



CONNECTIONS

Bioplatforms Australia Quarterly Newsletter | Q1-2010

BIOTECH RESEARCH IS A NATIONAL PRIORITY - BPA CHAIRMAN



It is a pleasure to present the first newsletter of Bioplatforms Australia.

When Bioplatforms Australia was formed in 2007 it reflected a new approach to supporting innovation in Australia. The Australian Government firmly acknowledged that research infrastructure is a vital resource but wanted to ensure that major investments were strategic and aligned with national priorities. Bioplatforms Australia was established to ensure major infrastructure investments were responsive to current research needs and paid attention to emerging trends especially in the fields of proteomics, genomics, metabolomics and bioinformatics. Our mission is to ensure that the nation's tools for innovation match our talents and fit our economic and social priorities. And it must achieve this by being responsive to those who lead and support our scientific endeavours.

To date Bioplatforms Australia has been granted over \$200m in cash and in-kind support to ensure that life science researchers have access to state-of-the-art scientific infrastructure. It is a significant investment that recognises the rising importance of systems biology and the enabling role of 'omics technologies. Our responsibility is to invest these funds but also to leverage national infrastructure for the benefit of the entire research sector. This includes greater collaboration among our wide network of partners and strong connections with the broader research community. Naturally, we will promote the first class services and facilities available to bioscience researchers and a systems biology approach. Furthermore, technology investments will always seek the cutting edge with the broadest accessibility in mind.

Our large network of specialists, formally represented by Genomics Australia, Proteomics Australia, Metabolomics Australia and the Australian

Bioinformatics Facility collectively and strategically represent all leading universities and biotech organisations providing first class 'omics services. This newsletter will highlight the technological expertise and exciting capabilities of our nation's 'omics sector and, hopefully, promote new opportunities for collaboration and increased commercialisation of our world class innovations.

Again, I welcome you to our first newsletter. We thank you for your interest and we hope that this, and future editions are informative and play some tiny part in connecting you with ideas, contacts or services that will help you in your endeavours.

Mr John Grant, AM
Chairman

AUSTRALIA'S FIRST GENOME PROJECT

An ambitious project to sequence the entire genome of *Acropora millepora*, a branching coral familiar to millions of visitors to the Great Barrier Reef, will be the first animal genome to be fully sequenced and assembled in Australia.

The project is a joint undertaking between the Australian Genome Research Facility (AGRF) and researchers in the ARC Centre of Excellence for Coral Reef Studies (CoECRS) located at James Cook University and the ANU. The research group also includes a multi-institutional bioinformatics team for project design support plus genome assembly and annotation.

An undertaking to map the coral genome is not just monumental in terms of science, it should also make an invaluable contribution to coral preservation. Coral has iconic status in Australia given the Great Barrier Reef represents the world's best preserved coral reef system and is a cornerstone of a \$6 billion a year tourist industry. Gene mapping can shed light on how corals

build reefs and how they respond to the impact of environmental stress.

The staghorn coral appears to be a simple animal but its genome is surprisingly large and complex with around 20,000 genes - similar to humans. It is not clear why coral possess as many genes as humans but as it lies deep in the ancestral tree of all animals and mapping its genes is expected to reveal significant insights into the evolution of life on earth and possibly the molecular basis of many human genetic disorders.

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'The staghorn coral may look like a simple animal, but its genome is surprisingly large and complex'
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Next-generation sequencing technology developed and supplied by Illumina will be used for the project. The vast strides made in sequencing technology since the human genome project now provide rapid, cost effective sequencing making full genome studies such as this more accessible and economically feasible.



This coral mapping project is a genuine first for Australian science. Contact **Professor David Miller** (07) 4781 4473 of CoECRS, JCU, **Dr Eldon Ball** (02) 6125 4496 at the ANU and **Dr Sue Forrest** (03) 9321 3703 at the AGRF <http://www.coralcoe.org.au>

LIFE SCIENCE ALLIANCE

EMBL Australia and Bioplatforms Australia have announced an agreement to drive research quality in Australia by directly supporting world class scientific leaders.



The new linkage encourages research teams supported by EMBL Australia to access key scientific facilities at Bioplatforms Australia. The alliance expects to build collaboration and resource-sharing while also promoting exceptional scientists with premium access to the nation's state-of-the-art facilities and expertise.

The alliance between EMBL Australia and Bioplatforms Australia expresses a number of shared objectives. Both seek to promote excellent life sciences research and innovation in Australia with a strong emphasis on collaboration and international competitiveness. Likewise, they both aim to enhance systems biology capabilities in Australia.

We are proud to be associated with EMBL Australia, which was invited to become the first Associate Member of the internationally-renowned European

'EMBL Australia's core ambition is to provide the next generation of scientific leaders'

Molecular Biology Laboratory in recognition of Australia's strengths in cell biology, stem cells and regenerative medicine, genetic epidemiology and clinical research. It was established in 2008 and actively supports adventurous discovery-based science by outstanding

young talent. It offers training, funding, scientific resources and access to world class facilities through its Partner Laboratory Network. It also fosters direct links with leading European scientists through country exchanges.

