



Syntrophy Volume 19

Issue 3 2018

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

IN THIS ISSUE

From the Editor

by Mitchell Brown

Dear all,

Welcome to edition 3 of Syntrophy for 2018. Kenya Fernandes has provided our focus article (page #3) '*Phenotypic plasticity in Cryptococcus isolates from HIV/AIDS patients*'. Kenya is a PhD student working under the supervision of Prof. Dee Carter at the University of Sydney. Her research focuses on Cryptococcal phenotype plasticity and alternative antifungal therapies. Kenya was awarded the NSW/ACT branch ASM student travel award for 2018 for her work. Cryptococcosis is a disease characterised by very high mortality rates and is a significant burden in sub-Saharan Africa. It's great to see Kenya working on such an important pathogen and sharing her findings with us.

Thanks to Maurizio Labatte for providing a report on the recent Molecular Microbiology Meeting (MMM2018) held at the Waterview on the 11th-12th April. (page #4) Well done to Prof. Jon Iredell and the conferences organisers for putting

together such a well-received programme.

You will find notice of several upcoming conferences in this edition. Our annual scientific meeting, ASM Queensland 2018 is to be held 1st – 4th July and the Brisbane Convention and Exhibition Centre. The organisers have assembled a great line up of speakers including Prof Dennis Burton from the Scripps Research Institute for the Bazeley Oration and Prof Paul Young from University of Queensland for the Rubbo Oration. You can find more details at:

asmmeeting.theasm.org.au

The poster abstract deadline is approaching on 18th May

Please contact us at branch@asmnsw.com.au if you wish to contribute to future Syntrophy editions. We are happy to share job opportunities and other relevant microbiological content with our readers.

Phenotypic plasticity in *Cryptococcus* isolates from HIV/AIDS patients.

by Kenya E. Fernandes

Page #3

SAVE THE DATE

ASM2018 Queensland
1st – 4th July 2018
Brisbane Convention & Exhibition Centre

See details page #11

Regular Features

- ➔ Upcoming Events Page #2
- ➔ Sponsors Page #2
- ➔ Event Reports Page #4-5
- ➔ Branch Contact Details Page #7

NEXT SYNTROPHY

Deadline for submissions to next issue:
24th May 2018

CONTACT SYNTROPHY COORDINATOR
syntrophy@asmnsw.com.au

Upcoming Events



SAVE THE DATE

ASM2018 Queensland
1st – 4th July 2018
Brisbane Convention & Exhibition Centre

See details page #11

Meeting Calendar

ASM2018 Queensland
1st-4th July 2018
Brisbane Convention & Exhibition
Centre

Branch Sponsors 2018

GOLD SPONSORS



www.sysmex.com.au

SILVER SPONSORS



www.biomerieux.com.au



www.bd.com



www.thermofisher.com.au

BRONZE SPONSORS



www.abacusdx.com



www.alere.com



www.ausdiagnostics.com



<http://geneticsignatures.com/>

Focus

Phenotypic plasticity in *Cryptococcus* isolates from HIV/AIDS patients.

by Kenya E. Fernandes

Cryptococcosis, caused by the pathogenic yeasts *Cryptococcus neoformans* and the *Cryptococcus gattii* complex, is currently ranked as one of the three most common life-threatening opportunistic infections in individuals with HIV/AIDS worldwide [1]. The health burden is particularly high in sub-Saharan Africa where 75% of all annual cryptococcal-related deaths occur, and where cryptococcal disease in HIV/AIDS patients is associated with ~70% mortality at 3 months [2]. *Cryptococcus* is an encapsulated yeast, and during infection cells have the capacity for substantial phenotypic variation including large, small and irregular cell variants, a dramatic increase in capsule size, and shedding of capsule [3]. Individual strains can give rise to variant cell populations, including micro cells that can be < 1 µm in diameter, and giant cells which can reach up to 100 µm.

