



# Syntrophy Volume 17

## Issue 7 2016

THE AUSTRALIAN SOCIETY FOR MICROBIOLOGY NSW-ACT BRANCH (ABN 24 065 463 274)

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## From the Editor

by Tim Newsome

Here is your latest instalment of Syntrophy.

Hot off the press you can find a report from our recent AGM (August 24) by our Chair Slade Jensen (page #4). We have a substantially renewed and greatly expanded State branch committee. In fact, we are at capacity with twenty committee members including the Executive. Such a large committee will allow us to do even more for our members and we gladly accept the challenge to become the most active State branch ever! I would like to extend a welcome to our renominated and newly nominated committee members, and in particular to our new Chair-elect Mitchell Brown. All their details, roles and contact information can be found on the ASM State branch website.

Most importantly our new committee makeup will allow us to better reach out to all the flavours of microbiology that excel in NSW and ACT. I'll leave it to our Chair to introduce our new members, but we are now exceptionally well represented by clinical microbiologists from no less than three hospitals. We also cover the NSW-ACT region far more effectively than ever before with committee members from eight different universities, including the

University of Canberra. This is first time since I've sat on the State branch that we have had representation from ACT. Our increased student committee members will be looking to expand the range of events we offer to our junior members.

I would also like to welcome on-board our new Biofilm SIG. Led by Prof Iain Gosbell (Western Sydney University), this SIG is looking to increase its impact and harness the extraordinary local talent in this area. Stay tuned, as there will be more in the space shortly.

Finally, thanks to everyone who came along to our AGM, I certainly had a great time and I have been assured that the revelries continued long after my departure. From the feedback I have received, the highlight of the evening was a talk by Richard Jones (Douglass Hanly Moir Pathology). He delivered a sobering perspective on providing healthcare to some of the world's most vulnerable and destitute populations. Caitlin Abbott has written a report on this very stimulating talk (page #5).

It is a matter of integrity:  
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*Helicobacter pylori*.

by Emma Dawson

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### NSW HEALTH PATHOLOGY MYCOLOGY MASTERCLASS 2016

19th – 20th September 2016  
Concord Hospital  
Cost \$275

See details page #9

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### NEXT SYNTROPHY

Deadline for submissions to next issue:  
**23<sup>rd</sup> September 2016**

CONTACT SYNTROPHY COORDINATOR  
[Susan.Badman@rcpaqap.com.au](mailto:Susan.Badman@rcpaqap.com.au)

## Upcoming Events

### NSW HEALTH PATHOLOGY MYCOLOGY MASTERCLASS 2016

19th – 20th September 2016  
Concord Hospital  
Cost \$275  
For a booking form, please contact:  
[Bronwyn.Bailey@sswahs.nsw.gov.au](mailto:Bronwyn.Bailey@sswahs.nsw.gov.au)

For further information, please contact:  
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Or  
[Charlotte.Webster@sswahs.nsw.gov.au](mailto:Charlotte.Webster@sswahs.nsw.gov.au)

See details page #9

### ASM CLINICAL SIG

Tuesday 13<sup>th</sup> September 2016  
Lecture Theatre 3  
Westmead Education Centre  
6pm for refreshments  
6.30pm – 7.45pm for talks

Further information to follow

## Meeting Calendar

2017

ASM Hobart, TAS

## Awards Closing Soon

ASM NSW-ACT Branch  
Joe Levey Country Travel Award  
17<sup>th</sup> October 2016

## Branch Sponsors 2016

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# Focus

## It is a matter of integrity: Dynamin-like proteins in *Helicobacter pylori*.

by Emma Dawson

*Helicobacter pylori* is a gram negative, spiral-shaped bacterium that infects approximately 50% of the world's population, and as much as 80% of the population in developing countries, making it one of the most common bacterial infections (1). The link between stomach ulcers and *H. pylori* was made by two Australians, pathologist Robin Warren and gastroenterologist, Barry Marshall. Based on this and other research, the World Health Organisation has declared *H. pylori* to be a Class 1 carcinogen, highlighting how important it is for us to understand this pathogen.