EMBL Australia's core ambition is to provide the next generation of scientific leaders who are well trained in collaborative research and able to enrich scientific communities through links forged with scientists around the world. The synergistic support provided by Bioplatforms Australia will ensure that these scientists will maximise their contribution with access to world-class scientific infrastructure and expertise.

ACCESS VOUCHERS

Access vouchers provide a \$10,000 subsidy to meritorious researchers.

In 2009 nine NHMRC Career Development Awardees were granted a Bioplatforms Australia access award for 'omic investigations relevant to their specific projects. The projects all support human health with strong potential for exciting innovation and cross collaboration.

The \$10,000 access vouchers subsidise any 'omics service provided by members and affiliates of Bioplatforms Australia. The vouchers are an important element of our access program as they promote talented scientists and high calibre research while showcasing the scientific facilities and expertise of our consortium.

The vouchers will be offered annually. At present, only NHMRC Career Development Awardees can benefit, however, we are seeking new agreements with other premier research organisations to broaden industry exposure to Australian 'omics capabilities.

2009 Access Voucher Awardees

Dr Vanessa Solomon



Dr Vanessa Solomon from the Peter MacCallum Cancer Centre will employ gene expression profiling by the Australian Genome Research Facility in Melbourne to discover

the genes driven by a molecular signalling pathway that is overactive in certain leukemias. Understanding which genes are important in the development of leukemia may reveal novel therapeutic targets, ultimately resulting in better ways to treat leukemia.

Dr Christine Hawkins



Dr Christine Hawkins from La Trobe University's Department of Biochemistry is investigating an enigmatic protease, caspase-2. Caspase-2

has been implicated in a variety of cellular processes with some evidence to suggest it prevents the formation of cancers. Her research intends to define the mechanism by which caspase-2 exerts its anti-cancer effect by identifying the cell proteins cleaved by this protease. Several targets have been identified and characterisation work will be facilitated by custom antibodies generated by the Monash Antibody Technologies Facility. The project hopes to promote development of diagnostic and/or therapeutic reagents for cancer in the future.

Dr Carl Walkley



Research by Dr Carl Walkley from St. Vincent's Institute of Medical Research seeks to understand the development of the most common form of bone cancer, osteosarcoma. He

aims to understand and identify genetic changes that characterise this tumour using a number of approaches including gene expression profiling and mass spectrometry with support from the

Australian Bioinformatics Facility. The project aims to identify new pathways for therapeutic intervention.

Associate Professor Meri Tulic



Associate Professor Meri Tulic from the School of Paediatrics and Child Health at the University of Western Australia will utilise gene expression profiling to try and identify

the differences observed in the innate immune function of normal and allergic children. This research seeks to understand the impact of microbial-rich environments in the maturation of a naive immune system and the mechanisms underlying any protective effect that occurs. Ultimately, the project is likely to contribute to more avenues for better-targeted treatment and prevention.

Dr Michael Piper



Dr Michael Piper from the Queensland Brain Institute is investigating the genetic mechanisms by which embryonic neural stem cells differentiate into neurons. This research

will provide a significant advance in the understanding of how neurons are generated from stem cells which will benefit efforts to harness endogenous neural stem cells in the adult to repair and regenerate injured brain tissue. To achieve this goal, important input will be sought from the Australian Genome Research Facility in Melbourne and Brisbane to perform cutting-edge DNA sequencing and downstream data analysis.

Associate Professor David Burgner



Associate Professor David Burgner is a Principal Research Fellow at Murdoch Children's Research Institute in Melbourne who is focusing on understanding susceptibility to

newborn and childhood infection. He is particularly interested in understanding innate immune responses in preterm

infants, who are particularly susceptible to life-threatening infection. Current work is exploring the mechanisms by which newborn infants recognise and respond to pathogens in an attempt to localise the immunological basis of their increased risk of sepsis. (Opportunities for a higher degree in this area exist. Contact dburgner@meddent.uwa.edu.au).

Dr Dana Hutchinson



Dr Dana Hutchinson from the Drug Discovery Biology group at the Monash Institute of Pharmaceutical Sciences (Monash University) is

researching the role of G protein-coupled receptors (GPCRs) in regulating the metabolism and cell fate of several cell types including cardiomyocytes and cardiofibroblasts. GPCRs are key targets in drug development for cardiovascular disease. Despite the clear relevance of GPCRs as a target class, it is not fully understood why some GPCR drugs yield better therapeutic outcomes than others, despite similar apparent activity at their target receptors in common screening assays. Custom quantitative PCR (qPCR) arrays will be developed to profile genes in cardiac cells that are key targets of drugs for the treatment of heart failure to help understand how different drugs exert their actions using infrastructure and expertise at the Australian Genome Research Facility.

