discipline but also the ability to make ethical judgments in a professional setting. This is of particular relevance for those teaching in the animal sciences. Section 6.1.3 of The Animal Ethics Code of Practice states that "*Students should be given the opportunity to discuss the ethical, social and scientific use of animals for scientific purposes, including teaching*."

In the School of Zoology at the University of Tasmania we have designed a vertically integrated approach to developing our students' appreciation of animal ethics across the three years of the undergraduate course. Relevant assessment tasks are embedded in our learning curriculum. This begins in 1st year, when students are introduced to the ethical framework that guides the use of animals in teaching and research. In 2nd year students are given their first opportunity to work with vertebrates and cephalopod molluscs in the field and the laboratory. Their roles and responsibilities under The Code are discussed in class and each student signs the student declaration. In 3rd year, students must take a greater personal responsibility for the care and use of animals. We have, therefore, designed specific learning tasks through which students develop a professional level of awareness of the processes of gaining animal ethics approval for scientific research.

To assess the effectiveness and improve delivery of our current strategies for engaging students in debate on animal ethics issues, we have surveyed University of Tasmania undergraduate students enrolled in Zoology units at 1st, 2nd and 3rd year levels. The survey asked students whether they had previously been in a class in which animals or animal tissues had been used; whether they had been given any information about animal ethics at that time and whether they had consciously thought about animal ethics issues relating to the use of animals in teaching and learning.

The results show that 90% of students in 1st yr had previously used animals in the classroom. However, only 57% reported receiving information about animal ethics at the time the animals were used. By 2nd year, this had increased to 80%. There was little change in the responses of the 3rd yr students to this question (82%). While we might have expected an increase, the 3rd yr class contains a significant proportion of Study Abroad students. In all year cohorts, there was a high level of awareness of animal ethics issues, with 80% of our 1st years reporting that they had consciously thought about animal ethics issues. This increased to 96% and 92% in the 2nd and 3rd year cohorts, respectively. We believe that these results demonstrate the effectiveness of our approach towards ensuring that we meet Section 6.3.1 of The Code, and that our students graduate with a high level of awareness of the responsibilities of scientists working with animals.

*This study way approved by the Tasmanian Social Sciences Human Research Ethics Committee (H0010485).*

# My work and aspirations in the area of animal welfare

**Warwick Anderson**
CEO, National Health and Medial Research Council
Honorary Life Member of ANZCCART

# Abstracts for

# Presentations given on

# Thursday 22nd July

# Animal welfare and science: an evolving construct.

**Margaret Rose**
Prince of Wales Clinical School, University of New South Wales,
Centre for Value, Ethics and the Law in Medicine, University of Sydney.
Honorary Life Member of ANZCCART

Recognition of the inextricable link between animal welfare and scientific outcomes has been a basic tenet of the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes* (the Code) since it was first published in 1969. However, since that time the concept of animal welfare has evolved to encompass not only the prevention of pain, distress and disease but today to encompass broader considerations of an animal's quality of life taking into account both positive and negative experiences.

These developments reflect changing community views as to what constitutes animal welfare. But the interconnect between animal welfare and science also has changed and this impacts on the use of animals for scientific purposes in two ways. Scientific advances particularly in the behavioural and neurosciences have enhanced our understanding of the experiences of animals and ways by which these can be measured and hence inform the scientific under pinning of animal welfare. These kind of studies also have highlighted the subtle influences on the collection and interpretation of data of an animal's responses to social and environmental stressors and the need to take these kind of influences into account in the definition of an animal model.

This paper will review the background to these changes and argue that sustaining this construct is essential to achieving both animal welfare and scientific outcomes.

