



# THE MAWA TRUST ANNUAL REVIEW 2008/2009

## ABOUT MAWA

The Medical Advances Without Animals Trust (MAWA) is a registered charity based in Canberra, Australia. Its aim is to advance medical science and improve human health and therapeutic interventions without using animals or animal products. MAWA is taking a leading role in animal replacement in medical research and is unique in deliberately fostering dialogue with the medical and scientific research communities to discover common ground to achieve its goals.

MAWA operates as an independent medical research and educational trust fund to facilitate the development and utilisation of non-animal based experimental methodologies to replace the use of animals in scientific research. By increasing funding for non-animal research and training scientists in alternative methodologies, reliance on the use of animals will be decreased. MAWA also encourages, through promotion and education, the wider adoption of such techniques.

## MAWA'S APPROACH PROVES SUCCESSFUL

MAWA's approach is a very positive one. Rather than focussing on and opposing practices which the Trust does not support, MAWA concentrates on finding and implementing solutions, thus avoiding non-productive conflict with the research community. MAWA believes that to achieve real progress the Trust must engage with scientists and academics and together work for change. By maintaining this focus and building bridges with researchers, MAWA has been very successful in promoting its ideals, developing collaborations and partnerships, and identifying funding opportunities.

## MAJOR ADVANCES FOR MAWA IN 2008/2009

Supporters of The MAWA Trust will be pleased to know that during 2008 and 2009 substantial progress was made in positioning MAWA to take a stronger leadership role in the replacement of animals in medical research. Valuable relationships were developed within the science and medical research communities with many senior academics and researchers now willing to work cooperatively with MAWA on the development and promotion of alternative methodologies.

Membership of MAWA's Advisory Panel increased significantly and comprises senior scientists, researchers, academics and medical consultants with expertise across a range of disciplines, many with international profiles who are considered to be leaders in their fields. A number of experts in law, ethics, philosophy and other relevant disciplines are also represented on, or are available to, the panel.

MAWA put considerable effort into liaison and networking activities and, in addition to the scientific community, met with government officials, politicians, opinion makers, industry bodies, other non-profit organisations and the private sector. Consequently there has been an increased interest in MAWA's research grants, scholarships, bursaries and other initiatives and the media have responded with some excellent coverage. MAWA has been invited to give presentations at significant conferences, seminars, workshops and symposia, and was also asked to contribute to university and government education and training programs.

During 2008/2009 a number of initiatives were launched, each designed to increase the exposure of the scientific community to MAWA's goal of supporting medical advances without animals, and many more initiatives will be introduced as funding becomes available. **In 2010, however, MAWA will be making some very important announcements in regard to two key initiatives which we are confident will result in major breakthroughs in the development and promotion of alternatives.**

## SPECIAL THANKS

The Trust would like to take this opportunity to acknowledge the significant contributions to the advancement of MAWA's initiatives made by Professor William Maher, Professor Suresh Mahalingam, Dr Brett Lidbury and Dr Luby Simson from The University of Canberra, and to express our profound appreciation for their encouragement and guidance.

The MAWA Trust Cares for the Environment – Recycled Paper

## THE MAWA TRUST MANAGEMENT COMMITTEE

Ms Elizabeth Ahlston; Professor Anne Keogh; Mr Raymond Kidd; Professor Stephen Leeder;  
The Hon Kevin Rozzoli AM; Associate Professor Garry Scroop; Ms Sharyn Watson.  
**MAWA Trustees:** Ms Elizabeth Ahlston; Professor Anne Keogh; The Hon Kevin Rozzoli AM.  
**MAWA Executive Director:** Ms Sharyn Watson

## TRUSTEES MEET WITH CANBERRA ACADEMICS AND UNIVERSITY EXECUTIVES

In August 2008 MAWA Trustees Ms Elizabeth Ahlston, Professor Anne Keogh and The Hon Kevin Rozzoli AM joined MAWA's Executive Director and board members for a series of important meetings with senior academics, researchers and university executives from The Australian National University (ANU) and The University of Canberra (UC). During these meetings MAWA had the opportunity to provide an update on its activities and to present a number of ideas and strategies to further MAWA's aims. Preliminary discussions took place to formalise strategic relationships and to canvass possibilities for collaborations and partnerships. MAWA Trustees were delighted by the high level of attendance and the seniority, interest and responsiveness of participants, which bodes well for future successes. The Trustees also took the opportunity to meet MAWA funded researchers and scholars, and to visit their research centres and host laboratories, including The John Curtin School of Medical Research (JCSMR) at the ANU.



Karen Edwards ANU

Deputy Director, JCSMR Professor Simon Eastaer, and Trustees The Hon Kevin Rozzoli AM, Professor Anne Keogh, Ms Elizabeth Ahlston with MAWA Honours Scholar Ms Mace Neve.

## MAWA ESTABLISHES A DIVERSIFIED RESEARCH PORTFOLIO

MAWA's research focus is on basic medical research to improve understanding of human illnesses, their causes, progression, and the underlying features that might allow them to be prevented, diagnosed earlier or treated more effectively. Since its foundation the Trust has supported research into a range of diseases involving a broad array of personnel, disciplines (predominantly, but not exclusively, within biological sciences, medical sciences, computer sciences and bio-engineering) and collaborations across faculties and institutions encouraging multi-disciplinary approaches.

MAWA funded researchers have developed and utilised a number of alternative methodologies to replace animal experiments including the use of human cells, tissues and organs, human gene studies, analytical technology, microorganisms, computer and mathematical models, information collation, epidemiology, and volunteer studies.

