News from the School of Biomedical Sciences

Biomed Benchmark

September 2012, Issue 16

Disarming disease causing bacteria

An international team of scientists, led by Monash University researchers, has discovered how diverse bacteria decorate their surface with molecules that allow them to cause disease, paving the way for future studies to design new drugs that inhibit this process.

The research, which was published in the prestigious international journal *Nature Structure and Molecular Biology*, shows that a protein complex called the Translocation and Assembly Module, or the TAM, forms a 'molecular' pump, allowing bacteria to shuttle key disease causing molecules from inside the bacterial cell, where they are made, to the outside surface, priming the bacteria to infect humans or animals.

The TAM was discovered in many disease-causing bacteria, from micro-organisms that cause whooping cough and meningitis to hospital-acquired 'bugs' that are developing resistance to current antibiotics.

The Monash team, led by Professor Trevor Lithgow from the Department of Biochemistry and Molecular Biology, has shown that the TAM is made of two protein parts, TamA and TamB, which function together to literally form a machine of molecular scale. Lead author and PhD student Joel Selkrig studied mutant strains of bacteria engineered to have no TAM, and compared them to 'normal' virulent bacteria.

"Together with our colleagues at the University of Melbourne, we noticed that proteins important for disease were missing in the outer membrane of the mutant bacteria," Joel said.

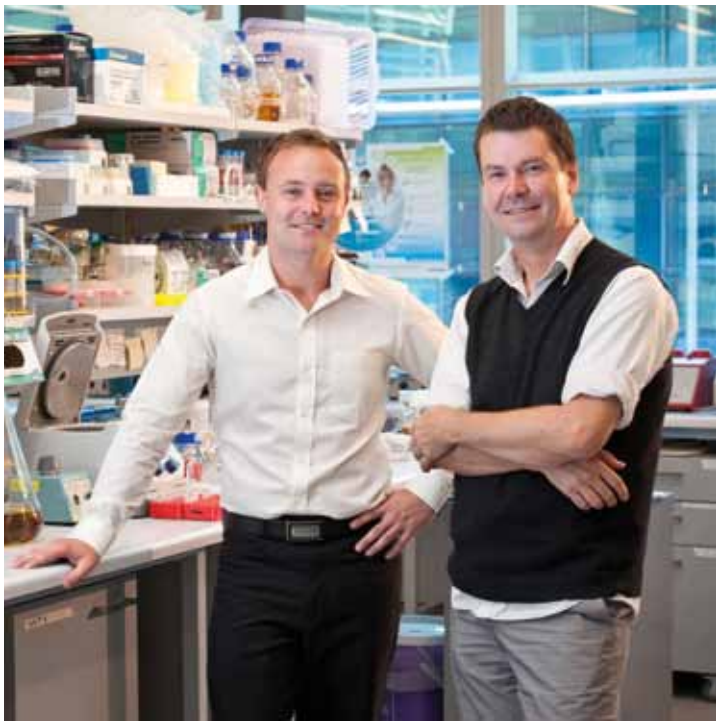
"The missing proteins are needed by the bacteria as they help them to stick to our bodies and perform other disease related functions."

But how do infected living cells respond to these mutant 'bugs'?

Using a mouse model of traveller's diarrhoea infection, colleagues at the University of Melbourne showed that bacteria lacking the TAM were unable to infect animals, which remained healthy.

Joel said that the next step for the group is to dissect the molecular mechanism of how the TAM complex functions and then, in collaboration with researchers at the Monash Institute of Pharmaceutical Sciences, design an antibiotic that inhibits the TAM in bacteria.

"This complex is a good antibacterial target as bacteria lacking a functional TAM can still survive but not cause disease," he said.



Joel Selkrig (left) with Professor Trevor Lithgow.

"Rather than targeting bacteria and killing them dead in their tracks, we can try to disarm them of their defensive and offensive molecules, and in doing so, disable the disease process."

"By allowing bacteria to stay alive after antibiotic treatment, we believe we can also prevent the emergence of antibiotic resistance, which is fast-becoming a major problem worldwide."

Professor Lithgow led a team of seven Monash researchers, scientists from the Universities of Melbourne and Queensland, in Australia; and the Universities of Glasgow and Birmingham, in the UK.

Grants success

In the latest round of funding announcements, two Monash research teams were successful recipients of ARC Linkage Project funding.

Professors Patrick Perlmutter (School of Chemistry) and Mibel Aguilar (Department of Biochemistry and Molecular Biology) will receive $240,000 to develop drug compounds containing stable and bioactive small proteins. They will initially target cardiovascular disease but the technology will be applicable to other health areas.

Professors Patrick Sexton and Arthur Christopoulos (Department of Pharmacology and Monash Institute of Pharmaceutical Sciences), and Drs Wim Meutermans and Giang Le (Alchemia Ltd) will receive $570,000 to understand how molecules called G protein-coupled receptors function and are regulated in animal and cellular models of lung disease.

Both groups will also receive industry funding.