# IACUC/AEC Approvals Devalued by the Scientific Imperative; Inconvenient Animal Ethics Sacrificed on the Altar of Research

**John Schofield**
Director of Animal Welfare University of Otago, Dunedin, New Zealand

Scientific journal policy is to now require confirmation of institutional animal ethics approval for any research manuscript presented for publication. Most papers include a statement to this effect. While such ethical approval would seem to provide a level of assurance that appropriate and humane experimental techniques have been used, there remain a number of well documented and widely used animal models which could be challenged. This paper will present some examples of such animal models and explore the reasons how and why such papers continued to be published. Their publication raises several questions: "how could the institutional AEC have approved this work?" and "how did this work pass editorial review by the journal?" In the cases presented, the ethical processes would appear to have been devalued. One might reasonably speculate that the institutions involved regarded ethical approval as an inconvenient hurdle to be managed with a rubber stamp. This paper will review how the scientific publication industry perpetuates these unacceptable and inhumane research practices.

By what bench mark are we to judge how humane is any proposed experimental model? The question posed by Jeremy Bentham "..but can they suffer?" is as valid today as it was when first stated in 1789. And a related bench mark is the human equivalency test (HET). In fact the HET concept is internationally accepted and it is particularly useful and easily applied in most cases. It can be summarised as follows:

***"Until there is evidence to the contrary, it must be assumed that procedures that will cause pain or distress in human beings will cause pain or distress in animals"***

Those of us fortunate enough to be working with animals within a large medical centre have immediate access to clinicians and surgeons who can advise on the human pain perspective. Alternatively the scientific literature can provide a great deal of information on how humans respond to potentially painful procedures. So the HET principle should regularly be applied whenever there is any doubt as to appropriate pain control for an animal model. Pain identification and its management have been well documented by the seminal work of Flecknell et al. And to not provide pain relief, when the HET principle would demand it, could be construed as a deliberate and inhumane practice. This paper will present seven commonly used reasons why scientists withhold pain control and discuss the validity of their arguments.

The experimental animal can be likened to a human infant, totally dependent on its parents for the necessities of life. How many research papers would be published about infants subjected to experimental manipulations, which were first approved by a Human Ethics Committee and which cause pain and suffering?

# Genetically modified mice as laboratory re-agents?

**Yvette Chen**
Animal Welfare Officer, The University of Melbourne

The mouse has long been the most commonly used species in animal research. In recent decades, the advent of significant scientific advances in techniques to manipulate and engineer the mouse genome has led to a rapid and continuing increase in the use of genetically modified (GM) mice in research. Understandably, such advances have been welcomed by the scientific research community. The award of the 2007 Nobel Prize in Physiology and Medicine to the scientists who discovered gene targeting testifies to this. The GM mouse presents the research community with unprecedented opportunities and unlimited potential for advances in basic research, medicine and biotechnology.

The unlimited potential of the use of GM mice however poses clear ethical dilemmas. It is well recognised by the laboratory animal science community and key research funding bodies that the creation, characterisation and breeding of new GM mouse strains are associated with inherent ethical issues, particularly regarding animals numbers used and the difficulty one can have when predicting potential animal welfare impacts in new GM strains, or in GM strains being used in new contexts.

How well are we positioned to ensure that the increasing use of GM mice remains as ethical as possible? In Australia, animal ethics committees (AECs) are responsible for deciding whether the use of animals in research is ethically acceptable, by weighing the predicted value of research against potential costs to animals, with consideration to the 3Rs (Replacement, Reduction and Refinement) . In practice, this means that where a research proposal gives a reasonable scientific justification for using the types and numbers of animals requested, and the expected degree of pain or distress is likely to be minimal, then an AEC has little reason to reject the proposed research project. But what happens now that the potential objectives and applications for exploring the roles of all genes are limitless? Where the use of multiple GM strains to determine which gene is implicated in a particular disease condition is proposed, how easy is it for an AEC to know how many strains are too many? In complex gene-mapping studies, how well equipped is an AEC to decide how many mice are too many? Inherent in GM mouse use is the risk of unexpected adverse welfare impact as a result of the genetic modification. How effectively is such information shared, particularly to AECs? Certainly, there are international GM mouse strain databases, networks and institutions that specialise in sharing this information to the scientific community; but in practice, how accessible is this information generally made to AEC members when making key decisions?

Is there more that research institutions, investigators, AECs and others involved in animal research can do to help ensure that GM mice do not simply become regarded as a laboratory reagent, rather than the sentient individual animals that they are?