To date MAWA has supported research into cancer, diabetes, vascular disease, osteoporosis, musculoskeletal diseases, hepatitis, prostate disease, obesity, inflammatory diseases, molecular drug design and computational methods of designing and screening therapeutic agents. MAWA has also supported the development of a non-animal drug screening methodology, a human model of nerve compression, an animal blood free medium for culture based diagnosis of human diseases, a non-animal method of studying the function of specific genes, and ex vivo human models to study viral-induced rheumatic disease and musculoskeletal disease. One of MAWA's current funded projects is using a combined data-mining and molecular biology approach to replace animal models for human disease studies.

## MAWA RESEARCH GRANTS 2008/2009

MAWA Research Grants provide funds to support research projects of one to three years duration directed at improving human health and therapeutic interventions without using animals or animal products. During 2008/2009 two grants were awarded to researchers utilising alternative methodologies for studies into human diseases, and one was awarded to develop computational methods of designing and screening therapeutic agents. These projects have considerable potential to replace the use of animals in medical research and toxicity testing.

### (1) Data Mining and Molecular Biology Project:

#### **Combined data mining and molecular biology approach to replace animal models for human disease studies.**

Dr Brett Lidbury, Senior Lecturer, Faculty of Applied Science, and Chief Investigator, Centre for Knowledge Discovery and Modelling in Health (CKDMH), University of Canberra, received MAWA funding for a project entitled *Replacement of Animal Models for Human Viral Disease Studies through a Combined Data-Mining and Molecular Biology Approach Using Existing Routine Pathology Data and Samples: A Hepatitis B Virus and Hepatitis C Virus Analysis*.

Brett is working closely with statistician Dr Alice Richardson and other members of the Centre for Knowledge Discovery and Modelling in Health in collaboration with ACT Pathology, The Canberra Hospital. He says that “*The team will engage in cutting-edge research and development of advanced statistics (which currently do not always cater to the increasingly diverse and specialised needs of biomedical research) and information technologies to support the use of advanced data mining techniques in medical laboratory diagnoses, clinical decision-support and biomedical research.*”

Human Hepatitis viruses remain a serious global health problem. Brett’s project combines advanced data mining and statistical methods with molecular biology laboratory approaches to elucidate disease mechanisms in humans infected with hepatitis B or hepatitis C virus. He says that the elucidation of disease mechanism in whole organisms, for viruses and other disease agents, traditionally relies upon animal models, particularly those using specialised rodent strains (eg inbred mice). This study, however, replaces the traditional animal dependent approach to pathogenesis research by using bioinformatic techniques (ie data mining and statistics) to define patient groups who display different data patterns associated with hepatitis B or hepatitis C infection, and hence a different physiological response to infection. Once “rules” are determined via data mining, patient profiles can be designed that will guide molecular genetic studies on the biological basis of disease resistance or susceptibility.

Brett and Alice report that data mining has so far confirmed previously established associations between liver function variables and hepatitis virus infections, but more work is required to identify additional disease markers and thereafter define a full disease profile, post infection, via pathology blood test data. In the short term though, Brett’s team have made progress on establishing primary rules by which to enhance the laboratory diagnosis of hepatitis B virus infection. Brett and Alice will present their findings at the World Computer Congress in Brisbane in September 2010, as well as to the biomedical research community at seminars and conferences.



Researchers from CKDMH UC Professor Dharmendra Sharma, Dr Alice Richardson, Dr Fariba Shadabi, Professor John Fulcher, Professor Simon Hawkins and Dr Brett Lidbury

## (2) Biomedical Sciences Project:

### Development of ex vivo human models to study viral-induced musculoskeletal disease to replace animal experiments.

Professor Suresh Mahalingam, Dean of Research and Director of the Centre for Biomedical, Molecular and Chemical Sciences, University of Canberra, received MAWA funding for a project entitled *Development of an ex vivo human cell culture model to investigate mechanisms of musculoskeletal diseases instead of using animals.*

Suresh stated in his proposal that “*much research into musculoskeletal diseases currently involves mice and rats, but the mechanisms underlying musculoskeletal disease triggered by viral infections are poorly understood, largely due to the poor reliability of current animal models of disease. These models often involve the use of human viruses to establish infection which do not mimic the human disease. The inoculation of human viruses into mice and rats can cause pain, suffering and distress to the animals. Subsequent in vitro experiments are also often performed on primary murine cells in the presence of sera generated from animal sources. Physiological and genetic differences between the murine and human species mean that results from murine or rat studies have had little impact in the understanding of human disease.*” Suresh argued that it is, therefore, essential that these experiments be translated across to the human model.

## WOULD YOU LIKE TO JOIN MAWA'S MONTHLY DONOR'S LIST?

Each month a regular amount that you have chosen would be debited from your credit card. You can increase or decrease your monthly donation or cancel your donation at any time. At the end of the financial year MAWA would send you an annual statement so that you can claim your tax deduction.

Monthly donations are a convenient way of giving and are particularly appreciated by MAWA. These contributions save on administrative costs which means more of every dollar you donate goes straight to our vital projects and provides a stable and reliable income which allows us to plan ahead knowing that these funds will be available. More importantly this regular giving enables us to focus less on fundraising efforts and more on expanding MAWA's work.

Suresh and Centre for Biomedical Molecular and Chemical Sciences researchers, in collaboration with clinicians from hospitals in Canberra, are using donated human muscle tissues from biopsies to develop and characterise an ex vivo human muscle cell model to investigate mechanisms of viral-induced musculoskeletal disease. Viruses, which include HIV, influenza, rubella virus and arthropod-borne viruses such as dengue and Ross River virus, are a significant cause of musculoskeletal disease in humans. MAWA is pleased to note that this project will also incorporate the evaluation of serum-free media in the maintenance of primary human muscle cells. The use of virus tagged green fluorescent protein avoids the need for monoclonal or polyclonal antibodies (derived from animals) to detect infected cells.

