



# Syntrophy Volume 16

## Issue 4 2015

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

IN THIS ISSUE

## From the Editor

by Peter Huntington

This Syntrophy, Hilary Fong reports on the March 2015 CAPSIG seminar and Mitchell Brown reports on the recent Clinical SIG meeting held at Westmead Hospital.

In this month's feature article, Grace Blackwell from the University of Sydney shares some of her work on antibiotic resistant clones of *Acinetobacter baumannii*.

The Branch has several awards on offer that are closing soon, so why not send in your application today?? See page 5.

In upcoming events, the Clinical Serology and Molecular SIG will be holding their next meeting at North Ryde on Wednesday 27<sup>th</sup> May. Featuring speakers Robert Gibb, Tony Field and Paul Austin topics will include Ross River Virus and Dengue. See the flyer on page 7 for full details.

'One Microbiology' is the theme of the 2015 ASM National Scientific Meeting and Trade Exhibition and will be held in Canberra on July 12-15. If you haven't already - register now! We hope you will be able to take part.

The scientific program shows a great line-up, with plenaries featuring international speakers Chantal Abergel, Judith Berman, Jorge Galan, Stephen Giovannoni and Stefan Schwarz. There's the Rubbo Oration by Janet Jansson, Snowden Oration by Chris Baggoley, and Bazeley Oration by Yoshihiro Kawaoka. There will be workshops on antimicrobial resistance, CDS users group, bio-imaging, microbial

proteomics, bioinformatics, women in science careers, measurement of uncertainty by CAPSIG, and Illumina sequencing.

There's a public lecture at the Shine Dome, and there's social events especially for students and early career researchers. Many of our Branch sponsors will also feature in the trade exhibition, so be sure to take them a visit.

I invite you to have a look at the full ASM 2015 program for yourself at:

<http://asmmeeting.theasm.org.au>

In conjunction with the National Meeting, EduCon 2015, the Microbiology Educator's Conference, will be held preceding ASM 2015 on 11<sup>th</sup>-12<sup>th</sup> July. See EduCon's program details and register by 5<sup>th</sup> June at: <http://asm2015.asnevents.com.au/asm-educon-2015>

The Australasian Mycological Society will also be joining ASM 2015 for a combined day on Wednesday 15<sup>th</sup> July.

We know that ASM 2015 will be a fantastic meeting and hope that you will be able to take part.

We hope you enjoy this edition of Syntrophy.

Origin of the AbaR and AbGRI2 islands in global clones 1 and 2 of *Acinetobacter baumannii*

by Grace Blackwell

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### ASM CS&M SIG

Wednesday 27<sup>th</sup> May 2015  
Douglass Hanly Moir Pathology

5:30pm for a 6:30pm start  
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### Regular Features

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### NEXT SYNTROPHY

Deadline for submissions to next issue:  
**25<sup>th</sup> June 2015**

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

## Upcoming Events

### ASM CS&M SIG

Wednesday 27<sup>th</sup> May 2015  
Douglass Hanly Moir Pathology

5.30pm for a 6.30pm start  
Details page 7

## Meeting Calendar

- ➔ 12-15 July 2015  
ASM Canberra, ACT
- ➔ 2016  
ASM Perth, WA
- ➔ 2017  
ASM Hobart, TAS

## Awards Closing Soon

- ➔ Clinical Scientist Continuing Education Award  
31<sup>st</sup> May 2015
- ➔ Joe Levey Country Travel Award  
20th June 2015
- ➔ Clinical Scientist Recognition Award  
30<sup>th</sup> June 2015
- ➔ James Vincent Scholarship  
30th June 2015

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# Focus

## Origin of the AbaR and AbGRI2 islands in global clones 1 and 2 of *Acinetobacter baumannii*

by Grace Blackwell

*Acinetobacter baumannii* is a Gram negative coccobacillus that is an important nosocomial pathogen causing opportunistic infections in the ICU and burn wards of hospitals. *A. baumannii* are the 'A' in the ESCAPE group of clinically relevant pathogens – the available antibiotics are largely ineffective against these bacteria. We have found that most Australian *A. baumannii* isolates are extensively antibiotic resistant (XAR), which means they are resistant to an antibiotic in 7 of the 9 effective classes of antibiotics<sup>1</sup>.