*H. pylori* invades and colonises the mucosal lining of the stomach and is the cause of up to 95% of duodenal ulcers, and up to 75% of gastric ulcers, and is also associated with gastric cancer and lymphoma. However, a majority of the world's population that are colonised with *H. pylori* are asymptomatic, with fewer than 10% of individuals colonised developing peptic ulcer disease, gastric cancer or lymphoma (2). Why so little disease occurs despite such high levels of colonisation is still not understood.

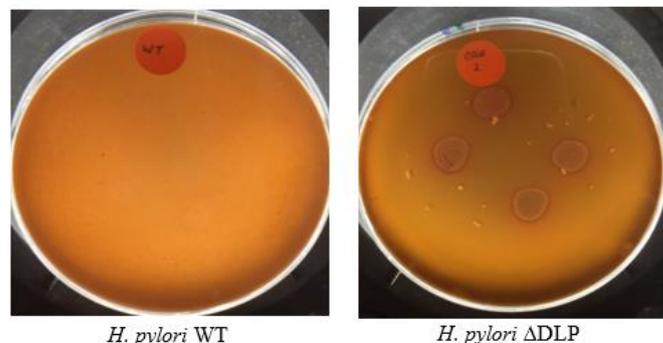
We are studying *H. pylori* cell structure and integrity under physiologically relevant conditions, and have identified proteins of the dynamin superfamily in *H. pylori* that are important for cell integrity. In eukaryotic cells, large GTPases of the dynamin superfamily are important drivers of membrane curvature and constriction during the membrane fusion and fission processes, and are required for the normal activity of cells and for specific functions such as neurotransmitter uptake (3). Dynamin-like proteins (DLPs) have recently been identified and implicated in membrane dynamics in a number of different bacterial species including *Nostoc punctiforme* (4), *Bacillus subtilis* (5), and enterotoxigenic *Escherichia coli* (6). We have characterised DLPs in a number of pathogenic bacteria, including *H. pylori*, and found that there is a high level of conservation, with 95% of all *H. pylori* genomes showing the presence of at least one putative DLP.

When we deleted DLPs in *H. pylori*, a reduction in membrane integrity was evident. We observed this on blood agar, where the wild type (WT) showed minimal haemolysis when compared to the  $\Delta$ DLP strain which showed a circle of clearance, indicating the release of an intracellular haemolysin (Figure 1). This reduction in membrane integrity was confirmed by microscopy, where a 2-fold increase in permeability was seen with the use of a DNA stain that is not usually taken across the cell membrane (Figure 1).

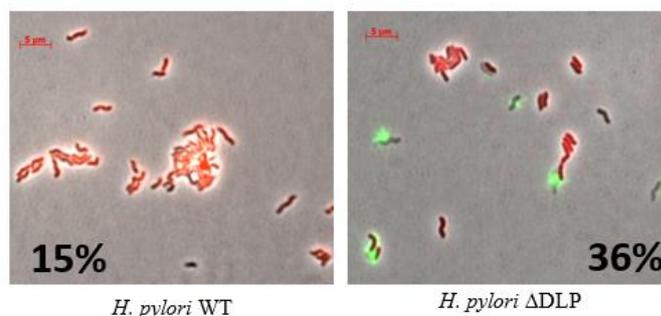
Since membrane integrity is important to stress resistance, the ability of the  $\Delta$ DLP strain to resist acid stress was tested; this phenotype is important to allow *H. pylori* to survive and thrive in the stomach, which is an extremely harsh environment. To our surprise, the  $\Delta$ DLP strain was not able to survive exposure to an acidic environment. To neutralise the acid in its immediate surroundings, *H. pylori* utilises the urease pathway, which converts urea into ammonia and carbon dioxide, and increases the periplasmic pH.

Even with the addition of 10 mM urea, the  $\Delta$ DLP strain was not able to neutralise acid, showing that the DLP deletion in some way compromises the urease pathway. The simplest explanation is that membrane integrity is required for proper function of this important acid tolerance pathway. This highlights two possibilities; either DLPs in *H. pylori* play a direct role in acid tolerance or they are global membrane integrity and maintenance proteins. The essential nature of DLPs in *H. pylori* in an acidic environment makes them a potential target for future development of novel treatments of this globally important pathogen.