Suresh sums up by saying that *“these studies have the potential to define the pathway whereby viral interactions with the host immune system lead to the development of an inappropriate inflammatory response leading to musculoskeletal disease. If successful, this will represent one of the first primary cell culture models for studying viral-induced musculoskeletal disease and may ultimately lead to improved therapies against these diseases. In addition, the establishment of a human muscle primary cell culture model will be invaluable in other research.”*



Professor William Maher, Dean of Applied Science, Dr Luby Simson, Research Fellow and Professor Suresh Mahalingam, Dean Research, UC

### (3) Computational Biophysics Project:

#### Techniques for modelling systems to design and screen pharmaceutical products to replace animal testing.

Professor Shin-Ho Chung, Leader of the Computational Biophysics Group, Division of Biomedical Science and Biochemistry, The Australian National University, was awarded a MAWA Research Grant for his project entitled *Computational methods of designing and screening therapeutic agents to replace testing in animals.*

The primary aim of this research is to devise a technique to study how biological ion channels work using modern supercomputers. Shin-Ho explains that ion channels are narrow tubes made from proteins and are the ultimate unit of physiology of life. By allowing some ions to move into and out of the living cell, ion channels generate all electrical signals in the brain and muscles. It is now known that many neurological, muscular, renal and cardiovascular disorders arise from malfunctioning of ion channels. Thus, understanding how these ion channels operate will ultimately help to find the causes of, and possibly cures for, many inherited or acquired diseases.



Professor Shin-Ho Chung, ANU.

All marketed drugs that act on ion channels were discovered empirically by testing on animals rather than by molecular insights, and most of them have shown serious problems of safety and efficacy. Computational simulations may prove to be a powerful tool in rapidly screening and modifying potential pharmaceutical agents that can combat channel-mediated diseases. Instead of using real ion channels obtained from animals to study them, Shin-Ho's group will construct a computer program that will enable them to visualize how ions move across them, how drugs and toxins interact with them and how they open and close. In this way, they can follow the movement of ions, atoms and drug molecules under various conditions.

Shin-Ho states that *“the methods such as the ones we propose to devise have not yet been attempted, partly due to the lack of significant theoretical and technical guidance. With important advances in theoretical biophysics and an ever-increasing processing power of modern supercomputers, it has now become possible to replace the screening method of potential pharmaceutical agents using animals with the state-of-the-art computational tools*

*that make use of physics and engineering methods and reasoning in biological research. Such integrated quantitative approaches will be necessary to solve future grand challenges and cutting-edge problems in the medical sciences such as the development of new and better agents for combating the diseases. We propose to embark upon an ambitious undertaking to meet this challenge, making combined use of the current technology in biophysics, mathematics, physics and computer sciences.”*

## FUTURE PROJECTS

MAWA has four more research projects in the pipeline and, when finalised, we look forward to informing you how each will develop new replacement methods to advance the Trust's aims and take MAWA in important new directions.

## MAWA QUINN HONOURS RESEARCH SCHOLARSHIPS AWARDED

As reported in our last newsletter MAWA has established honours scholarships to support students undertaking honours research projects that replace animals or animal products and with the specific intention of encouraging new scientists to advance the development, validation or application of alternative methodologies. MAWA's aim with this initiative is to attract new graduates at the beginning of their research careers to promote the scientific advantages of non-animal methods of research. The MAWA Honours Scholarships are named after Mrs Elsie Quinn, for her outstanding contributions to the Trust.

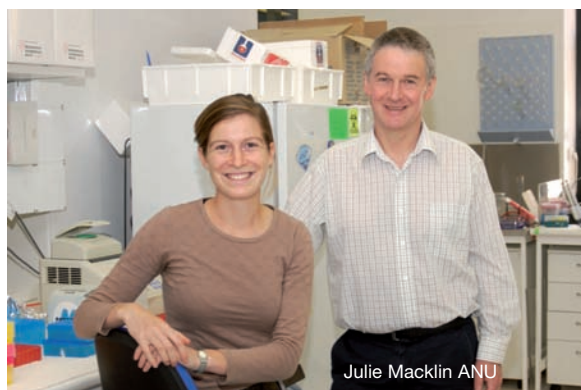
## MAWA Quinn Honours Scholarships were awarded to:

### (1) Predictive Medicine Project

#### Using human DNA samples to replace the use of genetically engineered animals.

Ms Mace Neve's study entitled *The role of oxytocin in social/sexual behaviour: a study of naturally occurring variation in the human oxytocin receptor gene* was undertaken in The John Curtin School of Medical Research at the Australian National University (ANU) under the supervision of Professor Simon Eastale, Leader of the Predictive Medicine Group and Deputy Director of JCSMR.

Mace looked at DNA differences in the gene that encodes a protein called OXTR and studied the role of oxytocin in reproductive and social behaviour in humans and consequent health effects. A standard approach to studying the function of genes is to create a mouse strain with the human gene inserted whereas Mace successfully used human DNA samples from volunteers instead of using genetically engineered rodents and avoided the problem of species differences in biological processes and behaviour.