In this presentation, the author explores the ethical issues that the increasing use of GM mice raises. The potential and capacity of the current animal ethical system to ensure that the intrinsic value of each mouse used in GM mice work is given the same ethical consideration and protection as that given to non-GM animals of other species used for research is discussed.

# Dealing with Issues of Non-Compliance

**Geoff Dandie**
CEO, ANZCCART

While I believe that the Code (*The Australian Code of Practice for the Care and Use of Animals for Scientific Purposes – 7th Edition*) has been written more for the purposes of education than regulation, it does come with some clearly defined requirements that are reinforced by the relevant Animal Welfare legislation in every Australian State and Territory of Australia. When researchers, institutions or possibly even ethics committees fail to comply with these requirements, they risk breaking the vital element of trust that holds our system together.

Of course, no system is absolutely perfect and it would be naïve to assume that issues of non-compliance with the Code never occur. The important thing is to ensure that such problems are identified early and addressed satisfactorily so that everyone involved can learn from the mistake and take steps to ensure that it does not happen again.

So the real test is "How effective are we at identifying and rectifying problems that occur?"

Delegates at an ANZCCART conference come from all over Australia and New Zealand as well as other parts of the World. We represent all categories of AEC membership and bring an untold wealth of knowledge and experience to the room.

The aim of this session will be to introduce a few of my own experiences and draw on the collective experiences of the group assembled to hopefully give everyone a broader insight of the kind of problems that may arise form time to time as well as offering a few suggestions on how to best deal with such problems. It is hoped that by gaining some insights form the experiences of others, delegates may be more confident that they can adequately deal with any problems they may experience in the future.

# Devil facial tumour disease

**Greg Woods, Alexandre Kreiss, Cesar Tovar, Gabriella Brown**
Menzies Research Institute, University of Tasmania, Hobart, Tasmania, Australia

The Tasmanian devil (*Sarcophilus harrisii*) is the world's largest living marsupial carnivore. In 1996 devils were first noticed to have grossly deformed "lumps" around their face. These "lumps" were later classified as devil facial tumour disease (DFTD). Since 1996 DFTD has spread like an infectious disease, from the north east of Tasmania where it as first identified, to over more than half of the state. In its wake up to 90% of devils in infected areas have been eliminated. The potency of this cancer is such that extinction of the Tasmanian devil could occur in the near future.

A unique feature of DFTD its that it is an infectious cancer, with the cancer cells themselves being the agents of infectivity. Karyotypic and microsatellite analyses have convincingly demonstrated that the genetic material within DFTD is different from the genetic material of the host devil, hence the tumour must be from a foreign origin. Devils inflict serious bites on the faces of each other and during this process a few DFTD cells from diseased devils can be inoculated into the wound.

At the histological level DFTD is well vascularised and consists of pleomorphic round cells with a high nuclear to cytoplasm ratio. Metastases are common. It was originally proposed to be of neuroendocrine in origin and recent genetic evidence has refined this to Schwann cell in origin.

For devil-to-devil transmission of a "cancer graft", either the host must be severely immunosuppressed or it is genetically similar to the "cancer graft". A thorough analysis (both *in vitro* and *in vivo*) of the immune system of the Tasmanian devil has indicated that they have a fully functional immune system and that immunosuppression does not account for the transmission of this disease.

As devils lack genetic diversity a plausible explanation could be that a low level of MHC polymorphism prevents allorecognition of the engrafted tumour cells. Molecular genetic studies confirmed a lack MHC polymorphism thereby supporting the concept that devils are highly inbred. To further extend this concept skin grafts were performed between devils. Unexpectedly, genetically similar devils showed the capacity to immunologically reject foreign skin grafts thereby indicating that a lack of MHC-diversity does not completely explain why tumour allografts are not recognized as foreign and rejected.

Armed with evidence for a competent immune system, some devils were immunized with irradiated tumour cells. A small proportion of these devils responded to the irradiated tumour cells and one was challenged with live tumour cells. This devil was initially protected against DFTD but when re-challenged 12 months later the tumour developed. It is likely that the immunisation could only confer short-term protection.

