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**AUTUMN
EDITION**

FROM THE CEO

Dr Stephen Prowse



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FROM THE CEO*Dr Stephen Prowse***Planning for a second CRC**

In mid February the AB-CRC Board undertook a key planning meeting with representatives from the Australian Government Department of Health and Aging (DoHA) and the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF). The purpose of the meeting was to explore the issues and opportunities around emerging infectious disease and working more closely together to improve our national response capacity. The meeting commenced with a number of presentations highlighting the issues related to emerging infectious disease and were followed by group discussions. These discussions were very valuable in informing the planning of a bid for a second round AB-CRC. Further development of the proposal will be led by Dr Lisa Adams on behalf of the AB-CRC. The outcomes of the consultation initiative and the next steps in the process will be made available in the next few weeks. For more information on the bid's progress, please refer to the article entitled '2008 CRC Bid Feasibility Planning Initiative' in this newsletter edition.

New Deputy CEO and Program Leader

Following the retirement of Dr Bryan Eaton from CSIRO Livestock Industries Australian Animal Health Laboratory (AAHL), I am delighted to be able to announce that Dr David Boyle, also from CSIRO, has been appointed Deputy CEO and Leader of the Technologies to Enhance Detection Program. David is a virologist with extensive experience in molecular technologies and disease diagnosis. He has been actively involved in AB-CRC activities since commencement, leading several projects. I am looking forward to working closely with David and benefiting from his incisive thinking and experience.

Our first PhD graduate

It is with great pleasure that I can inform you that the first PhD candidate associated with the AB-CRC has successfully graduated. Danielle Magoffin's PhD was entitled "*Molecular analysis of J-virus and Beilong virus using reverse genetics*". Her work was supervised by Professor John Mackenzie from Curtin University of Technology and Dr Linfa Wang from CSIRO's AAHL.

Foot-and-Mouth Disease Intellectual Property

An important component of an AB-CRC project has involved the development of improved diagnostic capacity for foot-and-mouth disease (FMD). During the course of this project, reagents have been developed that greatly enhance the capacity to discriminate between infected and vaccinated animals. Such discrimination is important in countries where FMD eradication is underway and of potential importance in the management of an outbreak. The AB-CRC is seeking expressions of interest in the further development of tests using the reagents.

RAPID DIAGNOSTIC TESTS FOR AVIAN INFLUENZA EVALUATED FOR NATIONAL USE

AB-CRC developed real-time diagnostic tests for the highly pathogenic avian influenza (AI) virus will be among the first to be evaluated using a new validation template for molecular tests developed by the Subcommittee of Animal Health Laboratory Standards (SCAHLs).

“The potential of H5N1 to cross species and infect humans has caused a lot of angst as 167 deaths have occurred from 274 confirmed human cases since 2003. Despite the threat of a human pandemic, the current influenza H5N1 is primarily a bird disease that has killed or forced the slaughter of more than 200 million birds,” said CSIRO’s Dr Hans Heine based at AAHL at Geelong.

“The disease is best controlled in birds and capabilities for rapid diagnosis of H5N1 are crucial to immediately identify any outbreak in order to implement control measures and prevent further spread of the disease,” Heine added.

Following the outbreak of avian influenza type H5N1 in Asia, it became apparent that Australia did not have an adequate rapid

diagnostic capability for this highly pathogenic influenza strain. Heine developed two real-time reverse transcription tests; one to rapidly identify all AI type A virus strains and a second specific test for the H5 influenza virus.

“The AB-CRC fast tracked the funding of this project to enable diagnosis of avian influenza in a matter of hours, allowing rapid response in case of an emergency,” said Dr Debby Cousins, Director of the AB-CRC’s Application & Linkage Program. “Previously, diagnosis of avian influenza was done by detection of AI antigen in impression smears with confirmation of the deadly H5N1 strain taking up to five days,” Cousins added.