In addition, NMHRC has recently prioritised funding for Hendra virus research and three scientists will lead these new projects:

Dr Fasseli Coulibaly (Department of Biochemistry and Molecular Biology) will receive $301,175 to study the structure of viral proteins that allow the virus to multiply in infected cells.

Professor Anthony Purcell (Department of Biochemistry and Molecular Biology) will receive $638,020 to study how fruit bats, horse and humans respond to Hendra virus.

Associate Professor Hans Netter (Department of Microbiology) will receive $368,510 to conduct comparative research in bat and human cell lines to recognise differences in virus-host cell interactions and identify mechanisms that contribute to disease progression in humans.

As well as the above grants, ARC has awarded Future Fellowships worth $3.2 million to five scientists: Drs Fasseli Coulibaly, Stephanie Gras and Onisha Patel (Department of Biochemistry and Molecular Biology); Associate Professor Dena Lyras (Department of Microbiology) and Dr Stavros Selemedis (Department of Pharmacology).

Limiting nerve damage in MS

For people living with Multiple Sclerosis, where fatty myelin sheaths of nerve fibres in the brain and spinal cord are damaged and repaired to varying degrees over many years, they may reach a point where they are unable to walk, see, lift objects or remember things.

Therefore, scientists are studying how they can slow the course of this disease so that affected people can maintain a good quality of life.

In work published in the journal *Brain*, Professor Claude Bernard, Dr Steven Petratos and their team from Monash Immunology and Stem Cell Laboratories; Professors Alan Harvey, University of Western Australia; Michael Fehlings, University of Toronto; and Stephen Strittmatter, Yale University; have shown that they can limit nerve damage in an animal model of progressive MS.

Key to this process is a protein called CRMP-2 that can be modified by the addition of a phosphate molecule, altering its normal function and activity, and causing nerve damage.

“In mice with the progressive form of MS, as the disease progressed, CRMP-2 phosphorylation increased,” says lead author Dr Petratos.

“This is the first time that phosphorylated CRMP2 has been linked to MS-like nerve fibre damage.”

Also, the Nogo receptor turns on this CRMP-2 phosphorylation ‘switch’ in nerve cells.

“When the receptor was ‘knocked out’, mice did not develop progressive MS-like disease as their nerve fibres did not die off,” Dr Petratos says.

“Therefore, we stopped axon degeneration from occurring.”

The scientists also saw phosphorylated CRMP-2 in spinal cord and brain tissue of deceased MS patients, confirming the importance of this molecule in disease progression.

When they used gene therapy to introduce a mutated CRMP-2 protein that cannot be phosphorylated into nerve cells in the eye, MS-affected mice that received this treatment had healthy and intact optic nerve fibres.

It may be possible in the future to use gene therapy to deliver a mutated form of CRMP-2 to MS patients so that nerve axons can be preserved.

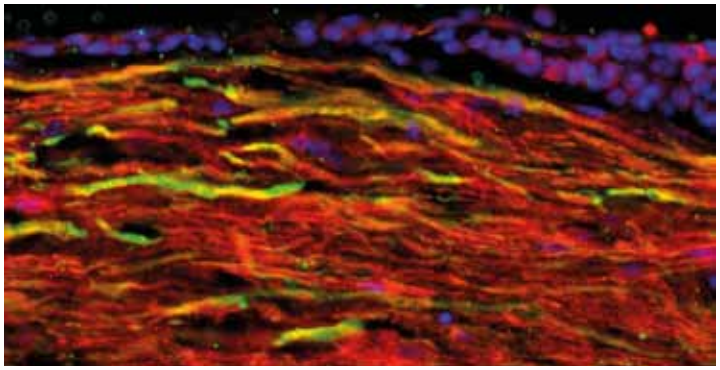
Currently, Phase II randomised, double-blind, placebo-controlled clinical trials are being conducted in the US in a small group of Alzheimer’s disease patients, where the same virus is being used to deliver a molecule called nerve growth factor directly into the brain. Previous Phase I studies showed that this gene therapy approach was generally safe and well tolerated.

Another possibility is to treat patients with an antibody against a protein that interacts with other Nogo receptor interacting molecules.

“We have previously shown that this strategy can reduce inflammation and axonal damage, and promote repair,” Professor Bernard says.

This approach is currently being tested in spinal cord injury trials in Europe.

Dr Steven Petratos (right) with Professor Claude Bernard.



Degenerating axons stained for CRMP-2 in mice with a progressive form of MS. Image: Ezgi Ozturk.

Wellcome Trust funds cancer drug development partnership

Australian and New Zealand scientists will receive $6.8 million of funding from Wellcome Trust (UK) to develop a new class of immune-suppressive drugs designed to protect cancer patients receiving bone marrow stem cell transplants.

Supported by the Wellcome Trust's Seeding Drug Discovery Initiative, researchers from the Peter MacCallum Cancer Centre (Peter Mac), The Auckland Cancer Society Research Centre, Monash University School of Biomedical Sciences, Queensland Institute of Medical Research and developers Medicines Development will build on basic research studies on a protein called perforin, a powerful toxin expressed by immune system cells.