Most resistant isolates of this species belong to one of two clones that have disseminated worldwide, global clone 1 (GC1) or global clone 2 (GC2). Most the resistance genes in these global clones are concentrated in resistance islands in the chromosome (Figure 1).

AbaR and AbGRI1 are in the same position in both GC1 and GC2, inserted in the *comM* gene, but their structure and gene content is quite different. GC2 isolates have a second resistance island, AbGRI2. In some GC2 strains, a third island AbGRI3 has been reported, but this has not been detected in Australian isolates. AbaR (GC1) and AbGRI2 (GC2) are in different locations in the chromosome but they share similar resistance gene content. These regions confer resistance to ampicillin, kanamycin, neomycin, sulphonamides, gentamicin, spectinomycin and tetracycline – these are all old antibiotics that were in use to treat infection prior to 1970.

AbaR<sup>2</sup> (Genbank # KF483599) is the most ancestral version of the AbaR islands and is a mosaic region made up of fragments from known transposons and mobile genetic elements<sup>3</sup>. Including the backbone transposons, it is 63.6 kb in size, while the central multiple antibiotic resistance region (MARR) is 40.5 kb.

The first reported version of AbGRI2 was found in a 1992 GC2 isolate from Sydney and was called AbGRI2-1<sup>4</sup>. AbGRI2 is 19.8 kb and all of it is found in the MARR of AbaR. In order to determine if AbGRI2 originally contained more of AbaR, we examined strain A320, the oldest GC2 strain in the Hall lab collection.

Strain A320 was originally subcultured from RUH-134, the reference GC2 strain<sup>5</sup>. RUH-134 was isolated in 1982 in the Netherlands and is multiply antibiotic resistant (MAR). A320 was sequenced and through PCR mapping, its resistance island was assembled. AbGRI2 in A320 was in two pieces, AbGRI2-0a and AbGRI2-0b, which have been separated via the inversion of almost a third of the chromosome. Once the inversion has been reversed, AbGRI2-0 appears to be 32.4 kb and contains all the resistance genes found in AbaR except the tetracycline resistance gene *tetA(A)*. Comparison of AbGRI2-0 to the MARR of AbaR showed that they contained fragments from the same transposons but in a very different order. However, each of these islands had additional sequence that was not found in the other.

Screening of the Hall lab collection has revealed an IncL/M plasmid R1215 that contains all the resistance genes found in AbaR. R1215 was sequenced and the assembled plasmid was 95.8 kb, with a 37.8 kb resistance island. The MARR of AbaR can be derived from the resistance regions on R1215 in a few steps, including inversions between oppositely oriented repeats via homologous recombination. AbGRI2-0 can also be made from R1215 through a different set of inversions and the addition of extra IS26's.

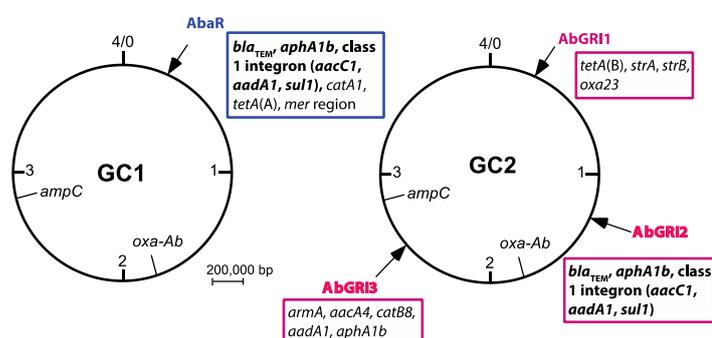
Consequently the resistance region of R1215 or a close relative is the likely progenitor of both AbaR in GC1 isolates and AbGRI2 in GC2 *A. baumannii*. The acquisition of these resistance islands gave the cells resistance to many of the old antibiotics in one step.