As all previously documented outbreaks of AI in Australia domestic poultry have been of the H7 subtype and any historic H5-subtype antisera held at the AAHL varied dramatically to the emergent H5N1 strain currently circulating in South-East Asia, the project team used current H5N1 samples from Vietnam and Cambodia to develop and evaluate the tests.

“Having funded the development of these tests, the AB-CRC has been keen to make the tests available to all capable laboratories across the nation to increase Australia’s capacity to detect incursions on a national basis,” said Cousins.

Together with the Rural Industries Research & Development Corporation’s chicken meat program, the Australian Egg Corporation Limited and AAHL, the AB-CRC Application & Linkage Program provided support and funding for technology transfer of this test during 2006.

Training in the technology was provided by AAHL at a workshop held in Geelong in May 2005 and during 2006 the technology was transferred to state government laboratories in Victoria, New South Wales, Queensland, Western Australia, Tasmania, Northern Territory and a private laboratory in South Australia. New Zealand also participated in the technology transfer exercise and the trials, which evaluated performance of the test in all laboratories.

This trial, which assisted in standardisation of the test across the country also assessed the robustness of the test and assisted AAHL in providing validation data which will enable the test to be evaluated by an independent panel of experts under the auspices of SCAHLs.

“Because these tests are such important tools for Australia’s preparedness against AI, laboratories across the country (and New Zealand) were keen to participate in this trial. It has provided an ideal first opportunity to validate a test across multiple labs and enable

results from different equipment platforms used in labs to be compared. In fact real-time PCR instruments from five different manufacturers were evaluated and all were found to be satisfactory. This study has also provided a sound foundation of knowledge for transfer of additional molecular tests across the country,” said Cousins.

“This test will also be the first molecular test to be subjected to the new SCAHLS validation requirements for molecular tests, developed using the new OIE standards,” added Cousins.

A technical report is now available at <http://www1.abcrc.org.au/uploads/ce407c64-9ae9-4859-9891-a1dad165659/docs/ABCRCAvianInfluenzaTechnicalReport240305.pdf>

A publication “Rapid detection of highly pathogenic avian influenza H5N1 virus by TaqMan RT-PCR” is in press in *Avian Diseases*.

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AB-CRC LEADS WORK ON DETECTION AND CONTROL OF HENDRA AND NIPAH VIRUSES

AB-CRC funded research work on the related emerging paramyxoviruses Hendra virus (HeV) and Nipah virus (NiV) continues to mitigate the threat any outbreaks could have on Australia’s economy and public health.

Both viruses cause fatal disease in animals and humans and are members of the genus *Henipavirus*. To date, major impacts of these viruses have been limited to south-east and southern Asian countries, which have suffered significant economic, social and public health repercussions.

Risk assessment of NiV entering Australia

Evidence of henipavirus infection has been detected in fruit bats of the genus *Pteropus* (commonly known as flying foxes) across much of their global range (in Australia, India, Bangladesh, Cambodia, Thailand, Malaysia, Indonesia and most recently Madagascar).

The AB-CRC is currently funding a risk assessment of NiV entering Australia via flying foxes. While the natural hosts of NiV (*P. vampyrus* and *P. hypomelanus*) do not occur in Australia, they are widespread in the Indonesian archipelago and islands lying off the coast of New Guinea, where their ranges

overlap with two species that also occur in Australia; *P. alecto* and *P. conspicillatus*.

“The key to understanding the risk of Nipah virus entering Australia is to define the prevalence of infection in regional populations, determine their seasonal movement patterns and understand the extent of contact with Australian species,” said Dr Hume Field, AB-CRC Program Coordinator - Ecology of Emerging Infectious Diseases.

Blood, urine and saliva samples were collected and screened for evidence of henipavirus infection in order to describe the spatial distribution and seroprevalence of the virus in flying fox populations in northern Australia including the Torres Strait, and Papua New Guinea and East Timor.

“The use of both battery and solar powered satellite transmitters has shown flying foxes to be capable of long distance movements of hundreds of kilometres crossing national boundaries indicating the potential for close connectivity between flying fox populations in Australia and New Guinea,” said PhD student Andrew Breed.