Cell phenotypes can be induced *in vitro* by growth in media simulating stresses encountered in a mammalian host [4]. In order to investigate how morphological variation influences pathogenesis and clinical manifestation of disease, we examined a collection of 70 *C. neoformans* and *C. tetragattii* clinical isolates recently taken from HIV/AIDS patients with cryptococcal meningitis in Botswana using these inducing conditions. Four variant phenotypes were seen across strains (Figure 1): giant cells > 15 µm, micro cells ≤ 1 µm, shed extracellular capsule, and irregularly shaped elongated cells. Giant cells were significantly associated with *C. tetragattii*, and with both bigger cells and bigger capsules indicating that their production is the result of a trend towards larger cells. Micro cells and shed capsule were present in a majority of *C. neoformans* strains but were not seen at all in *C. tetragattii* and had no associations with cell or capsule size, indicating that micro cells are a distinct cell population and that shed capsule can be released regardless of size. Irregular cells were present at similar levels across species and genotypes. These were significantly more likely to occur in strains isolated from patients who had undergone prior antifungal therapy and were significantly negatively correlated with death indicating that they may be sick cells with less capacity to cause disease, exacerbated by antifungal exposure.

When correlated with clinical data, phenotypic variables fell into two distinct groups associated with differing symptoms: the “big” phenotypes of bigger cells, bigger capsules, and giant cells, and the “small” phenotypes of micro cells and shed capsule. “Big” phenotypes were positively correlated with CD4 count, representing immune status, and negatively correlated with nausea and vomiting, symptoms associated with increased intracranial pressure, which suggests that they are produced during earlier stages of infection, possibly in response to higher CD4 counts as their large size allows them to evade phagocytosis and persist within the host [3]. “Small” phenotypes were negatively correlated with CD4 count, and positively correlated with intracranial pressure indicators, suggesting that micro cells and shed capsule are produced later in infection and result in increased intracranial pressure, likely due to an increased ability to disseminate and cross biological barriers. Interestingly, the “small” phenotypes were also strongly negatively correlated with photophobia, neck stiffness, and visual changes, which are symptoms associated with inflammation of the meninges [5], suggesting that while accumulating in the CSF these might be dampening the host inflammatory response.

Finally, a striking finding was that isolates that produced all three major morphological variants (giant cells, micro cells, and shed capsule) were significantly more likely to cause patient death. Overall, these results indicate that the capacity for variation may play a major

role in virulence, as strains that have the ability to produce cells with different properties under different situations may be able to better sustain infection and resist treatment.

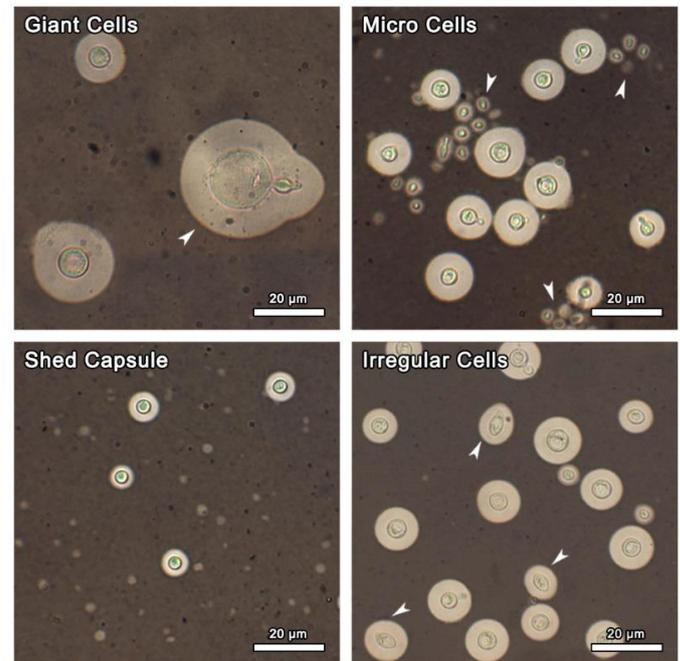


Figure 1: Morphological variants observed across clinical isolates following growth under inducing conditions.