Although great progress has been made in understanding this disease, DFTD is still spreading through the devil population. Rapid progress in the next couple of years will be vital to protect this iconic species from potential extinction in the wild.

# Tales of the Unexpected - Projects conducted in other countries in association with Australian Institutions

**Moira Desport, Blesilda Verin and Erich von Dietze**
Murdoch University, Perth, WA

Conducting research overseas, especially in neighbouring Asian countries has many challenges as well as benefits. Murdoch University researchers are funded to undertake research in locations including Indonesia, Thailand, Myanmar, Timor and Philippines. Our researchers also work more widely throughout Asia, including countries such as Tibet, Bhutan, Mongolia, India, etc. When an AEC approves projects involving the use of animals in these countries, what are they actually approving? How can an AEC effectively "seek evidence that will include compliance with codes, laws and practices equivalent to those in Australia"? What are the risks and benefits of doing research in these locations? What are the impacts of language barriers, resource-poor settings and cultural differences when using animals for scientific purposes in these countries?
Experiences and insights gained from laboratory and field-based research projects involving cattle and buffalo in Indonesia and Myanmar will be presented.

# Cytotoxic ability of devil lymphocytes and implications for Devil Facial Tumour Disease

**Gabriella Brown, Alexandre Kreiss, Greg Woods**
Menzies Research Institute, University of Tasmania, Hobart, Tasmania, Australia

Devil Facial Tumour Disease (DFTD) is a contagious cancer that only affects the Tasmanian devil. The disease has spread rapidly, causing severe population declines and the species is now endangered. One factor that has contributed to the spread of DFTD is a lack of resistance to the disease among wild devils, suggesting an ineffective immune response against the tumour. The most efficient anti-tumour responses in mammals are mediated by cytotoxic cells, including T lymphocytes and Natural Killer cells. Cytotoxicity responses can be increased by immunisation. The aims of this project were to determine if cytotoxic anti-tumour responses can occur in Tasmanian devils and to create an immunisation to induce immune responses against DFTD.

Maximal cytotoxic responses can be induced by immunising with foreign cells. Four Tasmanian devils were injected with Human K562 cells in adjuvant. Blood was collected under anaesthesia 7 – 21 days after each dose. Cytotoxic responses against K562 cells were measured using isolated lymphocytes and cultured tumour cells in radioactive chromium release assays. Serum antibody levels were tested using flow cytometry. Three of the four devils injected with untreated K562 cells formed strong cytotoxic responses after two doses and all four devils produced antibody responses, showing that Tasmanian devils can produce functional cytotoxic responses.

In order to create immunisations against DFTD, the cells must be killed, as injecting viable cells carries a risk of causing the disease. Irradiation is one method used to kill cells but this can affect immunogenicity of target cells, decreasing the immune responses induced. Therefore K562 cells killed with 20 Gy of gamma radiation were injected into two devils to determine if cytotoxic responses were still formed. Both devils injected with irradiated K562 cells produced cytotoxic and antibody responses, although they were weaker than those against non-irradiated cells and required one more dose.

Cytotoxicity against DFTD cells was tested using a series of different cell preparations and adjuvants. Initially two devils were injected with irradiated DFTD cells in Montanide, an adjuvant that preferentially induces cytotoxic responses. Neither devil produced cytotoxic nor antibody responses, even after four doses. In the next set of immunisations, the adjuvant was supplemented with oligonucleotides containing repeated CpG motifs. None of the four devils injected with irradiated cells produced cytotoxic or antibody responses, even after three doses. In the third set of immunisations, sonication rather than irradiation was used to kill the DFTD cells. Two devils that had previously been unresponsive against irradiated DFTD were injected with sonicated cells with both montanide and CpG. Both of these devils formed moderate cytotoxic and antibody responses after this extra dose. This appears to be a promising formulation for use in immunisations against DFTD, and its effects will be tested in other Tasmanian devils.