The project also involves molecular genetic analysis to determine the population structure of *P. alecto* flying foxes.

“Molecular genetic studies indicate a certain amount of population structuring of *P. alecto* occurs within Australia and Indonesia. This combines with the satellite telemetry results to contribute to our understanding of the ecology of henipaviruses,” Breed added.

For more information on the risk assessment of NiV entering Australia, contact:

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Development of detection assays for HeV and NiV

AB-CRC research has provided two new assays which will identify quickly and accurately these related emerging viruses.

The high level of similarity between HeV and NiV combined with their restriction to high biocontainment laboratories has to date severely limited the availability of reliable differential serological assays.

A breakthrough has come via the development of two new multiplexed microsphere assays, one for antibody detection and differentiation and another designed as a surrogate for virus neutralisation.

“These assays were developed based on a new technology platform and a novel concept in receptor-blocking,” explained Dr Katharine Bossart, the key scientist responsible for the research.

“To our knowledge, this was the first example that blocking of receptor and viral protein interaction by antisera has been used as a surrogate for virus neutralisation. The assays were developed based on the scientific knowledge accumulated from years of collaborative research between CSIRO AAHL and the Uniformed Services, University of Health Sciences in USA, and represent an excellent example of converting basic research into practical solution to resolve the difficulties encountered in diagnosing infections by two closely related lethal viruses,” added Katharine.

Both assays have considerable sensitivity and represent important new tools for henipavirus serosurveillance. Additionally, they can be done without high biocontainment, require very small amounts of sera and provide valuable data quickly - within two to three hours.

“These assays will significantly enhance the capability and capacity for serosurveillance in wildlife populations and in the event of a henipavirus outbreak,” commented Dr Linfa Wang, who leads the AB-CRC project. He said that while the assays are highly complex and scientifically sophisticated, they are transferable to other groups who have the required instrument and are prepared to receive basic training of staff members.

Negotiation has started to transfer these new tests to laboratories in Australia and overseas.

For more information on henipavirus assays, contact

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PIG INDUSTRY SURVEILLANCE IMPROVING AUSTRALIA'S BIOSECURITY

The current inability to identify and monitor a significant portion of the Australian pig-rearing community is the subject of an important AB-CRC project.

As the world becomes more and more urbanised, the incidence of peri-urban farming will also increase. For example, over 300 peri-urban pig producers with small-scale non-commercial pig herds exist in the Sydney basin alone.

“No-one really knows how many small ‘non-commercial’ farmers exist in Australia. There are methods to detect commercial pig farms such as animal branding registries. However, the small farmer who sells pigs to domestic abattoirs or privately to friends does not even make a blip on the radar,” said Dr Trish Holyoake, the project’s principal investigator and Senior Lecturer in Intensive Animal

Health at the University of Sydney.

“Because they are so hard to find it is difficult to provide extension materials to them to assist with prevention and recognition of exotic disease,” she added.

The AB-CRC study focuses on non-commercial farms that sell pigs through live auctions, where often commercial pigs, cattle and sheep are also presented for sale thereby posing a potential risk for disease transmission. In addition, a proportion of non-commercial pigs are not processed through abattoirs, thereby missing existing slaughter surveillance.

The study has also determined that quarantine procedures are generally not implemented for incoming animals and farmers often have a poor knowledge of clinical signs of exotic disease. Additionally many farmers are not familiar with swill feeding regulations. The research seeks to determine the extent of swill feeding among pig producers who trade their pigs at live auction.

“This project seeks to improve the way that we communicate with non-commercial producers – that way we can get information to them and they are more likely to contact us in the case of suspected exotic disease,” said Dr Jenny-Ann Toribio, a project leader and Senior Lecturer in Epidemiology also based at the University of Sydney.

“We also aim to improve the way we track pigs that move off-farm. To date we’ve designed identification methods for light-weight pigs that currently fall under the radar for individual identification as they are too small to be tattooed. This year we are measuring the uptake, integration and ultimately the effectiveness of a paper-based tracking system for non-commercial pigs called PigPass,” Toribio added.