### REFERENCES

1. Magiorakos AP, Srinivasan A, Carey RB et al. Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance. *Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases* 2012; 18: 268-81.
2. Hamidian M, Wynn M, Holt KE et al. Identification of a marker for two lineages within the GC1 clone of *Acinetobacter baumannii*. *The Journal of antimicrobial chemotherapy* 2014; 69: 557-8.
3. Post V, Hall RM. AbaR5, a large multiple-antibiotic resistance region found in *Acinetobacter baumannii*. *Antimicrobial agents and chemotherapy* 2009; 53: 2667-71.
4. Nigro SJ, Farrugia DN, Paulsen IT et al. A novel family of genomic resistance islands, AbGRI2, contributing to aminoglycoside resistance in *Acinetobacter baumannii* isolates belonging to global clone 2. *The Journal of antimicrobial chemotherapy* 2013; 68: 554-7.
5. Nemeč A, Dolžani L, Brisse S et al. Diversity of aminoglycoside-resistance genes and their association with class 1 integrons among strains of pan-European *Acinetobacter baumannii* clones. *Journal of medical microbiology* 2004; 53: 1233-40.

### ABOUT THE AUTHOR

Grace Blackwell is a PhD candidate under the supervision of Professor Ruth Hall in the School of Molecular Bioscience at the University of Sydney. Her work focuses on the evolution of antibiotic resistance islands in *Acinetobacter baumannii*.



**Figure 1:** Chromosomal location of resistance islands and their resistance gene content in the two global clones of *A. baumannii*.



Australian Society for Microbiology NSW-ACT Branch

### Clinical Special Interest Group

Mitchell Brown

On Wednesday the 13<sup>th</sup> of May, a clinical SIG meeting was hosted by the Centre for Infectious Diseases and Microbiology at Westmead Hospital. A great crowd of more than 65 people braved the horrible weather outside to travel from all over town and beyond to Westmead for the event. The attendees were a mix of clinical scientists, medical staff, students, educators and industry representatives. The evening began with pizza (with some beer and bubbles to wash it down of course) and a chance to mingle and chat with colleagues. We then moved into a rather warm lecture theatre (apologies I could not figure out how to adjust that) and heard three great presentations from some of Westmead's finest; Dr Catriona Halliday presented "*Rapid Diagnosis of Invasive Fungal Infections*", followed by Justin Ellem with "*Laboratory Update: Molecular Diagnostics*" and finally Dr Matthew Watts presented "*Strongyloides stercoralis: new diagnostic tools*". All talks were well received. Thank you to all presenters and attendees for a very enjoyable and successful evening.



### Report on CAPSIG (NSW) Seminar March 2015 Complementary Medicines - Revival!

Hilary Fong

CAPSIG (NSW) presented their first seminar of the year on the 25<sup>th</sup> March with some 68 attended. This seminar covered three aspects of complementary medicines, which is a fast growing industry for both domestic and export markets. The three speakers collectively presented talks on: the 'revival' of traditional medicine practiced by the Indigenous groups in Australia; the manufacturing of complementary medicines (such as herbals, vitamins); and the regulatory requirements.