Dr Clare Parish



Dr Clare Parish from the Florey Neuroscience Institutes is investigating the genes involved in remodelling adult neurons. What regulates the growth

and guidance of nerve cell processes (axons) during brain development is largely known, however, regulation of axon remodelling in the adult brain remains to be identified. Harnessing this knowledge could significantly impact repair of neural circuits in the injured brain. To achieve this goal, important input will be sought from the Australian Genome Research Facility in Melbourne to perform a complex microarray

on brains that have been induced to undergo axonal remodelling.

Dr Matthew McKenzie



Dr Matthew McKenzie from La Trobe University is researching the assembly of large mitochondrial protein complexes, in particular

NADH ubiquinone oxidoreductase (Complex I) of the respiratory chain. Defects in the assembly of this complex often result in mitochondrial disorders in both children and adults, with brain, heart and skeletal muscle defects common. Proteins have recently been identified that aid the assembly of Complex I, however many have not been studied in any detail. Antibodies against a variety of these 'assembly proteins' will be generated at the Monash Antibody Technologies Facility and will be used to study the biogenesis of Complex I and how defects in its assembly contribute to mitochondrial disease pathogenesis.

Further information:

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'The projects all support human health with strong potential for exciting innovation and cross collaboration'



Network and learn at prominent 'omics conferences hosted in Australia in 2010

PROJECT SPOTLIGHT

Australian Life Scientist magazine featured three great articles on prominent 'omics projects presently being undertaken by our partners. The wine yeast demonstration project managed by AWRI and the coral genome project highlighted in this newsletter were feature stories in the Nov/Dec 2009 edition. A third article covered proteomic techniques and research outcomes reported by Mark Molloy at APAF in the quest to identify biomarkers for colorectal cancer. These stories can be accessed on our website.

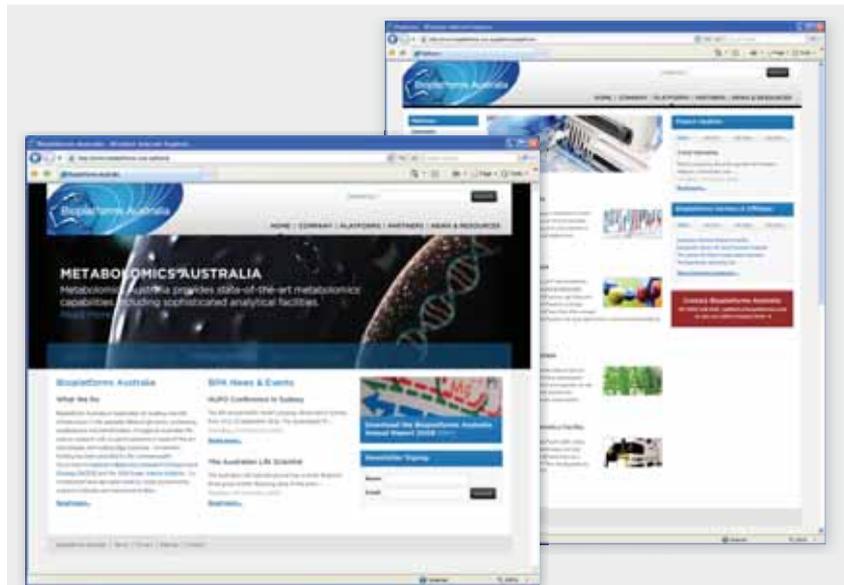
AUSTRALASIAN METABOLOMICS SYMPOSIUM 2010

The second Australasian Metabolomics Symposium held at the University of Melbourne from 3 to 5 October 2010 is expected to attract more international participants than the successful first symposium held in Auckland last year. The symposium follows a three day metabolomics workshop for novices interested in the field. Don't miss out on sponsorship and trade show opportunities. Further information at www.bioplatforms.com or contact Dr Ute Roessner u.roessner@unimelb.edu.au.

HUPO CONFERENCE IN SYDNEY



The 9th Annual HUPO World Congress will be hosted in Sydney from 19 to 23 September 2010. HUPO 2010 offers a compelling scientific program including recent discoveries and novel proteomic techniques. A refreshing new format is focused around four "clinical themes" and will highlight the next generation of proteomics scientists in the emerging discipline of systems biology. The Congress will also



NEW WEBSITE

Check out our new website at www.bioplatforms.com

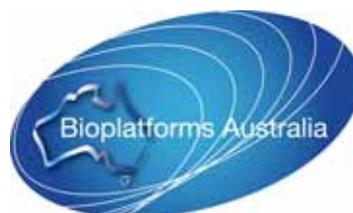
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'HUPO 2010 offers a compelling scientific program including recent discoveries and novel proteomic techniques'
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provide an outstanding forum for the launch of the Human Proteome Project and will showcase the remarkable

progress and exciting advances made by HUPO members. HUPO 2010 also includes a world-class exhibition involving industrial partners and vendors in proteomics, systems biology and associated disciplines such as diagnostics. View www.hupo2010.com for further details.

Whats's your Story?

Contributions to future editions of Connections are welcome. If you have an exciting project that showcases new technology or has achieved new findings we would love to share it with our readers. Please contact Andrew Gilbert at agilbert@bioplatforms.com.



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