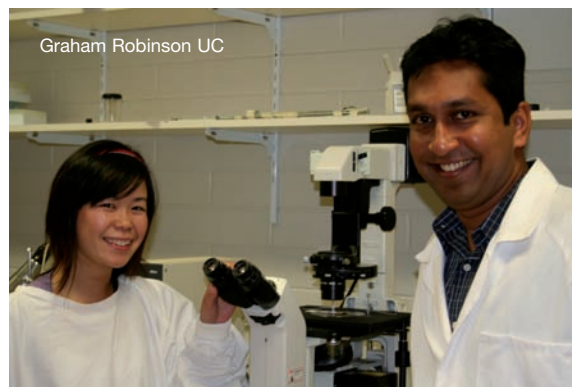


Ms Mace Neve and Professor Simon Eastale, ANU

MAWA was delighted when Mace was awarded First Class Honours and to learn that after a year of employment in order to qualify Mace to practice law (she completed a Bachelor of Laws in addition to her Bachelor of Science), she is planning a return to the John Curtin School to pursue a research career in biomedicine, utilising non-animal methodologies.

### (2) Viral Immunology Project

#### Using a novel human cell culture model to replace animal experiments.



Ms Amanda Choo and Professor Suresh Mahalingam UC

Ms Amanda Choo's research project in viral immunology entitled *An ex vivo human model to study viral-induced rheumatic disease* was undertaken in the Centre for Biomedical, Molecular and Chemical Sciences at the University of Canberra (UC) under the supervision of Professor Suresh Mahalingam, Dean of Research and Director of the Centre for Biomedical, Molecular and Chemical Sciences.

Amanda's project explored the basic mechanisms underlying acute and chronic arthritis triggered by viral infections. Professor Mahalingam stated that much research into inflammatory diseases involves the injection of human viruses into rodents causing pain and distress to the animals whereas Amanda used a novel human cell culture model to study viral induced arthritis and it is expected that this approach will prove more reliable and lead to improved therapies.

MAWA'S congratulations go to Amanda upon her successful completion of her honours year and subsequent appointment as a Research Officer at The Australian National University. Amanda is giving consideration to pursuing further postgraduate studies and hopes to "make a difference in today's society by advancing medical science without causing suffering to animals."

### (3) Biochemistry-Molecular Drug Design Project

#### Structure based drug design to reduce toxicity testing in animals

Ms Karina Turci's project entitled *Understanding biotin protein ligase: towards a new class of antibiotics* was undertaken in the School of Molecular and Biomedical Sciences at the University of Adelaide (UA) under the supervision of Associate Professor Grant Booker, Senior Lecturer, and Dr Steven Polyak, Research Fellow, from the Department of Biochemistry.

Karina investigated the molecular interaction between biotin protein ligase (BPL) and substrate biotin domains. Obtaining significant mechanistic information about the process of biotinylation will enable the discovery of new antibiotics which are desperately required to combat the rise of drug resistant bacteria. Using structure based drug design Karina's laboratory hopes to develop new drugs that are highly specific, thereby minimising side effects caused by undesirable interactions with off target proteins and pathways. This emerging technology has the potential to alleviate the requirement for extensive toxicity testing in animals.

MAWA's congratulations go to Karina for her excellent result of First Class Honours. Karina plans to commence a Doctor of Philosophy in 2010 and her research will focus on discovering new medicines with non-animal based research.



Professor Grant Booker, Ms Karina Turci and Dr Steven Polyak UA

## UPDATE: MAWA DOCTORAL SCHOLARS MAKE PROGRESS

The award of MAWA Doctoral Research Scholarships to Dr Rasmi Fotedar and Mr Eric Han was reported in the MAWA News No 9. Doctoral scholars and their supervisors provide six monthly progress reports on their projects and the Trust is very pleased with outcomes to date for both Rashmi and Eric.

### (1) Public Health Microbiology Project:

#### **Development of an animal blood-free medium to replace traditional media containing animal blood.**

Dr Rashmi Fotedar's project entitled *Development of an animal blood-free medium for culture-based diagnosis of human diseases* is progressing very well according to her supervisors Professors Basil Donovan and John Tapsall. Virtually all traditional media for studying pathogenic organisms contain blood or blood components from animals (eg horses, goats, sheep, and cattle) like haemoglobin, plasma, haemolysed RBCs etc but Rashmi is working on the production of an easily prepared animal blood free medium for culture-based diagnosis of diseases.

The use of animal blood for the production of a suitable medium has major limitations world wide because blood is not always readily available, is relatively expensive, may be of variable quality, and is liable to be contaminated and therefore potentially hazardous. The use of this novel blood-free medium in clinical laboratories could eventually replace or greatly decrease the use of media that rely on animal blood. The production of a completely blood-free medium will be a major breakthrough in non-animal culture-based research and will benefit both individual patients and communities by helping to control infections.

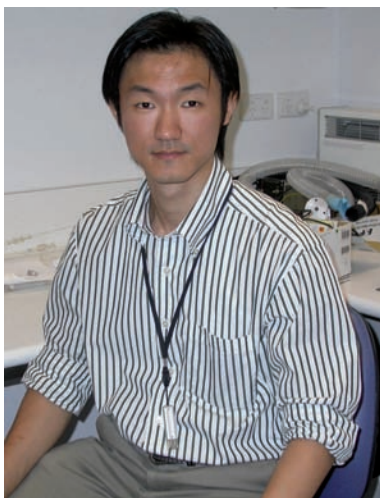
Rashmi's results to date indicate that the medium her team has developed is suitable and comparable to blood containing media currently used for the growth of human pathogens. It does, however, need to be further evaluated for its usefulness in antimicrobial susceptibility and other molecular based studies used for microbial genotyping. Basil, John and Rashmi hypothesize that this novel blood-free medium, if properly developed and assessed, can replace the widely used blood containing media in many culture based processes required for the isolation, identification, antibiogram determination and genotyping of human pathogens.