ABOUT THE AUTHOR

Kenya is a PhD student working under the supervision of Prof. Dee Carter at the University of Sydney. Her research focuses on phenotypic plasticity in *Cryptococcus* and alternative antifungal therapy

REFERENCES

- 1. Perfect JR, Bicanic T. 2015. Cryptococcosis diagnosis and treatment: what do we know now. *Fungal Genet Biol* 78:49-54.
- 2. Rajasingham R, Smith RM, Park BJ, Jarvis JN, Govender NP, Chiller TM, Denning DW, Loyse A, Boulware DR. 2017. Global burden of disease of HIV-associated cryptococcal meningitis: an updated analysis. *Lancet Infect Dis* 17:873-881.
- 3. Zaragoza O. 2011. Multiple disguises for the same party: the concepts of morphogenesis and phenotypic variations in *Cryptococcus neoformans*. *Front Microbiol* 2:181.
- 4. Fernandes KE, Dwyer C, Campbell LT, Carter DA. 2016. Species in the *Cryptococcus gattii* complex differ in capsule and cell size following growth under capsule-inducing conditions. *mSphere* 1:e00350-16.
- 5. Colombo AC, Rodrigues ML. 2015. Fungal colonization of the brain: anatomopathological aspects of neurological cryptococcosis. *An Acad Bras Cienc* 87:1293-1309.



Report from MMM 2018 Meeting

by Maurizio Labatte

On the 11th and 12th of April, the ASM sponsored 2018 Molecular Microbiology Meeting (MMM2018) brought together approximately 60 molecular microbiologists across Australia including a few international guests at the Waterview in Bicentennial Park at Sydney Olympic Park. After a brief introduction by Professor Jon Iredell, the meeting was launched unveiling an enjoyable program of very high standard presentations covering multiple topics in antibiotic resistance, emerging diagnostics, synthetic biology, microbiome and public health. Excellent poster presentations were on display with two poster prizes being awarded to Leah Roberts from the School of Chemistry and Molecular Biosciences, University of Queensland and, Grace Yan from the School of Biotechnology and Biomolecular Sciences, University of New South Wales. Congratulations to both PhD students!

It was clear that the meeting was enjoyed by all with a good turnout on both days and with interesting discussions in between the sessions. Congratulations goes to the program committee of Jon Iredell, Ruby Lin, Jeremy Barr, Deborah Williamson, Andrew Ginn and Mitchell Brown and, conference organiser Emily Mascord for putting together an enjoyable meeting. Looking forward to MMM 2019!



We Believe the Possibilities

New Urinalysis Solutions Designed To Suit Your Workload

3 Technologies
Flow Cytometry
Chemistry
Digital Imaging



Revolutionary Design
Modular
Scalable
Automation Ready



email: info@sysmex.com.au



Report on CAPSIG (NSW) Technical Seminar April 2018

by Hilary Fong

CAPSIG NSW presented its first seminar on 11th April 2018. Given the growing number of small complementary medicine and cosmetic manufacturing facilities, CAPSIG NSW has been facilitating ongoing training in this industry to have a better understanding of GMP and awareness of the myriad of regulatory requirements. This is to ensure regulatory compliance and also to help businesses grow within Australia.

Our first speaker, Mr. John Staton, being a life-long member and past president of the Australian Cosmetic Chemist Society, is an old friend to CAPSIG NSW. He presented a broad view of the microbiological aspects of cosmetic formulation, including the microbial susceptibility in various cosmetic products, effectiveness of preservatives and possible objectionable organisms. Formulation variables, such as the water content, pH and chemical interactions between actives and excipients, are also important in developing a quality product. The addition of natural ingredients and packaging configuration options, also play an important role for the shelf-life and stability of the product. John's presentation provided a useful guide from formulation, development and manufacturing to the finished product. Case studies of product failure, the outcomes in financial cost and consumer safety, were also presented. His presentation is a "must read" for anyone engaged in cosmetic and pharmaceutical development and operations.