According to A/Prof Joanne Jamie, of Macquarie University, some 80% of the population in developing countries today still relies on traditional medicine as their primary healthcare option. When modern science was applied to explore further the mode of action of herbals, plant-based extracts are the most consistently successful source of novel drugs and accounted for about 80% of new discoveries. For example, Artemisinin derived from *Artemisia annua* is now used as an antimalarial ingredient. Plant genera including Acacia, Eucalyptus and Melaleuca are often found in common household disinfectants and for first aid treatments. There are many other plants found that are indicated for pain relief, gastrointestinal ailment and fever. Due to aging of the indigenous elders, some of the traditional medicine knowledge has begun to fade away. Fortunately, in recognition of this trend and with the support of the Government via the NHMRC and WHO, universities are offering undergraduate studies as well as postgraduate research programs.

Complementary medicine is not just about herbals. In Australia, the dietary supplement market is growing exceptionally fast. Mr Peter Kissane, of Sphere Healthcare, spoke about the Food-Medicine Interphase. When a vitamin supplement is sold as a 'food' it is generally under the Food Standards Code, however, if it were marketed with a therapeutic claim, then it would come under the control of the TGA. Whereas foods are regulated by the State Law, therapeutic goods are under the scrutiny of the TGA, which is part of the Commonwealth Government. This has a far-reaching impact on manufacturing and quality assurance. Peter has compiled a comprehensive list of relevant standards and codes for both, as well as an overview on the differences in microbiological quality.

We are also pleased to have two representatives from the TGA, Ms Yasmin Mollah and Ms Angeliza Querubin to give an overview of the regulatory requirements: such as the 'risk based' approach adopted by the TGA, the regulatory framework, review process, compliance review, substantiation of label claim, evidence guidelines and criteria for ARTG, etc. All these are important to registration or listing of complementary medicines. *This is a very comprehensive guidance presentation and is a must for all those who are involved in regulatory affairs and preparing submissions!*

We would like to thank the four speakers, who have given us a better understanding on how a product is developed, manufactured under the code of GMP and registered/listed as a complementary medicine. All the presentations are now available for viewing from our website capsig.com.au. CAPSIG NSW would also like to thank also ams Laboratories, bioMérieux and Merck Millipore – sponsors of this event.



Australian Society for Microbiology NSW-ACT Branch

### Clinical Scientist Continuing Education Award

**Award:** The Award is a contribution of up to AUD\$1000 (towards registration fees / airfares / accommodation) to assist the recipient to attend the ASM Annual National conference, or any other scientific meeting or workshop with a microbiology component, in the same or following year as the Award is given.

#### Eligibility:

1. The nominee must be a clinical scientist primarily involved in routine diagnostic work, rather than research, who has distinguished themselves with excellent performance in the clinical laboratory.
2. The applicant must be residing in NSW-ACT for at least 5 continuous years before the Award application is submitted.
3. The applicant must be working full-time in a clinical laboratory in NSW-ACT for at least 5 continuous years before the Award application is submitted.

**Membership Status:** Applicants must have been FASM / MASM / SASM members of the NSW-ACT branch of the Australian Society for Microbiology for at least 5 continuous years before the Award application is submitted.

#### Application Requirements:

Applicants must submit an application consisting of the following:

1. A covering letter supporting their eligibility of the Award, including their work achievements to date, a demonstrated pro-active contribution to microbiology and details of the conference / workshop they wish to attend, outlining how attendance will benefit their career.
2. A brief curriculum vitae outlining the applicant's qualifications, continuing education, employment history, publications and presentations.
3. Two referee's reports (to be submitted directly to the branch secretary) supporting the application for the Award, summarising and confirming the applicants eligibility. It is the responsibility of the applicant to ensure that their referees submit the reports to the ASM NSW-ACT branch secretary by the closing date.
4. Evidence of their involvement in NSW-ACT branch activities since they have been members. This could include attendance at scientific meetings, seminars, newsletter contributions or assistance in the organisation of microbiology events. Applicants with this record will be preferred, but not exclusively.