Rashmi's research is being undertaken in the Department of Public Health and Community Medicine, University of New South Wales (UNSW) and the Department of Microbiology at the Prince of Wales Hospital.

### (2) Neurophysiology and Biomechanics:

#### **Development of a human model of nerve injury to replace animal experiments.**

Mr Eric Han is also progressing well with his project entitled *Pathophysiology of focal human entrapment neuropathy*. From this research Eric has already had two manuscripts accepted for publication in international peer reviewed journals, a third paper has been submitted and another two are "works in progress". MAWA's support has been acknowledged in all Eric's manuscripts.



Mr Eric Han, MAWA Doctoral Scholar

Patients with entrapment neuropathy such as carpal tunnel syndrome, radiculopathy, and pressure palsy suffer debilitating symptoms such as tingling, pain, numbness, spontaneous muscle contraction, cramp, and even muscle paralysis. These conditions are thought to be caused by compression and/or interruption of oxygen supply (ischaemia) of the affected peripheral nerve. At present the extent to which these factors contribute to symptoms and loss of function in human entrapment neuropathy is not known. One reason for this is that researchers have used animals (mainly dogs) that are purposely subjected to injuries as models for human nerves; however, animals cannot report symptoms, such as tingling, pain or numbness. Consequently, animal nerve injury models can only be generalised to humans in limited ways.

To overcome these problems Eric has developed a mechanical compression device as a safe and reversible human model of nerve injury to replace the use of animal experiments. Human subjects can now be studied using this non-invasive technique. This will enable the investigation of causes of symptoms and the underlying neurophysiological mechanisms and effects, while allowing for simultaneous collection of symptom report data from subjects, a situation impossible with animal models.

Eric's project is being undertaken at the Prince of Wales Medical Research Institute (POWMRI) and the University of New South Wales (UNSW), under the supervision of Associate Professor Matthew Kiernan and Associate Professor Lynne Bilston.



Dr Rashmi Fotedar, MAWA Doctoral Scholar,

## INTRODUCTION OF NEW MAWA SCHOLARSHIPS

### **MAWA Supplementary Scholarships**

These scholarships may be provided to scholars who are awarded a more prestigious scholarship, for example a National Health and Medical Research Council scholarship, to undertake doctoral studies that meet MAWA's criteria. MAWA appreciates that it cannot compete for scholars under these circumstances so this top up funding will allow MAWA to co-sponsor projects and to spread its funds more widely, thereby increasing MAWA's profile. Two supplementary scholarships have been awarded to date and we will be reporting more fully on this initiative in our next MAWA News.

### **MAWA Bridging Scholarships**

These scholarships may be provided to scholars who are likely to be awarded a more prestigious scholarship but need to commence their studies in second semester prior to the commencement of their doctoral scholarship. In recognition that Australia is out of step with most overseas countries which commence their academic year in the middle of the year these scholarships have been introduced to fill a niche by providing financial support to bridge this gap. It is an economical way for MAWA to provide an incentive to students to undertake research projects that will further MAWA's aims. Unfortunately applications submitted to date have not met MAWA's strict selection criteria, or have not met MAWA's eligibility requirements. In 2010 MAWA will be promoting these scholarships with more emphasis on our policies and conditions of support.

## OTHER MAWA INITIATIVES

### **Collaboration with Transinsight - Go3R Search Engine**

The Centre for the Documentation and Evaluation of Alternatives (ZEBET) and Transinsight in Germany launched their search engine Go3R for alternative methods to animal experiments earlier this year. MAWA has been in communication with Dr Michael Alvers CEO of Transinsight and he, in turn, has approached the Trust in regard to MAWA becoming one of Transinsight's world wide collaborators. MAWA consulted with a number of academics with expertise in this field and was very pleased to find there is a high level of interest here in Australia. The proposal will be fully explored in 2010.

### **Establishment of Human Tissue Bank**

MAWA has commenced discussions with a number of researchers and medical and hospital personnel in regard to the establishment of a human tissue bank in Canberra. Once again there is a high level of interest and enthusiasm giving MAWA confidence to carry this initiative forward.

### **Facilitation of a Think Tank on Alternatives**

Researchers working with the Trust suggested that MAWA facilitate a think tank on developing alternatives and already we have a number of scientists who have expressed interest. This initiative will be linked to activities planned for 2010 which will provide the personnel required for its facilitation.

## WELCOME BACK TO PROFESSOR STEPHEN LEEDER

The Trust is very happy to welcome back Professor Stephen Leeder to MAWA's board. Stephen was the Dean of Medicine at the University of Sydney and MAWA's first Chair. His active support of the Trust in its early days was invaluable.

In 2003-04, Professor Leeder worked at Columbia University, New York, in the Earth Institute and Mailman School of Public Health, developing a substantial report, based on research data and scientific interpretation, of the economic consequences of cardiovascular disease (CVD) in developing economies. The report concentrated upon the macroeconomic consequences of CVD, and especially on the fact that one-third of CVD deaths in many developing countries were occurring among people of working age.



Professor Stephen Leeder AO

Stephen returned to Australia as professor of public health and community medicine at the University of Sydney and Director of the Menzies Centre for Health Policy, a collaborative centre between The Australian National University and The University of Sydney. Stephen has 35 years of experience in epidemiological research, medical education reform and mentoring young investigators, so MAWA is indeed fortunate to have his support.