Transplantation of bone marrow from a family member or an unrelated donor restores vital platelet and white blood cell levels in patients with lymphoma or leukaemia following treatment with high-dose chemotherapy. However, the immune system can reject 'foreign' transplanted tissue, and perforin plays an important role in this process.

With the Wellcome Trust funding, the research teams can now further develop perforin-blocking molecules to test in humans - as previous studies at the Queensland Institute of Medical Research have shown that first-generation perforin inhibitors can prolong the survival of bone marrow cells in laboratory mice.

"It's fantastic to deploy a basic science discovery in a drug development program," says Professor Whisstock, whose group from the Department of Biochemistry and Molecular Biology, together with Peter Mac scientists, discovered the 3-dimensional structure of perforin in 2010.

If the research team meets the scientific milestones set under the terms of the Wellcome Trust (UK) Seeding Drug Discovery Award (Grant Number 097767), it aims to progress to human clinical trials by 2016.

Professor James Whisstock, one of the research partners to receive Wellcome Trust (UK) funding.

Trans-Pacific funding for MS and stem cell research partnership

Multiple Sclerosis and stem cell research will receive a significant boost in funding, with $6.6 million being jointly committed over three years by the California Institute for Regenerative Medicine and Australia's National Health and Medical Research Council.

An international team of scientists with complementary skills from the Monash School of Biomedical Sciences and CSIRO Materials Science and Engineering, in Clayton; The Scripps Research Institute and Universities of California, Irvine and San Diego, in the US, will collaborate on this project.

The research funding will allow Professor Claude Bernard's group at Monash Immunology and Stem Cell Laboratories, the CSIRO team headed by Doctors Andrew Laslett and Carmel O'Brien, and Californian colleagues to coax human stem cells to become human neuronal precursor cells in the laboratory, assess whether these myelin-producing cells can be transplanted safely in mouse models of MS and slow, halt or reverse disease progression.

Professor Claude Bernard (centre) with Doctors Andrew Laslett and Carmel O'Brien.

As human pluripotent stem cells can potentially form any cell type in the human body, the researchers will compare various human stem cell-derived neuronal precursors to identify the best candidate to use ultimately in human clinical trials with MS patients.

Importantly, the Monash, CSIRO and Californian researchers will need to reproducibly isolate these precursor cells in sufficient quantity, purity and activity before embarking on preclinical studies at the School of Biomedical Sciences and University of California, Irvine.

This is an exciting prospect for MS scientist Professor Claude Bernard, who will coordinate the research effort in Australia and liaise with his Californian peers.

"I am delighted that both NHMRC and California Institute for Regenerative Medicine are supporting this important MS research initiative," he said.

"This collaboratively funded project, which will bring together internationally recognised experts, may bring us a step closer to developing novel treatments for MS patients with progressive disease."

From a funding perspective, NHMRC will provide $1.75 million to Monash University and CSIRO scientists, and stem cell agency California Institute for Regenerative Medicine will commit almost $4.9 million to Californian researchers as part of its Early Translational Awards program. The research findings will be shared between all groups.

A leading cause of disability, MS attacks myelin, the protective coating around nerves, resulting in the progressive and unpredictable loss of motor function, vision and memory.

It is estimated that 21,000 Australians and 2.5 million people worldwide have MS.

Obesity and metabolic disorders in the spotlight

Monash University and the Israel-based Weizmann Institute of Science co-hosted the inaugural *Obesity and the metabolic syndrome*: *A making connections* symposium in May at the State Library of Victoria.

During the two-day event, experts from the Weizmann Institute, Monash and other Australian universities and research institutes discussed incidence, causes, prevention and management of obesity. There were also sessions on type 2 diabetes, heart disease, stroke and other obesity-related disorders.

Over 100 researchers and the general public attended the symposium, which encouraged collaboration between the two countries.

It is estimated that by 2025 around 70% of Australia's adult population will be overweight, with 34% classified as obese.

Invited speakers from Weizmann Institute, Monash University, University of Queensland, Baker IDI Heart and Diabetes Institute, and Garvan Institute of Medical Research.

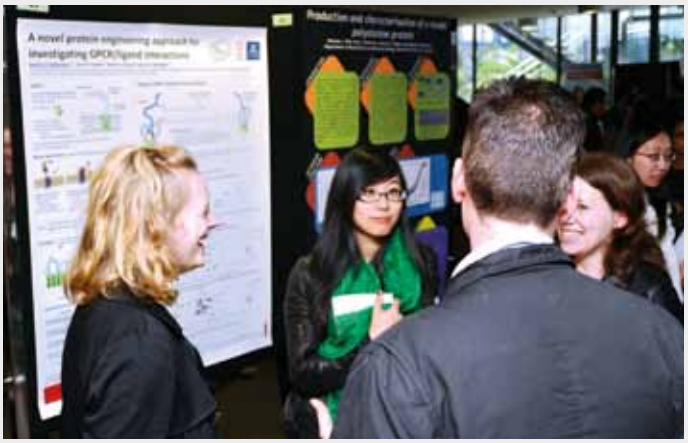
Protein symposium for Melbourne research students

The 11th Melbourne Protein Group (MPG) Student Symposium was held on 5 July at Monash University.