#### Conditions of the Award:

1. One award per year. No award may be given in the event that the NSW-ACT Branch committee feels there is no suitable applicant.
2. Publication of the Awardee with photo in the Branch newsletter Syntrophy and at the Branch AGM.
3. Payment will be given on presentation of tax invoices or receipts.
4. The Awardee will be required to write a brief 1 page report on their conference / workshop attendance (approx. 600 words). The report should be submitted no later than 4 weeks after the event for publication in the Branch newsletter Syntrophy.

**Closing Date:** 31st May 2015



Australian Society for Microbiology NSW-ACT Branch

### Joe Levey Country Travel Award 2015

**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:** 20<sup>th</sup> June 2015

#### Applications to:

Charlotte Webster  
 ASM NSW-ACT Branch Chair  
 Email: [Charlotte.Webster@sswahs.nsw.gov.au](mailto:Charlotte.Webster@sswahs.nsw.gov.au)



Australian Society for Microbiology NSW-ACT Branch

### Clinical Scientist Recognition Award

**Award:** The Award is a contribution of up to AUD\$1000 (towards registration fees / airfares / accommodation) to assist the recipient to attend the ASM Annual National conference, or any other scientific meeting or workshop with a microbiology component, in the same or following year as the Award is given.

#### Eligibility:

1. The nominee must be a clinical scientist primarily involved in routine diagnostic work, rather than research, who has distinguished themselves with excellent performance in the clinical laboratory.
2. The applicant must be residing in NSW-ACT for at least 5 continuous years before the Award application is submitted.
3. The applicant must be working full-time in a clinical laboratory in NSW-ACT for at least 10 continuous years before the Award application is submitted.

**Membership Status:** Applicants must have been FASM / MASM / SASM members of the NSW-ACT branch of the Australian Society for Microbiology for at least 10 continuous years before the Award application is submitted.

#### Application Requirements:

Applicants must submit an application consisting of the following:

1. A covering letter supporting their eligibility of the Award, including their work achievements to date, a demonstrated pro-active contribution to microbiology and details of the conference / workshop they wish to attend, outlining how attendance will benefit their career.
2. A brief curriculum vitae outlining the applicant's qualifications, continuing education, employment history, publications and presentations.
3. Two referee's reports (to be submitted directly to the branch secretary) supporting the application for the Award, summarising and confirming the applicants eligibility. It is the responsibility of the applicant to ensure that their referees submit the reports to the ASM NSW-ACT branch secretary by the closing date.
4. Evidence of their involvement in NSW-ACT branch activities since they have been members. This could include attendance at scientific meetings, seminars, newsletter contributions or assistance in the organisation of microbiology events. Applicants with this record will be preferred, but not exclusively.

#### Conditions of the Award:

1. One award per year. No award may be given in the event that the NSW-ACT Branch committee feels there is no suitable applicant.
2. Publication of the Awardee with photo in the Branch newsletter Syntrophy and at the Branch AGM.
3. Payment will be given on presentation of tax invoices or receipts.

**Closing Date:** 30th June 2015

#### Applications for both awards to:

Charlotte Webster  
ASM NSW-ACT Branch Chair  
Email: [Charlotte.Webster@sswahs.nsw.gov.au](mailto:Charlotte.Webster@sswahs.nsw.gov.au)



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Science

### School of Biotechnology and Biomolecular Sciences James Vincent Scholarship

#### Scholarship:

The James Vincent scholarship may take the form of either a travel grant to attend a relevant national or international conference, to obtain skills available only at another institution in Australia or overseas, or to satisfy other specific requirements of their higher degree research programme. The scholarship will be awarded by the School of Molecular Biosciences of the University of Sydney, under the recommendation of the NSW Branch of the Australian Society for Microbiology.

#### Eligibility:

- Honours and postgraduate research students at the University of Sydney or University of New South Wales.
- Students working in the area of symbiotic nitrogen fixation, the major research area of Professor Vincent, may receive preference.
- If not currently a student member of ASM, applicants must be eligible for membership and apply for membership at time of application for award.