### **SO MUCH CAN BE ACHIEVED WITH A BEQUEST**

Not many people can afford to give large donations but a legacy is often possible and is a wonderful way of making a contribution beyond your lifetime. Even a small bequest to MAWA can make a difference in our vital work to advance medical knowledge and replace animal research with alternative methodologies. Bequests are often the largest single source of charitable income and without the generosity of those people who have left a bequest to us MAWA could not have continued its work. Please telephone 02 62871980, email, or go to our website for further details.

## NATIONAL ALTERNATIVES SYMPOSIUM & WEBSITE CO-SPONSORED BY MAWA

A national symposium on *Australian Alternatives to Using Animals in Scientific and Medical Research* was organised by Drs Denise Russell and Melissa Boyde from the University of Wollongong as part of “The Replace Animals in Australian Testing (RAAT) project”. RAAT’s vision is to reduce the number of animals used in scientific experiments and medical research in Australia and its aim is to create a network of researchers and other individuals or groups interested in advocating non-animal based research.

The symposium was attended by scholars, researchers and members of the animal protection movement with expertise and interest in the replacement of animals in scientific research. Speakers from the fields of humanities, law and scientific/medical research from several Australian universities, and from animal advocate organisations addressed the current situation concerning the promotion of alternatives to the use of animals in Australia.

The symposium’s main focus was to explore two questions: (1) How to get over the impediments to using alternatives to animals in scientific and medical research and (2) What practical strategies can be used to promote alternatives to using animals in scientific and medical research. The MAWA Trust co-sponsored this important event which was held at the University of Sydney in October 2008. MAWA also provided funding support for the RAAT website created as part of the symposium project to establish an information resource about replacement technologies currently available in Australia.



Dr Jason Grossman, Research Fellow, Australian National University, Ms Mace Neve, MAWA Scholar, Ms Glenys Oojges, Executive Director, Animals Australia, Dr Siobhan O’Sullivan, Research Fellow, Uni of Melbourne

MAWA was represented by Trustee Elizabeth Ahlston, Executive Director Sharyn Watson, board member Raymond Kidd and MAWA Honours Scholar Mace Neve from The Australian National University. Sharyn gave a presentation on MAWA’s advances and initiatives including the Trust’s collaborations and partnerships with research groups and institutions to facilitate the development and utilisation of non-animal based experimental methodologies. Sharyn also spoke about possibilities for securing government research funding and program grants for replacement research, and in particular, opportunities that could arise as a result of the National Health and Medical Research Council’s new initiatives.

## MAWA PRESENTATION AT BUREAU OF ANIMAL WELFARE SEMINAR

MAWA’s Executive Director, Sharyn Watson, was invited by Dani Maver, Principal Veterinary Officer, Victorian Bureau of Animal Welfare, to provide a tailored presentation for animal management officers, and animal welfare representatives and lay members of Animal Ethics Committees (AECs), at a specialised training seminar. As these members don’t have biological science backgrounds, but are required to discuss complex scientific applications with scientists and veterinarians, they are obviously at a disadvantage. Dani asked if MAWA could assist them to better fulfil their responsibilities.

The well attended seminar was held at the University of Melbourne. Sharyn spoke on MAWA’s work and future plans, especially those that would result in much greater support being available for AEC lay and animal welfare members. She also talked about organisations world wide that provided helpful on-line resources, databases and assistance, and what efforts could reasonably be expected of a researcher in considering alternatives. Sharyn and colleagues had prepared comprehensive resource kits on alternatives, and advice on how to search for them, which were provided to all participants. Costs were covered by the Department of Primary Industry. Dani advised that the feedback she received was very positive on both the seminar and the resources.

## MAWA TRUSTEE AWARDED ORDER OF AUSTRALIA



The Hon Kevin Rozzoli AM

Our congratulations to MAWA Trustee The Hon Kevin Rozzoli on his award as a member of the Order of Australia. Kevin was a foundation member of MAWA’s board and is a Trustee and MAWA’s current Chair. He served as a Member of the Legislative Assembly of New South Wales for thirty years and as speaker of the house for seven years. Throughout his political career Kevin spoke out strongly against animal experimentation and for the promotion of alternative methodologies to replace animal research. Kevin is currently an Honorary Research Associate at the University of Sydney, and an Honorary Research Fellow at Monash University. He is also Chair of a number of organisations and Director of two university centres. Kevin was awarded his Order of Australia for “Service to the New South Wales Parliament and to the community of Sydney through a range of environmental protection, health, welfare, and educational organisations.”

### **Australia Day Achievement award to MAWA Board Member**

Our congratulations also go to Raymond Kidd on his Australia Day Achievement Award for “A significant contribution to the protection of the environment”. This was Raymond’s second Australia Day Achievement Award, his first was received in 2006 for “Environmental Stewardship”.

## MAWA SUPPORTS WORK OF EXPATRIATE VETERINARIAN ANDREW KNIGHT

Andrew Knight, an Australian veterinarian living in London, a Fellow of the Oxford Centre for Animal Ethics and Director of Animal Consultants International has written a series of scientific papers which have been published in peer reviewed journals, and has presented his work at scientific conferences and universities internationally.

Of particular interest to MAWA is Andrew's very comprehensive article on non-animal methodologies within biomedical research and toxicity testing and the associated scientific poster, and a paper in which he investigates the validity of the assumption that animal models are reasonably predictive of human outcomes. Andrew scrutinised a large number of existing systematic reviews of the human clinical or toxicological utility of animal experiments and concludes that they demonstrate poor human predictivity or utility. This paper is considered controversial by some, but MAWA was pleased that academics and researchers from The Australian National University (ANU), and the Universities of Sydney, Melbourne, Adelaide and Canberra agreed with a suggestion from an academic at ANU that the article should be made available to early career researchers and that it would be beneficial as set reading for science ethics courses.