The MPG, which was started by the Lorne Conference on Protein Structure and Function committee, allows Victorian students working in protein-related research to come together to showcase their scientific findings. Since its humble beginnings, the MPG Student Symposium has grown from strength to strength over the years and is now a popular event that is strongly supported by the protein community in Victoria.

Over 100 students attended the 2012 meeting, which featured two invited keynote speakers, six student talks and a career advice session. Also, there was a poster session with 40 student papers.

Generous sponsorship allows the day to be a free event for students. Major donors included: the Lorne Protein Conference, Monash Research Platforms, School of Biomedical Sciences and Department of Biochemistry and Molecular Biology.



At the poster session.

Poster prize winners. From left to right: Claire Dickson (University of Tasmania), Ved Mooga (La Trobe University), Adam Shahine (Monash School of Biomedical Sciences) and Jacinta Wubben (La Trobe Institute for Molecular Sciences).

Early warning system: The eyes have it

Despite studying the neural workings of vision for over a century, neuroscientists are still making surprising discoveries. The brain 'sees' in different ways, but if you don't know where to look, you'll miss important information.

A tiny region in the brain called prostriata does something special. In work published in the journal *Current Biology*, Professor Marcello Rosa and his team from the Department of Physiology have discovered that prostriata devotes most of its resources on what is happening out of the corner of the eye, allowing us to respond rapidly to potential danger in our environment.

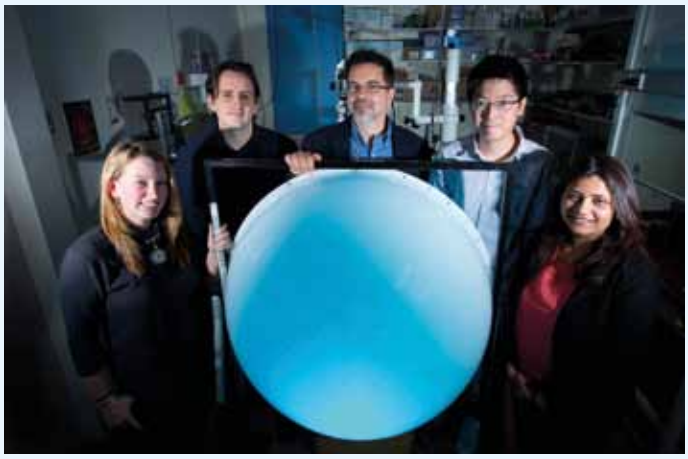
"This finding is completely unexpected as it violates a major principle of vision neuroscience," says lead author Dr Hsin-Hao Yu.

"Prostriata is the first brain structure identified that is specialised for peripheral vision. This visual information is then broadcast directly and rapidly to areas related to emotion, attention and decision making.

"This contrasts with the traditional view that central vision is most important, where you constantly move your eyes to get sharp, clear pictures of different parts of a scene. This type of visual information is analysed by an elaborate network of brain areas."

Prostriata is evolutionarily more ancient. During the early history of mammalian evolution, it was probably more important to monitor what was happening in the periphery. Since then, we have developed a more sophisticated visual system to read and recognise complex objects such as faces directly in front of us, in high resolution.

But before we discount the importance of peripheral vision in humans, previous research has shown a link to agoraphobia, where affected people become anxious in environments that are unfamiliar or where they perceive that they have little control.



From left to right: Amanda Davies, Tristan Chaplin, Professor Marcello Rosa, Dr Hsin-Hao Yu and Dr Richa Verma.

"You wouldn't think this is a visual issue, but it is," Dr Yu says.

"People with agoraphobia seem to have more sensitive peripheral vision than the general population and it appears that these two things are related."

Dr Yu hopes to collaborate with colleagues to study the significance of peripheral vision in humans using functional Magentic Resonance Imaging before testing if the prostriata is directly involved in agoraphobia.

He is also mapping how neurons in the prostriata receive and send information to other parts of the brain in animal models, a technically challenging task.

"We suspect there is a new visual pathway in the brain that hasn't been discovered before and we are using tracing methods to reveal this visual processing network," Dr Yu says.

Sperm, scaffolds and sterility

Have you ever wondered how sperm transform from round cells to tadpoles - which can fertilise eggs - or what happens when the 'program' is disrupted?

These are questions that Professor Moira O'Bryan asks.

In a recently published *PLoS Genetics* paper, Professor O'Bryan's team from the Department of Anatomy and Developmental Biology, and colleagues at Prince Henry's Institute of Medical Research, Australian National University and Garvan Institute of Medical Research, in Australia; University of Edinburgh, UK; and University of California, Davis, in the US, have shown that a protein called Katanin p80 not only controls how sperm are made in the body, but if it is mutated it results in male sterility.