### (A) Haemolysis on blood-agar plates



### (B) Cell permeability staining



**Figure 1** Reduction in membrane integrity seen between WT and  $\Delta$ DLP in *H. pylori*

(A) Growth on blood agar shows evidence of haemolysis on the  $\Delta$ DLP plate but not WT  
(B) WT *H. pylori* are much less permeable to the DNA stain Sytox green compared to  $\Delta$ DLP

### ABOUT THE AUTHORS

Emma Dawson is in her final year of her PhD in the Institute of Technology at the University of Technology Sydney under the supervision of Dr Iain Duggin. Emma's PhD focuses on understanding the function that dynamin-like proteins have in the ever challenging and extremely interesting pathogen, *Helicobacter pylori*.

### REFERENCES

- ➔ 1. Montano V, Didelot X, Foll M, Linz B, Reinhardt R, Suerbaum S, et al. Worldwide Population Structure, Long-Term Demography, and Local Adaptation of *Helicobacter pylori*. *Genetics*. 2015;200(3):947-63.
- ➔ 2. Cover TL, Blaser MJ. *Helicobacter pylori* in health and disease. *Gastroenterology*. 2009;136(6):1863-73.
- ➔ 3. Ferguson SM, De Camilli P. Dynamin, a membrane-remodelling GTPase. *Nature reviews Molecular cell biology*. 2012;13(2):75-88.
- ➔ 4. Low HH, Lowe J. A bacterial dynamin-like protein. *Nature*. 2006;444(7120):766-9.
- ➔ 5. Burmann F, Ebert N, van Baarle S, Bramkamp M. A bacterial dynamin-like protein mediating nucleotide-independent membrane fusion. *Molecular microbiology*. 2011;79(5):1294-304.
- ➔ 6. Michie KA, Boysen A, Low HH, Moller-Jensen J, Lowe J. LeoA, B and C from enterotoxigenic *Escherichia coli* (ETEC) are bacterial dynamins. *PloS one*. 2014;9(9):e107211.



Australian Society for Microbiology NSW-ACT Branch

## The ASM NSW-ACT Branch 56th Annual General Meeting

The ASM NSW-ACT Branch 56<sup>th</sup> Annual General Meeting was held at Hotel Harry Surry Hills on Wednesday the 24<sup>th</sup> of August. Approximately 40 members and guests attended the event, which included Prestige Canapés and drinks, branch reports from myself (Chairperson) and Jim (Treasurer), and a very interesting (and heartbreaking) talk by Richard Jones from Douglass Hanly Moir Pathology. As part of my report I summarised the successful events that the Branch had held/sponsored over the last 12 months, including the 2016 Sydney Micro Meeting and the Microbiology Careers Evening for undergraduate/postgraduate students. Following Jim's summary of Branch finances, and confirmation of the 2016-2017 committee members, Richard then shared with us some of the many challenges associated with establishing pathology testing in Sub-Saharan Africa...the work of those associated with the Sonic Healthcare Catalyst Program is truly amazing (a more detailed report on Richard's presentation is provided as part of this issue). Overall it was a very enjoyable evening and a big thank you to everyone involved in its organisation. Finally, I would also like to extend a big thank you to the 2015-2016 committee for their tireless dedication over the last year and a warm welcome to incoming members...it is fantastic to see our state membership so broadly represented! Our new committee....