Ultimately the recommendations from this research will provide a holistic approach to improving biosecurity within the non-commercial pig industry and be presented to government and industry for their consideration and implementation.

For more information, please contact

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2008 CRC BID FEASIBILITY PLANNING INITIATIVE

Dr Lisa Adams
Director, Research Development, AB-CRC

Significant progress has been made since December in assessing the feasibility of a 2008 CRC bid to establish an AB-CRC Mark II.

A Biosecurity CRC Rebid National Steering Group has been established.

The Steering Group's generous feedback and wise counsel has ensured a constructive initial planning phase.

A consultation initiative to inform national research and education programs in biosecurity and emerging infectious diseases has been launched.

Of the 40 registrations of interest received to date, 36 registered an interest in assessing whether it would be worthwhile for their organisation to be a member of a future CRC in biosecurity and emerging infectious diseases.

The consultation results will be forwarded to registered interest stakeholders in March.

From this initial consultation, the following preliminary conclusions can be made;

- Strong support exists for a nationally coordinated model for research and

education in biosecurity and emerging infectious diseases.

- Any future model must enhance international cooperation with emphasis on our sub-region.
- The public health sector needs to be more fully engaged and linkages expanded with the animal health sector.
- General consensus is to maintain and build upon the current research scope of the AB-CRC.
- A national skills shortage for specialist staff, particularly laboratory and field-based specialists in animal health, continues to be an issue.

The AB-CRC Board has undertaken a key planning meeting with representatives from the DoHA and DAFF. The meeting explored issues and opportunities around emerging infectious disease and in particular, working more closely to improve national biosecurity preparedness and response capacity.

The second phase in the 2008 CRC rebid planning process is being finalised.

Briefing sessions will be organised with registered stakeholders to communicate the results of the national consultation and planning to date, and to clarify planning expectations going forward. Sessions are likely to be held in mid to late April, with targeted briefings also being undertaken.

For any questions or comments on the 2008 CRC Bid Feasibility Planning Initiative please contact Dr Lisa Adams at lisa.adams@abcrc.org.au or (08) 9266 1643.

FIRST AB-CRC FUNDED PHD STUDENT GRADUATES

Danielle Magoffin has become the first PhD student to graduate under AB-CRC funding.

Her thesis entitled '*Molecular analysis of J-virus and Beilong virus using reverse genetics*' received a commendation from the Curtin University of Technology Chancellor and Danielle has subsequently accepted a postdoctoral fellowship at the INRS-Institut Armand-Frappier in Montreal, Canada.



Danielle following her graduation ceremony

Danielle began her PhD in July 2003 at the CSIRO AAHL in Geelong, under the supervision of Dr Linfa Wang and Professor John Mackenzie. In 2004 her project transferred to the CUT and became part of the AB-CRC and Danielle was granted a professional development scholarship.

Danielle's research on the classification of two novel rodent paramyxoviruses, J-Virus (JPV) and Beilong Virus (BeiPV) has been significant in itself.

The paramyxoviruses are unique because they have genes not found in other paramyxoviruses, and BeiPV is the largest paramyxovirus yet found. Danielle pioneered new tools and assays for working with paramyxoviruses, notably developing functional reverse genetics systems to overcome limitations of classical genetics systems for working with paramyxoviruses.

A real-time PCR assay developed will aid future work related to JPV pathogenesis, and a multiplex microsphere assay for JPV and BeiPV serology was used to assess JPV and BeiPV infectious potential in native rodent populations.

Most importantly, if a zoonotic rodent paramyxovirus related to these viruses emerges, Danielle's work has ensured the tools for virus detection and serological monitoring are now established.

CRCA CONFERENCE GEARS UP

Registration is now available for the 12th Cooperative Research Centres Association Conference in Perth from 16-18 May.

The CRCA Conference will critically evaluate how successful scientific research, development and innovation can occur through cooperative research, both in Australia and internationally, and provide valuable global perspectives on innovation and the research and development process, tackling such issues as innovation policy and planning, and entrepreneurship.