How this happens is complex and microtubules, which dictate cell shape, play a critical role. Enter Katanin p80, which chops up these scaffolding structures, so that sperm precursors can reconfigure themselves from large, round cells into the streamlined motile cells we are all familiar with.

Mutate katanin p80 and mice produce sperm with odd-shaped heads that don't work at all.

It also turns out that mutations in Katanin p80 affect how chromosomes are sorted in the testis.

"Normally when a cell divides, chromosomes attach to a microtubule structure called a spindle. As the cell divides, the spindle divides the chromosomes into equal halves, the cell is pinched in the middle and eventually forms two cells," Professor O'Bryan says.

"If this is 'mucked up', cell division is impaired and you end up with infertile male mice - which occurred in our study - or genetically abnormal offspring."

The next step for Professor O'Bryan is to look at the Katanin p80 gene in infertile men. She will collaborate with Professor Rob McLachlan from Prince Henry's Institute of Medical Research and Monash IVF and search a DNA database of 2500 infertile men with similar clinical disorders, and sequence their Katanin p80 DNA.

If it turns out that what is seen in mice applies to infertile men, in the future researchers could develop diagnostic tests to explain to men why they are infertile.

In addition, Professor O'Bryan and her group are searching for other subtle health defects in her mice.

"Male infertility is often the canary in the coal mine of general health and often precedes more painful or costly events later in life in both humans and mice. As such, the chance to investigate male infertility offers the opportunity to not only give someone a child of their own, but also to avert later illness," Professor O'Bryan says.

www.andrologyaustralia.org/

Golden jubilee postgraduate research award to golden staph scientist

Seong Hoong Chow has been awarded the Golden Jubilee Postgraduate Research Award as part of 50th anniversary celebrations at the Department of Biochemistry and Molecular Biology.

He will receive a $5000 annual top-up to his Monash Graduate Scholarship stipend and $5000 research grant during his PhD studies. The award is given to the Department's top ranked candidate who has demonstrated outstanding academic merit. Seong Hoong was also one of the top students in the honours program in biotechnology at the Monash Sunway Campus, in Malaysia.

"I am grateful to the Department for awarding me this award," Seong Hoong says.

"It will help ease the financial pressures living away from home and allow me to focus on successfully completing my PhD.

"I will also spend the research grant component to travel to international conferences and laboratories, and buy a new computer."

Seong Hoong, 25, a recent recruit to the laboratory of Dr Kip Gabriel, is studying the role of a toxin called Panton-Valentine Leukocidin in golden staph infection. This 'bug', otherwise known as *Staphylococcus aureus*, is commonly resistant to antibiotics in the community and hospitals, and causes everything from mild skin infections to blood poisoning and toxic shock syndrome.

Seong Hoong will try to uncover how *S. aureus* uses this toxin to target the mitochondria - the powerhouses of the cell - within immune cells called macrophages, and how these processes cause disease. He will also collaborate with two other researchers: Dr Thomas Naderer from the Department of Biochemistry and Molecular Biology, and Dr Anton Peleg from the Department of Microbiology.

We wish him well in his research career.

Seong Hoong Chow (right) with Professor Rod Devenish. Image: Dr Kip Gabriel.

Channelling science through art

The Monash School of Biomedical Sciences is home to a new art installation by Anna White.

The eleven oil-on-acrylic panels titled *Scarlet, Blue, Yellow, Orange*, which were launched on 7 June, were commissioned by the Department of Biochemistry and Molecular Biology to commemorate its 50th anniversary last year.

Anna, an exhibiting artist and Fine Art graduate of the Monash University Faculty of Art, Design and Architecture, was drawn to the research of structural biologist Dr Michelle Dunstone and her colleagues, and the images and processes generated as part of their work.

"I am interested in how discoveries are represented through staining, colour coding, fluorescence and modelling," she said.

How then did Anna connect art with biochemistry and molecular biology concepts, and capture the mystery of medical research artistically?

"I was inspired by the idea of protein folding and my paintings are a metaphorical interpretation of conventional diagrams and models," she said.

"Here I experimented with coloured linear marks that blended, crossed and looped around one another and used gestural lines to evoke a sense of movement."

On the panels, Anna applied oil paint to perspex, and used a scraper to blend and flatten the paint to produce a pixellated image. She chose a transparent acrylic support, referencing slides and petri dishes used in research laboratories, and left some surfaces unpainted to connect the interior and exterior of the building, where the art is displayed.

One year after embarking on her project, Anna has selected 11 painted panels – out of a total of 35 – which hang in a clustered group in the Building 77 foyer. These panels are connected by colour palette and markings, and can also be viewed individually.

"I hope the university community will engage with the work visually and find connections that generate thought about relationships between art and science, and how scientific discoveries are represented," Anna said.

Anna White beside her art installation.

French sojourn for Monash researcher

Dr Denisse Leyton

Dr Denisse Leyton was awarded a 2012 Bede Morris Fellowship and will travel to France to learn new research techniques and set up scientific collaborations between the two countries.