**Slade Jensen**

**Chairperson**

Western Sydney University

**Tim Newsome**

**Branch Secretary**

The University of Sydney

**Jim Manos**

**Branch Treasurer**

University of Sydney

**Mitchell Brown**

**Chairperson-elect**

Westmead Hospital

**Nick Coleman**

University of Sydney

**Ruth Hall**

University of Sydney

**Christopher Harmer**

University of Sydney

**Thomas Jeffries**

Western Sydney University

**Maurizio Labatte**

The University of Technology Sydney

**Kaitlin Tagg**

Westmead Hospital

**Thiru Vanniasinkam**

Charles Sturt University

**Belinda Chapman**

Quantal Bioscience

**Bobby Dimitrijovski**

Royal North Shore Hospital

**Reena Ghildyal**

University of Canberra

**William Klare**

University of Sydney

**Andrew Robinson**

University of Wollongong

**Martina Sanderson-Smith**

University of Wollongong

**Monica Stelmach**

Concord Hospital

**Jai Tree**

University of New South Wales

**Karen Vickery**

Macquarie University





Australian Society for Microbiology NSW-ACT Branch

### AGM Seminar

by Caitlin R Abbott

#### Attempting to heal a world torn apart: Richard Jones and the Sonic Healthcare Catalyst Program in Goma, DRC



Richard Jones' presentation at the NSW-ACT Annual General meeting was a jolt. Far more than a "you don't know how good you've got it" sentiment, it was a devastatingly realistic and unsentimental glimpse into the daily realities of trying to deliver health care, including microbiological services, in close-to-impossible circumstances in a war-torn country.

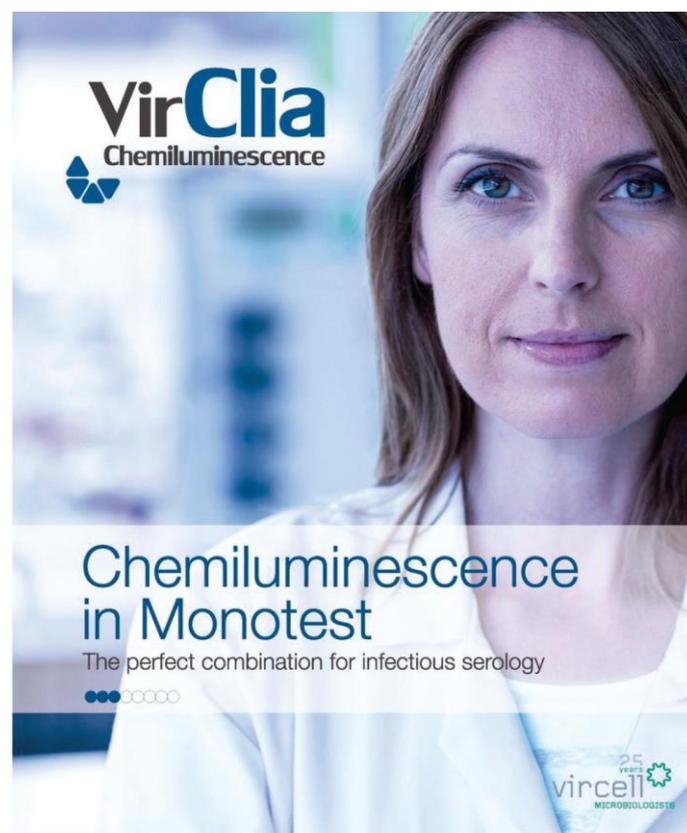
The history of the Democratic Republic of Congo (DRC) is a narrative familiar to those with any knowledge of modern history. Stability does not exist. A colonial power (in this case, Belgium), grants independence and everything changes. A few months of instability leads to a power struggle, and a USA-backed individual seizes power. Everything changes. Twenty years later continental and civil war erupts. Everything changes again. Five and a half million people lose their lives. Ninety percent of those are from preventable diseases. Every day forty-five thousand people die.

Goma is a city torn apart by more than just military and political forces. Located on top of the Great Rift Valley, the earth itself is being ripped apart as two tectonic plates edge apart. An active volcano, Nyirangongo, lies only 13km north of the city and the lake on which Goma depends, Lake Kivu, holds massive quantities of dissolved carbon dioxide and methane in its depths. Lake Kivu is a source of sustenance while also providing the threat tsunamis and asphyxiation to those that live nearby. The city has been site of numerous conflicts. Rape is used as a weapon, children are forced to fight, and the internally displaced are constantly on the move. Half the population live on less than a dollar a day. Even families that can afford to send their children to school are reluctant to do so, due to the threat of kidnap. Most live without running water or electricity.