#### Criteria:

1. Applicants should submit details of their academic record and two referee's reports
2. Applicants should briefly justify their proposal and suggested budget in terms of the object of the scholarship.
3. The value of the scholarship shall depend on the financial needs of the applicant subject to the availability of funding, but shall not exceed the previous year's net income to the fund. The amount offered each year will be limited to the earnings generated from the funds held in the Vincent award, less 10% which will be added to the capital to allow for growth.
4. The scholarship is tenable for 1 year.
5. 1 award per year. No award may be given in the event that the NSW branch committee in consultation with the J Vincent representatives at USyd and UNSW feel there is no suitable applicant.

**Closing date:** 30th June 2015

#### Send applications to:

Prof. Brett Neilan,  
School of Biotechnology and Biomolecular Sciences,  
The University of New South Wales  
UNSW  
SYDNEY NSW 2052  
Email: [b.neilan@unsw.edu.au](mailto:b.neilan@unsw.edu.au)

## ASM CS&M SPECIAL INTEREST GROUP

NSW-ACT Branch of the Australian Society for Microbiology,  
Clinical Serology and Molecular Special Interest Group

Convenor: Deane Byers tel:(02) 9045-6070, Email: [serology@rcpaqap.com.au](mailto:serology@rcpaqap.com.au)

Retiring Treasurer/Secretary: David Dickeson tel:(02) 9845-6861, Email: [david.dickeson@health.nsw.gov.au](mailto:david.dickeson@health.nsw.gov.au)

**Date:** Wednesday 27<sup>th</sup> May 2015

**Time:** 5.30pm light refreshments; 6.30 - 8pm talks.

### Speakers:

Robert Gibb  
[Supervising Scientist,  
Serology, Pathology Queensland,  
Herston Hospitals Complex, Qld]

**Ross River Virus: Re-emergence in  
S.E. Queensland, 2015**

Tony Field  
[Department Head Molecular,  
Healthscope Pathology, Clayton, Vic]

**Winter is Coming**

Paul Austin  
[Section Leader - Serology  
Department of Virology & Immunology  
LabPLUS, Auckland City Hospital, New Zealand]

**Non-specific dengue IgM results from  
the Pan-Bio IgM capture assay:  
Event summary and method comparison**

**Venue:** Douglass Hanly Moir Pathology  
14 Giffnock Avenue, Macquarie Park (North Ryde)  
Ample parking on site.

[Refreshments served in canteen area at 5.30pm, presentations in the Bob Dylan Auditorium at 6.30pm]

### RSVP:

Deane Byers Telephone: (02) 9045-6070  
or Email: [serology@rcpaqap.com.au](mailto:serology@rcpaqap.com.au)

*This meeting is kindly  
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asm2015  
CANBERRA 

12-15 July 2015

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# one

## MICROBIOLOGY



Image courtesy of the Australian Academy of Science

### Rubbo Oration

**Janet Jansson**, Pacific Northwest National Laboratory, USA

### Plenary Speakers

**Chantal Abergel**, CNRS-AMU, France

**Judith Berman**, Tel Aviv University, Israel

**Ed DeLong**, MIT, USA

**Jorge Galan**, Yale University, USA

**Stefan Schwarz**, Friedrich-Loeffler-Institut, Germany

### Public Lecture: From Guts to Great Oceans

**Janet Jansson, Mike Manefield, Ed DeLong**

### Workshops

Antimicrobials

Imaging in microbiology

Bioinformatics for microbial ecology

Methods in microbial proteomics and metabolomics

Women in leadership

### EduCon

Microbiology Educators' Conference preceding ASM2015

Annual Scientific Meeting and Trade Exhibition

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<http://asmmeeting.theasm.org.au/>

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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, Bobby Dimitrijovski to obtain a copy of the current sponsorship prospectus: [bobby.dimitrijovski@sswahs.nsw.gov.au](mailto:bobby.dimitrijovski@sswahs.nsw.gov.au)