Dr Leyton, an ARC Super Science Research Fellow from the Department of Biochemistry and Molecular Biology, will spend 12 weeks in the laboratory of Dr Olivera Francetic, a leader in bacterial protein secretion at the Institut Pasteur, in Paris. She will also present seminars there and at the University of Birmingham, in the UK.

The $10,000 fellowship, which was established in memory of Australian immunologist Professor Bede Morris, will support Dr Leyton's travel and living expenses while the Institut Pasteur will fund her training and research costs.

"At the Insititut Pasteur, we will use molecular modelling, imaging, biochemical, structural and other approaches to determine how surface structures called pili assemble and function in a pathogenic strain of *E. coli*, which causes intestinal bleeding, diarrhoea and damage to the bowel and colon," Dr Leyton said.

"The fellowship will also allow us to transfer knowledge and technologies between Dr Francetic at the Institut Pasteur, me, and members of the Host-Pathogen Molecular Biology Unit at Monash University and NHMRC Program in Cellular Microbiology."

The Bede Morris fellowship, which is supported by donations from colleagues and friends of Professor Morris, and the French Embassy in Australia, is administered by the Australian Academy of Science.

Dr Leyton leaves for Paris on 1 October.

Bon voyage.

Early-career researchers score international travel awards

From left to right: Andrew Major, Jenna Haverfield and Jessica Morison.

Three Monash PhD students are successful recipients of Anthony Koelmeyer International PhD Excellence awards.

Jessica Morison and Andrew Major, from the School of Biomedical Sciences, and Jenna Haverfield, from Prince Henry's Institute of Medical Research, have each received $1500 towards international travel and laboratory visits, and they are delighted.

"This award enables me to showcase my new and exciting findings to an international audience, and also raise my profile as an emerging early-career researcher," says Jenna Haverfield, who studies how hormones control sperm production and male fertility.

She will attend the Study for the Society of Reproduction conference in Pennsylvania, in the US before visiting labs at Columbia and Rockefeller Universities, in New York.

Jenna's colleague Jessica Morison, an organ transplantation immunologist, has two continents in her sights. She will fly to Scotland to attend the European Congress of Immunology meeting before visiting scientists at Oxford University, in the UK, and Harvard and Columbia Universities, in the US.

"As I wish to pursue an international postdoctoral position, I hope to find a laboratory which will support my development as a scientist and allow me to learn new techniques that I can bring back to Australia," Jessica Morison says.

Reproductive biologist Andrew Major, who has already attended The American Society of Andrology meeting in Arizona and visited several labs in the US, has had a memorable international travel experience.

"I was able to learn a new technique, meet collaborators who helped me prepare two publications, speak to lab heads and discuss opportunities for post-doctoral positions," he says.

Also, Andrew received a conference award **(Page 8)** during his trip, which highlights why this travelling award is so important for PhD students.

www.med.monash.edu.au/mbio-gradschool/

2012 Eureka prize news

On 28 August, at a gala event in Sydney, Australia Museum Eureka prizes were awarded for outstanding achievements in science leadership, research and innovation, communication and journalism, and teaching.

Associate Professor Dena Lyras

Of the 19 awards on offer, two research teams from the School of Biomedical Sciences were selected as finalists for the 2012 Eureka Prize for Infectious Diseases Research.

Professor Trevor Lithgow, Joel Selkrig, Dr Matthew Belousoff, Dr Chaille Webb, Dr Andrew Perry and Dr Hsin-Hui Shen, from the Department of Biochemistry and Molecular Biology, discovered the Translocation and Assembly Module (TAM) in bacteria **(Page 1)**, which diverse pathogens use to cause disease. This discovery could aid in the design of a new class of antibiotics that also reduce the incidence of antibiotic resistance, a growing problem.

Associate Professor Dena Lyras, Professor Julian Rood, Dr Glen Carter, Dr Jennifer O'Connor, Dr Milena Awad, Anjana Chakravorty and Pauline Howarth, from the Department of Microbiology, have unravelled the factors that are important for *Clostridium difficile* infection to occur and changed our understanding of how this pathogen causes disease. *C. difficile* is a hospital-acquired superbug that causes devastating epidemics worldwide.

Although the prize ultimately went to researchers from the Walter and Eliza Hall Institute, we congratulate both School of Biomedical Sciences teams on their selection.

Two Monash groups from other faculties were winners in the following categories:

Google Australia Eureka Prize for Innovation in Computer Science: Associate Professor Jon McCormack, Aidan Lane and Dr Alan Dorin, from the Monash Faculty of Information Technology, and Peter McIlwain, from Sonic Design, for their Nodal software, which uses a unique method to visually represent and perform music.

ANSTO Eureka Prize for Innovative Use of Technology: Associate Professor Wei Shen and Professor Gil Garnier, from the Monash Faculty of Engineering, for their low-cost paper device for blood typing tests.

http://eureka.australianmuseum.net.au/

At the Eurekas. Image: Australian Museum Eureka Prizes. Photographer: Daniel O'Doherty.