The Sonic Healthcare Catalyst Program, which is partly sponsored by Douglass Hanly Moir Pathology, supports the development of radiology and pathology services in war-torn areas. In Goma, the Catalyst Program supports the HEAL Africa Hospital. A 155-bed hospital, HEAL performs on average 3000 surgeries per year. The most common surgical pathologies are obstetric fistula, trauma (from gun violence), orthopaedics and plastic surgery (from burn injuries). The most common infections are what you would expect from an area with little to no healthcare, clean water or basic infrastructure. Malaria, schistosomiasis, HIV, typhoid fever, and diarrhoeal diseases are the predominate focus.

Running a diagnostic microbiology lab in the DRC is subject to nearly unimaginable challenges. The water supply comes from a heavily contaminated lake, the mains voltage is unreliable, culture media choices are severely limited to those able to survive the shipping process, and antibiotic shipments are at risk of theft. A small herd of goats is kept locally to provide blood for blood agar. Who would have thought that a prerequisite skill for a microbiology lab technician would be the ability to catch a goat? Adding to these problems of supply are the problems of disposal. Prior to education and training, many 'disposables' such as gloves and syringes were re-used, and, scattered waste was subject to scavengers. Now, with incinerators running and lockable wheelie bins in place the safety of patients and surrounding inhabitants can be better managed.

Richard's presentation was a sobering reminder that in some parts of the world, looking beyond day-to-day survival is a luxury. It was inspiring to hear of the work performed by microbiologists and other health care workers who seeking to establish basic medical services and training to the people of the DRC, work performed at their own risk. Richard ended with a description of how the next phase of this work is about sustainability and how trained local personnel are starting to provide services to NGOs in the region, one ultimately positive outcome in a heartbreaking situation. In this case, what started out as a Band-Aid solution may eventually become a profitable enterprise.



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Australian Society for Microbiology NSW-ACT Branch

## Joe Levey Country Travel Award 2016

**Award:** The Joe Levey Country Travel Awards (up to two will be awarded per year) will consist of a maximum of \$500 to cover budget travel and accommodation costs for a country microbiologist to visit another laboratory or institution within NSW or the ACT, with the aim of learning a new technique, or to attend a scientific meeting within Australia.

**Eligibility:** All current Australian Society for Microbiology members who reside in a country region of NSW. Applicants must have been a member of ASM for at least 12 months before the Award application is submitted.

### Criteria:

Applicants are required to submit the following:

1. A one page account of their current employment and responsibilities.
2. A one page proposal of their objectives in seeking further training. This proposal should provide clear justification of the need to travel. The ASM NSW-ACT Branch committee must be convinced that the training cannot be undertaken at, or near, the applicant's place of work and that the visit funded will result in benefits that could not reasonably be expected to have accrued at the applicant's place of work. Applicants must specify the proposed start and finish dates for training.
3. Statements of approval to undertake training from their supervisor and host.
4. Estimate of travel and accommodation costs & amount requested with justification. Payment will be made on presentation of tax invoices or receipts.
5. Recipients are required to write a brief one page report for Syntrophy, to be submitted no later than 4 weeks after the completion of training or conference attendance.

## Closing Date: 17th October 2016

### Email applications to:

Tim Newsome, Secretary NSW-ACT Branch

Australian Society for Microbiology

Email: [tim.newsome@sydney.edu.au](mailto:tim.newsome@sydney.edu.au)