Our second presenter, Ms. Kerry Turner, guided us through the minefield of GMP/TGA requirements, from a compliance and regulatory perspective. As the domestic and export businesses of the complementary medicine and cosmetic industries grow in Australia, it is important that all stakeholders are conversant with the latest regulations. This is to ensure compliance to the TGA code of GMP and also relevant legislation in trade practices, consumer protection and product safety. This is important to protect the brand and reputation of "Australian Made". Kerry outlined the mechanisms associated with submission and registration of new products and explained the different requirements of AUST R and AUST L. For people unfamiliar with relevant TGA regulations, (e.g. should my product be registered or listed? Do I need stability data for a listed product? etc.), guidance is provided in the presentation.

Having learnt from the previous two speakers, "What to do," for a product, our third speaker Dr Shrikant Dhumal completed the seminar by guiding us through the testing process. For example, is a chosen testing method reliable, valid and stability indicating? TGA GMP auditors and assessors in the drug evaluation branch closely examine these aspects. QC testing should commence from the raw materials and through every stage of the manufacturing. Product stability should include the detection and quantitative analyses of break-down products or related substances (*and preservatives efficacy remains adequate throughout the product shelf-life as asserted by the first speaker John Staton – reporter's note*). The laboratories conducting the testing must be suitably equipped and accredited and all test methods must be scientifically validated.

These three presentations combined provide a good guide for self-assessment - this will help businesses check for full compliance or if there is a need to improve. CAPSIG NSW is grateful to have consent

from all the speakers for uploading their presentations to our website. Visit: www.capsig.com.au.

We thank our three speakers, not only for their excellent presentations, but also for sharing their life-long experience in this area.

Thanks to our sponsors, bioMerieux and eurofins|jams Laboratories, we are able to offer free registrations to students enrolled in undergraduate or postgraduate full/time. On this occasion, we had ten students from UWS and one from UNSW attended. (*This offer is open to the first 10 applicants from bona fide full-time students enrolling in Microbiology, Medical Sciences or related disciplines*).

To the staff and catering service at Canterbury Hurlstone Park RSL, we thank you once again, for their assistance and excellent service.





asm2018
QUEENSLAND

1-4 July
Brisbane Convention
& Exhibition Centre
www.theasm.org.au

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

Save The Date!

Mark your calendars and join us on 1st - 4th July 2018 at the
Brisbane Convention & Exhibition Center for ASM 2018!

The conference will explore exciting topics in human and animal health, bacterial pathogenesis, virology, environmental microbiology and molecular microbiology. The meeting includes international speakers in addition to numerous prestigious award speakers. The program also includes fantastic opportunities for early career and mid-career scientists to attend and win prizes for the presentation of their work.

Visit our website!

www.asmmeeting.theasm.org.au

Key Speakers:



Prof Dennis Burton,
The Scripps Research Institute
Bazeley Orator



Prof Mike Jennings
Griffith University
Plenary Speaker



Prof Karl Kuchler
Medical University Vienna
Plenary Speaker



A/Prof Victor Torres
New York University School of Medicine
Plenary Speaker



Prof Fitnat Yildiz
University of California, Santa Cruz
Plenary Speaker



Prof Paul Young
University of Queensland
Rubbo Orator

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

ASM CONTACT DETAILS

ASM NSW-ACT State Branch

E. branch@asmnsw.com.au

ASM NSW-ACT Branch Chair

Mitchell Brown

T. +61 2 9845 6255

E. mitchell.brown@swahs.health.nsw.gov.au

ASM NSW-ACT Branch Secretary

Tim Newsome

T. +61 2 9351 2907

E. tim.newsome@sydney.edu.au

ASM NSW-ACT Branch Treasurer

Jim Manos

T. +61 2 9351 8942

E. jim.manos@sydney.edu.au

ASM National Office

PO Box 375

South Melbourne VIC 3205

AUSTRALIA

T. 1300 656 423

F. 1300 655 841

E. admin@theasm.com.au

National ASM
www.theasm.org.au

ASM NSW-ACT Branch
www.asmnsw.com.au

Syntrophy is distributed via email to ASM Members located in NSW-ACT using details included on the ASM National Office database. *Not yet a member? Join today:* www.theasm.org.au/membership

Submissions and enquiries can be directed to the Syntrophy Coordinator, Susan Badman at syntrophy@asmnsw.com.au

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: sponsorship@asmnsw.com.au.