News in brief

Professor Ed Nice
(Department of Biochemistry and Molecular Biology and Director, Monash Antibody Technologies Facility) received the 2012 Xiaoyu Hu Memorial Award from the Chinese Peptide Society at the 12th Chinese Peptide Symposium in Shenyang, China. This accolade, which recognises his outstanding contributions to peptide science, is awarded biennially to one international and one Chinese scientist eminent in the field. Professor Nice received a small cash prize and a plaque.

From left to right: Professors Keliang Liu, CPS 2012 Chairman; Jiaxi Xu, Chinese award winner; Ed Nice, International award winner; Xueyun Cui, CEO and sponsor, Hainan Zhonghe Pharmaceuticals; and Rui Wang, Chairman of the award committee.

Andrew Major
(Department of Anatomy and Developmental Biology) received the American Society of Andrology Outstanding Trainee Investigator Award for his research presentation on male reproduction at the ASA 37th Annual Conference in Arizona, in the US. He received $500 USD and a plaque. Andrew studies how proteins called importins allow sperm to form in the testis. Using quantitative fluorescence microscopy, the PhD student has discovered how the protein PSPC1 gains access to the sperm precursor cell nucleus to control gene activity.

Andrew Major

Dr Hernán Alonso
(Department of Microbiology) was awarded a 2012 Churchill Fellowship worth $13,000, and will travel to Japan in November to learn new cryo-electron microscopy techniques. The biochemist, who will study the structure of an oil-degrading protein in bacteria, will spend four weeks in the laboratory of Dr Kaoru Mitsuoka at the National Institute of Advanced Industrial Science and Technology, in Tokyo. Dr Alonso hopes to return to Melbourne and apply these new skills at the Ramaciotti Centre for Structural Cryo-Electron Microscopy, a new facility to be built at Monash University.

Dr Hernán Alonso

Starting uni

University can be hard to contemplate when you've taken a gap year off, backpacking around Europe.

But for Jessica Miller, Monash Biomedical Science was what she wanted to study when she returned.

"I picked the course because it was what I was interested in and there are lots of career options,'' she says.

"You can be a research assistant, do honours, postgraduate medicine, nutrition and other allied health courses."

It also helped that biology and chemistry were subjects Jessica enjoyed in Year 11 and she was "curious about how our bodies function and do amazing things".

Apart from a marine biologist uncle, Jessica is the first female in her family to have an interest in science. However, her family are strongly connected to Monash University as alumni: Jessica's grandfather and David Syme Business School Foundation Dean Dr John Miller AO sponsors the top undergraduate student graduating with a Bachelor of Business (Accounting)/Bachelor of Business (Management), her mother worked in the equal opportunity department 16 years ago, and uncle Jamie Miller and aunt Sarah Miller graduated with arts degrees here.

While it's early days as a first-year Biomedical Science student, Jessica admits that university is a big change from secondary school where she received more direction from her teachers.

"I'm getting used to the self-directed study," she says.

"It's also a different type of learning when you're in a big lecture theatre compared to tutorials. You can zone out in lectures, but with tutorials you can learn so much because the lecturer is nearby."

Jessica Miller

At the very onset, Jessica has tried to connect with her peers during the transition day program **(Page 9)** and first-year biomedical science camp near Apollo Bay, which was organised by the Biomed Society.

"We have a good student society and the students are friendly," she says.

"It's not cliquey like at high school - everyone is welcome – so Monash has a nice feel."

Transitioning well

After months of preparation, the Biomedical Science Transition Program was held on 16 February. Although organisers had planned an outdoor event, the forecast of a scorching hot day with flash flooding in the afternoon necessitated last minute changes.

For 190 first-year Biomedical Sciences students, it was a nervous start. To help them transition successfully from secondary school to university life, the students took part in fun activities where they navigated their way around the Monash Clayton campus, learned where they could seek assistance, made new friends and developed problem solving and team-building skills. During the day, the Biomedical Sciences students attended a lecture, made short films, participated in speed dating sessions and worked together in traffic jam activities.

Running the transition program was no small feat. On the day, three staff, six PhD students and 38 undergraduate leaders assisted their charges. But the effort was worth it as the new students indicated that they had an enjoyable day meeting their peers, which we hope will stand them in good stead as they begin their university studies.

It's all about team building.

Movie time: Camera, action.

Just like work: A new ‘rad’ lab for students

The Department of Medical Imaging and Radiation Sciences launched its new radiography simulation and ultrasound laboratories at Monash Clayton campus in April.

Thanks to the support of Faculty, School of Biomedical Sciences and Monash University; and donations from Maroondah Radiology Department, The Royal Children’s Hospital, Shimadzu and Philips, we now have an architecturally designed skills lab that reflects a modern general radiography clinic with waiting areas, ceiling-mounted modern X-ray machines, and a digital image intensifier. What adds to learning at the new laboratory are: a Philips Brilliance Workspace Portal, Agfa DX-S computed radiography system (incorporating an NX HP Musica workstation) and computer workstations for the students.