Tel (02) 9351 2907



Health  
Pathology

#### Position Details

Reference Number	<a href="#">344482</a>
Position Title	Managing Scientist Microbiology
Employment Status	Permanent Full Time
Entity	NSW Health Pathology
Geographical Location	Royal North Shore
Advertised Award/Classification	Health Professional and Medical Salaries (State) Award - 1/7/2016
Salary	\$1,782.49 - \$2,358.21
Number of FTE	1.00
Purpose of Position	<p>The Managing Scientist is responsible for managing the Microbiology Department to ensure an efficient and effective laboratory medicine service across operational management, regulatory compliance and accreditation, financial planning and reporting, cost containment, Department performance monitoring and reporting, corporate risk management, human resources management and strategic planning.</p> <p>An eligibility list will be created for future permanent full time / part time, temporary and casual vacancies.</p> <p>This position is a permanent position. To be eligible for permanent appointment to a position in NSW Health, you must have an Australian citizenship or permanent Australian residency. Employment of a temporary visa holder will only occur if there is no suitable local applicant.</p> <p>This is a Category A position. All Category A applicants must read and understand <i>Policy Directive PD2011_005 Occupational assessment, screening and vaccination against specified diseases</i>. All new recruits must agree to comply with the requirements outlined in this policy. New recruits must provide evidence against specified diseases and comply with the requirements of this policy at their <b>own cost</b> prior to appointment.</p>
Selection Criteria	<p>Tertiary qualifications of at least a Bachelor Degree in Science or a recognised equivalent qualification deemed appropriate by the employer.</p> <p>Extensive experience in Microbiology discipline with demonstrated understanding of processes and workflows and the discipline's relationship with the wider pathology environment.</p> <p>Proven leadership and operational management skills and experience including budget management, staff and resource management. As well as maintenance of professional standards and accreditation with demonstrated high level interpersonal, negotiation and communication skills that support the goals and values of NSW Health Pathology.</p> <p>Demonstrated commitment to excellent customer service and extensive experience with establishing and maintaining good relationships with customers.</p> <p>Demonstrated knowledge of, and experience with, managing the requirements of current NATA Medical Testing Accreditation and other relevant legislative and regulatory requirements.</p>

Demonstrated advanced knowledge and operating competency with Laboratory Information Systems, Microsoft Office applications, Quality Management Systems and proven data analysis skills.

Demonstrated experience with professional horizon scanning and strategic thinking in Microbiology and in the broader pathology industry, with the ability to implement Network and State-wide initiatives.

Demonstrated experience with monitoring and reporting service performance.

Contact Person Peter Huntington

Contact Number 99264329

Closing Date 29/09/2016

Supporting Documents

Position Description [click here to view](#)

Application Guide [click here to view](#)

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# **NSW HEALTH PATHOLOGY CONCORD HOSPITAL MICROBIOLOGY MYCOLOGY MASTERCLASS 19<sup>TH</sup> – 20<sup>TH</sup> SEPTEMBER 2016**

This workshop will consist of 2 days advanced medical mycology - lectures and practical hands-on laboratory sessions that will reflect current clinical and laboratory practices for the diagnosis and identification of invasive fungal infections.

Invited speakers: Dr David Ellis, Dr Sarah Kidd and Dr Catriona Halliday

Cost: \$275 (GST incl.)

Places are strictly limited.

If you would like a booking form please contact: [Bronwyn.Bailey@sswahs.nsw.gov.au](mailto:Bronwyn.Bailey@sswahs.nsw.gov.au)

For any further information

Evanthia Tambosis ([Evanthia.Tambosis@sswahs.nsw.gov.au](mailto:Evanthia.Tambosis@sswahs.nsw.gov.au)) or

Charlotte Webster ([Charlotte.Webster@sswahs.nsw.gov.au](mailto:Charlotte.Webster@sswahs.nsw.gov.au)) or

by phone on 02 97676904

*This event is kindly sponsored by MSD and Olympus*

The Australian Society  
for **Microbiology**   
bringing Microbiologists together

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Submissions and enquiries can be directed to the Syntrophy Coordinator, Susan Badman at [Susan.Badman@rcpaqap.com.au](mailto:Susan.Badman@rcpaqap.com.au) or (02) 9045 6073.

Organisations with research opportunities or companies seeking to fill positions are welcome to place an advertisement in an upcoming issue of Syntrophy. Please contact the Syntrophy Coordinator with your details for inclusion.

Organisations interested in becoming a sponsor of ASM NSW-ACT Branch should contact the Sponsorship Coordinator, Mitchell Brown to obtain a copy of the current sponsorship prospectus: [Mitchell.Brown@health.nsw.gov.au](mailto:Mitchell.Brown@health.nsw.gov.au).