MAWA has been very happy to support Andrew's work by printing and disseminating his papers and posters, and providing funding to assist with open access fees for journal articles to allow for greater outreach.

Open access journal sites:

Knight A. Systematic reviews of animal experiments demonstrate poor contributions toward human healthcare.

*Reviews on Recent Clinical Trials* 2008; 3(2): 89-96.

<http://www.bentham-direct.org/pages/content.php?RRCT/2008/00000003/00000002/0002RRCT.sgm>

Knight A. Non-animal methodologies within biomedical research and toxicity testing. *ALTEX*

(*Alternatives to Animal Experimentation*) 2008; 25(3): 213-231. <http://www.altex.ch/en/index.html?id=50&iid=101&aid=9>



Dr Andrew Knight, presenting one of his scientific posters at a conference.

## WORLD FIRST ALTERNATIVES DEVELOPED IN AUSTRALIA

### Australian Scientists Develop Artificial Skin

Reported in the Sydney Morning Herald and The Age that researchers at the Queensland University of Technology have developed three-dimensional models made up of skin cells to create a human skin equivalent. These in vitro methods could revolutionise wound healing research and could replace pig skin to test new therapies, cosmetics and chemical consumer products.

Human skin is donated by patients undergoing surgical procedures and the skin keratinocytes are isolated and grown as a skin substitute in vitro in an animal-product-free medium.



Professor Zee Upton said that while the human skin equivalent was originally developed for use in her research into wound healing it could also be used for product testing. "When it comes to testing new wound therapies or products and cosmetics that go on human skin, pig skin is our closest alternative and is most often used," Professor Upton said. "Obviously the ultimate goal is to avoid labs having to use animals altogether."

Skin equivalents have also been developed overseas but could not be imported into Australia because of transport difficulties and quarantine restrictions.

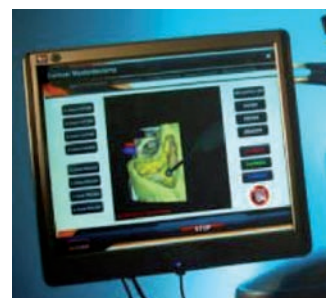
### Surgery Simulator Invented in Australia to Train Surgeons

The Age reported on a **world first** surgery simulator, invented by the University of Melbourne and CSIRO, which gives students unprecedentedly realistic practice at operations. The simulator allows students to "feel" the bone and flesh under their virtual drill, using force-feedback pens. It also enables them to see the operation through a 3-D microscope that shows a live, animated model of the anatomy they are operating on.

"There have been other computer simulators, but when it's just a mouse melting away the bone you don't feel part of it, you don't get that true connection," said Professor Stephen O'Leary, a senior surgeon at the Royal Victorian Eye and Ear Hospital who worked to develop the machine. "This brings engagement and realism to the process." He also likes the augmented reality of being able to stop and rewind an operation, to show a student what went wrong.

It would be a great learning tool that would save time and hone the skills of Australia's trainee surgeons, he said. In the future it could even be programmed with scans from an individual patient, so a surgeon could practise before an operation.

The prototype, built in 2004, was licensed in 2005 to Medic Vision, a Melbourne company that has turned it into a commercial product. It took two years to iron out the problems but the company is receiving interest from around the world.



## NEWS FROM OVERSEAS

### Dr Gill Langley Retires from The Dr Hadwen Trust

The MAWA Trust owes a debt of gratitude to the Dr Hadwen Trust for all the practical help and advice it was given during its formative years and we join with all those who have spoken of Dr Gill Langley's outstanding achievements as Science Director in wishing her a happy and rewarding "early retirement".

Dr Langley has taken early retirement after steering the charity for over 29 years. She has played a pivotal role in the Dr Hadwen Trust's growth from a tiny beginning in 1981 to its present position as the UK's leading medical research charity that funds and promotes exclusively non-animal techniques to replace animal experiments.



Dr Gill Langley

The Dr Hadwen Trust was founded by the BUAV (British Union for the Abolition of Vivisection) in 1970 but broke away from it and was re-launched as an independent organisation in 1981 when Dr Langley was invited by the Trustees to undertake its running. Over the next few years, occasionally without enough funds to pay Dr Langley's salary, the Dr Hadwen Trust began to grow. A legacy was a vital turning point and by 1988 it was possible to employ Terry Huxtable who has run the organisation since then, allowing Dr Langley to focus on the scientific aspects of the work. With increased funds and growing support, both the scientific community and the general public, including growing interest by the media, the organisation has attained its current respected position. There has been a marked shift in attitude by many scientists towards the use of non-animal methodologies. Currently the Dr Hadwen Trust is funding seventeen research projects that do not involve the use of animals and a further five grants are in the pipeline: they will run over three years each and are looking into cystic fibrosis, neurofibromatosis, lethal viral infections, asthma and human brain function.

Dr Langley wrote: "The 1990s saw major strides forward. Replacing animals in research and testing became mainstream in the worlds of science, philosophy and politics." A few of the highlights during Dr Langley's period as scientific director of the Dr Hadwen Trust have been a successful conference at Nottingham University on "The Status of Animals: Ethics, Education and Welfare", and her acceptance to give the Plenary Lecture at the 3rd World Congress on Alternatives and Animal Use in the Life Sciences in Bologna, Italy, in 1999.

Many animal protection advocates and scientific colleagues have paid tribute to Dr Gill Langley's enormous contribution towards the replacement of animals in medical and scientific research. In the words of Terry Huxtable, Dr Hadwen Trust's Chief Executive Officer: "She has been an inspirational and guiding figure for the organisation."