After the Deputy Vice-Chancellor (Education) Professor Adam Shoemaker officially opened the facility, guests also visited the medical ultrasound simulation laboratory nearby, which comprises four clinical-quality Philips ultrasound systems.

“These labs will enhance the research capacity of the department and I wish to congratulate everyone involved in this project,” Professor Shoemaker said.

Associate Professor Marilyn Baird, Head of the Department of Medical Imaging and Radiation Sciences, also spoke at the launch.

“Both facilities will provide students with a blended learning experience, where they can build transferable clinical skills through simulation and hands-on experience, and learn how to plan, execute and evaluate radiographic procedures,” she said.

“You know you have achieved your objective when two alumni, the chief radiographer and tutor radiographer from The Epworth say: ‘The radiography lab and equipment look just like work.’ ”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1) Professor Adam Shoemaker officially launches the Philips Ultrasound Laboratory. 2) Guests at the launch. 3) From left to right: Alumni Jessica Jones (Tutor Radiographer) and Emma Wilkinson (Chief Radiographer) from Epworth Hospital beside an ultrasound machine. 4) An X-ray machine with ‘model’ subject.

Education news

Associate Professor Marilyn Baird, Head of Department of Medical Imaging and Radiation Sciences, was appointed Associate Dean (Teaching and Learning) at the Faculty of Medicine, Nursing and Health Sciences. In this part-time role, Associate Professor Baird implements the Faculty’s education strategy, monitors the quality of undergraduate and postgraduate courses in health and biosciences, and promotes teaching and learning research.

Associate Professor Yvonne Hodgson received two honours recently. The Manager of Academic Programs and Quality at the School of Biomedical Sciences was promoted to Associate Professor and awarded a Dean’s Award for Excellence in Education (Quality of Teaching). She received $2000 and a certificate from Professor Christina Mitchell, Dean of Medicine, Nursing and Health Sciences.

Top students honoured

On 15 May, the Faculty of Medicine, Nursing and Health Sciences honoured high achieving students in 2011 at a ceremony at BMW Edge, at Federation Square. Dean Professor Christina Mitchell and industry sponsors presented awards to the following students from the Bachelor of Biomedical Sciences, Bachelor of Radiography and Medical Imaging, and Master of Medical Radiations (Radiation Therapy) courses. They received a certificate and $200, $250 or $500 prize-money.

Bachelor of Biomedical Science

Year 1 Prizes: Mr Joshua Hardy and Ms Eunice Li Xia Leong.

Year 2 Prizes: Ms Quy My Thi Huynh and Mr Janaka Lovell.

Year 2 Solly Faine Prize: Mr Steven Mileto.

Year 3 Faculty Prizes: Ms Alison Boast and Ms Rowenne Smith.

Honours Prize: Ms Shanelle Andrew.

Bachelor of Radiography and Medical Imaging

MIA Year 1 Highest Aggregate Prize: Ms Shu Xuan Au Yang.

Shimadzu Year 1 Radiographic Imaging and Methods Prize: Ms Shu Xuan Au Yang.

Year 2 Prize: Mr Benjamin Coughlin.

Covidien Year Two Highest Aggregate Prize: Ms Lara Baker.

Year 3 Philips Ultrasound Prize: Ms Lia Blaich.

Year 3 Toshiba CT Prize: Ms Lia Blaich.

Year 4 Siemens Prize for MRI: Ms Jia Sim, highest aggregate mark in MRI studies.

Australian Institute of Radiography (Victorian Branch) Prize: Ms Briony Ewen, highest aggregate marks throughout the Bachelor of Radiography and Medical Imaging.

The Royal Australian and New Zealand College of Radiologists Prize: Ms Elizabeth Wettenhall, best project in selective studies in Medical Imaging.

Australian Institute of Radiography Prize: Ms Imalda Devaparanam, highest aggregate marks throughout the Master of Medical Radiations (Radiation Therapy).

Shanelle Andrew

Lia Blaich

Open Day 2012

On Sunday, 5 August, secondary students and their families travelled to one of three Monash University campuses to learn about the courses on offer.

Included in the Open Day mix at Monash Clayton, were information sessions on selection and careers in the following undergraduate courses administered by the School: Bachelor of Biomedical Science and Bachelor of Radiography and Medical Imaging.

There were also opportunities for prospective students to field questions to course administrators, lecturers and student ambassadors in two locations, and visit the Centre for Human Anatomy Education and the recently opened Radiography Simulation Laboratory **(Page 10)**.

Special thanks go to Associate Professor Yvonne Hodgson, who coordinated Open Day planning here and the large team of staff and enrolled students, who volunteered their time to showcase the University on the weekend.

In addition to Open Day events at Monash Caulfield, Clayton and Parkville on the Sunday, the Berwick, Gippsland and Peninsula campuses were also open to the public the previous day.

A total of 46,270 people visited the six Monash campuses across the weekend, the highest attendance on record.

1) Q and A at the Radiography Simulation Laboratory. 2) Student volunteer at the Physiology stand. 3) Open Day ambassadors at work. 4) Visitors at the School of Biomedical Sciences.

Biomed Benchmark

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