This year, workshops are incorporated into the body of the conference with optional concurrent Science & Technology tours. There will also be a range of informal networking dinners hosted by various workshops which are open to all.

Representatives from the 57 CRCs throughout Australia will be in attendance as will an impressive line-up of international keynote speakers, including:

- Norman Augustine
Chairman and CEO (Retired),
Lockheed Martin Corporation, USA
- Professor Tim Brown
Dean, College of Science, Professor of
Statistics, ANU (China perspective)

- Dr Bi Choe
Director, Office of Strategic Planning &
Policy, Samsung Medical Centre, Korea
- Professor Anil Gupta
Executive Vice Chairperson,
National Innovation Foundation; Chair
in Entrepreneurship, Indian Institute of
Management, India
- Professor Leo Tan
President, Singapore National Academy
of Science; National Institute of
Education, Nanyang Technological
University, Singapore
- David White; Director of Lifelong
Learning, Education & Training
Policy, Education & Culture Directorate
General, European Commission,
Belgium
- Anthony Wong
Commissioner for
Innovation and Technology, Innovation &
Technology Commission, Hong Kong

For further information or to register online, visit the conference website at www.crca.asn.au/conference

AWARDS

2007 Australian Academy of Technological Sciences and Engineering (ATSE) Crawford Fund Derek Tribe Award

Nominations close 2 April 2007

The ATSE Crawford Fund Derek Tribe Award is made biennially to a citizen of a developing country in recognition of their distinguished contributions to the application of research in agriculture or natural resource management in a developing country or countries. In addition to making a public address, the recipient will visit agricultural centres in Australia to enhance networking and linkages with similar institutions and individuals in Australia.

Nomination forms are available from the Crawford Fund Central Office (03) 9347 8328 or can be downloaded from www.crawfordfund.org

2007 Prime Minister's Prizes for Science

Nominations close at 5.00 pm AEST Friday 27 April 2007

Nominations for Australia's most prestigious science and science teaching awards are now open. The Prizes are awarded to those who have made outstanding contributions to science and science teaching and who are currently active in research or teaching.

Nominations should be made by nominators who are personally knowledgeable of the

nominated achievement and who can offer expert opinions on its worth. Self nominations will not be considered.

Nomination Guidelines and the online nomination process are at www.dest.gov.au/scienceprize

2007 Australian Museum Eureka Prizes

Entries and nominations close Friday 4 May 2007

The Australian Museum Eureka Prizes have been rewarding outstanding Australian science for almost 20 years. The Eureka Prizes this year include 20 awards worth over \$200,000.

For more details and entry forms visit www.australianmuseum.net.au/eureka

2008 Rolex Awards for Enterprise

Applications close 31 May 2007

The Rolex Awards are an opportunity for exceptional international recognition of Australians making great achievements on behalf of humanity in a wide range of scientific, cultural and environmental fields.

The Awards, worth US\$100,000 each, are presented every two years in five areas: Science and Medicine, Technology and Innovation, Exploration and Discovery, The Environment and Cultural Heritage. However projects may be submitted in almost any field provided it contributes to the betterment of

humankind. Anyone of any age or background is eligible to apply.

Application forms can be downloaded from www.rolexawards.com. Application kits are also available by calling (02) 9251 8988.

COURSES

Emergency Risk Communication

When a public health emergency arises—whether it's a terrorist attack, earthquake, or mass outbreak of a disease—communicating with the public and the media presents unique challenges. Emotional responses often take the place of rational thought and people expect and demand information and reassurance quickly.

Understanding the principles of emergency risk communication (ERC) and developing an emergency risk communication plan can help meet those challenges.

The following link: www.nwcp.org/riskcomm/intro_erc/mentalnoise provides an online course on ERC for public health professionals.

The course is sponsored by the University of Washington Northwest Center for Public Health Practice and was designed for medical and health science graduate students. It won the US national '2006 Gold Award for Excellence in Public Health Communication' in the category of 'in-house new media' from the National Public Health Information Coalition.