The newly appointed science director of the Dr Hadwen Trust for Humane Research is Dr Sebastien Farnaud. Dr Farnaud has impeccable scientific credentials: his earlier scientific qualifications were obtained in Toulouse, France, and his MSc and PhD in Molecular Biology at King's College, University of London, in 1991 and 2000.

### Dr Jane Goodall & Dr Hadwen Trust Call For EU Strategy on Alternatives

In 2008 world renowned primatologist and UN Messenger of Peace, Dr Jane Goodall DBE made a rare visit to the European Parliament to urge Members of the European Parliament (MEPs) to support a strategy to replace animal experiments. Her call came as the European Commission prepared to publish draft legislation to update the EU's animal experiments directive. The event highlighted the welfare, scientific, human health and economic benefits of replacing animal experiments.

Dr Goodall was joined by biomedical researchers, MEPs and animal protectionists at the Replace Animal Experiments in Europe event in Brussels, organised by the Dr Hadwen Trust and the Humane Society International. Together they are spearheading a campaign to accelerate European efforts to replace animal experiments. They are calling for Europe to establish a world-leading Centre of Excellence in non-animal research to speed up the development of new techniques.



Primatologist Dr Jane Goodall

Dr Jane Goodall said, "the amazing human brain should set to work to find new ways of testing and experimenting that will not involve the use of live, sentient beings. The scientific establishment should actively encourage such research. More funding should be made available for it. And rewards – such as a Nobel Prize – should be given for it. It is a goal worthy of great energy and scientific ingenuity. It is a goal towards which all civilized nations should be moving."

Extract from The Dr Hadwen Trust News

**ALL DONATIONS TO THE MAWA TRUST ARE TAX DEDUCTIBLE**

# EXAMPLES OF ADVANCED NON-ANIMAL TECHNOLOGIES

## Replacement of Animals in Brain Tumour Research

Geoffrey J Pilkington BSc PhD, Professor of Cellular & Molecular Neuro Oncology, School of Pharmacy & Biomedical Sciences at University of Portsmouth says:

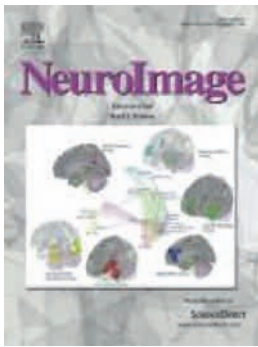
*"In brain tumour research it is clear that the development of three-dimensional tissue culture models, which utilise both cells and serum of human origin, offer a real alternative to some of the established laboratory animal models which have been found to be wanting when clinical translation to the disease in man is considered."*

### Carcinogenicity Tests

Animal experiments can be very time-consuming and costly. For example, the rodent carcinogenicity test uses 400 – 800 animals per test and takes up to five years to complete. By contrast, many replacement methods, such as cell-based studies, silicon chip biosensors, genomics, proteomics and computer simulations, can provide fast, reliable answers to medical and safety questions.

Extract from The Dr Hadwen Trust News

## Non Animal Pain Research Could Help Patients



A recent paper in NeuroImage reports on the conclusions of a panel of pain experts from academia and industry who met to explore the opportunities and challenges in replacing animal experiments in pain research. The authors concluded that advanced non-animal technologies could contribute to a better understanding of human pain and have the capacity to replace some of the current uses of animals in pain research. In particular, the advent of powerful advanced brain imaging technologies is enabling ethical studies of healthy and pain-patient volunteers that could provide vital insights into human pain and offer greater hope for a pain-free future. Recommendations in the report highlight further opportunities to advance the replacement of animal studies with robust methods of relevance to understanding and treating human pain.

Extract from The Dr Hadwen Trust News

### Non Animal Test Tube Methods

Where traditional animal tests have been replaced – such as the mouse convulsion method using 600 mice a time to safety test insulin or the rabbit skin irritation test for chemicals – non-animal test-tube methods have proved more precise, versatile and reproducible than animals. The insulin test was replaced by a method producing results faster and more precisely, and the skin irritation test that took 14 days to complete was replaced by a non-animal test delivering results in 42 hours.

Extract from The Dr Hadwen Trust News

## Microdosing's Big Impact

Human microdosing of drugs or other molecules, combined with accelerator mass spectrometry (AMS), can provide fast, reliable clinical data early on in drug development. AMS is able to yield full information on absorption, distribution, metabolism and excretion (ADME) characteristics from microdosing of human volunteers.



Dr Colin Garner, CEO of Xceleron, a company specialising in human microdosing for drug development said: *"Past studies suggest that in vivo animal models are not necessarily reliable predictors of drug absorption and elimination in humans and we have found human microdosing data to be more than 80% predictive. The benefits of microdosing in terms of cost savings, improved candidate selection, pipeline productivity, and risk mitigation are significant."*

The technique also fits well with the new vision for drug development from the Food and Drug Administration in the USA, which issued guidelines stating that it *"strongly recommends in vivo metabolic evaluation in humans be performed as early as possible"*. The future looks bright for microdosing.

Extract from The Dr Hadwen Trust News

### Human Cell Based Techniques

New human cell-based techniques to ensure the purity of injectable drugs were recently validated in Europe, greatly enhancing patient safety and replacing thousands of rabbit tests each year. They are also a major commercial success with a worldwide market.

Extract from The Dr Hadwen Trust News

AT PRESENT OUR FUNDS ARE LIMITED  
IN ORDER TO EXPAND OUR WORK AND MAKE A  
WORTHWHILE IMPACT WE NEED YOUR HELP

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